Programme for International Student Assessment

PISA 2018

Australia in Focus

NUMBER 1

Academic resilience among Australian students

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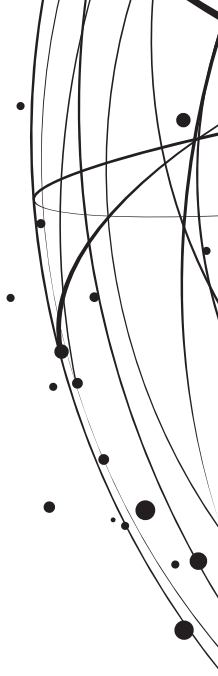
Australian Council *for* Educational Research

ACER



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What is PISA?

The Programme for International Student Assessment (PISA) is an international comparative study of student performance directed by the Organisation for Economic Co-operation and Development (OECD). PISA measures the cumulative outcomes of education by assessing how well 15-year-olds, who are nearing the end of their compulsory schooling in most participating educational systems, are prepared to use the knowledge and skills in particular areas to meet real-life opportunities and challenges.

PISA 2018 is the seventh cycle of PISA since it was first conducted in 2000. Seventy-nine countries and economies participated in PISA 2018. In Australia, PISA is managed by the Australian Council for Educational Research (ACER) and is jointly funded by the Australian Government and all state and territory governments.

Who is assessed?

PISA assesses a random sample of 15-year-old students, drawn from a nationally representative sample of schools. In 2018, 79 countries and economies (all 36 OECD countries and 43 partner countries and economies) and around 600 000 students (representing 32 million 15-year-old students) participated in the PISA assessment.

In Australia, 740 schools and a total of 14 273 students participated in PISA 2018. Australia took a larger sample than the one required by PISA in order to oversample smaller jurisdictions to ensure that reliable estimates could be inferred for those populations.

Student and school contextual data

In addition to the cognitive data collected and reported in PISA, extensive student and school background contextual data was collected. Since PISA began in 2000, the background questionnaires have served two interrelated purposes. The first purpose has been to provide a context through which to interpret scores from the cognitive assessment (both within and across education systems).

The second purpose has been to provide reliable and valid non-cognitive outcomes, which can inform policy and research in their own right. Key to the analysis in this report is the variable that defines a student's socioeconomic background.

Socioeconomic background

Socioeconomic status is a broad concept that summarises many different aspects of a student, school or school system. In PISA, a student's socioeconomic status is typically measured by the PISA index of economic, social and cultural status (ESCS). The ESCS is a composite score built by the indicators of three indices via principal component analysis: the highest occupational status of parents (HISEI); the highest educational level of parents in years of education (PARED); and home possessions (HOMEPOS). As no direct income measure is available from the PISA data, the availability of household possessions is used as a proxy for family wealth. The values of the ESCS scale are standardised to have a mean of 0 and a standard deviation of 1 for the population of students in OECD countries, with each country given equal weight. The ESCS index makes it possible to draw comparisons between students and schools with different socioeconomic profiles. The higher the value of ESCS, the higher the socioeconomic status. It must be noted that there have been some adjustments to the computation of ESCS over the PISA cycles. For the purposes of this report, ESCS is used to distinguish among students who are:

- the most disadvantaged: students whose values on the ESCS are among the bottom 25 per cent within their country
- socioeconomically average: students whose values on the ESCS are among the middle 50 per cent within their country
- the least disadvantaged: students whose values on the ESCS are among the highest 25 per cent within their country.

Reporting of country results

Seventy-nine countries and economic regions participated in PISA 2018. Economic regions are required to meet the same PISA technical standards as participating countries, although results for an economic region are only representative of the region assessed and not of the country. For convenience, this report refers to these economic regions as countries. However, this report does not include results for all countries that participated in PISA in 2018. For the purposes of international comparisons with Australia on various student and school characteristics, 20 countries have been reported (15 OECD countries; 5 partner countries). The comparison countries include OECD countries: Australia, Canada, Denmark, Estonia, Finland, Germany, Ireland, Japan, Korea, New Zealand, Norway, Poland, Sweden, the United Kingdom and the United States; and the partner countries: B-S-J-Z (China), Chinese Taipei, Hong Kong (China), Macao (China) and Singapore. The selection of countries was based on each country's performance relative to Australia's performance when participating in their first cycle of PISA, and if the country performed significantly higher than Australia, or not significantly different to Australia in the 2018 cycle of PISA. The average across all OECD countries (referred to as the OECD average) has also been reported for added comparison.

