Immigrant Status and Home Language Background: Implications for Australian Student Performance in PISA 2000

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October 2004

Australian Council *for* Educational Research

ACER

This publication is the result of research that formed part of a program supported by a grant to the Australian Council for Educational Research by State, Territory and Commonwealth governments. The support provided by these governments is gratefully acknowledged.

Published 2004 by
Australian Council for Educational Research Ltd
19 Prospect Hill Road, CAMBERWELL VICTORIA 3124 AUSTRALIA

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EXECUTIVE SUMMARY

The primary focus of this report is to examine the effect that immigrant status and home language background may have on the performance of Australian students who participated in the OECD/Programme for International Student Assessment (PISA 2000). Approximately 5 477 students from 231 schools across Australia participated in the study.

In this report, two sets of analyses were conducted. The first set focuses on immigrant status of students and the second set of analyses provides data on those students who speak a language other than English at home compared to students from an English home language background.

Immigrant status categories are defined as:

Native students - those born in the country of assessment (in this case, Australia), with at least one of their parents born in that country;

First-generation students - those born in the country of assessment but whose parents are foreign-born; and

Non-native students - those foreign-born and whose parents are also foreign-born.

The range of languages spoken at home were categorised into five main groups: English, European, Chinese, Other Asian and Middle Eastern.

The analyses showed considerable consistency in the results for the two groups. The main findings were:

- Comparing native and non-native students, for all three domains (reading, mathematical and scientific literacy) there were no significant differences in student performance. This was not the case in most of the 32 countries that participated in PISA 2000 where there were significant differences between the performance of native and non-native students.
- Comparing results of students whose home language is English and those whose home language is not English, there was a difference in reading and scientific literacy performance in favour of the English home language group, but no significant difference in mathematical literacy. An exception was noted in reading literacy for Chinese and Other Asian home language students, who performed as well as English home language students at the higher proficiency levels.
- For Australian students, it was found that the association between gender and student performance in reading was significant – with girls doing better than boys in all categories. This difference also applied to students of different home backgrounds. In Australia there were no significant differences between girls and boys in mathematical literacy and scientific literacy.
- Engagement with reading was found to be the single most important factor associated with performance in reading literacy. Non-native students and students from non-English speaking home backgrounds were significantly more engaged with reading than native students.
- Although non-native students and students from non-English speaking home backgrounds reported having, on average, less books in the home, they spent more time reading. This may be a result of the fact that they borrowed books from libraries more often.
- Non-native students and students from non-English speaking home backgrounds also spent more time doing homework, which was another significant factor associated with reading success.
- Non-native students and students from non-English speaking home backgrounds had aspirations to complete a higher level of education than native-born students.
- Non-native students and students from non-English speaking home backgrounds generally had a positive experience of their teachers – they perceived higher levels of teacher support and better student/teacher relationships. However, they had a less positive view of school disciplinary climate.

- Non-native students and students from non-English speaking home backgrounds used learning strategies such as memorisation and elaboration significantly more often than native students.
- Non-native students and students from non-English speaking home backgrounds had a higher level of academic self-confidence.

It appears then that students of immigrant status and/or who have a non-English home language background have such a positive, engaged approach to their learning that they are able to overcome some of the disadvantages that may be associated with settling in to a new country or not speaking English at home.

1. INTRODUCTION

Australia has had a long history of immigration since the first European settlement in the 1700s. People from all parts of the world have brought with them, their cultures, customs and languages. This report is based on data collected from secondary students in Australia and explores the different backgrounds of those students and looks at the nature of the association between immigrant status/home language background and academic achievement.

The OECD/Programme for International Student Assessment (PISA) aims to measure how well students nearing the end of their compulsory schooling are prepared for adult life. The assessment is forward looking, focusing on students' ability to meet real-life challenges, rather than testing whether they have mastered a particular curriculum.

The first PISA survey was carried out in 2000 in 32 countries (including 28 OECD member countries), with about 200 000 students doing the assessments. There were stringent sampling requirements in place to guarantee a sample representative of the 15-year-old population in each of the participating countries. In Australia there were 5 477 students included in the analysis. The sampling plan for each country was approved by the International Sampling Referee to guarantee that the procedures were the same in all countries. The students were chosen in a strictly controlled, two-step sampling process. The first step was to randomly select the schools. The second step was to randomly select, from the lists supplied by the schools, 32 students. In Australia, it was necessary to oversample the smaller states and territories to allow for meaningful comparisons. To be included in the final report (OECD, 2001a), countries had to obtain agreement from at least 85 per cent of the schools in the defined sample. In addition, there was a minimum requirement of 80 per cent of students needed from the 32 chosen. Australia was able to satisfy these stringent requirements. The full details of Australia's sample and results can be found in the national report, *15-up and counting, reading, writing, reasoning .... How literate are Australia's students? The PISA 2000 survey of students' reading, mathematical and scientific literacy skills* (Lokan, Greenwood, & Cresswell, 2001).

Students were given a two-hour test which assessed their abilities in three main domains: reading, mathematical and scientific literacy. The term 'literacy' is used to indicate a broad notion of knowledge and skills. The PISA surveys take place every three years and each time a different major domain is selected. In 2000, reading literacy was the major domain. This means that the majority of testing time was devoted to this domain. In 2003 the major domain was mathematical literacy, and in 2006, scientific literacy. The assessment items are created under the guidance of a group of experts that has been established for each of the domains. The items are extensively trialled in all the participating countries to verify that they are identical in countries and are not culturally or geographically biased. Measures are also taken to monitor the administration of the tests to ensure that the procedures are the same in all countries. The resulting international database (OECD, 2001b) is, therefore, a reliable set of data that can be used for valid between country comparisons and analysis of within-country results.

This report focuses on the issues of immigrant status and language background and their association with the performance of the Australian students who participated in the study, with specific emphasis on variables which are most likely to have an impact on or be associated with performance in reading literacy. In PISA reading literacy is defined as: *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.*

2. IMMIGRANT STATUS AND HOME LANGUAGE BACKGROUND

In the PISA Student Questionnaire there was a question that asks the students about the country of birth of themselves and their parents - details are shown in Table 1.

Immigrant Status

Table 1 Country of birth of students and their parents

Country of birth	Student	Mother	Father
Australia	4715	3720	3611
England	60	337	349
New Zealand	58	110	103
Italy	5	56	78
Vietnam	33	109	98
Scotland	10	55	68
Greece	5	36	62
Germany	2	24	39
Philippines	45	85	48
Netherlands	1	34	38
Lebanon	22	64	62
Other Eng-spkg	90	129	138
Other European	63	174	203
Other Americas	21	21	25
Middle Eastern	33	61	60
African	15	26	26
Indian area	37	75	77
Chinese, Japan, Korea	110	141	126
Other Oceania	26	38	44
Other Asian	43	106	100
Other	4	7	6

Immigrant status can be a difficult concept to define, because the students' countries of birth as well as their parents' countries of birth may have an impact. The PISA international report (OECD, 2001a) defines three categories of students with regard to immigrant status:

- *Native students*: those born in the country of assessment (in this case, Australia), with at least one of their parents born in that country;
- *First-generation students*; those who were born in the country of assessment but whose parents were foreign-born;
- *Non-native students*; those who were foreign-born and whose parents were also foreign-born.

This report adopts the same scheme when defining immigrant status. There were also some students born overseas to Australian born parents – this group was too small to be considered for valid comparisons, although some details of this group are included. Most of the comparisons are made between native and non-native students.

Table 2 Immigrant status of students

	Number	Percentage
Native	4121	75.2
First generation	565	10.3
Non-native	623	11.4
Overseas born with Australian born parents	53	1.0
Insufficient data	115	2.1

It can be seen in Table 2 that there are similar percentages of first-generation and non-native students in Australia and that about three-quarters of the students are categorised as native, i.e. they were born in Australia and at least one of their parents was born in Australia.

