



TALIS 2018

The Teaching and Learning International Survey

Australian TALIS-PISA Link Report

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Australian Council for Educational Research



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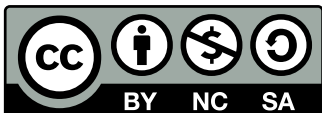
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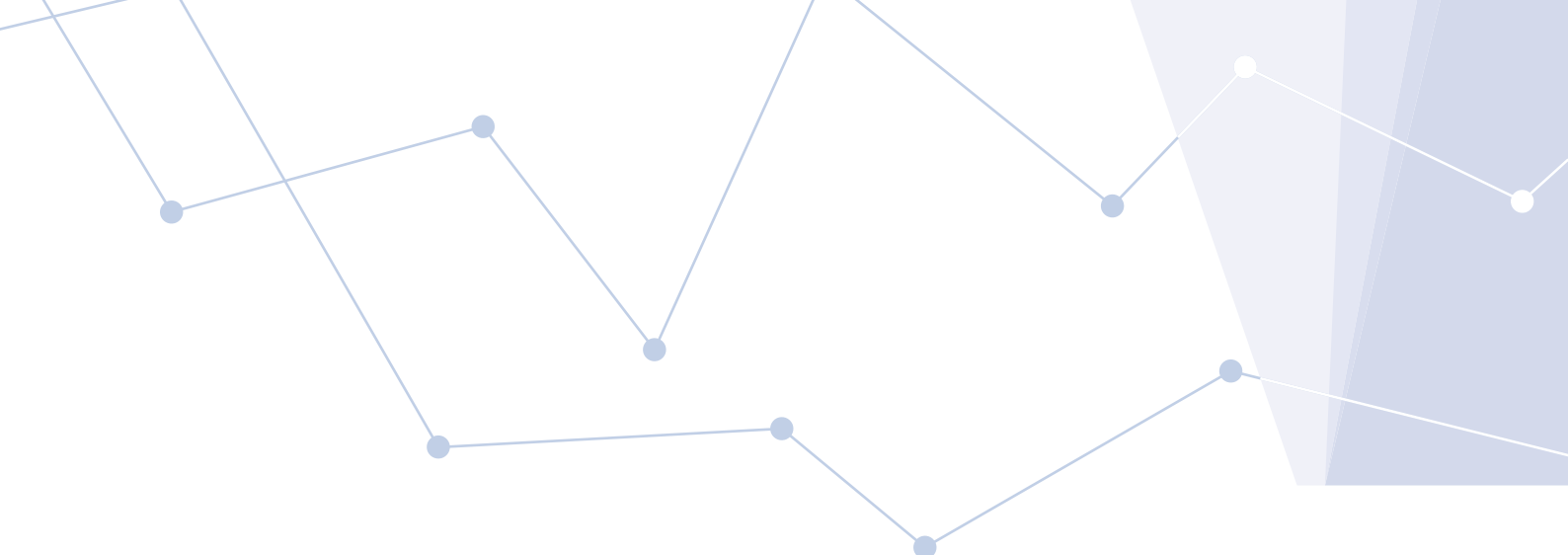
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Abbreviations

ACER	Australian Council for Educational Research
CABA	Ciudad Autonoma de Buenos Aires
ESCS	economic, social and cultural status
ICT	information and communication technology
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least squares (estimation)
PISA	Programme for International Student Assessment
SE	Standard Error
TALIS	Teaching and Learning International Survey





Executive Summary

Australia was one of nine countries and economies to participate in the 2018 TALIS-PISA link study.¹ This study involved coordinating the samples of schools that participated in the Program of International Student Assessment (PISA, a study of the performance of 15-year-old students) and the Teaching and Learning International Survey (TALIS, a study that surveys teachers and principals in lower secondary schools) in 2018.

TALIS data provides information regarding the background, beliefs and practices of lower secondary teachers and principals, and PISA data delivers insights into the background characteristics and cognitive and non-cognitive skills of 15-year-old students. Linking these data offers an internationally comparable dataset combining information for key education stakeholders. The combined TALIS-PISA database for Australia contains information from 131 schools and principals, 2233 teachers and 2404 students.

There are, however, also important limitations to the TALIS-PISA link data that must be acknowledged. First, the teachers sampled from each school were not necessarily teachers of the students who participated in PISA. The link between teachers and students is, therefore, established at the school level and not at the class level. Second, the cross-sectional design of the TALIS survey, and the PISA data, removes any possibility of measuring *causal effects* of teachers and schools on students' outcomes. The statistically significant relationships reported are associations between variables at a point in time. For example, reading scores may tend to be higher in schools where teachers (on average) spend more time observing their students and providing immediate feedback on their tasks compared to other schools. However, it cannot be claimed that this practice is causing the higher scores, as both the score and the practice were measured at the same time.

This report presents the results of a series of analyses that investigate the teacher and school factors that matter for student academic success and social-emotional development. The teacher and school factors measured in TALIS 2018 include teacher practices, working hours, teacher well-being and school climate (e.g. cooperation and collaboration between staff, quality of relations and interactions between staff and students, involvement with parents and other stakeholders). Student outcomes measured in PISA 2018 include performance on the three major areas of the PISA assessment (reading, mathematical and scientific literacy), students' expectations for further study and their experiences at school.

¹ Participants in the 2018 TALIS-PISA link included Australia, Ciudad Autónoma de Buenos Aires (Argentina), Colombia, the Czech Republic, Denmark, Georgia, Malta, Turkey and Viet Nam.

Chapter 2, *Teacher and school factors that relate to Australian students' performance in PISA*, presents results of the analyses of relationships between teacher and school factors (after accounting for students' own characteristics and those of their classmates) and Australian students' performance in reading, mathematical and scientific literacy in PISA 2018. Each of the analyses reported in this chapter included the set of students' own characteristics (gender, immigrant background and socioeconomic status), classroom composition variables (the share of students whose first language was different to that of the assessment, the share of low academic performers, share of students with behavioural problems, share of students from socioeconomically disadvantaged homes, share of academically gifted students, share of students who are immigrants or with a migrant background and the share of students who are refugees), and the set of teacher or school factors that were the focus of the analyses.

These analyses of relationships between student performance in PISA and teacher and school factors in TALIS found that:

- ▶ There was no clear pattern of relationships between the TALIS measures of teachers' classroom practices and student performance in reading, mathematics or science.
- ▶ Reading and science scores tended to be lower in Australian schools where teachers, on average, spent more time on school management tasks.
- ▶ Mathematics scores were higher in Australian schools where mathematics teachers participated in education conferences where other teachers and/or researchers present research or discuss educational issues.
- ▶ Science scores tended to be higher in Australian schools where science teachers reported higher levels of satisfaction with their work environment.
- ▶ Reading and science scores tended to be lower in Australian schools where school leaders reported reviewing school administrative procedures and reports more frequently.
- ▶ The factors most consistently related with Australian students' performance in reading, mathematics and science were the characteristics of students themselves and characteristics of their classmates.
- ▶ Scores in reading, mathematics and science tended to be higher in schools where students were in classes with higher proportions of socioeconomically advantaged students, even when controlling for the effects of their own socioeconomic background.
- ▶ In addition, Australian students tended to score higher in all three areas in schools where students were in classes with higher proportions of higher-achieving students. Conversely, scores tend to be lower in schools where classes have higher concentrations of socioeconomically disadvantaged, or lower-achieving students.

Chapter 3, *What Australian teachers and schools do that matters for equity*, investigates whether the teacher and school factors identified in Chapter 2 as relating to average student performance are similarly related to the performance of lower-achieving and higher-achieving students in Australia. It also presents analyses that focus on the achievement 'gaps' between different groups of students, asking what teacher and school factors are associated with reductions in these gaps for Australian students.

PISA scores were *higher* for lower-performing Australian students in schools where:

- ▶ Teachers had more positive perceptions of the classroom disciplinary climate (mathematics scores only)
- ▶ Teachers made greater use of work hours to mark and correct student work (reading, mathematics and science scores)
- ▶ Teachers reported higher job satisfaction with their work environment (reading, mathematics and science scores)
- ▶ Principals reported greater involvement of stakeholders (reading scores only)

- ▶ There were more positive teacher-student relations in classrooms (science scores only)
- ▶ Classes had higher proportions of academically gifted students (mathematics and science).

Differences in the average reading scores of female and male students were *lower* in schools where:

- ▶ Teachers reported more positive teacher-student relations in classrooms
- ▶ Teachers were appraised by other members of the school management team
- ▶ Principals had worked on a professional development plan for the school.

Differences in the average reading scores of female and male students were *higher* in schools where:

- ▶ Teachers reported a collaborative school culture
- ▶ Principals had resolved problems with the lesson timetable or collaborated with other principals on challenging work tasks.

Differences between advantaged and disadvantaged students within the same schools were *lower* (thereby in favour of students from disadvantaged backgrounds) in schools where:

- ▶ There were higher proportions of female teachers (reading, mathematics, and science)
- ▶ Teachers' formal training and education covered content of some or all subjects they taught (reading, mathematics, and science); and teaching in a multicultural or multilingual setting (mathematics only)
- ▶ Teachers' initial education and training covered use of ICT for teaching (reading and science)
- ▶ Teachers acted as an assigned mentor for one or more teachers (mathematics only)
- ▶ Teachers had undertaken professional development in the past 12 months on student behaviour and classroom management (reading and mathematics), approaches to individualised learning (reading only), analysis and use of student assessments (reading only)
- ▶ Teachers reported high professional collaboration (reading, mathematics, and science)
- ▶ Principals reported more teacher actions towards achieving academic excellence, as measured by the index of academic pressure (reading, mathematics, and science).

Chapter 4, *Outcomes other than performance*, presents results of the analyses of relationships between teacher and school factors measured in TALIS 2018 and a selection of student measures from PISA 2018. These include Australian students' expectations for further study, perceptions of their learning environment (classroom disciplinary climate and teacher enthusiasm) and perceptions of the difficulty of the PISA 2018 reading literacy assessment.

Australian students were *more likely* to expect that they would complete a tertiary degree when:

- ▶ They were in schools where teachers, on average, observed students working and provided immediate feedback more frequently
- ▶ They were in schools where teachers, on average, spent more work hours teaching, or marking or correcting student work
- ▶ Students were female, came from more advantaged homes, or were from an immigrant background.

Australian students were *less likely* to expect that they would complete a tertiary degree when they were:

- ▶ In classrooms with higher proportions of students from disadvantaged homes
- ▶ In schools where teachers spent higher proportions of class time on actual teaching and learning
- ▶ In schools where teachers, on average, felt better prepared for teaching in a multicultural or multilingual setting after their initial education and training
- ▶ In schools where teachers, on average, were more satisfied with their profession.

Australian students reported *higher* perceptions of teacher enthusiasm in schools where teachers, on average, reported spending more work hours counselling students, higher job satisfaction with their work environment or higher quality teacher-student relations in classrooms.

Australian students report *lower* classroom disciplinary climate (i.e. more problems and noise) and *lower* teacher enthusiasm in schools where teachers, on average, reported spending more work hours participating in school management.

Australian students report *lower* perceptions of PISA reading literacy test difficulty (i.e. the test was less difficult) in schools where teachers, on average, were more satisfied with their work environment.

Australian students' own characteristics and those of their classmates, particularly their socioeconomic background, were related to their expectations of completing tertiary study, their perceptions of the climate of their classrooms, their teachers' enthusiasm and the difficulty of the PISA reading tasks.

Chapter 5, *Where to from here?*, summarises the key findings from the previous chapters and poses questions as to what can be learned from Australia's participation in the 2018 TALIS-PISA link study.

The TALIS-PISA link in Australia

1.1 Introduction

Australia was one of nine countries and economies to participate in the 2018 TALIS-PISA link study.² This study involved coordinating the samples of schools that participated in the Program of International Student Assessment (PISA, a study of the performance of 15-year-old students) and the Teaching and Learning International Survey (TALIS, a study that surveys teachers and principals in lower secondary schools) in 2018. A sample of teachers from schools that were selected to participate in PISA were invited to respond to the TALIS survey. These teachers were not necessarily those who taught the PISA sample of 15-year-old students from the school, but a random selection of teachers at the school who taught any students in that target age group. TALIS data provides information regarding the background, beliefs and practices of lower secondary teachers and principals, and PISA data delivers insights into the background characteristics and cognitive and non-cognitive skills of 15-year-old students. Linking these data offers an internationally comparable dataset combining information for key education stakeholders. For Australia, the combined TALIS-PISA 2018 database includes information from 131 schools and principals, 2 233 teachers and 2 404 students.

The breadth and depth of the linked TALIS-PISA data provide an opportunity to examine the specific characteristics and actions of teachers and schools and the relationships they seem to have with student achievement and social-emotional development. Linking PISA with TALIS creates a rich dataset that connects student, teacher, principal and school data across countries. This provides an opportunity to identify, among many teacher and school factors, the ones that have a significant association with student achievement. While PISA includes questionnaires to be completed by teachers and principals of participating schools, the focus of the PISA questionnaires differs from those of TALIS. The TALIS questionnaires have greater coverage of issues regarding teachers' practices in the classroom, initial education and training and other factors that may be related to students' performance in assessments and experiences of their classrooms.

² Participants in the 2018 TALIS-PISA link included Australia, Ciudad Autónoma de Buenos Aires (Argentina), Colombia, the Czech Republic, Denmark, Georgia, Malta, Turkey and Viet Nam.

What are the main goals of PISA?

PISA attempts to answer several important questions related to education:

- ▶ How well prepared are young adults to meet the challenges of the future?
- ▶ What skills do young adults have that will help them adapt to change in their lives? Are they able to analyse, reason and communicate their ideas effectively?
- ▶ Are some ways of organising schools and school learning more effective than others?
- ▶ What influence does the quality of school resources have on student outcomes?
- ▶ What educational structures and practices maximise the opportunities of students from disadvantaged backgrounds?
- ▶ To what extent does a student's performance depend on their background? How equitable is education for students from all backgrounds?

Who is assessed?

PISA assesses a random sample of 15-year-old students, drawn from a nationally representative sample of schools. In Australia, 740 schools and a total of 14273 students participated in PISA 2018.

What is assessed?

The PISA assessment focuses on young people's ability to apply their knowledge and skills to real-life problems and situations. The term *literacy* is attached to the assessment domains of reading, mathematics and science, to reflect the focus on these broader skills, and as a concept it is used in a much broader sense than simply being able to read and write. The OECD considers that mathematics and science are so pervasive in modern life that it is important for students to be literate in these areas as well.

Assessment tasks typically contain some stimulus text describing a real-life situation and a series of two or more questions (also called items) for students to answer. For the mathematical and scientific components, the text typically presents situations in which mathematical or scientific problems are posed, or mathematical or scientific concepts need to be understood. Some items are multiple-choice, in which students must select the correct response from a set of options provided, and other items require students to construct and write their own responses.

Each PISA assessment cycle focuses on a different assessment domain. Reading literacy was the focus of the 2018 cycle (as it was in 2000 and 2009), meaning that a greater proportion of the assessment was devoted to assessing reading literacy, compared to mathematical or scientific literacy.

What did participants need to do?

PISA 2018 was administered as a computer-based assessment. Students completed a two-hour cognitive assessment. All students completed assessment tasks in reading literacy (the focus of the 2018 assessment) and from one or more other domains (mathematical and/or scientific literacy). Students also completed a student questionnaire about their family background, aspects of their lives such as their motivation towards and engagement with learning, and their attitudes towards school.

The principals of the schools completed a short, web-based questionnaire that focused on information about the level of resources in the school, the school environment and the qualifications of staff.

Sourced from Thomson et al, 2019.

What are the main goals of TALIS?

TALIS collects internationally comparable data on the learning environment and working conditions of teachers and principals in schools across the world. It offers teachers and principals the opportunity to provide their perspectives on the state of education in their own countries, the systems in which they work and the successes and challenges they face in their profession. The main objective of the study is to:

... generate internationally comparable information relevant to developing and implementing policies focused on school leaders, teachers and teaching, with an emphasis on those aspects that affect student learning (OECD, 2019, p. 19).

The data collected by TALIS can be used by policymakers to assist them in developing and reviewing policies that promote the teaching profession and provide optimal conditions for effective teaching and learning.

Who is surveyed?

TALIS includes two online surveys – one for teachers and another for school principals. The target populations are teachers and principals employed in lower secondary education (Years 7 – 10 in the Australian education system). For TALIS 2018, responses were collected from 3573 teachers and 230 principals in Australian schools.

The TALIS-PISA link study focuses on responses from teachers and principals of schools who participated in PISA 2018, and were thus employed at schools that enrolled 15-year-old students.

What is measured?

The TALIS 2018 surveys included items relating to nine major themes:

- ▶ Teachers' instructional practices
- ▶ School leadership
- ▶ Teachers' professional practices
- ▶ Teacher education and initial preparation
- ▶ Teacher feedback and development
- ▶ School climate
- ▶ Job satisfaction
- ▶ Teacher self-efficacy, and
- ▶ Teacher human resource measures and stakeholder relations.

Two cross-cutting themes – innovation and equity and diversity – were also included.

Sourced from Thomson & Hillman, 2019.

1.2 Limitations of the TALIS-PISA link

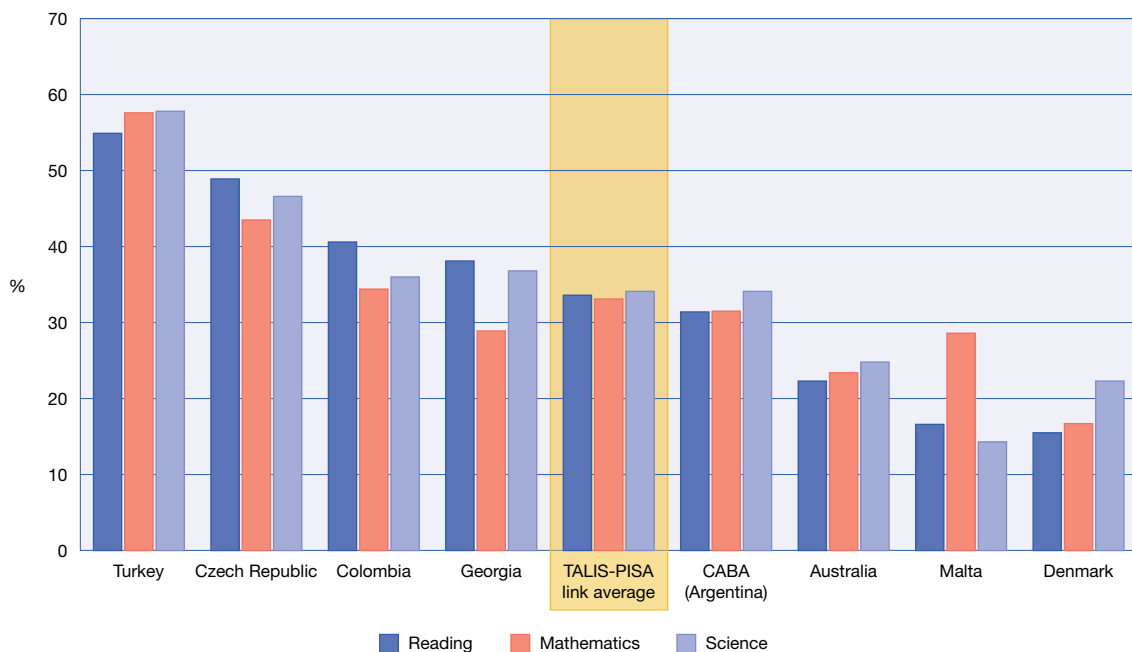
There are important limitations to the TALIS-PISA link data that must be acknowledged ahead of discussion of any analyses of the data. As mentioned earlier, the teachers sampled in each school were not necessarily teachers of the students who participated in PISA. The link between teachers and students is, therefore, established at the school and not at the class level. In other words, the data do not allow matching a teacher with her or his students; rather the data only permit the matching of a sample of teachers teaching 15-year-old students in a school with a sample of 15-year-

old students from that same school. Information on teachers is therefore averaged at the school level to be analysed together with students' outcomes.

In addition, the cross-sectional design of the TALIS survey, and the PISA data, removes any possibility of measuring *causal effects* of teachers and distinguishing between short-term and long-term effects of teachers and schools on students' outcomes. For example, it cannot be said that teachers spending time observing their students and providing immediate feedback on their tasks, as reported by teachers on average in a school, is *causing* higher reading scores for students in that school. It can only be said that reading scores tend to be higher in schools where teachers, on average, reported using this particular classroom practice more frequently than did teachers in other schools. There is an association between this classroom practice and students' reading scores, but no comment can be made on the direction of influence.

A further caveat around the results presented here for Australia is that, for most of the student measures, the percentage of variance that can be explained at the school level is lower in Australia than in some of the other countries in the TALIS-PISA link. While between 40 and 50 per cent of the variance in student performance, for example, can be attributed to differences between schools in countries like Turkey and the Czech Republic, in Australia the percentage is closer to 25 per cent (Figure 1.1). In Australia, there is also substantial variance at the student level, meaning students differ *within* schools as well as *between* schools. In Turkey, for comparison, the bulk of the variance (between 50 and 60%), and thus differences, is between schools, not within schools. Students in Turkish schools may be more similar to one another in terms of their performance than is the case in Australian schools, but there are greater differences between schools. As there is less variance at the school level in the Australian data, analyses of the relationships between student performance and teacher and school factors averaged to the school level are less likely to reveal significant relationships.

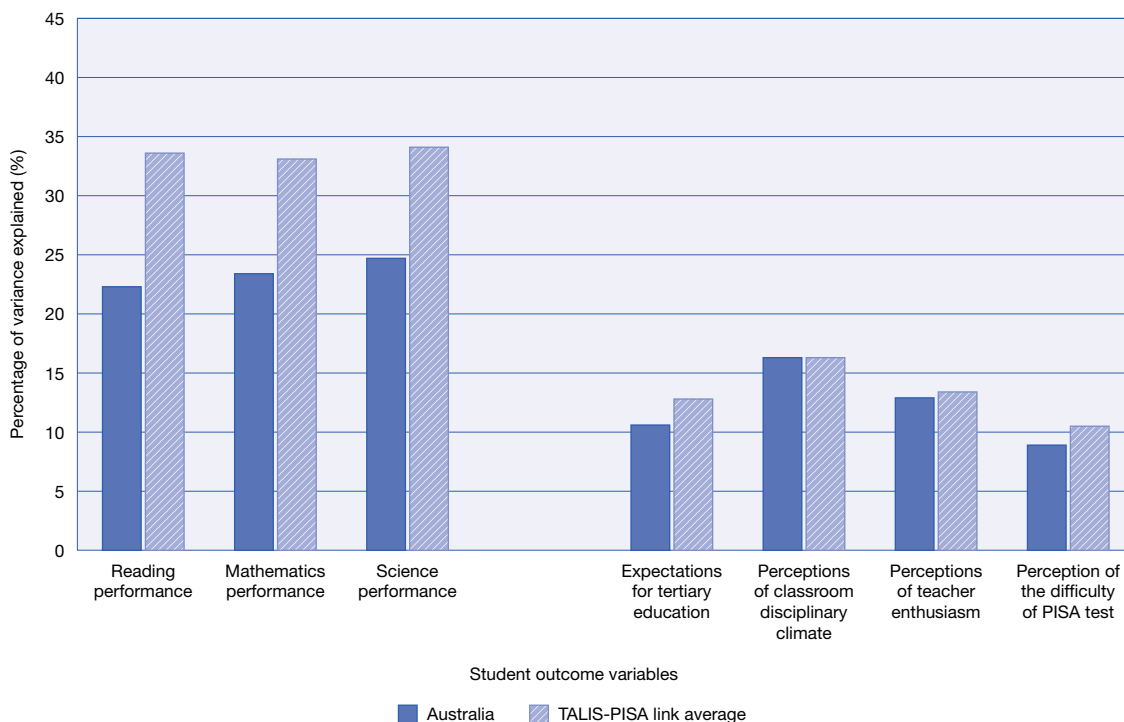
FIGURE 1.1 Percentage of variance in PISA reading, mathematics and science scores at the school level – all participating countries and TALIS-PISA link average



A summary of the percentage of variance explained at the school level for all of the student outcomes investigated in this report is presented in Figure 1.2.

The total variance at the school level for Australian student outcomes other than performance on the PISA assessment is smaller again, ranging from nine percent to 16 per cent. While there is variance at the school level in terms of students' PISA scores, expectations for further study, experiences of school and the PISA assessment, the bulk of the variance appears to reside *within* schools, and thus between students.

FIGURE 1.2 Share of total variance in student outcomes measures explained at the school level for Australia and the TALIS-PISA link average



1.3 Selecting variables to explore in the TALIS-PISA link

The OECD, in their investigation of teacher and school factors that related to students' performance in the PISA assessments, educational aspirations and experiences of school, used reviews of the relevant literature together with a data-driven exploration of relationships in the combined TALIS-PISA dataset (lasso techniques) to identify relationships across all participating countries and economies (OECD, 2021).³

1.4 Interpreting results

The results presented in the following chapters focus on the regression analyses (linear, quantile or logistic regressions, depending on the outcome variable) employed to investigate these relationships for each country separately, to see if the relationships between teacher and school factors and students' outcomes (achievement or otherwise) differed between countries. The tables contain the regression coefficients (β), which, in linear regression, indicate the degree to which an independent variable is associated with a non-categorical outcome variable. In most cases, the outcome variable in question is a measure of student performance in PISA reading, mathematical or scientific literacy. The sign of the regression coefficient, - or +, indicates the direction of the relationship. For example, a statistically significant regression coefficient of 2.5 would indicate that for every change on 1 unit in the independent variable, the outcome variable would increase by 2.5 units, and thus a

³ Those readers interested in the results of the literature reviews and lasso techniques are referred to the OECD report for further details (OECD, 2021)

statistically significant positive association or relationship exists between these two variables. A statistically significant regression coefficient of -3.7 would indicate that for every unit increase in the independent variable, the outcome variable would decrease by 3.7 units, and thus a statistically significant negative association or relationship exists between these two variables.

Interpretation of regression coefficients resulting from logistic regressions differs from interpretation of linear regression, as the outcome variable is binary – one category or another. As such, it is the statistical significance of the regression coefficient and its sign which are the foci of the interpretation, rather than the magnitude of the coefficient. A statistically significant positive coefficient indicates a positive association with the outcome variable, such as expecting to go onto university education, whereas a statistically significant negative coefficient indicates a negative association with that outcome – fewer students with this characteristic report planning to go on to university, for example.

The term ‘significant’ is used through the report to describe a relationship or association that meets the requirements of statistical significance at the 0.05 level, indicating that the association would be found in at least 95 analyses out of 100 runs if the analyses were repeated. It should not be confused with the term ‘substantial’, which is a qualitative term and based on judgement rather than statistical comparisons. A relationship may appear substantial, due to the size of the regression coefficient, but not be statistically significant, due to factors that affect the size of the standard error associated with the coefficient. Regression coefficients should always be considered alongside their associated standard errors. Those regression coefficients that reach statistical significance will be presented in **bold** font within tables.

The results for Australia are presented alongside those of the average (mean) across all countries and economies that participated in the TALIS-PISA link study for comparison, but the focus remains on what relationships were identified among Australian students.

1.5 Report outline

Chapter 2 presents results of the analyses of relationships between teacher and school factors (after accounting for students’ own characteristics and those of their classmates) and Australian students’ performance in reading, mathematical and scientific literacy in PISA 2018.

Chapter 3 investigates whether the teacher and school factors identified in Chapter 2 as relating to average student performance are similarly related to the performance of lower-achieving and higher-achieving students. It presents analyses that focus on the achievement ‘gaps’ between different groups of students, asking what teacher and school factors are associated with reductions in these gaps for Australian students.

Chapter 4 presents results of the analyses of relationships between teacher and school factors and Australian students’ expectations for further study, perceptions of their learning environment (classroom disciplinary climate and teacher enthusiasm) and perceptions of the difficulty of the PISA 2018 assessment (after accounting for students’ own characteristics and those of their classmates).

Chapter 5 summarises the key findings from the previous chapters and poses questions as to what can be learned from Australia’s participation in the TALIS-PISA link study.



Teacher and school factors that relate to Australian students' performance in PISA

CHAPTER

2

Key Findings

- ▶ There was no clear pattern of relationships between the TALIS measures of teachers' classroom practices and student performance in reading, mathematics or science.
- ▶ Reading and science scores tended to be lower in Australian schools where teachers, on average, spent time on school management tasks.
- ▶ Mathematics scores were higher in Australian schools where mathematics teachers participated in education conferences where other teachers and/or researchers present research or discuss educational issues.
- ▶ Science scores tended to be higher in Australian schools where science teachers reported higher levels of satisfaction with their work environment.
- ▶ Reading and science scores tended to be lower in Australian schools where school leaders reported reviewing school administrative procedures and reports more frequently.
- ▶ The factors most consistently related with Australian students' performance in reading, mathematics and science were the characteristics of students themselves and characteristics of their classmates. Scores in reading, mathematics and science tended to be higher in schools where students are in classes with higher proportions of socioeconomically advantaged students, even when controlling for the effects of their own socioeconomic background.
- ▶ In addition, Australian students tended to score higher in all three areas in schools where students were in classes with higher proportions of higher-achieving students. Conversely, scores tend to be lower in schools where classes have higher concentrations of socioeconomically disadvantaged, or lower-achieving students.

2.1 Introduction

The focus of this chapter is the identification of the teacher and school factors that matter for student achievement in Australia using data from the 2018 TALIS and PISA collections. TALIS and PISA data are linked by merging individual student data collected by PISA with TALIS principal data and TALIS teacher data averaged at the school level. Due to the survey design of the TALIS-PISA link data discussed in Chapter 1, teacher dimensions measure the average teacher's characteristics and practices at the school.⁴ The following sections focus on teacher and school factors that show a significant relationship with Australian students' performance in reading, mathematics and science.⁵ The lasso technique applied to TALIS-PISA link data retains six potential key predictors of student achievement in reading, mathematics and science: teachers' classroom practices, teachers' well-being and job satisfaction, teachers' use of working time, classmates' characteristics, school culture and school leadership. Variance decomposition analysis suggests that each of these factors explain at least 20 per cent of the variation in student performances between schools. The relationship for the average of the TALIS-PISA link countries is provided for comparison purposes.

The analyses were conducted initially using the average response for teachers at each school, and then repeated restricting responses to those of reading (English), mathematics or science teachers depending on which area of student performance was the outcome variable. For example, the regression analysis focusing on relationships between classroom practices and student performance would be run three times, with the different areas of PISA (reading, mathematical and scientific literacy) serving as the outcome variable in one of the analyses. In the next step, the responses of reading (English) teachers only would be included as the independent variable, and the outcome variable would be performance in reading literacy. This would then be repeated with mathematics teachers and mathematical literacy, and science teachers and scientific literacy. In some instances, independent variables may show significant relationships with student performance when the average response of all teachers acts as the independent variable, but the relationship is not significant when subject teachers only are included, or the reverse may hold true – there is no significant relationship for teachers on average, but a significant relationship between responses of subject teachers and student performance in that subject area.

Each of the analyses reported in this chapter included the set of students' own characteristics (gender, immigrant background and socioeconomic status), classroom composition variables (the share of students whose first language was different to that of the assessment, the share of low academic performers, share of students with behavioural problems, share of students from socioeconomically disadvantaged homes, share of academically gifted students, share of students who are immigrants or with a migrant background and the share of students who are refugees), and the set of teacher or school factors that were the focus of the analyses.

The most consistent associations with Australian students' performance are students' own characteristics, particularly gender and socioeconomic background, and with those of their classmates, particularly the proportion of the class from lower socioeconomic backgrounds and in some cases the proportion of higher-achieving or lower-achieving students in that class. The beta weights – the measure of association between students' reading, mathematics and science PISA scores and each of the variables in the analyses – are not presented for the student and classroom composition variables in the abbreviated tables in the body of this chapter. The full tables are available in Appendix A. The final section of this chapter presents the associations between student and classroom factors and the performance of Australian students in PISA without any teacher or school factors.

4 Note, as explained in Chapter 1, the teachers sampled in each school were not necessarily teachers of the students who participated in PISA. The link between teachers and students is, therefore, established at the school and not at the class level.

5 As discussed in Chapter 1, all statistically significant relationships presented here are associations only. No claims of causation can be made.

2.2 Teachers' classroom practices

The practices teachers employ in their classrooms were measured using a number of TALIS survey items and constructed indices. These include estimates of time spent on actual teaching and learning during class, the frequency with which they use various teaching strategies such as clarifying their instructions or cognitive activation, their use of various assessment techniques, and their perceptions of the disciplinary climate of their classrooms and their autonomy over what and how they teach. Further information about the measures of teachers' classroom practices is provided in the notes to Table 2.1. For further discussion of Australian teachers' perceptions of the disciplinary climate of their classrooms and comparisons with other countries, please see Chapter 3 of the Australian TALIS report, Volume 1 (Thomson & Hillman, 2019).

As shown in Table 2.1, there was no clear pattern of relationships between the various TALIS indicators of teachers' classroom practices and student performance in reading, mathematics and science. Instead, different practices showed relationships with performance in the different subject areas when the analyses were restricted to subject teachers. For example, when including all teachers, there were no relationships between measures of various classroom practices and Australian students' reading scores in PISA.