Academic resilience among Australian students

What is academic resilience in PISA?

Since Coleman et al. (1966) reported that academic achievement was less related to the quality of a student's school and more related to the social composition of the school, the study of the effects of socioeconomic background has become a major focus of research in education. Socioeconomically disadvantaged students (i.e. those whose scores on a constructed measure of social and cultural capital are below a specified cut-off, usually the 25th percentile) have been found to be more likely to drop out of school, repeat a grade, achieve lower levels at senior secondary school, and score lower on tests such as PISA (Coleman et al., 1966; Finn & Rock, 1997; OECD, 2011; Sirin, 2005; Thomson, De Bortoli, Underwood & Schmid, 2020). Despite this association between socioeconomic disadvantage and poorer outcomes related to education, a percentage of students who come from disadvantaged backgrounds enjoy success at school. This apparent success despite the odds is of interest to researchers and educators alike – what, if any, characteristics do these academically resilient students share, why might this be and what can we learn from this group of students, however small, that might assist in improving outcomes for all students, regardless of their socioeconomic background?

Academically resilient students are defined for this report as those students who, despite being socioeconomically disadvantaged relative to other students in their country, performed particularly well in the PISA 2018 Reading literacy assessment. Specifically, they are in the lowest quartile of the PISA measure of economic, social and cultural status (ESCS), and in the highest quartile of achievement on the PISA Reading literacy scale. As a comparison group for resilient students, this report also identifies disadvantaged low achievers, a group of students that share a similar socioeconomic background to resilient students but whose scores in the PISA Reading literacy assessment placed them among the lowest performers in Australia.

Comparing the share of academically resilient students across countries

Figure 1 shows the percentage of academically resilient students for Australia and a group of countries selected for comparison. It ranges from almost 20 per cent of students in Macao (China) to just under 10 per cent of students in Singapore. The average over all OECD countries (including those not presented in Figure 1) was 11.3 per cent. Among Australian students, just over 13 per cent of students were academically resilient. In contrast, 39 per cent of Australian students in the lowest socioeconomic quartile scored in the lowest quartile of reading literacy performance. The average reading literacy score for Australian academically resilient students was 615 points; for Australian low performers it was 361 points.