Home Language Background of Students

Since English is the official language of Australia, fluency is regarded as necessary for full participation in Australian society. Information about students' home language background was gained from a question in the PISA Student Questionnaire which asked the students: *Do you speak a language other than English at home?* The students who answered 'Yes', were asked to indicate which language was spoken at home. Students who were recent arrivals from non-English speaking countries and who had been learning English for less than one year were excluded from the study.

Student responses to the question on language spoken at home were coded and the results are shown in Table 3.

Table 3 Home language background of students

Language spoken at home	Students
English	4487
Indigenous Australian languages	13
Italian	89
Greek	73
Cantonese	100
Mandarin	47
Arabic	73
Vietnamese	88
German	20
Spanish	32
Tagalog	47
Other - incl. Gaelic	8
Other European	152
Other Asian	63
Indian languages	41
African languages	4
Pacific Island languages	26
Middle Eastern languages	31

There are always errors associated with estimating the characteristics of a whole population by looking at the characteristics of a sample drawn from that population. Generally, the larger and more random the sample that is drawn, the more confidently can one say that the characteristics of the sample are similar to those of the population. In this study the small numbers of students in some categories of language, as can be seen in Table 3, means that results from those categories

would have relatively large amounts of error. Therefore, it was decided to re-categorise the languages into five main groups – English, European, Chinese, Other Asian and Middle Eastern. This has to be weighed up against the loss of information that would be gained about each particular language (albeit, with a large amount of error).

Table 4 Home language background of students by main group

	Number	Percentage
English	4567	83.4
European	338	6.3
Chinese	105	1.9
Other Asian	217	4.0
Middle Eastern	61	1.1

It can be seen in Table 4 that the majority of students speak English at home, while, in total, 15 per cent of students speak a language other than English at home. The highest proportion of students who did not speak English at home spoke a European or Asian language, while a smaller proportion spoke Chinese, or a Middle Eastern language.

Immigrant Status and Student Performance

In keeping with the standards set for international comparative studies, the scores in PISA have been standardised to a mean of 500 across the OECD countries, with a standard deviation of 100. This means that approximately two-thirds of the students score between 400 and 600.

Table 5 Immigrant status and student performance

	Reading literacy	Mathematical literacy	Scientific literacy
Native	532 (3.6)	536 (3.6)	531 (3.5)
First generation	530 (7.2)	537 (7.2)	523 (9.1)
Non-native	514 (9.2)	526 (9.5)	514 (10.5)

Note: Standard errors of the means are shown in parentheses.

In reading literacy, there were no significant differences found between native and non-native students in Australia when the standard errors were taken into consideration (see box on *Standard Error*). There were also no significant differences between native and non-native students in mathematical literacy and scientific literacy.

STANDARD ERROR

In this report estimates of population parameters are often presented within the 95 per cent confidence limits. This means that there is a 95 per cent chance that the estimate of a population parameter lies within plus or minus 1.96 standard errors of the sample estimate. For example, if a region's mean student performance is 520 with a standard error of 4 then sampling theory indicates that we can be 95 per cent confident that the mean in the population from which the sample was drawn is between 512 (=520-1.96x4) and 528 (=520+1.96x4). The 95 per cent confidence interval is 512 to 528.

These differences are smaller than differences noted in most other countries, as described in the international PISA report (OECD, 2001a), where significant differences between native and non-native students occur in many countries. A comparison of these differences across the countries in the OECD is shown in Figure 1. The length of the bar to the right of the mid point indicates the increase in reading literacy score that native students obtained in the PISA 2000 assessment,

compared to non-native students. Liechtenstein, Luxembourg, Switzerland and Germany showed the biggest differences, while Australia, New Zealand, Portugal and Canada had smaller than average differences. In three countries, Ireland, Greece and Hungary, the difference was in the opposite direction – that is, non-native students scored higher than native-born students.

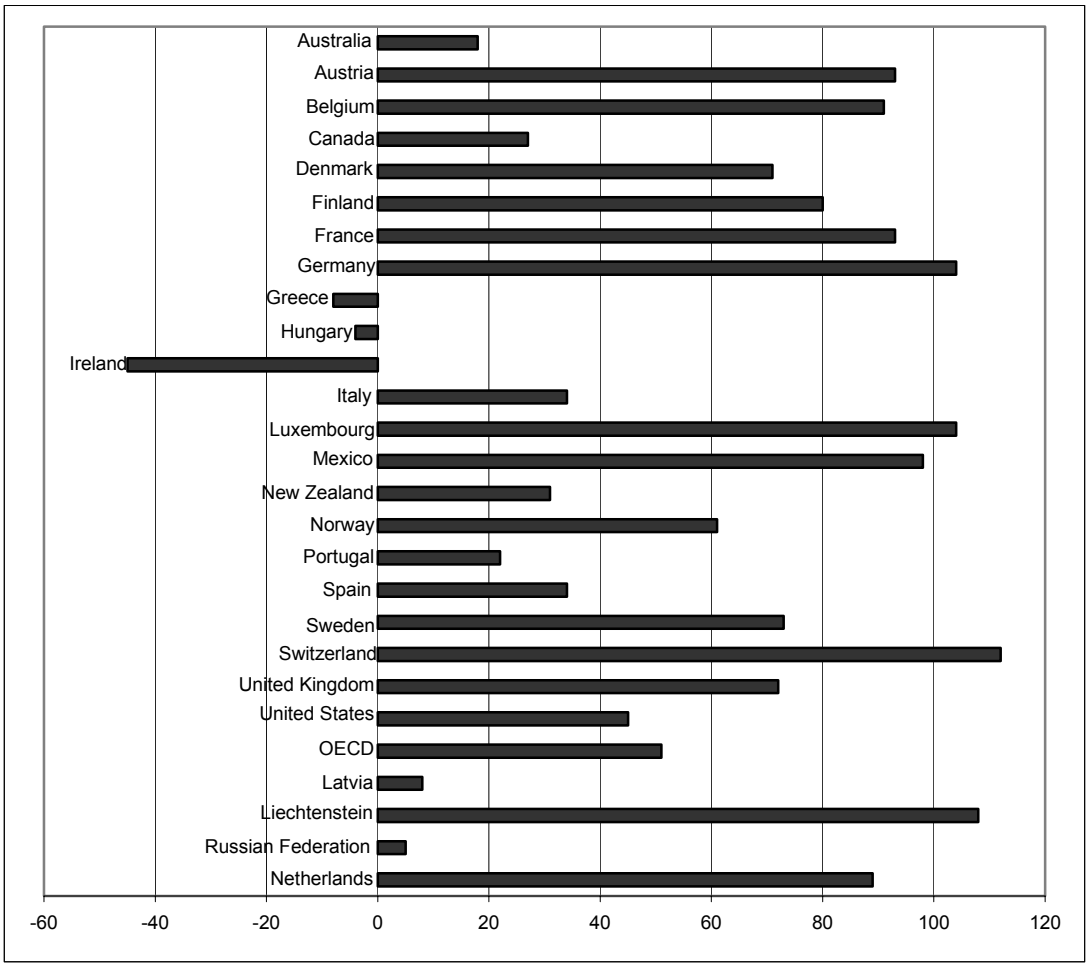

Figure 1 Country differences between native and non-native students in reading performance

Source: Table 6.10 Annex B1(OECD, 2001a).

To add extra meaning to the results and to promote discussion beyond mean scores, proficiency levels are described to give an indication of the skills and knowledge that students possess in reading literacy. There were no proficiency levels created in mathematical literacy and scientific literacy because they were the minor domains. In reading literacy, there were five levels described from the lowest proficiency (Level 1) to the highest (Level 5). Tasks at Level 5 were much more complex than tasks at Level 1. There was also a small percentage of students who were unable to carry out tasks at Level 1. It is not that these students did not possess any literacy skills, it is just that this particular assessment was unable to assess and describe those skills.

The percentages of Australian students at the various proficiency levels is shown in Figure 2. The differences between native and non-native students were small. It can be seen that 16 per cent of non-native students scored at Level 1 or below compared to 12 per cent of the native students. At the more complex levels, 39 per cent of the non-native students scored at Level 4 and above, compared to 43 per cent of the native students.