TABLE 2.1 Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices²												
Share of class time spent on actual teaching and learning	0.78	0.99	0.76	0.32	0.01	0.90	0.73	0.30	1.23	0.95	1.01	0.32
Teachers' autonomy over planning and teaching ³	-3.54	7.32	-4.16	2.28	-3.10	6.51	-3.18	2.19	-2.47	7.63	-3.78	2.30
Teachers' perceived disciplinary climate ⁴	-4.90	6.83	-6.33	2.78	-11.58	6.54	-7.02	2.65	-4.74	7.02	-6.91	2.70
Teachers' practices (frequency): clarity of instruction ⁵	-2.03	5.29	2.33	2.46	-5.05	5.07	1.12	2.43	1.60	6.29	2.00	2.47
Teachers' practices (frequency): cognitive activation ⁶	-4.73	6.93	-3.32	2.77	-2.02	6.20	-5.05	2.56	-5.97	7.53	-4.97	2.73
Teachers' assessment practices: administer own assessment ⁷	22.89	11.91	13.49	6.17	11.73	11.32	9.17	5.70	13.69	12.37	12.11	5.88
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-18.45	17.32	-6.34	5.90	-9.40	15.50	-4.22	5.68	-12.76	17.23	-4.28	5.56
Teachers' assessment practices: let students evaluate their own progress ⁷	1.40	19.16	-15.53	6.77	-4.13	18.50	-14.81	6.50	-2.81	20.58	-15.79	6.68
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	26.88	22.02	5.51	7.70	10.57	19.91	3.10	7.49	25.24	22.74	7.61	7.50
R^2	0.21		0.29		0.21		0.28		0.18		0.27	

¹ Teacher variables are averaged for all teachers within the school.

² Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

When the analysis was restricted only to reading teachers, reading scores tended to be higher in schools where teachers reported administering their own assessments ($\beta=16.2$) and where teachers observed students working on particular tasks and provided immediate feedback ($\beta=16.5$) (Table 2.2). Mathematics scores were lower in schools where mathematics teachers reported higher frequency of practices to improve the clarity of their instructions during class ($\beta=-4.5$), while science scores were lower in schools where science teachers perceived higher discipline issues in class ($\beta=-7.4$). The negative relationship found between mathematics teachers' use of techniques to clarify

their instructions and students' mathematics performance may be a result of teachers needing to provide further and more regular clarification of mathematics tasks and processes for students in classrooms where students are already having difficulty understanding mathematical concepts. As the relationship is one of association, students' lower scores cannot be attributed to teachers' use of these techniques (or vice versa).

TABLE 2.2 Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices²												
Share of class time spent on actual teaching and learning	-0.54	0.36	-0.09	0.20	0.55	0.50	0.80	0.20	-0.12	0.54	0.29	0.21
Teachers' autonomy over planning and teaching ³	-1.27	3.33	-1.71	1.72	2.71	3.37	1.70	1.49	-4.10	3.26	-1.24	1.32
Teachers' perceived disciplinary climate ⁴	-2.34	2.71	-1.58	1.60	-0.42	3.60	-2.51	1.73	-7.40	3.06	-5.34	1.92
Teachers' practices (frequency): clarity of instruction ⁵	-0.22	3.42	0.90	1.46	-4.47	2.18	1.44	1.32	-1.04	3.49	0.88	1.31
Teachers' practices (frequency): cognitive activation ⁶	-1.63	3.46	-1.31	1.55	-0.51	3.35	-1.66	1.57	-7.02	3.71	1.57	1.55
Teachers' assessment practices: administer own assessment ⁷	16.20	6.11	1.48	4.52	-1.60	6.23	-0.52	4.36	-3.55	8.44	1.90	3.77
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-16.21	14.55	2.34	4.31	-4.74	6.62	-0.07	3.52	1.31	8.35	-3.86	3.04
Teachers' assessment practices: let students evaluate their own progress ⁷	14.42	8.12	0.79	3.96	3.69	7.90	-3.13	3.60	8.00	11.10	-4.11	3.81
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	16.46	7.81	-2.07	4.01	12.35	7.17	-7.74	3.81	8.05	9.29	-5.36	3.97
R^2	0.20		0.25		0.18		0.25		0.19		0.24	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

2.3 Teachers' use of working time

The activities that teachers participate in during their working hours could easily be identified as a potential influence on student performance, with time spent teaching, marking work or preparing for lessons seen as beneficial, while time spent on administration or other tasks may be viewed as taking away from the time teachers have to do this work. The results for Australian students, however, indicate that teachers' use of working time may not be as influential, at least directly, as supposed. When the average time of all teachers in a school was considered, time spent participating in school management tasks was negatively related to student performance in reading ($\beta=-9.07$) and science ($\beta=-7.52$) but unrelated to mathematics performance (Table 2.3).

TABLE 2.3 Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Total working hours	0.71	0.78	0.54	0.39	0.36	0.71	0.48	0.39	0.36	0.73	0.73	0.41
Teachers' working hours²												
Teaching	-0.07	1.18	0.20	0.54	0.87	1.03	0.19	0.51	0.20	1.16	0.14	0.56
Individual planning or preparation of lessons either at school or out of school	4.41	2.95	0.20	1.23	3.12	2.63	0.25	1.16	5.66	2.97	0.66	1.23
Team work and dialogue with colleagues within this school	-5.02	4.97	-3.21	1.89	-1.92	4.59	-2.03	1.77	-4.34	5.29	-2.47	1.94
Marking/Correcting of student work	3.49	2.39	6.01	1.25	2.07	2.30	5.01	1.23	2.63	2.34	5.48	1.21
Counselling students	2.47	3.61	-0.88	1.53	2.13	3.65	-1.25	1.49	4.40	3.87	-0.47	1.61
Participation in school management	-9.07	3.35	-5.40	1.97	-5.62	3.20	-5.48	1.85	-7.52	3.81	-5.08	1.97
General administrative work	0.19	3.82	2.54	1.84	0.55	3.25	2.75	1.82	-1.32	3.83	0.94	1.82
Professional development activities	-4.92	5.35	-4.28	1.88	-3.53	4.62	-4.21	1.70	-4.78	5.68	-3.33	1.92
Communication and cooperation with parents or guardians	7.07	8.70	2.51	2.35	1.28	7.65	2.34	2.26	4.63	8.32	1.11	2.35
Engaging in extracurricular activities	-2.24	3.54	1.78	1.62	-2.34	2.96	0.97	1.56	-2.58	3.41	1.81	1.56
Other work tasks	3.53	2.90	-0.08	1.42	1.93	2.83	-0.08	1.36	2.04	3.08	-0.73	1.38
R^2	0.21		0.30		0.21		0.30		0.19		0.28	

¹ Teacher variables are averaged for all teachers within the school.

² Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

When the analyses were restricted to subject area teachers, the relationship with reading scores was no longer significant. Time spent by science teachers in marking and correcting work was positively related to student scores in science ($\beta=4.79$). The negative relationship between time spent by science teachers in school management tasks and students' science scores also remained significant ($\beta=-3.63$) (Table 2.4).

TABLE 2.4 Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Total working hours	0.34	0.47	0.19	0.28	0.34	0.55	0.26	0.31	-0.02	0.48	-0.25	0.28
Teachers' working hours²												
Teaching	0.05	0.48	-0.80	0.36	0.39	1.27	0.06	0.45	-1.36	0.85	0.05	0.41
Individual planning or preparation of lessons either at school or out of school	0.08	1.10	-1.03	0.66	0.56	1.19	-0.56	0.65	-1.69	0.96	0.72	0.61
Team work and dialogue with colleagues within this school	0.53	4.83	-4.99	1.57	-2.27	3.06	-4.46	1.55	0.16	3.06	-4.70	1.44
Marking/Correcting of student work	0.77	1.04	1.04	0.69	-1.51	1.07	2.91	1.21	4.79	1.49	2.84	0.96
Counselling students	-2.05	1.82	2.37	1.47	-0.01	1.61	-1.03	1.28	0.77	2.79	1.38	1.71
Participation in school management	1.28	2.94	-2.38	1.30	0.54	1.92	-0.20	1.59	-3.63	1.61	-0.58	1.35
General administrative work	2.45	2.41	1.37	1.46	-1.22	1.58	1.63	1.34	-0.63	0.92	0.36	1.35
Professional development activities	-3.76	2.57	1.08	1.00	0.12	4.18	-0.96	1.37	1.43	2.61	0.27	1.36
Communication and cooperation with parents or guardians	0.65	4.13	0.37	2.54	1.07	2.30	1.04	1.69	0.52	4.45	1.65	2.30
Engaging in extracurricular activities	1.85	2.37	1.05	1.36	2.56	3.96	1.45	1.50	1.89	3.00	-1.60	1.33
Other work tasks	-0.49	1.97	-0.89	0.89	0.15	1.22	1.95	1.26	3.10	1.75	1.03	0.79
R^2	0.20		0.26		0.18		0.25		0.21		0.25	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

2.4 Teachers' induction and initial preparation

Measures of teachers' experiences of induction activities focused on the proportion of teachers, averaged across the school, who had participated in informal and formal induction activities at their first school or at their current school, while measures of teachers' sense of preparedness included responses to TALIS items that asked teachers to rate how well prepared they felt for various elements of teaching (including general pedagogy, classroom management and monitoring student learning). Further information about the preparation and induction of Australian teachers is located in Chapter 4 of the Australian TALIS report, Volume 1 (Thomson & Hillman, 2019).

Relationships between teachers' early teaching experiences – induction activities undertaken at their first school and their sense of preparedness for various aspects of the teaching role after their initial education and training – were related to Australian students' scores in mathematics and science only (Table 2.5 and Table 2.6).

TABLE 2.5 Relationship between PISA 2018 science performance and induction (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:			
	Science			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Share of teachers who took part in the following induction activity				
Formal induction activities during first employment	-54.58	30.48	-7.37	15.57
Induction activities at current school	22.40	26.51	4.78	12.02
Informal induction activities during first employment	70.52	31.07	1.90	17.78
Informal induction activities at current school	9.47	24.64	-14.32	13.71
R^2	0.18		0.26	

¹ Teacher variables are averaged for all teachers within the school.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

On average across the TALIS-PISA link countries, students recorded lower mathematics scores in schools in which teachers felt better prepared for teaching in mixed ability settings. This was not the case for Australian students, however, with no relationship between students' scores in any subject and teachers' sense of preparedness to teach in mixed ability settings, or any other measures of preparedness after initial education and training (Table 2.6). When the analyses were restricted to mathematics teachers only, Australian students' mathematics scores tended to be higher in schools where mathematics teachers reported lower preparedness in general pedagogy ($\beta=-32.87$) (Table 2.7).

TABLE 2.6 Relationship between PISA 2018 mathematics performance and sense of preparedness after initial education and training (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:			
	Mathematics			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Initial education and training – sense of preparedness				
Sense of preparedness for some or all of the subjects I teach ²	32.76	19.16	16.35	8.87
Pedagogy of some or all of the subjects I teach ²	-28.41	24.07	14.11	9.61
General pedagogy ²	-27.52	22.43	-7.65	9.47
Classroom practice in some or all of the subjects I teach ²	-3.59	24.63	6.18	9.01
Teaching in a mixed ability setting ²	-19.06	17.66	-16.31	6.87
Teaching in multicultural or multilingual setting ²	-7.90	17.04	-10.23	5.97
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving)	-1.15	16.49	6.63	7.64
Use of ICT for teaching ²	16.78	14.47	-4.60	5.65
Student behaviour and classroom management ²	20.08	17.63	1.91	8.58
Monitoring students' development and learning ²	16.07	20.19	-10.28	9.16
R^2	0.21		0.29	

¹ Teacher variables are averaged for all teachers within the school.

² The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

TABLE 2.7 Relationship between PISA 2018 mathematics performance and sense of preparedness after initial education and training (controlling for student characteristics and classroom composition) – mathematics subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary Mathematics teachers¹

Related to:	PISA scores in:			
	Mathematics			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Initial education and training – sense of preparedness				
Sense of preparedness for some or all of the subjects I teach ²	5.31	6.70	13.29	5.15
Pedagogy of some or all of the subjects I teach ²	14.75	11.26	-1.16	5.55
General pedagogy ²	-32.87	11.37	6.57	4.51
Classroom practice in some or all of the subjects I teach ²	-7.65	8.82	-12.38	4.49
Teaching in a mixed ability setting ²	12.79	9.22	-1.20	3.52
Teaching in multicultural or multilingual setting ²	-0.08	6.11	-2.73	3.15
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving) ²	-9.81	8.55	0.52	4.44
Use of ICT for teaching ²	10.16	6.17	0.07	4.55
Student behaviour and classroom management ²	-0.85	7.92	-3.25	4.72
Monitoring students' development and learning ²	6.51	7.58	-4.35	4.48
R^2	0.19		0.24	

¹ Teacher variables are averaged only for mathematics teachers within the school. The sample is restricted to schools with at least one mathematics teacher.

² The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

2.5 Teachers' continued professional development

Participation in continued professional development is almost universal among Australian teachers, as it is compulsory to retain registration as a teacher (see Thomson & Hillman, 2019). The measures of participation in professional development included in the analyses covered aspects of *coverage* (how many activities teachers had participated in over the previous 12 months; the proportions of teachers who had participated in various professional development activities) as well as the *content* of the professional development activities (the proportion of teachers who had covered a range of different topics, such as knowledge and understanding of subject fields, ICT skills for teaching, or approaches to individualised learning). Further details on Australian teachers' and principals' participation in professional development are available in Chapter 5 of the TALIS 2018 Australian report, Volume 1 (Thomson & Hillman, 2019).

Higher participation in a range of professional development activities was not associated with Australian students' performance in PISA 2018. There was no relationship between the number of professional development activities taken by teachers, on average, and students' scores (Table 2.8). Reading scores tended to be lower in schools where higher proportions of all teachers reported attending courses or seminars in person ($\beta=-172.91$) or online ($\beta=-102.44$), in the twelve months prior to TALIS 2018.

When the analyses were restricted to reading teachers, the negative association between participation in online courses and reading scores remained significant (Table 2.9). Mathematics scores, in contrast, tended to be higher in schools where higher proportions of mathematics teachers (but not all teachers) had attended education conferences where teachers and/or researchers have opportunities to present or discuss their research ($\beta=33.36$).

TABLE 2.8 Relationship between PISA 2018 reading and mathematics performance and type of professional development (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:							
	Reading				Mathematics			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different professional development activities participated in during 12 months prior to survey	74.65	40.49	16.23	12.83	35.72	36.03	11.58	12.65
Share of teachers who participated in the following type of professional development activity 12 months prior to survey								
Courses/seminars attended in person	-172.91	67.46	-23.47	22.12	-93.30	56.73	-14.52	20.89
Online courses/seminars	-102.44	44.73	-11.14	16.75	-55.79	41.12	-3.45	15.97
Education conferences where teachers and/or researchers present research or discuss educational issues	-29.64	48.02	-2.36	15.44	-6.86	45.77	4.71	15.80
Formal qualification programme (e.g. degree)	-49.58	63.88	-19.35	22.45	-34.91	53.82	-16.94	21.75
Observation visits to other schools	-80.46	50.30	-36.98	18.04	-40.23	39.86	-26.87	17.64
Observation visits to business premises, public organisations or non-government organisations	-118.26	62.84	-35.78	20.53	-41.88	58.04	-24.69	19.41
Peer and/or self-observation and coaching as part of a formal school arrangement	-41.62	44.50	-1.82	15.74	-16.10	38.53	-0.49	15.16
Participation in a network of teachers formed specifically for the professional development of teachers	-82.51	52.29	-16.67	18.55	-37.49	43.57	-13.50	18.48
Reading professional literature	-76.19	53.17	-5.06	19.24	-18.94	45.49	-10.67	18.54
R^2	0.21		0.29		0.21		0.28	

¹ Teacher variables are averaged for all teachers within the school.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

TABLE 2.9 Relationship between PISA 2018 reading and mathematics performance and type of professional development (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:							
	Reading				Mathematics			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different professional development activities participated in during 12 months prior to survey	23.89	14.73	-1.81	6.27	-23.34	12.59	-0.21	5.07
Share of teachers who participated in the following type of professional development activity 12 months prior to survey								
Courses/seminars attended in person	-24.37	34.18	4.75	9.23	24.15	20.19	3.43	8.50
Online courses/seminars	-49.15	17.67	6.59	9.00	28.15	18.41	16.45	7.15
Education conferences where teachers and/or researchers present research or discuss educational issues	-12.72	15.09	9.08	8.78	33.36	16.77	2.68	6.63
Formal qualification programme (e.g. degree)	-48.22	33.07	-4.83	10.11	-6.59	23.35	-6.76	8.19
Observation visits to other schools	-18.59	28.30	-1.01	10.84	17.02	17.72	8.71	12.81
Observation visits to business premises, public organisations or non-government organisations	47.92	39.72	19.49	11.01	34.04	24.62	-7.23	9.30
Peer and/or self-observation and coaching as part of a formal school arrangement	-32.57	25.31	-4.28	9.07	22.01	18.81	-11.39	7.37
Participation in a network of teachers formed specifically for the professional development of teachers	-18.25	19.05	3.02	7.92	21.90	17.27	4.57	7.11
Reading professional literature	-22.84	28.69	2.40	10.87	23.28	20.59	8.01	8.35
R^2	0.20		0.25		0.18		0.25	

¹ Teacher variables are averaged for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

The content of teachers' professional development was related to Australian students' performance in reading only. Reading scores tended to be higher in schools where teachers on average participated in activities focused on knowledge of the curriculum ($\beta=77.47$) or teaching in a multicultural or multilingual setting ($\beta=83.51$) (see Table A2.13). When the analyses were restricted to reading teachers only, there was a negative association between student performance and reading teachers' participating in activities focused on teacher parent/guardian cooperation ($\beta=-32.99$).

2.6 Teachers' job satisfaction and well-being

Measures of teachers' well-being and job satisfaction included indices created from their responses to TALIS items, including workplace well-being, workload stress, satisfaction with their current work environment and satisfaction with the teaching profession as a whole, as well as ratings of teacher satisfaction with employment conditions, remuneration and how teachers are valued by different stakeholders (including policymakers and the media). The notes to Table 2.10 provide further details about the teacher well-being and satisfaction measures included in the analyses, while further information on the satisfaction and well-being of Australian teachers and principals can be found in Chapters 2 and 3 of the Australian TALIS report, Volume 2 (Thomson & Hillman, 2020).

In Australia, there was no relationship between measures of teachers' well-being and satisfaction with their jobs and students' scores in reading or mathematical literacy after controlling for students' own characteristics and those of their classmates, either for all teachers or when restricted to reading or mathematics teachers only.

Australian students' scores in science, however, tended to be higher in schools where science teachers reported higher levels of satisfaction with their work environment ($\beta=6.03$) but lower levels of satisfaction with their profession ($\beta=-12.16$). This somewhat contradictory pattern of relationships was also found across the TALIS-PISA link countries on average (Table 2.10).

TABLE 2.10 Relationship between PISA 2018 science performance and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition) – science subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary science teachers¹

Related to:	PISA scores in:			
	Science			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teacher well-being and job satisfaction				
Workplace well-being and stress ²	-4.40	3.40	-1.44	1.50
Workload stress ³	-5.06	3.51	-1.27	1.52
Job satisfaction with work environment ⁴	6.03	3.05	3.46	1.39
Job satisfaction with profession ⁵	-12.16	3.96	-6.16	1.52
Teachers' satisfaction with the salary ⁶	7.12	8.38	-2.23	3.96
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁶	2.39	10.06	1.44	4.32
Teachers' views of the way different stakeholders value the profession ⁷	-2.70	2.99	-2.30	1.30
R^2	0.20		0.25	

¹ Teacher variables are averaged only for science teachers within the school. The sample is restricted to schools with at least one science teacher.

² The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

³ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁴ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁵ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁶ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁷ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

2.7 School climate

The climate of the school a student attends, including such factors as involvement of parents and community groups with the school, collaboration among staff, encouragement of high academic standards and supportive relationships between students and teachers, is often cited as an important potential influence on student performance.

Analyses of the Australian TALIS-PISA link data, however, revealed no significant relationships between aspects of the school climate, as reported by teachers and school principals, and student performance in reading, mathematics or science once students' own characteristics and the characteristics of their classmates were accounted for (Table A2.14). Nor were school climate factors related to student performance on average across the TALIS-PISA link countries.

When the analyses were restricted to responses from subject teachers only (either reading, mathematics or science teachers, depending on the PISA subject score), there were no significant relationships found in Australia. On average across the TALIS-PISA link countries, mathematics scores tended to be higher in schools where there were higher reports of mathematics teachers' actions towards achieving academic excellence ($\beta=2.52$, Table A2.15).

2.8 School leadership

Measures of school leadership were based on principals' reports of their participation in a range of leadership activities over the 12 months prior to TALIS, including observing teachers in the classroom, providing feedback based on these observations, supporting teachers to develop new practices, collaborating with other principals on challenging tasks and working on professional development plans for their schools.

There were no significant, positive relationships between Australian students' performance in reading, mathematics or science and the various aspects of school leadership measured in TALIS 2018. Those associations that were statistically significant were negative, with reading and science scores tending to be lower in schools where school leaders reported reviewing school administrative procedures and reports more frequently (Table 2.11).

When the analyses were restricted to subject teachers only (and thus schools with at least one of these teachers), the relationship held for reading scores ($\beta=-20.43$) but was no longer significant for science scores (Table 2.12).

TABLE 2.11 Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School leadership												
Collaborated with teachers to solve classroom discipline problems ²	-1.89	5.32	-1.39	2.09	-1.14	4.89	-0.91	2.02	-2.73	5.76	-1.98	2.09
Observed instruction in the classroom ²	8.29	6.97	-4.85	3.12	2.47	5.92	-4.25	2.91	6.92	8.29	-4.31	3.16
Provided feedback to teachers based on my observations ²	-10.63	8.15	4.56	3.44	-4.17	8.20	4.46	3.14	-9.46	9.68	4.58	3.35
Took actions to support cooperation among teachers to develop new teaching practices ²	4.68	6.98	-1.85	2.76	-1.79	4.93	-3.00	2.71	0.84	6.13	-2.68	2.64
Took actions to ensure that teachers take responsibility for improving their teaching skills ²	4.74	9.98	-0.12	3.39	3.49	9.21	1.84	3.25	0.16	10.19	-0.52	3.29
Took actions to ensure that teachers feel responsible for students' learning outcomes ²	6.40	8.77	6.07	3.21	3.62	8.83	3.66	3.01	10.74	8.93	5.68	3.10
Provided parents/guardians with information on school and student performance ²	7.34	7.89	-0.02	2.46	1.09	6.72	0.26	2.28	0.47	7.43	-1.13	2.33
Reviewed school administrative procedures and reports ²	-16.28	5.75	2.64	2.48	-8.38	6.01	3.87	2.52	-14.89	6.26	2.04	2.45
Resolved problems with the lesson timetable in this school ²	-4.40	4.72	-2.38	1.81	-1.62	4.41	-2.05	1.76	-0.33	5.55	-0.87	1.82
Collaborated with principals from other schools on challenging work tasks ²	-1.10	4.35	0.82	2.56	-1.54	4.12	-0.66	2.58	-0.60	4.72	-0.01	2.46
Worked on a professional development plan for this school ²	-2.34	6.91	-0.03	2.59	-4.03	5.77	-0.99	2.40	-2.40	6.72	-0.21	2.43
<i>R</i> ²	0.21		0.29		0.21		0.28		0.19		0.26	

¹ Teacher variables are averaged for all teachers within the school.

² The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

TABLE 2.12 Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary principals (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School leadership												
Collaborated with teachers to solve classroom discipline problems ²	-4.96	6.52	-3.32	2.79	-2.27	6.15	-4.98	2.71	-4.30	7.37	-4.44	2.92
Observed instruction in the classroom ²	3.81	8.85	-3.84	4.04	1.49	6.65	-5.64	3.88	-2.39	9.76	-3.81	4.40
Provided feedback to teachers based on my observations ²	-6.58	10.65	9.23	4.34	-4.02	8.60	-1.04	4.01	-6.46	11.38	0.12	4.57
Took actions to support cooperation among teachers to develop new teaching practices ²	-2.32	6.35	-7.63	3.39	-1.59	7.48	-3.76	3.43	-1.96	7.70	-3.64	3.39
Took actions to ensure that teachers take responsibility for improving their teaching skills ²	7.98	10.78	4.91	4.61	3.28	10.22	1.83	4.83	5.83	13.70	-2.01	4.36
Took actions to ensure that teachers feel responsible for students' learning outcomes ²	5.73	11.29	2.42	4.98	4.72	10.28	3.92	4.40	2.13	12.06	8.08	4.15
Provided parents/guardians with information on school and student performance ²	9.81	8.77	-9.32	3.05	-8.15	8.79	1.26	3.52	2.00	7.51	-0.01	2.78
Reviewed school administrative procedures and reports ²	-20.43	6.16	3.45	2.94	-8.55	6.47	-0.44	3.67	-10.87	7.45	2.90	3.12
Resolved problems with the lesson timetable in this school ²	-4.33	4.11	-2.52	2.36	-2.62	5.45	3.33	2.74	-1.28	6.94	0.78	2.86
Collaborated with principals from other schools on challenging work tasks ²	0.56	5.39	2.85	2.74	3.43	5.04	-4.37	3.66	-2.49	5.17	-7.05	3.66
Worked on a professional development plan for this school ²	5.76	6.64	4.52	2.77	-2.00	6.15	4.90	3.22	-2.30	7.85	4.14	3.25
<i>R</i> ²	0.20		0.25		0.18		0.25		0.19		0.24	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

Notes: For full results, including those for classroom and student characteristics, see tables in Appendix A. Statistically significant values are indicated in bold.

2.9 Classroom characteristics

The performance of Australian students is associated with the composition of their classes, with the characteristics of the students sitting around them, and these relationships hold when controlling for students' own characteristics and when various teacher and school factors are added to the analyses.

Table 2.13 presents the results of analyses of the relationships between Australian students' performance in reading, mathematics and science and their own characteristics and those of their classmates. Comparison of the R^2 values in Table 2.13 and those of any of the other analyses in this chapter indicates that the addition of the teacher and school factors to the analyses does not result in a great increase in the percentage of variance explained – for Australian students, the bulk of the variance is already explained by student and classroom factors – $R^2 = 0.19$, compared to values around $R^2 = 0.20$ or 0.21 for the analyses that also included teacher or school factors.

Australian students' scores in reading, mathematics and science tend to be higher in schools where students are in classes with higher proportions of socioeconomically advantaged students, even when controlling for the effects of their own socioeconomic background. These relationships were not found across the TALIS-PISA link countries on average.

In addition, Australian students tended to score higher in all three PISA subjects in schools where students were in classes with higher proportions of higher-achieving students. Conversely, scores tend to be lower in schools where classes have higher concentrations of socioeconomically disadvantaged, or lower-achieving students. This was also the case across the TALIS-PISA link countries on average.

TABLE 2.13 Relationship between PISA 2018 reading, mathematics and science performance and classroom characteristics (controlling for student characteristics) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom characteristics²												
Share of students whose first language is different from the language(s) of instruction ³	0.23	0.81	0.07	0.31	0.31	0.58	0.15	0.31	0.14	0.73	0.06	0.34
Share of low academic achievers ³	-1.20	0.70	-0.64	0.33	-0.61	0.62	-0.65	0.31	-0.97	0.75	-0.79	0.32
Share of students with special needs ³	0.86	0.96	-0.98	0.69	0.25	0.77	-1.23	0.65	0.51	0.91	-1.24	0.64
Share of students with behavioural problems ³	0.10	1.04	-0.77	0.45	0.36	0.87	-0.59	0.42	0.38	1.14	-0.53	0.43
Share of students from socioeconomically disadvantaged homes ³	-1.14	0.39	-0.50	0.35	-1.16	0.39	-0.62	0.34	-1.06	0.42	-0.55	0.34
Share of academically gifted students ³	0.91	0.36	1.52	0.28	1.44	0.44	1.79	0.25	1.29	0.42	1.54	0.27
Share of students who are immigrants or with a migrant background ³	0.26	0.77	0.97	0.55	0.05	0.65	0.93	0.59	0.19	0.71	0.89	0.57
Share of students who are refugees ³	0.17	0.76	-0.41	1.33	0.30	0.85	-1.13	1.33	0.29	1.00	-0.23	1.24
Class size ⁴	-0.73	1.79	1.26	0.44	-0.96	1.46	1.00	0.39	-1.12	1.68	1.27	0.41
Student characteristics												
Female students ⁵	32.62	5.75	23.30	2.26	-10.10	5.19	-10.91	2.02	-2.62	5.30	-2.84	2.12
Students with an immigrant background ⁵	-4.64	5.61	-33.10	4.71	7.13	5.40	-25.04	5.78	-5.67	6.00	-29.41	5.34
Students' socioeconomic status ⁷	27.36	3.22	21.03	1.01	23.97	3.58	20.29	1.10	25.97	3.50	20.43	1.13
R ²	0.19		0.27		0.20		0.27		0.17		0.26	

¹ Teacher variables are averaged for all teachers within the school.

² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

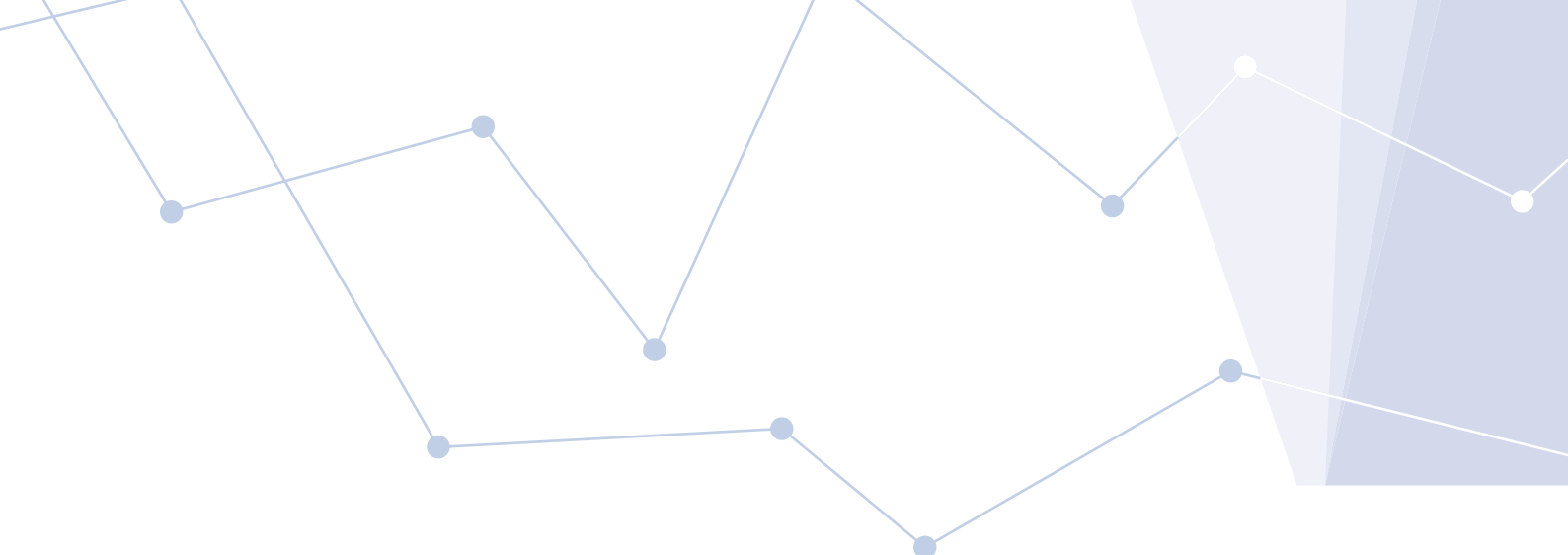
⁴ Number of students in the target class.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.



What Australian teachers and schools do that matters for equity

Key Findings

PISA scores were *higher* for lower-performing Australian students in schools where:

- ▶ Teachers had more positive perceptions of the classroom disciplinary climate (mathematics scores only)
- ▶ Teachers made greater use of work hours to mark and correct student work (reading, mathematics and science scores)
- ▶ Teachers reported higher job satisfaction with their work environment (reading, mathematics and science scores)
- ▶ Principals reported greater involvement of stakeholders (reading scores only)
- ▶ There were more positive teacher-student relations in classrooms (science scores only)
- ▶ Classes had higher proportions of academically gifted students (mathematics and science).

PISA scores were *higher* for higher-performing Australian students in schools where:

- ▶ Teachers made greater use of work hours to mark and correct students work (reading scores only)
- ▶ Teachers were satisfied with their work environment (mathematics scores only)
- ▶ Principals reported greater involvement of stakeholders (reading and mathematics)
- ▶ Classes had higher proportions of academically gifted students (mathematics and science).

Differences in the average reading scores of female and male students were *lower* in schools where:

- ▶ Teachers reported more positive teacher-student relations in classrooms
- ▶ Teachers were appraised by other members of the school management team
- ▶ Principals had worked on a professional development plan for the school.

Differences in the average reading scores of female and male students were *higher* in schools where:

- ▶ Teachers reported a collaborative school culture
- ▶ Principals had resolved problems with the lesson timetable or collaborated with other principals on challenging work tasks.

