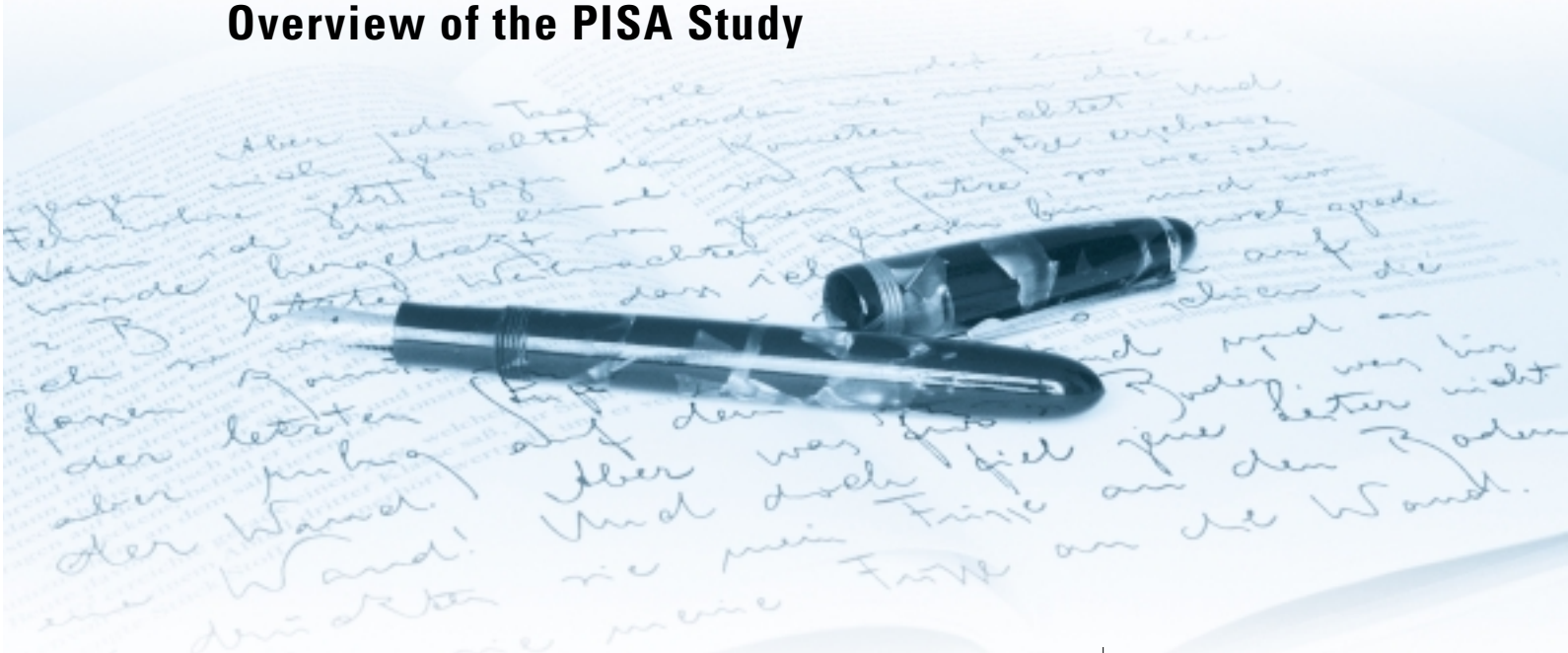
Stanat · Artelt · Baumert · Klieme · Neubrand · Prenzel ·
Schiefele · Schneider · Schümer · Tillmann · Weiß

PISA 2000: Overview of the Study

Design, Method and Results

Overview of the PISA Study



PISA – the Programme for International Student Assessment – is the most comprehensive international assessment of educational outcomes to date. The study was initiated by the Organisation for Economic Cooperation and Development (OECD) as part of its INES programme, which provides the OECD member countries with internationally comparable data about their educational systems. In the context of this programme, PISA aims to examine the outcomes of schools in the participating countries. In Germany, the ministers of education in the 16 states resolved to extend the study, making it possible to analyse and compare the results of each state. The following summary of the study design, methods and results is based on the detailed report prepared by the German PISA consortium (Baumert et al., 2001; Baumert et al., 2002).

Research Goals and Study Approach

What are the aims of PISA?

PISA will provide the participating countries with information on how well their schools prepare young adults to meet the challenges of the future, and it will do so on a regular basis. The PISA assessments do not focus primarily on purely factual knowledge. Rather, they evaluate the wider knowledge and skills needed to participate in social, economic and political life in modern society. PISA examines the extent to which young adults have acquired these broader concepts and skills and gauges social disparities in educational performance. Additionally, central aspects of the living and learning environment both inside and outside school are analysed, making it possible to pinpoint potential reasons for any disparities identified. This will provide a broad empirical base for discussions of school policy decisions.

What does PISA assess on the international level?

PISA is a long-term project, planned to span three assessment cycles. Each cycle covers the three domains of reading literacy, mathematical literacy and scientific literacy, and looks in depth at one of these domains. The assessment

for the first cycle took place in 2000, with a primary focus on reading literacy. The second cycle (assessment in 2003) will focus on mathematical literacy and the third (assessment in 2006) on scientific literacy. In each cycle, two-thirds of the testing time is devoted to the "major" domain, which is examined more thoroughly, while the other two domains provide a summary profile of skills.

PISA also represents the first attempt to examine cross-curricular competencies in a large-scale student performance study. The first cycle looked at important prerequisites for self-regulated learning, including learning strategies, interest and subject-specific self-concepts. In the second cycle, general problem-solving skills will be investigated. Finally, the possibility of assessing student proficiency in the use of modern information and communication technologies is under consideration for the third cycle.

Background questionnaires are used to gather contextual information about the students and their schools. On the student level, these include characteristics such as social background, aspects of students' relationships to parents, attitudes to reading and reading habits outside school. On the school level, the questionnaires tap aspects such as the school's human and material resources, class size, organisational structures and decision-making processes.

What can PISA tell us?

PISA provides participating countries with the following information about their educational systems:

- Profiles of the knowledge and skills acquired by students approaching the end of compulsory education in curricular and cross-curricular domains. These profiles will pinpoint the strengths and weaknesses of educational systems and locate areas requiring action.

- Contextual indicators relating performance to student and school characteristics. Information on these relationships can shed light on the effectiveness of educational systems (e.g., to what extent they succeed in weakening the link between student performance and social background) and draw attention to possible points of intervention.

- Trend indicators showing how results change over time.

How was the study design extended in Germany?

In Germany, the international research design was extended in a number of respects, making it possible to address questions that are of particular relevance to German educational policy. National tests and context questionnaires were developed by the German PISA consortium and implemented on a second day of testing. Supplementary mathematics and science tests made it possible to investigate the two "minor" domains of the first assessment cycle in more breadth and depth. Additionally, they allowed relationships between the international PISA tasks and questions more closely related to German curricula to be examined. Further cross-curricular competencies were also assessed on the second day of testing, namely, the ability to solve school-related organisational problems as well as aspects of cooperation and communication. The national context questionnaire for students surveyed aspects such as students' relationships to their peers in more detail, and the national context questionnaire for principals included, among other things, questions on quality

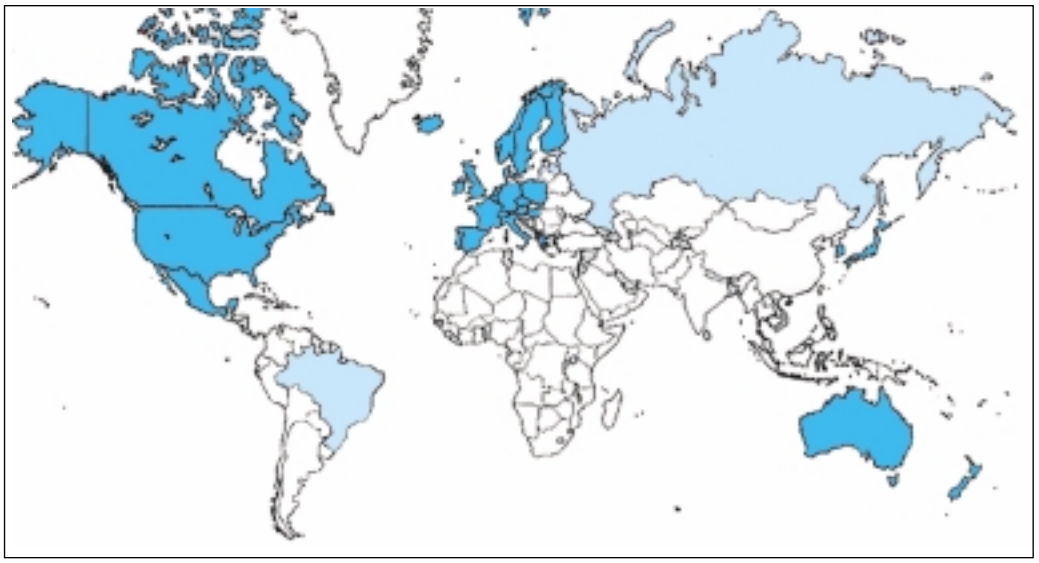
assurance and regional cooperation. Finally, a parent questionnaire, for which there was no international equivalent, served to verify the students' reports on their family backgrounds and to map out the students' school career.

Who are the PISA participants?