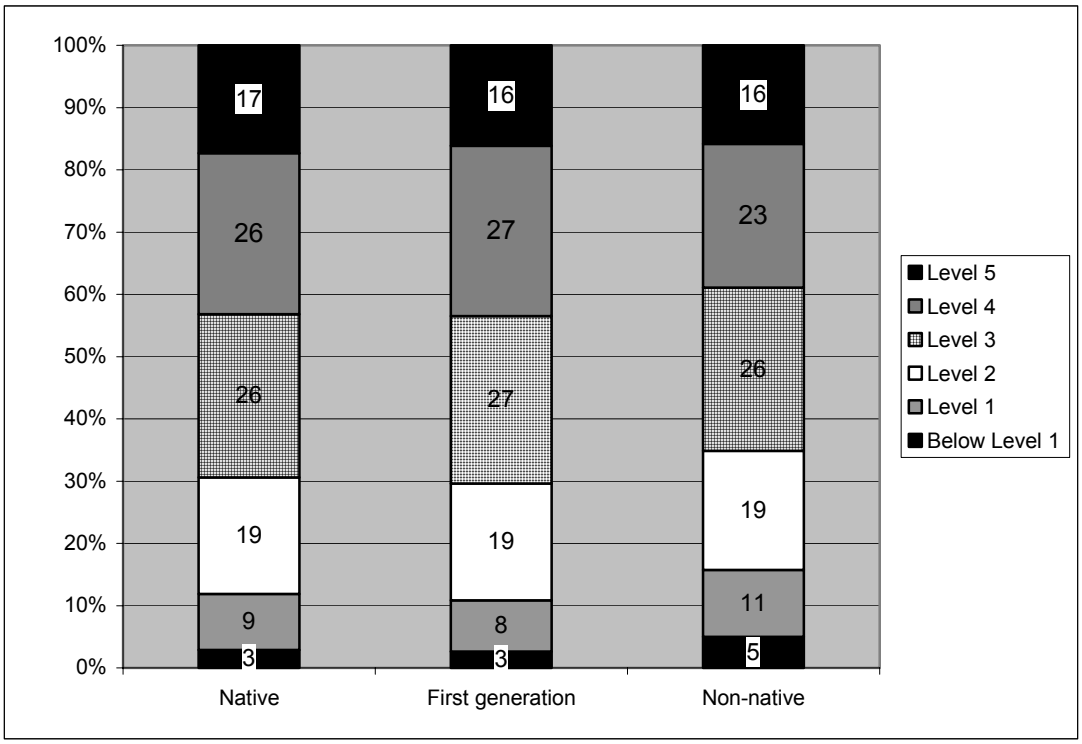

Figure 2 Proficiency levels on the combined reading scale by students' immigrant status

Home Language Background and Student Performance

The results of students' performance by home language background are listed in Table 6. These results show that in reading and scientific literacy there was a significant difference between students whose home language is English and those whose home language is not English. In mathematical literacy there was no significant difference between English and non-English home language students when the standard errors were taken into consideration (see previous box on *Standard Error*).

Table 6 Home language background (English/non-English) and student performance

		Reading literacy	Maths literacy	Scientific literacy
English		535 (3.4)	537 (3.5)	534 (3.3)
Non-English overall		508 (7.6)	522 (6.5)	497 (9.4)
Non-English subdivided	European	500 (6.3)	514 (9.1)	488 (6.9)
	Chinese	545 (15.7)	568 (12.2)	558 (16.1)
	Other Asian	518 (11.9)	534 (13.6)	509 (14.1)
	Middle Eastern	464 (14.4)	480 (18.1)	448 (18.4)

Note: Standard errors of the means are shown in parentheses.

The results of the five language groups are also listed in Table 6. The results show that in reading literacy, students who speak Chinese at home scored a higher mean than those who speak English at home, but that this difference was not statistically significant. This can be seen more clearly in Figure 3 where the results are shown graphically. The box represents the 95 per cent confidence limits of the mean score. The line in the middle of the box is the estimate of the mean. The vertical length of the bar, therefore, is related to the standard error of measurement, which is itself related largely to the size of the sample. In Figure 3 the longest bars are those of students who speak Chinese and Middle Eastern language at home, the categories with the least number of students.

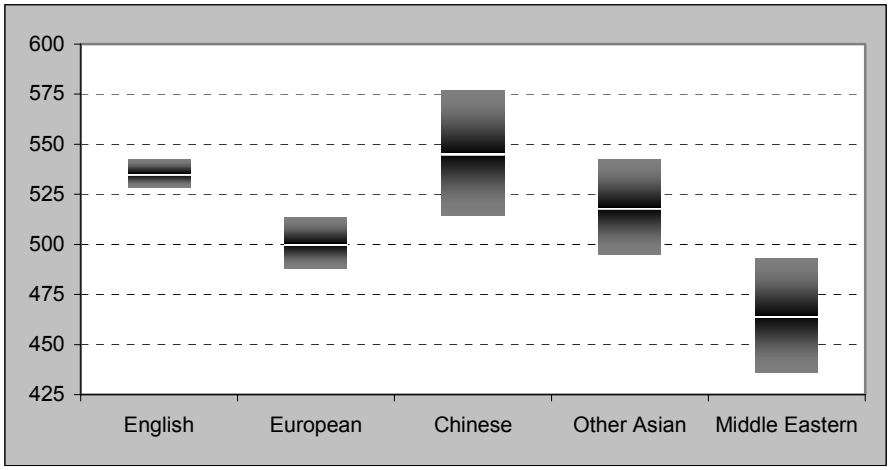

Figure 3 Reading literacy performance and home language background – mean scores with confidence intervals

If there is overlap between two boxes then the results are not statistically significantly different. It can be seen in Figure 3 that the scores for the English home language background students were significantly higher than students with European and Middle Eastern home languages. However, scores for English home language students were not significantly higher than results for students with a Chinese or Other Asian home language.

The differences in Australia between English and non-English home language students are smaller than differences noted in other countries, as described in the international PISA report (OECD, 2001), where significant differences between students who speak their native language and those who speak a non-native language in the home occur in many countries. A comparison of these differences across the participating countries is shown in Figure 4. The length of the bar to the right indicates the increase in reading literacy score that native home language students obtained in the PISA 2000 assessment, compared with non-native home language students.

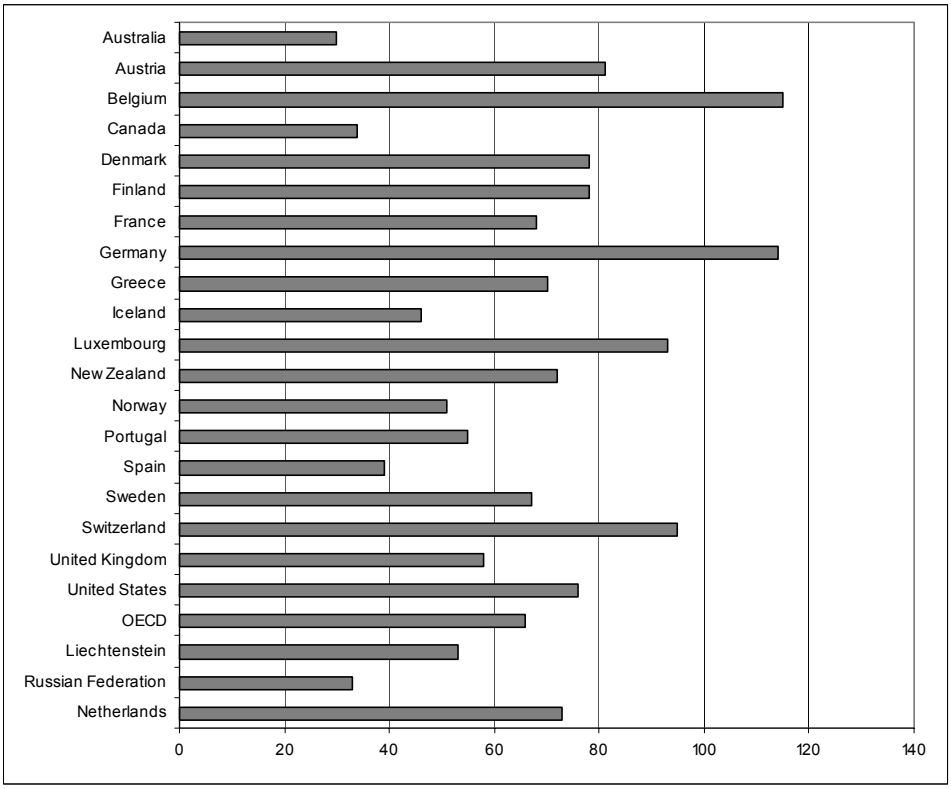

Figure 4 Country differences between native home language and non-native home language students in reading performance

The percentages of Australian students at the various proficiency levels from below the lowest proficiency (Level 1) to the highest (Level 5) are shown in Figure 5. It can be seen that 11 per cent of students speaking English in the home scored at or below Level 1, while 45 per cent of those students scored at Level 4 or higher. Of the students who speak other languages at home, 49 per cent of Chinese home language students scored at Level 4 or higher.