Differences between advantaged and disadvantaged students within the same schools were *lower* (thereby in favour of students from disadvantaged backgrounds) in schools where:

- ▶ There were higher proportions of female teachers (reading, mathematics, and science)
- ▶ Teachers' formal training and education covered content of some or all subjects they taught (reading, mathematics, and science); and teaching in a multicultural or multilingual setting (mathematics only)
- ▶ Teachers' initial education and training covered use of ICT for teaching (reading and science)
- ▶ Teachers acted as an assigned mentor for one or more teachers (mathematics only)
- ▶ Teachers had undertaken professional development in the past 12 months on student behaviour and classroom management (reading and mathematics), approaches to individualised learning (reading only), analysis and use of student assessments (reading only)
- ▶ Teachers reported high professional collaboration (reading, mathematics, and science)
- ▶ Principals reported more teacher actions towards achieving academic excellence, as measured by the index of academic pressure (reading, mathematics, and science).

This chapter explores the characteristics and practices of schools and their teachers that are important for equity in student achievement. The first section discusses the practices and characteristics of Australian teachers and schools that relate to the reading, mathematics and science performance of higher-achieving students and lower-achieving students. The following two sections present the results of analyses that investigate teacher and school factors that are related to within-school differences in the average performances of groups of students including:

- ▶ male and female students (See Box 3.1 for a summary of gender-related differences in Australia's PISA 2018 performance) and
- ▶ students from advantaged and disadvantaged backgrounds (see Box 3.2 for a summary of socioeconomic background differences in Australia's PISA 2018 performance).

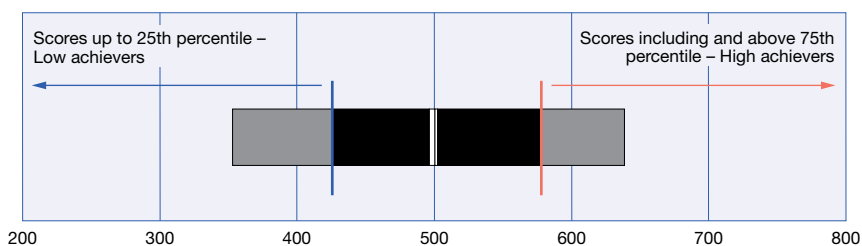
3.1 Teacher and school factors for lower-achieving and higher-achieving students

The analyses reported in Chapter 2 examined which teacher and school factors were important in explaining the average differences in student performance across schools. This chapter investigates which teacher and school factors are related to the performance of students at higher or lower points along the distribution of performance, by employing quantile regression techniques.⁶

As an example, the distribution of Australian student performance in reading literacy in PISA 2018 is presented in Figure 3.1. The mean, or average, reading score for Australian students was 503 points, with a confidence interval of 499 to 505 points. Students at the 25th percentile, in contrast, scored 429 points, while those at the 75th percentile scored 580 points. While standard linear regression would focus on student performance for the entire sample of students, quantile regressions focus instead on student performance in the lowest quartile (scores up to 429 points) and the highest quartile (scores above 580 points).

⁶ Quantile regressions can be applied to investigate relationships between teacher and school factors and student performance at different points (percentiles) along the distribution of student performance. Standard linear regression, in comparison, focuses on relationships between these teacher and school factors and average student performance, or, in other words, the score of the average student (see, for example, Koenker and Bassett (1978) or Koenker (2005) for a detailed introduction).

FIGURE 3.1 Australia's reading literacy distribution, PISA 2018



By estimating quantile regressions at the 25th and 75th percentiles in the conditional distribution of students' performances, this section explores whether there are practices and characteristics of teachers and schools that matter specifically for lower-performing students or their higher-performing peers.

For ease of reading, in the following sections, students at the 25th percentile or below (or equivalently at the bottom quartile) of the test score distribution are referred to as lower achievers (or in equivalent terms as lower performers, lower-achieving students, etc.). Students at the 75th percentile or above (or at the top quartile) of the test score distribution are referred to as higher achievers.

In the following sections, the interpretation of the quantile regression results focuses on the significance, and to a lesser extent, on the size of the regression coefficients estimated at the bottom and the top quartiles of the conditional performance distribution. For example, a teacher factor will be deemed more important for low achievers than for high achievers if it is found to be significant for the bottom quartile but not for the top quartile. Differences in the coefficients are neither reported nor commented on, as in most cases, they are not statistically significant, most likely due to small sample sizes.⁷

3.1.1 Teachers' classroom practices

Mathematics scores of lower-achieving Australian students tended to be higher in schools where teachers reported fewer disciplinary issues in the classroom ($\beta=-21.76$, Table 3.1). Disruption in the classroom caused by poor discipline may be particularly detrimental for students who are already having difficulty understanding and applying mathematical concepts.

Among higher-achieving Australian students, there was no significant association between teachers' perceptions of the disciplinary climate of the classroom and student performance (Table 3.2).

Across the TALIS-PISA link countries on average, the negative association between disciplinary issues in the classroom and performance of both lower-achieving and higher-achieving students was evident across reading, mathematics and science.

⁷ As discussed in Chapter 1, all statistically significant relationships presented here are associations only. No claims of causation can be made.

TABLE 3.1 Relationship between lower-achieving students' PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Lower-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices³												
Share of class time spent on actual teaching and learning	1.61	1.47	1.55	0.44	-0.31	1.39	1.49	0.43	1.51	1.36	1.74	0.45
Teachers' autonomy over planning and teaching ⁴	-0.92	10.76	-2.55	3.35	-3.91	9.29	-1.77	3.18	-0.27	9.56	-2.33	3.19
Teachers' perceived disciplinary climate ⁵	-14.49	10.13	-15.33	3.49	-21.76	10.99	-14.60	3.66	-12.43	10.52	-14.32	3.47
Teachers' practices (frequency): clarity of instruction ⁶	-4.52	9.11	1.25	3.72	-6.58	8.66	-0.44	3.51	-0.11	9.38	2.49	3.65
Teachers' practices (frequency): cognitive activation ⁷	-5.12	13.08	-2.02	3.92	-2.83	12.99	-3.76	3.83	-6.81	13.81	-3.46	3.90
Teachers' assessment practices: administer own assessment ⁸	11.85	20.39	12.56	9.03	14.55	18.18	8.22	8.34	3.42	19.23	9.44	8.62
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁸	-18.40	30.49	-6.04	8.76	-4.54	24.48	-1.59	8.12	-7.87	28.63	-0.86	8.41
Teachers' assessment practices: let students evaluate their own progress ⁸	-4.86	31.24	-10.74	9.64	-0.30	27.90	-6.73	9.39	-2.41	27.37	-9.66	9.40
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁸	-0.04	36.60	-7.60	11.29	7.68	36.70	-5.06	10.38	20.91	36.89	-4.88	10.81
Student characteristics												
Female students ⁹	36.17	9.09	29.61	3.11	-11.50	8.82	-6.74	3.05	1.30	8.39	1.74	2.91
Students with an immigrant background ¹⁰	4.78	12.38	-32.97	8.75	14.78	11.57	-27.44	10.65	3.72	11.07	-33.12	12.71
Students' socioeconomic status ¹¹	31.23	5.38	26.44	1.70	28.69	5.29	25.38	1.71	32.94	5.54	25.97	1.74

¹ Teacher variables are averaged for all teachers within the school.

² Lower-achieving students are those in the bottom quartile (i.e. 25th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ The index of target class autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁵ The index of classroom disciplinary climate measures the extent to which teachers perceive disciplinary issues in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁶ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁷ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁸ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE 3.2 Relationship between higher-achieving students' PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Higher-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices³												
Share of class time spent on actual teaching and learning	1.36	1.16	1.31	0.46	0.79	1.28	1.17	0.46	1.61	1.54	1.40	0.48
Teachers' autonomy over planning and teaching ⁴	-5.13	7.98	-1.59	2.99	1.43	7.57	-0.70	2.98	-3.21	10.72	-2.51	3.06
Teachers' perceived disciplinary climate ⁵	-12.06	9.58	-16.59	3.61	-14.97	10.43	-17.85	3.46	-10.14	11.57	-16.57	3.64
Teachers' practices (frequency): clarity of instruction ⁶	-3.53	7.77	0.65	3.54	-5.66	7.48	-0.35	3.47	-0.12	10.60	0.13	3.43
Teachers' practices (frequency): cognitive activation ⁷	3.91	12.19	-0.88	3.98	1.29	10.27	-3.30	3.78	-0.63	13.12	-2.83	3.77
Teachers' assessment practices: administer own assessment ⁸	9.84	17.83	9.97	9.09	-8.80	18.25	6.32	8.78	4.57	21.84	10.97	8.89
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁸	-17.79	25.89	-1.49	7.90	-7.85	23.20	-1.02	7.69	-21.17	24.95	-2.07	7.54
Teachers' assessment practices: let students evaluate their own progress ⁸	-13.46	25.97	-14.98	9.15	-16.23	26.94	-14.51	9.47	-4.35	28.11	-12.74	8.79
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁸	54.21	28.54	-6.00	9.71	17.39	27.34	-7.56	9.99	31.17	35.20	-2.34	9.50
Student characteristics												
Female students ⁹	23.88	8.97	18.79	3.05	-16.58	8.55	-14.53	2.87	-9.14	8.78	-7.02	3.01
Students with an immigrant background ¹⁰	7.23	9.09	-29.07	8.43	17.46	9.86	-21.36	9.70	3.55	11.02	24.84	12.70
Students' socioeconomic status ¹¹	35.38	5.72	28.90	1.63	30.02	4.50	27.08	1.58	31.45	5.07	27.55	1.61

¹ Teacher variables are averaged for all teachers within the school.

² Higher-achieving students are those in the top quartile (i.e. 75th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ The index of target class autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁵ The index of classroom disciplinary climate measures the extent to which teachers perceive disciplinary issues in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁶ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁷ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁸ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

3.1.2 Teachers' use of working time

For lower-achieving Australian students, having teachers who allocate work hours to marking and correcting student work appears to be beneficial – reading, mathematics and science scores were all higher in schools where marking was done during work time (Table 3.3). These relationships were also found across TALIS-PISA countries on average. Among higher-achieving students, the association between teachers' using work time to mark and correct student work and performance was only significant for reading scores ($\beta=6.10$) (Table 3.4).

Among lower-achieving and higher-achieving Australian students, performance in all three PISA subjects tended to be lower in schools in which teachers spent more working hours participating in school management. While these relationships held for lower-achieving students across TALIS-PISA countries, there was no negative association between teachers' time commitment to school management and student performance among higher-achieving students on average across TALIS-PISA link countries. It is difficult to find an explanation for the association between lower performance and greater involvement of teachers in school management tasks.

TABLE 3.3 Relationship between lower-achieving students' PISA 2018 reading, mathematics and science performance and teachers' working hours (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Lower-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' working hours³												
Total working hours	1.74	1.16	1.11	0.59	1.25	1.20	0.84	0.56	1.41	1.13	1.19	0.57
Teaching	-0.07	2.03	-0.49	0.89	0.45	1.68	-0.14	0.85	-0.39	1.80	-0.30	0.85
Individual planning or preparation of lessons either at school or out of school	0.96	3.57	0.74	2.09	1.20	3.71	1.52	1.97	1.69	3.66	1.72	2.08
Team work and dialogue with colleagues within this school	-0.91	9.75	-7.23	3.40	0.30	7.49	-7.17	3.33	0.22	7.82	-6.74	3.36
Marking/correcting of student work	9.30	3.24	9.53	2.30	6.95	3.45	9.02	2.19	7.19	3.22	8.84	2.18
Counselling students	0.79	6.01	-1.93	2.28	1.65	5.80	-2.71	2.23	2.66	6.04	-1.97	2.44
Participation in school management	-16.12	6.00	-6.64	3.05	-12.96	5.51	-5.99	3.05	-14.54	5.16	-6.90	2.93
General administrative work	1.22	4.65	4.45	2.95	1.30	4.95	4.48	2.82	0.47	4.83	2.56	2.77
Professional development activities	-1.46	8.04	-2.73	3.03	-1.18	8.31	-3.08	2.88	0.04	8.10	-1.61	3.01
Communication and cooperation with parents or guardians	14.18	13.95	0.62	3.41	7.94	11.33	0.45	3.18	8.21	10.56	-0.93	3.14
Engaging in extracurricular activities	-4.74	5.63	3.87	2.52	-3.51	4.28	3.54	2.34	-3.70	4.56	4.41	2.43
Other work tasks	4.35	4.36	0.95	2.23	4.28	4.67	1.68	2.10	3.23	5.11	0.26	2.17
Student characteristics												
Female students ⁴	38.11	9.42	35.16	3.38	-8.55	8.97	-0.69	3.42	-0.53	8.09	7.20	3.17
Students with an immigrant background ⁵	-4.90	12.15	-32.26	8.43	7.97	10.38	-24.48	9.29	-5.44	10.15	-30.38	11.63
Students' socioeconomic status ⁶	32.76	4.60	25.44	1.91	29.68	5.16	25.00	1.85	33.01	4.89	25.92	1.89

¹ Teacher variables are averaged for all teachers within the school.

² Lower-achieving students are those in the bottom quartile (i.e. 25th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE 3.4 Relationship between higher-achieving students' PISA 2018 reading, mathematics and science performance and teachers' working hours (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Higher-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' working hours³												
Total working hours	0.70	1.08	0.90	0.57	0.99	1.07	0.88	0.55	0.29	1.14	1.08	0.59
Teaching	-0.63	1.47	-0.50	0.84	0.58	1.50	-0.55	0.82	-0.16	1.66	-0.47	0.85
Individual planning or preparation of lessons either at school or out of school	4.55	3.16	3.64	1.88	1.56	3.13	4.15	1.92	5.94	3.28	4.45	1.96
Team work and dialogue with colleagues within this school	-4.88	5.69	-8.72	3.94	-0.79	5.84	-8.47	3.66	-1.96	6.08	-8.26	4.02
Marking/correcting of student work	6.10	2.41	8.78	2.00	4.65	2.91	7.44	2.12	4.76	3.08	7.64	2.07
Counselling students	-0.91	5.09	-3.18	2.14	-2.47	5.30	-4.46	2.18	0.27	5.24	-2.52	2.32
Participation in school management	-17.94	5.37	-5.94	3.18	-14.01	4.52	-5.30	2.88	-16.11	5.24	-5.21	3.16
General administrative work	3.36	5.54	3.39	3.08	5.31	5.91	3.99	2.97	2.80	6.07	1.66	3.04
Professional development activities	-4.21	6.62	-4.97	2.64	-3.14	5.72	-4.10	2.54	-6.64	7.09	-4.11	2.83
Communication and cooperation with parents or guardians	13.12	9.58	-0.61	2.92	9.26	8.78	-0.81	3.02	14.74	9.82	-1.18	3.06
Engaging in extracurricular activities	-3.35	4.35	4.20	2.51	-3.23	3.50	3.55	2.41	-4.20	4.02	3.56	2.48
Other work tasks	4.86	4.89	2.15	2.33	2.29	4.46	2.19	2.36	1.68	4.33	1.47	2.37
Student characteristics												
Female students ⁴	26.74	8.90	24.76	3.43	-16.13	7.20	-9.32	3.15	-7.69	8.94	-0.51	3.33
Students with an immigrant background ⁵	0.23	10.04	-30.77	8.092	14.56	8.64	-21.73	9.96	-1.10	8.99	-25.43	11.23
Students' socioeconomic status ⁶	35.51	5.62	28.69	1.64	31.89	5.18	27.61	1.65	32.86	5.17	28.04	1.73

¹ Teacher variables are averaged for all teachers within the school.

² Higher-achieving students are those in the top quartile (i.e. 75th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

3.1.3 Teachers' job satisfaction and well-being

Among lower-achieving students in Australia, PISA scores in reading, mathematics and science all tended to be higher in schools where teachers' satisfaction with their work environment was higher (Table 3.5). These relationships were also found across TALIS-PISA link countries on average. For higher-achieving Australian students, the positive association between their performance and their teachers' job satisfaction held only for mathematics scores ($\beta=13.49$) (Table 3.6).

As reported in Chapter 2, there was no association between Australian students' performance on average and their teachers' job satisfaction, this association appears to be restricted to lower-achieving students in Australia.

TABLE 3.5 Relationship between lower-achieving students' PISA 2018 reading, mathematics and science performance and teacher well-being and job satisfaction (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Lower-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher well-being and job satisfaction												
Workplace well-being and stress ³	-6.34	10.27	-3.67	5.01	-5.31	9.66	-5.80	4.57	-3.57	10.29	-4.10	4.70
Workload stress ⁴	10.99	12.01	11.29	4.78	7.53	10.62	10.85	4.54	6.35	10.95	10.30	4.42
Job satisfaction with work environment ⁵	18.48	8.98	13.81	3.62	14.68	7.29	13.22	3.44	18.38	8.23	14.78	3.39
Job satisfaction with profession ⁶	-12.67	13.87	-8.55	4.55	-12.54	13.93	-6.26	4.23	-11.32	12.57	-6.49	4.27
Teachers' satisfaction with the salary ⁷	13.14	24.93	-6.25	10.48	6.90	20.19	-9.88	8.99	7.56	22.39	-6.43	9.28
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁷	12.42	40.26	14.02	10.67	12.33	33.14	10.73	9.77	19.88	37.72	11.23	9.99
Teachers' views of the way different stakeholders value the profession ⁸	-5.96	9.74	-10.56	4.47	-4.31	8.48	-11.07	4.26	-5.36	9.49	-11.25	4.10
Student characteristics												
Female students ⁹	36.07	9.71	33.14	3.31	-8.39	8.93	-3.20	3.19	-0.50	8.35	4.74	3.03
Students with an immigrant background ¹⁰	1.23	12.04	-27.51	10.08	16.85	11.39	-23.31	10.16	0.20	9.76	-30.17	12.12
Students' socioeconomic status ¹¹	35.68	5.91	27.98	1.78	31.27	5.47	26.49	1.69	34.87	5.67	27.71	1.72

¹ Teacher variables are averaged for all teachers within the school.

² Lower-achieving students are those in the bottom quartile (i.e. 25th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE 3.6 Relationship between higher-achieving students' PISA 2018 reading, mathematics and science performance and teacher well-being and job satisfaction (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Higher-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher well-being and job satisfaction												
Workplace well-being and stress ³	-3.25	10.39	-3.82	4.52	2.40	9.03	-2.69	4.61	6.82	10.12	-2.07	4.99
Workload stress ⁴	0.14	8.24	7.96	4.42	3.39	7.18	7.13	4.30	4.38	8.93	8.80	4.45
Job satisfaction with work environment ⁵	13.30	7.57	13.41	3.30	13.49	6.07	14.03	3.30	16.38	8.52	12.99	3.39
Job satisfaction with profession ⁶	-13.68	12.56	-8.14	4.03	-9.46	12.34	-7.04	4.18	-8.13	12.27	-4.65	4.11
Teachers' satisfaction with the salary ⁷	0.95	21.47	-5.41	9.49	9.50	19.29	-0.79	9.11	15.07	22.42	-1.97	9.47
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁷	11.66	31.64	5.52	10.43	11.67	31.17	5.65	10.92	13.30	31.21	6.57	11.08
Teachers' views of the way different stakeholders value the profession ⁸	-1.16	9.10	-9.78	4.56	-0.02	8.13	-9.95	4.28	-1.33	10.00	-8.83	4.45
Student characteristics												
Female students ⁹	26.57	9.49	21.98	3.19	-15.58	7.26	-11.82	3.05	-9.35	9.75	-3.98	3.13
Students with an immigrant background ¹⁰	7.22	9.02	-30.05	10.09	18.33	9.58	-20.47	10.31	2.91	10.79	-22.72	12.13
Students' socioeconomic status ¹¹	38.58	6.14	29.17	1.72	33.40	4.77	27.70	1.69	35.17	5.37	28.11	1.70

¹ Teacher variables are averaged for all teachers within the school.

² Higher-achieving students are those in the top quartile (i.e. 75th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

3.1.4 School climate

In Australia, there were no consistent relationships between school climate factors and the performance of lower-achieving students (Table 3.7). The reading scores, but not mathematics or science scores, of lower-achieving students tended to be higher in schools with greater stakeholder involvement ($\beta=5.33$). Lower-performing students' science scores tended to be higher in schools with higher scores on a scale of teacher-student relations ($\beta=14.5$), a measure of teachers' perceptions of the quality of interactions and relationships between students and teachers in the classroom that included items such as "Teachers and students usually get on well with each other" and "Most teachers are interested in what students have to say" (see Chapter 3 of the Australian TALIS report Volume 1 for further details of Australia's results on this scale, Thomson & Hillman, 2019).

Among higher-achieving Australian students, scores in reading and mathematics tended to be higher in schools with greater levels of stakeholder involvement ($\beta=4.44$ and $\beta=4.28$, respectively, Table 3.8). Across the TALIS-PISA link countries on average, scores in all three subject areas were higher where stakeholder involvement in schools was higher.

TABLE 3.7 Relationship between lower-achieving students' PISA 2018 reading, mathematics and science performance and school climate (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	Lower-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School climate												
Collaborative school culture ³	2.86	6.74	-0.20	3.22	1.24	6.00	-0.72	2.97	1.42	6.78	-0.10	3.11
Teacher-student relations ⁴	14.03	7.53	11.28	4.17	10.50	6.75	11.35	3.94	14.50	7.25	11.29	4.00
Teachers' actions towards achieving academic excellence ⁵	-1.01	4.55	1.00	1.25	-0.09	3.41	1.27	1.10	-0.25	3.39	1.26	1.15
Stakeholder (i.e. parents and local community) involvement in school ⁶	5.33	2.67	3.18	1.46	4.29	2.38	3.03	1.39	4.74	2.62	2.82	1.34
Student characteristics												
Female students ⁷	38.50	9.81	34.58	3.42	-7.93	8.63	-2.78	3.35	0.96	8.59	6.28	3.15
Students with an immigrant background ⁸	2.51	11.85	-33.31	9.58	14.84	9.97	-27.32	11.60	2.56	10.90	-33.55	13.32
Students' socioeconomic status ⁹	33.61	5.78	29.22	2.00	29.43	5.19	27.97	1.90	32.54	5.09	28.58	1.85

¹ Teacher variables are averaged for all teachers within the school.

² Lower-achieving students are those in the bottom quartile (i.e. 25th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ Dummy variable: the reference category is male.

⁸ Dummy variable: the reference category is student with no immigrant background.

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE 3.8 Relationship between higher-achieving students' PISA 2018 reading, mathematics and science performance and school climate (controlling for student characteristics)

Results of quantile regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	Higher-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School climate												
Collaborative school culture ³	4.71	6.25	0.32	2.78	2.95	5.48	0.09	2.74	5.52	6.97	0.65	2.79
Teacher-student relations ⁴	10.76	7.02	10.42	3.38	11.13	6.25	11.20	3.16	12.73	7.37	10.37	3.20
Teachers' actions towards achieving academic excellence ⁵	0.71	2.66	1.96	1.00	0.62	2.19	1.88	1.01	1.40	2.95	1.74	1.00
Stakeholder (i.e. parents and local community) involvement in school ⁶	4.44	2.18	2.76	1.10	4.28	1.91	3.09	1.10	3.48	2.19	2.90	1.02
Student characteristics												
Female students ⁷	26.78	9.21	21.19	3.05	-15.19	7.81	-12.01	2.82	-8.51	8.23	-4.02	3.04
Students with an immigrant background ⁸	4.15	9.16	-32.32	7.79	14.63	9.47	-22.22	10.49	-0.05	10.41	-27.15	12.81
Students' socioeconomic status ⁹	36.15	5.76	30.39	1.76	31.49	50.8	28.64	1.72	31.65	5.69	28.85	1.78

¹ Teacher variables are averaged for all teachers within the school.

² Higher-achieving students are those in the top quartile (i.e. 75th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ Dummy variable: the reference category is male.

⁸ Dummy variable: the reference category is student with no immigrant background.

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

3.1.5 Classroom characteristics

In Chapter 2, the relationship between Australian students' performance in PISA and the composition of their classes was present in all of the reported analyses. When restricting the focus to the performance of lower-achieving students in mathematics or science, these relationships were still significant – mathematics scores of lower-achieving students were lower in schools where classes had higher proportions of socioeconomically disadvantaged students ($\beta=-1.39$), while mathematics and science scores of lower-achieving students were higher in schools where classes had higher proportions of academically gifted students ($\beta=1.32$ and $\beta=1.18$, respectively) (Table 3.9).

TABLE 3.9 Relationship between lower-achieving students' PISA 2018 reading, mathematics and science performance and classroom characteristics (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Lower-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom characteristics³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.12	0.97	0.01	0.42	0.54	0.95	0.08	0.41	0.02	0.97	0.02	0.45
Share of low academic achievers ⁴	-1.37	1.02	-0.85	0.42	-0.79	0.98	-0.75	0.41	-1.21	0.98	-1.00	0.42
Share of students with special needs ⁴	0.67	1.22	-0.88	0.94	0.37	1.08	-1.13	0.90	0.41	1.09	-1.19	0.83
Share of students with behavioural problems ⁴	-0.32	1.58	-0.84	0.59	0.61	1.30	-0.60	0.57	0.41	1.32	-0.62	0.57
Share of students from socioeconomically disadvantaged homes ⁴	-1.15	0.66	-0.23	0.47	-1.39	0.60	-0.50	0.45	-1.13	0.61	-0.31	0.45
Share of academically gifted students ⁴	0.86	0.54	1.45	0.35	1.32	0.65	1.75	0.32	1.18	0.58	1.55	0.34
Share of students who are immigrants or with a migrant background ⁴	0.47	1.01	1.26	0.86	0.02	0.93	0.96	0.80	0.51	0.99	0.85	0.78
Share of students who are refugees ⁴	-0.10	1.41	-0.96	1.84	0.31	1.19	-1.44	2.05	0.21	1.24	-0.35	1.86
Class size ⁵	-1.06	2.37	1.29	0.59	-0.99	2.02	1.10	0.52	-1.09	2.06	1.49	0.57
Student characteristics												
Female students ⁶	38.16	8.35	27.04	3.27	-8.26	9.09	-9.27	3.08	0.88	7.83	0.01	3.15
Students with an immigrant background ⁷	-2.16	11.87	-33.08	10.07	8.09	9.66	-28.03	9.76	-4.87	11.05	-31.74	12.75
Students' socioeconomic status ⁸	25.08	5.09	20.53	1.79	23.80	4.68	20.26	1.72	26.47	4.97	20.69	1.76

¹ Teacher variables are averaged for all teachers within the school.

² Lower-achieving students are those in the bottom quartile (i.e. 25th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Number of students in the target class.

⁶ Dummy variable: the reference category is male.

⁷ Dummy variable: the reference category is student with no immigrant background.

⁸ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

When shifting focus to the performance of higher-achieving students, the association between higher scores and higher proportions of academically gifted students in the classroom held for the mathematics and science scores for Australian students. Across the TALIS-PISA link countries on average, reading, mathematics and science scores were higher where higher-achieving students were in classes with greater proportions of academically gifted students.

TABLE 3.10 Relationship between higher-achieving students' PISA 2018 reading, mathematics and science performance and classroom characteristics (controlling for student characteristics)
Results of quantile regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Higher-achieving ² students' PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom characteristics³												
Share of students whose first language is different from the language(s) of instruction	0.19	1.10	0.02	0.40	-0.12	0.70	0.10	0.38	-0.05	0.97	0.00	0.46
Share of low academic achievers ⁴	-0.98	0.92	-0.44	0.40	-0.57	0.92	-0.53	0.38	-0.76	1.08	-0.63	0.41
Share of students with special needs ⁴	1.15	1.42	-0.93	0.85	0.23	1.23	-1.28	0.80	0.45	1.32	-1.32	0.89
Share of students with behavioural problems ⁴	-0.16	1.39	-0.67	0.62	0.10	1.25	-0.56	0.57	0.38	1.74	-0.49	0.58
Share of students from socioeconomically disadvantaged homes ⁴	-1.20	0.70	-0.83	0.49	-0.94	0.52	-0.74	0.46	-1.11	0.67	-0.84	0.45
Share of academically gifted students ⁴	0.77	0.40	1.56	0.35	1.43	0.56	1.81	0.30	1.38	0.59	1.55	0.36
Share of students who are immigrants or with a migrant background ⁴	0.28	0.93	0.99	0.68	0.20	0.79	1.13	0.68	0.05	0.99	1.18	0.78
Share of students who are refugees ⁴	0.10	0.96	0.05	1.35	0.56	1.11	-0.54	1.23	0.81	1.17	0.26	1.32
Class size ⁵	0.00	2.08	1.35	0.53	-0.87	1.77	1.03	0.50	-0.11	2.35	1.36	0.53
Student characteristics												
Female students ⁶	26.75	9.18	18.55	2.98	-14.59	7.81	-14.35	2.76	-7.14	9.06	-6.86	2.94
Students with an immigrant background ⁷	-2.48	9.11	-34.10	8.12	8.68	8.97	-22.72	9.83	-4.59	9.85	-29.53	9.80
Students' socioeconomic status ⁸	29.88	6.43	22.35	1.80	25.35	5.09	21.05	1.62	26.26	4.90	21.39	1.75

¹ Teacher variables are averaged for all teachers within the school.

² Higher-achieving students are those in the top quartile (i.e. 75th percentile) of the conditional distribution of PISA reading, mathematics or science score.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Number of students in the target class.

⁶ Dummy variable: the reference category is male.

⁷ Dummy variable: the reference category is student with no immigrant background.

⁸ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

These findings bring into question practices of streaming in mathematics and science classes where students are grouped by ability, as the benefits of interacting with classmates who are strong performers academically are apparent for *all* students – those at the lower end of the performance scale do better when in classes with higher-achieving students, as do higher-achieving students themselves, and students on average.

3.1.6 Students' characteristics

The relationships between students' own characteristics, specifically their gender and their socioeconomic background, and performance in the PISA assessments is also evident in the analyses presented above. For Australian students, female students in the lowest and highest quartiles of reading performance still scored higher (on average) than male students in the same quartiles – higher-achieving females outperformed higher-achieving males, in other words. This was not true for mathematics or science performance, as there were no associations with gender for either lower or higher achievers among Australian students.

Another student characteristic that was consistently related to student performance for both lower-achieving and higher-achieving Australian students was their socioeconomic background. Among students in the lowest and highest quartiles of performance (and for the average student, see Chapter 2) in reading, mathematics and science, higher socioeconomic background was associated with higher scores – even among those students whose performance places them at the lower levels, social and cultural capital confers a benefit.

3.2 Within-school differences between student groups – teacher and school factors associated with gender and socioeconomic differences in performance

The following sections report on investigations into whether there are teacher and school factors that are associated with smaller (or no) differences in the average performance of female and male, and advantaged and disadvantaged students, within schools. In other words, what policies and practices might be in place in these schools that result in smaller (or no) differences between the reading scores of their male and female students, when population estimates suggest that we would expect to see differences?

It is important to keep in mind that the analyses in these two sections differ from those in other chapters, as the focus is on *within*-school differences between groups of students. The reading, mathematics and science scores of students are averaged at the school level. The student characteristics and teacher responses are also averaged at the school level, which results in a smaller sample size than in the analyses reported in Chapter 2. Given this reduction in sample size, analyses were conducted with the full set of teacher responses (averaged to school level) rather than reducing the samples further to focus on responses of subject teachers.

3.2.1 Gender differences in performance in Australian schools

Box 3.1 presents a summary of the gender differences reported in the PISA 2018 results for Australia. As seen here, and in the results of analyses presented earlier in this chapter and in Chapter 2, female students score higher in reading than male students, on average, as well as within the lowest and highest quartiles of performance.

BOX 3.1 Gender differences in Australia's PISA 2018 results

Female students scored, on average, 32 points higher than male students in the PISA 2018 reading literacy assessment (equivalent of approximately one school year).

- ▶ 15% of female students were high performers in reading compared to 11% of male students.
- ▶ 15% of female students were low performers in reading compared to 24% of male students.

Female students scored, on average, 6 points lower than male students in the PISA 2018 mathematical literacy assessment (equivalent of approximately two-and-a-half months of schooling).

- ▶ 9% of female students were high performers in mathematics compared to 12% of male students.
- ▶ 23% of female students were low performers compared to 22% of male students.

There was no difference between the performance of female and male students in the PISA 2018 scientific literacy assessment.

- ▶ 8% of female students were high performers in science compared to 10% of male students.
- ▶ 18% of female students were low performers compared to 20% of male students.

Sourced from Thomson et al, 2019.

Gender differences are estimated at the school level (that is, the average score of female and male students from the same school, rather than differences between individual female and male students).

A difference in the average reading performance of female students compared to their male peers was recorded in 37 per cent of Australian schools in the TALIS-PISA link sample (16% of the schools included in the sample for Australia were single-sex schools and are thus excluded from the following analyses, Table 3.11). However, in nine per cent of schools, male students scored higher in reading than female students, on average, and in a further 39 per cent of schools there was no statistically significant difference in the average reading scores of their male and female students.

In mathematics, Australian male students scored higher, on average, than female students, and 15 per cent of Australian schools followed this pattern. In 11 per cent of schools, however, female students recorded higher mean mathematics scores than male students, and no statistical differences found in 58 per cent of Australian schools.

In science, there was no statistically significant difference in the average scores of Australian female and male students. Male students scored higher, on average, than female students in 16 per cent of schools, while female students recorded higher average science scores in a similar proportion (14%) of schools.

