

Program for International Student Assessment (PISA) International Data Explorer Help Guide

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PISA International Data Explorer Help Guide

I. Background on the Program for International Student Assessment (PISA) and the PISA International Data Explorer (IDE)

The Program for International Student Assessment (PISA) International Data Explorer (IDE) is a web-based application for accessing data from PISA, supported by the U.S. National Center for Education Statistics (NCES). PISA is a system of international assessments that measures 15-year-olds' capabilities in reading literacy, mathematics literacy, and science literacy. PISA also includes measures of general or cross-curricular competencies, such as financial literacy and problem solving. PISA focuses on the application of knowledge and skills as students near the end of mandatory schooling. PISA is organized by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries.

Begun in 2000, PISA is administered every 3 years. Each administration includes assessments of all three subjects, but assesses one of the subjects in depth (the *major* subject area or domain). The other two subjects in that year are considered *minor* domains. The major subject area assessed in 2000 was reading literacy; in 2003, mathematics literacy; and in 2006, science literacy. The cycle repeated again in 2009. Additionally, problem solving was assessed in 2003 and 2012, collaborative problem solving in 2015, and financial literacy in 2012 and 2015. Currently, the IDE includes problem-solving and financial-literacy data for 2012 only. Exhibit 1 summarizes the PISA administration cycle from 2000 through 2015.

When a subject area is the major domain, the design is such that it is possible to report subscales as well as a combined scale. For example, in 2003 and 2012, results are reported for a combined mathematics literacy scale and four mathematic subscales. In the years when a subject area is a minor domain, only an overall scale is available, and it is based on a set of items of varying difficulty that represent the range of topics covered by the full assessment. For example, in 2009, results are reported for an overall mathematics literacy scale, but not for subscales. Table 1 shows the PISA reporting scales currently available in the IDE, by year.

Exhibit 1. PISA administration cycle

Assessment year	2000	2003	2006	2009	2012	2015
Subjects assessed	READING	Reading	Reading	READING	Reading	Reading
	Mathematics	MATHEMATICS	Mathematics	Mathematics	MATHEMATICS	Mathematics
	Science	Science	SCIENCE	Science	Science	SCIENCE
		Problem solving			Problem solving	Collaborative Problem solving
					Financial literacy	Financial literacy

NOTE: Reading, mathematics, and science literacy are assessed in each assessment cycle of the Program for International Student Assessment (PISA). A separate problem-solving assessment was administered in 2003 and 2012, a separate collaborative problem-solving assessment was administered in 2015; and a separate financial literacy assessment was administered in 2012 and 2015. The data for the collaborative problem-solving assessment and the financial literacy assessment in PISA 2015 is forthcoming. The subject in all capital letters is the major subject area for that cycle.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2015.

Table 1. PISA reporting scales currently available in the IDE, by year

Reporting scale	Year					
	2000	2003	2006	2009	2012	2015
Reading						
Overall scale	x	x	x	x	x	x
Subscale: Access and retrieve	x			x		
Subscale: Integrate and interpret	x			x		
Subscale: Reflect and evaluate	x			x		
Subscale: Continuous text				x		
Subscale: Noncontinuous text				x		
Mathematics						
Overall scale (2000)	x					
Overall scale		x	x	x	x	x
Subscale: Space and shape	x	x			x	
Subscale: Change and relationships	x	x			x	
Subscale: Quantity		x			x	
Subscale: Uncertainty		x			x	
Subscale: Employ					x	
Subscale: Formulate					x	
Subscale: Interpret					x	
Science						
Overall scale (2000)	x					
Overall scale (2003)		x				
Overall scale			x	x	x	x
Subscale: Identifying scientific issues			x			
Subscale: Explaining phenomena scientifically			x			x
Subscale: Using scientific evidence			x			
Subscale: Evaluate and design scientific enquiry						x

Subscale: Interpret data and evidence scientifically						x
Subscale: Physical systems						x
Subscale: Living systems						x
Subscale: Earth and space						x
Subscale: Content Knowledge						x
Subscale: Procedural and Epistemic Knowledge						x
Attitude subscale: Interest in science			x			
Attitude subscale: Support for scientific inquiry			x			
Problem Solving						
Overall scale					x	
Financial Literacy						
Overall scale					x	

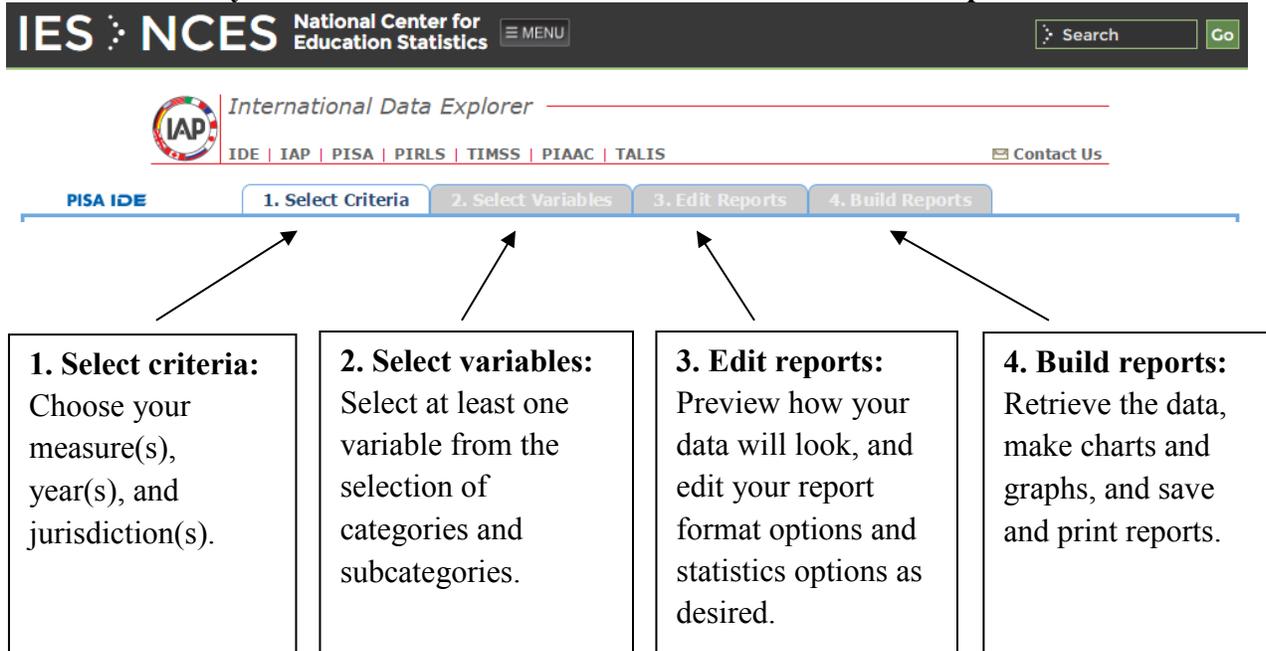
NOTE: The science attitude subscales are not included in the overall science scale. Data for two of the reading subscales—continuous text and noncontinuous text—are not available for PISA 2000. For more information about the definitions of the various literacy scales and subscales, see the PISA 2015 Assessment and Analytical Framework Science, Reading, Mathematic and Financial Literacy (Paris: OECD), available at <http://www.oecd.org/edu/pisa-2015-assessment-and-analytical-framework-9789264255425-en.htm>

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2017). PISA International Data Explorer, available at <https://nces.ed.gov/surveys/international/ide/>.

II. General Overview

There are four general steps for exploring PISA data using the PISA IDE (see exhibit 2). Each step is described in more detail starting on page 9.

Exhibit 2. What you will see in the IDE environment and what each step entails



III. Computer Requirements for the IDE

- Screen resolution should be 1024 x 768 pixels.
- Browsers: Internet Explorer (IE) version 7 or higher. For rendering and scrolling pages with large tables, Firefox 2.0 is faster than IE7 (FireFox 3.0 or higher is recommended). Google Chrome or Safari.
- Enable JavaScript and pop-ups in your browser.
- The IDE requires Flash version 9.0.115 or higher (download Adobe Flash Player at <http://get.adobe.com/flashplayer/>).
- Exports of files to Microsoft Office require Office 2003 or later.
- Exports of files to PDF can be read with Adobe Acrobat Reader.
- Screen reader software should be Jaws 8.0 or higher.

If you encounter an error, please send us the details through **Contact Us** (located in the upper-right portion of the screen on each page of the IDE website). When writing, include your browser version and operating system version, and as many other details as possible. Be sure to provide an e-mail address so that we can contact you.

Screenshots throughout this Help Guide were made using the Internet Explorer browser. Other browsers may vary the way the IDE is displayed.

IV. Steps to Explore Data

To create your own custom tables, charts, and graphs, follow these steps when using the PISA IDE:

1. Select criteria
2. Select variables
3. Edit reports
4. Build reports

Each of these steps is discussed in detail throughout the remainder of this guide, beginning with the selection of criteria.

1. Select Criteria

1.A. Overview

Your data query in the PISA IDE begins on the **Select Criteria** screen (see exhibit 3).

Select a **Language** from the drop-down menu and then select a **Subject** from the drop-down menu. Once the screen resets, you can choose one or more **Years, Measures, and Jurisdictions** for the data you wish to view or compare. Use the **Reset** button, located in the upper-right portion of the screen (just below the **Help** button), to cancel your selections and begin again.

Click on a blue sideways-facing arrow (▶) to open up a category, and click on a blue downward-facing arrow (▼) to close a category.

Exhibit 3. Selecting criteria

PISA IDE | 1. Select Criteria | 2. Select Variables | 3. Edit Reports | 4. Build Reports

Language: English

The PISA mathematics and science frameworks were revised in 2003 and 2006, respectively. Because of changes in the frameworks, it is not possible to compare learning outcomes from PISA 2000 with those from later cycles in mathematics and learning outcomes from PISA 2000 and 2003 with those from later cycles in science. Thus, mathematics data from 2000 and science data from 2000 and 2003 appear separately in the Subject dropdown.

STEP 1:
Select criteria from each drop-down menu to begin. Additional options related to your selections will appear. Then select measures, jurisdictions, and years based on available data. [Help](#)

Subject: Mathematics, Reading, and Science Age: 15 years [Reset](#)

[View all \(472\)](#) | [View Selected \(0\)](#) | Search: [Go](#)

Category	Sub Category	Measure	All Years	2015	2012	2009	2006	2003	2000
Scales	Overall score	<input type="checkbox"/> PISA Mathematics Scale: Overall Mathematics details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> PISA Reading Scale: Overall Reading details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> PISA Science Scale: Overall Science details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subscale scores								
	Attitude Scales								
Student and									
Group	Jurisdiction		All Years	2015	2012	2009	2006	2003	2000
International	<input type="checkbox"/> International Average (OECD Countries)		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/> Average of the Selected Jurisdictions		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OECD	<input type="checkbox"/> Australia		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Austria		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Belgium		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Canada		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Chile		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Czech Republic		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Denmark		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Estonia		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[2. Select Variables](#)

1.B. Choose Subject

Under **Subject**, you have the choice of **Mathematics, Reading, and Science**; **Financial Literacy**; **Problem Solving**; **Science (2003)**; **Science (2000)**; or **Mathematics (2000)**. Once a subject is chosen, the screen resets and you can select **Year(s)**, **Measure(s)**, and **Jurisdiction(s)**.

The PISA mathematics and science frameworks were revised in 2003 and 2006, respectively. Because of changes in the frameworks, it is not possible to compare learning outcomes from PISA 2000 with those from later cycles in mathematics and learning outcomes from PISA 2000 and 2003 with those from later cycles in science. Thus, mathematics data from 2000 and science data from 2000 and 2003 appear separately in the Subject dropdown.

1.C. Choose Year

At the top of the **Measure** and **Jurisdiction** sections, you have the choice of selecting 2015, 2012, 2009, 2006, 2003, and/or 2000 by checking the appropriate box. To include data from all

years, check the “All Years” box to the left of the individual years. Reading, mathematics, and science data are available for all years. Financial-literacy and problem-solving data are currently available for 2012.

1.D. Choose Measure

After choosing a subject, you can choose between the overall scale and/or any of the subject’s subscales. However, subscales are only available for the subject area that was the major domain in a particular year. Note that the overall scale is the default. Only the overall scale is available for financial literacy and problem solving.

In addition, there are a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables fall under different categories, such as Student and Family Characteristics and School and Classroom Climate, and include variables such as student age in years, size of class, and an index of computer availability.

1.E. Choose Jurisdiction

With your **Measure(s)** and **Year(s)** selected, next choose at least one **Jurisdiction**.

Jurisdictions are found under the following groups: **OECD**, **Non-OECD** and **US States and Territories**. There is also a group category called **International**, with options to display the **International Average (OECD Countries)** and the **Average of the Selected Jurisdictions**.

The general procedures for selecting one or more jurisdictions are as follows:

1. To open or close jurisdictions, click on the arrow. Jurisdictions in the group are open and can be selected when the blue arrow points down (see exhibit 4).
2. Click the checkboxes next to the specific jurisdictions that you are interested in, or uncheck those jurisdictions that you wish to deselect. If you click the checkbox next to the group name (e.g., “OECD”), you will select all the jurisdictions within that group. If desired, uncheck the group name to deselect all.
3. If you want to close a group (for example, close the list of OECD countries in order to readily see the non-OECD jurisdictions), click the blue arrow next to the group name. The closed group’s arrow points to the right. Be advised that closing the group will not deselect your choices.

Exhibit 4. Choosing jurisdictions

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

Language: English

The PISA mathematics and science frameworks were revised in 2003 and 2006, respectively. Because of changes in the frameworks, it is not possible to compare learning outcomes from PISA 2000 with those from later cycles in mathematics and learning outcomes from PISA 2000 and 2003 with those from later cycles in science. Thus, mathematics data from 2000 and science data from 2000 and 2003 appear separately in the Subject dropdown.

STEP 1:
Select criteria from each drop-down menu to begin. Additional options related to your selections will appear. Then select measures, jurisdictions, and years based on available data. [Help](#)

Subject: Mathematics, Reading, and Science Age: 15 years [Reset](#)

View all (472) View Selected (1) Search: Go

Category	Sub Category	Measure	All Years	2015	2012	2009	2006	2003	2000
Scal	Overall score	<input type="checkbox"/> PISA Mathematics Scale: Overall Mathematics details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input checked="" type="checkbox"/> PISA Reading Scale: Overall Reading details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> PISA Science Scale: Overall Science details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subscale scores								
	Attitude Scales								

Group	Jurisdiction	All Years	2015	2012	2009	2006	2003	2000
International	<input checked="" type="checkbox"/> International Average (OECD Countries)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/> Average of the Selected Jurisdictions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OECD	<input type="checkbox"/> Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Austria	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input checked="" type="checkbox"/> Belgium	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/> Canada	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Chile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/> Czech Republic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Denmark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Estonia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[2. Select Variables](#)

To continue in the IDE, click the **Select Variables** button at the bottom right of the page or the tab at the top of the page to go to the next screen (see exhibit 4).

2. Select Variables

2.A. Overview

Step 2, **Select Variables**, can only be accessed after choosing criteria at step 1, **Select Criteria**.

To continue your data query and edit a report, *you must choose at least one variable on this screen*. You can browse for variables using the **Category** and **Sub Category** lists or by using the **Search** function (see exhibit 5). You can return to this screen to change variable selections at any time.

Exhibit 5. Select variables overview

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 2: Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections. [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years [Reset](#)

Jurisdictions: International Average (OECD Countries), Average of the Selected Jurisdictions, Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

Measure: PISA Reading Scale: Overall Reading

Year: 2015

View all (2109) View Selected (0) Search: Go

Category	Sub Category	Variable	All Years	2015	2012	2009	2006	2003	2000
▼ All Students	▼ All Students	<input type="checkbox"/> All students details		<input checked="" type="checkbox"/>					
▶ Proficiency Levels									
▶ Student and Family Characteristics									
▶ Students' Attitudes and Learning Strategies									
▶ Learning Environment									
▶ Learning Time and Course Work									
▶ Careers and Further Education									
▶ Libraries									
▶ Computer Usage									
▶ Students and									

[3. Edit Reports](#)

2.B. Search Using Category and Sub Category Lists

On the **Select Variables** screen, choose at least one variable for your report. One way to do this is to search for variables using the **Category** and **Sub Category** lists. If you don't wish to choose from any of the specified categories and subcategories, then select **All students** in the **All Students** category.

The variables shown are tied to the criteria you selected at step 1 (**Measure**, **Year**, and **Jurisdiction**), which are indicated at the top of the screen. To change any of these criteria, return to step 1, **Select Criteria**.

To browse for variables, get details about them, select them, and view them:

1. Click the blue arrows to open and close categories and subcategories of variables (see exhibit 6).
2. Click **details** or **hide details** to show or hide the full title of a given variable, the PISA ID, and the values (i.e., value labels). Note that some variables have the same or similar short titles, but comparing details will show you how they differ. See the example in exhibit 6, which shows two **Grandparents** variables (SU002004 and SU012305). The differences between these two variables are described in the details.

3. Click the checkbox next to a variable to select it for your analysis/report. You will see the count increase next to **View Selected**.
4. Click the **View Selected** tab to see the variables you have chosen. To return to the full list of variables by category, click the **View All** tab.
5. Remember to select the year for which you wish to build a report and make sure that data are available for your chosen year and variables.
6. Searching variables is an option from the **Search** box. See Section 2.C Search Function for more details about this function.