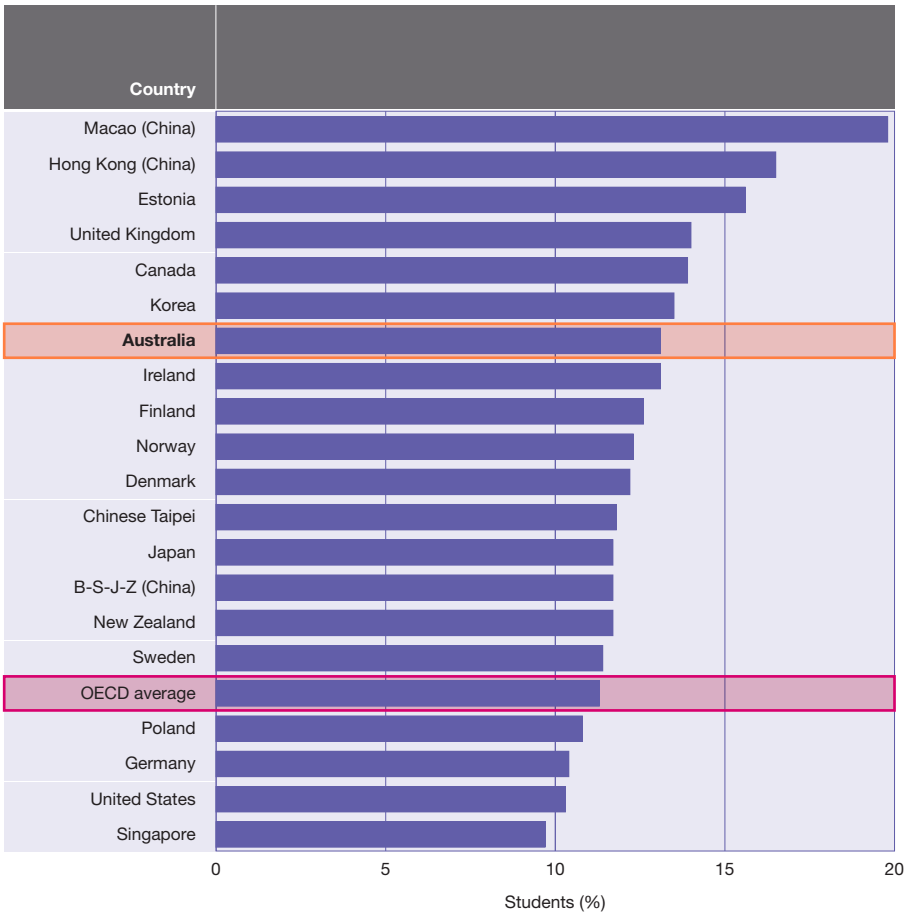

FIGURE 1 Percentage of academically resilient students, Australia and comparison countries

Relationship between academic resilience, students' attitudes and dispositions, and growth mindset

This section of the report explores the relationship between students' academic resilience and their attitudes and dispositions, with the working assumption that students who overcome adversity (in the form of their socioeconomic background) are more likely to exhibit positive attitudes and dispositions than those who do not.

Learning to read is a challenging task that requires persistence and motivation. It has been suggested that enjoyment of reading and motivation to master tasks may be two manifestations of academic resilience (Martin & Marsh, 2006). Learning goals are also useful to examine, as goal-oriented students are more likely to be academically resilient.

Enjoyment of reading

PISA assessed students' enjoyment of reading by asking students to report the extent to which they agreed with the following five statements:

- *I only read if I have to.*
- *Reading is one of my favourite hobbies.*
- *I like talking about books with other people.*
- *For me, reading is a waste of time.*
- *I read only to get information that I need.*

Students' responses to these questions were combined in an index of enjoyment of reading. The index is standardised to have a mean of 0 and a standard deviation of 1 across OECD countries. The mean index scores for Australia and comparison countries, for academically resilient and non-resilient students, are shown in Figure 2.

The average across the OECD for resilient students was 0.32, and for non-resilient students was -0.32. Resilient students in Australia scored an average of 0.34 on this index, which was similar to the OECD average, while students who were not academically resilient scored an average of -0.42, significantly lower than the OECD average for non-resilient students. In Australia, and across the OECD on average, academically resilient students reported more positive attitudes towards reading than did non-academically resilient students. There were statistically significant differences in enjoyment of reading scores for academically resilient students and non-academically resilient students in all comparison countries and across the OECD on average. In Australia, the difference between the average scores (0.72) in Australia was larger than the difference over all OECD countries of 0.64.

While the finding of a difference in ratings of enjoyment of reading between groups of students who are doing well and not doing well in that area may be as one would expect, there is interesting variation across the comparison countries in students' enjoyment of reading. In B-S-J-Z (China), Hong Kong (China), Chinese Taipei, Macao (China), and Japan, both academically resilient and non-academically resilient students scored at or above the overall OECD average on *enjoyment of reading*. In other words, even students who did not perform well in the PISA reading literacy assessment indicated that they enjoyed reading, on average. In Denmark, Norway and Sweden the opposite was the case – neither group appeared to really enjoy reading, although non-academically resilient students enjoyed it less than academically resilient students.