In the early summer of 2000, a total of 180,000 students from 28 OECD member countries and four non-OECD countries (Brazil, Latvia, Liechtenstein and the Russian Federation) participated in the first PISA assessment. Between 4,500 and 10,000 students were tested in each country. The student samples were selected such that they are representative for the total population of 15-year-olds enrolled in educational institutions. Youth in this age group are nearing the end of compulsory education in almost all OECD countries. PISA thus assesses selected outcomes of educational systems towards the end of compulsory schooling. The German sample consists of 5,073 students from 219 schools; on average, 23 15-year-olds were tested per school.

How were the schools and students selected?

The sample selection process in each country was subject to detailed quality standards defined by the international project management. In a first step, the educational systems of the participating countries were broken down by key characteristics such as regions (federal states, provinces, cantons, etc.) and school types. Within these subdivisions (in Germany: school types within the federal states), schools were then sampled at random. In the second step of the selection process, 15-year-old students were sampled within the sampled schools, again at random.



OECD countries participating in PISA 2000

Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Japan
Korea
Luxembourg
Mexico
Netherlands
New Zealand
Norway
Poland
Portugal
Spain
Sweden
Switzerland
United Kingdom
United States

Non-OECD countries participating in PISA 2000

Brazil
Latvia
Liechtenstein
Russian Federation

How was the German sample enlarged?

As a result of variable cut-off dates for school entry, the relatively frequent deferment of entry to primary school, and grade repetition, 15-year-old students are distributed over several different grade levels in Germany. In order to be able to draw valid conclusions about the educational performance of students approaching the end of lower secondary schooling, a supplementary grade-based sample was also drawn in Germany, with a further 10 ninth-grade students being randomly selected in each school.

In addition, the ministers of education in the 16 German states resolved to enlarge the PISA sample such that it can provide reliable estimates for each state and allows results to be compared on a state-by-state basis. A total of 45,899 students (two overlapping samples of 33,809 15-year-olds and 33,766 ninth-graders) from 1,466 schools were surveyed. The 219 schools selected for the international comparison (PISA sample) represent a subset of this enlarged sample (PISA-E sample). With the exception of special schools, where shorter versions of the assessment tests and questionnaires were implemented, and a small group of schools in which the second day of testing was used for a supplementary study, the assessment procedure was identical in all schools. Both the international and the national tests and questionnaires were implemented in the PISA schools and the PISA-E schools.

How was the assessment conducted?

The assessment was administered in the participating schools, during regular school hours, in May and June 2000. Students completed the international assessments on the first day of testing, and the supplementary German assessments on the following, second day of testing. Each assessment took about three hours (two hours assessment tests, 30 minutes context questionnaires and assessments of cross-curricular competencies).

How was the quality of the assessment assured?

The PISA assessment is characterised by its rigorous quality standards. Throughout the study, quality assurance procedures such as the following were applied:

- Experts from the international consortium closely monitored the sample selection process in each participating country. The national project managers documented each step in the sampling process in such detail that the international project management could track and replicate the procedure.

- To ensure that the tests were conducted under comparable conditions in each country, the international consortium performed quality inspections of the assessment. In each country, independent observers visited a sample of schools unannounced and monitored the assessment procedures. No serious deviations from the standardised procedures were observed in any of the countries.

- An additional study by the German national consortium surveyed the test administrators and the teachers responsible for coordinating the assessment in the participating schools. The results of these surveys also indicate that the assessment sessions ran very smoothly. Moreover, almost 70% of school coordinators reported that the students put just as much effort into the PISA assessments as they would into a class test, and 28% had the impression that the students even made more of an effort than in a class test.

- Minimum response rates were required for both schools and students. It was specified that at least 85% of the schools initially selected, and at least 80% of students selected, had to take part in each country. Countries that did not fulfil these minimum participation rates, and that could not demonstrate that the sample was representative by reference to data from other studies, were excluded from the international comparison. This was the case for one country: the Netherlands. In Germany, all of the schools selected for the study participated in the assessment, and the student participation rate was 86%.

- The international criteria for minimum participation rates were also applied to the German state-by-state comparison. In Berlin and Hamburg, response rates were well below the specified level. For this reason, no results can be reported for the total populations of 15-year-olds or ninth-grade students in these city states. Within the academic-track Gymnasium schools, however, the participation rates were acceptable. This allows the results of Gymnasium students in Hamburg and Berlin to be included in the state-by-state Gymnasium comparison.

Who is responsible for PISA?

PISA is a collaborative effort. It brings together expertise from all the participating countries and is steered jointly by their governments. The most important decisions are made by the OECD's Board of Participating Countries (BPC), on which each country is represented. The BPC has commissioned an international consortium led by the Australian Council for Educational Research (ACER) with the organisation and scientific coordination of the study. National project managers in each of the participating countries are responsible for implementing the programme at the national level. In Germany, the PISA study was commissioned by the standing conference of education ministers in the 16 states. A national consortium overseen by the Max Planck Institute for Human Development in Berlin is responsible for conducting and extending the assessment in Germany.

International Test Design

PISA does not seek to examine whether students have acquired a specific knowledge base. Rather, it aims to assess the extent to which young people have developed a deeper understanding of central concepts; master processes such as modelling situations, communicating results, or critically evaluating information; and are able to apply this conceptual and procedural knowledge in various contexts. The application of this general approach to each of the three domains is described in a framework that was developed in close cooperation between international and national expert groups and that served as the basis for the development of the PISA tasks (OECD, 1999 / Deutsches PISA-Konsortium, 2000; Neubrand et al., 2001).

How does PISA define reading literacy?

Reading literacy is more than just the ability to read. In PISA, reading literacy is defined as an essential tool for achieving one's goals, developing one's knowledge and potential, and participating in society. Students taking part in PISA were assessed on their capacity to retrieve specific information from written texts, on whether they could understand and interpret what they had read,

and on how well they could reflect on and evaluate the content and form of the material. The tasks covered a broad spectrum of text types – continuous texts such as narrations, descriptions and instructions as well as non-continuous material such as tables, charts, and forms.

How does PISA define mathematical literacy?

Mathematical literacy encompasses more than the knowledge of mathematical rules and theorems and the command of mathematical procedures. Rather, it is the ability to put mathematical knowledge and skills to functional use in a multitude of contexts. It includes an understanding of the role that mathematics plays in the world as well as the ability to translate everyday problems into a mathematical context, to use mathematical knowledge and procedures to solve problems, and to make well-founded mathematical judgements.

How does PISA define scientific literacy?

Scientific literacy includes an understanding of fundamental scientific concepts such as energy conservation, adaptation and decay, familiarity with scientific ways of thinking and working, and the ability to apply this knowledge of scientific concepts and processes, particularly to evaluate aspects of science and technology. It also requires the ability to identify questions that can be answered by scientific enquiry and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and changes made to it through human activity.

How were the PISA tests developed?

The PISA tasks were developed on the basis of the PISA framework and constructed in close cooperation between the international and national expert groups. The first set of potential instruments included questions proposed by the participating countries, tasks devised by the international consortium's professional test developers, and material from previous studies. A preliminary selection of tasks from this item pool was made on the basis of feedback from the national expert groups. These tasks were then translated into the languages of the participating countries, following an exacting procedure. In the spring of 1999, the instruments were tested in a field trial conducted in all participating countries. The field trial data were then subjected to thorough analyses to determine which of the items were suitable for the assessment. To ensure that the tasks did not put any country at a disadvantage, tests were run to check that their relative difficulty was comparable across the participating countries, for example.

What are proficiency levels?

Five levels of proficiency were differentiated in each domain. These proficiency levels describe the students' capacity to deal with tasks of various levels of difficulty. For example, students proficient at Level 5 on the reading literacy scale (expert level) are capable of locating information that is deeply embedded in a text, even when the content and form of the text are unfamiliar and it is necessary to infer which information is relevant to the task. In contrast, students who are proficient at Level 1 (elementary level) are able to find explicitly stated information in familiar text types only if these contain little competing or distracting information. The proficiency levels make it possible not only to rank students' performance but also to describe what they can do.

Germany in international comparison: Results from PISA 2000

Reading literacy

For reading literacy – the major domain of the first PISA cycle – the study yields the following results:

- Germany's mean performance on the reading literacy scale is significantly below the OECD average (see Table 1). Only two other western European countries – Liechtenstein and Luxembourg – also score below the OECD average. Finland shows the highest performance on the reading literacy scale, followed by Canada, New Zealand and Australia.

- Variation in student performance is comparatively large in Germany. The gap between the lowest and the highest achieving students is larger than in any of the other participating countries (see Table 1).