Exhibit 6. Select variables using category and sub category lists

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 2:
Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections. Help

Subject, Age: Mathematics, Reading, and Science, 15 years Reset
Jurisdictions: International Average (OECD Countries), Average of the Selected Jurisdictions, Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading Scale: Overall Reading
Variable: All students
Year: 2015

View all (2092) View Selected (1) Search: Go

Category	Sub Category	Variable	All Years	2015	2012	2009	2006	2003	2000
		<input type="checkbox"/> Father details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Siblings details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Grandparents hide details Full Title: How often do the following people work with you on your homework? Grandparents ID: SU002004 Values: Never; Few times/year; Once a month; Several times/month; Several times/week	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Other relatives details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Parents' friends details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Brothers details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Sisters details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Grandparents hide details Full Title: Who usually lives at home with you? Grandparents ID: SU012305 Values: No; Yes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/> Other details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

3. Edit Reports

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When selecting **Financial Literacy** as the subject, additional student questionnaire items will appear under the category **Students' Financial Awareness and Experiences**. These items address key areas related to students' experience and exposure to financial literacy including access to information and education, access to money and financial products, and spending and saving behaviors.

When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

2.C. Search Function

The second way to search for variables is to use the **Search** function on the **Select Variables** screen.

Type a term in the **Search** box and click **Go** (or hit “Enter” on your keyboard) to find variables by keywords in the question and/or details for the variable (see exhibit 7). If you use multiple keywords, “and” is assumed. You can narrow your search by using “or,” “not,” or “and not.” The search function operates on an exact phrase if it is contained in quotes. The variable(s) that include the search term(s) in the question or its details will be listed.

Exhibit 7. Select variables using the search function

The screenshot shows the PISA IDE interface with the '2. Select Variables' tab active. At the top, there are four tabs: '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. Below the tabs, there is a 'STEP 2:' instruction: 'Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections.' There are 'Help' and 'Reset' buttons. The current selection is: Subject: Mathematics, Reading, and Science, 15 years; Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States; Measure: PISA Reading Scale: Overall Reading; Variable: All students; Year: 2015. A search bar contains the text 'Search: (45) interest or enjoyment' and a 'Go' button. Below the search bar, there are two buttons: 'View all (2104)' and 'View Selected (1)'. The main table has columns for 'Category', 'Sub Category', 'Variable', and years from 2012 to 2000. The '2015' column has a checked checkbox. The table lists variables under 'Students' Attitudes and Learning Strategies', including 'Engagement in Reading Activities' and 'Interest in Mathematics'. Under 'Engagement in Reading Activities', the variable 'Read each day' is selected. Under 'Interest in Mathematics', the variable 'Attitude: Interested' is selected. Under 'Enjoyment of and Interest in Science', several variables are listed, including 'Science enjoyment: Have fun', 'Science enjoyment: Like reading', 'Science enjoyment: Science problems', 'Science enjoyment: New knowledge', 'Science enjoyment: Learning science', 'Science interest: Physics', 'Science interest: Chemistry', 'Science interest: Plant biology', and 'Science interest: Human biology'. Each variable has a checkbox and a 'details' link. The '2015' column shows 'NO DATA' for most variables, while the '2012' column shows 'NO DATA' for most variables. The '2009' column shows 'NO DATA' for most variables. The '2008' column shows 'NO DATA' for most variables. The '2007' column shows 'NO DATA' for most variables. The '2006' column shows 'NO DATA' for most variables. The '2005' column shows 'NO DATA' for most variables. The '2004' column shows 'NO DATA' for most variables. The '2003' column shows 'NO DATA' for most variables. The '2002' column shows 'NO DATA' for most variables. The '2001' column shows 'NO DATA' for most variables. The '2000' column shows 'NO DATA' for most variables. At the bottom right, there is a '3. Edit Reports' button.

Category	Sub Category	Variable	All Years	2015	2012	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000		
Students' Attitudes and Learning Strategies	Engagement in Reading Activities	<input type="checkbox"/> Read each day details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>												
		<input type="checkbox"/> Attitude: Interested details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Interest in Mathematics	Enjoyment of and Interest in Science	<input type="checkbox"/> Science enjoyment: Have fun details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/> Science enjoyment: Like reading details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science enjoyment: Science problems details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science enjoyment: New knowledge details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science enjoyment: Learning science details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science interest: Physics details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science interest: Chemistry details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/> Science interest: Plant biology details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Science interest: Human biology details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

3. Edit Reports

3.A. Overview

You can access step 3, **Edit Reports**, after choosing criteria at step 1, **Select Criteria**, and choosing variables at step 2, **Select Variables**. The IDE will automatically build reports based on your selections from steps 1 and 2. However, at step 3, the **Edit Reports** phase, you may modify your selections for each report.

At this step, you can

- preview and edit the layout of your reports;
- copy reports or create new reports based on the variables selected;
- change formatting options, such as number of decimal places to display, for all reports (these may also be changed in individual reports, but format options can overwrite previous edits);
- change statistics options, such as averages, for all reports (these may also be changed in individual reports, but statistics options can overwrite previous edits);
- select reports to be built into tables and charts at step 4, **Build Reports**; and
- delete reports.

Using your chosen criteria, the IDE will return a separate data report for each variable you have chosen. If you have selected two or three variables (not counting **All Students**), you will also see a cross-tabulated report for these variables. If you have chosen four or more variables you will get tables for each variable, but you won't get the cross-tabulation. If your selected criteria include more than one measure (e.g., overall mathematics scale and one or more subscale or continuous variable), a separate set of data reports will be generated for each measure (see exhibit 8).

Exhibit 8. Edit reports overview

PISA IDE | 1. Select Criteria | 2. Select Variables | 3. Edit Reports | 4. Build Reports

STEP 3:
Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports will appear at the bottom of the report list) [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years [Reset](#)

Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States

Measure: PISA Reading Scale: Overall Reading

Variables: All students, Read each day, Language at home

Year: 2015

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Delete	PISA Reading Scale: Overall Reading	All students	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Delete	PISA Reading Scale: Overall Reading	Read each day	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Delete	PISA Reading Scale: Overall Reading	Language at home	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	Preview Delete	PISA Reading Scale: Overall Reading	Read each day, Language at home	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages

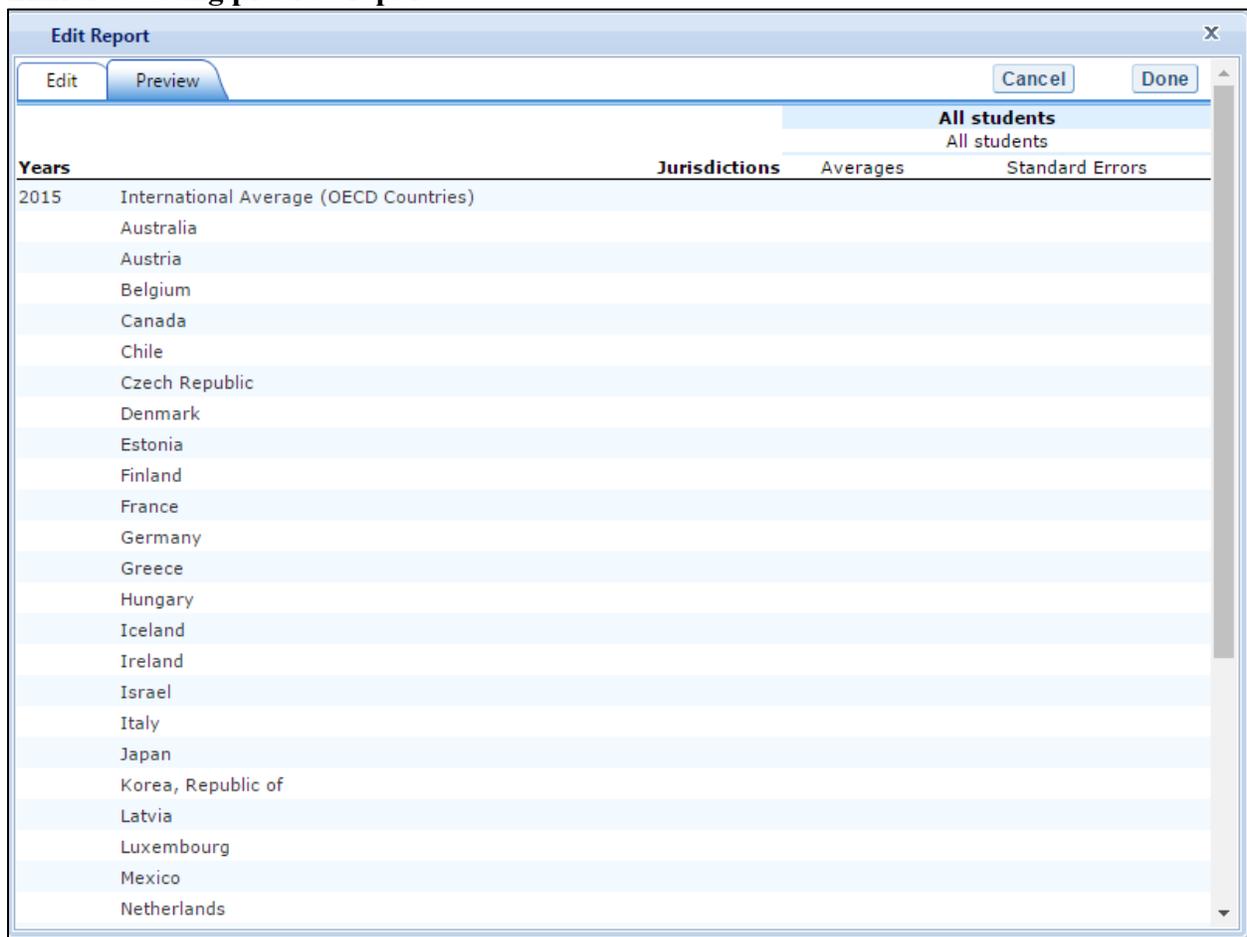
[4. Build Reports](#)

The **Edit Reports** step shows detailed information on the layout of your reports. The **Report** column indicates the report, or cross-tabulation report, number based on the variable(s) chosen during the criteria selection. Under the **All** tab, reports may be chosen for the report-building phase, either by selecting **All** or selecting individual reports. The **Action** column gives you the option to **Preview**, **Edit**, **Delete**, or **Copy** the report. The **Measure** column shows which measure the report will portray. The **Variable** column indicates the variable(s) included in the report. The **Year** column shows which years you have selected for comparison. The **Jurisdiction** column shows the countries and subnational education systems selected for comparison, and the **Statistic** column provides the type of statistic output that will be generated in the report-building phase.

3.B. Preview Report

Select **Preview**, in the **Action** column (see exhibit 8), to see how your report will be laid out. The preview will not provide actual data, but will show how the data will be arranged in rows and columns (see exhibit 9). You can select **Preview** at any time to see how your changes will affect the report's final layout.

Exhibit 9. Using preview report



All students			
All students			
Years	Jurisdictions	Averages	Standard Errors
2015	International Average (OECD Countries)		
	Australia		
	Austria		
	Belgium		
	Canada		
	Chile		
	Czech Republic		
	Denmark		
	Estonia		
	Finland		
	France		
	Germany		
	Greece		
	Hungary		
	Iceland		
	Ireland		
	Israel		
	Italy		
	Japan		
	Korea, Republic of		
	Latvia		
	Luxembourg		
	Mexico		
	Netherlands		

3.C. Edit Report

To edit the report, select the **Edit** command, in the **Action** column, next to the report number (see exhibit 8). (Another way to edit a report is to select the **Edit** tab when you are previewing a report.) The following can be done using the edit function (see exhibit 10):

1. Name your report. You have the option of giving each report a distinctive name, up to a limit of 50 characters, using only letters, numbers, spaces, underscores, and hyphens. (Otherwise, by default, the report is named Report 1, Report 2, etc., or Cross-Tabulated Report 1, Cross-Tabulated Report 2, etc.)
2. Select a measure. You can choose a measure if more than one was selected at step 1.
3. Select which jurisdictions, variables, years (if applicable), and statistics to include (out of the selections previously made at steps 1 and 2). You can select up to two statistics options from the following: averages, percentages, standard deviations, and percentiles. (For further information, see Section 3.G. Statistics Options.)
4. To create a new variable while editing a report, click on **Create New...** under the **Variable** heading. Section 3.D below explains the process for creating a new variable.
5. Change the table layout by dragging elements to determine which items will appear in rows and which will appear in columns. Some of the arrangements will not be permissible, but a pop-up alert will explain this.

Exhibit 10. Editing reports

The screenshot shows the 'Edit Report' dialog box with the following configuration:

- Name:** Report 1
- Measure:** PISA Reading Scale: Overall Reading

Step 2: Select available options from each of the columns below, then preview results.

Jurisdiction	Variable Create new ...	Year	Statistic
<input type="checkbox"/> Select All <input checked="" type="checkbox"/> International Average (OECD Countries) <input checked="" type="checkbox"/> Australia <input checked="" type="checkbox"/> Austria <input checked="" type="checkbox"/> Belgium <input checked="" type="checkbox"/> Canada <input checked="" type="checkbox"/> Chile	<input checked="" type="checkbox"/> All students <input type="checkbox"/> Read each day <input type="checkbox"/> Language at home	<input type="checkbox"/> Select All <input checked="" type="checkbox"/> 2015	<input checked="" type="checkbox"/> Averages <input type="checkbox"/> Percentages <input type="checkbox"/> Standard deviations <input type="checkbox"/> Percentiles

Step 3: Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
<div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;">Years</div> <div style="border: 1px solid gray; padding: 2px;">Jurisdictions</div>	<div style="border: 1px solid gray; padding: 2px;">All students</div>

To save changes, make sure to select **Done** in the upper-right portion of the screen before closing the **Edit Report** window.

3.D. Create New Variables

To create a new variable, select **Edit**, in the **Action** column, and select **Create new...** under **Variable** (see exhibit 10). The new variable is created by combining values for an existing variable. The steps are as follows:

1. Click **Create new...** under the **Variable** heading.
2. Select the variable for which you wish to combine values.
3. Select the values you want to combine by checking the boxes to the left of the values (see exhibit 11).
4. Create a name for the new value, and press **Create**. The collapsed values will appear in gray to indicate that they have already been used.
5. Wait for the screen to refresh, and press **Done**.
6. The new variable will appear in the **Variable** list in the **Edit Report** window or **Create New Report** window, designated as “collapsed.”
7. Check the box next to the new variable to view it in the report. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 11. Creating new variables

Create Variables X

1. Select a Variable group: Read each day ▼ Help

2. Select values to create new Variable:

- I don't read for enjoyment
- 30 minutes or less a day
- Between 30 and 60 minutes
- 1 to 2 hours a day
- More than 2 hours a day

3. Create a name for the new Value:

Name: Create

Reset Cancel Done

A new variable that you create is applicable only to a specific report; it does not apply to the other reports listed on the **Edit Reports** screen. For example, if you selected multiple measures of science literacy for analysis, then you would need to create the new variable for each measure, or create a copy of the report and edit it accordingly. To do the latter, click on **Copy** report on the **Edit Reports** screen (copied reports appear at the end of the list of reports) and then, for the new copy, click on **Edit** (using the above example, you can change the measure and give the report a new name).

You can repeat the process and combine different values of a variable to create additional new variables. Using the **Create New Report** function, you can create a new report for each new variable that you create. (For further information, see section 3.E. Create New Report, below.)

If you selected two or three variables from which to create new variables, you can repeat the process for each of them. Using the **Create New Report** or **Edit Report** function, these collapsed variables will be listed and available for cross-tabulation (see exhibit 12). If you have chosen four or more variables (not counting **All Students**) you won't get the cross-tabulation. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 12. Edit reports with collapsed variables

The screenshot shows the 'Edit Report' dialog box with the following configuration:

- Name:** Report 1
- Measure:** PISA Reading Scale: Overall Reading
- Step 1:** Create a name and select a measure for the new report.
- Step 2:** Select available options from each of the columns below, then preview results.

Jurisdiction	Variable	Year	Statistic
<input type="checkbox"/> Select All <input checked="" type="checkbox"/> International Average (OECD Countries) <input checked="" type="checkbox"/> Australia <input checked="" type="checkbox"/> Austria <input checked="" type="checkbox"/> Belgium <input checked="" type="checkbox"/> Canada <input checked="" type="checkbox"/> Chile	<input type="checkbox"/> All students <input type="checkbox"/> Read each day <input type="checkbox"/> Language at home <input type="checkbox"/> Read each day (collapsed)	<input type="checkbox"/> Select All <input checked="" type="checkbox"/> 2015	<input checked="" type="checkbox"/> Averages <input type="checkbox"/> Percentages <input type="checkbox"/> Standard deviations <input type="checkbox"/> Percentiles <input type="checkbox"/> Averages <input type="checkbox"/> Percentages
- Step 3:** Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
Years	
Jurisdictions	
Read each day (collapsed)	

3.E. Create New Report

From the main **Edit Reports** screen, clicking on **Create New Report** brings up the same options as **Edit Report**, but with no checkboxes marked and without any new variables you may have created. Thus, **Create New Report** provides a clean slate for your selections from the first two steps, **Select Criteria** and **Select Variables** (see exhibit 13). Each new report you create will appear at the end of the list of reports. If you do not give the report a specific name, it will be called “New Report”.

Exhibit 13. Creating new reports

New Report

Edit Preview Cancel Done

1. Create a name and select a measure for the new report. Help

Name: Measure:

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable Create new ...	Year	Statistic
<input type="checkbox"/> Select All <input type="checkbox"/> International Average (OECD Countries) <input type="checkbox"/> Australia <input type="checkbox"/> Austria <input type="checkbox"/> Belgium <input type="checkbox"/> Canada <input type="checkbox"/> Chile	<input type="checkbox"/> All students <input type="checkbox"/> Read each day <input type="checkbox"/> Language at home	<input type="checkbox"/> Select All <input type="checkbox"/> 2015	<input type="checkbox"/> Averages <input type="checkbox"/> Percentages <input type="checkbox"/> Standard deviations <input type="checkbox"/> Percentiles

3. Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
<input type="text" value="Jurisdictions"/> <input type="text" value="Years"/>	

3.F. Format Options

From the main **Edit Reports** screen, clicking on **Format Options** will allow you to make formatting changes applicable to all the reports listed. The following formatting options are available using this function (see exhibit 14):

1. **Variable Labels (Long)** displays a more detailed description of the variables selected in a query than the default short label. For variables from questionnaires, the full text of the

question is displayed. Be advised that the length of the extra detail may sometimes interfere with table formatting.