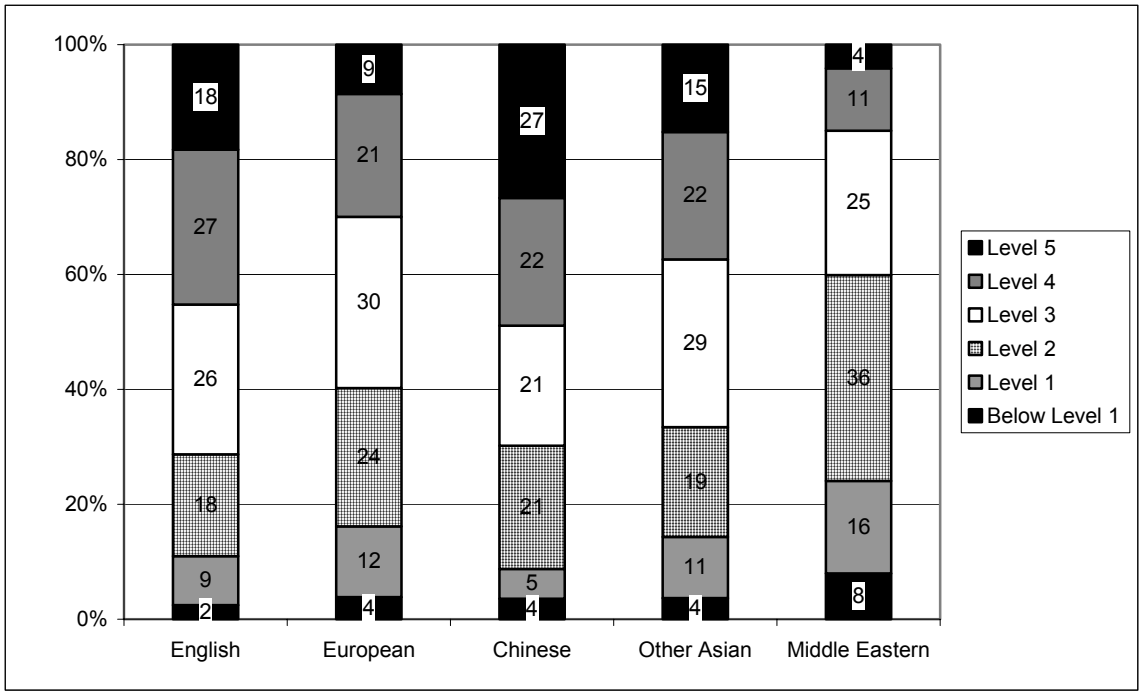

Figure 5 Proficiency levels on the combined reading scale by students' home language background

3. STUDENT BACKGROUND CHARACTERISTICS

At the completion of their assessments in reading, mathematics and science, the students completed a questionnaire. The aim of this was to find out the context and background that students bring to school and how this may be associated with their performance in the domains of assessment in PISA. Students' responses to questions were combined into indices which were then standardised to give valid comparisons across the countries in the OECD (see box on *Metric for Reporting Results)*.

METRIC FOR REPORTING RESULTS

Each of the variables from the *PISA School Questionnaire* and *PISA Student Questionnaire* takes the form of an index, standardised to a mean of zero and a standard deviation of one. Values below zero on an index indicate that the mean of responses from a country's principals or students is lower than the mean of responses from other countries in the OECD. Similarly, values above zero indicate that the mean of the responses of the principals or students is higher than the OECD mean. It should be noted that a negative result does not necessarily mean a negative viewpoint or attitude. It only indicates that this is a score below the OECD mean.

Engagement with Reading

Engagement with reading was the single most important factor associated with student performance in reading.

Students were asked to respond to a series of statements that reflected their level of engagement with reading. Items included - *I only read if I have to, reading is one of my favourite hobbies, I find it hard to finish books, for me reading is a waste of time, I read only to get information that I need,* and *I cannot sit still and read for more than a few minutes*. These items form the index of *engagement in reading*. Across the OECD, this factor is the most significant in its association with reading performance (Kirsch et al., 2002). Not taking into account the impact of other variables, it has been calculated in Australia that the correlation between reading engagement and student performance is 0.42, which was found to be statistically significant (see box on *Correlation analysis)*.

CORRELATION ANALYSIS

An analysis of the correlation between two variables can be used to investigate the association between them. If there is a significant positive correlation, it does not imply that one factor depends on the other or that there is a cause-effect relationship between them – it simply means that they occur together. Further analysis and investigation is needed to determine the nature of the association. Correlation values range from –1 (a negative correlation – as one goes up the other goes down) to a +1 (a positive correlation – as one goes up so does the other). The most commonly used measure is the Pearson correlation coefficient, which is abbreviated as ***r***. The statistical significance is indicated by a '*p-value'*. For example, p<.01 indicates a 99% confidence that there is a correlation between the two variables.

Another way to consider the association between two variables is to consider the difference in one variable associated with a measured difference in the other. To do this the difference in reading score associated with a one standard deviation in the measure of engagement with reading was calculated. Not taking into account the other variables, it was found that a one standard deviation difference in engagement with reading is associated with a 42 score point difference in the reading score. When other variables, such as socioeconomic status and gender, are taken into account, the magnitude of the change in reading literacy decreased, but engagement in reading was still the most significant factor (see the Multivariate Analysis section later in this report).

Table 7 Mean index score of students' engagement with reading by immigrant status and home language background

Immigrant status	Total	Female	Male
Native	-0.10	0.13	-0.30
First generation	-0.07	0.18	-0.29
Non-native	0.06	0.29	-0.20
Home language background			
English	0.09	0.14	-0.30
European	-0.06	0.18	-0.22
Chinese	0.26	0.47	0.01
Other Asian	0.09	0.40	-0.23
Middle Eastern	-0.27	-0.02	-0.50

Table 7 shows that non-native students were more engaged in reading than native students (this difference is statistically significant) and that students who have a Chinese home language were considerably more engaged in reading than other students. As was the case with other countries in the study, female students were found to have a more positive engagement with reading than males.

There were some differences observed when comparing home language and the association of engagement with reading and performance in the PISA reading literacy assessment. These differences are summarised in Table 8 which shows that there was a greater positive impact for students who speak English or Chinese at home compared with other students.

Table 8 Home language background of students and correlation with reading engagement

Home language background	Pearson correlation coefficient	Associated change in reading score*
English	0.45**	44
European	0.33**	31
Chinese	0.40**	42
Other Asian	0.28**	31
Middle Eastern	0.14	21

* for a one standard deviation change in engagement with reading

** $p<.01$

Gender

In all countries that participated in PISA, females scored significantly better than males in reading. In Australia, females scored an average of 546 and males 513. A breakdown of these results by gender and immigrant status is shown in Table 9.

In Australia, as in all countries in PISA, females outscored males in reading.

It can be seen that, in reading literacy, for native and first-generation students there was a significant difference between females and males, with females scoring higher. There was no significant difference for non-native males and females. There were no significant differences in mathematical or scientific literacy for all students.