TABLE 3.11 Direction of within-school differences in PISA 2018 scores between Australian female and male students

Results based on responses of 15-year-old students¹

	Percentage (%) of Australian schools characterised by the following type of within-school differences in PISA score between females and males					Size of within-school differences ²	
	Females outperform males (statistically significant difference)	No statistical difference (females tend to be higher)	No statistical difference (males tend to be higher)	Males outperform females (statistically significant difference)	Difference cannot be estimated ³	Mean	S.E.
Reading	37	25	14	9	16	30.1	4.6
Mathematics	11	24	34	15	16	-7.8	3.6
Science	14	24	29	16	16	-0.6	3.7

¹ Unweighted counts of schools whose students were surveyed within the TALIS-PISA link.

² Within-school differences in performance between females and males are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they are in favour of females and negative when they are in favour of males.

³ Single-gender schools (i.e. all students surveyed in the school are same-gender students).

Note: Statistically significant values are indicated in bold.

3.2.2 Teacher and school factors related to gender differences in performance in Australian schools

A series of regression analyses, using ordinary least squares estimation (OLS), were conducted to investigate whether there were teacher or school factors that were associated with lower, or even no, differences between the average reading, mathematics and science scores of female and male students within the same schools. Full results of these analyses are located in Appendix A.

Differences between female and male students' reading scores within the same schools were *lower* (and thus in favour of male students) in schools where:

- ▶ Teachers reported more positive teacher-student relations in classrooms
- ▶ Teachers were appraised by other members of the school management team
- ▶ Principals had worked on a professional development plan for the school.

Differences between female and male students' reading scores within the same schools were *higher* (and thus in favour of female students) in schools where:

- ▶ Teachers reported a collaborative school culture
- ▶ Principals had resolved problems with the lesson timetable or collaborated with other principals on challenging work tasks.

None of the teacher or school factors investigated appeared to be significant contributors to reductions in the within-school differences between male and female students' mathematics scores. Nor were any factors associated with lower differences between the science scores of male and female students, although it should be noted that such differences were only apparent in a small number of schools and relatively evenly split between those where females scored higher and those where males scored higher.

Schools that enacted practices or policies that directly addressed issues of gender differences, such as teachers reporting that students know to avoid gender discrimination or teachers supporting gender equity, did not relate to higher equity (i.e. lower gender differences) in reading, or mathematics for Australian students.

In reading literacy:

- ▶ Students from the highest socioeconomic quartile scored, on average, 89 points higher (equivalent to two-and-three-quarter school years) than students in the lowest quartile.
- ▶ 6% of students in the lowest socioeconomic quartile were high performers compared to 10% of high-performing students in the second quartile, 15% in the third quartile and 24% in the highest quartile.
- ▶ 31% of students in the lowest socioeconomic quartile were low performers compared to 21% of low-performing students in the second quartile, 15% in the third quartile and 10% in the highest quartile.

In mathematical literacy:

- ▶ Students from the highest socioeconomic quartile scored, on average, 81 points higher (equivalent to almost 3 school years) than students in the lowest quartile.
- ▶ 4% of students in the lowest socioeconomic quartile were high performers compared to 7% of high-performing students in the second quartile, 13% in the third quartile and 20% in the highest quartile.
- ▶ 37% of students in the lowest socioeconomic quartile were low performers compared to 25% of low-performing students in the second quartile, 17% in the third quartile and 11% in the highest quartile.

In scientific literacy:

- ▶ Students from the highest socioeconomic quartile scored, on average, 83 points higher (equivalent to approximately 3 school years) than students in the lowest quartile.
- ▶ 4% of students in the lowest socioeconomic quartile were high performers compared to 7% of high-performing students in the second quartile, 11% in the third quartile and 18% in the highest quartile.
- ▶ 31% of students in the lowest socioeconomic quartile were low performers compared to 20% of low-performing students in the second quartile, 14% in the third quartile and 10% in the highest quartile.

Sourced from Thomson et al, 2019.

3.2.3 Teacher and school factors related to socioeconomic differences in performance in Australian schools

In the following analyses, students are categorised as being *advantaged* or *disadvantaged* based on their scores on the PISA index of economic, social and cultural status (ESCS). The index is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home. Students were categorised as advantaged if their scores on the PISA ESCS index were in the highest quartile of the distribution, while students were categorised as disadvantaged if their scores were in the lowest quartile. Full results of these analyses are located in Appendix A.

Differences between advantaged students and disadvantaged students within the same schools were *lower* (thereby in favour of students from disadvantaged backgrounds) in schools where:

- ▶ There was a greater than average share of female teachers (reading, mathematics, and science)
- ▶ Teachers' formal training and education covered content of some or all subjects they taught (reading, mathematics, and science) or teaching in a multicultural or multilingual setting (mathematics only)

- ▶ Teachers' initial education and training covered use of ICT for teaching (reading and science)
- ▶ Teachers acted as an assigned mentor for one or more teachers (mathematics only)
- ▶ Teachers had undertaken professional development in student behaviour and classroom management (reading and mathematics), approaches to individualised learning (reading only), analysis and use of student assessments (reading only) in the past 12 months
- ▶ Teachers reported high levels of professional collaboration (reading, mathematics, and science)
- ▶ Principals reported more teacher actions towards achieving academic excellence, as measured by the index of academic pressure (whether teachers understand the schools' curricular goals, succeed in implementing the curriculum, hold high expectations for student achievement and students have a desire to do well) (reading, mathematics, and science).

Differences between advantaged and disadvantaged students within the same schools were *higher* (thereby in favour of more advantaged students) in schools where:

- ▶ Teachers spent more working hours teaching or marking/correcting work (mathematics only)
- ▶ Teachers' formal training and education covered teaching in a mixed ability setting (mathematics only)
- ▶ Teachers undertook formal induction activities during their first employment (mathematics and science)
- ▶ Teachers had undertaken professional development in Teacher-Parent/Guardian cooperation in the past 12 months (reading and mathematics)
- ▶ Teachers were appraised by their assigned mentors (reading and science)
- ▶ Principals reported that there was a policy or practice implemented at their school regarding students being taught to be inclusive of different socioeconomic backgrounds (science only).



Outcomes other than performance

Teacher and school factors that are related to Australian students' educational aspirations and experiences of school

Key Findings

Australian students were *more likely* to expect that they would complete a tertiary degree when:

- ▶ They were in schools where teachers, on average, observed students working and provided immediate feedback more frequently
- ▶ They were in schools where teachers, on average, spent more work hours teaching, or marking or correcting student work
- ▶ Students were female, came from more advantaged homes, or were from an immigrant background.

Australian students were *less likely* to expect that they would complete a tertiary degree when they were:

- ▶ In classrooms with higher proportions of students from disadvantaged homes
- ▶ In schools where teachers spent higher proportions of class time on actual teaching and learning
- ▶ In schools where teachers, on average, felt better prepared for teaching in a multicultural or multilingual setting after their initial education and training
- ▶ In schools where teachers, on average, were more satisfied with their profession.

Australian students reported *higher* perceptions of teacher enthusiasm in schools where teachers, on average, reported spending more work hours counselling students, higher job satisfaction with their work environment or higher quality teacher-student relations in classrooms.

Australian students reported *lower* classroom disciplinary climate (i.e. more problems and noise) and *lower* teacher enthusiasm in schools where teachers, on average, reported spending more work hours participating in school management.

Australian students reported *lower* perceptions of PISA test difficulty (i.e. the test was less difficult) in schools where teachers, on average, were more satisfied with their work environment.

Australian students' own characteristics and those of their classmates, particularly their socioeconomic background, were related to their expectations of completing tertiary study, their perceptions of the climate of their classrooms, their teachers' enthusiasm and the difficulty of the PISA reading tasks.

4.1 Introduction

In addition to measures of students' performance in reading, mathematics and science, PISA also collects information around their expectations for further study and their experiences of school life, including their perceptions of the disciplinary climate of their classes (for example, how long it takes for students to settle down and begin their work) and their relationships with their teachers and perceptions of teachers' enthusiasm for their work. In PISA 2018, students were also asked a set of questions about their experience of sitting the PISA assessment and how difficult they found the tasks included.

The findings presented in the following sections are based on the regression analyses (predominantly linear or logistic regressions, depending on the outcome variable) employed to investigate potential relationships between teacher and school factors and students' expectations for further study, perceptions of the disciplinary climate of their classes and enthusiasm of their teachers, and their perceptions of the difficulty of the PISA reading assessment.

4.2 Students' expectations for further study

Students' educational expectations were measured by asking students which educational level they expect to complete, as distinct from which educational level they may aspire to complete. A dichotomous variable was created from their responses to use in the logistic analyses of relationships between teacher and school factors and students' educational expectations. Students who expected to complete at least an undergraduate degree at a university were coded to one, with all other students coded to zero.

All other variables held constant, and thus all other things being equal, Australian students' expectations of completing an undergraduate degree at university were *higher* when:

- ▶ Students were female (Tables 4.1–4.4, Tables A4.1–A4.2)
- ▶ Students were from an immigrant background (Tables 4.1–4.4, Tables A4.1–A4.2)
- ▶ Students were from more advantaged homes – as students' socioeconomic status increased, so did the likelihood of them expecting to complete an undergraduate degree at university (Tables 4.1–4.4, Tables A4.1–A4.2)
- ▶ They were in schools where teachers, on average, observed students working and provided immediate feedback more frequently (Table 4.1)
- ▶ They were in schools where teachers, on average, spent more work hours teaching, or marking or correcting student work (Table 4.2).

On the other hand, Australian students' expectations of completing an undergraduate degree at university were *lower* when:

- ▶ They were in classrooms with higher proportions of students from disadvantaged homes (Tables 4.1–4.4, Tables A4.1–A4.2)
- ▶ They were in schools where teachers spent higher proportions of class time on actual teaching and learning (Table 4.1)
- ▶ They were in schools where teachers, on average, felt better prepared for teaching in a multicultural or multilingual setting after their initial education and training (Table 4.3)
- ▶ They were in schools where teachers, on average, were more satisfied with their profession (Table 4.4).

As discussed in Chapters 1 and 2, the results of these analyses do not suggest that being in classrooms with higher proportions of students from disadvantaged homes *causes* students to exclude university study from their plans for the future, nor do they suggest that having teachers who felt satisfied with their profession *causes* students to plan for something other than university study.

Factors pertaining to teachers' initial education and training were not related to Australian students' expectations of completing an undergraduate degree at university, nor were measures of teachers' professional development (Tables A4.1 and A4.2).

TABLE 4.1 Relationship between students' educational expectations and classroom practices (controlling for student characteristics and classroom composition)
Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Classroom practices³				
Share of class time spent on actual teaching and learning	-0.04	0.02	0.01	0.01
Teachers' autonomy over planning and teaching ⁴	-0.04	0.09	-0.06	0.04
Teachers' perceived disciplinary climate ⁵	-0.15	0.13	0.01	0.06
Teachers' practices (frequency): clarity of instruction ⁶	0.11	0.08	-0.01	0.06
Teachers' practices (frequency): cognitive activation ⁷	-0.12	0.10	0.00	0.06
Teachers' assessment practices: administer own assessment ⁸	0.37	0.20	0.25	0.12
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁸	0.19	0.23	-0.35	0.11
Teachers' assessment practices: let students evaluate their own progress ⁸	-0.39	0.35	0.00	0.14
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁸	0.83	0.36	0.07	0.16
Student characteristics				
Female students ⁹	1.13	0.14	0.69	0.05
Students with an immigrant background ¹⁰	0.70	0.18	-0.33	0.21
Students' socioeconomic status ¹¹	0.80	0.09	0.64	0.03
Classroom characteristics³				
Share of students whose first language is different to the language of instruction ¹²	0.00	0.01	0.01	0.01
Share of low academic achievers ¹²	-0.02	0.01	-0.03	0.01
Share of students with special needs ¹²	0.02	0.02	-0.01	0.02
Share of students with behavioural problems ¹²	0.01	0.01	0.00	0.01
Share of students from socioeconomically disadvantaged homes ¹²	-0.03	0.01	-0.01	0.01
Share of academically gifted students ¹²	0.00	0.01	0.01	0.01
Share of students who are immigrants or with a migrant background ¹²	0.02	0.01	0.02	0.01
Share of students who are refugees ¹²	0.02	0.02	0.03	0.02
Pseudo R^2	0.18		0.14	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures educational expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ Information on classroom practices and characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁵ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁶ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁷ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁸ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹² Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE 4.2 Relationship between students' educational expectations and teachers' working hours (controlling for student characteristics and classroom composition)

Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teachers' working hours³				
Total working hours	-0.01	0.01	0.01	0.01
Teaching	0.04	0.02	0.00	0.01
Individual planning or preparation of lessons either at school or out of school	0.01	0.06	-0.04	0.02
Team work and dialogue with colleagues within this school	-0.07	0.07	-0.09	0.04
Marking or correcting of student work	0.10	0.05	0.12	0.03
Counselling students	0.07	0.07	-0.02	0.03
Participation in school management	-0.02	0.08	-0.11	0.04
General administrative work	0.02	0.05	0.06	0.04
Professional development activities	-0.08	0.10	-0.05	0.03
Communication and cooperation with parents or guardians	0.03	0.08	-0.03	0.05
Engaging in extracurricular activities	0.01	0.05	0.07	0.04
Other work tasks	-0.10	0.07	0.00	0.03
Student characteristics				
Female students ⁴	1.09	0.14	0.71	0.05
Students with an immigrant background ⁵	0.63	0.18	-0.35	0.21
Students' socioeconomic status ⁶	0.80	0.09	0.63	0.03
Classroom characteristics⁷				
Share of students whose first language is different to the language of instruction ⁸	0.00	0.01	0.00	0.01
Share of low academic achievers ⁸	0.00	0.01	-0.03	0.01
Share of students with special needs ⁸	0.02	0.02	0.00	0.01
Share of students with behavioural problems ⁸	0.01	0.02	0.00	0.01
Share of students from socioeconomically disadvantaged homes ⁸	-0.02	0.01	0.00	0.01
Share of academically gifted students ⁸	0.01	0.01	0.01	0.01
Share of students who are immigrants or with a migrant background ⁸	0.02	0.01	0.02	0.01
Share of students who are refugees ⁸	0.00	0.02	0.00	0.02
Pseudo R^2	0.18		0.14	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures education expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁷ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE 4.3 Relationship between students' educational expectations and sense of preparedness after initial education and training (controlling for student characteristics and classroom composition)
Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Initial education and training (sense of preparedness)				
Sense of preparedness for some or all subject(s) I teach ³	0.10	0.50	0.40	0.22
Pedagogy of some or all subject(s) I teach ³	0.16	0.53	0.03	0.22
General pedagogy ³	-0.02	0.57	-0.44	0.22
Classroom practice in some or all subject(s) I teach ³	0.18	0.49	0.34	0.18
Teaching in a mixed ability setting ³	-0.45	0.46	-0.35	0.14
Teaching in a multicultural or multilingual setting ³	-0.81	0.30	-0.10	0.12
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving) ³	0.57	0.32	0.07	0.17
Use of ICT for teaching ³	0.49	0.33	-0.53	0.13
Student behaviour and classroom management ³	-0.33	0.44	0.04	0.19
Monitoring students' development and learning ³	0.05	0.48	0.14	0.19
Student characteristics				
Female students ⁴	1.13	0.15	0.69	0.05
Students with an immigrant background ⁵	0.67	0.18	-0.33	0.22
Students' socioeconomic status ⁶	0.81	0.09	0.64	0.02
Classroom characteristics⁷				
Share of students whose first language is different to the language of instruction ⁸	0.01	0.01	0.01	0.01
Share of low academic achievers ⁸	-0.01	0.01	-0.03	0.00
Share of students with special needs ⁸	0.01	0.02	0.00	0.01
Share of students with behavioural problems ⁸	0.05	0.02	0.02	0.01
Share of students from socioeconomically disadvantaged homes ⁸	-0.04	0.01	-0.01	0.01
Share of academically gifted students ⁸	0.01	0.01	0.02	0.01
Share of students who are immigrants or with a migrant background ⁸	0.02	0.01	0.02	0.01
Share of students who are refugees ⁸	0.01	0.02	0.00	0.02
Pseudo R^2	0.18		0.14	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures educational expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁷ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE 4.4 Relationship between students' educational expectations and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition)
Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teacher well-being and job satisfaction				
Workplace well-being and stress ³	0.00	0.15	-0.05	0.07
Workload stress ⁴	0.02	0.11	0.09	0.05
Job satisfaction with work environment ⁵	0.09	0.10	0.03	0.05
Job satisfaction with profession ⁶	-0.28	0.14	-0.04	0.06
Teachers' satisfaction with the salary ⁷	0.15	0.25	-0.14	0.12
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule)	-0.11	0.40	0.08	0.16
Teachers' views of the way different stakeholders value the profession ⁸	-0.12	0.12	-0.25	0.05
Student characteristics				
Female students ⁹	1.10	0.14	0.68	0.05
Students with an immigrant background ¹⁰	0.66	0.18	-0.31	0.23
Students' socioeconomic status ¹¹	0.79	0.09	0.63	0.03
Classroom characteristics¹²				
Share of students whose first language is different to the language of instruction ¹³	0.00	0.01	0.01	0.01
Share of low academic achievers ¹³	-0.01	0.01	-0.04	0.01
Share of students with special needs ¹³	0.01	0.01	0.00	0.01
Share of students with behavioural problems ¹³	0.02	0.01	0.00	0.01
Share of students from socioeconomically disadvantaged homes ¹³	-0.03	0.01	0.00	0.01
Share of academically gifted students ¹³	0.00	0.01	0.01	0.01
Share of students who are immigrants or with a migrant background ¹³	0.02	0.01	0.01	0.01
Share of students who are refugees ¹³	0.00	0.01	0.00	0.02
Pseudo R^2	0.18		0.14	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures education expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

4.3 Students' perceptions of the disciplinary climate of the classroom

Analyses reported in previous chapters have included a measure of teachers' perceptions of the disciplinary climate of classes they teach, including items such as "I lose quite a bit of time because of students interrupting the lesson" and "There is much disruptive noise in the classroom". The PISA measure of students' perceptions of the classroom climate included similar items:

- ▶ 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 quieten down
- ▶ Students cannot work well
- ▶ Students don't start working for a long time after the lesson begins.

The items were combined to create an index of classroom disciplinary climate with an average score of zero and a standard deviation of one across OECD countries. Positive scores indicated better classroom disciplinary climate, with fewer interruptions and a calmer environment, than on average across OECD countries (see Chapter 9 of Thomson et al, 2020 for further information on Australian students' results on this index).

The variable most consistently associated with Australian students' perceptions of the disciplinary climate of their classrooms was the students' own socioeconomic background, with students from higher socioeconomic backgrounds reporting better disciplinary climates than other students (Table 4.5, Tables A4.3–A4.7).

In some of the analyses, the composition of the classroom was also related to the students' perceptions of the classroom disciplinary climate, with ratings increasing as the proportion of students with a language background other than English increased (Tables A4.3, A4.4 and A4.7). Only when factors related to school leadership were analysed did the share of students from disadvantaged homes associate (negatively) with students' perceptions of the disciplinary climate of the classroom (Table A4.7).

The only teacher factor related to Australian students' perceptions of the disciplinary climate of their classrooms was the amount of time their teachers reported participating in school management tasks – as this increased, students' perceptions of their classroom climate decreased (Table 4.5).

Professional development activities were not related to Australian students' perceptions of the disciplinary climates of classrooms, nor were measures of teachers' well-being and satisfaction, school climate, or school leadership. Some of these measures were related to students' perceptions of the disciplinary climate of classrooms across the TALIS-PISA countries on average (Tables A4.4–A4.7).

TABLE 4.5 Relationship between students' perceptions of classroom disciplinary climate and teachers' working hours (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teachers' working hours³				
Total working hours	0.01	0.01	0.01	0.00
Teaching	-0.01	0.01	-0.01	0.01
Individual planning or preparation of lessons either at school or out of school	-0.01	0.03	-0.01	0.01
Team work and dialogue with colleagues within this school	0.03	0.05	-0.02	0.02
Marking or correcting of student work	0.01	0.03	0.01	0.01
Counselling students	0.07	0.04	0.03	0.02
Participation in school management	-0.08	0.04	0.00	0.02
General administrative work	0.05	0.04	-0.01	0.02
Professional development activities	-0.02	0.07	0.01	0.02
Communication and cooperation with parents or guardians	-0.04	0.09	-0.05	0.02
Engaging in extracurricular activities	0.00	0.04	0.06	0.02
Other work tasks	0.05	0.04	0.04	0.01
Student characteristics				
Female students ⁴	0.10	0.07	0.06	0.02
Students with an immigrant background ⁵	0.06	0.07	-0.14	0.06
Students' socioeconomic status ⁶	0.08	0.04	0.02	0.01
Classroom characteristics⁷				
Share of students whose first language is different to the language of instruction ⁸	0.02	0.01	0.00	0.00
Share of low academic achievers ⁸	-0.01	0.01	-0.01	0.00
Share of students with special needs ⁸	0.01	0.01	0.00	0.01
Share of students with behavioural problems ⁸	-0.01	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ⁸	-0.01	0.01	0.01	0.00
Share of academically gifted students ⁸	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ⁸	-0.01	0.01	0.00	0.01
Share of students who are refugees ⁸	0.00	0.01	0.01	0.01
R^2	0.07		0.07	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁷ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

4.4 Students' perceptions of teacher enthusiasm

The PISA measure of students' perceptions of teacher enthusiasm was constructed using students' ratings of agreement (strongly disagree, disagree, agree, strongly agree) to the following statements about two language of instruction classes (English, in Australia) they had attended prior to undertaking the PISA assessments:

- ▶ It was clear to me that the teacher liked teaching us
- ▶ The enthusiasm of the teacher inspired me
- ▶ It was clear that the teacher likes to deal with the topic of the lesson
- ▶ The teacher showed enjoyment in teaching.

Responses were combined to create the index of teacher enthusiasm, with an average score of zero and a standard deviation of one across OECD countries. Positive scores indicate higher perceptions of teacher enthusiasm than on average across OECD countries.

All other variables held constant, and thus all other things being equal, Australian students reported *higher* teacher enthusiasm when they were:

- ▶ From more advantaged homes – as students' socioeconomic status increased, so did their perceptions of teacher enthusiasm (Tables 4.6–4.8, Table A4.8)
- ▶ In schools where teachers, on average, reported higher job satisfaction with their work environment (Table 4.6)
- ▶ In schools where teachers, on average, reported spending more work hours counselling students (Table 4.7)
- ▶ In schools where teachers, on average, reported higher teacher-student relations (Table 4.8).

On the other hand, Australian students reported *lower* teacher enthusiasm when they were in schools where teachers, on average, reported spending more work hours participating in school management (Table 4.7). Interestingly, measures of teachers' classroom practices were not significantly related to Australian students' perceptions of their teachers' enthusiasm. Across the TALIS-PISA countries on average, the only classroom practice related to students' perceptions of teacher enthusiasm was teachers' perceptions of the classroom disciplinary climate (Table A4.8).

TABLE 4.6 Relationship between students' perceptions of teacher enthusiasm and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of teacher enthusiasm ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teacher well-being and job satisfaction				
Workplace well-being and stress ³	0.06	0.08	0.01	0.03
Workload stress ⁴	0.06	0.09	-0.03	0.03
Job satisfaction with work environment ⁵	0.12	0.06	0.04	0.03
Job satisfaction with profession ⁶	-0.02	0.09	0.03	0.03
Teachers' satisfaction with the salary ⁷	0.03	0.13	0.04	0.06
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁸	0.23	0.25	-0.03	0.07
Teachers' views of the way different stakeholders value the profession ⁸	0.04	0.06	-0.01	0.02
Student characteristics				
Female students ⁹	0.04	0.05	0.06	0.02
Students with an immigrant background ¹⁰	0.10	0.06	-0.08	0.08
Students' socioeconomic status ¹¹	0.10	0.03	0.03	0.01
Classroom characteristics¹²				
Share of students whose first language is different to the language of instruction ¹³	0.01	0.01	0.00	0.00
Share of low academic achievers ¹³	-0.01	0.01	0.00	0.00
Share of students with special needs ¹³	0.01	0.01	0.00	0.01
Share of students with behavioural problems ¹³	0.00	0.01	0.00	0.00
Share of students from socioeconomically disadvantaged homes ¹³	0.00	0.01	0.00	0.00
Share of academically gifted students ¹³	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ¹³	-0.01	0.01	0.01	0.00
Share of students who are refugees ¹³	0.00	0.01	0.00	0.01
R^2	0.04		0.04	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures student perception of teacher enthusiasm in language-of-instruction lessons. PISA asked 15-year-old students whether they agree ("strongly disagree", "disagree", "agree", "strongly agree") with the following statements about the teacher teaching the two language-of-instruction lessons they attended prior to sitting the PISA test: "It was clear to me that the teacher liked teaching us"; "The enthusiasm of the teacher inspired me"; "It was clear that the teacher likes to deal with the topic of the lesson"; and "The teacher showed enjoyment in teaching". These statements were combined to create the index of teacher enthusiasm whose average is 0 and standard deviation is 1 across OECD countries. Positive values in this index mean that students perceived their language-of-instruction teachers to be more enthusiastic than the average student across OECD countries did.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE 4.7 Relationship between students' perceptions of teacher enthusiasm and teachers' working hours (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of teacher enthusiasm ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teachers' working hours³				
Total working hours	-0.01	0.01	0.01	0.00
Teaching	0.00	0.02	-0.02	0.01
Individual planning or preparation of lessons either at school or out of school	0.03	0.03	0.00	0.01
Team work and dialogue with colleagues within this school	-0.06	0.05	-0.03	0.03
Marking or correcting of student work	0.01	0.03	-0.01	0.01
Counselling students	0.09	0.04	0.04	0.02
Participation in school management	-0.06	0.03	-0.01	0.03
General administrative work	0.04	0.05	0.02	0.02
Professional development activities	-0.01	0.06	0.03	0.02
Communication and cooperation with parents or guardians	-0.03	0.09	0.01	0.02
Engaging in extracurricular activities	0.02	0.04	0.02	0.02
Other work tasks	-0.01	0.03	0.02	0.01
Student characteristics				
Female students ⁴	0.03	0.05	0.04	0.02
Students with an immigrant background ⁵	0.10	0.06	-0.10	0.08
Students' socioeconomic status ⁶	0.10	0.03	0.03	0.01
Classroom characteristics⁷				
Share of students whose first language is different to the language of instruction ⁸	0.01	0.01	0.00	0.00
Share of low academic achievers ⁸	-0.01	0.01	0.00	0.00
Share of students with special needs ⁸	0.02	0.01	0.00	0.01
Share of students with behavioural problems ⁸	-0.01	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ⁸	-0.01	0.01	0.01	0.00
Share of academically gifted students ⁸	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ⁸	-0.01	0.01	0.01	0.01
Share of students who are refugees ⁸	0.00	0.01	0.01	0.01
R^2	0.04		0.05	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures student perception of teacher enthusiasm in language-of-instruction lessons. PISA asked 15-year-old students whether they agree ("strongly disagree", "disagree", "agree", "strongly agree") with the following statements about the teacher teaching the two language-of-instruction lessons they attended prior to sitting the PISA test: "It was clear to me that the teacher liked teaching us"; "The enthusiasm of the teacher inspired me"; "It was clear that the teacher likes to deal with the topic of the lesson"; and "The teacher showed enjoyment in teaching". These statements were combined to create the index of teacher enthusiasm whose average is 0 and standard deviation is 1 across OECD countries. Positive values in this index mean that students perceived their language-of-instruction teachers to be more enthusiastic than the average student across OECD countries did.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁷ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE 4.8 Relationship between students' perceptions of teacher enthusiasm and school climate (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers and principals¹

Related to:	Students' perceptions of teacher enthusiasm ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
School climate				
Collaborative school culture ³	0.05	0.05	0.01	0.02
Teacher-student relations ⁴	0.10	0.05	0.04	0.02
Teachers' actions towards achieving academic excellence ⁵	-0.01	0.02	0.00	0.01
Stakeholder (i.e. parents and local community) involvement in school ⁶	0.02	0.01	0.01	0.01
Student characteristics				
Female students ⁷	0.04	0.06	0.05	0.02
Students with an immigrant background ⁸	0.10	0.06	-0.09	0.08
Students' socioeconomic status ⁹	0.10	0.03	0.03	0.01
Classroom characteristics¹⁰				
Share of students whose first language is different to the language of instruction ¹¹	0.01	0.01	0.00	0.00
Share of low academic achievers ¹¹	-0.01	0.01	0.00	0.00
Share of students with special needs ¹¹	0.01	0.01	0.00	0.01
Share of students with behavioural problems ¹¹	0.00	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ¹¹	0.00	0.00	0.00	0.00
Share of academically gifted students ¹¹	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ¹¹	-0.01	0.01	0.01	0.01
Share of students who are refugees ¹¹	0.00	0.01	-0.01	0.01
R^2	0.04		0.04	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures student perception of teacher enthusiasm in language-of-instruction lessons. PISA asked 15-year-old students whether they agree ("strongly disagree", "disagree", "agree", "strongly agree") with the following statements about the teacher teaching the two language-of-instruction lessons they attended prior to sitting the PISA test: "It was clear to me that the teacher liked teaching us"; "The enthusiasm of the teacher inspired me"; "It was clear that the teacher likes to deal with the topic of the lesson"; and "The teacher showed enjoyment in teaching". These statements were combined to create the index of teacher enthusiasm whose average is 0 and standard deviation is 1 across OECD countries. Positive values in this index mean that students perceived their language-of-instruction teachers to be more enthusiastic than the average student across OECD countries did.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations and interactions teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ Dummy variable: the reference category is male.

⁸ Dummy variable: the reference category is student with no immigrant background.

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹⁰ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹¹ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

4.5 Students' perceptions of PISA test difficulty

The measure of students' perceptions of the difficulty of the PISA reading assessments was created using their ratings of agreement (strongly disagree, disagree, agree, strongly agree) to three statements about the reading tasks in the assessment:

- ▶ There were many words I could not understand
- ▶ Many texts were too difficult for me
- ▶ I was lost when I had to navigate between different pages.⁸

The index of perception of test difficulty was created with an average score of zero and a standard deviation of one across OECD countries, with positive scores on the index indicating that students perceived the test as more difficult.

Analyses of student, teacher and school factors relationships with Australian students' perceptions of the difficulty of the PISA reading assessment found that students from an immigrant background tended to find the PISA test more difficult on average when measures of classroom practices were included in analyses (Table A4.9). The relationship between immigrant background and perceptions of test difficulty was not significant in the analysis containing measures of teachers' well-being and satisfaction (Table 4.9).

In contrast, Australian students' perceptions of the difficulty of the PISA test were *lower* among students with higher socioeconomic backgrounds – as socioeconomic background scores increased, perception of difficulty decreased (Tables 4.9 and A4.9) – and in schools where teachers, on average, were more satisfied with their work environment (as satisfaction increased, perceptions of difficulty decreased, Table 4.9).

Measures of teachers' classroom practices, such as assessment strategies, were not significantly related to Australian students' perceptions of the difficulty of the PISA reading tasks (Table A4.9).

⁸ The PISA 2018 assessment was a computer-based assessment, and some reading tasks were presented in a virtual website format in which students had to navigate their way between different "web pages" in order to locate information and complete tasks.

TABLE 4.9 Relationship between students' perceptions of difficulty of the PISA test and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of difficulty of the PISA test ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teacher well-being and job satisfaction				
Workplace well-being and stress ³	-0.03	0.06	0.02	0.02
Workload stress ⁴	0.01	0.04	-0.02	0.02
Job satisfaction with work environment ⁵	-0.09	0.04	-0.01	0.02
Job satisfaction with profession ⁶	0.01	0.06	0.00	0.02
Teachers' satisfaction with the salary ⁷	0.10	0.12	0.07	0.04
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule)	0.10	0.16	0.00	0.05
Teachers' views of the way different stakeholders value the profession ⁸	0.04	0.05	0.04	0.02
Student characteristics				
Female students ⁹	-0.06	0.05	0.00	0.02
Students with an immigrant background ¹⁰	0.11	0.06	0.16	0.05
Students' socioeconomic status ¹¹	-0.25	0.04	-0.15	0.01
Classroom characteristics¹²				
Share of students whose first language is different to the language of instruction ¹³	0.00	0.01	0.00	0.00
Share of low academic achievers ¹³	0.00	0.01	0.00	0.00
Share of students with special needs ¹³	0.01	0.01	0.00	0.00
Share of students with behavioural problems ¹³	-0.01	0.01	0.00	0.00
Share of students from socioeconomically disadvantaged homes ¹³	0.00	0.00	0.00	0.00
Share of academically gifted students ¹³	0.00	0.00	-0.01	0.00
Share of students who are immigrants or with a migrant background ¹³	0.00	0.00	-0.01	0.00
Share of students who are refugees ¹³	0.00	0.01	0.01	0.01
R^2	0.07		0.07	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures perception of difficulty of the PISA test by asking students how they feel about the reading tasks included in the test ("strongly disagree", "disagree", "agree", "strongly agree"): "There were many words I could not understand"; "Many texts were too difficult for me"; "I was lost when I had to navigate between different pages". These statements were combined to create the index of perception of difficulty of the PISA test whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student finds the test more difficult.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

Where to from here?