2. **Show data for values categorized as “missing”** will include the percentage of students in the total sample or in a reporting group for whom membership in a particular response category is unknown because no response was given by the students, their teacher, or their school. The percentage of “missing” will be shown in the right-most table column. Missing data are available only for queries that involve percentages as the statistic type. Unless you check this option, the default is for missing responses not to be included in the percentage distribution shown.
3. **Decimal Places** allows you to specify the level of precision for a particular statistic. Depending on the value range of the dependent variable (for example, the dependent variable “PISA Mathematics Scale: Overall Mathematics [PVMATH]” ranges from 0 to 1000; the dependent variable “Index economic, social and cultural status (2015) [ESCS15]” ranges from -4 to 4), the default decimal places for a report could be from zero to three. Also, standard errors will be shown to one more decimal place than is shown for a particular statistic. For example, if you request that average scores be displayed to one decimal place (by default, the average scores is displayed to be the whole number), the corresponding standard errors will be displayed to two decimal places. If you export to Excel, you will be able to increase the number of decimal places in most cases. Note that only integer-level precision is allowed for percentages; that is, the number of decimal places is fixed at “none” for percentages and the corresponding standard errors are shown to one decimal place.
4. **Include** gives you the option of showing standard errors. By default, standard errors are shown inside parentheses, but you have the option of choosing to show them without parentheses. You can preview the effects of your selection in the **Sample Display** area (see the blue-shaded box at the bottom of exhibit 14 below).

Exhibit 14. Format options

Format Options X

Choose options that will apply to all reports. View selected format in Sample Display. [Help](#)

Variable Labels:

Short (e.g. Gender)

Long (e.g. Gender of student as taken from school records)

Show data for values categorized as Missing (this applies only when percentages are displayed).

Show variable name in titles (e.g. [GENDER])

Year Order:

Most recent year first (default)

Oldest year first

Decimal Places: None 1 2 Default
(For row percents, the number of decimal places is fixed at "None")

Include:

Standard Errors none

Use parentheses/brackets

Sample Display: ### (#.##)

[Cancel](#) [Done](#)

Be advised that the choices you make in the **Format Options** window will apply to all reports and cannot be changed for individual reports. Use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Format Options** to the default settings (although caution is advised, as this will also delete any new reports that you have created).

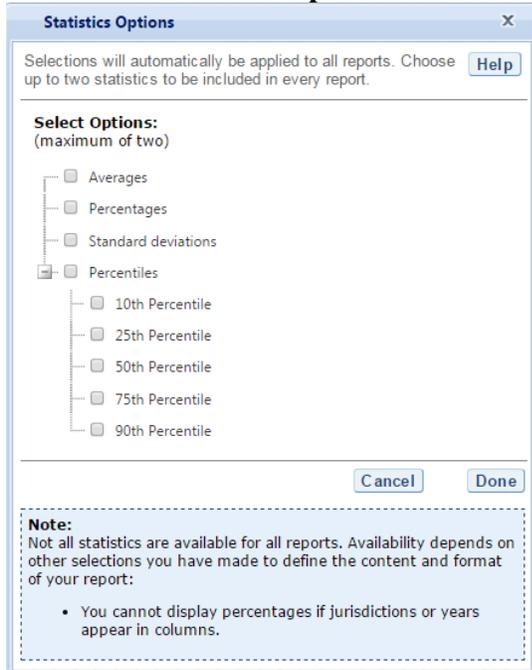
3.G. Statistics Options

Available only from the main **Edit Reports** screen, clicking on **Statistics Options** allows you to designate up to two statistics. The selections you make are applicable to all the reports listed, although you can also change the statistics for an individual report when you edit it. (For further information, see Section 3.C. Edit Report.)

The following statistics options are available (see exhibit 15):

1. **Averages.** This statistic provides the average value for a selected continuous variable or score (i.e., overall score or subscale score). For the PISA assessment, student performance is reported on scales that range from 0 to 1,000. By default, the standard errors of the scores are shown in parentheses.
2. **Percentages.** This statistic shows the percentage of students as a row percentage. For example, if the first column lists countries, then each country will display its own percentage distribution across its row. By default, percentage distributions do not include missing data. For information on how to show data for values categorized as missing, see Section 3.F. Format Options.
3. **Standard deviations.** The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700. The standard deviation is the square root of the variance.
4. **Percentiles.** This statistic shows the threshold (or cutpoint) score for the following:
 - 10th percentile – the bottom 10 percent of students
 - 25th percentile – the bottom quarter of students
 - 50th percentile – the median (half the students scored below the cutpoint and half scored above it)
 - 75th percentile – the top quarter of students
 - 90th percentile – the top 10 percent of students

Exhibit 15. Statistics options



Statistics Options X

Selections will automatically be applied to all reports. Choose up to two statistics to be included in every report. [Help](#)

Select Options:
(maximum of two)

- Averages
- Percentages
- Standard deviations
- Percentiles
 - 10th Percentile
 - 25th Percentile
 - 50th Percentile
 - 75th Percentile
 - 90th Percentile

[Cancel](#) [Done](#)

Note:
Not all statistics are available for all reports. Availability depends on other selections you have made to define the content and format of your report:

- You cannot display percentages if jurisdictions or years appear in columns.

As previously noted, the selections you make in **Statistics Options** will be applied automatically to all reports, although you can change the statistics for an individual report when you edit it. Be advised that if you use **Statistics Options** after editing the statistics in one or more of your individual reports, the statistics options selected will overwrite your previously edited selections. If you wish to use the same criteria and variables in a report with a different selection of statistics, consider using the **Create New Report** function to generate a new report with different statistics. (For further information, see Section 3.E. Create New Report.) You can also make a copy of an individual report.

You can use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Statistics Options** to the default setting, which is averages for all reports (this will also delete any new reports that you created).

Not all statistics are available for all reports. Their availability depends on other selections you have made to define the content and format of your report:

- Percentages will not display if jurisdictions or years appear in columns.
- If proficiency levels are selected in the variable section, only average scores and percentages will be displayed.

Please note that the statistics produced by the IDE may not match the statistics in reports published by the OECD due to differences in certain statistical standards. In particular, NCES and the OECD may differ in the minimum sample sizes required for publishing estimates. In the IDE, statistics for a group are suppressed if they are based on less than 62 cases. In the OECD

reports, statistics are suppressed if there are fewer than 30 students or fewer than 5 schools with valid data.

3.H. Select Reports to Build

As you edit your reports, you can give them distinct names (up to 50 characters) to differentiate them, as well as make changes to the jurisdictions and variables previously selected, the statistics, and the layout of the rows and columns. (For further information, see section 3.C. Edit Report.) You may make copies of reports with these changes. In order to proceed to step 4, **Build Reports**, each report for which you want to retrieve data should be previewed using the **Preview** function. To decrease processing time as you move to step 4, you can uncheck any reports for which you do not wish to retrieve data. By default, all reports are checked. To uncheck one or more reports, you can either uncheck the reports individually or click on the **All** box. (Doing the latter will uncheck all of the reports and allow you to check only those for which you wish to retrieve data.) In the example that follows (see exhibit 16), data will be retrieved for all reports.

Exhibit 16. Selecting reports to build

PISA IDE | 1. Select Criteria | 2. Select Variables | **3. Edit Reports** | 4. Build Reports

STEP 3:
Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports appear at the bottom of the report list.) Help

Subject, Age: Mathematics, Reading, and Science, 15 years
Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading Scale: Overall Reading
Variables: All students, Read each day, Language at home
Year: 2015

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	PISA Reading Scale: Overall Reading	All students	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	PISA Reading Scale: Reading	Read each day	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	PISA Reading Scale: Reading	Language at home	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	PISA Reading Scale: Overall Reading	Read each day, Language at home	2015	International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germ...	Averages

4. Build Reports

If you wish to delete a report from the list of reports, click **Delete** (see 1 above) in the **Action** column. Use the **Reset** button (see 2 above), located in the upper-right portion of the screen (just below the **Help** button), to restore the deleted reports (although caution is advised, as this will also delete any new reports that you created and restore the **Format Options** and **Statistics Options** to the default settings).

To continue to the last step in the IDE, click the **Build Reports** button at the bottom of the page (see 3 above) or the tab at the top of the page to go to the next screen.

4. Build Reports

4.A. Overview

You can access step 4, **Build Reports**, after choosing criteria at step 1, **Select Criteria**, in which case the default report built will provide data for just averages and for the **All Students** variable. After step 1, you may also go on to steps 2 and 3, where you can select additional variables and edit reports, before moving on to **Build Reports**. In **Build Reports**, you can do the following:

1. Generate a data table for each report as shown in the **Select Report** drop-down feature (see 1 in exhibit 17). By default, all reports are checked at step 3, although you can uncheck any reports for which you do not wish to retrieve data. (For further information, see section 3.H. Select Reports to Build.)
2. Export and save data tables into various formats using the **Export Reports** button (see 2 in exhibit 17). The output formats include HTML (print-friendly), Microsoft Excel, Microsoft Word, and Adobe PDF.
3. Select the **Chart** tab (see 3 in exhibit 17) to create and customize charts for each report and save them for export in the above formats.
4. Select the **Significance Test** tab (see 4 in exhibit 17) to run a significance test on your results, customize it, and export it.

Exhibit 17. Building reports overview

2015
 International Average (OECD Countries) | 493 | (0.5) |Australia
 503 | (1.7) |Austria
 485 | (2.8) |Belgium
 499 | (2.4) |Canada
 527 | (2.3) |Chile
 459 | (2.6) |Czech Republic
 487 | (2.6) |Denmark
 500 | (2.5) |

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 4: View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years
Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading scale: Overall Reading
Variables: All students
Year: 2015

1 Select Report: Report 1 **4** [Link to this Page](#) **2** Export Reports

Table **3** Chart Significance Test Gap Analysis Regression Analysis

Averages for PISA reading scale: overall reading, age 15 years by All students [TOTAL], year and jurisdiction: 2015

Year	Jurisdiction	Average	Standard Error
2015	International Average (OECD Countries)	493	(0.5)
	Australia	503	(1.7)
	Austria	485	(2.8)
	Belgium	499	(2.4)
	Canada	527	(2.3)
	Chile	459	(2.6)
	Czech Republic	487	(2.6)
	Denmark	500	(2.5)

4.B. View Reports as Data Tables

Some reports will take longer than others to process, so please do not hit the “Back” button on your browser once you click on **Build Reports** (see exhibit 18). Your table will appear once the processing is complete. To select a different table to view, go to the **Select Report** drop-down menu (see 1 in exhibit 17) and choose the table of interest. To change the formatting or statistics options of a table or to generate a table from a report not included in your selection, return to step 3, **Edit Reports**.

Exhibit 18. Processing data

The screenshot shows the 'PISA IDE' interface with four tabs: '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. The '4. Build Reports' tab is active. The page displays 'STEP 4: View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export.' Below this, there is a 'Help' button and a list of metadata: 'Subject, Age: Mathematics, Reading, and Science, 15 years'; 'Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States'; 'Measure: PISA Reading Scale: Overall Reading'; 'Variables: All students, Read each day, Language at home'; and 'Year: 2015'. A 'Select Report:' dropdown menu is set to 'Report 3'. To the right are 'Link to this Page' and 'Export Reports' buttons. Below the dropdown is a 'Table' tab and a row of buttons: 'Chart', 'Significance Test', 'Gap Analysis', and 'Regression Analysis'. A progress bar shows 'Progress: 97%' with a 'Cancel' button below it. At the bottom, a loading spinner is accompanied by the text: 'Some queries may take up to two minutes to process. Please do not hit the "Back" button while processing.'

4.C. Charts

To create a chart, go to **Select Report** on the **Build Reports** screen to choose the report of interest from the drop-down menu, and then click the **Chart** link (see exhibit 19).

You will be able to create many types of charts and customize them. Section 4.E. Create Charts – Chart Options provides a summary of the available features and how they can be customized.

Exhibit 19. Viewing reports as charts

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 4:
View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years
Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading Scale: Overall Reading
Variables: All students, Read each day, Language at home
Year: 2015

Select Report: Report 1 [Link to this Page](#) [Export Reports](#)

Table **Chart** Significance Test Gap Analysis Regression Analysis

4.D. Create Charts – Data Options

When you click **Chart**, your screen will present **Data Options** pertaining to **Statistic, Year, and Jurisdiction** (see exhibit 20). Only the statistics option(s) used to report data in the previous step will be presented, and only one statistics option can be selected at a time. For example, **Percentiles** will appear as the only data option to build the chart if the table created in the previous step is reporting data with only percentiles selected as the statistics option.

Once you are finished with the Data Options, click the **Chart Options** button in the lower-right corner of the screen.

Exhibit 20. Data options for charts

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 4:
View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years
Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading Scale: Overall Reading
Variables: All students, Read each day, Language at home
Year: 2015

Select Report: Report 1 [Link to this Page](#) [Export Reports](#)

Table Chart 1 X Significance Test Gap Analysis Regression Analysis

Data Options

Select a single statistic and any combination of jurisdictions and years. Continue to Chart Options.

Statistic	Year	Jurisdiction
<input checked="" type="radio"/> Averages <input type="radio"/> Percentages <input type="radio"/> achievement level (cumulative) <input type="radio"/> achievement level (discrete) <input type="radio"/> Percentiles	<input checked="" type="checkbox"/> Year <input checked="" type="checkbox"/> 2015	<input checked="" type="checkbox"/> International <input checked="" type="checkbox"/> International Average (OECD Countries) <input checked="" type="checkbox"/> OECD <input checked="" type="checkbox"/> Australia <input checked="" type="checkbox"/> Austria <input checked="" type="checkbox"/> Belgium <input checked="" type="checkbox"/> Canada <input checked="" type="checkbox"/> Chile <input checked="" type="checkbox"/> Czech Republic

[Chart Options](#)

4.E. Create Charts – Chart Options

On the **Chart Options** screen, select **Bar Chart**, **Column Chart**, or **Line Chart** (see exhibit 21). If all of the percentiles are chosen as the statistics option, you also have the option of selecting a **Percentile Chart**.

After selecting a chart type, change any data dimensions from the drop-down menus for **Bar**, **Column**, or **Line Values** and **Values Grouped by**. Any new variables that you created at step 3, **Edit Reports**, will be available for selection, but only if you selected the variables (by clicking the checkbox next to them) and pressed **Done** after you edited the report.

You can enter a **Chart Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the chart is named “Chart 1”).

Preview your chart by clicking the **Preview** button in the lower-right corner, or go back to the data options and make different selections by clicking the **Data Options** button in the lower-left corner.

Exhibit 21. Chart options

PISA IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 4: View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. [Help](#)

Subject, Age: Mathematics, Reading, and Science, 15 years
Jurisdictions: International Average (OECD Countries), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
Measure: PISA Reading Scale: Overall Reading
Variables: All students, Read each day, Language at home
Year: 2015

Select Report: Report 1 [Link to this Page](#) [Export Reports](#)

Table Chart 1 X Significance Test Gap Analysis Regression Analysis

Chart Options

Choose an available chart type based on selected data. Choose data dimensions from the drop-down menus and name the chart, then preview the chart. To select different data return to Data Options.

Bar Chart Column Chart Line Chart

Bar Values: All students
 Values Grouped by: None
 Chart Name: Chart 1

[Data Options](#) [Preview](#)

While previewing your chart, you can do the following (see exhibit 22 as an example of a **Percentile Chart** and exhibit 23 as an example of a **Bar Chart**):

1. Use the drop-down menus to change the jurisdiction and other variables as applicable. Notice that when you change your selection, the change occurs slowly enough that you get a sense of the size and direction of the change—especially if you didn't previously specify in the data dimensions how you want your values grouped. In order to build a percentile chart, you must have already generated a report choosing percentiles as the statistics option. In the drop down menu for 'Values grouped by', percentiles can be chosen if there is a report created based on the percentiles and this is the data option being used in the chart.
2. Place your cursor over the bars of the chart to see the data points and value label(s).
3. For the **Bar Chart**, choose between using colors or patterns for the bars by clicking the alternating **Pattern** or **Color** button located just below the **Chart** tab in the upper-left portion of the screen. For the **Percentile Chart**, choose between **Color** or **Grayscale**.
4. Change the color of the bars with a single click on each level in the bars, which brings up a thumbnail of a color chart. Click on the thumbnail to reveal a color grid, and then select the color you desire.
5. Change the pattern of the bars with a single click on each level in the bars. Continuous clicking brings up many patterns to choose from.