Reading literacy			Mathematical literacy			Scientific literacy		
Countries	**Means (standard errors in parentheses)**	**Distribution***	**Countries**	**Means (standard errors in parentheses)**	**Distribution***	**Countries**	**Means (standard errors in parentheses)**	**Distribution***
Finland	546 (2.6)	291	Japan	557 (5.5)	286	Korea	552 (2.7)	263
Canada	534 (1.6)	310	Korea	547 (2.8)	276	Japan	550 (5.5)	297
New Zealand	529 (2.8)	355	New Zealand	537 (3.1)	325	Finland	538 (2.5)	283
Australia	528 (3.5)	331	Finland	536 (2.2)	264	United Kingdom	532 (2.7)	321
Ireland	527 (3.2)	309	Australia	533 (3.5)	299	Canada	529 (1.6)	290
Korea	525 (2.4)	227	Canada	533 (1.4)	278	New Zealand	528 (2.4)	326
United Kingdom	523 (2.6)	330	Switzerland	529 (4.4)	329	Australia	528 (3.5)	307
Japan	522 (5.2)	284	United Kingdom	529 (2.5)	302	Austria	519 (2.6)	296
Sweden	516 (2.2)	304	Belgium	520 (3.9)	350	Ireland	513 (3.2)	300
Austria	507 (2.4)	307	France	517 (2.7)	292	Sweden	512 (2.5)	303
Belgium	507 (3.6)	351	Austria	515 (2.5)	306	Czech Republic	511 (2.4)	308
Iceland	507(1.5)	302	Denmark	514 (2.4)	283	France	500 (3.2)	334
Norway	505 (2.8)	340	Iceland	514 (2.3)	277	Norway	500 (2.8)	311
France	505 (2.7)	301	Liechtenstein	514 (7.0)	322	**OECD average**	500 (0.7)	325
United States	504 (7.0)	349	Sweden	510 (2.5)	309	United States	499 (7.3)	328
OECD average	500 (0.6)	328	Ireland	503 (2.7)	273	Hungary	496 (4.2)	331
Denmark	497 (2.4)	319	**OECD average**	500 (0.7)	329	Iceland	496 (2.2)	284
Switzerland	494 (4.2)	335	Norway	499 (2.8)	303	Belgium	496 (4.3)	364
Spain	493 (2.7)	276	Czech Republic	498 (2.8)	320	Switzerland	496 (4.4)	324
Czech Republic	492 (2.4)	318	United States	493 (7.6)	325	Spain	491 (3.0)	310
Italy	487 (2.9)	296	**Germany**	490 (2.5)	338	**Germany**	487 (2.4)	335
Germany	484 (2.5)	366	Hungary	488 (4.0)	321	Poland	483 (5.1)	313
Liechtenstein	483 (4.1)	316	Russian Federation	478 (5.5)	343	Denmark	481 (2.8)	335
Hungary	480 (4.0)	306	Spain	476 (3.1)	298	Italy	478 (3.1)	318
Poland	479 (4.5)	326	Poland	470 (5.5)	336	Liechtenstein	476 (7.1)	315
Greece	474 (5.0)	320	Latvia	463 (4.5)	337	Greece	461 (4.9)	316
Portugal	470 (4.5)	320	Italy	457 (2.9)	299	Russian Federation	460 (4.7)	327
Russian Federation	462 (4.2)	303	Portugal	454 (4.1)	299	Latvia	460 (5.6)	321
Latvia	458 (5.3)	334	Greece	447 (5.6)	357	Portugal	459 (4.0)	287
Luxembourg	441 (1.6)	325	Luxembourg	446 (2.0)	307	Luxembourg	443 (2.3)	315
Mexico	422 (3.3)	281	Mexico	387 (3.4)	273	Mexico	422 (3.2)	251
Brazil	396 (3.1)	284	Brazil	334 (3.7)	320	Brazil	375 (3.3)	301

* Gap between the scores of the 5% lowest performing students and the 5% highest performing students.

Performance significantly above the OECD average

Performance does not differ significantly from the OECD average

Performance significantly below the OECD average

Table 1 Means and distributions of student performance in the three competency domains across the participating countries

- Germany's mean performance on tasks requiring students to reflect on and evaluate texts is particularly low, and the variation in student performance on this aspect is particularly wide.

- The large disparities in student performance are attributable primarily to the particularly low results of the least proficient students (see left half of Fig. 1). In Germany, 13% of students only reach the lowest proficiency level and almost 10% are not even proficient at this level. This means that almost one-quarter of young people in Germany can only read at an elementary level (OECD average: 18%). In terms of independent reading and lifelong learning, these students must be regarded as a potentially at-risk group. In countries such as Korea, Finland, Canada, Australia and Sweden, this group is much smaller, at less than 15% of students.

- The proportion of students performing at the highest proficiency level is close to the international average, with 9% of students reaching Level V (see right half of Fig. 1). This is comparable with the OECD average as well as with the performance of students in countries such as Denmark, France, Austria, Iceland and Switzerland.

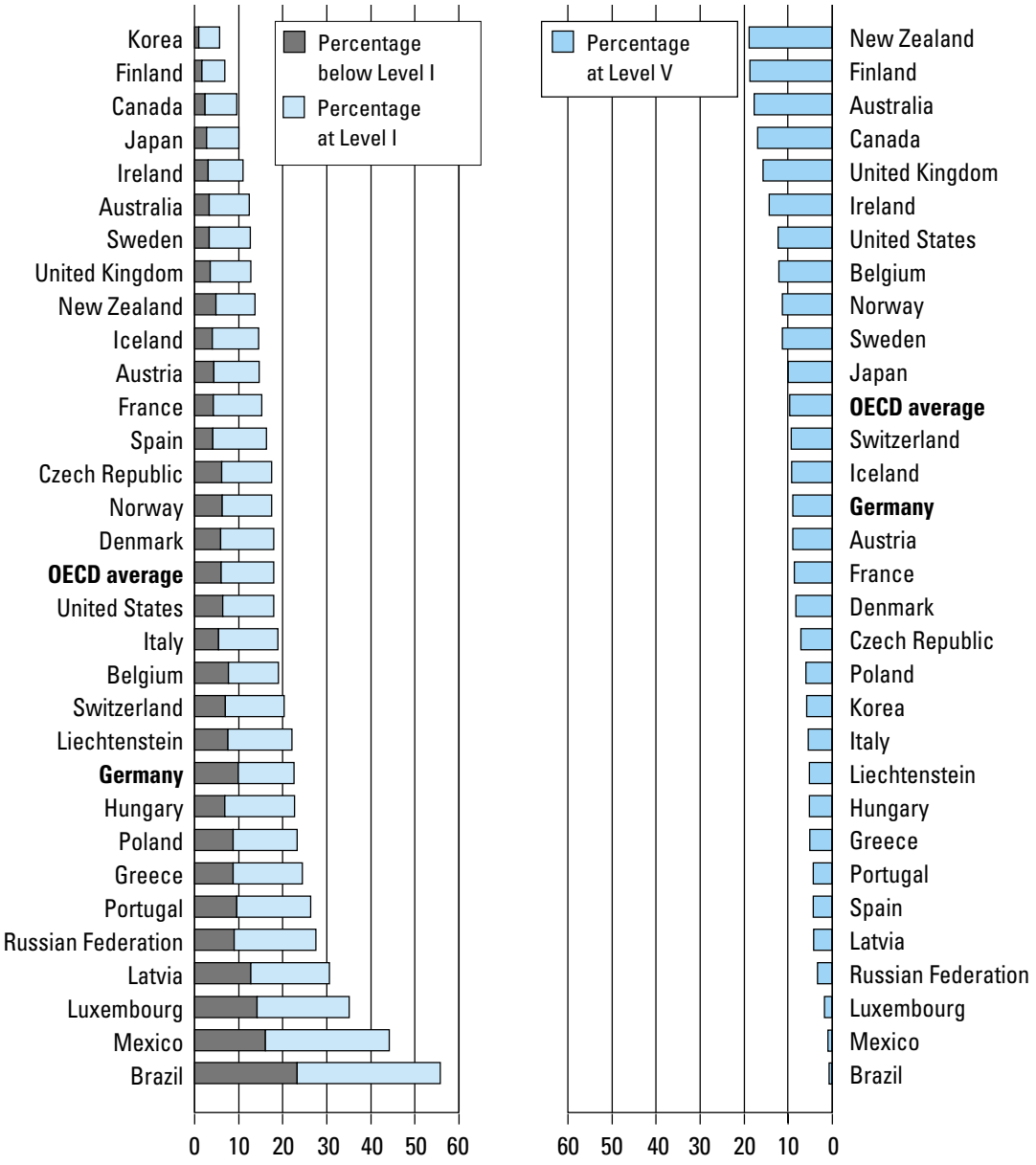


Figure 1 Percentage of students across the participating countries performing below or at Proficiency Level I and at Proficiency Level V on the reading literacy scale

- Almost half the students who do not even reach Level I were born in Germany, have parents who were born in Germany, and speak German at home.

- Teachers in the vocationally-oriented Hauptschule track were asked which of their students are particularly weak readers. Less than 15% of the young people assigned to the at-risk group on the basis of their reading performance in PISA were identified as weak readers by their teachers. This indicates that lower secondary school teachers may be insufficiently equipped to diagnose weak reading skills.

- Whether the students in a country perform well or poorly in the reading literacy assessment is dependent on a number of factors. In Germany, there is a close link between student performance and factors such as interest in reading and reading activities. At the same time, the proportion of young people who report that they never read for pleasure is – at 42% – particularly high in Germany. This suggests that measures to promote reading literacy should make reading motivation a primary target.

- The association between reading performance and knowledge of effective learning strategies is even closer. Again, this points to opportunities for targeted intervention measures.

Mathematical literacy

In the domain of mathematics, Germany again performs below the OECD average. Here again, the relative weaknesses of the least proficient students are most pronounced:

- Germany ranks in the lower middle of the mathematical literacy scale, along with the USA, Spain and the eastern European countries participating in PISA (see Table 1). The Nordic countries as well as several western European states make up the upper middle of the scale.

- By far the best performances are achieved by the two east Asian countries, Japan and Korea. The leading group also includes four Anglo-American countries (United Kingdom, Canada, Australia and New Zealand) as well as Finland and Switzerland.

- At 1.3%, the proportion of students in Germany who are capable of independent mathematical reasoning and reflection (Level V) is very small.