Overall, there were few relationships between teacher and school factors and students' performance on the PISA tests, expectations for further study or experiences of school uncovered in the analyses conducted using the TALIS-PISA link data. As mentioned in Chapter 1, the percentage of variance at the school level (or differences between schools) in these measures of student outcomes tended to be smaller for Australia than for some of the other countries and economies that participated in this linked study. Therefore, substantial relationships or differences based on measures aggregated to the school level, as was necessary in these analyses, were less likely to be identified.

Overall, of the analyses presented here, the most consistent relationships were found between students' outcomes (performance, expectations and experiences) and their own characteristics and those of their classmates. This is not to say, in any way, that the practices and experiences of teachers and the climate of schools have no bearing on these outcomes for Australian students, only that these potential relationships were not found using these datasets and these analyses. What teachers and schools do does matter enormously, the research literature tells us this, but not all datasets are appropriate for investigating in what ways, how and why teachers and schools matter. The relationships may not be direct, but rather flow through relationships with other factors, and the relationships may not be linear.

5.1 The importance of peers

The consistent relationships between students' own characteristics and those of their classmates do have some implications for education in Australian schools. While most schools in Australia do not necessarily have a great degree of control over the characteristics of their student intake (apart from schools that have selective entry), they can exercise a degree of control over which students are placed in which classes.

For Australian students, scores in reading, mathematics and science tend to be higher in schools where students are in classes with higher proportions of socioeconomically advantaged students, even when controlling for the effects of their own socioeconomic background. These relationships were not found across the TALIS-PISA link countries on average. Conversely, scores tend to be lower in schools where classes have higher concentrations of socioeconomically disadvantaged students. This was also the case across the TALIS-PISA link countries on average. These findings of associations between performance and classroom levels of socioeconomic advantage or disadvantage and achievement point to a strong peer effect being in place in Australian schools.

In addition, Australian students tended to score higher in all three PISA subjects in schools where students were in classes with higher proportions of higher-achieving students, while students scored lower in schools where students were in classes with higher proportions of lower-achieving students. These relationships were found not only for all students on average, but also when the samples were restricted to students who had scored in the lowest and highest quartiles of achievement in PISA. These findings bring into question practices of streaming, where students are placed in classes based on their ability. All students, both lower-achieving and higher-achieving, may gain some benefit from being in a classroom with students who perform well, according to the results in Chapters 2 and 3. While grouping students based on their ability (or rather, their performance on previous assessments) may result in more homogenous classrooms and greater capacity for teachers to ‘target’ their instruction or activities at a certain level, such grouping also removes the potential for students to learn, by example or through peer-to-peer instruction, from their more able classmates, and for the more able classmates to learn through the experiences of teaching others.

5.2 Improving school experiences for lower-achieving students – and everyone else

The results of the analyses presented in Chapter 3 point to some teacher and school factors that may have potential in addressing the needs of Australia’s lower-achieving students – a group that appears to be increasing in size and decreasing in relative performance, according to Australia’s 2018 PISA results (Thomson et al., 2019).

Teacher factors that were associated with higher PISA scores among lower-achieving Australian students included teachers’ perceptions of the classroom disciplinary climate (mathematics scores only), teachers’ use of work hours to mark and correct student work (reading, mathematics and science scores), and teachers’ job satisfaction with their work environment (reading, mathematics and science scores).

School factors that were associated with higher PISA scores among lower-achieving students included involvement of stakeholders (reading scores only), teacher-student relations (science scores only) and, importantly, classroom composition, with lower-achieving students scoring higher in mathematics and science in schools where classes had higher proportions of academically gifted students and lower in mathematics in schools where classes had higher proportions of socioeconomically disadvantaged students.

It is important to note that, where there were positive associations between these various teacher and school factors for lower-achieving Australian students, in no case was the relationship negative for higher-achieving students, or for students on average. This means that should schools choose to target these areas for intervention, with the aim of improving outcomes for their lower-achieving students, they can be confident that they will not be disadvantaging other students. In many cases, the performance of their average and higher-achieving students may also benefit from improvements in classroom disciplinary climate, student-teacher relations and teachers’ job satisfaction.

5.3 Reducing performance gaps is not going to be straightforward

A number of schools have introduced practices or policies that directly addressed issues of gender equality. However, measures of these practices and policies collected in TALIS, such as teachers reporting that students know to avoid gender discrimination or teachers supporting gender equity, did not relate to lower gender differences in reading, mathematics or science scores for Australian students.

A handful of teacher and school factors were associated with smaller differences between female and male students’ reading scores (averaged to the school level). In schools where teachers reported higher teacher-student relations, or were appraised by members of the school management team (other than their principal) or where principals had worked on a professional development plan for

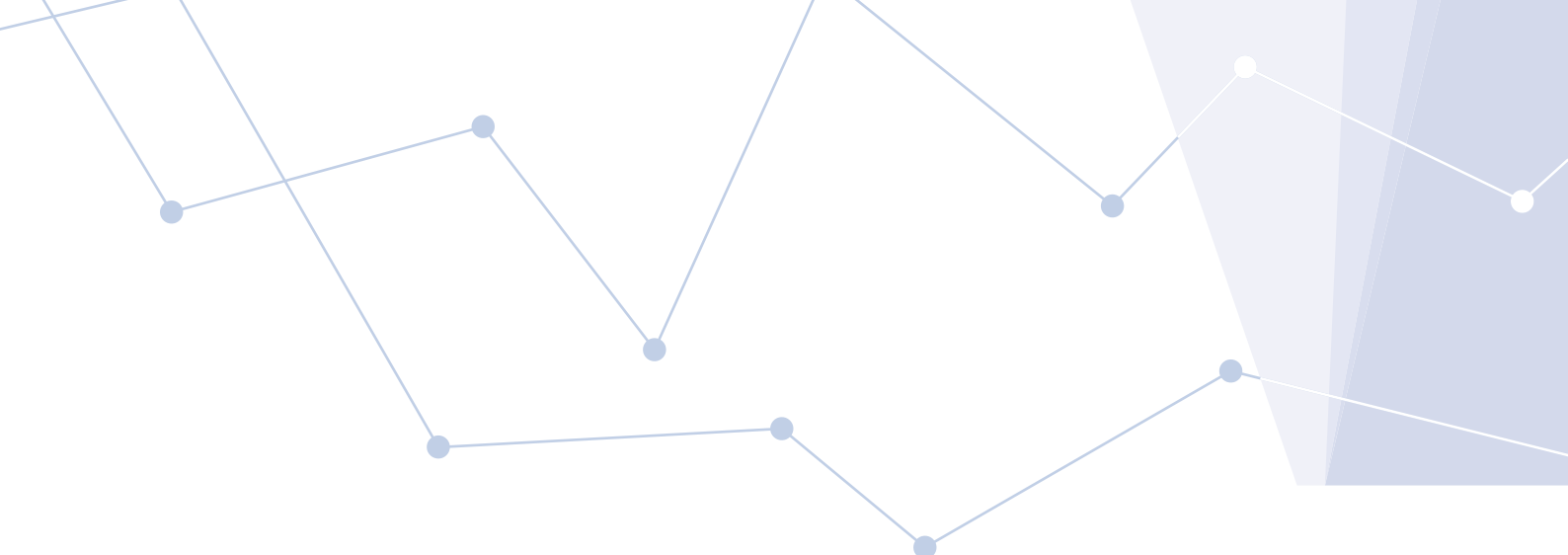
the school in the 12 months prior to TALIS, the difference between average reading scores for female and male students was lower than in other schools.

None of the teacher or school factors investigated appeared to be significant contributors to reductions in the within-school differences between male and female students' mathematics scores. Despite the size of the gender difference in mathematics scores being smaller than that in reading scores, it would appear to be more difficult to address by way of targeting teacher or school factors collected in TALIS.

Nor were there any factors associated with lower differences between the science scores of male and female students, although it should be noted that such differences were only apparent in a small number of schools and relatively evenly split between those where females scored higher and those where males scored higher. In systems and countries with larger, and statistically significant differences in the average science scores of male and female students, these analyses may be of greater utility.

A number of teacher and school factors were associated with lower differences between socioeconomically advantaged and disadvantaged students within the same schools. This includes teachers' formal education and training covering content of some or all of the subjects they taught, teachers' reporting of higher professional collaboration and participation in professional development that covered student behaviour and classroom management (reading and mathematics), approaches to individualised learning (reading only), analysis and use of student assessments (reading only). In addition, performance gaps between advantaged and disadvantaged students in reading, mathematics and science were lower in schools where principals had higher ratings on the index of academic pressure (reports of whether teachers understand the schools' curricular goals, succeed in implementing the curriculum, hold high expectations for student achievement and students have a desire to do well).

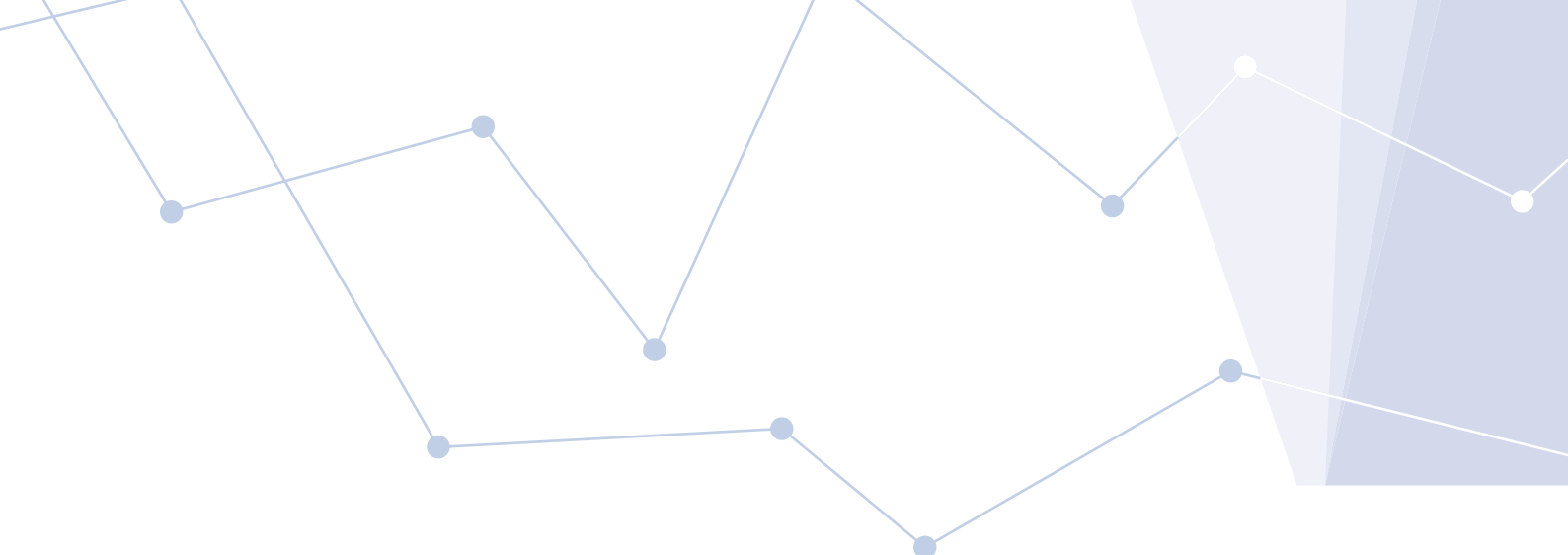
While the analyses reported here are of association only, these findings point to areas for further investigation as potential foci for intervention to improve outcomes for students in key groups, such as those from lower socioeconomic backgrounds, or those with a history of lower achievement – what theories would explain these associations? What interventions already exist that focus on these factors, and do they work, to what extent, and under what circumstances?

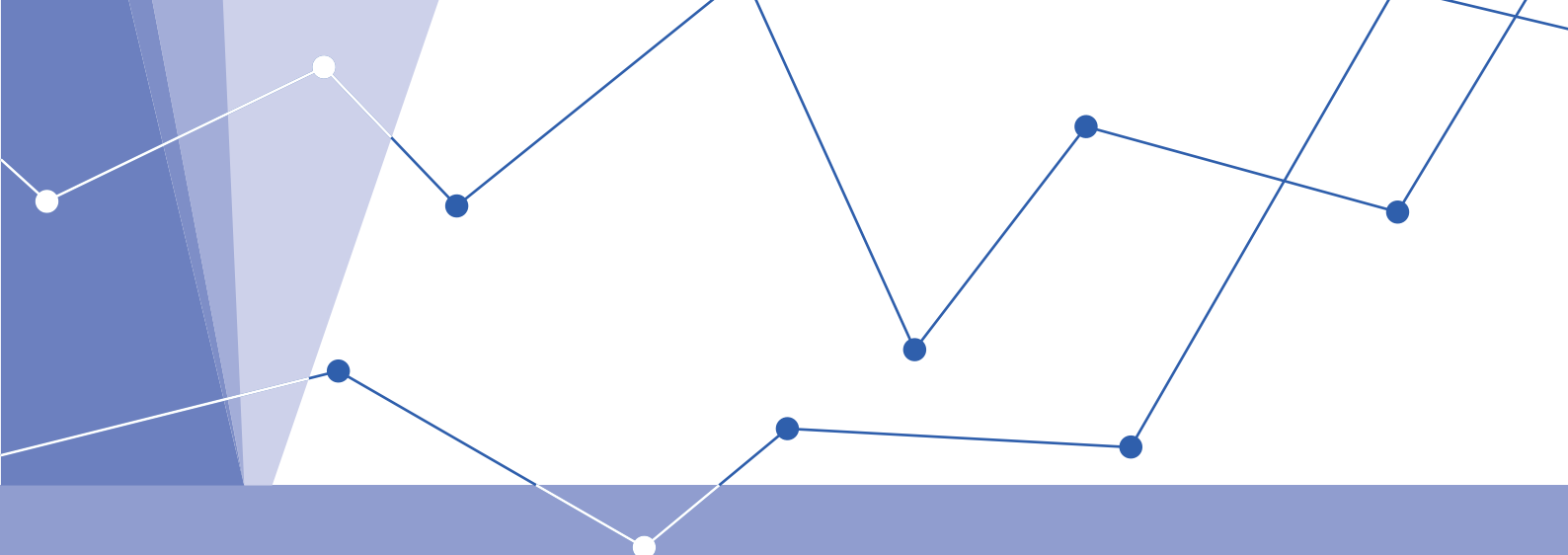




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Appendix A

Note for tables: All tables are reproduced from OECD (2021), *Positive, High-achieving Students?: What Schools and Teachers Can Do*, TALIS, OECD Publishing.
<https://doi.org/10.1787/3b9551db-en>

TABLE A2.1 Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices²												
Share of class time spent on actual teaching and learning	0.78	0.99	0.76	0.32	0.01	0.90	0.73	0.30	1.23	0.95	1.01	0.32
Teachers' autonomy over planning and teaching ³	-3.54	7.32	-4.16	2.28	-3.10	6.51	-3.18	2.19	-2.47	7.63	-3.78	2.30
Teachers' perceived disciplinary climate ⁴	-4.90	6.83	-6.33	2.78	-11.58	6.54	-7.02	2.65	-4.74	7.02	-6.91	2.70
Teachers' practices (frequency): clarity of instruction ⁵	-2.03	5.29	2.33	2.46	-5.05	5.07	1.12	2.43	1.60	6.29	2.00	2.47
Teachers' practices (frequency): cognitive activation ⁶	-4.73	6.93	-3.32	2.77	-2.02	6.20	-5.05	2.56	-5.97	7.53	-4.97	2.73
Teachers' assessment practices: administer own assessment ⁷	22.89	11.91	13.49	6.17	11.73	11.32	9.17	5.70	13.69	12.37	12.11	5.88
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-18.45	17.32	-6.34	5.90	-9.40	15.50	-4.22	5.68	-12.76	17.23	-4.28	5.56
Teachers' assessment practices: let students evaluate their own progress ⁷	1.40	19.16	-15.53	6.77	-4.13	18.50	-14.81	6.50	-2.81	20.58	-15.79	6.68
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	26.88	22.02	5.51	7.70	10.57	19.91	3.10	7.49	25.24	22.74	7.61	7.50
Classroom composition²												
Share of students whose first language is different from the language(s) of instruction ⁸	0.07	0.79	-0.20	0.35	0.13	0.59	-0.07	0.32	0.09	0.74	-0.15	0.36
Share of low academic achievers ⁹	-0.82	0.84	-0.70	0.32	-0.33	0.65	-0.77	0.30	-0.44	0.86	-0.81	0.31
Share of students with special needs ⁹	0.55	1.03	-0.74	0.67	-0.12	0.75	-0.88	0.62	0.01	0.92	-1.03	0.64
Share of students with behavioural problems ⁹	0.66	1.08	-0.14	0.47	1.10	0.85	0.07	0.43	0.98	1.10	0.32	0.45
Share of students from socioeconomically disadvantaged homes ⁹	-1.04	0.43	-0.30	0.28	-1.03	0.35	-0.42	0.27	-1.01	0.45	-0.36	0.28
Share of academically gifted students ⁹	1.10	0.33	1.37	0.26	1.55	0.41	1.62	0.24	1.39	0.42	1.39	0.25
Share of students who are immigrants or with a migrant background ⁹	0.32	0.77	1.16	0.58	0.09	0.67	1.07	0.60	0.18	0.70	0.94	0.58
Share of students who are refugees ⁹	0.20	0.79	-0.94	1.17	0.49	0.85	-1.75	1.18	0.33	0.99	-0.84	1.13

TABLE A2.1 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – all teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student characteristics												
Female students ⁹	31.71	5.72	22.68	1.93	-10.58	5.28	-11.48	1.76	-3.50	5.23	-3.54	1.81
Students with an immigrant background ¹⁰	-3.98	5.56	-31.39	4.38	8.13	5.42	-23.85	5.67	-5.10	5.92	-28.07	5.25
Students' socioeconomic status ¹¹	26.32	3.15	20.62	1.01	23.29	3.54	19.83	1.10	25.40	3.39	20.07	1.14
R^2	0.21		0.29		0.21		0.28		0.18		0.27	

¹ Teacher variables are averaged for all teachers within the school.

² Information on classroom characteristics and practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.2 Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices²												
Share of class time spent on actual teaching and learning	-0.54	0.36	-0.09	0.20	0.55	0.50	0.80	0.20	-0.12	0.54	0.29	0.21
Teachers' autonomy over planning and teaching ³	-1.27	3.33	-1.71	1.72	2.71	3.37	1.70	1.49	-4.10	3.26	-1.24	1.32
Teachers' perceived disciplinary climate ⁴	-2.34	2.71	-1.58	1.60	-0.42	3.60	-2.51	1.73	-7.40	3.06	-5.34	1.92
Teachers' practices (frequency): clarity of instruction ⁵	-0.22	3.42	0.90	1.46	-4.47	2.18	1.44	1.32	-1.04	3.49	0.88	1.31
Teachers' practices (frequency): cognitive activation ⁶	-1.63	3.46	-1.31	1.55	-0.51	3.35	-1.66	1.57	-7.02	3.71	1.57	1.55
Teachers' assessment practices: administer own assessment ⁷	16.20	6.111	1.48	4.52	-1.60	6.23	-0.52	4.36	-3.55	8.44	1.90	3.77
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-16.21	14.55	2.34	4.31	-4.74	6.62	-0.07	3.52	1.31	8.35	-3.86	3.04
Teachers' assessment practices: let students evaluate their own progress ⁷	14.42	8.12	0.79	3.96	3.69	7.90	-3.13	3.60	8.00	11.10	-4.11	3.81
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	16.46	7.81	-2.07	4.01	12.35	7.17	-7.74	3.81	8.05	9.29	-5.36	3.97
Classroom composition²												
Share of students whose first language is different from the language(s) of instruction ⁸	0.45	0.28	-0.25	0.19	0.71	0.35	0.21	0.25	0.00	0.51	-0.01	0.30
Share of low academic achievers ⁸	-0.30	0.23	-0.48	0.17	-0.32	0.31	-0.16	0.13	0.80	0.46	-0.24	0.18
Share of students with special needs ⁸	-1.37	0.58	-0.23	0.89	0.67	0.57	-0.15	0.53	1.01	0.90	1.78	0.59
Share of students with behavioural problems ⁸	0.06	0.41	0.46	0.34	0.83	0.54	0.71	0.34	-0.51	0.67	-0.08	0.31
Share of students from socioeconomically disadvantaged homes ⁸	-0.70	0.20	-0.73	0.26	-1.03	0.32	-0.95	0.23	-1.29	0.47	-0.78	0.22
Share of academically gifted students ⁸	0.15	0.36	0.54	0.16	0.16	0.34	0.34	0.22	0.93	0.43	0.92	0.21
Share of students who are immigrants or with a migrant background ⁸	-0.13	0.29	0.55	0.42	-0.12	0.34	-0.85	0.67	-0.11	0.39	0.41	0.67
Share of students who are refugees ⁸	-0.84	0.66	-1.43	0.88	-0.44	0.47	-2.44	1.08	0.55	0.94	-0.89	0.99

TABLE A2.2 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and classroom practices (controlling for student characteristics and classroom composition) – subject teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student characteristics												
Female students ⁹	33.14	6.27	22.65	2.21	-10.35	5.70	-6.76	2.34	-2.85	5.86	-1.21	2.07
Students with an immigrant background ¹⁰	-2.55	7.23	-30.92	5.39	9.05	6.83	-22.65	5.67	-1.94	6.49	-28.54	6.49
Students' socioeconomic status ¹¹	28.96	3.37	23.61	1.16	26.28	3.82	22.38	1.30	30.54	4.01	22.87	1.21
R^2	0.20		0.25		0.18		0.25		0.19		0.24	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² Information on classroom characteristics and practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.3 Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' working hours²												
Total working hours	0.71	0.78	0.54	0.39	0.36	0.71	0.48	0.39	0.36	0.73	0.73	0.41
Teaching	-0.07	1.18	0.20	0.54	0.87	1.03	0.19	0.51	0.20	1.16	0.14	0.56
Individual planning or preparation of lessons either at school or out of school	4.41	2.95	0.20	1.23	3.12	2.63	0.25	1.16	5.66	2.97	0.66	1.23
Team work and dialogue with colleagues within this school	-5.02	4.97	-3.21	1.89	-1.92	4.59	-2.03	1.77	-4.34	5.29	-2.47	1.94
Marking/Correcting of student work	3.49	2.39	6.01	1.25	2.07	2.30	5.01	1.23	2.63	2.34	5.48	1.21
Counselling students	2.47	3.61	-0.88	1.53	2.13	3.65	-1.25	1.49	4.40	3.87	-0.47	1.61
Participation in school management	-9.07	3.35	-5.40	1.97	-5.62	3.20	-5.48	1.85	-7.52	3.81	-5.08	1.97
General administrative work	0.19	3.82	2.54	1.84	0.55	3.25	2.75	1.82	-1.32	3.83	0.94	1.82
Professional development activities	-4.92	5.35	-4.28	1.88	-3.53	4.62	-4.21	1.70	-4.78	5.68	-3.33	1.92
Communication and cooperation with parents or guardians	7.07	8.70	2.51	2.35	1.28	7.65	2.34	2.26	4.63	8.32	1.11	2.35
Engaging in extracurricular activities	-2.24	3.54	1.78	1.62	-2.34	2.96	0.97	1.56	-2.58	3.41	1.81	1.56
Other work tasks	3.53	2.90	-0.08	1.42	1.93	2.83	-0.08	1.36	2.04	3.08	-0.73	1.38
Classroom composition³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.25	0.76	0.01	0.31	0.30	0.61	0.17	0.31	0.11	0.72	0.00	0.33
Share of low academic achievers ⁴	-1.35	0.82	-0.78	0.30	-0.63	0.67	-0.83	0.28	-1.16	0.87	-0.91	0.30
Share of students with special needs ⁴	0.95	0.97	-0.44	0.60	0.47	0.83	-0.83	0.60	0.74	0.97	-0.78	0.60
Share of students with behavioural problems ⁴	-0.36	0.98	-0.81	0.44	-0.02	0.83	-0.46	0.42	-0.19	1.06	-0.42	0.44
Share of students from socioeconomically disadvantaged homes ⁴	-0.34	0.39	-0.39	0.30	-0.73	0.39	-0.58	0.29	-0.35	0.46	0.52	0.30
Share of academically gifted students ⁴	0.74	0.39	1.32	0.23	1.35	0.45	1.60	0.22	1.15	0.45	1.39	0.23
Share of students who are immigrants or with a migrant background ⁴	-0.01	0.80	0.91	0.54	-0.11	0.65	0.81	0.56	0.02	0.74	0.90	0.54
Share of students who are refugees ⁴	0.09	0.80	-0.83	1.25	0.26	0.87	-1.57	1.28	0.24	1.02	-0.84	1.18

TABLE A2.3 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – all teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student characteristics												
Female students ⁵	32.21	5.54	25.44	2.17	-9.92	5.11	-8.53	2.07	-2.82	5.04	-0.42	2.16
Students with an immigrant background ⁶	-4.74	5.72	-31.25	4.27	7.23	5.34	-23.16	5.54	-5.36	5.66	-27.17	5.11
Students' socioeconomic status ⁷	27.65	3.17	19.73	0.95	24.30	3.56	19.10	1.04	26.43	3.36	19.36	1.10
R^2	0.21		0.30		0.21		0.30		0.19		0.28	

¹ Teacher variables are averaged for all teachers within the school.

² Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.4 Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' working hours²												
Total working hours	0.34	0.47	0.19	0.28	0.34	0.55	0.26	0.31	-0.02	0.48	-0.25	0.28
Teaching	0.05	0.48	-0.80	0.36	0.39	1.27	0.06	0.45	-1.36	0.85	0.05	0.41
Individual planning or preparation of lessons either at school or out of school	0.08	1.10	-1.03	0.66	0.56	1.19	-0.56	0.65	-1.69	0.96	0.72	0.61
Team work and dialogue with colleagues within this school	0.53	4.83	-4.99	1.57	-2.27	3.06	-4.46	1.55	0.16	3.06	-4.70	1.44
Marking/Correcting of student work	0.77	1.04	1.04	0.69	-1.51	1.07	2.91	1.21	4.79	1.49	2.84	0.96
Counselling students	-2.05	1.82	2.37	1.47	-0.01	1.61	-1.03	1.28	0.77	2.79	1.38	1.71
Participation in school management	1.28	2.94	-2.38	1.30	0.54	1.92	-0.20	1.59	-3.63	1.61	-0.58	1.35
General administrative work	2.45	2.41	1.37	1.46	-1.22	1.58	1.63	1.34	-0.63	0.92	0.36	1.35
Professional development activities	-3.76	2.57	1.08	1.00	0.12	4.18	-0.96	1.37	1.43	2.61	0.27	1.36
Communication and cooperation with parents or guardians	0.65	4.13	0.37	2.54	1.07	2.30	1.04	1.69	0.52	4.45	1.65	2.30
Engaging in extracurricular activities	1.85	2.37	1.05	1.36	2.56	3.96	1.45	1.50	1.89	3.00	-1.60	1.33
Other work tasks	-0.49	1.97	-0.89	0.89	0.15	1.22	1.95	1.26	3.10	1.75	1.03	0.79
Classroom composition³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.22	0.33	0.02	0.22	0.35	0.41	0.04	0.23	0.65	0.55	0.10	0.28
Share of low academic achievers ⁴	-0.35	0.31	-0.19	0.16	-0.24	0.29	-0.06	0.13	1.04	0.49	-0.30	0.19
Share of students with special needs ⁴	-1.11	0.59	-2.20	0.84	0.33	0.68	-1.00	0.52	0.30	0.77	1.59	0.73
Share of students with behavioural problems ⁴	0.43	0.53	1.07	0.38	0.36	0.48	0.14	0.30	-0.62	0.67	-0.48	0.30
Share of students from socioeconomically disadvantaged homes ⁴	-0.74	0.28	-0.58	0.27	-0.99	0.28	-1.02	0.28	-1.61	0.49	-0.55	0.25
Share of academically gifted students ⁴	0.04	0.45	0.49	0.15	0.05	0.31	0.89	0.22	1.23	0.37	0.91	0.18
Share of students who are immigrants or with a migrant background ⁴	-0.09	0.39	0.27	0.42	0.32	0.30	-0.39	0.65	-0.44	0.39	0.49	0.65
Share of students who are refugees ⁴	0.40	0.62	0.01	0.88	-0.90	0.46	-1.84	1.17	0.06	0.96	-0.51	1.19

TABLE A2.4 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and working hours (controlling for student characteristics and classroom composition) – subject teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Student characteristics												
Female students ⁵	28.49	6.25	24.46	2.20	-10.46	5.89	-6.54	2.46	-2.92	6.05	0.05	1.99
Students with an immigrant background ⁶	-4.79	6.75	-31.79	5.33	8.96	6.61	-23.01	5.60	-7.77	6.76	-31.41	6.67
Students' socioeconomic status ⁷	29.53	3.26	23.49	1.08	27.14	3.81	21.89	1.30	30.84	4.07	22.42	1.15
R^2	0.20		0.26		0.18		0.25		0.21		0.25	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.5 Relationship between PISA 2018 science performance and induction (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:			
	Science			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Share of teachers who took part in the following induction activity				
Formal induction activities during first employment	-54.58	30.48	-7.37	15.57
Induction activities at current school	22.40	26.51	4.78	12.02
Informal induction activities during first employment	70.52	31.07	1.90	17.78
Informal induction activities at current school	9.47	24.64	-14.32	13.71
Classroom composition²				
Share of students whose first language is different from the language(s) of instruction ³	0.29	0.81	0.04	0.34
Share of low academic achievers ³	-0.53	0.70	-0.78	0.34
Share of students with special needs ³	0.36	0.93	-1.12	0.69
Share of students with behavioural problems ³	0.06	1.10	-0.36	0.42
Share of students from socioeconomically disadvantaged homes ³	-1.11	0.44	-0.51	0.32
Share of academically gifted students ³	1.20	0.37	1.60	0.31
Share of students who are immigrants or with a migrant background ³	0.06	0.81	1.22	0.59
Share of students who are refugees ³	0.42	1.06	-0.27	1.23
Student characteristics				
Female students ⁴	-3.36	5.16	-1.58	2.10
Students with an immigrant background ⁵	-7.79	5.99	-27.98	5.37
Students' socioeconomic status ⁶	26.06	3.36	20.25	1.15
R^2	0.18		0.26	

¹ Teacher variables are averaged for all teachers within the school.

² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.6 Relationship between PISA 2018 science performance and induction (controlling for student characteristics and classroom composition) – science subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary Science teachers¹

Related to:	PISA scores in:			
	Science			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Share of teachers who took part in the following induction activity				
Formal induction activities during first employment	-12.11	11.98	4.04	6.80
Induction activities at current school	2.07	11.76	7.27	5.51
Informal induction activities during first employment	-4.07	11.40	5.01	6.28
Informal induction activities at current school	4.52	12.77	-15.13	6.08
Classroom composition²				
Share of students whose first language is different from the language(s) of instruction ³	0.50	0.56	0.04	0.28
Share of low academic achievers ³	0.52	0.51	-0.53	0.19
Share of students with special needs ³	0.67	0.90	2.07	0.65
Share of students with behavioural problems ³	-0.83	0.64	-0.56	0.32
Share of students from socioeconomically disadvantaged homes ³	-1.19	0.42	-0.48	0.23
Share of academically gifted students ³	0.87	0.45	1.20	0.18
Share of students who are immigrants or with a migrant background ³	-0.20	0.40	1.06	0.78
Share of students who are refugees ³	-0.12	1.09	-2.70	1.14
Student characteristics				
Female students ⁴	-3.11	5.99	-0.60	2.15
Students with an immigrant background ⁵	-4.01	6.72	-29.28	6.36
Students' socioeconomic status ⁶	31.40	4.24	23.88	1.22
R^2	0.18		0.23	

¹ Teacher variables are averaged only for science teachers within the school. The sample is restricted to schools with at least one science teacher.

² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.7 Relationship between PISA 2018 mathematics performance and sense of preparedness after initial education and training (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:			
	Mathematics			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Initial education and training – sense of preparedness				
Sense of preparedness for some or all of the subjects I teach ²	32.76	19.16	16.35	8.87
Pedagogy of some or all of the subjects I teach ²	-28.41	24.07	14.11	9.61
General pedagogy ²	-27.52	22.43	-7.65	9.47
Classroom practice in some or all of the subjects I teach ²	-3.59	24.63	6.18	9.01
Teaching in a mixed ability setting ²	-19.06	17.66	-16.31	6.87
Teaching in multicultural or multilingual setting ²	-7.90	17.04	-10.23	5.97
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving) ²	-1.15	16.49	6.63	7.64
Use of ICT for teaching ²	16.78	14.47	-4.60	5.65
Student behaviour and classroom management ²	20.08	17.63	1.91	8.58
Monitoring students' development and learning ²	16.07	20.19	-10.28	9.16
Classroom composition³				
Share of students whose first language is different from the language(s) of instruction ⁴	0.48	0.61	0.42	0.33
Share of low academic achievers ⁴	-0.13	0.64	-0.71	0.25
Share of students with special needs ⁴	-0.27	0.72	-0.78	0.63
Share of students with behavioural problems ⁴	0.72	0.90	0.17	0.40
Share of students from socioeconomically disadvantaged homes ⁴	-1.51	0.44	-1.15	0.34
Share of academically gifted students ⁴	1.18	0.39	1.86	0.23
Share of students who are immigrants or with a migrant background ⁴	0.23	0.63	1.02	0.56
Share of students who are refugees ⁴	-0.11	0.81	-1.36	1.13
Student characteristics				
Female students ⁵	-10.80	5.09	-10.57	1.76
Students with an immigrant background ⁶	7.46	5.51	-23.33	5.62
Students' socioeconomic status ⁷	23.97	3.53	19.26	1.08
R^2	0.21		0.29	

¹ Teacher variables are averaged for all teachers within the school.