Exhibit 22. Preview of percentile chart

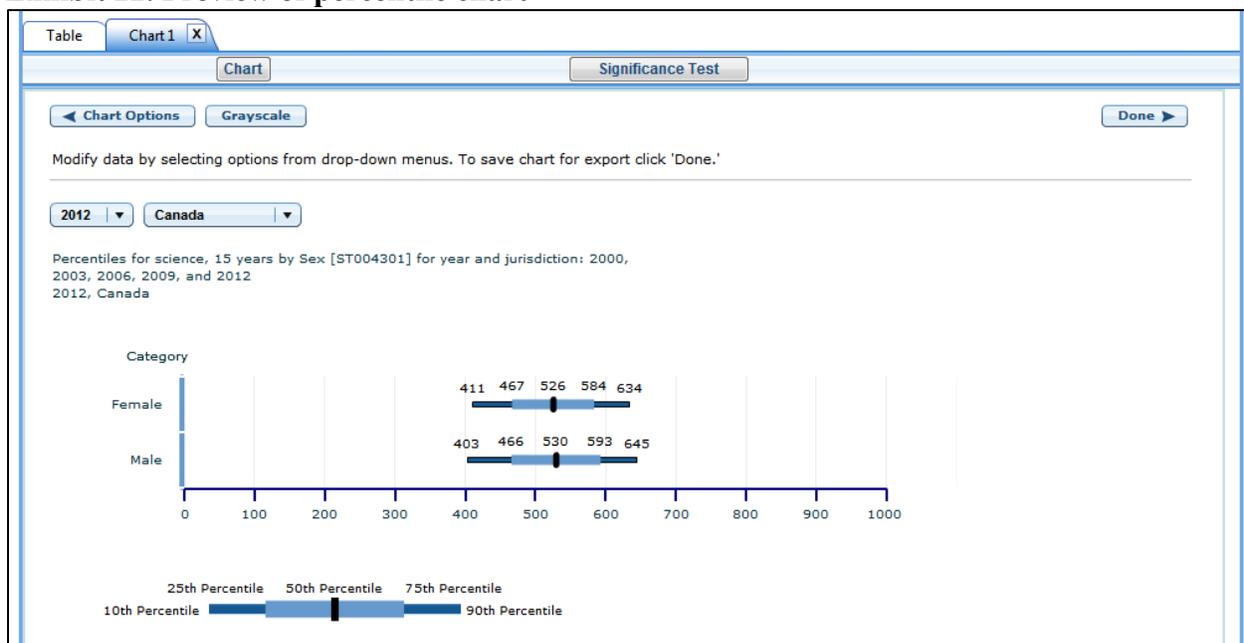
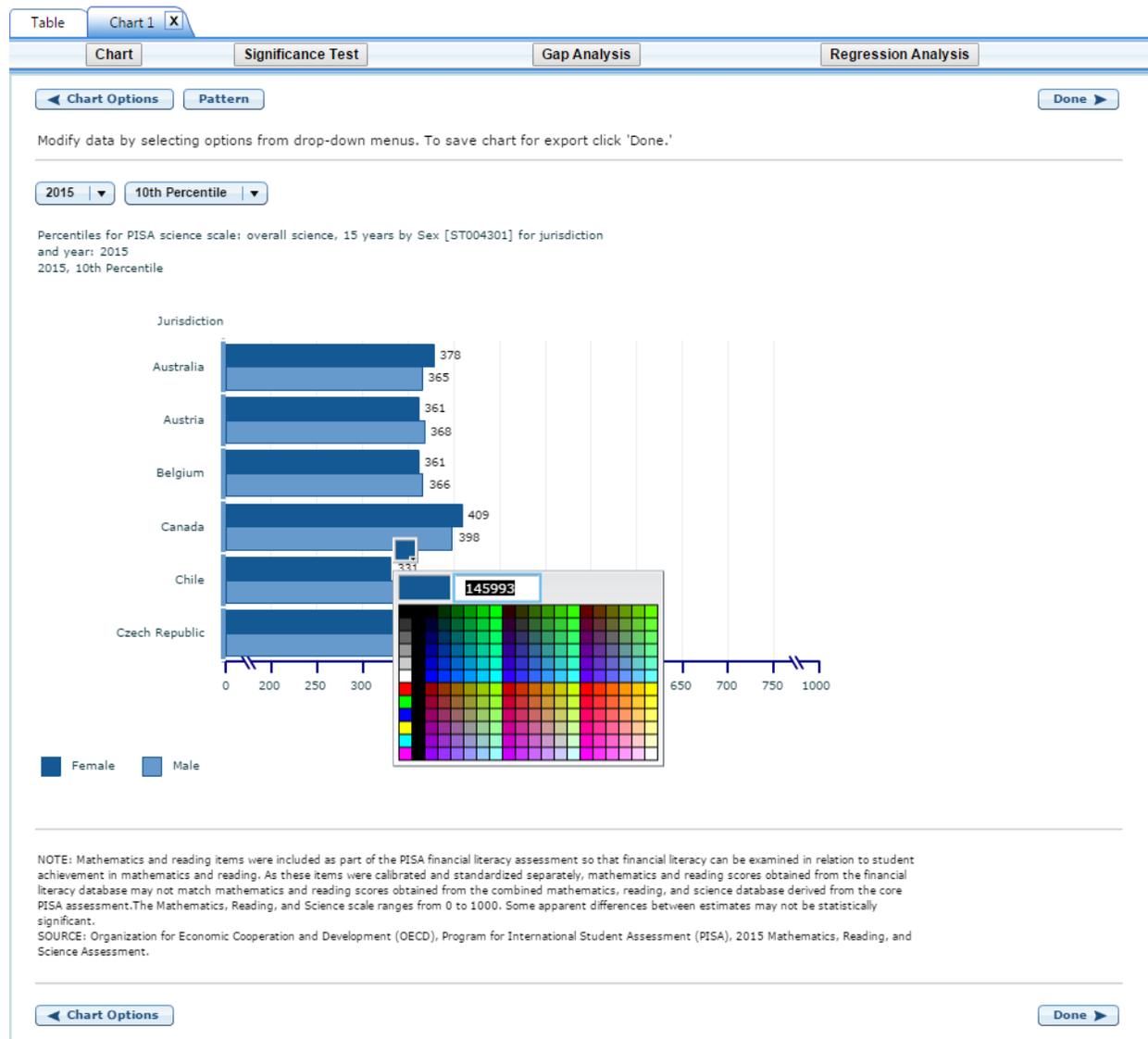


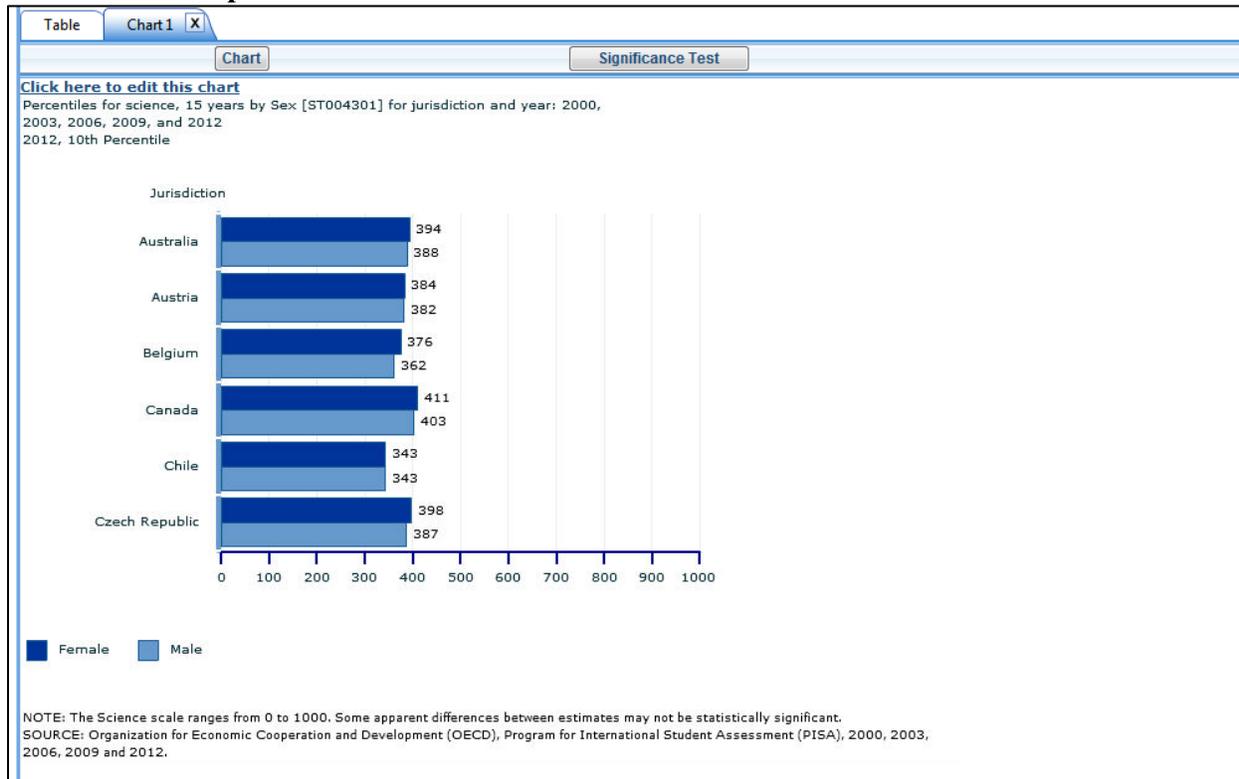
Exhibit 23. Preview of bar chart



Click the **Done** button located on the right side of the screen, or click back to **Chart Options** to change your selection criteria (see exhibit 23). You must click **Done** if you wish to later save and/or print your chart via the **Export Reports** function.

Clicking **Done** takes you to the exportable version of the chart (see exhibit 24). You can subsequently “**Click here to edit this chart**” (located in the upper-left corner, below the **Chart** link) to make more changes. Alternatively, clicking anywhere in the chart area will take you to the edit screen.

Exhibit 24. Completed chart



To make an additional chart from the same report or table, click the **Chart** link on the **Build Reports** screen. It is recommended that you provide a new chart name (the default is Chart 1, Chart 2, etc.). If you don't start the chart process again by clicking the **Chart** link, the new chart will overwrite the previous one.

If you wish to make charts from other reports, select another report in the **Select Report** drop-down list. If other reports were not checked in step 3, **Edit Reports**, go back to step 3 and check the ones you want. Then, when you advance to step 4, **Build Reports**, the reports will appear in the **Select Report** drop-down list. If you need to create new reports, go back to step 1, **Select Criteria**, and/or step 2, **Select Variables**. Remember to export any completed charts you want to save by clicking **Done** and using the **Export Reports** function before leaving the **Build Reports** screen. (For further information, see Section 4.I. Export Reports.)

4.F. Significance Tests

Tests for statistical significance indicate whether observed differences between estimates are likely to have occurred because of sampling error or chance. "Significance" here does not imply any judgment about absolute magnitude or educational relevance. It refers only to the statistical nature of the difference and whether that difference likely reflects a true difference in the population.

With your report of interest selected, click the **Significance Test** link, which is located to the right of the **Chart** link (see exhibits 17 and 24). You first need to decide which variable you want to test and the criterion by which you want to test it (i.e., between jurisdictions, within variables, or across years). You will compare or look across the variable's range of values, so it must have more than one value. You can look across jurisdictions for a variable (that is, compare between two or more jurisdictions) or you can look across the values within a variable for a single jurisdiction. For example, with the variable shown in exhibit 25, you could choose to compare scores of female students between countries and subnational education systems, or you could choose to compare scores of female students and male students.

The general steps for running significance tests are as follows (see exhibit 25):

1. In the **Significance Test** window, select either **Between Jurisdictions**, **Within Variables**, or **Across Years**. Then, select the appropriate jurisdiction(s), variable(s), year(s), and statistic(s). For **Between Jurisdictions**, select at least two jurisdictions. For **Within Variables**, select one or more jurisdictions. For **Across Years**, more than one year needs to be selected.
2. You can enter a **Test Title** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test is named "Sig Test 1").
3. Select the output type as either **Table** or **Map**. The table option will show the significance test results as a matrix. The map option will show the significance test results on a world map, highlighting countries and subnational education systems that have been selected. The map output is only available when **Between Jurisdictions** is selected in the first step.
4. Additional options allow you to select **Show Score Details** to display the estimates and standard errors for the table cells. If you selected a map, this option is not applicable, as the map will automatically show score details.
5. Click the **Preview** tab located in the upper-left corner, or the **Preview** button located in the bottom-left corner.
6. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the significance tests.
7. Click the **Done** button in the upper- or lower-right corner of the screen to run the significance tests.

Exhibit 25. Significance test options

Loading ...

Edit Preview Cancel Done

1. Select one category to compare significance from the choices available below. Help

Between Jurisdictions Within Variables Across Years

2. Create a name for this significance test. Name: Sig Test 1

3. Select the output type. Table Map

4. Select additional options. Show table details

5. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable	Year	Statistic
<input checked="" type="checkbox"/> All Jurisdictions <input checked="" type="checkbox"/> International Average (OECD Countries) <input checked="" type="checkbox"/> Australia <input checked="" type="checkbox"/> Austria <input checked="" type="checkbox"/> Belgium <input checked="" type="checkbox"/> Canada	<input checked="" type="checkbox"/> Sex <input checked="" type="checkbox"/> Female <input checked="" type="checkbox"/> Male	<input checked="" type="checkbox"/> All Years <input checked="" type="checkbox"/> 2015 <input checked="" type="checkbox"/> 2012 <input type="checkbox"/> 2009 <input type="checkbox"/> 2006 <input type="checkbox"/> 2003	<input checked="" type="checkbox"/> Averages

Preview Cancel Done

When the table option is selected, you will get a significance test matrix in which you will see the differences and p values. Using the symbols shown in the legend of the matrix, an indication is also provided of whether one estimate is significantly lower or higher than another estimate or whether there is no significant difference (see exhibit 26).

The alpha level for all t -tests is .05. As of December 2016, all comparisons within a jurisdiction, within the same year, are made using dependent t -tests. Prior to this, only male-female comparisons within a jurisdiction were treated as dependent. Comparisons between jurisdictions are treated as independent, and comparisons of achievement across years are made using independent t -tests with a linking error taken into account.

PISA assessments are linked across years. That is, the sets of items used to assess mathematics, reading, and science across years include a subset of common items, referred to as link items. To establish common reporting metrics for PISA, the difficulty of the link items, measured on different occasions, is compared. The comparison of the item difficulties on the different occasions is used to determine a score transformation that allows the reporting of the data on a common scale. As each item provides slightly different information about the link

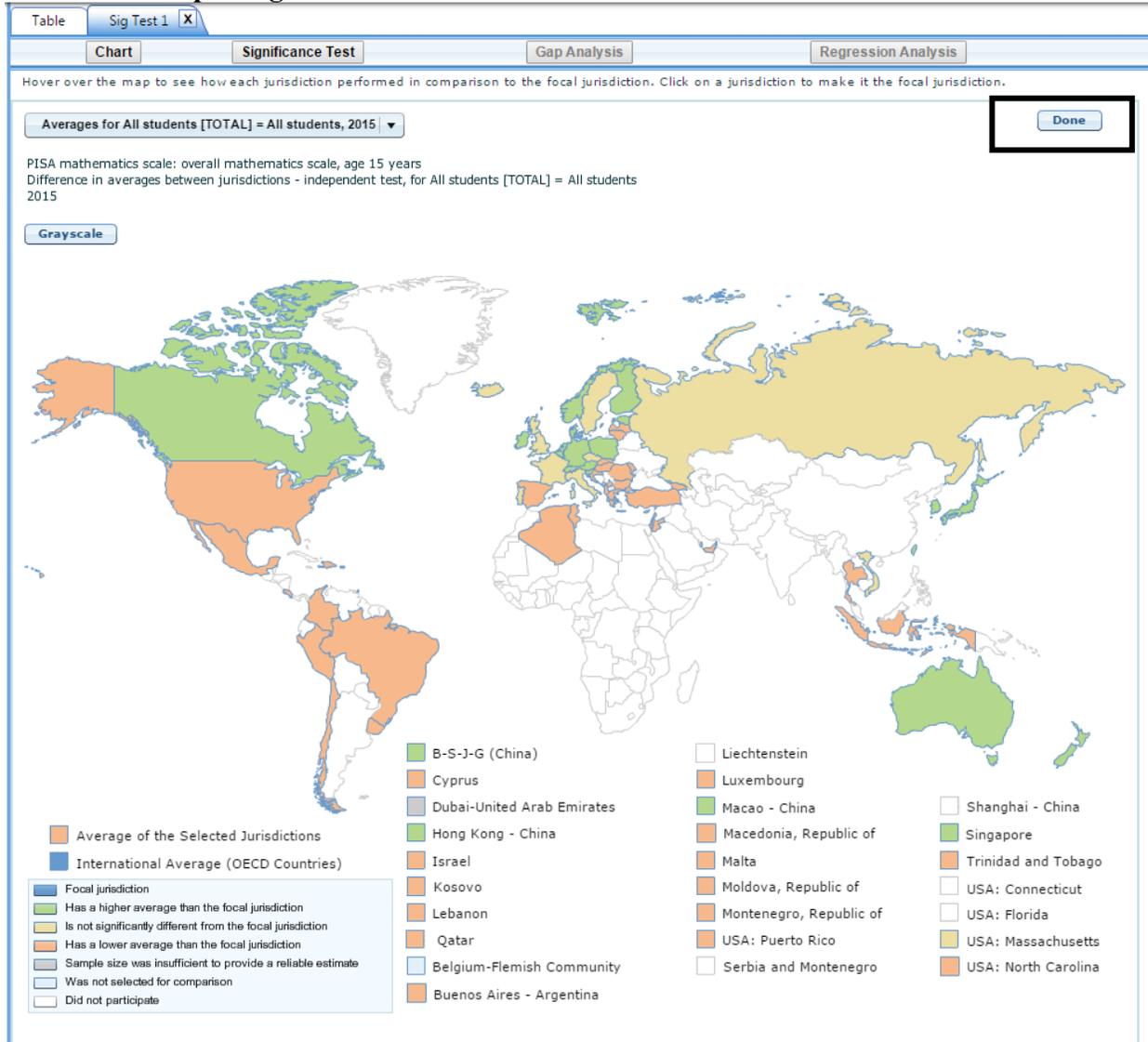
transformation, it follows that the chosen sample of link items will influence the estimated transformation. The consequence is an uncertainty in the transformation due to the sampling of link items, just as there is an uncertainty in country means due to the sampling of students. The uncertainty that results from the link-item sampling is referred to as linking error, and this error must be taken into account when making certain comparisons using the PISA assessment data. As with sampling errors, the likely range of magnitude for the errors is represented as a standard error. Significance tests for scores across years within the IDE take into account the linking errors applicable to each subject.