- Even tasks that represent standard curriculum content in German schools (Levels II-IV) can be expected to be solved by less than half of the students.

- One-quarter of the 15-year-olds are proficient at the elementary school level but no higher (Level I or below). These students can be classified as belonging to an at-risk group, since they are likely to lack the mathematical skills required in vocational training programmes.

- Mathematical literacy is closely linked to reading literacy. This suggests that measures to foster mathematical knowledge and skills also have to target verbal competencies.

Scientific literacy

The pattern of results for scientific literacy resembles that found for mathematical literacy:

- Here, again, Germany ranks in the lower middle of the performance scale (see Table 1).
- Again, Korea and Japan show the highest performance, followed by Finland, the United Kingdom, Canada, New Zealand and Australia.
- In Germany, only just over 3% of students are proficient at Level V of the scientific literacy scale. More than one-quarter of 15-year-olds perform at Level I of the scale. They have reached only an elementary level of scientific literacy and are capable only of reproducing simple factual knowledge and of using everyday knowledge to draw and evaluate conclusions.
- Again, the variation in student performance is relatively large in Germany, and the overall level of performance is low. In contrast, some countries manage to combine high overall performance with low disparities. This is the case in Korea, for example.
- In the scientific domain, too, Germany is evidently less successful than other countries in providing support for weak students. The weakest performers in countries such as Korea, Austria and the United Kingdom achieve far better results than their counterparts in Germany.
- Students in Germany show considerable weaknesses in scientific understanding and in applying scientific knowledge. These results indicate that German science instruction is still not sufficiently geared to problem solving and practical applications.

Social background and student performance

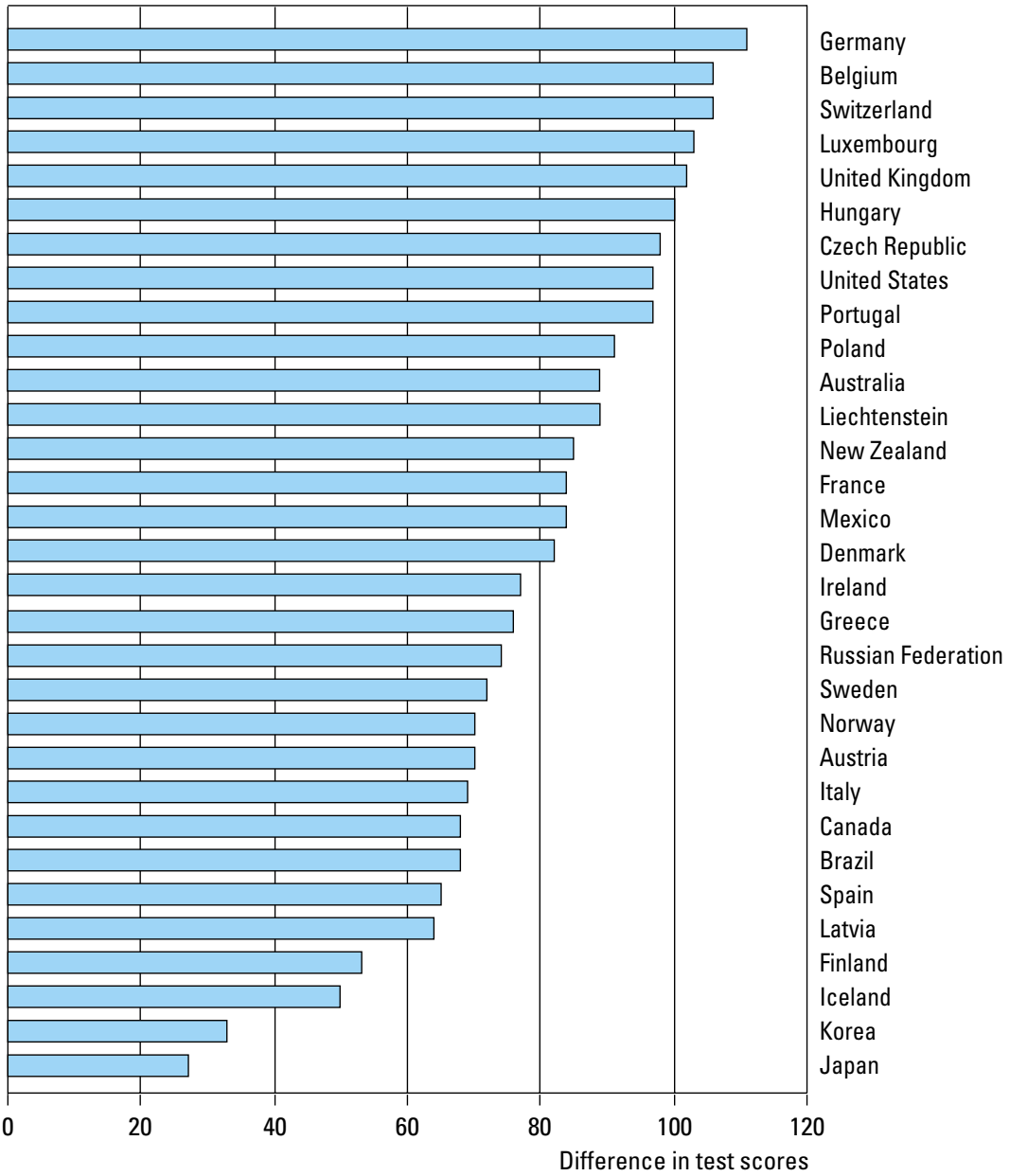
The first cycle of PISA incorporates an in-depth examination of the relationship between social background and student performance:

- Although the relationship between social background and school career relaxed somewhat in the two decades following World War II, the connection is still quite strong. Almost half the students from the highest socio-economic status groups* attend the academic-track Gymnasium, compared to just over 10% of students from the lowest socio-economic status groups. Conversely, almost 40% of students from lower socio-economic status groups are enrolled in the vocationally-oriented Hauptschule, compared to just 10% of those from higher socio-economic status groups.
- When 15-year-olds with the same level of basic cognitive ability are compared, the relative probability that students from the highest socio-economic status groups will attend the Gymnasium rather than the intermediate-track

* The term "highest socio-economic groups" is used to describe persons classified as belonging to the upper and lower service classes according to the Erikson-Goldthorpe-Portocarero occupational class scheme (EGP). These include professionals, civil servants in the administrative/professional, executive and clerical grades and members of the semi-professions. The term "lowest socio-economic groups" covers skilled workers, workers with supervisory duties, manual workers, unskilled and semi-skilled workers and agricultural workers.

Realschule is three times higher than for students from the lowest socio-economic status groups.

- Performance is closely linked to a student's social background as well. While about 10% of students from the highest socio-economic status groups have only elementary reading skills (Level I or below), the proportion in other socio-economic groups is between 20 and 30%, reaching almost 40% among children of unskilled and semi-skilled workers.



This figure presents the differences in the mean reading literacy scores of two subgroups of students – the 25% of students from families with the highest social status in the country and the 25% of students from families with the lowest social status. The bars in the figure illustrate the extent to which the former group outperforms the latter in each country.

Figure 2 Differences in the mean reading literacy scores of 15-year-olds from families in the top and bottom quarters of the socio-economic index

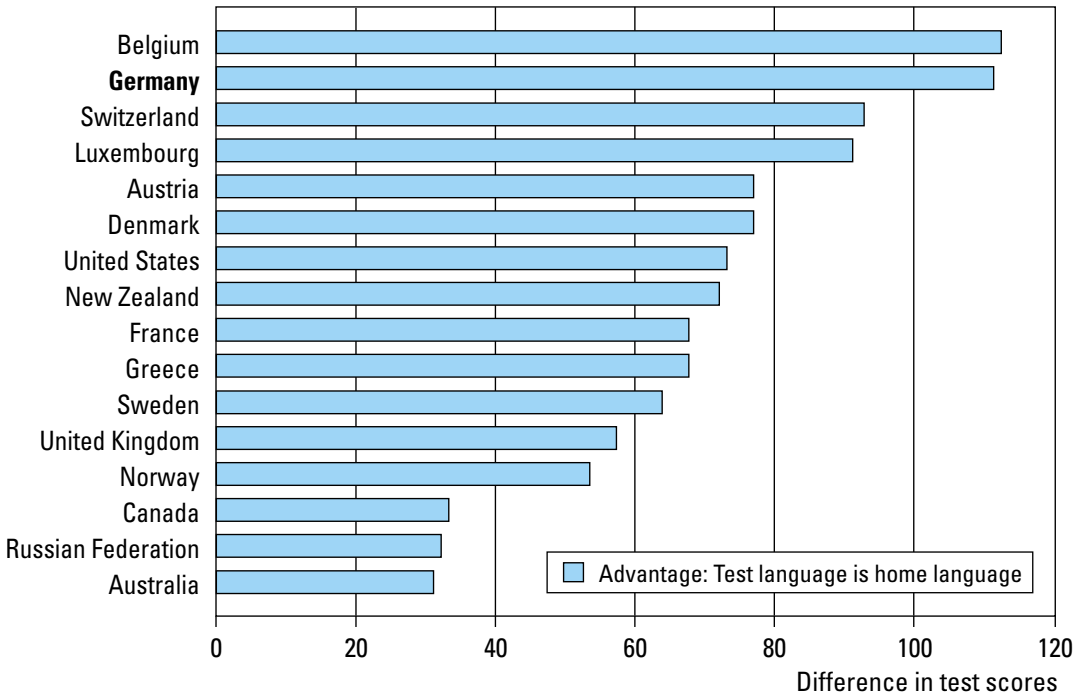
- In all PISA countries, there is a link between social background and performance. However, nowhere is this relationship as strong as it is in Germany (see Fig. 2). Links of a similar magnitude are found in countries such as Belgium, Switzerland and Luxembourg.