² The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.8 Relationship between PISA 2018 mathematics performance and sense of preparedness after initial education and training (controlling for student characteristics and classroom composition) – mathematics subject teachers

Results of linear regression based on responses of 15-year-old students and lower secondary Mathematics teachers¹

Related to:	PISA scores in:			
	Mathematics			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Initial education and training – sense of preparedness				
Sense of preparedness for some or all of the subjects I teach ²	5.31	6.70	13.29	5.15
Pedagogy of some or all of the subjects I teach ²	14.75	11.26	-1.16	5.55
General pedagogy ²	-32.87	11.37	6.57	4.51
Classroom practice in some or all of the subjects I teach ²	-7.65	8.82	-12.38	4.49
Teaching in a mixed ability setting ²	12.79	9.22	-1.20	3.52
Teaching in multicultural or multilingual setting ²	-0.08	6.11	-2.73	3.15
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving) ²	-9.81	8.55	0.52	4.44
Use of ICT for teaching ²	10.16	6.17	0.07	4.55
Student behaviour and classroom management ²	-0.85	7.92	-3.25	4.72
Monitoring students' development and learning ²	6.51	7.58	-4.35	4.48
Classroom composition³				
Share of students whose first language is different from the language(s) of instruction ⁴	0.44	0.35	0.25	0.31
Share of low academic achievers ⁴	-0.14	0.25	-0.10	0.13
Share of students with special needs ⁴	0.49	0.54	-1.16	0.53
Share of students with behavioural problems ⁴	0.32	0.43	0.00	0.33
Share of students from socioeconomically disadvantaged homes ⁴	-1.04	0.28	-0.83	0.24
Share of academically gifted students ⁴	0.09	0.33	0.88	0.26
Share of students who are immigrants or with a migrant background ⁴	0.16	0.29	-0.57	0.80
Share of students who are refugees ⁴	-0.82	0.42	-2.92	1.40
Student characteristics				
Female students ⁵	-12.42	5.73	-6.36	2.24
Students with an immigrant background ⁶	9.83	6.61	-22.54	5.62
Students' socioeconomic status ⁷	26.98	3.61	23.22	1.32
R^2	0.19		0.24	

¹ Teacher variables are averaged only for mathematics teachers within the school. The sample is restricted to schools with at least one mathematics teacher.

² The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.9 Relationship between PISA 2018 reading and mathematics performance and type of professional development (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:							
	Reading				Mathematics			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different professional development activities participated in during 12 months prior to survey	74.65	40.49	16.23	12.83	35.72	36.03	11.58	12.65
Share of teachers who participated in the following type of professional development activity 12 months prior to survey hours								
Courses/seminars attended in person	-172.91	67.46	-23.47	22.12	-93.30	56.73	-14.52	20.89
Online courses/seminars	-102.44	44.73	-11.14	16.75	-55.79	41.12	-3.45	15.97
Education conferences where teachers and/or researchers present research or discuss educational issues	-29.64	48.02	-2.36	15.44	-6.86	45.77	4.71	15.80
Formal qualification programme (e.g. degree)	-49.58	63.88	-19.35	22.45	-34.91	53.82	-16.94	21.75
Observation visits to other schools	-80.46	50.30	-36.98	18.04	-40.23	39.86	-26.87	17.64
Observation visits to business premises, public organisations or non-government organisations	-118.26	62.84	-35.78	20.53	-41.88	58.04	-24.69	19.41
Peer and/or self-observation and coaching as part of a formal school arrangement	-41.62	44.50	-1.82	15.74	-16.10	38.53	-0.49	15.16
Participation in a network of teachers formed specifically for the professional development of teachers	-82.51	52.29	-16.67	18.55	-37.49	43.57	-13.50	18.48
Reading professional literature	-76.19	53.17	-5.06	19.24	-18.94	45.49	-10.67	18.54
Classroom composition²								
Share of students whose first language is different from the language(s) of instruction ³	0.28	0.83	0.18	0.33	0.43	0.61	0.24	0.32
Share of low academic achievers ³	-1.08	0.72	-0.78	0.30	-0.40	0.59	-0.75	0.28
Share of students with special needs ³	0.87	0.99	-0.76	0.69	0.30	0.79	-0.97	0.69
Share of students with behavioural problems ³	0.42	0.97	-0.51	0.44	0.50	0.81	-0.46	0.42
Share of students from socioeconomically disadvantaged homes ³	-1.05	0.47	-0.56	0.36	-1.15	0.46	-0.73	0.35
Share of academically gifted students ³	0.67	0.31	1.53	0.27	1.31	0.38	1.73	0.25
Share of students who are immigrants or with a migrant background ³	0.23	0.75	0.54	0.61	-0.07	0.62	0.61	0.63
Share of students who are refugees ³	-0.54	0.88	-0.12	1.25	-0.03	0.88	-1.08	1.23
Student characteristics								
Female students ⁴	31.06	5.70	23.84	2.25	-10.81	5.18	-10.24	2.13
Students with an immigrant background ⁵	-6.31	5.67	-31.36	4.36	6.39	5.33	-22.73	5.64
Students' socioeconomic status ⁶	26.87	3.25	20.11	0.97	23.99	3.54	19.59	1.07
R ²	0.21		0.29		0.21		0.28	

¹ Teacher variables are averaged for all teachers within the school.

² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.10 Relationship between PISA 2018 reading and mathematics performance and type of professional development (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:							
	Reading				Mathematics			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different professional development activities participated in during 12 months prior to survey	23.89	14.73	-1.81	6.27	-23.34	12.59	-0.21	5.07
Share of teachers who participated in the following type of professional development activity 12 months prior to survey hours								
Courses/seminars attended in person	-24.37	34.18	4.75	9.23	24.15	20.19	3.43	8.50
Online courses/seminars	-49.15	17.67	6.59	9.00	28.15	18.41	16.45	7.15
Education conferences where teachers and/or researchers present research or discuss educational issues	-12.72	15.09	9.08	8.78	33.36	16.77	2.68	6.63
Formal qualification programme (e.g. degree)	-48.22	33.07	-4.83	10.11	-6.59	23.35	-6.76	8.19
Observation visits to other schools	-18.59	28.30	-1.01	10.84	17.02	17.72	8.71	12.81
Observation visits to business premises, public organisations or non-government organisations	47.92	39.72	19.49	11.01	34.04	24.62	-7.23	9.30
Peer and/or self-observation and coaching as part of a formal school arrangement	-32.57	25.31	-4.28	9.07	22.01	18.81	-11.39	7.37
Participation in a network of teachers formed specifically for the professional development of teachers	-18.25	19.05	3.02	7.92	21.90	17.27	4.57	7.11
Reading professional literature	-22.84	28.69	2.40	10.87	23.28	20.59	8.01	8.35
Classroom composition²								
Share of students whose first language is different from the language(s) of instruction ³	0.45	0.30	-0.08	0.19	0.34	0.44	0.30	0.25
Share of low academic achievers ³	-0.40	0.28	-0.32	0.16	-0.36	0.34	0.02	0.12
Share of students with special needs ³	-1.01	0.68	-0.86	0.57	0.38	0.60	-0.75	0.59
Share of students with behavioural problems ³	0.39	0.51	-0.07	0.33	0.34	0.42	-0.06	0.32
Share of students from socioeconomically disadvantaged homes ³	-0.86	0.20	-0.43	0.24	-0.89	0.30	-0.79	0.21
Share of academically gifted students ³	0.05	0.35	0.47	0.15	-0.03	0.35	0.96	0.19
Share of students who are immigrants or with a migrant background ³	-0.15	0.30	0.69	0.43	0.39	0.42	-1.24	0.74
Share of students who are refugees ³	-0.05	0.61	-0.80	0.77	-0.90	0.51	-2.67	1.11
Student characteristics								
Female students ⁴	30.65	6.51	21.90	2.27	-10.72	6.08	-4.64	2.32
Students with an immigrant background ⁵	-3.93	6.96	-30.47	5.14	9.84	6.57	-22.45	5.59
Students' socioeconomic status ⁶	29.39	3.48	23.76	1.15	27.30	3.75	22.27	1.30
R^2	0.20		0.25		0.18		0.25	

¹ Teacher variables are averaged for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.11 Relationship between PISA 2018 reading, mathematics and science performance and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher well-being and job satisfaction												
Workplace well-being and stress ²	-4.44	6.49	2.09	2.98	-2.84	6.93	2.22	2.98	-1.48	7.34	3.03	2.97
Workload stress ³	-0.66	7.69	0.65	2.64	-1.13	6.38	0.14	2.45	-1.10	7.72	-0.14	2.52
Job satisfaction with work environment ⁴	4.69	5.91	2.37	2.09	5.28	4.50	3.66	2.05	9.10	6.19	3.95	2.08
Job satisfaction with profession ⁵	-6.54	8.35	0.56	2.95	-6.70	8.12	0.41	2.86	-6.32	8.75	1.81	2.87
Teachers' satisfaction with the salary ⁶	8.56	15.76	2.71	7.17	16.03	13.67	2.60	7.17	17.91	15.62	2.97	7.00
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁶	6.54	24.43	-4.32	7.34	3.89	18.96	-4.62	6.73	8.07	24.20	-3.35	6.85
Teachers' views of the way different stakeholders value the profession ⁷	-3.43	6.99	-11.82	2.93	-2.52	5.94	-11.81	2.73	-3.22	7.11	-12.10	2.80
Classroom composition⁸												
Share of students whose first language is different from the language(s) of instruction ⁹	0.13	0.81	0.14	0.33	0.25	0.60	0.31	0.31	0.05	0.73	0.15	0.35
Share of low academic achievers ⁹	-1.02	0.72	-1.19	0.30	-0.38	0.61	-1.16	0.30	-0.55	0.75	-1.29	0.30
Share of students with special needs ⁹	0.88	0.96	-0.83	0.68	0.24	0.82	-1.05	0.67	0.38	0.98	-1.22	0.65
Share of students with behavioural problems ⁹	0.41	1.08	-0.29	0.44	0.66	0.85	-0.10	0.41	0.77	1.10	0.13	0.42
Share of students from socioeconomically disadvantaged homes ⁹	-1.19	0.47	-0.59	0.34	-1.24	0.43	-0.69	0.34	-1.17	0.50	-0.66	0.32
Share of academically gifted students ⁹	0.98	0.39	1.18	0.27	1.50	0.42	1.53	0.26	1.38	0.43	1.24	0.25
Share of students who are immigrants or with a migrant background ⁹	0.32	0.88	0.88	0.54	0.13	0.69	0.73	0.56	0.24	0.78	0.86	0.55
Share of students who are refugees ⁹	0.19	0.77	0.25	1.06	0.31	0.82	-0.35	1.08	0.38	0.94	0.49	1.05
Student characteristics												
Female students ¹⁰	33.01	5.81	23.38	2.23	-9.57	5.26	-10.25	2.13	-1.83	5.27	-2.15	2.14
Students with an immigrant background ¹¹	-4.68	5.53	-31.72	4.36	7.06	5.44	-23.67	5.62	-5.56	5.91	-28.38	5.28
Students' socioeconomic status ¹²	27.22	3.11	19.80	0.97	23.97	3.56	19.07	1.07	26.01	3.40	19.36	1.11
R ²	0.20		0.29		0.21		0.29		0.18		0.27	

- 1 Teacher variables are averaged for all teachers within the school
 - 2 The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.
 - 3 The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.
 - 4 The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.
 - 5 The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.
 - 6 The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".
 - 7 The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by.
 - 8 Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.
 - 9 Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.
 - 10 Dummy variable: the reference category is male.
 - 11 Dummy variable: the reference category is student with no immigrant background.
 - 12 The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.
- Note: Statistically significant values are indicated in bold.

TABLE A2.12 Relationship between PISA 2018 reading, mathematics and science performance and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher well-being and job satisfaction												
Workplace well-being and stress ²	3.55	3.75	2.26	1.53	-2.14	3.54	-3.53	1.93	-4.40	3.40	-1.44	1.50
Workload stress ³	2.25	3.87	3.55	1.52	1.46	2.98	5.50	1.56	-5.06	3.51	-1.27	1.52
Job satisfaction with work environment ⁴	4.23	3.10	1.13	1.47	0.71	3.13	2.60	1.59	6.03	3.05	3.46	1.39
Job satisfaction with profession ⁵	-0.24	3.17	-1.07	1.39	0.06	3.36	-1.04	1.44	-12.16	3.96	-6.16	1.52
Teachers' satisfaction with the salary ⁶	-9.69	8.35	-3.60	4.42	3.11	8.29	5.51	3.45	7.12	8.38	-2.23	3.96
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁶	8.20	12.65	4.32	3.93	5.27	10.49	0.39	3.64	2.39	10.06	1.44	4.32
Teachers' views of the way different stakeholders value the profession ⁷	1.99	3.24	-1.45	1.45	-4.83	2.65	-7.50	1.50	-2.70	2.99	-2.30	1.30
Classroom composition⁸												
Share of students whose first language is different from the language(s) of instruction ⁹	0.21	0.32	-0.24	0.18	0.60	0.43	0.47	0.26	0.82	0.63	0.37	0.30
Share of low academic achievers ⁹	-0.40	0.30	-0.47	0.17	-0.18	0.32	-0.14	0.13	0.48	0.42	-0.54	0.20
Share of students with special needs ⁹	-0.48	0.59	-0.21	0.63	0.49	0.60	-0.19	0.60	0.67	0.78	1.56	0.67
Share of students with behavioural problems ⁹	0.47	0.47	0.41	0.35	0.29	0.48	0.29	0.28	-0.64	0.50	-0.25	0.29
Share of students from socioeconomically disadvantaged homes ⁹	-0.93	0.24	-0.90	0.20	-1.15	0.30	-0.88	0.23	-1.16	0.44	-0.59	0.26
Share of academically gifted students ⁹	0.05	0.44	0.51	0.15	0.05	0.32	0.92	0.20	0.62	0.42	0.81	0.19
Share of students who are immigrants or with a migrant background ⁹	0.09	0.30	0.84	0.43	0.22	0.34	-1.12	0.70	-0.58	0.39	0.65	0.69
Share of students who are refugees ⁹	-0.14	0.66	-1.59	0.75	-0.98	0.45	-2.98	1.24	0.82	0.82	-0.20	1.22
Student characteristics												
Female students ¹⁰	32.47	6.42	23.46	2.17	-11.26	5.91	-5.83	2.14	-3.76	5.80	0.33	2.23
Students with an immigrant background ¹¹	-2.77	6.86	-31.24	5.35	8.97	6.56	-21.41	5.76	-7.61	7.05	-33.13	6.72
Students' socioeconomic status ¹²	29.68	3.46	23.62	1.13	27.58	3.80	22.69	1.26	29.88	4.16	22.40	1.21
R^2	0.19		0.25		0.17		0.24		0.20		0.25	

- ¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.
 - ² The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.
 - ³ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.
 - ⁴ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.
 - ⁵ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.
 - ⁶ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".
 - ⁷ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by.
 - ⁸ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.
 - ⁹ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.
 - ¹⁰ Dummy variable: the reference category is male.
 - ¹¹ Dummy variable: the reference category is student with no immigrant background.
 - ¹² The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.
- Note: Statistically significant values are indicated in bold.

TABLE A2.13 Relationship between PISA 2018 reading performance and content of professional development (controlling for student characteristics and classroom composition) – all teachers and reading teachers
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	PISA scores in:							
	Reading – all teachers ¹				Reading – reading teachers only ²			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Share of teachers for whom the following topic was included in their professional development activity in the 12 months prior to the survey								
Knowledge and understanding of my subject field(s)	-65.20	44.01	7.70	14.35	5.54	22.72	9.50	9.44
Pedagogical competencies in teachers in my subject field(s)	-7.53	27.32	-7.16	18.51	-16.53	14.24	-2.49	7.72
Knowledge of the curriculum	77.47	29.69	9.77	14.62	4.43	15.34	4.64	8.43
Student assessment practices	3.70	33.84	-13.66	17.18	-5.62	15.99	7.76	9.14
ICT skills for teaching	4.29	18.67	22.89	9.19	15.33	10.54	4.57	6.09
Student behaviour and classroom management	-27.48	18.69	10.56	12.38	9.00	11.77	-3.04	7.01
School management and administration	-21.65	29.08	-20.24	14.30	-3.64	14.92	6.30	10.71
Approaches to individualised learning	-12.38	24.88	-3.58	12.98	16.94	14.25	-14.12	6.27
Teaching students with special needs	28.02	23.87	-11.62	11.97	-8.34	9.90	3.57	5.95
Teaching in a multicultural or multilingual setting	83.51	40.04	-0.29	15.50	17.97	16.08	1.74	7.18
Teaching cross-curricular skills (e.g. creativity, critical thinking, problem solving)	13.43	25.34	-37.54	15.02	-11.44	11.45	-14.01	6.20
Analysis and use of student assessments	-10.47	29.41	24.13	15.30	1.81	11.61	-1.05	7.24
Teacher parent/guardian cooperation	-54.05	31.40	-23.19	15.24	-32.99	16.49	-7.11	9.68
Communicating with people from different cultures or countries	7.00	46.62	-3.17	15.67	18.35	21.80	-13.62	9.03
Classroom composition³								
Share of students whose first language is different from the language(s) of instruction ⁴	-0.56	0.74	0.25	0.36	0.04	0.32	-0.11	0.19
Share of low academic achievers ⁴	-0.24	0.66	-0.92	0.32	-0.25	0.28	-0.34	0.15
Share of students with special needs ⁴	0.20	0.77	-0.36	0.85	-0.02	0.66	-0.86	0.69
Share of students with behavioural problems ⁴	0.02	0.89	-0.40	0.46	-0.14	0.57	0.37	0.34
Share of students from socioeconomically disadvantaged homes ⁴	-1.16	0.46	-0.76	0.35	-0.72	0.23	-0.76	0.25
Share of academically gifted students ⁴	1.12	0.31	1.41	0.33	0.29	0.40	0.60	0.16
Share of students who are immigrants or with a migrant background ⁴	0.64	0.66	0.95	0.61	0.06	0.36	0.45	0.40
Share of students who are refugees ⁴	-0.94	0.83	-0.11	1.30	-0.29	0.85	-1.21	0.91
Student characteristics								
Female students ⁵	33.66	5.80	23.49	1.91	31.76	6.40	20.79	2.53
Students with an immigrant background ⁶	-7.24	5.53	-32.48	4.30	-3.74	7.23	-30.56	5.01
Students' socioeconomic status ⁷	26.86	3.07	20.25	0.99	29.88	3.84	22.94	1.13
R ²	0.22		0.30		0.19		0.26	

¹ Teacher variables are averaged for all teachers within the school.

² Teacher variables are averaged only for reading teachers within the school. The sample is restricted to schools with at least one reading teacher.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.14 Relationship between PISA 2018 reading, mathematics and science performance and school climate (controlling for student characteristics and classroom composition) – all teachers

Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School climate												
Collaborative school culture ²	5.87	4.49	-1.86	2.03	3.29	4.16	-1.93	2.00	5.30	4.64	-1.67	2.01
Teacher-student relations ³	0.57	5.13	2.29	2.54	2.47	5.14	5.54	2.48	5.86	5.42	3.10	2.49
Teachers' actions towards achieving academic excellence ⁴	1.00	2.37	0.30	0.80	0.67	1.79	0.37	0.75	0.87	2.21	0.16	0.75
Stakeholder (i.e. parents and local community) involvement in school ⁵	2.30	1.62	0.51	0.74	1.03	1.56	0.55	0.75	1.34	1.74	0.36	0.71
Classroom composition⁶												
Share of students whose first language is different from the language(s) of instruction ⁷	0.10	0.77	-0.10	0.32	0.21	0.58	-0.01	0.31	-0.07	0.69	-0.11	0.33
Share of low academic achievers ⁷	-1.05	0.62	-0.71	0.29	-0.40	0.58	-0.65	0.28	-0.62	0.66	-0.81	0.29
Share of students with special needs ⁷	0.61	0.85	-0.86	0.70	-0.02	0.74	-1.13	0.69	-0.03	0.84	-1.21	0.67
Share of students with behavioural problems ⁷	0.21	1.06	-0.68	0.44	0.48	0.85	-0.49	0.40	0.79	1.10	-0.42	0.42
Share of students from socioeconomically disadvantaged homes ⁷	-1.04	0.44	-0.30	0.31	-1.15	0.44	-0.49	0.30	-1.08	0.47	-0.39	0.31
Share of academically gifted students ⁷	0.68	0.35	1.32	0.25	1.27	0.46	1.61	0.24	1.05	0.42	1.35	0.25
Share of students who are immigrants or with a migrant background ⁷	0.30	0.72	1.20	0.57	0.11	0.64	1.11	0.61	0.33	0.64	1.11	0.60
Share of students who are refugees ⁷	0.23	0.68	-0.23	1.30	0.34	0.76	-0.94	1.28	0.37	0.83	-0.09	1.20
Student characteristics												
Female students ⁸	33.46	5.86	23.85	2.16	-9.63	5.26	-10.60	1.99	-2.00	5.41	-2.43	2.06
Students with an immigrant background ⁹	-4.53	5.55	-32.88	4.67	7.32	5.32	-24.55	5.75	-5.32	5.97	-29.28	5.46
Students' socioeconomic status ¹⁰	27.13	3.18	20.73	1.00	23.90	3.51	20.07	1.09	25.83	3.40	20.14	1.11
R ²	0.20		0.27		0.20		0.27		0.18		0.25	

¹ Teacher variables are averaged for all teachers within the school.

² The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

³ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁴ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁵ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁶ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁷ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁸ Dummy variable: the reference category is male.

⁹ Dummy variable: the reference category is student with no immigrant background.

¹⁰ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.15 Relationship between PISA 2018 reading, mathematics and science performance and school climate (controlling for student characteristics and classroom composition) – subject teachers

Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School climate												
Collaborative school culture ²	1.41	2.79	-1.62	1.30	0.34	2.66	-0.49	1.34	0.24	3.01	1.99	1.46
Teacher-student relations ³	0.51	2.36	1.07	1.58	-2.64	2.85	1.93	1.40	4.67	3.04	-0.93	1.39
Teachers' actions towards achieving academic excellence ⁴	1.81	3.34	0.39	1.01	0.23	2.76	2.52	1.09	-0.16	2.61	1.51	1.00
Stakeholder (i.e. parents and local community) involvement in school ⁵	2.27	2.00	1.43	1.02	3.43	1.78	-0.59	1.10	0.93	2.18	1.76	0.95
Classroom composition⁶												
Share of students whose first language is different from the language(s) of instruction ⁷	0.31	0.31	-0.22	0.19	0.52	0.44	0.30	0.27	0.25	0.52	0.20	0.29
Share of low academic achievers ⁷	-0.26	0.31	-0.45	0.17	-0.29	0.26	-0.21	0.13	0.38	.052	-0.42	0.20
Share of students with special needs ⁷	-0.64	0.62	-0.50	0.72	0.89	0.60	-0.27	0.52	0.84	1.03	1.10	0.66
Share of students with behavioural problems ⁷	0.39	0.45	0.56	0.39	0.17	0.45	0.09	0.28	-0.54	0.69	-0.13	0.31
Share of students from socioeconomically disadvantaged homes ⁷	-0.88	0.24	-0.81	0.22	-0.93	0.31	-0.91	0.24	-1.08	0.41	-0.53	0.29
Share of academically gifted students ⁷	0.13	0.40	0.45	0.15	0.06	0.31	0.71	0.20	0.81	0.43	0.98	0.20
Share of students who are immigrants or with a migrant background ⁷	-0.05	0.35	0.91	0.39	0.19	0.30	-0.89	0.69	-0.10	0.41	0.74	0.77
Share of students who are refugees ⁷	0.19	0.67	-1.22	0.85	-0.66	0.50	-2.03	1.12	0.17	0.90	-0.43	1.22
Student characteristics												
Female students ⁸	32.45	6.45	24.83	2.31	-10.47	5.95	-5.05	2.19	-3.10	6.13	-0.73	2.23
Students with an immigrant background ⁹	-4.13	7.19	-32.01	5.42	7.52	6.89	-23.50	5.79	-4.23	6.63	-31.18	6.57
Students' socioeconomic status ¹⁰	29.12	3.55	24.03	1.14	26.71	3.84	22.51	1.30	31.19	4.18	23.13	1.21
R ²	0.19		0.23		0.17		0.23		0.18		0.23	

- ¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.
 - ² The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.
 - ³ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.
 - ⁴ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.
 - ⁵ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.
 - ⁶ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.
 - ⁷ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.
 - ⁸ Dummy variable: the reference category is male.
 - ⁹ Dummy variable: the reference category is student with no immigrant background.
 - ¹⁰ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.
- Note: Statistically significant values are indicated in bold.

TABLE A2.16 Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – all teachers
Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School leadership												
Collaborated with teachers to solve classroom discipline problems ²	-1.89	5.32	-1.39	2.09	-1.14	4.89	-0.91	2.02	-2.73	5.76	-1.98	2.09
Observed instruction in the classroom ²	8.29	6.97	-4.85	3.12	2.47	5.92	-4.25	2.91	6.92	8.29	-4.31	3.16
Provided feedback to teachers based on my observations ²	-10.63	8.15	4.56	3.44	-4.17	8.20	4.46	3.14	-9.46	9.68	4.58	3.35
Took actions to support cooperation among teachers to develop new teaching practices ²	4.68	6.98	-1.85	2.76	-1.79	4.93	-3.00	2.71	0.84	6.13	-2.68	2.64
Took actions to ensure that teachers take responsibility for improving their teaching skills ²	4.74	9.98	-0.12	3.39	3.49	9.21	1.84	3.25	0.16	10.19	-0.52	3.29
Took actions to ensure that teachers feel responsible for students' learning outcomes ²	6.40	8.77	6.07	3.21	3.62	8.83	3.66	3.01	10.74	8.93	5.68	3.10
Provided parents/guardians with information on school and student performance ²	7.34	7.89	-0.02	2.46	1.09	6.72	0.26	2.28	0.47	7.43	-1.13	2.33
Reviewed school administrative procedures and reports ²	-16.28	5.75	2.64	2.48	-8.38	6.01	3.87	2.52	-14.89	6.26	2.04	2.45
Resolved problems with the lesson timetable in this school ²	-4.40	4.72	-2.38	1.81	-1.62	4.41	-2.05	1.76	-0.33	5.55	-0.87	1.82
Collaborated with principals from other schools on challenging work tasks ²	-1.10	4.35	0.82	2.56	-1.54	4.12	-0.66	2.58	-0.60	4.72	-0.01	2.46
Worked on a professional development plan for this school ²	-2.34	6.91	-0.03	2.59	-4.03	5.77	-0.99	2.40	-2.40	6.72	-0.21	2.43

TABLE A2.16 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – all teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom composition³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.19	0.6	-0.09	0.33	0.47	0.52	0.02	0.31	0.05	0.62	-0.07	0.33
Share of low academic achievers ⁴	-0.32	0.67	-0.64	0.29	-0.04	0.58	-0.79	0.28	-0.25	0.73	-0.88	0.28
Share of students with special needs ⁴	0.31	0.91	-0.89	0.66	0.00	0.84	-0.96	0.63	-0.03	0.93	-1.05	0.63
Share of students with behavioural problems ⁴	-0.31	0.89	-0.96	0.42	-0.01	0.81	-0.74	0.39	0.11	1.01	-0.67	0.40
Share of students from socioeconomically disadvantaged homes ⁴	-1.45	0.42	-0.43	0.32	-1.34	0.42	-0.42	0.31	-1.28	0.48	-0.38	0.32
Share of academically gifted students ⁴	0.95	0.29	1.39	0.27	1.43	0.38	1.57	0.25	1.25	0.35	1.37	0.25
Share of students who are immigrants or with a migrant background ⁴	0.26	0.67	1.53	0.60	-0.15	0.57	1.48	0.62	0.18	0.60	1.38	0.60
Share of students who are refugees ⁴	0.10	0.66	-1.00	1.33	0.35	0.78	-1.66	1.35	0.23	0.89	-0.60	1.25
Student characteristics												
Female students ⁵	31.25	5.47	23.84	2.16	-10.53	4.94	-10.08	2.06	-3.36	5.04	-2.07	2.00
Students with an immigrant background ⁶	-5.44	5.66	-32.38	4.43	6.98	5.63	-24.46	5.66	-5.71	6.19	-28.86	5.15
Students' socioeconomic status ⁷	26.95	3.28	20.48	0.99	23.72	3.61	19.85	1.08	25.80	3.40	19.99	1.13
R^2	0.21		0.29		0.21		0.28		0.19		0.26	

¹ Teacher variables are averaged for all teachers within the school.

² The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A2.17 Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – subject teachers
Results of linear regression based on responses of 15-year-old students and lower secondary principals (subject specific)¹

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School leadership												
Collaborated with teachers to solve classroom discipline problems ²	-4.96	6.52	-3.32	2.79	-2.27	6.15	-4.98	2.71	-4.30	7.37	-4.44	2.92
Observed instruction in the classroom ²	3.81	8.85	-3.84	4.04	1.49	6.65	-5.64	3.88	-2.39	9.76	-3.81	4.40
Provided feedback to teachers based on my observations ²	-6.58	10.65	9.23	4.34	-4.02	8.60	-1.04	4.01	-6.46	11.38	0.12	4.57
Took actions to support cooperation among teachers to develop new teaching practices ²	-2.32	6.35	-7.63	3.39	-1.59	7.48	-3.76	3.43	-1.96	7.70	-3.64	3.39
Took actions to ensure that teachers take responsibility for improving their teaching skills ²	7.98	10.78	4.91	4.61	3.28	10.22	1.83	4.83	5.83	13.70	-2.01	4.36
Took actions to ensure that teachers feel responsible for students' learning outcomes ²	5.73	11.29	2.42	4.98	4.72	10.28	3.92	4.40	2.13	12.06	8.08	4.15
Provided parents/guardians with information on school and student performance ²	9.81	8.77	-9.32	3.05	-8.15	8.79	1.26	3.52	2.00	7.51	-0.01	2.78
Reviewed school administrative procedures and reports ²	-20.43	6.16	3.45	2.94	-8.55	6.47	-0.44	3.67	-10.87	7.45	2.90	3.12
Resolved problems with the lesson timetable in this school ²	-4.33	4.11	-2.52	2.36	-2.62	5.45	3.33	2.74	-1.28	6.94	0.78	2.86
Collaborated with principals from other schools on challenging work tasks ²	0.56	5.39	2.85	2.74	3.43	5.04	-4.37	3.66	-2.49	5.17	-7.05	3.66
Worked on a professional development plan for this school ²	5.76	6.64	4.52	2.77	-2.00	6.15	4.90	3.22	-2.30	7.85	4.14	3.25

TABLE A2.17 (CONTINUED) Relationship between PISA 2018 reading, mathematics and science performance and school leadership (controlling for student characteristics and classroom composition) – subject teachers

Related to:	PISA scores in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom composition³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.05	0.25	-0.24	0.19	0.50	0.41	0.10	0.27	0.41	0.52	0.13	0.31
Share of low academic achievers ⁴	-0.31	0.28	-0.33	0.15	0.00	0.28	0.00	0.13	0.45	0.48	-0.43	0.18
Share of students with special needs ⁴	-0.61	0.64	-1.96	0.62	0.10	0.61	-0.38	0.56	0.47	0.89	1.70	0.67
Share of students with behavioural problems ⁴	0.44	0.45	0.65	0.30	0.35	0.45	0.03	0.32	-0.65	0.69	-0.38	0.31
Share of students from socioeconomically disadvantaged homes ⁴	-0.96	0.22	-0.99	0.21	-1.15	0.31	-0.80	0.25	-1.17	0.49	-0.44	0.27
Share of academically gifted students ⁴	0.20	0.39	0.58	0.15	0.31	0.32	0.69	0.26	0.77	0.40	1.07	0.20
Share of students who are immigrants or with a migrant background ⁴	0.27	0.28	0.22	0.44	0.09	0.37	-0.36	0.67	0.00	0.40	0.27	0.66
Share of students who are refugees ⁴	-0.12	0.61	0.49	0.81	-0.57	0.44	-1.34	1.17	-0.16	1.06	0.05	1.19
Student characteristics												
Female students ⁵	30.95	6.20	23.82	2.27	-10.14	5.67	-6.71	2.28	-3.33	5.90	-0.45	2.15
Students with an immigrant background ⁶	-4.20	7.14	-31.37	5.10	8.67	6.86	-23.08	5.79	-4.95	7.14	-30.78	6.32
Students' socioeconomic status ⁷	29.10	3.50	23.35	1.12	26.97	3.94	22.01	1.30	30.12	4.14	22.91	1.20
R^2	0.20		0.25		0.18		0.25		0.19		0.24	

¹ Teacher variables are averaged only for reading/mathematics/science teachers within the school. The sample is restricted to schools with at least one reading/mathematics/science teacher.

² The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Dummy variable: the reference category is male.