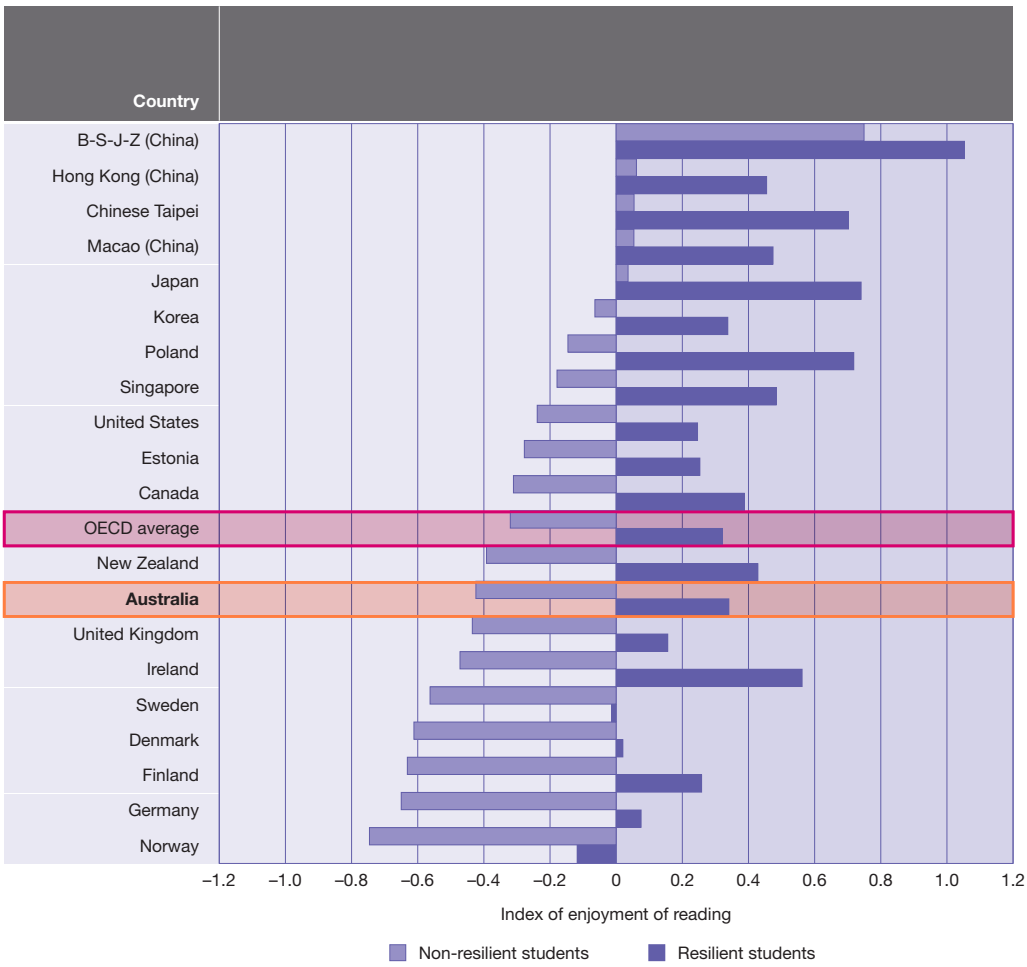

FIGURE 2 Average scores on *Enjoyment of reading* index, resilient and non-resilient students, Australia and comparison countries

Motivation to master tasks

Students' perception of mastery of tasks was measured using four questions exploring whether students derive personal satisfaction from investing effort. Students responded to these items on a four-point scale ranging from "strongly disagree" to "strongly agree". The items examining mastery were:

- *I find satisfaction in working as hard as I can.*
- *Once I start a task, I persist until it is finished.*
- *Part of the enjoyment I get from doing things is when I improve on my past performance.*
- *If I am not good at something, I would rather keep struggling to master it than move on to something I may be good at.*

Students' responses to these questions were combined in an index of motivation to master tasks. The index is standardised to have a mean of 0 and a standard deviation of 1 across OECD countries. The mean index scores for Australia and comparison countries, for academically resilient and non-resilient students, are shown in Figure 3.

Australian students' motivation to master tasks is not high – for both academically resilient and non-resilient students the average on the index is significantly lower than the OECD average. In some countries, for example Korea, B-S-J-Z (China) and Singapore most notably, the average on the index is significantly higher than the OECD average for both groups of students, and for other countries

such as the United States and Poland, the score for academically resilient students is higher than the OECD average.