Table 9 Student performance by gender and immigrant status

	Reading Literacy		Mathematical Literacy		Scientific Literacy	
	Female	Male	Female	Male	Female	Male
Native	548 (4.4)	515 (4.5)	526 (5.0)	540 (4.5)	532 (4.7)	527 (4.4)
First generation	555 (8.9)	511 (7.8)	538 (11.4)	536 (8.8)	533 (12.8)	514 (9.6)
Non-native	535 (13.3)	500 (9.7)	523 (11.8)	533 (10.6)	520 (15.5)	519 (12.6)

A breakdown of mean scores by gender and home language background is shown in Table 10. As for the Australian results overall, females scored higher than males in reading literacy for all groups except for the Middle Eastern home language group which showed no difference. For mathematical and scientific literacy there were no significant differences in gender. In scientific literacy females scored slightly higher in most of the home language categories, and in mathematical literacy males generally scored higher. One exception to the pattern was for female students from Other Asian home language backgrounds students who outperformed their male counterparts across all domains.

Table 10 Student performance by gender and home language background

	Reading Literacy		Mathematical Literacy		Scientific Literacy	
	Female	Male	Female	Male	Female	Male
English	552 (4.4)	519 (4.3)	530 (5.0)	543 (4.1)	536 (4.7)	533 (4.0)
European	519 (9.6)	487 (8.3)	495 (12.1)	528 (10.9)	496 (11.7)	482 (11.2)
Chinese	559 (23.3)	528 (15.2)	555 (18.0)	577 (14.7)	564 (24.7)	548 (17.9)
Other Asian	544 (14.5)	491 (13.3)	543 (16.3)	523 (14.9)	524 (18.5)	496 (16.9)
Middle Eastern	464 (20.5)	464 (18.2)	466 (37.5)	488 (15.1))	433 (22.5)	461 (21.2)

Socioeconomic Status

Students were asked to complete questions about their parents' occupations. The coding of occupations was done using The International Standard Classification of Occupations (ISCO) developed by The International Labour Organisation. An index of socioeconomic status was derived in which values ranged from 0 to 90 with a mean across the OECD of 49 (low values indicate low socioeconomic status and high values indicate high socioeconomic status). Table 11 shows the mean SES levels in Australia, by immigrant status and home language background.

Table 11 Mean SES level based on parent occupation by immigrant status and home language background

Immigrant status	Socioeconomic status
Native	52
First generation	51
Non-native	53
Home language background	
English	53
European	50
Chinese	50
Other Asian	49
Middle Eastern	51

There were no significant differences in socioeconomic status between the different groups. Irrespective of immigrant status and home language background, overall parental socioeconomic status was positively correlated with students' reading performance. Across Australia, for a one standard deviation change in socioeconomic status, there was an associated change in reading score of 32 score points. This was without taking other factors into account.

Socioeconomic status is not related to immigrant status and home language background.

Family Possessions and Educational Resources

Students were also asked a number of questions regarding their reading habits and attitudes towards reading. For the whole Australian PISA sample there is a positive correlation between reading achievement and number of books in the home ($r = 0.31$) – this is a significant correlation ($p<.01$).

Table 12 shows the percentage distribution of the number of books students had in the home by immigrant status. Across the three types of students, it can be seen that native-born students appear to have more books in the home - 64 per cent of native-born students have at least 100 books in the home, compared to 45 per cent of non-native students.

Table 12 Percentage distribution of books in the home by immigrant status

	Native %	First Generation %	Non-native %
None	1	2	1
1 to 10 books	3	6	9
11 to 50 books	14	20	21
51 to 100 books	18	23	24
101 to 250 books	23	22	18
251 to 500 books	22	16	14
More than 500 books	19	12	13

Table 13 shows the percentage distribution of the number of books students had in the home by their home language background. Across the five categories of languages, it can be seen that students who speak English at home appear to have more books in the home - 64 per cent of students who speak English at home have at least 100 books in the home, compared with 24 per cent of students who speak a Middle Eastern language at home.

Table 13 Percentage distribution of books in the home by home language background

	English %	European %	Chinese %	Other Asian %	Middle Eastern %
None	1	1	1	1	4
1 to 10 books	3	7	14	7	14
11 to 50 books	14	16	30	29	27
51 to 100 books	19	17	17	29	31
101 to 250 books	23	20	17	18	11
251 to 500 books	22	18	11	11	7
More than 500 books	18	21	10	5	7

The pattern of borrowing books from libraries (school and public) shows a different pattern in that non-native students tend to borrow books more often than native students (see Table 14).

Table 14 Percentage distribution of students who borrow books to read for pleasure from a public or school library by immigrant status

	Native %	First generation %	Non-native %
Never	41	34	24
A few times per year	33	38	35
About once a month	18	18	26
Several times a month	9	11	16

The same pattern emerges when comparing students of different home language backgrounds (see Table 15). Students from Chinese speaking home backgrounds tend to borrow books more frequently than other students. In contrast, students from English speaking home backgrounds tend to borrow books the least. This pattern of behaviour is consistent with observations in Table 7 that non-native students and those from non-English speaking home backgrounds are more engaged with reading than native/English-speaking home background students.

Table 15 Percentage distribution of students who borrow books to read for pleasure from a public or school library by home language background

	English %	European %	Chinese %	Other Asian %	Middle Eastern %
Never	41	32	14	20	32
A few times per year	34	37	34	34	31
About once a month	17	21	23	29	28
Several times a month	8	11	30	17	9

This pattern continues when one examines reading habits. Table 16 shows that non-native students generally spend more time reading each day than native students.

Table 16 Percentage distribution of how much time students spend each day reading for enjoyment by immigrant status

	Native %	First generation %	Non-native %
Don't read	35	32	27
30 min or less	30	31	32
31- 60 min	20	22	25
1-2 hours	12	11	10
More than 2 hours	4	5	7

Similarly, students in homes where English is not generally spoken tend to spend more time reading (see Table 17), suggesting further evidence that these students are well engaged in reading, which may help them overcome disadvantages that they may have because of their home language background.

Table 17 Percentage distribution of how much time students spend each day reading for enjoyment by home language background

	English %	Non-English %
Don't read	38	20
30 minutes or less	31	32
31- 60 minutes	20	27
1-2 hours	6	12
More than 2 hours	5	8

Access to Cultural Activities and Possessions

Students were asked about the level of cultural possessions (for example, works of literature) that they had at home, their level of participation in cultural activities such as visiting a museum or art gallery and the degree of cultural communication that took place at home. The results from these questions were combined into three indices: cultural possessions, cultural activities and cultural communication with a mean of zero and standard deviation of 1.0 across the OECD.

Tables 18 and 19 show the mean scores of the students on the cultural indices and their respective correlation with achievement in reading literacy. The differences in the index scores between native/English speaking students and those of immigrant status and non-English home language backgrounds are not statistically significant. The tables show, however, that irrespective of status and home background, Australian students score below the OECD mean in most instances. The results also show that there is a positive correlation between culturally related activities and reading performance for the whole Australian PISA sample.

Table 18 Culturally related activities and immigrant status

	Native	First generation	Non-native	Correlation with reading
Cultural possessions	-0.09	-0.18	-0.01	0.32*
Cultural activities	-0.36	-0.43	-0.21	0.27*
Cultural communication	-0.13	-0.19	-0.04	0.32*

* p<.01

Table 19 Culturally related activities and home language background

	English	European	Chinese	Other Asian	Middle Eastern	Correlation with reading
Cultural possessions	-0.07	-0.01	-0.32	-0.16	-0.58	-0.06**
Cultural activities	-0.36	-0.26	-0.25	-0.35	-0.51	0.00
Cultural communication	-0.12	-0.01	-0.27	-0.22	-0.48	-0.03**

* p<.01

Homework Time

Non-native students and students from non-English home language backgrounds spend more time doing homework.