⁶ Dummy variable: the reference category is student with no immigrant background.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.1 Relationship between within-school differences in PISA 2018 scores between female and male students and classroom practices (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between female and male students ² in:			
	Reading			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Classroom practices³				
Share of class time spent on actual teaching and learning	0.81	1.98	0.15	0.45
Teachers' autonomy over planning and teaching ⁴	-9.21	8.93	3.95	3.06
Teachers' perceived disciplinary climate ⁵	12.66	14.08	15.11	3.47
Teachers' practices (frequency): clarity of instruction ⁶	-4.53	8.09	-1.42	3.30
Teachers' practices (frequency): cognitive activation ⁷	-4.95	9.35	-3.02	3.08
Teachers' assessment practices: administer own assessment ⁸	2.88	15.35	-19.30	7.31
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁸	0.83	22.56	-6.13	6.86
Teachers' assessment practices: let students evaluate their own progress ⁸	36.74	25.94	10.61	8.56
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁸	-48.66	31.47	11.99	10.43
Student characteristics				
Share of female students	42.94	90.26	40.22	19.92
Share of students with an immigrant background	-17.02	22.00	-13.84	34.61
Students' socioeconomic status ⁹	1.83	12.87	10.98	4.55
R^2	0.08		0.35	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus (-) the school-level average PISA score for males. Differences are positive when they favour female students and negative with they favour male students.

³ Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁵ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁶ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁷ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁸ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.2 Relationship between within-school differences in PISA 2018 scores between female and male students and teacher characteristics (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between female and male students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher characteristics												
Share of female teachers	-30.41	43.43	39.80	22.22	-32.54	39.16	26.09	15.17	-31.70	40.34	25.83	20.00
Years of experience as a teacher	-0.31	1.21	-0.04	0.51	0.55	0.82	-0.17	0.41	0.28	0.96	0.18	0.45
Student characteristics												
Share of female students	16.63	91.82	31.16	24.28	7.30	88.15	25.76	19.95	-4.94	84.27	35.97	21.65
Share of students with an immigrant background	-13.38	20.16	-105.25	73.79	4.86	17.11	-89.33	47.70	0.76	17.36	-43.00	57.38
Students' socioeconomic status ³	-4.87	8.97	9.26	4.48	-7.42	7.11	7.39	3.89	-8.80	7.25	6.50	4.60
R^2	0.01		0.20		0.02		0.21		0.02		0.18	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative when they favour male students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.3 Relationship between within-school differences in PISA 2018 scores between female and male students and motivation to join the profession (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between female and male students ² in:			
	Reading			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Motivation to join the profession				
Personal utility value ³	10.28	7.33	0.64	5.43
Social utility value ⁴	-3.67	10.54	-6.97	4.26
Share of teachers for whom teaching was a first career choice	5.07	38.60	47.00	19.88
Student characteristics				
Share of female students	33.51	95.18	35.74	22.90
Share of students with an immigrant background	-7.84	20.27	-71.15	48.45
Students' socioeconomic status ⁵	-7.52	9.62	4.95	4.69
R^2	0.03		0.23	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative when they favour male students.

³ The index of personal utility value measures the extent to which personal utility motivations, such as teaching offered a steady career path; teaching provided a reliable income; teaching was a secure job; and teaching schedule (e.g. hours, holidays, part-time positions) fit with responsibilities in personal life, were considered important to become a teacher.

⁴ The index of social utility value measures the extent to which social utility motivations, such as teaching allowed to influence the development of children and young people; teaching allowed to benefit the socially disadvantaged; and teaching allowed to provide a contribution to society, were considered important to become a teacher.

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.4 Relationship between within-school differences in PISA 2018 scores between female and male students and school climate (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between female and male students ² in:			
	Reading			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
School climate				
Collaborative school culture ³	9.76	4.61	7.23	3.27
Teacher-student relations ⁴	-14.71	5.81	-8.83	3.83
Teachers' actions towards achieving academic excellence ⁵	-1.71	2.35	2.38	1.54
Stakeholder (i.e. parents and local community) involvement in school ⁶	0.45	2.13	-1.49	1.00
Student characteristics				
Share of female students	38.22	82.75	52.40	21.66
Share of students with an immigrant background	-21.97	22.35	-26.38	52.77
Students' socioeconomic status ⁷	6.34	11.30	13.84	5.09
R^2	0.06		0.23	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative when they favour male students.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.5 Relationship between within-school differences in PISA 2018 scores between female and male students and formal appraisal (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between female and male students ² in:			
	Reading			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Number of different sources of appraisal	-3.81	6.00	4.72	3.02
Formal appraisal: source				
Principal	3.24	5.43	3.98	2.60
Other members of school management team ³	-8.55	4.06	-0.35	2.05
Assigned mentors ³	4.02	3.60	-0.81	1.74
Teachers (who are not part of school management team) ³	0.51	3.88	-2.90	1.78
External individuals or bodies ³	8.69	5.92	-3.94	1.92
Student characteristics				
Share of female students	-8.96	91.55	17.61	21.75
Share of students with an immigrant background	-19.88	22.88	-108.22	51.93
Students' socioeconomic status ⁴	-5.95	9.19	4.82	4.32
R^2	0.07		0.29	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative when they favour male students.

³ The frequency with which teachers at the school are formally appraised by each source, as reported by principals: "never", "less than once every two years", "once every two years", "once per year" or "twice or more per year".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.6 Relationship between within-school differences in PISA 2018 scores between female and male students and school leadership (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	Within-school differences in PISA scores between female and male students ² in:			
	Reading			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
School leadership				
Collaborated with teachers to solve classroom discipline problems ³	-4.94	7.16	-0.93	2.71
Observed instruction in the classroom ³	9.45	9.14	10.39	3.68
Provided feedback to teachers based on my observations ³	7.18	9.77	2.77	3.68
Took actions to support cooperation among teachers to develop new teaching practices ³	-5.95	9.09	-6.68	3.65
Took actions to ensure that teachers take responsibility for improving their teaching skills ³	10.18	15.39	3.06	4.22
Took actions to ensure that teachers feel responsible for students' learning outcomes ³	12.75	15.62	-5.33	4.79
Provided parents/guardians with information on school and student performance ³	-10.87	9.77	-0.10	3.24
Reviewed schools' administrative procedures and reports ³	-4.60	8.57	7.94	3.85
Resolved problems with the lesson timetable in this school ³	10.62	5.02	5.45	2.74
Collaborated with principals from other schools on challenging work tasks ³	16.30	6.78	-3.73	2.83
Worked on a professional development plan for this school ³	-22.55	7.73	-0.68	3.38
Student characteristics				
Share of female students	64.31	90.74	44.95	20.45
Share of students with an immigrant background	4.02	21.73	-94.15	46.30
Students' socioeconomic status ⁴	3.75	8.46	5.66	5.01
R^2	0.19		0.34	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative when they favour male students.

³ The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.7 Relationship between within-school differences in PISA 2018 scores between female and male students and principals' views on teachers' attitudes regarding gender discrimination (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary principals (subject specific)¹

Related to:	Within-school differences in PISA scores between female and male students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' attitudes regarding gender discrimination												
All or almost all teachers would agree that students should learn how to avoid gender discrimination ³	-10.28	14.11	-8.38	5.85	-7.08	11.88	-6.78	4.85	-10.85	11.87	-10.77	5.04
All or almost all teachers would agree that it is important to treat female and male students equally ³	12.80	13.60	12.89	6.88	7.39	11.75	11.62	5.74	12.08	11.44	15.06	6.52
Student characteristics												
Share of female students	13.55	89.53	31.45	24.26	10.95	86.51	29.69	19.12	-5.19	82.44	38.34	21.18
Share of students with an immigrant background	-9.63	20.85	-108.73	62.00	7.87	17.57	-91.55	46.47	4.60	17.96	-54.92	50.62
Students' socioeconomic status ⁴	-5.74	9.56	7.01	4.77	-6.35	7.96	5.89	4.01	-8.35	7.88	5.90	5.07
R^2	0.02		0.17		0.01		0.17		0.02		0.16	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between female and male students are defined as the school-level average PISA score for females minus the school-level average PISA score for males. Differences are positive when they favour female students and negative with they favour male students.

³ Dummy variable (based on principals' responses): the reference category refers to "none or almost none", "some" and "many".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.8 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and classroom characteristics (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom characteristics³												
Share of students whose first language is different from the language(s) of instruction ⁴	0.99	0.86	-1.03	0.53	0.57	0.71	-0.83	0.48	0.95	0.84	-1.56	0.56
Share of low academic achievers ⁴	-1.68	2.03	-0.54	0.64	-1.43	1.59	-0.30	0.62	-0.77	1.64	-0.07	0.57
Share of students with special needs ⁴	-0.81	1.94	1.55	1.37	-0.81	1.39	2.23	1.42	-0.60	1.64	1.01	1.16
Share of students with behavioural problems ⁴	1.34	2.63	0.15	0.88	0.01	1.92	-0.83	0.86	-0.06	2.18	0.68	0.83
Share of academically gifted students ⁴	0.10	2.11	0.44	0.52	1.09	1.78	0.80	0.46	0.60	1.99	0.75	0.55
Class size ⁵	2.41	3.64	-0.38	0.76	-1.10	2.95	-0.39	0.60	0.29	3.23	-0.62	0.72
Student characteristics												
Share of female students	34.58	51.74	-0.13	18.62	-0.40	35.61	-9.57	18.43	16.30	49.30	0.40	18.67
Share of students with an immigrant background	-82.18	60.68	134.32	127.86	-36.80	46.03	93.74	114.22	-78.72	56.23	116.92	120.11
Students' socioeconomic status ⁶	7.48	43.16	1.72	11.09	-3.71	29.39	-4.63	8.56	3.26	32.07	5.82	9.90
R^2	0.06		0.26		0.09		0.28		0.05		0.25	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

⁵ Number of students in the target class.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.9 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and classroom practices (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Classroom practices³												
Share of class time spent on actual teaching and learning	-0.77	2.57	1.53	0.64	-0.18	2.12	1.28	0.54	-0.35	2.14	1.39	0.61
Teachers' autonomy over planning and teaching ⁴	-25.00	22.01	3.31	4.69	-24.67	14.69	2.40	3.89	-20.14	17.63	2.00	4.16
Teachers' perceived disciplinary climate ⁵	-3.36	17.88	9.81	5.49	-8.03	13.21	6.98	4.26	-6.60	15.65	9.00	5.20
Teachers' practices (frequency): clarity of instruction ⁶	-17.25	14.42	-2.34	4.90	-17.38	10.80	-4.61	3.79	-13.07	13.31	1.16	4.68
Teachers' practices (frequency): cognitive activation ⁷	12.21	21.34	-4.99	5.50	15.52	16.77	-0.78	4.39	10.46	18.07	-7.10	5.04
Teachers' assessment practices: administer own assessment ⁸	9.84	24.07	3.31	12.32	3.06	19.59	5.16	9.54	11.60	21.61	-1.57	10.41
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁸	-27.97	35.69	-12.72	10.65	-21.67	32.69	-1.50	8.98	-26.28	36.58	-8.20	10.40
Teachers' assessment practices: let students evaluate their own progress ⁸	-1.06	47.83	6.16	12.95	15.77	34.69	-10.00	13.06	-7.94	39.36	-3.65	11.82
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁸	-30.46	75.93	1.03	15.13	-48.53	55.74	-9.62	13.19	-20.09	60.67	-2.87	13.74
Student characteristics												
Share of female students	53.59	55.67	14.09	20.09	11.31	38.29	8.79	17.37	32.63	52.27	3.64	19.20
Share of students with an immigrant background	-46.45	45.74	13.85	106.41	-18.14	31.56	15.91	93.35	-34.66	36.83	25.47	93.16
Students' socioeconomic status ⁹	29.12	37.21	14.05	9.59	19.49	26.08	10.74	7.37	14.54	30.33	19.33	8.90
R ²	0.08		0.32		0.10		0.33		0.06		0.32	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ Information on classroom practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁴ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁵ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁶ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁷ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁸ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.10 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and teacher characteristics (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher characteristics												
Share of female teachers	-163.15	76.40	-3.29	23.41	-119.61	53.50	-13.98	22.29	-133.24	67.41	9.47	22.60
Years of experience as a teacher	3.68	2.01	-0.76	0.78	3.30	1.76	-0.08	0.66	4.64	1.80	-0.53	0.78
Student characteristics												
Share of female students	69.94	45.01	13.65	18.81	33.75	36.24	12.06	17.46	44.57	42.89	2.27	18.02
Share of students with an immigrant background	-55.47	41.49	58.17	126.32	-33.93	30.94	22.95	115.74	-47.91	32.95	7.91	113.81
Students' socioeconomic status ³	19.51	31.78	6.78	8.68	22.20	23.96	3.85	7.17	11.18	25.48	9.87	8.01
R^2	0.10		0.16		0.10		0.17		0.11		0.15	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.11 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and employment status (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Employment status												
Share of teachers with permanent employment	28.25	56.63	46.73	32.81	15.31	48.39	51.90	25.18	50.64	53.79	50.64	33.81
Share of teachers working fulltime (more than 90% of fulltime hours)	-54.81	63.38	-9.42	29.86	-33.13	47.36	-19.20	26.21	-52.99	56.93	-3.43	31.24
Student characteristics												
Share of female students	39.60	44.40	10.33	19.77	13.86	33.68	7.34	18.69	28.57	43.83	1.88	18.51
Share of students with an immigrant background	-41.01	41.65	110.27	123.95	-22.36	30.88	31.71	118.29	-34.77	33.70	21.95	114.27
Students' socioeconomic status ³	21.81	31.33	3.62	9.38	25.07	24.42	2.21	7.80	13.86	25.44	9.05	8.53
R^2	0.04		0.17		0.04		0.16		0.04		0.15	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.12 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and self-efficacy (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Self-efficacy												
Self-efficacy in classroom management	3.33	19.04	-1.89	7.05	9.77	15.09	-0.85	6.23	-1.76	17.75	-3.43	5.52
Self-efficacy in instruction	-28.13	20.57	-1.32	6.62	-14.01	16.64	5.80	5.83	-9.98	16.14	0.60	5.95
Self-efficacy in student engagement	-3.38	22.14	-0.61	7.28	-7.57	17.02	-5.71	5.96	-7.41	18.90	-0.47	7.13
Student characteristics												
Share of female students	57.80	54.21	17.42	18.95	24.17	37.42	13.27	17.44	37.82	50.62	3.74	19.64
Share of students with an immigrant background	-36.17	38.53	83.63	120.67	-17.75	28.58	25.56	114.20	-31.76	30.83	68.68	114.25
Students' socioeconomic status ³	33.35	32.58	7.27	9.34	30.60	24.91	3.55	8.05	25.55	26.04	10.29	8.57
R^2	0.07		0.18		0.05		0.21		0.04		0.17	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.13 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and teachers' working hours (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teachers' working hours³												
Total working hours	-1.96	1.54	0.39	0.84	-0.73	1.06	0.45	0.74	-1.40	1.16	-0.12	0.75
Teaching	6.11	3.21	0.44	1.18	5.01	2.25	-0.58	1.13	4.67	2.54	0.09	1.06
Individual planning or preparation of lessons either at school or out of school	10.41	5.55	2.86	2.16	3.22	4.54	0.29	1.72	7.33	4.83	2.55	1.88
Team work and dialogue with colleagues within this school	-1.29	10.04	1.77	4.39	4.76	9.54	2.25	4.03	-4.56	9.87	1.66	4.67
Marking/Correcting of student work	5.16	5.10	-3.24	2.65	8.07	3.68	-0.35	2.43	5.85	4.15	-3.08	2.77
Counselling students	8.52	10.08	-2.28	3.23	3.57	8.29	-0.90	2.67	15.43	8.68	-0.72	3.21
Participation in school management	-10.09	8.77	-1.93	4.13	-9.83	6.33	0.97	3.48	-11.86	7.59	0.34	4.22
General administrative work	-1.61	7.15	4.20	3.84	0.32	4.95	-1.63	3.40	0.12	5.94	5.26	3.92
Professional development activities	-6.89	11.69	-5.65	4.39	3.60	8.54	-0.03	3.30	-1.17	9.70	-4.53	4.52
Communication and cooperation with parents or guardians	-14.05	13.81	3.17	4.50	-14.66	12.51	4.67	4.36	-16.86	12.94	4.23	4.18
Engaging in extracurricular activities	5.94	8.27	1.21	3.26	1.81	4.79	-1.64	3.00	2.44	5.82	1.14	3.14
Other work tasks	3.55	8.67	0.22	2.48	9.09	6.51	1.62	2.32	8.07	6.78	1.14	2.36
Student characteristics												
Share of female students	39.14	48.50	32.27	22.09	6.16	36.73	32.99	17.73	28.86	48.75	21.21	20.35
Share of students with an immigrant background	-63.91	48.83	115.47	95.65	-56.09	29.45	43.58	85.85	-65.24	33.92	29.42	112.98
Students' socioeconomic status ⁴	5.64	33.16	4.56	10.12	7.32	24.94	1.12	8.22	1.81	27.12	4.76	9.55
R ²	0.16		0.32		0.21		0.35		0.20		0.32	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ Average number of hours (i.e. 60 minutes) teachers report having spent on the following activities during the most recent complete calendar week. A "complete" calendar week is one that was not shortened by breaks, public holidays, sick leave, etc. It also includes tasks that took place during weekends, evenings or other out-of-class hours..

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.14 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and motivation to join the profession (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Motivation to join the profession												
Personal utility value ³	-17.32	15.83	-4.31	5.78	-23.19	12.62	-3.74	5.08	-19.16	13.76	-7.30	5.70
Social utility value ⁴	-13.50	12.97	-1.25	6.02	-9.74	10.14	-3.01	5.81	-9.14	11.55	-1.95	5.85
Share of teachers for whom teaching was a first career choice	-2.58	76.01	-16.51	22.37	-29.80	59.69	16.59	20.18	-21.09	66.36	-9.71	20.85
Student characteristics												
Share of female students	30.65	49.01	17.08	18.52	-0.52	34.75	8.52	17.08	15.04	47.00	7.94	18.16
Share of students with an immigrant background	-39.59	39.13	81.41	110.43	-21.90	28.92	-7.18	103.70	-33.04	31.72	44.96	109.02
Students' socioeconomic status ⁵	20.44	30.87	6.18	8.72	23.62	23.06	4.31	6.89	14.61	25.33	8.30	7.94
R^2	0.06		0.19		0.08		0.19		0.05		0.19	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The index of personal utility value measures the extent to which personal utility motivations, such as teaching offered a steady career path; teaching provided a reliable income; teaching was a secure job; and teaching schedule (e.g. hours, holidays, part-time positions) fit with responsibilities in personal life, were considered important to become a teacher.

⁴ The index of social utility value measures the extent to which social utility motivations, such as teaching allowed to influence the development of children and young people; teaching allowed to benefit the socially disadvantaged; and teaching allowed to provide a contribution to society, were considered important to become a teacher.

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.15 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and content of initial education and training (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Share of teachers who hold a master's (ISCED 7) or doctoral degree (ISCED 8)	46.20	69.68	-63.14	28.05	17.34	54.63	-66.09	27.30	18.00	61.08	-52.52	25.21
Share of teachers for whom the following elements were included in their formal education or training												
Content of some or all the subjects I teach ²	-286.36	120.42	-31.00	52.76	-259.83	102.96	-45.96	46.16	-248.04	108.50	-58.14	48.93
Pedagogy of some or all of the subjects I teach	-147.06	117.56	-10.36	48.72	-13.05	109.61	11.67	41.68	-63.97	116.83	11.29	50.47
General pedagogy	-103.08	161.12	45.64	46.87	-124.01	142.35	41.55	41.16	-53.57	161.92	34.73	46.46
Classroom practice in some or all of the subjects I teach	211.58	124.94	42.16	36.45	130.28	90.50	21.67	30.75	188.36	99.77	73.73	34.03
Teaching in a mixed ability setting	141.29	81.00	34.57	21.96	147.37	69.52	23.90	20.09	120.88	78.56	16.77	22.83
Teaching in multicultural or multilingual setting	-72.93	66.53	-17.31	22.96	-94.95	46.49	-22.93	18.53	-100.97	56.84	-24.74	22.33
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving)	66.40	72.99	64.08	24.49	87.54	52.27	66.93	20.58	71.95	61.52	60.89	22.99
Use of ICT for teaching	-151.52	83.73	-39.44	20.79	-105.00	72.89	-37.93	17.60	-116.67	74.44	-35.54	20.88
Student behaviour and classroom management	24.78	131.40	24.54	34.77	-31.16	91.47	26.13	28.86	41.59	106.80	17.17	30.85
Monitoring students' development and learning	-14.86	88.28	-46.02	31.39	6.47	73.24	-51.57	27.41	15.57	79.92	-38.48	29.24
Student characteristics												
Share of female students	49.89	41.53	27.42	16.29	29.98	30.55	27.21	15.51	37.63	43.24	20.16	17.36
Share of students with an immigrant background	-67.64	37.52	95.07	101.95	-41.39	25.88	3.30	92.14	-52.13	29.27	74.39	103.91
Students' socioeconomic status ³	4.97	29.66	6.95	9.01	17.82	23.40	3.14	6.93	-2.16	24.21	10.32	8.15
R ²	0.18		0.33		0.19		0.36		0.16		0.34	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.16 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and sense of preparedness after initial education and training (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Initial education and training – sense of preparedness												
Sense of preparedness for some or all the subjects I teach ³	12.99	69.82	-8.64	19.04	3.35	54.55	-20.67	15.43	18.64	58.56	-14.66	17.10
Pedagogy of some or all of the subjects I teach ³	-46.95	70.38	-28.10	17.97	-47.52	58.75	-35.16	16.12	-55.60	57.30	-29.56	16.33
General pedagogy ³	23.57	60.93	30.23	19.97	8.91	48.83	11.59	17.01	38.62	48.87	17.57	18.90
Classroom practice in some or all of the subjects I teach ³	-59.35	76.71	-19.12	16.55	-41.67	53.71	-14.06	12.96	-50.30	63.97	-20.72	15.13
Teaching in a mixed ability setting ³	27.61	50.54	42.44	13.64	31.78	40.44	35.04	11.68	14.20	44.46	28.49	12.39
Teaching in multicultural or multilingual setting ³	10.40	47.76	-27.30	12.24	-21.83	30.77	-29.92	11.29	-9.14	38.33	-27.85	11.86
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving) ³	-4.13	53.30	6.54	15.41	27.57	36.66	21.17	13.26	-4.92	42.20	12.16	14.47
Use of ICT for teaching ³	-70.76	35.75	-22.36	11.51	-53.52	31.33	-16.94	9.21	-74.99	31.46	-9.76	10.57
Student behaviour and classroom management ³	23.45	61.93	6.94	18.69	27.74	43.46	8.21	16.05	36.78	49.14	13.45	17.14
Monitoring students' development and learning ³	48.40	56.22	12.43	18.35	56.22	46.62	16.66	15.00	94.79	50.96	16.43	17.04
Student characteristics												
Share of female students	15.41	48.60	11.69	19.68	-6.83	35.76	16.60	17.14	-4.99	43.45	6.49	18.20
Share of students with an immigrant background	-41.45	48.38	42.24	84.19	-23.14	31.77	20.77	74.90	-33.83	35.63	20.73	86.52
Students' socioeconomic status ⁴	18.16	37.78	12.70	9.19	19.29	29.52	10.29	7.32	3.69	29.99	15.54	8.25
R ²	0.10		0.30		0.14		0.34		0.17		0.32	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The extent to which teachers felt prepared for a given element in their teaching: "not at all", "somewhat", "well" or "very well".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.17 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and induction (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Share of teachers who took part in the following induction activity												
Formal induction activities during first employment	133.55	81.13	27.42	28.58	127.46	64.92	53.23	29.13	155.92	74.46	21.94	27.75
Induction activities at current school	-14.68	63.70	-1.23	23.81	10.06	52.32	-4.00	21.42	5.90	54.42	-0.58	21.40
Informal induction activities during first employment	-71.13	76.74	-21.31	39.86	-90.81	58.55	-71.37	44.25	-104.19	66.62	-4.62	33.69
Informal induction activities at current school	-31.81	62.77	58.33	34.97	-51.25	60.67	73.73	38.95	-84.33	60.67	31.00	30.02
Student characteristics												
Share of female students	37.86	45.58	15.71	17.82	14.75	33.51	3.39	17.00	29.52	43.13	0.28	17.17
Share of students with an immigrant background	-40.34	42.30	34.52	101.10	-26.38	31.25	-8.56	99.58	-40.74	34.46	-5.07	107.59
Students' socioeconomic status ³	24.94	32.66	0.43	9.05	27.08	23.70	-0.57	7.15	20.25	25.59	5.30	8.66
<i>R</i> ²	0.06		0.21		0.08		0.23		0.09		0.19	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.18 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and peer mentoring (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Peer mentoring												
Having an assigned mentor	59.30	71.97	-3.96	39.92	7.76	42.83	11.37	35.19	36.59	57.05	35.17	36.94
Being an assigned mentor for one or more teachers	-112.36	76.07	20.11	39.11	-94.76	45.37	20.80	39.86	-106.27	59.57	6.50	37.45
Student characteristics												
Share of female students	34.94	44.25	-0.26	19.19	9.83	34.66	-3.36	20.69	22.49	43.46	-2.50	19.50
Share of students with an immigrant background	-50.32	43.38	28.27	127.06	-28.25	30.54	-12.28	119.15	-41.49	33.62	-2.32	108.81
Students' socioeconomic status ³	20.96	30.07	8.61	9.13	26.64	23.44	5.32	7.73	15.70	24.30	11.49	8.38
R ²	0.06		0.17		0.06		0.19		0.06		0.15	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.19 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and type of professional development (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different professional development activities participated in during 12 months prior to survey	-20.30	80.54	10.54	23.70	5.50	71.32	0.45	22.84	45.37	83.64	23.85	24.01
Share of teachers who participated in the following type of professional development activity 12 months prior to survey												
Courses/seminars attended in person	-19.62	156.08	-16.45	35.47	-112.55	128.99	-26.39	34.95	-74.34	141.39	-39.31	32.57
Online courses/seminars	17.50	101.94	-30.44	32.47	-26.41	87.03	-10.75	31.81	-76.73	100.36	-35.34	32.77
Education conferences where teachers and/or researchers present research or discuss educational issues	-9.93	100.77	-8.28	32.07	23.18	87.49	25.69	31.97	-58.96	99.20	-11.78	31.07
Formal qualification programme (e.g. degree)	82.30	134.38	-22.03	34.18	60.34	109.32	-34.02	32.10	33.87	129.71	-50.12	34.73
Observation visits to other schools	-146.86	140.87	-33.16	33.90	-76.16	111.67	-4.84	29.77	-139.92	130.67	-31.99	34.95
Observation visits to business premises, public organisations or non-government organisations	76.06	150.55	-39.94	38.97	4.03	131.13	-32.16	34.39	-99.51	137.31	-65.21	38.00
Peer and/or self-observation and coaching as part of a formal school arrangement	-29.46	97.01	-17.78	29.58	-29.70	78.67	1.03	27.24	-60.97	96.06	-30.23	28.37
Participation in a network of teachers formed specifically for the professional development of teachers	-35.33	107.63	-0.43	31.97	-9.21	93.86	27.16	29.40	-81.66	108.38	-13.89	32.05
Reading professional literature (subject)	100.96	114.01	39.58	38.27	13.15	95.84	30.45	38.48	28.65	111.17	11.03	38.03
Student characteristics												
Share of female students	28.82	51.13	5.19	18.40	2.28	36.42	12.37	16.14	9.50	50.06	3.27	17.21
Share of students with an immigrant background	-58.92	46.51	98.82	111.40	-36.42	35.66	-51.78	93.86	-59.14	40.48	-6.31	104.77
Students' socioeconomic status ³	-2.37	37.60	1.78	8.89	10.50	29.08	-0.48	7.26	-6.11	30.26	2.25	8.33
R^2	0.15		0.29		0.08		0.30		0.08		0.29	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.20 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and content of professional development (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Share of teachers for whom the following topic was included in their professional development activity in the 12 months prior to the survey												
Knowledge and understanding of my subject field(s)	111.99	106.18	5.07	27.80	102.64	76.46	-46.00	24.94	155.56	86.61	-6.50	25.81
Pedagogical competencies in teachers in my subject field(s)	-47.50	75.15	-49.62	24.93	29.30	57.35	10.74	20.97	-1.44	67.99	-18.12	24.62
Knowledge of the curriculum	-48.92	81.38	6.90	25.22	14.60	62.17	37.33	23.34	-47.84	66.44	1.05	23.27
Student assessment practices	77.44	69.71	-18.11	30.42	-27.03	56.77	-35.22	29.49	21.94	67.02	-12.71	26.92
ICT skills for teaching	-58.28	62.71	11.73	16.93	-20.96	46.55	-20.76	15.43	-27.31	53.28	-6.47	16.19
Student behaviour and classroom management	-124.32	48.57	36.14	25.66	-93.57	38.72	17.89	23.20	-83.15	48.80	41.07	23.14
School management and administration	-29.07	66.80	15.64	28.89	-21.06	61.54	24.78	25.71	9.17	71.79	16.99	27.61
Approaches to individualised learning	-177.22	80.80	6.60	25.48	-70.01	53.84	34.31	23.00	-114.55	63.31	45.19	23.34
Teaching students with special needs	106.21	69.31	12.85	19.55	46.35	49.14	11.46	15.45	68.61	55.67	-2.35	18.78
Teaching in a multicultural or multilingual setting	-18.24	104.26	-86.69	27.90	-13.64	78.66	-28.31	22.48	31.31	90.64	-58.44	27.02
Teaching cross-curricular skills (e.g. creativity, critical thinking, problem solving)	67.39	46.00	-0.12	24.83	8.28	35.70	-9.68	21.84	32.13	42.64	-1.62	24.18
Analysis and use of student assessments	-134.47	63.06	-11.12	22.98	-99.62	53.57	-10.53	22.20	-109.10	61.89	-20.11	21.98
Teacher parent/guardian co-operation	219.67	74.19	17.65	23.46	135.83	58.59	9.24	19.28	115.77	71.98	14.39	24.00
Communicating with people from different cultures or countries	100.03	125.03	40.12	30.10	160.13	88.02	10.74	26.29	91.76	105.40	34.83	30.23
Student characteristics												
Share of female students	-12.40	42.28	13.59	17.79	-28.24	28.23	19.38	14.65	-11.86	41.83	9.53	16.29
Share of students with an immigrant background	-109.41	38.77	-45.69	91.06	-82.01	30.53	-113.67	86.57	-90.57	37.51	-108.04	82.56
Students' socioeconomic status ³	36.47	32.35	6.48	8.96	39.57	24.82	7.37	7.75	34.91	27.09	12.13	8.74
R ²	0.28		0.37		0.30		0.38		0.23		0.35	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.21 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and teacher well-being and job satisfaction (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Teacher well-being and job satisfaction												
Workplace well-being and stress ³	-18.68	17.67	5.19	7.29	-20.32	13.77	0.29	7.48	-20.22	14.98	0.54	6.51
Workload stress ⁴	28.80	19.77	-2.00	6.12	25.01	14.72	-6.80	6.38	25.64	16.91	-3.82	5.49
Job satisfaction with work environment ⁵	-10.27	9.81	6.78	4.64	-2.68	8.02	9.22	4.51	-11.79	8.14	5.53	4.39
Job satisfaction with profession ⁶	-8.86	16.58	-3.65	6.75	-15.10	13.88	-11.69	5.11	-8.52	15.54	-12.37	5.41
Teachers' satisfaction with the salary ⁷	21.85	37.05	-1.98	12.22	34.52	31.29	-4.18	11.15	21.06	31.35	2.08	11.37
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁷	4.37	51.07	5.49	14.41	32.46	36.37	4.86	12.75	26.49	39.68	12.16	14.04
Teachers' views of the way different stakeholders value the profession ⁸	-12.01	14.54	-4.25	4.82	-13.98	11.65	-3.12	4.68	-10.25	12.93	-5.58	4.86
Student characteristics												
Share of female students	43.67	45.93	12.04	20.16	16.98	34.61	7.77	19.14	33.83	46.44	4.39	19.25
Share of students with an immigrant background	-40.09	41.11	200.27	113.69	-11.55	31.64	77.75	105.23	-33.84	34.83	129.02	101.78
Students' socioeconomic status ⁹	26.87	30.61	0.80	8.96	22.73	24.46	-1.61	7.58	18.59	25.16	3.61	8.23
R ²	0.09		0.25		0.10		0.25		0.08		0.27	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.
² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.
³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.
⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.
⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.
⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.
⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".
⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.
⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.
 Note: Statistically significant values are indicated in bold.