- Particularly Japan, Korea, Iceland, Finland, but also Canada and Sweden manage to combine a high overall level of performance with a weak relationship between social background and student performance. This desirable combination – high performance, low social inequality – is attained largely by ensuring a satisfactory level of performance in the lower socio-economic groups.

Students from immigrant families

PISA also examines the situation of students from immigrant families:

- In terms of the type of school attended, 15-year-olds with one parent born outside Germany barely differ from those whose parents were both born in the country. For students whose parents were both born outside Germany, however, the situation is quite different. More than 30% of the students whose parents were both born in Germany attend the academic-track Gymnasium, compared to only 15% of those students whose parents were both born elsewhere. The corresponding figures for the vocationally-oriented Hauptschule are around 25% and 50% respectively.



This figure presents the differences in the mean reading literacy scores of two subgroups of students – students from families who speak the test language at home (i.e., German in Germany, Swedish in Sweden, etc.) and students from families who speak a language other than the test language at home. The bars in the figure illustrate the extent to which the former group outperforms the latter.

Figure 3 Differences in the mean reading literacy scores of 15-year-olds from immigrant families and native families in countries with considerable second-language immigration

- These differences in educational opportunities disappear when controlling for the students' reading literacy. In other words, when comparing students with similar reading skill levels, children from immigrant families are no longer at a disadvantage when it comes to school-type attendance. This suggests that lack of German language skills is the main obstacle preventing this group from flourishing at school.

- Almost 50% of the students whose parents were both born outside Germany do not progress beyond elementary Level I reading literacy tasks, even though more than 70% of them have received all their formal education in German schools.

- Lack of language skills also seem to affect student performance in mathematics and science. Shortcomings in reading comprehension inhibit the acquisition of knowledge and skills in these subjects too.

- Patterns of immigration differ greatly across the PISA countries. Measured in terms of immigration rates, Germany can best be compared with Sweden. Results show that immigrant students in Sweden (as well as in most other countries) are much less academically disadvantaged than their counterparts in Germany. Even when the families continue to speak the minority language at home, they are better integrated into the new society and their children perform much better on the reading literacy scale (see Fig. 3).

Gender differences in student performance

Marked differences emerge in the performance of male and female students, especially on the reading literacy scale:

- In all countries, females clearly outperform males in reading literacy – on average, they are about half a proficiency level ahead. This gender gap may be at least partly attributed to differences in attitudes to reading: males report much less interest in reading and enjoyment of reading than females.

- Males score higher than females in mathematics, but the gender gap is much smaller than in reading, and it is statistically significant only in half of the participating countries (including Germany). Results show that some countries succeed in combining high overall performance with small gender differences.

- No consistent gender differences emerged for the international scientific literacy test. When analysing test results for the individual subjects separately, however, it becomes apparent that male students in Germany outperform their female counterparts in physics and chemistry.

Patterns of school careers

There are considerable differences between the PISA countries with respect to the distribution of 15-year-olds across grade levels:

- In Germany, 15-year-old students are enrolled in five different grade levels. In most of the PISA countries, the range is much smaller, and in some countries almost all 15-year-olds are enrolled in the same grade level (e.g., Japan, Korea, Iceland and Norway).

- These differences in the distribution of 15-year-olds across grade levels are attributable primarily to cross-national differences in patterns of primary school entrance and grade repetition. In Germany, grade repetition is relatively common. In fact, 24% of the young people in the age group investigated have repeated a year at least once, and for 12%, entry to primary school was deferred. In total, 34% of 15-year-olds in Germany are in lower grades than would be expected on the basis of their age.

Results of the German state-by-state comparison*

Confirmation of the international findings

For the most part, the findings for the German federal states substantiate the results of the international comparison. In almost all of the German states, a relatively low level of overall performance is coupled with a wide variation in student performance. Compared to the international figures, the proportion of students classified as belonging to the at-risk group is also relatively large across the federal states.

The international results show that the relationship between social backgroun and student performance is stronger in Germany than in any of the other PISA countries. This finding, too, is further substantiated by the state-by-state comparison. Within Germany, the closest links between student background and performance are found in the former West German states. Although the social divide tends to be less pronounced in the former East German states, it is still large compared to the other PISA countries.

Overall, findings show that the individual states have much in common. However, a number of notable differences can also be identified.

Reading literacy

The state-by-state comparison yields the following results for the domain of reading literacy:

- Most of the states perform around the German mean on the reading literacy scale and any cross-state differences are practically insignificant (see Table 2). When the highest and lowest performing states are compared, however, the difference is substantial. In fact, the largest cross-state differences are equivalent to performance gains of one-and-a-half to two academic years. Regional performance differences of this magnitude are also found in other federal countries such as Canada.

- Even when taking account of differences in the composition of the student population across the German states and considering the performance of students of German origin separately, marked differences in mean performance on the reading literacy scale can still be observed.

- There is a relatively large range of performance scores within the German states. The performance gap between the 5% highest achieving and the 5% lowest achieving students is very large in all of the 14 states included in the

* The results of the city states Berlin and Hamburg are included only in the comparison of Gymnasium students (cf. explanation on p. 5).

Reading literacy			Mathematical literacy			Scientific literacy		
Countries	Means (standard errors in parentheses)	Distribution*	Countries	Means (standard errors in parentheses)	Distribution*	Countries	Means (standard errors in parentheses)	Distribution*
Finland	546 (2.6)	291	Japan	557 (5.5)	286	Korea	552 (2.7)	263
Canada	534 (1.6)	310	Korea	547 (2.8)	276	Japan	550 (5.5)	297
New Zealand	529 (2.8)	355	New Zealand	537 (3.1)	325	Finland	538 (2.5)	283
Australia	528 (3.5)	331	Finland	536 (2.2)	264	United Kingdom	532 (2.7)	321
Ireland	527 (3.2)	309	Australia	533 (3.5)	299	Canada	529 (1.6)	290
Korea	525 (2.4)	227	Canada	533 (1.4)	278	New Zealand	528 (2.4)	326
United Kingdom	523 (2.6)	330	Switzerland	529 (4.4)	329	Australia	528 (3.5)	307
Japan	522 (5.2)	284	United Kingdom	529 (2.5)	302	Austria	519 (2.6)	296
Sweden	516 (2.2)	304	Belgium	520 (3.9)	350	Ireland	513 (3.2)	300
Bavaria	510 (4.0)	339	France	517 (2.7)	292	Sweden	512 (2.5)	303
Austria	507 (2.4)	307	Bavaria	516 (4.2)	337	Czech Republic	511 (2.4)	308
Belgium	507 (3.6)	351	Austria	515 (2.5)	306	Bavaria	508 (4.4)	334
Iceland	507 (1.5)	302	Denmark	514 (2.4)	283	Baden-Württemberg	505 (4.7)	358
Norway	505 (2.8)	340	Iceland	514 (2.3)	277	France	500 (3.2)	334
France	505 (2.7)	301	Liechtenstein	514 (7.0)	322	Norway	500 (2.8)	311
United States	504 (7.0)	349	Baden-Württemberg	512 (4.6)	338	United States	499 (7.3)	328
Baden-Württemberg	500 (5.5)	368	Sweden	510 (2.5)	309	Saxony	499 (5.1)	335
Denmark	497 (2.4)	319	Ireland	503 (2.7)	273	Hungary	496 (4.2)	331
Switzerland	494 (4.2)	335	Saxony	501 (4.3)	322	Iceland	496 (2.2)	284
Spain	493 (2.7)	276	Norway	499 (2.8)	303	Belgium	496 (4.3)	364
Czech Republic	492 (2.4)	318	Czech Republic	498 (2.8)	320	Switzerland	496 (4.4)	324
Saxony	491 (5.0)	347	United States	493 (7.6)	325	Thuringia	495 (5.3)	324
Italy	487 (2.9)	297	Thuringia	493 (6.0)	315	Spain	491 (3.0)	310
Rhineland-Palatinate	485 (6.6)	357	Schleswig-Holstein	490 (3.8)	349	Rhineland-Palatinate	489 (7.9)	356
Saarland	484 (2.4)	352	Germany	490 (2.5)	338	Germany	487 (2.4)	335
Germany	484 (2.5)	366	Hungary	488 (4.0)	321	Schleswig-Holstein	486 (3.6)	354
Liechtenstein	483 (4.1)	316	Rhineland-Palatinate	488 (6.5)	354	Saarland	485 (2.9)	337
Thuringia	482 (7.0)	344	Saarland	487 (2.7)	348	Poland	483 (5.1)	313
North Rhine-Westphalia	482 (2.6)	384	Hesse	486 (5.6)	351	Hesse	481 (4.7)	336
Hungary	480 (4.0)	306	Mecklenburg-West Pomerania	484 (5.0)	320	Denmark	481 (2.8)	335
Poland	479 (4.5)	326	North Rhine-Westphalia	480 (3.6)	354	Mecklenburg-West Pomerania	478 (6.4)	340
Schleswig-Holstein	478 (4.2)	365	Lower Saxony	478 (3.4)	332	North Rhine-Westphalia	478 (3.3)	169
Hesse	476 (6.6)	365	Russian Federation	478 (5.5)	343	Italy	478 (3.1)	318
Lower Saxony	474 (4.9)	374	Saxony-Anhalt	477 (4.6)	306	Liechtenstein	476 (7.1)	315
Greece	474 (5.0)	321	Spain	476 (3.1)	298	Lower Saxony	476 (3.7)	352
Portugal	470 (4.5)	320	Brandenburg	472 (5.0)	304	Saxony-Anhalt	471 (5.9)	334
Mecklenburg-West Pomerania	467 (5.9)	350	Poland	470 (5.5)	336	Brandenburg	470 (4.9)	324
Russian Federation	462 (4.2)	303	Latvia	463 (4.5)	337	Bremen	461 (5.6)	368
Brandenburg	459 (6.3)	338	Italy	457 (2.9)	299	Greece	461 (4.9)	316
Latvia	458 (5.3)	334	Portugal	454 (4.1)	299	Russian Federation	460 (4.7)	327
Saxony-Anhalt	455 (5.9)	354	Bremen	452 (5.2)	368	Latvia	460 (5.6)	321
Bremen	448 (4.1)	377	Greece	447 (5.6)	357	Portugal	459 (4.0)	287
Luxembourg	441 (1.6)	324	Luxembourg	446 (2.0)	307	Luxembourg	443 (2.3)	315
Mexio	422 (3.3)	281	Mexico	387 (3.4)	273	Mexico	422 (3.2)	251
Brazil	396 (3.1)	284	Brazil	334 (3.7)	320	Brazil	375 (3.3)	301