In both the international and national PISA reports it was found that the amount of time that a student spends on homework is associated with their performance in the assessments. The correlation of homework time and reading performance in Australia is 0.27 (significant p<.01). An international index (mean = 0, standard deviation = 1) was created to compare the results for time spent on homework across the countries. A breakdown of the figures for Australian students, presented in Figure 6, shows that native-born students score below the OECD mean and that non-native students score well above the OECD mean.

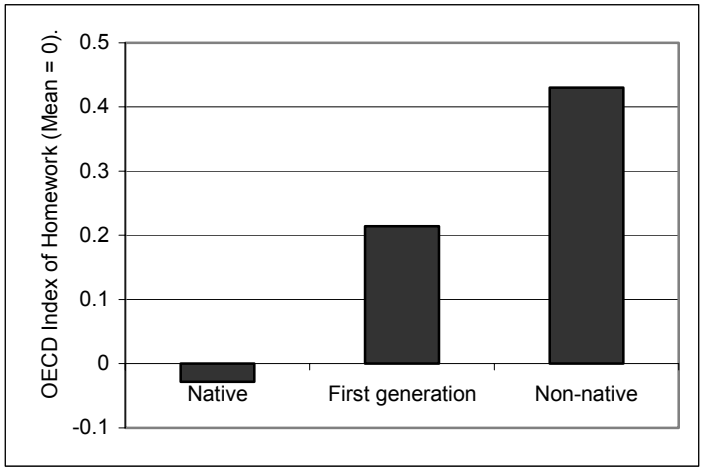

Figure 6 OECD index of homework and immigrant status*

A breakdown of the figures according to home language background is shown in Figure 7 and it can be seen that English and European home language background students tend to spend less time doing homework than other students.

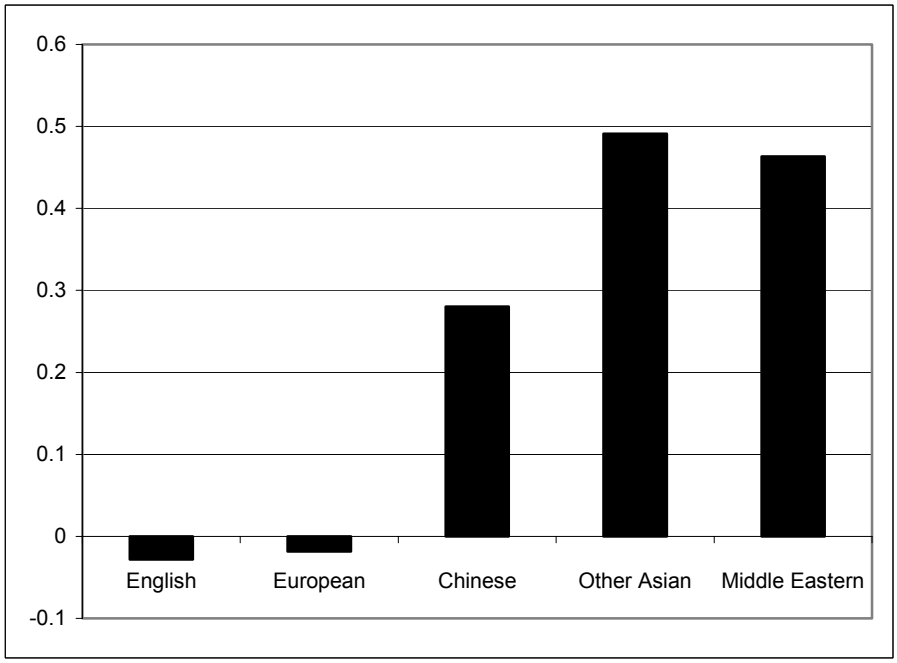

Figure 7 OECD index of homework and home language background*

* This is the index score – not actual time

Future Educational Plans

In many studies, it has been found that educational aspirations are correlated with student performance. Students were asked about their future educational plans. Irrespective of immigrant status and home language background, the majority of students planned on completing Year 12 (in excess of 85 per cent). Tables 20 and 21 show the highest level of secondary school that students plan on completing.

Table 20 Future educational plans at school by immigrant status

Highest Level of School Planned	Native %	First generation %	Non-native %
Year 9 or Year 10	9	5	3
Year 11	5	4	3
Finish Year 12	86	91	94

When considering immigrant status, a greater proportion of non-native students and students from non-English home backgrounds appear to have a desire to finish Year 12 than native and English home background students. This is most evident amongst students speaking Chinese and other Asian languages at home (see Table 21).

Non-native students and students from non-English speaking home backgrounds have high educational aspirations.

Table 21 Future educational plans at school by home language background

Highest Level of School Planned	English %	European %	Chinese %	Other Asian %	Middle Eastern %
Year 9 or Year 10	9	6	1	3	3
Year 11	5	4	2	2	7
Finish Year 12	87	91	97	95	90

The pattern of educational aspirations is repeated to a degree when students were asked to indicate what they wanted to do beyond secondary school. Table 22 shows the educational aspirations of students by immigrant status. Eighty-one per cent of non-native students plan to complete a university degree, compared to 57 per cent of native students. In Australia, educational aspirations beyond school are significantly positively correlated with student performance ($r = 0.45$).

Table 22 Future educational plans after school by immigrant status

Highest Level of Education Planned	Native %	First generation %	Non-native %
No education after school	8	3	2
Finish apprenticeship	14	9	5
Finish TAFE certificate	21	21	12
Finish 3 or 4 year university degree	36	38	42
Finish 5 or 6 year university degree	16	21	29
Finish Masters or PhD	5	7	10

Table 23 shows the educational aspirations of students by home language background. Ninety-one per cent of Chinese home language students plan to complete a university degree, compared with 58 per cent of Middle Eastern home language students and 58 per cent of English home language students. In Australia, educational aspirations beyond school are significantly positively correlated with student performance ($r = 0.13$).

Table 23 Future educational plans after school by home language background

Highest Level of School Planned	English	European	Chinese	Other Asian	Middle Eastern
	%	%	%	%	%
No education after school	7	5	2	0	2
Finish apprenticeship	14	10	3	3	1
Finish TAFE certificate	21	17	4	13	39
Finish 3 or 4 year university degree	36	37	48	41	33
Finish 5 or 6 year university degree	17	22	28	32	18
Finish Masters or PhD	5	9	15	12	6

The Learning Environment

The way that students perceive their learning environment can have important implications for the way they approach their schoolwork. Students in PISA were asked a series of questions in the questionnaire which were grouped into a number of main indices (the full details and examples of items are listed in Table A1). The main indices and results are described in the following section (Tables 24 and 25 give the values for the learning environment indices by immigrant status and home language background).

Teacher support: this is the student's perception of the degree of support and individual help that they receive from their teachers. The mean for Australian students was well above the OECD mean. Non-native students perceived the highest levels of teacher support and assistance. Students who spoke Middle Eastern languages in the home perceived the highest levels of teacher support and assistance (mean = 0.56).

Non-native students and Middle Eastern and Other Asian home language students perceive a high degree of teacher support.

Disciplinary climate: this is the student's perception of the orderliness and level of cooperation among students in the classroom. A higher score on this index indicates a more orderly, disciplined environment. Native students had higher perception of the disciplinary climate than non-native students. Students from English home language backgrounds had higher perceptions of the disciplinary climate than students from non-English home language backgrounds in particular students from Middle Eastern home language backgrounds (mean = -0.09).

Student/teacher relations: this index represents the students' perceptions of how well they get on with their teacher. The values for Australian students were above the OECD mean and non-native students perceived the highest level of student/teacher relations. Students who spoke other Asian languages at home perceived the highest level of student/teacher relations (mean = 0.38) in contrast with students from Chinese home language backgrounds (mean = -0.07).

Sense of belonging: this index deals with how well students feel a part of the school and whether they feel lonely and out of place. There was little difference between the immigrant groups with respect to their sense of belonging at school. The values are around the OECD mean of zero. There was a slight difference between the home language background groups with respect to their sense of belonging at school. Students from Middle Eastern home language backgrounds perceived the most positive sense of belonging (mean = 0.13), while students from other Asian home language backgrounds felt the least sense of belonging within their school (mean = -0.14).