However, in many other countries, in particular Sweden, Japan and Estonia, the index score for both groups of students is significantly and substantially lower than the OECD average. This indicates that even academically resilient students responded "strongly disagree" to the items indicating a goal of mastery of subject material, which runs somewhat at odds with the strong performance of these countries on PISA. Of course, this report is only looking at a small section of the student population, much of whom did not contribute to that strong performance.

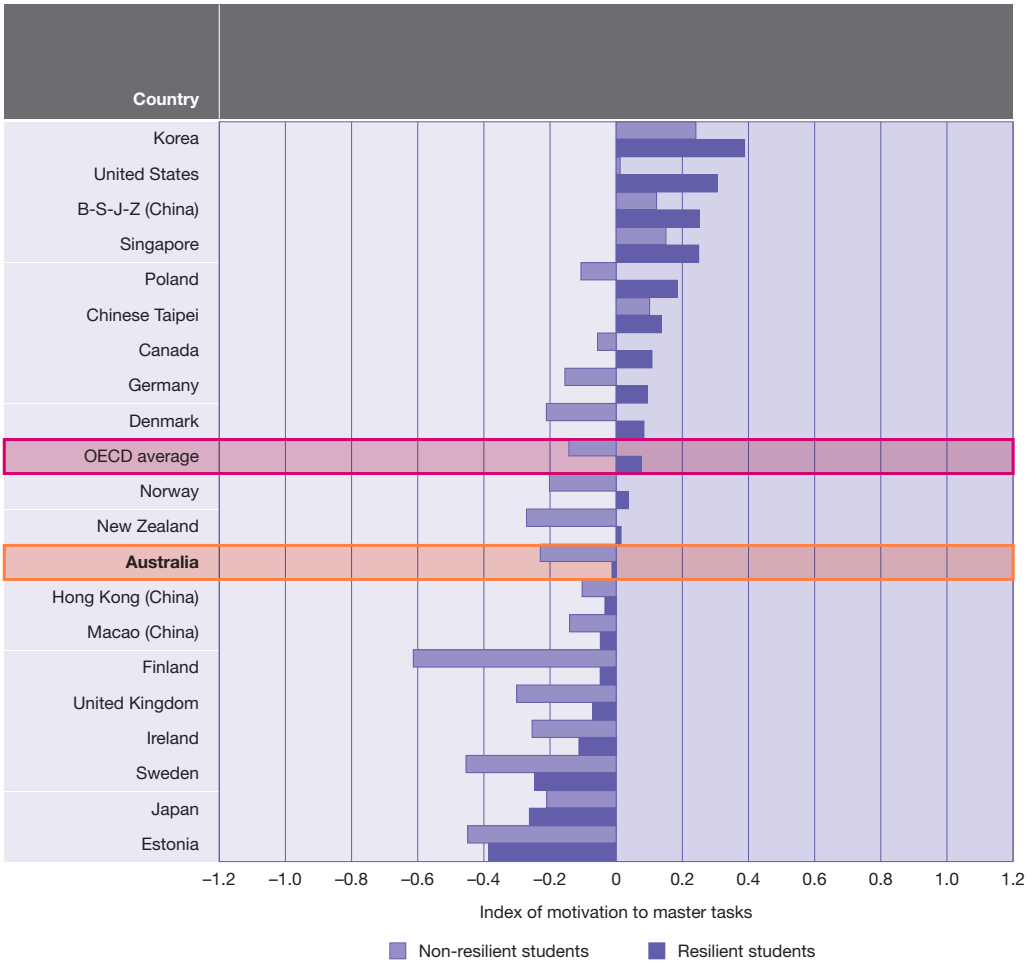

FIGURE 3 Average scores on *Motivation to master tasks* index, resilient and non-resilient students, Australia and comparison countries

Learning goals

Goal oriented students tend to be academically resilient and exhibit higher levels of confidence than others, and they are likely to seek challenges and be persistent (Dweck, 1986).