* Gap between the scores of the 5% lowest performing students and the 5% highest performing students.

Performance significantly above the OECD average

Performance does not differ significantly from the OECD average

Performance significantly below the OECD average

Table 2 Means and distributions of student performance in the three competency domains across the participating countries and in 14 of the German federal states

analysis. In most states, the gap is larger than in any of the other PISA countries (see Table 2).

- Performance on tasks that require students to reflect on and evaluate texts is comparatively low in all of the German states under consideration. Students in Germany fare better on tasks requiring them to retrieve information or interpret texts. This pattern of results again substantiates the findings of the international comparison.

- Although the exact size of the group varies from state to state, the proportion of at-risk students (Level I and below) is relatively large in all German states (see Fig. 4 and Fig. 1). In Brandenburg, Saxony-Anhalt and Bremen, 25% of the total population of 15-year-olds can be classified as at risk. Even when considering only ninth-graders whose parents were born in Germany, at least 15% of students belong to the at-risk group in 8 of the 14 states considered. Students in the at-risk group have not reached a level of reading proficiency beyond a superficial understanding of simple written texts.

- Another particularly notable finding is that relatively few students in some of the former East German states (Brandenburg, Saxony-Anhalt and Mecklenburg-West Pomerania) are capable of completing the most sophisticated reading tasks (Level V; see Fig. 4 and Fig. 1). Even when considering only ninth graders of German origin, 5% or fewer of the students in these states perform at the top level of reading proficiency.

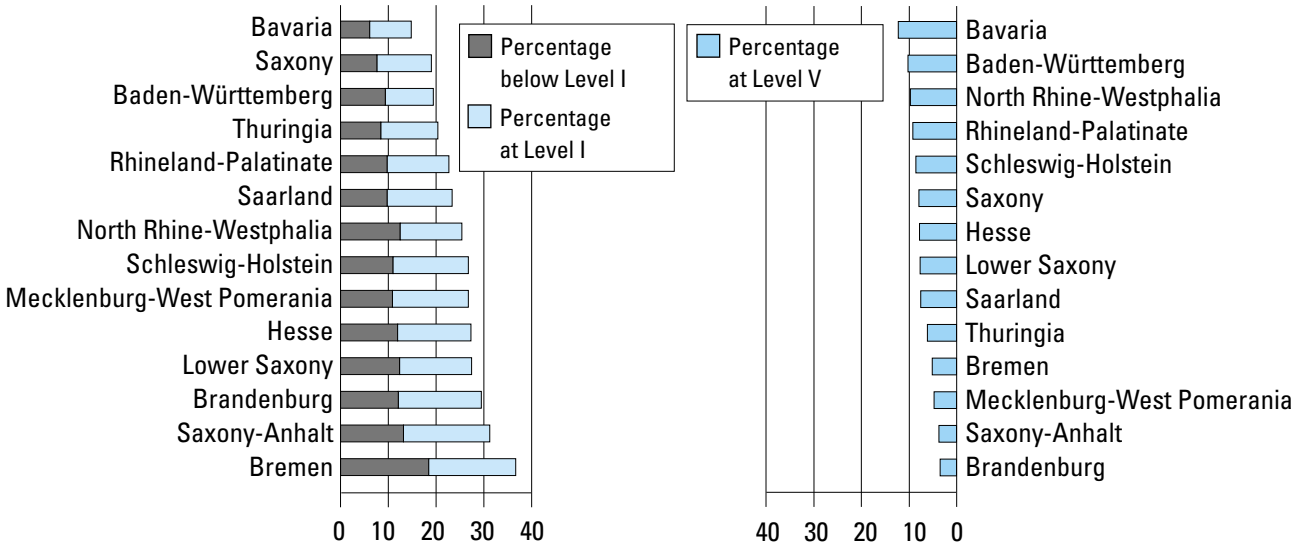


Figure 4 Percentage of students in 14 of the German federal states performing below or at Proficiency Level I and at Proficiency Level V on the reading literacy scale

Mathematical literacy

The pattern of results in the domain of mathematical literacy resembles that found for reading literacy:

- The variation in the mean performance scores of the federal states is such that well over half the OECD countries are positioned between the highest and lowest achieving German states. At the same time, most of the federal states rank in the lower range of the international performance spectrum. Only two states perform significantly above the OECD average (Bavaria and Baden-Württemberg), and these states still lag well behind the international leading group (see Table 2).

- Even when taking account of differences in the composition of the student population across the German states and considering the performance of students of German origin separately, there are still pronounced differences in mean performance on the mathematical literacy scale.

- In contrast to reading literacy, there is a clear east-west divide with respect to the internal distribution of performance on the mathematical literacy scale. While the gap between the 5% highest achieving and the 5% lowest achieving students in the former West German states is exceptionally large by international comparison, the performance of the students in the former East German states is more homogeneous. The degree of variation here is comparable to the mean variation across the OECD countries (see Table 2).

- In almost all states, relative weaknesses are particularly pronounced at the lower end of the performance distribution. The proportion of 15-year-old students who are proficient only at an elementary level in mathematics (Level I and below) exceeds 25% in 10 of the 14 states considered.

- The proportion of young people who are capable of independent mathematical reasoning and reflection (Level V) is about the same as the OECD average. This is attributable primarily to the relatively high proportion of students in this group in Bavaria, Baden-Württemberg and Schleswig-Holstein.

- It is only in Bavaria, Baden-Württemberg and Saxony that more than half of the students master tasks that represent standard curriculum content in German schools (Levels II-IV).

Scientific literacy

The state-by-state results for the domain of scientific literacy can be summarised as follows:

- Students in the federal states do not achieve top-rate performances in the domain of scientific literacy either. Here again, however, the cross-state differences are considerable, and they remain relatively consistent when considering biology, physics and chemistry separately. Although some states do perform around the international average, they still lag far behind the international leading group (see Table 2).

- Young people who are proficient only at Level I or below on the scientific literacy scale have very little chance of acquiring the fundamental scientific and technological knowledge base required for many training programmes and occupations, as well as in everyday life. Only in a few of the German states (Bavaria, Baden-Württemberg, Saxony and Thuringia) is this at-risk group smaller than the OECD average.

- Although the state performance ranking does display a certain degree of stability, the relative positions of many states change when attention is focussed on particular aspects. When considering only the performance of Gymnasium students, for example, Schleswig-Holstein performs best on the scientific literacy scale. Saxony-Anhalt ranks at the bottom of the table in