Generally it seems that non-native students compared to native students have a more positive view of the support and help their teachers give, but are not so positive about the general disciplinary climate in their classrooms.

Table 24 Mean index scores of student perceptions of the learning environment by immigrant status

Learning environment index	Native	First generation	Non-native
Teacher support	0.39	0.46	0.56
Disciplinary climate	0.12	0.07	-0.07
Student/teacher relations	0.14	0.21	0.33
Sense of belonging	-0.06	0.01	-0.06

Table 25 Mean index scores of student perceptions of the learning environment by home language background

Learning environment index	English	European	Chinese	Other Asian	Middle Eastern
Teacher support	0.40	0.51	0.29	0.55	0.56
Disciplinary climate	0.11	0.07	-0.06	-0.07	-0.09
Student/teacher relations	0.16	0.14	-0.07	0.38	0.05
Sense of belonging	-0.05	0.07	-0.09	-0.14	0.13

Students' Learning Preferences and Behaviours

Students were asked to respond to a series of statements about the frequency with which they apply certain learning strategies, their preferred learning styles and their attitudes and behaviours with regard to learning. A number of scales were created from this information. It can be seen in Table 26 that non-native students tend to have higher scores on the indices for these learning characteristics than native students. The differences between non-native and native students in Table 26 were all statistically significant, except for *cooperative learning* and *self-concept, verbal*.

Table 26 Mean index scores of learning strategies and attitudes by immigrant status

Learning strategy	Native	First generation	Non-native
Control strategies	-0.02	0.10	0.24
Elaboration strategies	0.03	0.15	0.31
Memorisation	0.11	0.24	0.32
Effort and perseverance	-0.03	0.08	0.30
Self efficacy	0.06	0.13	0.30
Control expectation	-0.10	0.07	0.20
Instrumental motivation	-0.27	-0.07	0.07
Competitive learning	0.06	0.21	0.30
Cooperative learning	0.03	0.12	0.00
Self-concept, academic	0.06	0.11	0.22
Self-concept, verbal	0.15	0.06	0.13

Similarly Table 27 shows that students whose home language background is a non-English language also tend to employ these learning strategies to a greater degree than English home language students. The exceptions were in competitive learning where English home language students scored higher and cooperative learning where there was some variation between the different groups.

Table 27 Mean index scores of learning strategies by home language background

Learning environment index	English	European	Chinese	Other Asian	Middle Eastern
Control strategies	-0.02	0.21	0.13	0.25	0.17
Elaboration strategies	0.03	0.29	0.23	0.26	0.22
Memorisation	0.11	0.40	0.17	0.40	0.29
Effort and perseverance	-0.03	0.24	0.30	0.27	0.23
Self efficacy	0.06	0.30	0.18	0.16	0.24
Control expectation	-0.09	0.17	0.32	0.07	0.22
Instrumental motivation	-0.27	0.10	0.12	0.08	0.08
Competitive learning	0.65	0.21	0.30	0.44	0.15
Cooperative learning	0.02	0.06	-0.22	0.16	0.27
Self-concept (academic)	0.06	0.24	0.16	0.20	0.22
Self-concept (verbal)	0.14	0.16	0.01	0.14	0.05

Control Strategies

The index of *control strategies* (defined as checking what has been learned and working out what still needs to be learned to ensure learning goals are reached) shows that non-native students and those from non-English home language background had a preference for using control strategies more frequently than their native and English-speaking counterparts.

Correlation analysis shows a weak positive correlation between the use of control strategies and reading performance based on home language background.

Across the whole Australian PISA sample, correlation analysis shows a weak to moderate positive correlation between the use of control strategies and reading performance.

Elaboration Strategies

The index of *elaboration strategies* (defined as exploring how prior knowledge learned in other contexts relates to new material) shows that non-native students use this technique more than native students. Table 28 shows the responses of the students to a question in the elaboration strategies scale. Sixty-eight per cent of non-native students responded that they often or always used this technique, compared to 56 per cent of native students. Across Australia, there was a significant, small, positive correlation between elaboration strategies and reading performance *(r = 0.13)*.

Table 28 Student responses to an item* in the elaboration strategies scale by immigrant status

	Native	First generation	Non-native
	%	%	%
Never	6	5	2
Sometimes	38	31	30
Often	42	49	51
Always	14	15	17

* *When I study, I try to understand the material better by relating it to things I already know.*

Table 29 shows that students who speak a language other than English in the home tend to use this technique more than English home language students (mean range: European languages = 0.29, Middle Eastern languages = 0.22 and English home language students = 0.03). Between 67 and 69 per cent of students from non-English home language backgrounds responded that they often or always used this technique, compared with 56 per cent of English home language students.

Table 29 Student responses to an item* in the elaboration strategies scale by home language background

	English	European	Chinese	Other Asian	Middle Eastern
	%	%	%	%	%
Never	6	5	1	2	3
Sometimes	38	27	30	28	30
Often	42	48	59	55	52
Always	14	20	10	15	16

* *When I study, I try to understand the material better by relating it to things I already know.*

Memorisation Strategies

The index of *memorisation strategies* is defined as involving verbatim representations of knowledge stored in the memory with little or no further processing. Table 30 shows the results for one item on the memorisation strategies scale. Across Australia, there is a significant, small, positive correlation between elaboration strategies and reading performance *(r = 0.10)*.

Non-native students tend to use memorisation strategies more often than native students.

Table 30 showed that non-native students used memorisation strategies significantly more frequently than native students.

Table 30 Student responses to an item* in the memorisation strategies scale by immigrant status

	Native	First generation	Non-native
	%	%	%
Never	6	4	2
Sometimes	38	35	35
Often	34	34	38
Always	22	27	25

* *When I study, I try to memorise everything that might be covered.*

Table 31 shows that students who speak other Asian languages use memorisation strategies significantly more frequently than Middle Eastern home language students and English home language students.

Students who speak European, Chinese and Other Asian languages at home tend to use memorisation strategies more often than English and Middle Eastern home language students.

Table 31 Student responses to an item* in the memorisation strategies scale by home language backgound

	English	European	Chinese	Other Asian	Middle Eastern
	%	%	%	%	%
Never	6	5	2	1	2
Sometimes	38	34	34	28	53
Often	34	30	42	39	25
Always	22	31	22	32	20

* *When I study, I try to memorise everything that might be covered.*

Effort and Perseverance

The pattern of behaviour is repeated in the index of *effort and perseverance* (defined as requiring a will to learn throughout the entire learning process), where non-native students tend to put more effort and perseverance into learning than native students. The mean for non-native students (0.30) is above the OECD mean, whereas the native students' mean (-0.03) is about the same as the OECD mean. In the whole Australian PISA sample, there is a significant, small, positive correlation between elaboration strategies and reading performance *(r = 0.17).*

Students whose home language background is not English tend to put more effort and perseverance into learning than English home language background students (means range from -0.03 for English home language background to 0.30 for Chinese home language background).

Other Student Attitudes and Behaviours

It was found that non-native students had higher levels on indexes relating to *self-efficacy* (defined as relating to one's own ability to effectively handle learning situations and overcome difficulties) *control expectations* (defined as relating to students' feelings that they have control over their learning and subsequent expectations of their ability to learn) and *instrumental motivation* (which relates to students' motivation to learn being influenced by the prospect of external rewards such as employment prospects).

It was also found that:

- students who speak a European or a Middle Eastern language at home possess a higher degree of *self-efficacy* than other students;
- European and Middle Eastern language students also had higher levels of *control expectations;* and
- students from Chinese home language backgrounds had higher levels of *instrumental motivation.*

Preference for Competitive and Cooperative Learning

Students were asked a series of questions regarding their preferences for learning by competing with other students and whether they preferred to learn in groups with other students. The index of *competitive learning* (defined as a learning style in which students prefer to learn independently and are motivated to compete against other students to achieve success) showed that non-native students preferred this mode of learning compared with native students. There was, however, no significant difference in preferences for *cooperative learning* (defined as a learning style in which students prefer to learn in a group with others and share ideas and help each other).