Exhibit 26. Significance test table output

Table Sig Test 1 X							
Chart		Significance Test		Gap Analysis		Regression Analysis	
To see how one value compares with the others, read across the row for that value. The displayed symbols indicate whether that value is significantly higher, significantly lower or not significantly different than the value associated with that column. In some cases the significance test may have not been possible for statistical reasons.							
Mathematics, Reading, and Science, age 15 years Difference in averages between jurisdictions - independent test, for Sex [ST004301] = Female 2015							
	International Average (OECD Countries) (506)	Australia (519)	Austria (495)	Belgium (507)	Canada (540)		
International Average (OECD Countries) (506)		< Diff = -13 (2.3) P-value = 0.0000	> Diff = 11 (3.6) P-value = 0.0020	x Diff = 0 (2.9) P-value = 0.8679	< Diff = -34 (2.5) P-value = 0.0000		
Australia (519)	> Diff = 13 (2.3) P-value = 0.0000		> Diff = 24 (4.3) P-value = 0.0000	> Diff = 12 (3.7) P-value = 0.0010	< Diff = -21 (3.4) P-value = 0.0000		
Austria (495)	< Diff = -11 (3.6) P-value = 0.0020	< Diff = -24 (4.3) P-value = 0.0000		< Diff = -12 (4.7) P-value = 0.0132	< Diff = -45 (4.4) P-value = 0.0000		
Belgium (507)	x Diff = 0 (2.9) P-value = 0.8679	< Diff = -12 (3.7) P-value = 0.0010	> Diff = 12 (4.7) P-value = 0.0132		< Diff = -33 (3.8) P-value = 0.0000		
Canada (540)	> Diff = 34 (2.5) P-value = 0.0000	> Diff = 21 (3.4) P-value = 0.0000	> Diff = 45 (4.4) P-value = 0.0000	> Diff = 33 (3.8) P-value = 0.0000			
LEGEND:							
<	Significantly lower.						
>	Significantly higher.						
x	No significant difference.						
NOTE: Comparisons are independent with an alpha level of 0.05, except for comparisons of achievement scores across years where a linking error is taken into account and basic male-female comparisons <i>within</i> country (with no additional variables included in the analysis) where a dependent methodology is used. For more information see the Statistical Notations and Other Notes section in the Help Guide.							

When the **map option** is selected, a global map is shown with the countries and subnational education systems selected shaded (see exhibit 27). The focal jurisdiction is shaded in blue, with all other countries compared to it. The other countries are shaded in colors that indicate whether they are higher, lower, or not significantly different from the focal jurisdiction on whatever measure has been selected. (Note that a lighter shade of blue is the default color for countries not selected for comparison.) When you hover over a country, a text bubble pops up which displays the numerical difference in estimates between that jurisdiction and the focal jurisdiction. At any point, you may choose a different focal jurisdiction by clicking on another country.

Exhibit 27. Map of significance tests



Please note that the IDE does not apply adjustments for multiple comparisons. This is consistent with current NCES statistical standards and practice. However, the U.S. PISA 2000 national report published by NCES, and the PISA 2000 international report published by the OECD, did adjust for multiple comparisons in significance testing (using the Bonferroni method). Therefore, results from significance testing obtained from the IDE may not match those in the NCES and OECD PISA 2000 reports.

4.G. Gap Analysis

Gap Analysis is included in the IDE to compare differences in gaps shown in a map, table, or chart. These gap differences can be compared between jurisdictions and/or across years.

Exhibit 28. Gap analysis link selection

Averages for PISA science scale: overall science, age 15 years by Sex [ST004301], year and jurisdiction: 2015						
Year	Jurisdiction	Female		Male		
		Average	Standard Error	Average	Standard Error	
2015	Australia	509	(1.7)	511	(2.1)	
	Austria	486	(3.1)	504	(3.6)	
	Belgium	496	(2.7)	508	(3.1)	
	Canada	527	(2.3)	528	(2.5)	
	Chile	440	(2.7)	454	(3.1)	
	Czech Republic	488	(2.5)	497	(3.3)	
	Denmark	499	(3.2)	505	(2.6)	
	Estonia	533	(2.3)	536	(2.7)	
	Finland	541	(2.6)	521	(2.7)	
	France	494	(2.7)	496	(2.7)	
	Germany	504	(2.8)	514	(3.2)	
	Greece	459	(3.9)	451	(4.6)	
	Hungary	475	(2.9)	478	(3.4)	

With your report of interest selected, click on the **Gap Analysis** link, which is located to the right of the **Significance Test** link (see exhibit 28). You will need to decide which variable you would like to test (e.g., gender) and the criterion by which you want to test it (i.e., between jurisdictions or across years). The difference measure, or gap, can be viewed between groups, between years, between groups and years, or between percentiles within the selected variable. For example, if you compute average mathematics literacy scores for two countries at two time points for males and females, you can:

- at one time point, compare the male-female gap in one country to the male-female gap in another country;
- compare the male-female gap at two time points within a country;
- compare the difference between the male-female gap at two time points in one country to the difference between the male-female gap at two time points in another country; or
- compare the gap for females at two time points in one country to the gap for females at two time points in another country.

Exhibit 29. Gap analysis options

The screenshot shows the 'Gap Analysis' dialog box with the following configuration:

- 1. Select the basis to use for comparison (Between Jurisdictions, Across Years):** Between Jurisdictions, Across Years
- 2. Create a name for this gap analysis:** Gap Test 3
- 3. Select the difference measure (gap) to analyze:** Between Groups, Between Years, Between Groups and Years, Between Percentiles
- 4. Select the output type:** Table, Map
- 5. Check to show table details:** Show table details
- 6. Select available options from each of the columns below, then preview results:**

Jurisdiction	Variable	Year	Statistic
<input checked="" type="checkbox"/> All Jurisdictions <input checked="" type="checkbox"/> Australia <input checked="" type="checkbox"/> Austria <input checked="" type="checkbox"/> Belgium <input checked="" type="checkbox"/> Canada <input checked="" type="checkbox"/> Chile	<input checked="" type="checkbox"/> Sex <input checked="" type="checkbox"/> Female <input checked="" type="checkbox"/> Male	<input checked="" type="checkbox"/> 2015	<input checked="" type="checkbox"/> Averages

The steps for running a gap analysis are similar to those for conducting a statistical significance test (see exhibit 29). Thus, to run a gap analysis, follow the instructions under section 4.F. **Significance Tests**, noting the following differences:

1. The **Gap Analysis** link should be selected, not the **Significance Test** link.
2. The gap analysis does not have a **Within Variables** option for analysis; the options are **Between Jurisdictions** and **Across Years**.
3. The difference measure (gap) of analysis must be selected from the following: **Between Groups, Between Years, Between Groups and Years, and Between Percentiles** (if variables are selected for which a difference measure is not feasible, the difference measure option will not appear as available in the Gap Analysis menu).

The gap analysis output is presented in a format similar to that of the significance test output, with one difference: the difference estimate shown in the output is the difference between the gaps selected for analysis. Note that you will still see the significance of these differences, just like in a significance test. For example, exhibit 30 shows cross-national differences between male-female score gaps.

The gap analysis function computes and statistically tests differences between score, percentage, or percentile gaps. For gap analysis tables, all comparisons are independent tests with an alpha level of 0.05. Note that the reference group for the gaps is kept constant during the analysis, as opposed to taking the absolute value of the gaps. Therefore, the gap analysis tests whether the magnitude of the gaps differ from each other only when the gaps go in the same direction (e.g., comparing a 5-point gender gap favoring females in one country with a 15-point gender gap favoring females in another country).

Exhibit 30. Gap analysis output

Subject, Age: Mathematics, Reading, and Science, 15 years

Jurisdictions: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States

Measure: PISA Science Scale: Overall Science

Variables: All students, Sex

Year: 2015

[Link to this Page](#) Export Reports

Select Report: Report 2

Table Gap Test 1 X Gap Test 2 X

Chart Significance Test Gap Analysis Regression Analysis

To see how one value compares with the others, read across the row for that value. The displayed symbols indicate whether that value is significantly higher, significant, or not significant.

PISA science scale: overall science scale, age 15 years
Differences between jurisdictions for gaps in averages between Sex [ST004301]=Female and Sex [ST004301]=Male
2015

	Australia (-2)	Austria (-19)	Belgium (-12)	Canada (-1)	Chile (-15)	Czech Republic (-9)	Denmark (-6)
Australia (-2)		> Diff = 17 (5.5) P-value = 0.0023	x Diff = 10 (4.9) P-value = 0.0510	x Diff = -1 (4.3) P-value = 0.8128	> Diff = 12 (4.9) P-value = 0.0112	x Diff = 7 (5.0) P-value = 0.1894	x Diff = 4 (4.9) P-value = 0.4273
Austria (-19)	< Diff = -17 (5.5) P-value = 0.0023		x Diff = -7 (6.3) P-value = 0.2590	< Diff = -18 (5.8) P-value = 0.0024	x Diff = -4 (6.3) P-value = 0.4990	x Diff = -10 (6.3) P-value = 0.1054	< Diff = -13 (6.3) P-value = 0.0416
Belgium (-12)	x Diff = -10 (4.9) P-value = 0.0510	x Diff = 7 (6.3) P-value = 0.2590		< Diff = -11 (5.3) P-value = 0.0453	x Diff = 3 (5.8) P-value = 0.6227	x Diff = -3 (5.8) P-value = 0.5930	x Diff = -6 (5.8) P-value = 0.3256
Canada (-1)	x Diff = 1 (4.3) P-value = 0.8128	> Diff = 18 (5.8) P-value = 0.0024	> Diff = 11 (5.3) P-value = 0.0453		> Diff = 14 (5.3) P-value = 0.0110	x Diff = 8 (5.3) P-value = 0.1588	x Diff = 5 (5.3) P-value = 0.3530
Chile (-15)	< Diff = -12 (4.9) P-value = 0.0112	x Diff = 4 (6.3) P-value = 0.4990	x Diff = -3 (5.8) P-value = 0.6227	< Diff = -14 (5.3) P-value = 0.0110		x Diff = -6 (5.8) P-value = 0.3051	x Diff = -9 (5.8) P-value = 0.1397
Czech Republic (-9)	x Diff = -7 (5.0) P-value = 0.1894	x Diff = 10 (6.3) P-value = 0.1054	x Diff = 3 (5.8) P-value = 0.5930	x Diff = -8 (5.3) P-value = 0.1588	x Diff = 6 (5.8) P-value = 0.3051		x Diff = -3 (5.8) P-value = 0.6566

Note that a gap analysis across years cannot be combined with the Between Years or Between Groups and Years difference measures, so you will select the difference measure Between Groups, or, if you have selected percentiles as one of your statistics, you may choose Between Percentiles.

4.H. Regression Analysis

Regression Analysis is included in the IDE to test for the relationship between one or more independent variables with a dependent variable, with the independent variables controlling for each other. The type of analysis performed in this feature of the IDE is referred to as linear regression, with the dependent variable being a continuous variable selected at step 1. To run a regression, first go to **Build Reports** and choose the report of interest from the drop-down **Select**

Report menu. Then click on the **Regression Analysis** link, which is to the right of the **Gap Analysis** link (see exhibit 31).

Exhibit 31. Regression analysis link selection

The screenshot shows the PISA IDE interface in the '4. Build Reports' step. At the top, there are four tabs: '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. Below the tabs, there is a 'STEP 4:' section with instructions: 'View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export.' A 'Help' button is located in the top right corner of this section.

Below the instructions, there is a summary of the current report configuration:

- Subject, Age:** Mathematics, Reading, and Science, 15 years
- Jurisdictions:** Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, Switzerland, United Kingdom, United States
- Measure:** PISA Mathematics Scale: Overall Mathematics
- Variables:** All students, Sex
- Year:** 2015

Below the summary, there is a 'Select Report:' dropdown menu set to 'Report 2'. To the right of the dropdown is a 'Link to this Page' link and an 'Export Reports' button.

At the bottom of the interface, there is a horizontal navigation bar with several tabs: 'Table', 'Chart', 'Significance Test', 'Gap Analysis', and 'Regression Analysis'. The 'Regression Analysis' tab is highlighted with a black box. Below the navigation bar, there is a footer text: 'Averages for PISA mathematics scale: overall mathematics, age 15 years by Sex [ST004301], year and jurisdiction: 2015'.

The general steps for running a regression analysis are as follows (see exhibit 32):

1. In the **Regression Analysis** pop-up window, you can enter a **Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test will be named "Regression 1").
2. Select the appropriate jurisdiction, year, and variable(s) for analysis. Please note that you may only choose one jurisdiction and year at a time, but you may choose up to 3 independent variables to be in your report. In order to use up to 3 independent variables, you must have already created and selected a cross-tabulated report (by selecting 3 variables in Step 2, **Select Variables**).
3. Click the **Preview** tab located in the upper-left corner to view the table format into which your output will be populated. In the Preview tab, an "X" denotes where the output will display.
4. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the analysis.
5. Click the **Done** button in the upper- or lower-right corner of the screen to run the regression analysis.

Exhibit 32. Regression analysis options

Regression Analysis [X]

Edit Preview [Cancel] [Done]

1. Create a name for this regression analysis. [Help]

Regression 1

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Year	Variable
<ul style="list-style-type: none"> <input type="radio"/> Slovenia <input type="radio"/> Spain <input type="radio"/> Sweden <input type="radio"/> Switzerland <input type="radio"/> Turkey <input type="radio"/> United Kingdom <input checked="" type="radio"/> United States 	<ul style="list-style-type: none"> <input checked="" type="radio"/> 2015 	<ul style="list-style-type: none"> <input type="checkbox"/> All Variables <input checked="" type="checkbox"/> Index immigration status

[Cancel] [Done]

After you have clicked **Done**, your regression analysis output will load onto the screen (see exhibit 33). A 0-1 contrast coding is used to code the independent variable, where the first subgroup of the independent variable is the reference group. Using dummy-coded variables in a linear regression is useful for comparing each subgroup against a reference group. For example, in exhibit 33, if the subgroup “Native” is the reference group for the independent variable **Index immigration status (IMMIG)**, the IDE creates a “Second Generation” dummy variable (1 for respondents who answered “Second Generation,” 0 otherwise), a “First Generation” dummy variable (1 for respondents who answered “First Generation,” 0 otherwise). Reference group “Native” is excluded from the regression analysis.

Exhibit 33. Regression analysis output

Mathematics, Reading, and Science, 15 years 2015
 Dependent Variable: PISA Mathematics Scale: Overall Mathematics
 Independent Variable(s): Index immigration status [IMMIG]
 Contrast Coding Reference Group: Native United States

Multiple Correlation		0.14					
R Squared		0.02					
	Degrees of Freedom	Mean square	F Ratio	P Value			
Model	2	244422362.71	10.11	0			
Error	1055.91	24178976.56					
	Standardized Regression Coefficients	S.E. of Standardized Coefficients	Regression Coefficients	S.E. of Regression Coefficients	T Statistic	Probability	Significance
Intercept	0	0	477.9051	3.1936	149.6458	0	>
Index immigration status							
Second generation	-0.0789	0.0256	-19.0492	6.1242	-3.1105	0.0026	<
First generation	-0.1213	0.0192	-40.7582	6.3514	-6.4172	0	<
		Mean	SD				
PISA Mathematics Scale: Overall Mathematics		469.63	88.46				
		Percentage	SD				
Index immigration status							
Second generation		16	36				
First generation		7	26				

Using the output from exhibit 33 you can compare the average mathematics literacy scores of first- and second-generation students to scores of native born students. When a single dummy-coded variable is used in a regression, the *intercept* is the mean of the reference group (e.g., 477.9), and the *regression coefficient* is the difference between the mean of the reference group and the group identified (coded 1) with the dummy-coded variable (e.g., -19.05 for second generation and -40.76 for first generation.) Since the regression coefficients are presented with a standard error and a *t* value, these can be used to test whether a difference between means is statistically significant. Under the Significance column in the output you will see 3 possible signs: 1) < signifies a significant negative difference, 2) > signifies a significant positive difference, and 3) x signifies the difference is not statistically significant.

4.I. Export Reports

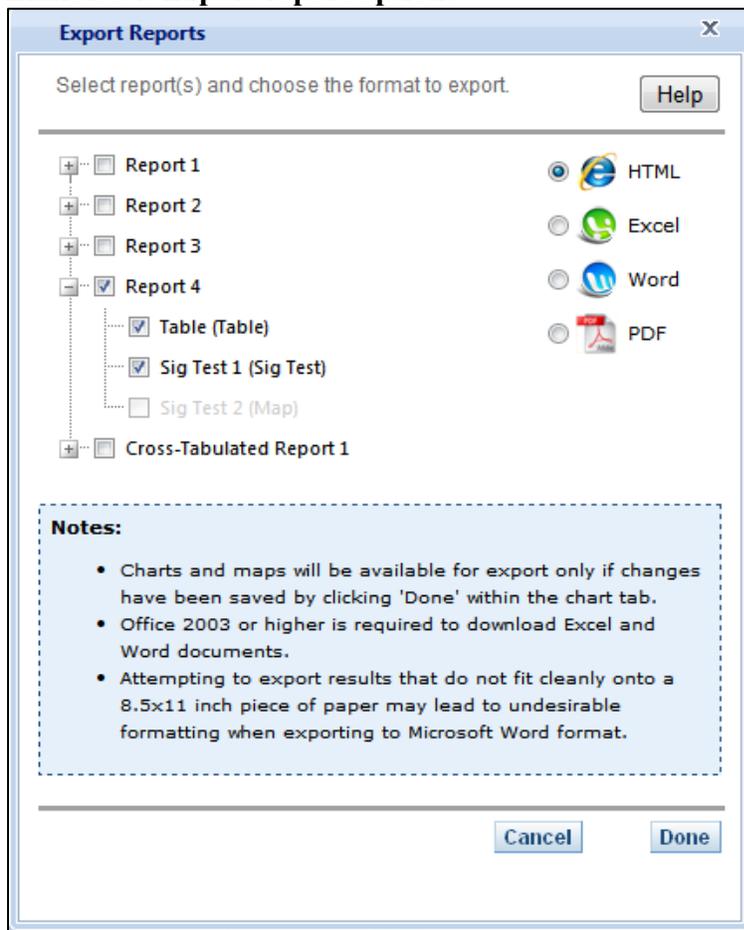
Click on the **Export Reports** button/arrow located on the right side of the **Build Reports** screen to save or print your tables, charts, and significance tests. The report names that appear in the **Export Reports** window are those that were checked off at step 3, **Edit Reports**.