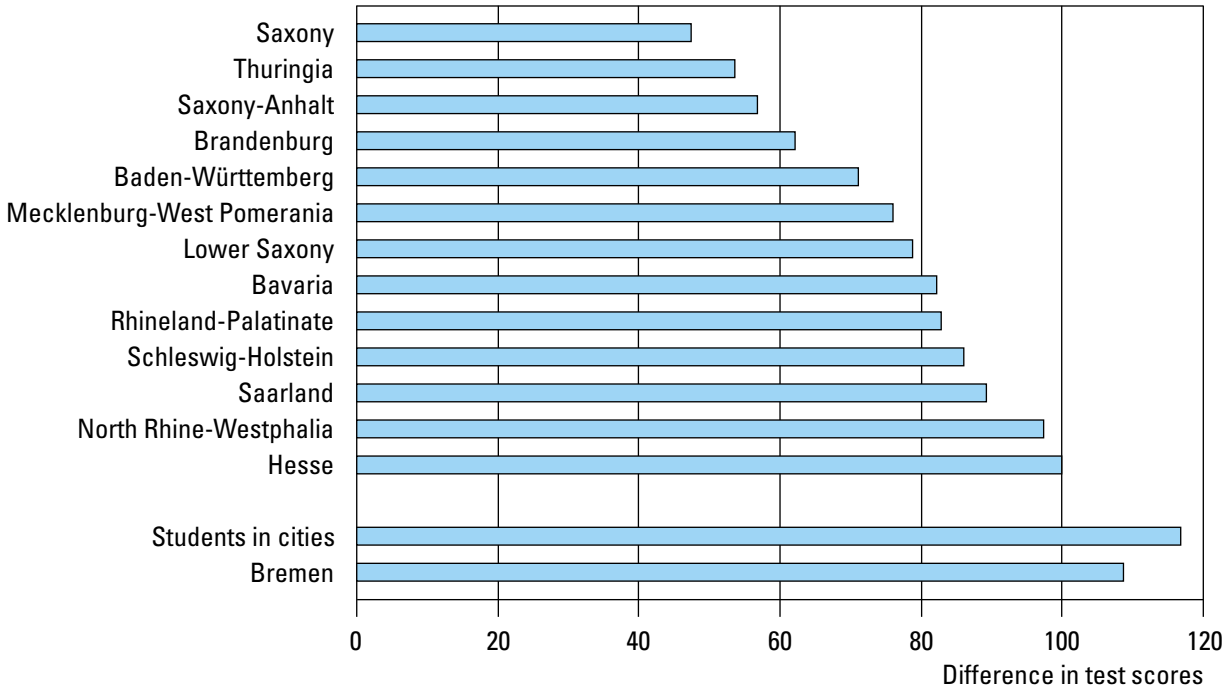
the comparison of Gymnasium students, but reaches the national average when only the supplementary national science test is considered. Similarly, the city state Bremen moves up the ranking table when the comparison is restricted to students of German origin. In other words, the findings point to state-specific profiles of relative strengths and weaknesses in scientific literacy.

Social background and student performance

In all of the German states, the type of school students attend is related to the socio-economic status of their family. Social disparities are particularly pronounced where enrolment in the academic-track Gymnasium is concerned. Here again, though, there are marked differences between the individual states:

- The relatively large east-west differences in the social divide are worthy of note. In the former East German states, the relative probability of attending a Gymnasium is far less dependent on the family's socio-economic status than in the former West. The relationship between social background and type of school attended is strongest in Bavaria, Rhineland-Palatinate and Schleswig-Holstein.

- In a number of states, the influence of the social background on the type of secondary school attended remains considerable, even when comparing students with the same levels of basic cognitive ability and reading literacy.



This figure presents the differences in the mean reading literacy scores of two subgroups of students – students from the highest socio-economic status groups and students from the lowest socio-economic status groups (see the footnote on p. 10 for further details of this categorisation). The bars in the figure illustrate the extent to which the former group outperforms the latter.

Figure 5 Differences in the mean reading literacy scores of 15-year-olds from the highest and the lowest socio-economic status groups

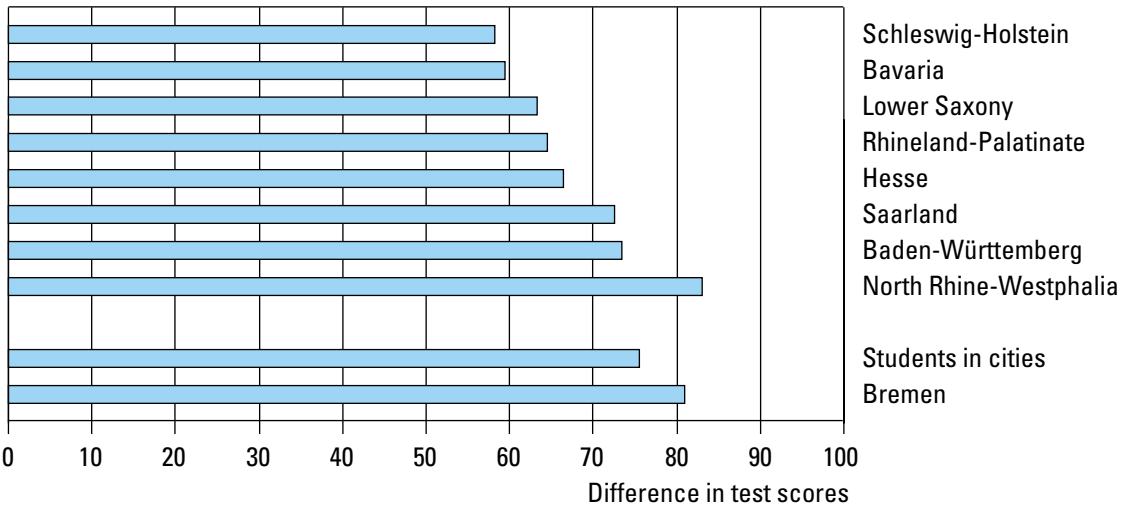
These social disparities in the stricter sense are particularly pronounced in Bavaria, Rhineland-Palatinate, Schleswig-Holstein and Lower Saxony. In these states, the relative probability that students from the highest socio-economic status groups will attend the Gymnasium rather than the intermediate-track Realschule is over four to six times higher than for students from the lowest socio-economic status groups, even when they are comparable in terms of levels of basic cognitive ability and reading literacy.

- Compared to the other PISA countries, the link between social background and learning outcomes towards the end of lower secondary school is exceptionally strong in all of the German states. Nevertheless, the regional differences in the relationship between background and performance are striking (see Fig. 5).

Students from immigrant families

There is considerable variation in the size and ethnic structure of the immigrant population in the individual federal states. These differences are particularly evident in east-west comparison. While students from immigrant families make up almost one-third of the population of 15-year-olds in parts of the former West Germany – and up to 40% in the cities – there has been far less immigration to the former eastern states. Consequently, results for students from immigrant families will be presented for the western states only:

- Young people whose parents were born in Germany clearly outperform their counterparts from immigrant families in all of the domains under investigation. The size of the performance gap varies considerably from state to state (see Figure 6) and from domain to domain within the individual states.



This figure presents the differences in the mean reading literacy scores of two subgroups of students – students whose parents were both born in Germany and students with at least one foreign-born parent. The bars in the figure illustrate the extent to which the former group outperforms the latter.

Figure 6 Differences in the mean reading literacy scores of 15-year-olds from immigrant families and native families (countries with an immigrant population of over 5% only; students in special schools excluded)

- The size of the performance gap is dependent on the immigrants' linguistic background, the length of their residency in Germany, the language spoken at home and the family's socio-economic status, but also on the instruction and support they receive at school.

Institutional conditions

There are few significant cross-state differences with respect to the institutional background conditions that were surveyed in PISA 2000:

- Cross-state differences in the students' evaluation of the school climate, student-teacher relations and instructional quality are relatively small. In terms of institutional conditions affecting the learning environment such as class sizes and adherence to timetables, the similarities between the states clearly outweigh the differences.

- State-specific differences in students' and parents' acceptance of the school are also relatively small. In the case of student absenteeism, for example, cross-state differences are no larger than urban-rural differences. Likewise, parental satisfaction with the child's school is more closely linked to the evaluation of teacher behaviour than to the federal state in which the school is located.

	Students whose entry to primary school was deferred by a year	Students who have repeated a grade at least once	Students whose entry to primary school was deferred or who have repeated a grade at least once
Baden-Württemberg	9.8 (1.2)	19.9 (1.5)	28.1 (2.1)
Bavaria	7.1 (0.8)	24.4 (2.1)	29.8 (2.4)
Hesse	10.5 (0.9)	25.4 (1.8)	33.0 (2.1)
Lower Saxony	10.9 (1.0)	26.4 (0.9)	34.8 (1.1)
North Rhine-Westphalia	8.4 (0.6)	26.6 (1.1)	32.9 (1.3)
Rhineland-Palatinate	8.8 (0.9)	22.9 (1.7)	30.0 (2.1)
Saarland	7.0 (0.6)	25.4 (1.1)	30.9 (1.1)
Schleswig-Holstein	11.5 (0.8)	35.7 (1.6)	44.7 (1.9)
States in the former West Germany[1]	9.0 (0.3)	25.0 (0.5)	32.0 (0.6)
Brandenburg	11.2 (0.7)	11.2 (1.4)	21.5 (1.5)
Mecklenburg-West Pomerania	12.5 (1.0)	20.2 (1.0)	30.8 (1.4)
Saxony	11.8 (0.7)	14.7 (0.9)	24.4 (1.0)
Saxony-Anhalt	11.0 (1.2)	17.1 (1.3)	26.9 (1.8)
Thuringia	11.5 (1.0)	12.6 (1.2)	22.9 (1.8)
States in the former East Germany	11.6 (0.4)	14.9 (0.5)	24.9 (0.7)
Bremen	11.2 (0.9)	33.5 (1.6)	42.3 (1.8)
Cities[2]	12.1 (1.4)	28.7 (3.8)	38.9 (4.4)

[1] Excluding the city states Berlin, Bremen and Hamburg.
[2] Cities with at least 300,000 inhabitants (excluding Berlin, Bremen and Hamburg).

Table 3 15-year-olds (excluding students in special schools) in the German federal states by characteristics of the school career (in %; standard errors in parentheses)

- The institutional conditions that do differ considerably across the German states include the frequency with which low-achieving students are separated out by means of deferred entry to primary school, grade repetition, or transfer to a less demanding school type. Because grade repetition is much less common in the former East German states, there are considerable east-west differences in the proportion of students who are enrolled in a lower grade than would be expected on the basis of their age (see Table 3).

Domain-transcending perspectives

When the state-by-state results in the three domains of competency are considered together, a high level of cross-state correspondence can be observed, though some state-specific profiles do become apparent:

- On the state level, correlations between the mean scores in the three domains are very strong. This suggests that domain-transcending economic, social, cultural, as well as institutional conditions are most likely responsible for the performance differences across the individual states.