Goal orientation was assessed using three statements asking students about their academic goals. Responses were given on a five-point scale ranging from "not at all true of me" to "extremely true of me" and were combined into a scaled index called the index of learning goals. The items comprising this index were:

- *My goal is to learn as much as possible.*
- *My goal is to completely master the material presented in my classes.*
- *My goal is to understand the content of my classes as thoroughly as possible.*

Similar to the findings for motivation to master tasks, neither resilient nor non-resilient Australian students identified strongly with the learning goal statements. Both groups had an average score on this index that was lower than the comparable OECD average (average for academically resilient OECD students 0.05, for academically resilient Australian students 0.02). For non-academically resilient OECD students -0.10, for non-academically resilient Australian students -0.17. In contrast, in Denmark, the United States and Singapore, both resilient and non-resilient students scored much higher on this index than across the OECD on average.

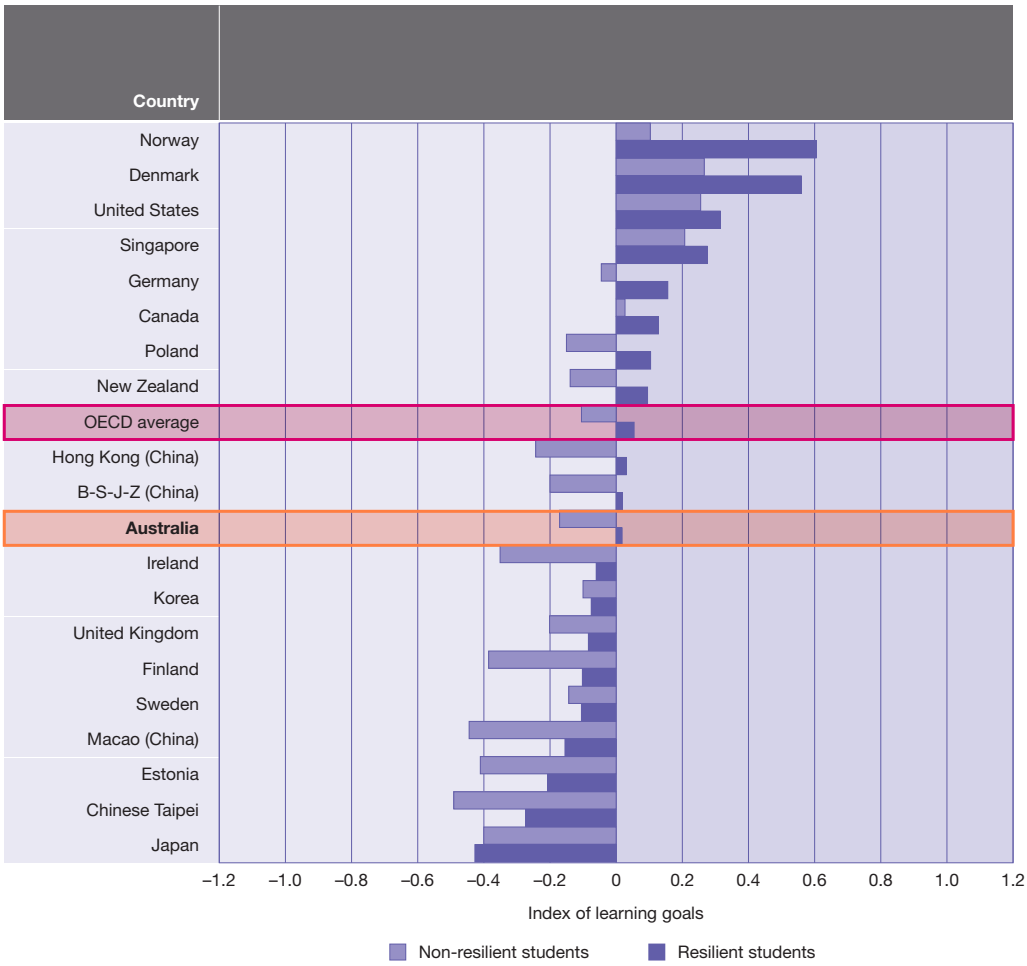

FIGURE 4 Average scores on *Learning goals* index, resilient and non-resilient students, Australia and comparison countries

Summary

Very little stands out across countries to separate the attitudes and dispositions of academically resilient and non-resilient students. Within-country differences may give more useful information for policy makers. Figure 5 provides a summary of the differences in attitudes and dispositions for academically resilient and non-resilient students in Australia and for the OECD on average. On each of these measures, academically resilient students have less negative attitudes or dispositions than non-resilient students. On average, academically resilient students tended to enjoy reading more, were willing to work hard to master tasks, and indicated more of an inclination to set and pursue goals.