Check the files you want to export, and select one of the file formats: **HTML** (print-friendly), **Excel**, **Word**, or **PDF** (see exhibit 34). All reports that you select at the same time will be exported in one file. In the Excel format, you will be able to increase the visible decimal places visible wherever more precision is available. Because there are many different operating systems

in use, you may get an error message with Excel or one of the other formats. Usually this will not affect your ability to export, so please wait for the software errors to resolve.

Charts or maps for each report will only be available on the **Export Reports** menu if you saved them by clicking **Done** when you finished each one (see exhibit 27). If a chart or map that you wish to save or print is grayed out (not available for selection), cancel the **Export Reports** tool, go back to your chart or map, and be sure to click **Done** on the last screen. After that, it will be available for export.

Exhibit 34. Export report options



V. PISA International Data Explorer Definitions

This section describes the kinds of criteria and variables that are used to form data queries, as well as the kinds of data available and the statistical methods used to assess them.

These topics include the following:

- Criteria
 - Language
 - Subject
 - Years
 - Measures
 - Jurisdictions
- Variables
- Statistics options
 - Averages
 - Percentages
 - Standard deviations
 - Percentiles
- Cross-tabulations
- Statistical notations and other notes

1. Criteria

Each data query must include at least one selection from five criteria choices: language, subject, year(s), measure(s), and jurisdiction(s). Shown below is an outline of these selection criteria followed by a brief description.

1. Language:
 - English
 - Spanish
2. Subject:
 - Science literacy
 - Reading literacy
 - Mathematics literacy
 - Financial literacy
 - Problem solving

3. Year:

- 2015 (data available for science, science subscales, reading and mathematics)
- 2012 (data available for mathematics, mathematics subscales, reading, science, financial literacy, and problem solving)
- 2009 (data available for reading, reading subscales, mathematics, and science)
- 2006 (data available for reading, mathematics, science, and science subscales)
- 2003 (data available for reading, mathematics, mathematics subscales, and science)
- 2000 (data available for reading, reading subscales, mathematics, and science)

4. Measure:

- Mathematics scale: Overall mathematics
- Reading scale: Overall reading
- Science scale: Overall science
- Mathematics subscale: Employ
- Mathematics subscale: Formulate
- Mathematics subscale: Interpret
- Mathematics subscale: Space and shape
- Mathematics subscale: Change and relationships
- Mathematics subscale: Quantity
- Mathematics subscale: Uncertainty
- Reading subscale: Access and retrieve
- Reading subscale: Integrate and interpret
- Reading subscale: Reflect and evaluate
- Reading subscale: Continuous text
- Reading subscale: Noncontinuous text
- Science subscale: Identifying scientific issues
- Science subscale: Explaining phenomena scientifically
- Science subscale: Using scientific evidence
- Science competency subscale: Evaluate and design scientific enquiry
- Science competency subscale: Explain phenomena scientifically
- Science competency subscale: Interpret data and evidence scientifically
- Science knowledge subscale: Content Knowledge
- Science knowledge subscale: Procedural and Epistemic Knowledge
- Science system subscale: Earth and space
- Science system subscale: Living systems
- Science system subscale: Physical systems
- Attitude scale: Interest in science
- Attitude scale: Support for scientific inquiry
- Financial literacy scale
- Problem solving scale

5. Jurisdiction:

- International average (OECD countries)
- Average of the selected jurisdictions
- OECD
- Non-OECD
- U.S. states

Language

The PISA IDE currently provides the option to view all steps of the IDE and build reports in English or Spanish. The Help Guide currently is only offered in English.

Subject

PISA assesses reading literacy, mathematics literacy, and science literacy at each administration. In addition, the IDE contains data from the administration of the PISA financial literacy and problem solving assessments in 2012.

Measures

The PISA IDE includes measures for each subject when selected, such as an overall scale, subscale, and continuous variables.

Although each administration of PISA assesses mathematics, reading, and science, one of these subjects is assessed in depth in each administration. You can choose between the overall scale and/or any of the subject's subscales as your measure. However, subscales are only available for a subject area in the years in which it was the major domain. The major subject area assessed in 2000 was reading literacy; in 2003, mathematics literacy; and in 2006, science literacy. The cycle repeated again in 2009. Subscales are constituent parts of the major overall subject scale for an assessment and are specified by the PISA assessment frameworks. In the years when a subject area is a minor domain, only an overall scale is available, and it is based on a set of items of varying difficulty that represent the range of topics covered by the full assessment. Only overall scale scores are reported in the IDE for financial literacy and problem solving. Please see Section I. Background, for more information.

In 2015 and 2006, science was the major domain, and reading and mathematics were minor domains. Therefore, for these years, subscales are only available for science data; only single composite scales are available for PISA reading and mathematics data.

In 2012 and 2003, mathematics was the major domain, and reading and science were minor domains. Therefore, for these years, subscales are only available for mathematics data; only single composite scales are available for PISA reading and science data.

In 2009 and 2000, reading was the major domain, and mathematics and science were minor domains. Therefore, for these years, subscales are only available for reading data; only single composite scales are available for PISA mathematics and reading data.

In addition, there are a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables fall under different categories, such as Student and Family Characteristics and School and Classroom Climate, and include variables such as student age in years, size of class, and an index of computer availability.

Years

Currently, data availability in the IDE is dependent on the measure selected. If the measure chosen is an overall literacy scale, you can choose one or multiple years: 2015, 2012, 2009, 2006, 2003, and 2000. If the measure chosen is one of the science subscales, you can choose 2015 and/or 2006. If you choose between any of the mathematics subscales, you can choose 2012 and/or 2003. If you choose any of the reading subscales, you can choose 2009 and/or 2000. Subscales are not available for financial literacy and problem solving.

Jurisdictions

All listed jurisdictions can be selected for any analyses, provided data are available for the selected year. In 2015, a total of 73 jurisdictions participated in the mathematics, reading, and science literacy PISA assessments: 35 Organization for Economic Cooperation and Development (OECD) countries and 38 non-OECD jurisdictions. The non-OECD jurisdictions include some subnational education systems, such as Hong Kong-China. Data are not available for some of these 73 jurisdictions for 2015, 2012, 2009, 2006, 2003, and 2000, either because they did not participate in that PISA cycle or because their data were suppressed due to reporting standards not being met (for example, PISA 2015 data for Argentina, Malaysia and Kazakhstan are suppressed due to international reporting standards not being met and 2000 data for the Netherlands and the United Kingdom were suppressed due to international reporting standards not being met). Also included in the IDE are the 5 U.S. states or territories that participated in PISA 2012 and PISA 2015. Data from 43 jurisdictions that participated in the administration of the problem solving assessment in 2012 are included in the IDE. All 18 jurisdictions that participated in the financial literacy assessment in 2012 are included in the IDE.

Data are available for 65 jurisdictions in 2012 (35 OECD and 30 non-OECD), 65 jurisdictions (35 OECD and 30 non-OECD) in 2009, 57 jurisdictions (35 OECD and 22 non-OECD) in 2006, 41 jurisdictions (31 OECD and 10 non-OECD) in 2003, and 38 jurisdictions (29 OECD and 9 non-OECD) in 2000. Jurisdictions for which data are not available for a selected year are identified by the icon representing “no data”—. Note that the IDE contains a few U.S.-specific background variables (e.g., race/ethnicity) that, when selected, will not yield information for any other jurisdictions.

Jurisdictions listed in the IDE as OECD countries are those that are currently members of the OECD. In some cases, countries which are current members of the OECD were not members during a prior administration or release of PISA. For example, Latvia was an OECD country at

the time of the 2015 PISA release, but not during earlier PISA cycles. The IDE recalculates OECD averages for previous PISA cycles based on the current count of 35 OECD countries as of the 2015 release. Please note that the recalculation of the OECD average based on the current count explains why OECD averages calculated by the IDE for earlier years (e.g., 2012, 2009, etc.) do not match the OECD averages from OECD and NCES reports published in earlier years.

2. Variables

In the PISA IDE, questions from two types of questionnaires (student and school), as well as variables that are derived from background information, are organized into categories that have shared characteristics and can be selected as a group when examining and generating tables.

Content category and subcategory titles may overlap, but specific variables appear only once in a subcategory. Use **Search** in the **Select Variables** step to locate variables.

Note that some variables might be similar in content, but not comparable over the years, either due to differences in the question asked or differences in their response categories. For example, an index variable for students' family structure is available in 2012, 2009, 2003 and 2000. Each index variable is based on students' responses to the same question asking who usually lived at home with them. However, these three variables (STP5437 in 2012, FAMSTR09 in 2009 and FAMSTR00 in 2003 and 2000) are not comparable due to differences in response categories (single-parent (natural or otherwise), two parents (natural or otherwise), and other in 2012, single-parent family, two-parent family, and other in 2009; single-parent family, two-parent family, mixed, and other in 2003 and 2000). The icon representing "no data"——will help in identifying the year for which the variable has data available for analysis.

Proficiency levels

Achievement results for PISA are reported using discrete proficiency levels for reading, mathematics, science, financial literacy, and problem solving. Increasing levels represent the knowledge, skills, and capabilities needed to perform tasks of increasing complexity. Based on the statistics option chosen, IDE can report the average scores of students at each proficiency level or the percentage of the students performing at each of the predefined levels for the chosen jurisdictions. The statistics options to choose standard deviations and percentiles will not generate reports as proficiency levels are not reportable using these statistical analyses.

Mathematics literacy results in 2015, 2012 and 2009, as well as problem solving in 2012, were reported using six proficiency levels: level 1, level 2, level 3, level 4, level 5, and level 6.

Differing from previous years, 2015 science literacy results were reported using seven proficiency levels, as level 1 was broken into level 1b and level 1a, followed by level 2, level 3, level 4, level 5, and level 6. In 2012 and 2009, science results were reported using six proficiency levels: level 1, level 2, level 3, level 4, level 5, and level 6.

Similar to the 2015 science literacy results, in 2015, 2012, and 2009, reading literacy results were also reported using seven proficiency levels, with level 1 broken into level 1b and level 1a,

followed by level 2, level 3, level 4, level 5, and level 6. The number of proficiency levels in 2015, 2012, and 2009 differs from the number in 2006, 2003, and 2000, when five proficiency levels were used: level 1, level 2, level 3, level 4, and level 5. The cut point for level 1a in 2009 is the same as level 1 in 2000, while the cut point score for level 1b is set significantly lower; levels 2 to 5 have the same cutpoints for all 3 years.

Financial literacy and problem solving results in 2012 and 2015 were reported using five proficiency levels: level 1, level 2, level 3, level 4, and level 5.

The IDE also provides available data for students performing below proficiency level 1 for mathematics, financial literacy, and problem solving, and below level 1b for science and reading literacy. Please note that the cognitive capabilities of students scoring below level 1 or level 1b cannot be defined as per the OECD. Descriptions that characterize typical student performance in reading, mathematics, and science literacy at each proficiency level are shown in the following tables (see pages that follow).

When multiple literacy scales are chosen as dependent variables and proficiency levels for any of the subjects are chosen as independent variables, the IDE will generate reports based on the selected independent variable (whether this is mathematics, reading or science proficiency levels) for all the subject literacy scales being measured. Please note that not all of these reports will display data. Each proficiency level variable can only be used to report the results for a particular subject.

Description of PISA mathematics literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 358	At level 1, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli.
Level 2 420	At level 2, students can interpret and recognize situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulas, procedures, or conventions. They are capable of direct reasoning and making literal interpretations of the results.
Level 3 482	At level 3, students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results, and reasoning.

<p>Level 4</p> <p>545</p>	<p>At level 4, students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic ones, linking them directly to aspects of real-world situations. Students at this level can utilize well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments, and actions.</p>
<p>Level 5</p> <p>607</p>	<p>At level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterizations, and insight pertaining to these situations. They can reflect on their actions and formulate and communicate their interpretations and reasoning.</p>
<p>Level 6</p> <p>669</p>	<p>At level 6, students can conceptualize, generalize, and utilize information based on their investigations and modeling of complex problem situations. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and these understandings, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the original situations.</p>

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2009 Technical Report*, *PISA 2012 Technical Report* and *PISA 2015 Technical Report (forthcoming)*.

SOURCE: Kastberg, D., Chan, J.Y., and Murray, G. (2016). Performance of U.S. 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context: First Look at PISA 2015 (NCES 2017-048). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Retrieved January 11, 2017 from <https://nces.ed.gov/pubs2017/2017048.pdf>

Description of PISA reading literacy proficiency levels

Proficiency level and lower cutpoint score ¹	Task descriptions
Level 1b 262	At level 1b, tasks require the reader to locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. The text typically provides support to the reader, such as repetition of information, pictures or familiar symbols. There is minimal competing information. In tasks requiring interpretation the reader may need to make simple connections between adjacent pieces of information.
Level 1a 335	At level 1a, tasks require the reader to locate one or more independent pieces of explicitly stated information; to recognize the main theme or author's purpose in a text about a familiar topic, or to make a simple connection between information in the text and common, everyday knowledge. Typically the required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text.
Level 2 407	At level 2, some tasks require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognizing the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require readers to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.

<p>Level 3</p> <p>480</p>	<p>At level 3, tasks require the reader to locate, and in some cases recognize the relationship between, several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting or categorizing. Often the required information is not prominent or there is much competing information; or there are other text obstacles, such as ideas that are contrary to expectation or negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require readers to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension but require the reader to draw on less common knowledge.</p>
<p>Level 4</p> <p>553</p>	<p>At level 4, tasks involve retrieving information that require the reader to locate and organize several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesize about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.</p>
<p>Level 5</p> <p>626</p>	<p>At level 5, tasks involve retrieving information that require the reader to locate and organize several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesis, drawing on specialized knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all aspects of reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.</p>

<p>Level 6</p> <p>698</p>	<p>At level 6, tasks typically require the reader to make multiple inferences, comparisons and contrasts that are both detailed and precise. They require demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text. Tasks may require the reader to deal with unfamiliar ideas, in the presence of prominent competing information, and to generate abstract categories for interpretations. Reflect and evaluate tasks may require the reader to hypothesize about or critically evaluate a complex text on an unfamiliar topic, taking into account multiple criteria or perspectives, and applying sophisticated understandings from beyond the text. There are limited data about access and retrieve tasks at this level, but it appears that a salient condition is precision of analysis and fine attention to detail that is inconspicuous in the texts.</p>
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¹ In PISA 2009, newly constructed items furnished the description of proficiency levels above and below those established in PISA 2000. Level 6 was developed to better describe the skills and understandings of students at the upper end of the reading scale. The cutpoint score for level 6 is a score greater than 698.32. Levels 1a and 1b were developed to better describe the skills and understandings of students at the bottom end of the reading scale. The cutpoint score for level 1a in PISA 2009 is the same as that for level 1 in PISA 2000, while the cutpoint score for level 1b is set significantly lower (at a score less than or equal to 262.04).

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2009 Technical Report*, *PISA 2012 Technical Report* and *PISA 2015 Technical Report (forthcoming)*

SOURCE: Kastberg, D., Chan, J.Y., and Murray, G. (2016). Performance of U.S. 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context: First Look at PISA 2015 (NCES 2017-048). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved January 11, 2017 from <https://nces.ed.gov/pubs2017/2017048.pdf>

Description of PISA science proficiency levels

Proficiency level and lower cutpoint score ¹	Task descriptions
Level 1b 261	At Level 1b, students can use basic or everyday scientific knowledge to recognize aspects of familiar or simple phenomenon. They are able to identify simple patterns in data, recognize basic scientific terms and follow explicit instructions to carry out a scientific procedure.
Level 1a 335	At Level 1a, students are able to use basic or everyday content and procedural knowledge to recognize or identify explanations of simple scientific phenomenon. With support, they can undertake structured scientific enquiries with no more than two variables. They are able to identify simple causal or correlational relationships and interpret graphical and visual data that require a low level of cognitive demand. Level 1a students can select the best scientific explanation for given data in familiar personal, local and global contexts.
Level 2 410	At level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
Level 3 484	At Level 3, students can draw upon moderately complex content knowledge to identify or construct explanations of familiar phenomena. In less familiar or more complex situations, they can construct explanations with relevant cueing or support. They can draw on elements of procedural or epistemic knowledge to carry out a simple experiment in a constrained context. Level 3 students are able to distinguish between scientific and non-scientific issues and identify the evidence supporting a scientific claim.
Level 4 559	At Level 4, students can use more complex or more abstract content knowledge, which is either provided or recalled, to construct explanations of more complex or less familiar events and processes. They can conduct experiments involving two or more independent variables in a constrained context. They are able to justify an experimental design, drawing on elements of procedural and epistemic knowledge. Level 4 students can interpret data drawn from a moderately complex data set or less familiar context, draw appropriate conclusions that go beyond the data and provide justifications for their choices.

Level 5 633	At Level 5, students can use abstract scientific ideas or concepts to explain unfamiliar and more complex phenomena, events and processes involving multiple causal links. They are able to apply more sophisticated epistemic knowledge to evaluate alternative experimental designs and justify their choices and use theoretical knowledge to interpret information or make predictions. Level 5 students can evaluate ways of exploring a given question scientifically and identify limitations in interpretations of data sets including sources and the effects of uncertainty in scientific data.
Level 6 708	At Level 6, students can draw on a range of interrelated scientific ideas and concepts from the physical, life and earth and space sciences and use content, procedural and epistemic knowledge in order to offer explanatory hypotheses of novel scientific phenomena, events and processes or to make predictions. In interpreting data and evidence, they are able to discriminate between relevant and irrelevant information and can draw on knowledge external to the normal school curriculum. They can distinguish between arguments that are based on scientific evidence and theory and those based on other considerations. Level 6 students can evaluate competing designs of complex experiments, field studies or simulations and justify their choices.