TABLE A3.22 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and innovativeness (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Innovativeness												
Teachers' views on team innovativeness	-2.91	13.49	-6.43	4.93	0.15	10.49	-4.53	5.46	-3.00	12.02	-2.83	4.58
Student characteristics												
Share of female students	40.20	45.89	19.62	17.46	13.08	33.74	16.85	16.32	27.87	44.54	2.15	18.26
Share of students with an immigrant background	-42.05	42.14	55.54	138.51	-22.49	30.00	18.51	120.43	-34.67	33.45	-22.76	123.58
Students' socioeconomic status ³	24.69	33.10	7.11	9.02	25.88	25.62	2.68	7.81	18.06	26.76	12.38	8.37
R^2	0.03		0.16		0.03		0.16		0.02		0.14	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.23 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and collaboration (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Collaboration												
Professional collaboration	-18.92	9.03	-1.93	3.44	-12.26	6.06	-2.21	2.85	-18.85	6.81	-2.48	3.40
Student characteristics												
Share of female students	42.73	40.49	11.29	18.39	16.05	31.94	7.75	17.88	30.33	40.20	0.50	18.02
Share of students with an immigrant background	-61.63	42.25	79.09	113.04	-35.79	32.22	17.24	112.91	-54.15	34.79	51.55	107.57
Students' socioeconomic status ³	13.23	29.83	8.03	9.26	19.34	23.37	4.15	7.55	6.60	24.20	12.52	8.40
R^2	0.08		0.15		0.06		0.17		0.08		0.15	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.24 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and school climate (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School climate												
Collaborative school culture ³	-12.63	9.74	8.87	3.91	-9.36	8.12	7.27	4.04	-13.61	7.83	8.73	3.82
Teacher-student relations ⁴	2.94	11.27	-1.60	4.39	5.06	8.99	-2.14	4.23	4.80	9.52	-2.62	4.59
Teachers' actions towards achieving academic excellence ⁵	-10.32	5.14	1.10	1.73	-10.60	3.31	0.15	1.64	-13.41	3.74	0.00	1.56
Stakeholder (i.e. parents and local community) involvement in school ⁶	4.21	4.76	0.81	1.61	3.87	3.66	1.28	1.64	4.64	3.61	0.40	1.57
Student characteristics												
Share of female students	50.89	43.22	17.75	18.52	23.76	29.75	16.61	16.19	40.82	40.16	4.59	18.24
Share of students with an immigrant background	-58.98	44.14	14.90	119.88	-38.54	33.05	6.26	101.04	-55.00	36.70	-14.21	113.60
Students' socioeconomic status ⁷	24.48	32.42	9.14	8.60	26.36	26.96	6.88	7.28	19.14	25.82	13.80	7.84
R ²	0.11		0.24		0.14		0.22		0.17		0.21	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.25 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and feedback received (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different methods based on which feedback is received	-25.79	49.43	-31.93	20.85	35.60	35.26	-34.57	18.89	6.36	34.10	-15.06	20.14
Share of teachers receiving feedback based on the following methods												
Observation of classroom teaching	-23.65	92.66	102.68	36.46	-61.39	67.10	101.91	37.68	-44.47	79.68	66.65	32.96
Student survey responses related to teaching	41.95	59.56	22.08	27.58	-41.01	42.41	35.24	25.79	7.48	45.92	19.62	27.10
Assessment of content knowledge	10.44	82.26	22.73	30.31	-51.52	53.46	31.23	25.94	-13.61	55.52	22.21	26.07
School based and classroom based results (e.g. performance results, project results, test scores)	-25.79	112.44	16.95	38.09	-113.35	89.06	28.14	35.93	-83.37	96.37	-12.40	38.33
Self-assessment of work	-47.00	83.62	26.27	29.03	-65.83	60.69	10.97	25.13	-64.96	63.87	7.43	28.99
Student characteristics												
Share of female students	30.82	46.83	18.78	18.62	-8.99	35.64	5.91	19.46	11.78	43.35	4.83	19.57
Share of students with an immigrant background	-43.54	50.75	31.03	110.23	-2.70	35.27	-48.47	109.37	-24.85	38.65	-12.99	109.02
Students' socioeconomic status ³	11.80	34.37	6.32	8.37	22.54	25.08	1.40	7.30	8.12	27.50	5.70	7.56
R ²	0.09		0.26		0.07		0.24		0.07		0.23	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.26 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and formal appraisal (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Number of different sources of appraisal	-10.92	10.47	5.53	4.10	-3.97	8.27	8.50	3.77	-11.75	9.96	8.68	4.03
Frequency of formal appraisal by source												
Principal	1.26	9.43	5.40	3.98	1.38	7.87	6.24	3.23	5.83	8.68	7.31	3.69
Other members of school management team ³	-2.03	7.82	-1.17	2.84	0.26	6.88	-3.00	2.84	-4.04	6.63	-1.33	2.77
Assigned mentors ³	14.92	7.18	1.36	2.40	9.96	6.05	1.54	1.93	14.74	6.42	0.76	2.10
Teachers (who are not part of school management team) ³	-1.80	7.46	-6.63	2.66	-4.96	5.15	-7.75	2.28	-3.66	6.14	-6.96	2.45
External individuals or bodies ³	-2.63	11.19	-4.59	2.91	-4.73	7.65	-8.04	2.34	-3.80	9.05	-7.26	2.45
Student characteristics												
Share of female students	33.87	52.94	-3.01	19.38	6.87	36.71	-1.93	17.76	23.58	48.91	-10.30	18.99
Share of students with an immigrant background	-31.49	43.96	56.93	90.90	-9.13	32.15	10.17	82.34	-21.32	34.36	-39.09	82.07
Students' socioeconomic status ⁴	38.34	34.03	6.74	8.45	35.34	26.98	4.20	7.45	31.25	28.67	9.04	7.99
R ²	0.08		0.26		0.07		0.27		0.09		0.27	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The frequency with which teachers at the school are formally appraised by each source, as reported by principals: "never", "less than once every two years", "once every two years", "once per year" or "twice or more per year".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.27 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and school leadership (controlling for student characteristics)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers and principals¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
School leadership												
Collaborated with teachers to solve classroom discipline problems ³	17.83	19.56	6.87	4.63	10.01	14.04	2.64	3.56	13.63	16.37	4.35	4.11
Observed instruction in the classroom ³	-0.40	14.80	0.78	5.94	7.45	11.04	6.09	4.92	-0.06	13.87	-0.89	6.20
Provided feedback to teachers based on my observations ³	-13.50	20.55	-2.36	6.35	-19.81	14.99	-9.27	5.40	-16.67	17.77	-0.58	6.24
Took actions to support cooperation among teachers to develop new teaching practices ³	-1.72	15.98	-1.61	5.15	10.53	10.86	1.53	4.34	8.07	13.31	-1.55	4.53
Took actions to ensure that teachers take responsibility for improving their teaching skills ³	-6.97	23.46	-5.29	6.53	-17.23	17.21	-9.20	6.09	-22.63	19.61	-4.35	6.15
Took actions to ensure that teachers feel responsible for students' learning outcomes ³	-0.74	19.22	-2.35	5.82	-12.01	14.71	-3.37	5.26	-4.96	16.83	-1.70	5.84
Provided parents/guardians with information on school and student performance ³	-11.34	20.64	-0.63	4.91	-6.41	14.13	-2.03	4.09	3.58	15.75	-2.33	4.38
Reviewed schools' administrative procedures and reports ³	10.38	17.53	3.65	4.84	3.49	14.13	5.13	4.40	6.85	15.44	3.63	4.38
Resolved problems with the lesson timetable in this school ³	-5.77	9.79	1.54	3.81	-4.84	7.56	-0.11	3.31	-4.15	8.66	0.60	3.76
Collaborated with principals from other schools on challenging work tasks ³	-2.32	9.94	-2.92	4.14	-1.79	8.52	-2.62	3.72	-10.94	8.61	-0.30	3.89
Worked on a professional development plan for this school ³	-7.87	14.18	2.36	4.58	1.31	10.46	2.45	4.06	-4.57	11.93	3.62	4.60
Student characteristics												
Share of female students	34.62	41.98	8.04	18.73	13.32	28.14	4.12	17.76	25.88	40.18	3.92	19.76
Share of students with an immigrant background	-49.05	43.79	14.45	96.89	-29.78	30.39	26.92	88.31	-45.93	34.59	-26.36	99.33
Students' socioeconomic status ⁴	22.75	31.72	13.70	8.15	22.16	23.71	10.00	6.71	7.04	25.48	15.31	7.71
R ²	0.08		0.34		0.12		0.34		0.12		0.31	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

⁴ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A3.28 Relationship between within-school differences in PISA 2018 scores between advantaged and disadvantaged students and principals' views on school policies and teachers' attitudes regarding socioeconomic discrimination (controlling for student characteristics)

Results of linear regression based on responses of 15-year-old students and lower secondary principals (subject specific)¹

Related to:	Within-school differences in PISA scores between advantaged and disadvantaged students ² in:											
	Reading				Mathematics				Science			
	Australia		TALIS-PISA link average		Australia		TALIS-PISA link average		Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Policies and practices related to socioeconomic discrimination implemented at the school												
Teaching students to be inclusive of different socioeconomic backgrounds ³	50.94	29.47	-38.29	11.87	35.89	22.62	-26.59	12.19	51.24	23.21	-28.87	10.36
Additional support for students from disadvantaged backgrounds ³	5.17	44.48	4.33	8.43	18.48	33.85	-1.92	7.81	2.79	40.04	4.98	7.81
Teachers' attitudes regarding socioeconomic discrimination												
All or almost all teachers would agree that schools should encourage students from different socioeconomic backgrounds to work together ⁴	-2.19	20.55	-0.20	6.74	3.28	16.35	-1.03	5.71	-10.86	19.43	-4.27	6.56
All or almost all teachers would agree that it is important to treat students from all socioeconomic backgrounds in the same manner ⁴	-8.34	25.93	1.77	7.73	-11.14	18.67	1.50	6.86	-11.69	23.35	4.67	7.91
Student characteristics												
Share of female students	40.62	46.34	19.67	17.85	12.75	34.41	14.14	16.52	31.31	43.64	1.79	18.16
Share of students with an immigrant background	-39.33	44.42	3.55	90.58	-19.48	30.81	23.67	80.90	-30.31	33.53	-30.97	117.80
Students' socioeconomic status ⁵	22.77	33.41	9.89	8.40	29.06	26.50	4.94	6.69	15.72	26.58	12.57	8.03
R^2	0.05		0.23		0.05		0.24		0.05		0.22	

¹ Teacher variables are averaged for all teachers within the school. Student characteristics are averaged at the school level.

² Within-school differences in performance between socioeconomically advantaged and disadvantaged students are defined as the school-level average PISA score for advantaged students minus the school-level average PISA score for disadvantaged students. Differences are positive when they are in favour of advantaged students and negative when they are in favour of disadvantaged students.

³ Dummy variable (based on principals' responses): the reference category refers to policy or practice not being implemented at the school.

⁴ Dummy variable (based on principals' responses): the reference category refers to "none or almost none", "some" and "many".

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including number of books in the home.

Note: Statistically significant values are indicated in bold.

TABLE A4.1 Relationship between students' educational expectations and content of initial education and training (controlling for student characteristics and classroom composition)
Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers and principals¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Share of teachers who hold a master's or doctoral degree	-0.72	0.52	0.81	0.27
Share of teachers for whom the following elements were included in their formal education or training				
Content of some or all subject(s) I teach	-0.02	0.88	-1.29	0.91
Pedagogy of some or all subject(s) I teach	-0.54	1.15	-2.30	1.31
General pedagogy	1.49	1.72	0.19	0.91
Classroom practice in some or all subject(s) I teach	-1.87	0.97	-0.55	0.43
Teaching in a mixed ability setting	-1.12	0.70	0.08	0.24
Teaching in a multicultural or multilingual setting	-0.35	0.44	-0.07	0.24
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving)	0.91	0.49	-0.55	0.34
Use of ICT for teaching	-0.21	0.65	-0.60	0.31
Student behaviour and classroom management	-0.56	0.82	-0.68	0.45
Monitoring students' development and learning	-0.04	0.75	0.29	0.42
Student characteristics				
Female students ³	1.11	0.15	0.69	0.05
Students with an immigrant background ⁴	0.67	0.18	-0.32	0.23
Students' socioeconomic status ⁵	0.82	0.09	0.64	0.03
Classroom characteristics⁶				
Share of students whose first language is different from the language(s) of instruction ⁷	0.01	0.01	0.02	0.01
Share of low academic achievers ⁷	-0.01	0.01	-0.03	0.01
Share of students with special needs ⁷	0.01	0.02	-0.01	0.01
Share of students with behavioural problems ⁷	0.02	0.02	0.00	0.01
Share of students from socioeconomically disadvantaged homes ⁷	-0.03	0.01	-0.01	0.01
Share of academically gifted students ⁷	0.01	0.01	0.01	0.01
Share of students who are immigrants or with a migrant background ⁷	0.01	0.01	0.01	0.01
Share of students who are refugees ⁷	0.01	0.02	0.01	0.02
Pseudo R^2	0.18		0.14	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures educational expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ Dummy variable: the reference category is male.

⁴ Dummy variable: the reference category is student with no immigrant background.

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁶ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁷ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.2 Relationship between students' educational expectations and content of professional development (controlling for student characteristics and classroom composition)
Results of binary logistic regression based on responses of 15-year-old students and lower secondary teachers and principals¹

Related to:	Students' educational expectations ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Share of teachers for whom the following topic was included in their professional development activity in the 12 months prior to the survey				
Knowledge and understanding of my subject field(s)	-0.55	1.00	0.57	0.53
Pedagogical competencies in teaching my subject field(s)	0.20	0.63	0.17	0.38
Knowledge of the curriculum	0.68	0.65	-0.11	0.50
Student assessment practices	-0.16	0.64	-0.85	0.39
ICT skills for teaching	0.39	0.40	0.49	0.23
Student behaviour and classroom management	-0.62	0.39	0.08	0.31
School management and administration	0.47	0.70	-0.43	0.30
Approaches to individualised learning	-0.34	0.41	0.57	0.24
Teaching students with special needs	0.47	0.44	-0.33	0.20
Teaching in a multicultural or multilingual setting	0.75	0.68	-0.47	0.28
Teaching cross curricular skills (e.g. creativity, critical thinking, problem solving)	-0.77	0.41	-0.05	0.26
Analysis and use of student assessments	0.45	0.60	0.10	0.30
Teacher parent-guardian cooperation	-0.50	0.75	-0.75	0.22
Communicating with people from different cultures and countries	0.46	0.83	0.15	0.28
Student characteristics				
Female students ³	1.14	0.14	0.70	0.05
Students with an immigrant background ⁴	0.67	0.18	-0.38	0.21
Students' socioeconomic status ⁵	0.79	0.09	0.64	0.03
Classroom characteristics⁶				
Share of students whose first language is different from the language(s) of instruction ⁷	-0.01	0.01	0.01	0.01
Share of low academic achievers ⁷	0.00	0.01	-0.03	0.01
Share of students with special needs ⁷	0.00	0.02	-0.01	0.02
Share of students with behavioural problems ⁷	0.03	0.02	0.01	0.01
Share of students from socioeconomically disadvantaged homes ⁷	-0.02	0.01	-0.01	0.01
Share of academically gifted students ⁷	0.01	0.01	0.01	0.01
Share of students who are immigrants or with a migrant background ⁷	0.02	0.01	0.03	0.01
Share of students who are refugees ⁷	-0.01	0.02	0.00	0.02
Pseudo R^2	0.18		0.15	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures educational expectations by asking students which educational level they expect to complete. Their responses were used to create a dummy variable that equals 1 if the student expects to complete at least a university undergraduate degree and 0 otherwise.

³ Dummy variable: the reference category is male.

⁴ Dummy variable: the reference category is student with no immigrant background.

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁶ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁷ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.3 Relationship between students' perception of classroom disciplinary climate and classroom practices (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Classroom practices				
Share of class time spent on actual teaching and learning	0.00	0.01	0.00	0.00
Teachers' autonomy over planning and teaching ³	0.07	0.07	0.04	0.02
Teachers' perceived disciplinary climate ⁴	-0.09	0.08	-0.16	0.03
Teachers' practices (frequency): clarity of instruction ⁵	0.08	0.06	-0.01	0.02
Teachers' practices (frequency): cognitive activation ⁶	-0.05	0.08	-0.01	0.03
Teachers' assessment practices: administer own assessment ⁷	0.09	0.12	0.04	0.05
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-0.22	0.13	0.02	0.05
Teachers' assessment practices: let students evaluate their own progress ⁷	-0.08	0.23	0.06	0.06
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	0.48	0.29	-0.07	0.07
Student characteristics				
Female students ⁸	0.08	0.06	0.06	0.02
Students with an immigrant background ⁹	0.06	0.07	-0.15	0.06
Students' socioeconomic status ¹⁰	0.09	0.04	0.02	0.01
Classroom characteristics¹¹				
Share of students whose first language is different from the language(s) of instruction ¹²	0.02	0.01	0.00	0.00
Share of low academic achievers ¹²	0.00	0.01	0.00	0.00
Share of students with special needs ¹²	0.01	0.01	-0.01	0.01
Share of students with behavioural problems ¹²	0.00	0.01	0.00	0.00
Share of students from socioeconomically disadvantaged homes ¹²	-0.01	0.01	0.01	0.00
Share of academically gifted students ¹²	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ¹²	0.00	0.01	0.02	0.01
Share of students who are refugees ¹²	0.00	0.01	-0.01	0.01
R^2	0.07		0.07	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁸ Dummy variable: the reference category is male.

⁹ Dummy variable: the reference category is student with no immigrant background.

¹⁰ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹¹ Information on classroom characteristics and practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹² Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.4 Relationship between students' perceptions of classroom disciplinary climate and type of professional development (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Number of different professional development activities in which teachers participated in the 12 months prior to the survey	-0.42	0.44	0.11	0.11
Share of teachers who participated in the following type of professional development activity in the 12 months prior to the survey				
Courses/seminars attended in person	0.42	0.68	0.03	0.18
Online courses/seminars	0.35	0.47	-0.15	0.16
Education conferences where teachers and/or researchers present research or discuss educational issues	0.47	0.53	-0.09	0.15
Formal qualification programme (e.g. degree)	0.80	0.63	-0.01	0.19
Observation visits to other schools	0.96	0.60	-0.05	0.17
Observation visits to business premises, public organisations or non-government organisations	0.04	0.65	-0.15	0.19
Peer and/or self-observation and coaching as part of a formal school arrangement	0.65	0.47	-0.19	0.15
Participation in a network of teachers formed specifically for the professional development of teachers	0.42	0.54	-0.28	0.15
Reading professional literature	0.55	0.68	-0.17	0.20
Student characteristics				
Female students ³	0.09	0.07	0.07	0.02
Students with an immigrant background ⁴	0.06	0.07	-0.14	0.06
Students' socioeconomic status ⁵	0.09	0.04	0.02	0.01
Classroom characteristics⁶				
Share of students whose first language is different from the language(s) of instruction ⁷	0.02	0.01	0.00	0.00
Share of low academic achievers ⁷	-0.01	0.01	-0.01	0.00
Share of students with special needs ⁷	0.01	0.01	0.00	0.01
Share of students with behavioural problems ⁷	0.00	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ⁷	-0.01	0.01	0.01	0.00
Share of academically gifted students ⁷	0.00	0.00	0.01	0.00
Share of students who are immigrants or with a migrant background ⁷	0.00	0.01	0.01	0.01
Share of students who are refugees ⁷	0.00	0.01	-0.01	0.01
R^2	0.06		0.07	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ Dummy variable: the reference category is male.

⁴ Dummy variable: the reference category is student with no immigrant background.

⁵ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁶ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁷ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.5 Relationship between students' perceptions of classroom disciplinary climate and teacher well-being and job satisfaction (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Teacher well-being and job satisfaction				
Workplace well-being and stress ³	-0.10	0.08	0.01	0.03
Workload stress ⁴	-0.04	0.10	-0.04	0.03
Job satisfaction with work environment ⁵	0.11	0.06	0.05	0.03
Job satisfaction with profession ⁶	-0.09	0.08	0.01	0.03
Teachers' satisfaction with the salary ⁷	-0.06	0.17	0.00	0.06
Teachers' satisfaction with the terms of the teacher contract apart from salary (e.g. benefits, work schedule) ⁷	0.01	0.28	-0.14	0.08
Teachers' views of the way different stakeholders value the profession ⁸	0.00	0.08	0.01	0.03
Student characteristics				
Female students ⁹	0.09	0.06	0.06	0.02
Students with an immigrant background ¹⁰	0.06	0.08	-0.15	0.06
Students' socioeconomic status ¹¹	0.09	0.04	0.02	0.01
Classroom characteristics¹²				
Share of students whose first language is different from the language(s) of instruction ¹³	0.01	0.01	0.00	0.00
Share of low academic achievers ¹³	0.00	0.01	-0.01	0.00
Share of students with special needs ¹³	0.00	0.01	-0.01	0.01
Share of students with behavioural problems ¹³	0.00	0.01	-0.01	0.01
Share of students from socioeconomically disadvantaged homes ¹³	-0.01	0.01	0.01	0.00
Share of academically gifted students ¹³	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ¹³	0.00	0.01	0.01	0.01
Share of students who are refugees ¹³	0.00	0.01	0.00	0.01
R^2	0.07		0.06	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ The index of workplace well-being and stress measures the extent to which teachers experience stress in their work; if work leaves room for personal time; the impact on their mental health; and the impact on their physical health. Higher levels on the scale correspond to higher levels of stress and lower levels of well-being based on teachers' reports on these items.

⁴ The index of workload stress measures the extent to which workload, including lesson preparation, lessons to teach, marking, administrative work and extra duties due to absent teachers, is considered an important source of stress. Higher levels on the scale correspond to workload being considered a more important source of stress.

⁵ The index of satisfaction with the work environment measures teachers' satisfaction with the workplace and with the job.

⁶ The index of satisfaction with the profession measures teachers' satisfaction with the teaching profession, regardless of the work environment.

⁷ The extent to which teachers agree: "strongly disagree", "disagree", "agree" or "strongly agree".

⁸ The index of perceptions of value of teachers measures the extent to which teachers feel that their views are valued by policymakers and the media in the country/region and that they can influence educational policy in the country/region.

⁹ Dummy variable: the reference category is male.

¹⁰ Dummy variable: the reference category is student with no immigrant background.

¹¹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹² Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹³ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.6 Relationship between students' perceptions of classroom disciplinary climate and school climate (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary teachers and principals¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
School climate				
Collaborative school culture ³	0.06	0.05	-0.01	0.02
Teacher-student relations ⁴	0.07	0.05	0.05	0.02
Teachers' actions towards achieving academic excellence ⁵	0.01	0.02	0.00	0.01
Stakeholder (i.e. parents and local community) involvement in school ⁶	0.01	0.02	0.01	0.01
Student characteristics				
Female students ⁷	0.09	0.06	0.07	0.02
Students with an immigrant background ⁸	0.06	0.08	-0.16	0.07
Students' socioeconomic status ⁹	0.09	0.04	0.02	0.01
Classroom characteristics¹⁰				
Share of students whose first language is different from the language(s) of instruction ¹¹	0.01	0.01	0.00	0.00
Share of low academic achievers ¹¹	0.00	0.01	-0.01	0.00
Share of students with special needs ¹¹	0.00	0.01	-0.01	0.01
Share of students with behavioural problems ¹¹	0.00	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ¹¹	-0.01	0.01	0.01	0.00
Share of academically gifted students ¹¹	0.00	0.00	0.01	0.00
Share of students who are immigrants or with a migrant background ¹¹	0.00	0.01	0.01	0.01
Share of students who are refugees ¹¹	0.00	0.01	0.00	0.01
R^2	0.06		0.05	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ The index of collaborative school culture measures if teachers think that the school provides staff, parents/guardians and students with opportunities to actively participate in school decisions, that the school has a culture of shared responsibilities and that there is a collaborative school culture characterised by mutual support.

⁴ The index of teacher-student relations measures the quality of teacher-student relations teachers perceive in the class.

⁵ The index of academic pressure measures principals' account of whether teachers understand the school's curricular goals, whether they succeed in implementing the school's curriculum, whether they hold high expectations for student achievement and whether students have a desire to do well in school.

⁶ The index of stakeholder involvement measures principals' account of whether parents/guardians support student achievement, whether they are involved in school activities and whether the school cooperates with the local community.

⁷ Dummy variable: the reference category is male.

⁸ Dummy variable: the reference category is student with no immigrant background.

⁹ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹⁰ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹¹ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.7 Relationship between students' perceptions of classroom disciplinary climate and school leadership (controlling for student characteristics and classroom composition)

Results of linear regression based on responses of 15-year-old students and lower secondary principals¹

Related to:	Students' perceptions of classroom disciplinary climate ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
School leadership				
Collaborated with teachers to solve classroom discipline problems ³	0.05	0.06	-0.06	0.02
Observed instruction in the classroom ³	-0.01	0.05	0.00	0.03
Provided feedback to teachers based on my observations ³	0.01	0.08	0.04	0.03
Took actions to support cooperation among teachers to develop new teaching practices ³	0.14	0.07	-0.02	0.03
Took actions to ensure that teachers take responsibility for improving their teaching skills ³	-0.01	0.11	0.01	0.03
Took actions to ensure that teachers feel responsible for students' learning outcomes ³	0.02	0.11	0.04	0.03
Provided parents/guardians with information on school and student performance ³	-0.04	0.09	-0.04	0.02
Reviewed schools' administrative procedures and reports ³	-0.12	0.07	0.01	0.03
Resolved problems with the lesson timetable in this school ³	-0.07	0.05	0.00	0.02
Collaborated with principals from other schools on challenging work tasks ³	-0.02	0.05	0.03	0.02
Worked on a professional development plan for this school ³	0.07	0.06	0.04	0.02
Student characteristics				
Female students ⁴	0.08	0.06	0.06	0.02
Students with an immigrant background ⁵	0.05	0.07	-0.15	0.06
Students' socioeconomic status ⁶	0.09	0.04	0.02	0.01
Classroom characteristics⁷				
Share of students whose first language is different from the language(s) of instruction ⁸	0.02	0.01	0.00	0.00
Share of low academic achievers ⁸	0.00	0.01	-0.01	0.00
Share of students with special needs ⁸	0.00	0.01	0.00	0.01
Share of students with behavioural problems ⁸	-0.01	0.01	-0.01	0.00
Share of students from socioeconomically disadvantaged homes ⁸	-0.01	0.01	0.00	0.00
Share of academically gifted students ⁸	0.00	0.00	0.00	0.00
Share of students who are immigrants or with a migrant background ⁸	-0.01	0.01	0.01	0.01
Share of students who are refugees ⁸	0.00	0.01	0.00	0.01
R^2	0.07		0.07	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures classroom disciplinary climate by asking students how frequently ("never or hardly ever", "some lessons", "most lessons", "every lesson") the following things happen in their language-of-instruction lessons: "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 quieten down"; "Students cannot work well"; and "Students don't start working for a long time after the lesson begins". These statements were combined to create the index of classroom disciplinary climate whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student enjoys a better disciplinary climate in language-of-instruction lessons than the average student in OECD countries.

³ The frequency with which principals engaged in a given activity at the school in the 12 months prior to the survey: "never or rarely", "sometimes", "often" or "very often".

⁴ Dummy variable: the reference category is male.

⁵ Dummy variable: the reference category is student with no immigrant background.

⁶ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

⁷ Information on classroom characteristics refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

⁸ Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.8 Relationship between students' perceptions of teacher enthusiasm and classroom practices (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of teacher enthusiasm ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Classroom practices				
Share of class time spent on actual teaching and learning	0.00	0.01	0.00	0.00
Teachers' autonomy over planning and teaching ³	0.06	0.08	0.01	0.03
Teachers' perceived disciplinary climate ⁴	-0.05	0.08	-0.08	0.03
Teachers' practices (frequency): clarity of instruction ⁵	0.03	0.06	0.00	0.02
Teachers' practices (frequency): cognitive activation ⁶	-0.03	0.07	0.03	0.03
Teachers' assessment practices: administer own assessment ⁷	-0.02	0.10	0.01	0.06
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-0.10	0.17	0.02	0.06
Teachers' assessment practices: let students evaluate their own progress ⁷	-0.17	0.29	0.03	0.07
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	0.22	0.25	-0.15	0.08
Student characteristics				
Female students ⁸	0.04	0.06	0.06	0.02
Students with an immigrant background ⁹	0.10	0.06	-0.08	0.08
Students' socioeconomic status ¹⁰	0.10	0.03	0.03	0.01
Classroom characteristics¹¹				
Share of students whose first language is different from the language(s) of instruction ¹²	0.01	0.01	0.00	0.00
Share of low academic achievers ¹²	-0.01	0.01	0.00	0.00
Share of students with special needs ¹²	0.01	0.01	0.00	0.01
Share of students with behavioural problems ¹²	0.00	0.01	0.00	0.01
Share of students from socioeconomically disadvantaged homes ¹²	0.00	0.01	0.00	0.00
Share of academically gifted students ¹²	0.00	0.01	0.00	0.00
Share of students who are immigrants or with a migrant background ¹²	-0.01	0.01	0.01	0.01
Share of students who are refugees ¹²	0.00	0.01	-0.01	0.01
R^2	0.03		0.04	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures student perception of teacher enthusiasm in language-of-instruction lessons. PISA asked 15-year-old students whether they agree ("strongly disagree", "disagree", "agree", "strongly agree") with the following statements about the teacher teaching the two language-of-instruction lessons they attended prior to sitting the PISA test: "It was clear to me that the teacher liked teaching us"; "The enthusiasm of the teacher inspired me"; "It was clear that the teacher likes to deal with the topic of the lesson"; and "The teacher showed enjoyment in teaching". These statements were combined to create the index of teacher enthusiasm whose average is 0 and standard deviation is 1 across OECD countries. Positive values in this index mean that students perceived their language-of-instruction teachers to be more enthusiastic than the average student across OECD countries did.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁸ Dummy variable: the reference category is male.

⁹ Dummy variable: the reference category is student with no immigrant background.

¹⁰ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹¹ Information on classroom characteristics and practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹² Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.

TABLE A4.9 Relationship between students' perceptions of difficulty of the PISA test and classroom practices (controlling for student characteristics and classroom composition)
Results of linear regression based on responses of 15-year-old students and lower secondary teachers¹

Related to:	Students' perceptions of difficulty of the PISA test ²			
	Australia		TALIS-PISA link average	
	β	S.E.	β	S.E.
Classroom practices				
Share of class time spent on actual teaching and learning	0.00	0.01	0.00	0.00
Teachers' autonomy over planning and teaching ³	-0.01	0.05	0.01	0.01
Teachers' perceived disciplinary climate ⁴	-0.01	0.05	0.00	0.02
Teachers' practices (frequency): clarity of instruction ⁵	-0.02	0.04	-0.01	0.01
Teachers' practices (frequency): cognitive activation ⁶	0.00	0.06	0.01	0.02
Teachers' assessment practices: administer own assessment ⁷	0.06	0.09	-0.09	0.04
Teachers' assessment practices: provide written feedback on student work in addition to marking ⁷	-0.04	0.11	0.06	0.03
Teachers' assessment practices: let students evaluate their own progress ⁷	-0.26	0.15	0.01	0.04
Teachers' assessment practices: observe students when working on particular tasks and provide immediate feedback ⁷	0.01	0.19	-0.03	0.05
Student characteristics				
Female students ⁸	-0.06	0.05	0.01	0.02
Students with an immigrant background ⁹	0.12	0.06	0.16	0.05
Students' socioeconomic status ¹⁰	-0.25	0.04	-0.15	0.01
Classroom characteristics¹¹				
Share of students whose first language is different from the language(s) of instruction ¹²	0.00	0.00	0.00	0.00
Share of low academic achievers ¹²	0.00	0.01	0.00	0.00
Share of students with special needs ¹²	0.00	0.01	0.00	0.00
Share of students with behavioural problems ¹²	0.00	0.01	0.00	0.00
Share of students from socioeconomically disadvantaged homes ¹²	0.00	0.00	0.00	0.00
Share of academically gifted students ¹²	0.00	0.00	-0.01	0.00
Share of students who are immigrants or with a migrant background ¹²	0.00	0.00	-0.01	0.00
Share of students who are refugees ¹²	0.00	0.01	0.01	0.01
R^2	0.07		0.08	

¹ Teacher variables are averaged for all teachers within the school.

² PISA measures perception of difficulty of the PISA test by asking students how they feel about the reading tasks included in the test ("strongly disagree", "disagree", "agree", "strongly agree"): "There were many words I could not understand"; "Many texts were too difficult for me"; "I was lost when I had to navigate between different pages". These statements were combined to create the index of perception of difficulty of the PISA test whose average is 0 and standard deviation is 1 across OECD countries. Positive values on this scale mean that the student finds the test more difficult.

³ The index of target classroom autonomy measures the level of control teachers feel over determining course content, selecting teaching methods, assessing students' learning, disciplining students and determining the amount of homework to be assigned in their target class.

⁴ The index of classroom disciplinary climate measures the level of disciplinary issues teachers perceive in the class. Higher values of the index of classroom disciplinary climate indicate a higher need in classroom discipline.

⁵ The index of clarity of instruction measures the frequency with which teachers use practices that aim at improving the clarity of instruction in the classroom.

⁶ The index of cognitive activation practices measures the frequency with which teachers use cognitive activation practices in the classroom.

⁷ The frequency with which teachers use a given assessment practice in the classroom: "never or almost never", "occasionally", "frequently" or "always".

⁸ Dummy variable: the reference category is male.

⁹ Dummy variable: the reference category is student with no immigrant background.

¹⁰ The PISA index of economic, social and cultural status (ESCS) is derived from three variables related to family background: parents' highest level of education, parents' highest occupational status and home possessions, including books in the home.

¹¹ Information on classroom characteristics and practices refers to the target class, which is defined as a randomly chosen class teachers currently teach from their weekly timetable.

¹² Central values of the percentage ranges: 0%, 5%, 20%, 45% or 80%.

Note: Statistically significant values are indicated in bold.