The index of *competitive learning* showed that other Asian home language students (mean = 0.44) followed by Chinese home language students (mean = 0.30) preferred this mode of learning compared with other students. In contrast students who spoke Middle Eastern languages at home showed a preference for *cooperative learning* (mean = 0.27) in contrast to students from Chinese home language backgrounds (mean = -0.22) who showed the least preference for this type of learning style.

Academic Self-concept

The index of *academic self-concept* is defined as students' belief in their own competence and confidence in their ability in their school subjects. In Australia there was a positive correlation between academic self-concept and reading achievement ($r=0.32$, $p<.01$).

Results showed that non-native students had a more positive attitude toward their academic abilities than native students. Eighty three per cent of non-native students perceived that they do well in tests in most school subjects compared to 75 per cent of native students.

Students from European home language backgrounds (mean = 0.24) followed by students from Middle Eastern home language backgrounds (mean = 0.22) had a more positive attitude toward their academic abilities than English home language students.

Verbal Self-concept

The index of *verbal self-concept* is defined as students' confidence in their use of language and communication in their school subjects. There were no significant differences between native and non-native students in this index. Interestingly, in most analyses in this report, the first generation students had values on the variables somewhere between the native students and the non-native students. This was not the case in *verbal self-concept* where first generation students appeared to score lower than either of the other two groups. Further analysis shows that the differences were not significant.

There were no significant differences between students from English home language backgrounds and non-English home language backgrounds in this index. However, students who speak a European language in the home (mean = 0.16) scored the highest in verbal self-concept of all language categories, while students from Chinese home language backgrounds perceived themselves as having the lowest verbal self-concept (mean = 0.01).

4. MULTIVARIATE ANALYSIS

A further analysis was carried out by building up a model of factors that are associated with student performance in reading. This type of regression analysis gives a better indication of the independent significance of each factor when the other factors have been accounted for.

One way to compare the association of each factor with performance in reading is to calculate the effect that a change of one standard deviation in the factor would have on the reading score.

In Tables 32 and 33 the first column lists the factors that are being investigated to see if there is an association between them and student performance on the reading literacy assessment. The second column shows the change in reading score associated with a change in the factor listed for Australian students.

Immigrant Status

Table 32 Multivariate analysis of immigrant status and other factors associated with reading performance

Factor	Associated change in reading score of a one standard deviation increase in factor
	Coefficient = 490
Immigrant status*	17
Socioeconomic background	20
Gender (female)	16
Engagement with reading	26
Homework time	10
Cultural communication with family	8
Cultural possessions at home	11
Number of books at home	5

* *Australian born or not.*

It can be seen in the second column that, consistent with previous calculations regarding student performance in reading (Kirsch et al., 2002), the factor most significantly associated with success in reading literacy is engagement with reading, where a one standard deviation increase is associated with a 26 score point increase. This was followed by socioeconomic status, where a one standard deviation increase is associated with a 20 score point increase. The table shows that Australian born students score 17 points higher than non-Australian born students, when the other factors are taken into account.

The amount of time spent on homework is also important, as is the number of books in the home. Both factors are significantly associated with reading performance, even after other factors, such as socioeconomic status and cultural possessions, are accounted for.

Home Language

The home language background is defined as either English or non-English. Table 33 shows that home language background in Australia is a factor that is associated with student performance with an increase in 24 score points for English home background students – this confirms earlier analyses in this report.

Table 33 Multivariate analysis of home language background and other factors associated with reading performance

Factor	Associated change in reading score of a one standard deviation increase in factor
	Coefficient = 490
Home language background *	24
Socioeconomic background	20
Gender (female)	15
Engagement with reading	28
Cultural communication with family	12
Cultural possessions at home	9
Number of books at home	4

* *For the purposes of regression analysis - Language category has been defined as English home language background or Non-English home language background.*

As previously shown in Table 32 and consistent with previous calculations regarding student performance in reading (Kirsch et al., 2002), the factor most significantly associated with success in reading literacy is engagement with reading, where a one standard deviation increase is associated with a 28 score point increase. This was followed by home language background, which is associated with a 24 score point increase when all other variables are taken into account.

The number of books in the home is significantly associated with reading performance, even after other factors such as socioeconomic status and cultural possessions are taken into account.

5. CONCLUSION

Given that Australia is a country populated mostly by immigrants or descendants of immigrants, it is important to look at immigrant status and home language background in relation to performance at school.

Immigrant status can be defined in many ways. This paper has adopted the same scheme as that adopted by the OECD in the initial report on the findings from PISA (OECD, 2001a):

- *Native students*: those born in the country of assessment (in this case, Australia), with at least one of their parents born in that country;
- *First-generation students*; those born in the country of assessment but whose parents are foreign-born;
- *Non-native students*; those foreign-born and whose parents are also foreign-born.

In comparing native-born students and non-native students, no significant differences were found in their performance in the three domains of reading, mathematical and scientific literacy. This was not the case in most of the 32 countries that participated in PISA 2000 where there were significant differences between the performance of native and non-native students.

When considering home language background, it was found that students whose home language is English performed better in reading and scientific literacy than those from non-English home backgrounds. However, there was no difference in their performance in mathematical literacy.

For all students, native and non-native, and for each home language group, it was found that the association between gender and student performance in reading was significant – with girls doing better than boys in all categories. In Australia there were no significant differences between girls and boys in mathematical literacy and scientific literacy.

There were differences between native and non-native students in their approach to school and learning. It appears that the largely positive, engaged approach of non-native students in Australia helps them to overcome some of the difficulties they encounter as immigrants. Non-native students and students from non-English home language backgrounds were significantly more engaged with reading than native and English home language students – this is the single most important factor associated with performance in reading literacy. Although non-native students reported having, on average, less books in the home, they spent more time reading and students from non-English speaking home backgrounds reported similar experiences. This may be a result of the fact that they borrow books from libraries more often. Non-native and non-English speaking home background students also spent more time doing homework – another significant factor associated with reading success.

In terms of plans for the future, non-native students and those from non-English home backgrounds reported they aspired to complete a higher level of education than native-born and English home background students. The former groups also indicated a more positive experience of their teachers – they perceived higher levels of teacher support and better student/teacher relationships. However, the non-native and non-English speaking home background students reported having less positive views of school disciplinary climate.

In their approach to learning, non-native students and those from non-English speaking home backgrounds generally employed many techniques to facilitate the process. They used strategies such as memorisation and elaboration significantly more and had a higher level of academic self-confidence than native and English speaking home background students. With regard to verbal self-concept, there was no difference between native and non-native students. However, some

students from non-English home backgrounds, such as European and Middle Eastern groups, had a more positive attitude toward their academic abilities.

In conclusion, it appears that students who are born overseas and who migrate to Australia, and those who speak a language other than English at home, tend to have a positive, engaged approach to their learning, which may help them to overcome some of the difficulties associated with settling into a new country and/or not speaking English at home.

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APPENDIX

Table A1 School Environment Scales in PISA 2000

Scale	Items
Index of student perceptions of **teacher support**	(Categorised: Never, Some lessons, Most lessons, Every lesson) *How often do these things happen in your 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 The teachers helps students with their learning
Index of student perceptions of **disciplinary climate**	(Categorised: Never, Some lessons, Most lessons, Every lesson) *How often do these things happen in your English lessons?* The teacher has to wait a long time for students to settle 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 At the start of the lesson, more than five minutes are spent doing nothing
Index of student perceptions of **teacher/student relations**	(Categorised: Never, Some lessons, Most lessons, Every lesson) *How often do these things happen in your English lessons?* 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 Most of my teachers treat me fairly
Index of student perceptions of **achievement pressure**	(Categorised: Never, Some lessons, Most lessons, Every lesson) *How often do these things happen in your English lessons?* The teacher expects students to work hard The teacher tells students that they can do better The teacher does not like it when students hand in careless work Students have to learn a lot
Index of **student's sense of belonging in the school**	(Categorised: Strongly disagree, Disagree, Agree, Strongly agree) *My school is a place where:* I feel 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