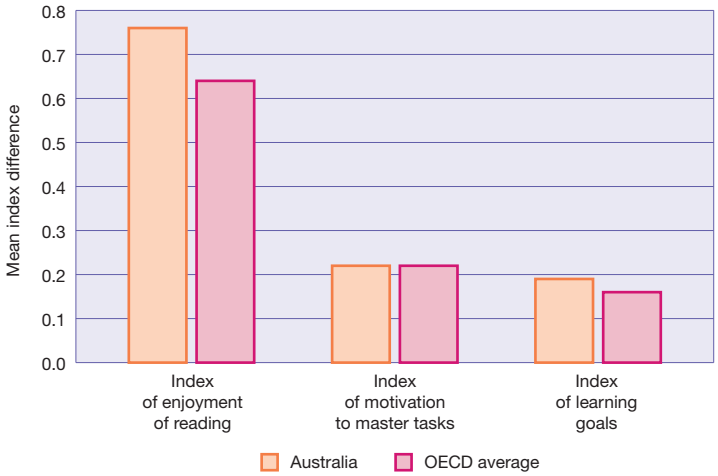

FIGURE 5 Differences between resilient and non-resilient students in attitudes and dispositions

Differences within Australia

There are several characteristics to consider when looking at academically resilient students within Australia: gender and language spoken at home (English or a different language). Particularly in reading literacy, in which females outperform males in every country, gender is likely to be a major factor in whether a student is academically resilient. Language spoken at home may also be a factor, with students who spoke English at home scoring higher, by 24 points on average, in reading literacy than students who spoke a language other than English at home.

Gender

The gender differences on the PISA reading literacy assessment are substantial in Australia, as can be seen in Table 1. Interestingly, while the gender difference in favour of females is still large for the non-academically resilient students, there was no statistically significant difference in the average reading literacy scores of academically resilient female and male students.

In terms of the proportions of students from disadvantaged backgrounds who were academically resilient, gender did seem to be a factor, with 32 per cent of female students in the lowest quartile of socioeconomic background categorised as academically resilient, compared to just 20 per cent of male students in the lowest quartile of socioeconomic background.

This is an interesting finding – it would seem that the overall 'benefit' for females in reading literacy scores seems to hold for the non-resilient students but not for the resilient students. It would still be expected that there would be a gender difference in favour of females even in the highest quarter of achievement – females outperformed males in all quarters of achievement in reading literacy – so it is interesting that this is not the case. It seems as though the resilient males are even more resilient.

TABLE 1 Mean scores PISA 2018 Reading Literacy, by gender

	Females		Males	
	Mean	SE	Mean	SE
Whole cohort	519	2.0	487	2.2
Non-resilient students	373	4.1	352	3.5
Resilient students	613	6.0	617	7.3

Home language

Among Australian students who participated in PISA 2018, the difference in average reading literacy scores for those who spoke English at home and those who did not was significant. Among students from disadvantaged backgrounds, either academically resilient or not, there was no significant difference in reading literacy scores associated with language spoken at home (Table 2).

Similar proportions of students who spoke English or another language at home were categorised as academically resilient – 26 per cent of the students whose language at home was English were found to be resilient, which was not significantly different to the 21 per cent of students who spoke a language other than English at home.

TABLE 2 Mean scores PISA 2018 Reading Literacy, by language spoken at home

	English spoken at home		Language other than English spoken at home	
	Mean	SE	Mean	SE
Whole cohort	507	1.8	483	4.7
Non-resilient students	363	3.4	352	5.9
Resilient students	614	6.0	624	9.6

School attended

Another consideration when looking at the characteristics of academically resilient students is the socioeconomic background level of the school they attend, and the characteristics of the lessons. Prior research (Agasisti, Avvisati, Borgonovi & Longobardi, 2018) into resilience using PISA found that the average socioeconomic profile of the students' school was strongly associated with student performance, along with aspects of the school culture, such as disciplinary climate in the classrooms.