- Compared to the other school types, the performance of ninth-graders attending the academic-track Gymnasium is relatively homogeneous in the three domains (see Table 4). There is a high level of correspondence in the mean levels of performance achieved by Gymnasium students across most of the states. Nevertheless, the performance gaps between the highest and lowest achieving states are relatively large in all three domains. In fact, these mean differences are equivalent to performance gains of one to one-and-a-half academic years.

Reading literacy			Mathematical literacy			Scientific literacy		
Countries	Means (standard errors in parentheses)	Distribution*	Countries	Means (standard errors in parentheses)	Distribution*	Countries	Means (standard errors in parentheses)	Distribution*
Bavaria	593 (3.7)	180	Bavaria	599 (4.7)	210	Schleswig-Holstein	595 (5.9)	235
Schleswig-Holstein	584 (4.2)	186	Schleswig-Holstein	590 (4.6)	207	Baden-Württemberg	588 (4.2)	233
Lower Saxony	584 (3.4)	190	Mecklenburg-West Pomerania	577 (2.3)	195	Bavaria	587 (5.9)	215
Rhineland-Palatinate	582 (3.5)	187	Baden-Württemberg	576 (6.1)	212	Saxony	582 (3.8)	223
Baden-Württemberg	582 (2.8)	188	Saxony	576 (3.7)	203	Lower Saxony	579 (6.2)	235
Saxony	582 (3.2)	193	Lower Saxony	575 (5.1)	206	Thuringia	579 (4.2)	217
North Rhine-Westphalia	581 (3.5)	195	Thuringia	574 (5.1)	218	Mecklenburg-West Pomerania	577 (5.5)	239
Thuringia	571 (3.8)	189	Saarland	572 (4.7)	204	Berlin	574 (7.4)	246
Saarland	570 (3.6)	183	Rhineland-Palatinate	570 (4.3)	201	Rhineland-Palatinate	573 (4.8)	219
Hesse	568 (4.4)	202	Hesse	568 (4.8)	208	Saarland	572 (4.9)	217
Berlin	568 (4.0)	205	North Rhine-Westphalia	567 (5.7)	211	North Rhine-Westphalia	569 (4.5)	237
Mecklenburg-West Pomerania	566 (3.5)	195	Berlin	565 (8.1)	246	Hesse	561 (4.8)	229
Hamburg	563 (7.0)	218	Saxony-Anhalt	561 (4.0)	208	Hamburg	559 (5.7)	249
Saxony-Anhalt	553 (3.0)	180	Hamburg	552 (6.8)	238	Brandenburg	554 (4.0)	242
Brandenburg	552 (2.5)	190	Brandenburg	550 (3.1)	198	Bremen	551 (7.7)	245
Bremen	547 (5.5)	221	Bremen	547 (5.7)	255	Saxony-Anhalt	551 (3.8)	203

* Gap between the scores of the 5% lowest performing students and the 5% highest performing students.

Table 4 Means and distributions in the performance of ninth-grade students attending the academic-track Gymnasium in the three competency domains

- States with a smaller proportion of students attending the academic-track Gymnasium tend to perform at a higher mean level of proficiency than states in which more 15-year-olds are enrolled in this school type. However,

the mean performances of the Gymnasium students in many states are higher or lower than would be expected in view of the relative proportion of students attending this school type. This finding challenges the assumption that the high levels of performance at the Gymnasium are primarily attributable to the selectivity of this school type. It appears that the higher the proportion of students enrolled in the Gymnasium track, the more difficult it becomes to give the weaker learners the necessary support, and hence to ensure minimum Gymnasium standards. Considering that fewer students in Germany tend to be admitted to the academic track preparing students for higher education than is the case in other countries, however, it would seem that guaranteeing minimum standards is less a problem of selectivity than of the teachers' ability to deal with heterogeneous learning groups.

- The mean levels of performance achieved by ninth graders in all three domains of competency are closely connected to measures of prosperity on the state level. More prosperous states with fewer social problems and a dynamic labour market also seem to be more successful in the sphere of schooling and education.

- On the state level, more instruction (in terms of the nominal number of classroom hours) is associated with higher mean performance in all three domains of competency. The total number of classroom hours scheduled in school timetables seems to be an indicator for the importance a state accords to instruction and for the implementation of these values in the institutional setting. This applies particularly to the amount of German language instruction.

- Surprisingly, as expenditure on teaching staff (per hour of schooling per week) increases, mean student performance tends to decrease. This pattern of results suggests that personnel expenditure increases in organisational contexts where the optimisation of secondary working conditions is given priority over instruction. The number of classroom hours and personnel expenditure per hour of schooling per week thus seem to be indicators for different philosophies and styles of educational policy and school management.

- It is important to note that the links between learning outcomes and societal, institutional and cultural background characteristics observed on the state level should not be interpreted as causal relationships. Rather, these findings draw attention to the significance of complex educational contexts that influence the quality of learning environments inside and outside school in many different ways and through a variety of mediating factors.

Future Prospects

The OECD published the first international report on the PISA results on 4 December, 2001 (OECD, 2001). The German PISA consortium presented its first national report on the same day (Baumert et al., 2001). The first report on the German state-by-state comparison was published on 25 June 2002. Over

the coming two years, further reports will be published on both the international and the national level. The German PISA consortium is currently preparing the following publications:

- An in-depth report on the German state-by-state comparison.
- Thematic reports on the domains of reading literacy, mathematical literacy and scientific literacy.
- A report presenting the findings on general problem-solving skills.
- Thematic reports on the impact of social background on student performance and the impact of the school, family and peers on learning in curricular and cross-curricular domains.
- The Max Planck Institute for Human Development has also played a central role in the preparation of an international thematic report on the prerequisites for self-regulated learning assessed in PISA.

Parallel to the activities associated with PISA 2000, the next cycle of the programme is well underway and preparations are being made for the main assessment, to take place in the early summer of 2003. The Leibniz Institute for Science Education (IPN) at the University of Kiel is responsible for conducting PISA 2003 in Germany.

Literature

The German PISA 2000 consortium has published a detailed report presenting the international results from the German perspective and identifying areas requiring action:

Baumert, J., Klieme, E., Neubrand, M., Prenzel, M., Schiefele, U., Schneider, W., Stanat, P., Tillmann, K.-J. & Weiß, M. (Eds.). (2001). *PISA 2000. Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich [PISA 2000: Core competencies of students in international comparison].* Opladen: Leske + Budrich.

In addition, a report on the results of the German state-by-state comparison has been published:

Baumert, J., Artelt, C., Klieme, E., Neubrand, J., Prenzel, M., Schiefele, U., Schneider, W., Tillmann, K.-J. & Weiß, M. (Eds.). (2002). *PISA 2000. Die Länder der Bundesrepublik Deutschland im Vergleich [PISA 2000: A comparison of student performance in the German federal states].* Opladen: Leske + Budrich.

OECD publications on PISA:

Organisation for Economic Co-operation and Development (OECD). (1999). *Measuring student knowledge and skills: A new framework for assessment.* Paris:

Organisation for Economic Co-operation and Development (OECD). (2000). *Measuring student knowledge and skills: The PISA 2000 assessment of reading, mathematical and scientific literacy*. Paris: OECD.

Organisation for Economic Co-operation and Development (OECD). (2002). *PISA 2000: Sample Items*. Paris: OECD.

Organisation for Economic Co-operation and Development (OECD). (in press). *PISA 2000: Technical Report*. Paris: OECD.

Resolutions concerning PISA passed by the standing conference of education ministers in the 16 German states (KMK):

(1) Konstanzer Beschluss zur Durchführung länderübergreifender Vergleichsuntersuchungen zum Lern- und Leistungsstand von Schülerinnen und Schülern (280. Sitzung der Kultusministerkonferenz, 23./24.10.1997)
[Constance resolution on the implementation of cross-state comparative studies on student learning and performance (280th meeting of the KMK, 23-24.10.1997)]
http://www.kmk.org/aktuell/pm971024.htm

(2) Erste Reaktion der Präsidentin der KMK auf die Vorstellung der internationalen PISA-Ergebnisse (4.12.2001)
[First response of the KMK president to the international PISA results (4.12.2001)]
http://www.kmk.org/aktuell/pm011204.htm

(3) Einigung der KMK mit den Lehrerverbänden über Konsequenzen aus PISA (5.12.2001)
[Agreement between the KMK and the teachers' associations about the implications of PISA (5.12.2001)]
http://www.kmk.org/aktuell/pm011205a.htm

(4) Definition von sieben vorrangigen Handlungsfeldern als Konsequenz aus PISA (296. Sitzung der Kultusministerkonferenz, 5./6.12.2001)
[Definition of seven primary areas of action in response to PISA (296th meeting of the KMK, 5-6.12.2001)]
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(5) Beschreibung erster Maßnahmen in den sieben Handlungsfeldern (297. Sitzung der Kultusministerkonferenz, 28.2./1.3.2002)
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(6) Beschreibung weiterer Maßnahmen in den sieben Handlungsfeldern; Entscheidung, dass PISA-E im Jahr 2002 als Bildungsbericht dienen soll; Bildungsstandards, Vergleichsarbeiten, Aufgabenpools (298. Sitzung der Kultusministerkonferenz, 23./24.5.2002)
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Information available online:

www.mpib-berlin.mpg.de/pisa
www.pisa.oecd.org
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