¹ In PISA 2015, newly constructed items furnished the description of proficiency levels above and below those established in PISA 2000. Levels 1a and 1b were developed to better describe the skills and understandings of students at the bottom end of the science literacy scale. The cutpoint score for level 1a in PISA 2015 is the same as that for level 1 in previous PISA cycles, while the cutpoint score for level 1b is set significantly lower (at a score less than or equal to 334.94).

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2015 Technical Report (forthcoming)*.

SOURCE: Kastberg, D., Chan, J.Y., and Murray, G. (2016). Performance of U.S. 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context: First Look at PISA 2015 (NCES 2017-048). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Retrieved January 11, 2017 from <https://nces.ed.gov/pubs2017/2017048.pdf>

Description of PISA financial literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 326	At Level 1, students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognize the difference between needs and wants and can make simple decisions on everyday spending. They can recognize the purpose of everyday financial documents such as an invoice and apply single and basic numerical operations (addition, subtraction or multiplication) in financial contexts that they are likely to have experienced personally.
Level 2 400	At Level 2, students begin to apply their knowledge of common financial products and commonly used financial terms and concepts. They can use given information to make financial decisions in contexts that are immediately relevant to them. They can recognize the value of a simple budget and can interpret prominent features of everyday financial documents. They can apply single basic numerical operations, including division, to answer financial questions. They show an understanding of the relationships between different financial elements, such as the amount of use and the costs incurred.
Level 3 475	At Level 3, students can apply their understanding of commonly used financial concepts, terms and products to situations that are relevant to them. They begin to consider the consequences of financial decisions and they can make simple financial plans in familiar contexts. They can make straightforward interpretations of a range of financial documents and can apply a range of basic numerical operations, including calculating percentages. They can choose the numerical operations needed to solve routine problems in relatively common financial literacy contexts, such as budget calculations.
Level 4 550	At Level 4, students can apply their understanding of less common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood, such as bank account management and compound interest in saving products. They can interpret and evaluate a range of detailed financial documents, such as bank statements, and explain the functions of less commonly used financial products. They can make financial decisions taking into account longer-term consequences, such as the impact of loan repayment on cost, and they can solve routine problems in less common financial contexts

Level 5 625	At Level 5, students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives in the long term. They can analyze complex financial products and can take into account features of financial documents that are significant but unstated or not immediately evident, such as transaction costs. They can work with a high level of accuracy and solve non-routine financial problems, and they can describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape, such as income tax.
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NOTE: Information about the procedures used to set the proficiency levels is available in the OECD

PISA 2012 Technical Report and *PISA 2015 Technical Report (forthcoming)*.

SOURCE: OECD (2014), *PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI)*, PISA, OECD Publishing.

<http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-vi.htm>

Description of PISA problem solving proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 358	At Level 1, students can explore a problem scenario only in a limited way, but tend to do so only when they have encountered very similar situations before. Based on their observations of familiar scenarios, these students are able only to partially describe the behaviour of a simple, everyday device. In general, students at Level 1 can solve straightforward problems provided there is a simple condition to be satisfied and there are only one or two steps to be performed to reach the goal. Level 1 students tend not to be able to plan ahead or set subgoals.
Level 2 423	At Level 2, students can explore an unfamiliar problem scenario and understand a small part of it. They try, but only partially succeed, to understand and control digital devices with unfamiliar controls, such as home appliances and vending machines. Level 2 problem-solvers can test a simple hypothesis that is given to them and can solve a problem that has a single, specific constraint. They can plan and carry out one step at a time to achieve a subgoal, and have some capacity to monitor overall progress towards a solution.
Level 3 488	At Level 3, students can handle information presented in several different formats. They can explore a problem scenario and infer simple relationships among its components. They can control simple digital devices, but have trouble with more complex devices. Problem-solvers at Level 3 can fully deal with one condition, for example, by generating several solutions and checking to see whether these satisfy the condition. When there are multiple conditions or inter-related features, they can hold one variable constant to see the effect of change on the other variables. They can devise and execute tests to confirm or refute a given hypothesis. They understand the need to plan ahead and monitor progress, and are able to try a different option if necessary.
Level 4 553	At Level 4, students can explore a moderately complex problem scenario in a focused way. They grasp the links among the components of the scenario that are required to solve the problem. They can control moderately complex digital devices, such as unfamiliar vending machines or home appliances, but they don't always do so efficiently. These students can plan a few steps ahead and monitor the progress of their plans. They are usually able to adjust these plans or reformulate a goal in light of feedback. They can systematically try out different possibilities and check whether multiple conditions have been satisfied. They can form an hypothesis about why a system is malfunctioning and describe how to test it.

<p>Level 5</p> <p>618</p>	<p>At Level 5, students can systematically explore a complex problem scenario to gain an understanding of how relevant information is structured. When faced with unfamiliar, moderately complex devices, such as vending machines or home appliances, they respond quickly to feedback in order to control the device. In order to reach a solution, Level 5 problem-solvers think ahead to find the best strategy that addresses all the given constraints. They can immediately adjust their plans or backtrack when they detect unexpected difficulties or when they make mistakes that take them off course.</p>
<p>Level 6</p> <p>683</p>	<p>At Level 6, students can develop complete, coherent mental models of diverse problem scenarios, enabling them to solve complex problems efficiently. They can explore a scenario in a highly strategic manner to understand all information pertaining to the problem. The information may be presented in different formats, requiring interpretation and integration of related parts. When confronted with very complex devices, such as home appliances that work in an unusual or unexpected manner, they quickly learn how to control the devices to achieve a goal in an optimal way. Level 6 problem-solvers can set up general hypotheses about a system and thoroughly test them. They can follow a premise through to a logical conclusion or recognize when there is not enough information available to reach one. In order to reach a solution, these highly proficient problem-solvers can create complex, flexible, multi-step plans that they continually monitor during execution. Where necessary, they modify their strategies, taking all constraints into account, both explicit and implicit.</p>

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2012 Technical Report* and *PISA 2015 Technical Report (forthcoming)*.

SOURCE: OECD (2014), *PISA 2012 Results: Creative Problem Solving: Students' Skills in Tackling Real-Life Problems (Volume V)*, PISA, OECD Publishing.

<http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-v.htm>

Exact cut scores for the mathematics proficiency levels are as follows:

- below level 1, less than or equal to 357.77;
- level 1, equal to or greater than and less than 420.07;
- level 2, equal to or greater than and less than 482.38;
- level 3, equal to or greater than and less than 544.68;
- level 4, equal to or greater than and less than 606.99;
- level 5, equal to or greater than and less than 669.30; and
- level 6, equal to or greater than 669.30.

Exact cut scores for the reading proficiency levels in the IDE are as follows:

- below level 1b, less than or equal to 262.04;
- level 1b, greater than 262.04 and less than 334.75;
- level 1a, equal to or greater than 334.75 and less than 407.47;
- level 2, equal to or greater than 407.47 and less than 480.18;
- level 3, equal to or greater than 480.18 and less than 552.89;
- level 4, equal to or greater than 552.89 and less than 625.61;
- level 5, equal to or greater than 625.61 and less than 698.32;
- level 6, equal to or greater than 698.32.

Exact cut scores for the science proficiency levels are as follows:

- below level 1b, less than 260.54
- level 1b, equal to or greater than 260.54 and less than 334.94
- level 1a, equal to or greater than 334.94 and less than 409.54;
- level 2, equal to or greater than 409.54 and less than 484.14;
- level 3, equal to or greater than 484.14 and less than 558.73;
- level 4, equal to or greater than 558.73 and less than 633.33;
- level 5, equal to or greater than 633.33 and less than 707.93; and
- level 6, equal to or greater than 707.93.

Exact cut scores for the financial literacy proficiency levels are as follows:

- below level 1, less than or equal to 325.57;
- level 1, greater than 325.57 and less than or equal to 400.33;
- level 2, greater than 400.33 and less than or equal to 475.10;
- level 3, greater than 475.10 and less than or equal to 549.86;
- level 4, greater than 549.86 and less than or equal to 624.63; and
- level 5, greater than 624.63.

Exact cut scores for the problem solving proficiency levels are as follows:

- below level 1, less than or equal to 358.49;
- level 1, greater than 358.49 and less than or equal to 423.42;
- level 2, greater than 423.42 and less than or equal to 488.35;
- level 3, greater than 488.35 and less than or equal to 553.28;
- level 4, greater than 553.28 and less than or equal to 618.21;
- level 5, greater than 618.21 and less than or equal to 683.14; and
- level 6, greater than 683.14.

3. Statistics Options

The IDE reports PISA data with several statistics options:

- Averages
- Percentages
- Standard deviations
- Percentiles

Averages

This statistic provides the average value for a selected continuous variable or overall score for the combined literacy scale (for example, science literacy) or score for one of the subscales corresponding to the subject chosen (for example, the science competency subscale: interpret data and evidence scientifically).

For the PISA assessment, student performance is reported on scales that range from 0 to 1,000. PISA scales are produced using item response theory (IRT) to estimate average scores for mathematics, reading, science, financial literacy, and problem solving for each jurisdiction. IRT identifies patterns of response and uses statistical models to predict the probability of answering an item correctly as a function of the students' proficiency in answering other questions. That is, student responses to the assessment questions are analyzed to determine the percentage of students responding correctly to each multiple-choice question and the percentage of students achieving each of the score categories for constructed-response questions.

Percentages

This statistic shows the percentage of students as a row percentage. For example, if a categorical variable is selected and the jurisdictions are listed in the table stub, the percentage data for the response categories will sum to 100 percent in each jurisdiction. By default, the percentage distributions do not include missing data, although there is an option to include them.

Standard deviations

The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700. The standard deviation is the square root of the variance.

Percentiles

This statistic shows the threshold (or cutpoint) score for the following:

- 10th percentile – the bottom 10 percent of students
- 25th percentile – the bottom quarter of students

- 50th percentile – the median (half the students scored below the cutpoint and half scored above it)
- 75th percentile – the top quarter of students
- 90th percentile – the top 10 percent of students

4. Cross-tabulations

Cross-tabulation is a method of combining separate variables into a single table. Normally, each variable has its own table. If you have selected two or three variables (not counting **All students**) and when you go to the **Edit Reports** step, you will automatically get a list with one table for each variable (including one for **All students**); at the end of that list you will get one cross-tabulation for the two or three variables selected.

If you have chosen four or more variables (not counting **All students**), you will get tables for each variable, but you won't get the cross-tabulation.

Be advised that if you go back to add another variable without subtracting one to keep the total under four, you will lose any edits you might have made to the cross-tabulation.

5. Statistical Notations and Other Notes

Statistical notations and other notes are found at the end of a data table, as applicable to that table:

- — Not available.
- † Not applicable. (For instance, the standard error for the statistic cannot be reported because the statistic does not meet reporting standards.)
- # The statistic rounds to zero.
- ‡ Reporting standards not met. (For instance, the sample size is insufficient to permit a reliable estimate.)
- NOTE: A general note pertains to any special characteristics of the data in the table.
- SOURCE: Source information is listed for all PISA data and should be cited when data are used in a publication or presentation.

Calculation of OECD averages

The IDE generates the OECD average for the selected measures and variables if “International Average (OECD Countries)” is clicked under “Jurisdiction.”

Jurisdictions listed in the IDE as OECD countries are those that are currently members of the OECD. In some cases, countries which are current members of the OECD were not members during a prior administration or release of PISA. For example, Latvia was an OECD country at

the time of the 2015 PISA release, but not during earlier PISA cycles. The IDE recalculates OECD averages for previous PISA cycles based on the current count of 35 OECD countries as of the 2015 release. Please note that the recalculation of the OECD average based on the current count explains why OECD averages calculated by the IDE for earlier years (e.g., 2012, 2009, etc.) do not match the OECD averages from OECD and NCES reports published in earlier years.

Furthermore, there are certain OECD countries that are excluded from the OECD averages both in the IDE and published OECD reports due to issues listed below:

- Four current OECD countries (Estonia, the Slovak Republic, Slovenia, and Turkey) did not participate in 2000 and 2003.
- Data for the Netherlands and the United Kingdom were suppressed in 2000 due to international reporting standards not being met.¹
- The reading literacy scores are not reported in the 2006 cycle for the United States due to a printing error in the test booklets.
- The OECD average for the optional financial literacy assessment is calculated based on the average scores of the 14 participating countries in 2012.
- The OECD average for the optional problem-solving assessment is calculated based on the 28 participating countries in 2012.

Please note that OECD averages are affected by data suppression rules (discussed on the next page). This means that in some cases the OECD average generated by the IDE when a variable is chosen may not match the PISA 2015 OECD and NCES reports for that variable. This occurs when an OECD country's data is suppressed in either the IDE or the OECD or NCES reports, but not both. If a country's data is suppressed in the IDE, it will not be included in the calculation of the average score. The OECD excluded the data for Austria from the trend analysis in its report (OECD, PISA 2009 Results: Learning Trends - Changes in Student Performance Since 2000 (Volume V), available at <http://www.pisa.oecd.org>) because of a concern over a data collection issue in 2009; however, after consultation with Austrian officials, NCES kept the Austrian data in the U.S. trend reporting.

Statistical Comparisons

Comparisons of achievement across years are made using independent *t*-tests with a linking error taken into account. Comparisons between jurisdictions are also treated as independent. As of December 2016, all comparisons within a jurisdiction, within the same year, are made using dependent *t*-tests. Prior to this, only male-female comparisons within a jurisdiction were treated as dependent. Because of this change, the results of statistical significance testing may differ

¹ While the Netherlands' 2000 data were suppressed for the OECD release of the PISA 2000 results, the United Kingdom's 2000 data were suppressed retroactively by the OECD after the release of the PISA 2000 results.

slightly from the results obtained using earlier versions of the PISA IDE. The alpha level for all *t*-tests is .05

Data Suppression

Data suppression may be handled slightly differently in the PISA IDE and the OECD PISA International Reports. For the IDE, the Rule of 62 is applied to suppress data to avoid reporting results for groups about which little of interest could be said due to lack of power. The Rule of 62 is borrowed from the IDE's counterpart, the National Assessment of Educational Progress (NAEP) Data Explorer (NDE). This rule states that statistics for a group are suppressed if they are based on less than 62 cases. Statistics are: means, standard errors, standard deviations and a set of percentiles. The rule serves to assure a minimum power requirement to detect moderate differences at nominal significance level (0.05). The minimum power is 0.80 and the moderate effect size is 0.5 standard deviation units. A design effect of 2 is assumed to derive an appropriate complex sample standard deviation.

6. Glossary

Below is a list of technical and PISA-specific assessment terms used in the IDE. The index variables listed are derived from a combination of variables, or questions, taken from the student, teacher, and/or school questionnaires.

There are a number of 2012 index variables that have identical “Anchored” index variables listed in the IDE [ANCINTMAT, ANCMATWKETH, ANCSMAT, ANCINSTMOT, ANCCOGACT, ANCMTSUP, ANCSUBNORM, ANCATSCHL, ANCATTLNACT, ANCBELONG, ANCSTUDREL, ANCCLSMAN]. These variables use anchoring vignettes which is a new survey method used to enhance the validity of index variables especially for cross country comparisons. For more details regarding the Anchored index variables see [*Annex A6 of the PISA 2012 International Report*](#).

6.A. Student and Family Characteristics

i. Student Demographics

Age (AGE)

The variable AGE is calculated as the difference between the year and month of the testing and the year and month of a student's birth. Data on student's age are obtained from both the questionnaire and the student tracking forms. If the month of testing was not known for a particular student, the median month for that country was used in the calculation.

Grade (DGRADE, GRADE)

Data on the student's grade are obtained both from the student questionnaire and from the student tracking form. As with all variables that are on both the tracking form and the questionnaire, inconsistencies between the two sources are reviewed and resolved during data-

cleaning. In order to capture between-country variation, the relative grade index (DGRADE) indicates whether students are at the modal grade in a country (value of 0), or whether they are below or above the modal grade level (+ x grades, - x grades). Students' responses in PISA 2015, 2012, 2009, 2006, 2003, and 2000 were as follows: 7th grade, 8th grade, 9th grade, 10th grade, 11th grade, 12th grade, 13th grade, and Ungraded.

ISCED

The International Standard Classification of Education (ISCED) is an internationally comparable method for describing levels of education across countries, created by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the mid-1970s. It was first revised in 1997. PISA 2015, 2012, 2009, 2006, 2003, and 2000 adopt the ISCED 1997 classification. ISCED levels are defined as follows:

- **Level 0** – the initial stage of organized instruction, designed primarily to introduce very young children to a school-type environment. ISCED level 0 programs can either be center or school based. Preschool and kindergarten programs in the United States fall into the level 0 category.
- **Level 1** – consists of primary education, which usually lasts 4 to 6 years. ISCED level 1 typically begins between ages 5 and 7, and is the stage where students begin to study basic subjects, such as reading, writing, and mathematics. In the United States, elementary school (grades 1 through 6) is classified as level 1.
- **Level 2** – also known as lower secondary education. Students continue to learn the basic subjects taught at level 1, but this level is typically more subject specific than level 1 and may be taught by specialized teachers. ISCED level 2 usually lasts between 2 and 6 years, and begins around the age of 11. Middle school and junior high (grades 7 through 9) in the United States are classified as level 2.
- **Level 3** – also known as upper secondary education, student coursework is generally subject specific and often taught by specialized teachers. Students often enter upper secondary education at the age of 15 or 16 and attend anywhere from 2 to 5 years. ISCED level 3 can prepare students for university, further schooling, or the labor force. Senior high school (grades 10 through 12) is considered level 3 in the United States.
- **Level 4** – consists of primarily vocational education, and courses are taken after the completion of secondary school, though the content is not more advanced than the content of secondary school courses. ISCED level 4 programs in the United States are often in the form of 1-year certificate programs.
- **Level 5** – divided into levels 5A and 5B, this level focuses on tertiary education. ISCED level 5A refers to academic higher education below the doctoral level. Level 5A programs are intended to provide sufficient qualifications to gain entry into advanced research programs and professions with high skill requirements. In the United States, bachelor's, master's, and first-professional degree programs are classified as ISCED level 5A. ISCED level 5B refers to vocational higher education. Level 5B programs provide a higher level of career and technical

education and are designed to prepare students for the labor market. In the United States, associate's degree programs are classified as level 5B.