To some extent, this was found to be true in the Australian PISA 2018 cohort. Table 3 shows the distribution of academically resilient and non-resilient students by the average socioeconomic background of the school they attend. While a substantial proportion of academically resilient students attend schools with the lowest socioeconomic background, far more resilient students than non-resilient students attend schools in the highest two quartiles of aggregated socioeconomic background, suggesting that attending schools with more advantaged peers may play a role in a student's chance of being academically resilient. There are a number of reasons this might be so – it may be the influence of peers on students' motivation for learning, or because the more advantaged schools themselves have better access to resources than less disadvantaged schools, or that students attending more advantaged schools receive stronger support from parents or teachers, or perhaps that they were selected to attend these schools on scholarship.

TABLE 3 Distribution of resilient and non-resilient students by school socioeconomic background

School aggregated Socioeconomic background	Resilient students (%)	Non-resilient students (%)
Lowest quarter	39	57
Second quarter	30	28
Third quarter	20	12
Highest quarter	11	4

What is it about the school that makes a difference to students? Agasisti et al. (2018) found that disadvantaged students attending schools with a calmer, more controlled disciplinary climate were more likely to be resilient. A similar pattern is evident in the group of Australian students in PISA 2018. Students were asked to indicate how often these events occurred in their language of instruction classes, on a scale from "every lesson", "most lessons", "some lessons", and "never or hardly ever":

- *Students don't listen to what the teacher says.*
- *There is noise and disorder.*
- *The teacher has to wait a long time for students to quiet down.*
- *Students cannot work well.*
- *Students don't start working for a long time after the lesson begins.*

These were combined into an index representing disciplinary climate in the students' language class, with the OECD average set to 0 and a standard deviation of 1. The score for academically resilient students was -0.12 – significantly lower than the OECD average, but the score for academically non-resilient students was -0.52 – half a standard deviation lower than the OECD average. Neither group of students is in well-ordered, disciplined classrooms, however the classrooms of academically resilient students are, on average, more disciplined than those of the non-resilient students. Of course this finding is somewhat self-evident, as more well-disciplined classrooms do go hand in glove with schools with a higher average socioeconomic background (Thomson et al., 2021).

Growth mindset

According to Nussbaum and Dweck (2008), a growth mindset is the belief that someone's ability can increase over time, in contrast to a fixed mindset, in which a person's ability is fixed and barely changes with experience. A growth mindset should have a positive relationship with resilience – having one might be something that distinguishes those who overcome adversity from those who do not, for example.

Almost 70 per cent of Australian students overall reported having such a belief, derived from their level of agreement with a single item on the PISA questionnaire: *Your intelligence is something about you that you can't change very much.* However there were substantial differences in the proportion of academically resilient and non-resilient students who disagreed or strongly disagreed with the statement, indicating a growth mindset. Of the academically non-resilient students, just 41 per cent disagreed with the statement, compared to 80 per cent of the academically resilient students.

Concluding comments

Just over 13 per cent of students from socioeconomically disadvantaged backgrounds in Australia managed to 'beat the odds' and score in the highest quartile of the PISA 2018 reading literacy assessment compared to almost 40 per cent of students from similar backgrounds whose reading literacy scores placed them in the lowest quartile of achievement. This report explores some of the ways in which these two groups of students may differ, apart from their reading literacy proficiency.

The key differences are:

- Gender – there are more academically resilient females than males.
- Resilient students enjoyed reading and are more likely to persist in the face of adversity than their non-resilient classmates, however for both groups this latter mean is still lower than the OECD average.
- Resilient students set goals and work towards achieving them to a greater extent than non-resilient students, although the average index scores for both groups are still below the OECD average.
- More academically resilient students were attending schools in the higher levels of combined socioeconomic background.
- The classrooms of academically resilient students are, on average, more disciplined than that of the non-resilient students.
- A growth mindset was far more prevalent among resilient than non-resilient students.

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