- **Level 6** – refers to the doctoral level of academic higher education. Level 6 programs usually require the completion of a research thesis or dissertation.

Study Programs (ISCEDD, ISCEDL, ISCEDO)

PISA 2015, 2012, 2009, 2006, and 2003 collected data on study programs available to 15-year-old students in each country. At the individual level, the study program was identified both through the student tracking form and the student questionnaire. All study programs were classified using the International Standard Classification of Education (ISCED). The following internationally comparable indices were derived from the data on study programs:

- **ISCED designation (ISCEDD)** – indicates the designation of the study program: (1) = "A" (general programs designed to give access to the next program level); (2) = "B" (programs designed to give access to vocational studies at the next program level); (3) = "C" (programs designed to give direct access to the labor market); or (4) = "M" (modular programs that combine any or all of these characteristics).
- **ISCED level (ISCEDL)** – indicates whether students are (1) primary education level (ISCED 1); (2) lower secondary education level (ISCED 2); or (3) upper secondary education level (ISCED 3).
- **ISCED orientation (ISCEDO)** – indicates whether the program's curricular content is (1) general; (2) prevocational; (3) vocational; or (4) modular programs that combine any or all of these characteristics.

Number of changes in educational biography (CHANGE)

This index is based on students' responses in the optional Educational Career questionnaire to the following questions: Did you change schools when you were attending <ISCED 1>; Did you change schools when you were attending <ISCED 2>; Have you ever changed your <study programme>;

Family Structure (FAMSTRUC, FAMSTR09, FAMSTR00)

This index is based on students' reports on people living at home with them. **FAMSTRUC** in PISA 2012 has the following three values [ST012301-06]: (1) single-parent family (students living with only one of the following: mother (including stepmother or foster mother), father (including stepfather or foster father), (2) two-parent family (students living with a father or step/foster father and a mother or step/foster mother), and (3) other (except the non-responses, which are coded as missing or not applicable). **FAMSTR09** in PISA 2009 includes two items: mother (including stepmother or foster mother) and father (including stepfather or foster father) [ST012301-2]. **FAMSTR00** in PISA 2000 and 2003 includes four items: mother; other female guardian (e.g., step or foster mother); father; and other male guardian (e.g., step or foster father) [ST000401-4]. The variable names are listed as they appear in the IDE. Although PISA 2012,

2009 and 2003 asked students about their family structure, the wording of the question changed, rendering comparisons impossible.

Student response options for all 3 years were then grouped into the following categories:

Single-parent family – students living with one of the following: mother, father, male guardian, or female guardian.

Two-parent family or nuclear family (PISA 2003 and 2000) – students living with a mother and a father.

Two-parent family (PISA 2012 and 2009) – students living with a father or step/foster father and a mother or step/foster mother.

Mixed (PISA 2003 and 2000) – students living with a mother and a male guardian, a father and a female guardian, or two guardians

Other – other response combinations.

Number of Siblings (NSIB)

In PISA 2000, students were asked to indicate the number of siblings older and younger than themselves, or the same age [ST000501–3].

ii. Language and Immigration

Immigration Status (IMMIG)

Information on the country of birth of students and their parents for PISA 2015 is collected in a similar manner as in PISA 2003, PISA 2006, PISA 2009, and PISA 2015 by using nationally specific ISO coded variables. The ISO codes of the country of birth for students and their parents are available in the PISA international database (COBN_S, COBN_M, and COBN_F). The index on immigrant background was calculated for PISA 2015, 2012, 2009, 2006, and 2003 from students' responses to the following three questions: In what country were you born? In what country was your mother born? [ST005501–3]. In what country was your father born? The variable names are listed as they appear in the IDE. Students with missing responses for either the student or for both parents, or for all three questions have been given missing values for this variable. Students were characterized into one of the following groups:

Native students – those students born in the country of assessment or who had at least one parent born in the country.

First-generation students – those students born outside the country of assessment and whose parents were also born in another country.

Second-generation students – those students born in the country of assessment but whose parents were born in another country.

Language at Home (ST013401)

For PISA 2015, 2012, 2009, 2006, 2003, and 2000, students indicate the language they usually speak at home. The data are captured in nationally-specific language codes, which were recoded into this variable with the following two values: (1) language at home is the same as the

language of assessment, and (2) language at home is a different language than the language of assessment.

Foreign Language Spoken at Home (LANG)

The PISA 2003 *index of foreign language spoken at home* is based on students' responses to one item asking if the language spoken at home most of the time was the language of assessment, another official national language, another national dialect or language, or another language [ST013401]. The variable name is listed as it appears in the IDE.

Student responses are then grouped into two categories:

Test language or other national language – The language spoken at home most of the time is the language of assessment, another official national language, or other national dialect or language.

Foreign language – The language spoken at home most of the time is different from the language of assessment, from other official national languages, and from other national dialects or languages.

iii. Parents' Employment and Education

Educational level of parents (MISCED, FISCED, HISCED, PARED)

The educational level of parents is classified using the International Standard Classification of Education (ISCED) (OECD, 1999) based on students' responses in the student questionnaire. For PISA 2015, 2012, 2009, 2006, 2003, and 2000, indices were constructed by selecting the highest level for each parent and then assigning them to the following categories: (0) None; (1) ISCED 1 (primary education); (2) ISCED 2 (lower secondary); (3) ISCED 3B or 3C (vocational/prevocational upper secondary); (4) ISCED 3A (upper secondary) and/or ISCED 4 (nontertiary postsecondary); (5) ISCED 5B (vocational tertiary); or (6) ISCED 5A, 6 (theoretically oriented tertiary and postgraduate) [ST001201, ST001301, ST001401, ST001501, ST008501, ST008801, ST012501, ST012601–4, ST012901, ST013001–4]. The variable names are listed as they appear in the IDE. Four indices were created based upon the items for parents' educational level:

Mother's educational level (MISCED09 and MISCED00) – the highest ISCED level obtained by the mother. MISCED09 includes PISA 2015, 2012, 2009, 2006, and 2003, and MISCED00 includes PISA 2000.

Father's educational level (FISCED09 and FISCED00) – the highest ISCED level obtained by the father. FISCED09 includes PISA 2015, 2012, 2009, 2006, and 2003, and FISCED00 includes PISA 2000.

Highest educational level of parents (HISCED09) – the higher ISCED level of either parent calculated for PISA 2015, 2012, 2009, 2006, and 2003.

Highest parental education in years of schooling (PARED) – calculated for PISA 2015, 2012, 2009, 2006, and 2003 by recoding HISCED into estimated years of schooling. The conversion of years of schooling varies by PISA administration and country.

Highest parental education in years (DUPARED) (US ONLY) – the educational year of attainment of either parent calculated for PISA 2009 and 2006.

Occupational Status of Parents (MSECATEG, FSECATEG, HSECATEG)

In PISA 2003, 2006, and 2009 occupational data for both the student's father and student's mother were obtained by asking open-ended questions. The responses were coded to the four-digit International Standard Classification of Occupations (ISCO) codes: (1) white collar, high skilled (legislators, senior officials and managers, professionals, technicians and associate professionals); (2) white collar, low skilled (service workers, shop and market sales workers and clerks); (3) blue collar, high skilled (skilled agricultural and fishery workers and craft and related trades workers); and (4) blue collar, low skilled (plant and machine operators and assemblers and elementary occupations). Three variables were created:

Mother's employment category (MSECATEG) – the ISCO code for the mother.

Father's employment category (FSECATEG) – the ISCO code for the father.

Highest employment category of either parent (HSECATEG) – the higher ISCO code of either parent or the only available parent.

International Socio-Economic Index of Occupational Status (ISEI)

While the computation of socio-economic status followed what had been done in previous cycles, PISA 2012 undertook an important upgrade with respect to the coding of parental occupation. Prior to PISA 2012, the 1988 International Standard Classification of Occupations (ISCO-88) was used for the coding of parental occupation. By 2012, however, ISCO-88 was almost 25 years old and it was no longer tenable to maintain its use as an occupational coding scheme. It was therefore decided to use its replacement, ISCO-08, for occupational coding in PISA 2012 and PISA 2015. For more details, see [Annex A of the OECD PISA 2015 International Report](#).

The main differences with regard to the previous ISEI construction are the following:

A new database was used which is more recent, larger and cross-nationally more diverse than the one used earlier.

The new ISEI was constructed using data for women and men, while previously only men were used to estimate the scale. The data on income were corrected for hours worked to adjust the different prevalence of part-time work between men and women in many countries.

In PISA 2000, the **ISEI** index was created and is equal to the father's occupation or to the mother's occupation if the father's ISEI is missing. Students are assigned numbers ranging from 16 to 90 on the index based on their parents' occupations, so that they are arrayed on a continuum from low to high socioeconomic status, rather than placed into discrete categories. Three additional indices were obtained from these scores in PISA 2000 and later years, with higher ISEI scores indicating higher levels of occupational status:

Mother’s occupational status (BMMJ) – In PISA 2015, 2012, 2006, 2003, and 2000 this variable was derived to show the ISEI score for the mother.

Father’s occupational status (BFMJ) – In PISA 2015, 2012, 2006, 2003, and 2000 this variable was derived to show the ISEI score for the father.

Highest occupational status of parents (HISEI) – In PISA 2015, 2012, 2009, 2006, 2003, and 2000 this variable was derived to show the higher ISEI score of either parent or the only available parent.

In PISA 2000, ISEI was computed from BMMJ or BFMJ. If BFMJ is available, ISEI is equal to BFMJ. If BFMJ is not available, but BMMJ is, then ISEI is equal to BMMJ.

iv. Home Possessions and Socioeconomic Status

Family Wealth (WEALTH, WEALTH12)

The *index of family wealth* (WEALTH from PISA 2015, and WEALTH12 from PISA 2012, 2009, 2006, 2003, and 2000) was derived from student responses to (i) whether they had household items at home; and (ii) the number of household items. Household items were asked slightly differently in 2015 than in previous cycles, making WEALTH and WEALTH12 not comparable. WEALTH12 is based on the students’ responses on whether they had the following at home: a room of their own, a link to the Internet, a dishwasher (treated as a country-specific item), a DVD player, and three other country-specific items; and their responses on the number of cellular phones, televisions, computers, cars and the rooms with a bath or shower [ST013513, ST013502, ST013504, ST013506, ST005811-15, ST01312, ST013507-09, ST005901, STP5289, STP5290-92, STP5295, ST013514, STP5059-61]. The variable names are listed as they appear in the IDE.

Home Educational Resources (HEDRES, HEDRES12)

The *index of home educational resources* (HEDRES from PISA 2015, and HEDRES12 from PISA 2012, 2009, 2006, 2003, and 2000) was derived from students’ reports on the availability and number of educational resource items in the home. Educational resource items were asked slightly differently in 2015 than in previous cycles, making HEDRES and HEDRES12 not comparable. HEDRES12 included seven items: a desk and a quiet place to study, a computer that students can use for schoolwork, educational software, books to help with students’ school work, technical reference books and a dictionary [ST013501, ST013503-05, ST013510-12]. Positive values indicate more educational resources in the home, and negative values indicate fewer educational resources. The variable names are listed as they appear in the IDE.

Home Possessions (HOMEPOS, HOMEPOS12)

The *household possession index* (HOMEPOS from PISA 2015, and HOMEPOS12 from PISA 2012, 2009, 2006, 2003, and 2000) is a summary index based upon students’ responses to (i) whether they had household items at home; and (ii) the number of household items. The home possessions scale for PISA 2015 was computed differently than in the previous cycles, to align the IRT model to the one used for all cognitive and non-cognitive scales, although categories for the number of books in the home are unchanged in PISA 2015. Therefore,

HOMEPOS and HOMEPOS12 are not comparable. HOMEPOS12 comprises all items on the indices of WEALTH12, CULTPOS12 and HEDRES12, as well as books in the home recoded into a four-level categorical variable (0-10 books, 11-25 or 26-100 books, 101-200 or 201-500 books, more than 500 books)[ST005901].

Economic, Social, and Cultural Status (ESCS, ESCS12)

The *index of economic, social, and cultural status* is derived from student responses for PISA 2015 (ESCS), and PISA 2012, 2009, 2006, and 2003 (ESCS12). ESCS was calculated using the following indices: highest occupational status of parents (HISEI), highest educational level of parents in years of education according to ISCEDD (PARED), and home possessions (HOMEPOS). ESCS12 was calculated using the following indices: highest occupational status of parents (HISEI), highest educational level of parents in years of education according to ISCEDD (PARED), and home possessions (HOMEPOS12). The *index of home possessions* (HOMEPOS12) comprises all items on the indices of WEALTH12, CULTPOS12 and HEDRES12, as well as books in the home recoded into a four-level categorical variable (0-10 books, 11-25 or 26-100 books, 101-200 or 201-500 books, more than 500 books). Positive values indicate a higher ESCS, and negative values indicate a lower ESCS. The variable names are listed as they appear in the IDE. For more information on methods and procedures for the computation of index variables, see Annex A in the PISA 2015 International Report.

Computer Facilities at Home (COMPHOME)

The *index of computer facilities at home* was calculated for PISA 2003 based upon students' reports on the presence of the following items in their home: a computer you can use for schoolwork; educational software; and a link to the Internet [ST005704–6]. Positive values indicate more computer facilities at home and negative values indicate fewer computer facilities. The variable names are listed as they appear in the IDE.

Cultural Possessions of the Family (CULTPOS12)

The *index of cultural possessions* related to classical culture in the family home was calculated for PISA 2012, 2009, 2006, 2003, and 2000 based upon students' reports on the availability of the following items in their home: classic literature (e.g., Shakespeare); books of poetry; and works of art (e.g., paintings) [ST013507–9]. Positive values indicate more possessions related to classical culture in the home, and negative values indicate fewer such possessions. The variable names are listed as they appear in the IDE.

Cultural Activities of Students (CULTACTV)

The *index of activities related to classical culture* was calculated for 2000 PISA based upon students' reports on how often they had participated in the following activities during the past year: visited a museum or art gallery; attended an opera, ballet, or classical symphony concert; and watched live theatre [ST001802, ST001804–5]. Students responded to each statement on a four-point scale: *never or hardly ever, once or twice a year, about three or four times a year, and more than four times a year*. Positive values indicate a higher frequency of activities related to

classical culture, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

6.B. Students' Attitudes and Learning Strategies

i. Engagement in Reading Activities

Enjoyment of Reading (ENJOY, JOYREAD)

The *index of enjoyment of reading* was derived from students' level of agreement with statements about reading. **ENJOY** in PISA 2009 included the following statements: I read only if I have to; reading is one of my favorite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me, reading is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; I cannot sit still and read for more than a few minutes; I like to express my opinions about books I have read; and I like to exchange books with my friends [ST013901–11]. **JOYREAD** in PISA 2000 included the following statements: I read only if I have to; reading is one of my favorite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me, reading is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; and I cannot sit still and read for more than a few minutes [ST013901–9]. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree* and *strongly agree*. All items that are negatively phrased are inverted for scaling. Positive values indicate more positive attitudes towards reading, and negative values indicate less positive attitudes. The variable names are listed as they appear in the IDE.

Reading Diversity (DIVRED09, DIVRED00)

The *index of diversity of reading materials* was derived from students' responses to the frequency with which they read different materials. **DIVRED09** in PISA 2009 included the following items: magazines; comics; fictions; nonfiction books; and newspapers [ST014001–5]. **DIVRED00** in PISA 2000 included the following items: magazines; comic books; fiction; nonfiction books; e-mail and web pages; and newspapers [ST014001–5, ST003605]. Students responded to each statement on a five-point scale: *never, a few times a year, about once a month, several times a month, and more often*. Positive values indicate higher diversity of reading materials, and negative values indicate lower diversity. The variable names are listed as they appear in the IDE.

Online Reading Activities (ONLNREAD)

The *index of online reading activities* from PISA 2009 was derived from the frequency with which students were involved in the following reading activities: reading e-mails; chatting online; reading online news; using an online dictionary or encyclopedia; searching online information to learn about a particular topic; taking part in online group discussions or forums; and searching for practical information online [ST014101–7]. Students responded to each statement on a five-point scale: *don't know what it is, never or almost never, several times a*

month, several times a week, and several times a day. The higher values on this index indicate more frequent online reading activities. The variable names are listed as they appear in the IDE.

Interest in Reading (INTREA)

The *index of interest in reading* from PISA 2000 was derived from student agreement with the following three statements: because reading is fun, I wouldn't want to give it up; I read in my spare time; and when I read, I sometimes get totally absorbed [CC000206, CC000213, CC000217]. Students responded to each statement on a four-point scale: *disagree, disagree somewhat, agree somewhat, and agree*. Positive values indicate higher levels of interest in reading, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

ii. Reading Types and Tasks

Interpretation of Literary Texts (RFSINTRP)

The *index of interpretation of literary texts* from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read fiction; explain the cause of events in a text; explain the way characters behave in a text; and explain the purpose of a text [RFS00104, RFS00202–3, RFS00205]. Students responded to each statement on a four-point scale: *many times, two or three times, once, or not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent interpretation of literary texts. The variable names are listed as they appear in the IDE.

Use of Texts Containing Noncontinuous Materials (RFSNCONT)

The *index of use of texts containing noncontinuous materials* from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: use texts that include diagrams or maps; use texts that include tables or graphs; find information from a graph, diagram, or table; and describe the way the information in a table or graph is organized [RFS00103, RFS00107, RFS00201, RFS00208]. Students responded to each statement on a four-point scale: *many times, two or three times, once, or not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent use of text containing noncontinuous materials. The variable names are listed as they appear in the IDE.

Reading Activities for Traditional Literature Courses (RFSTRLIT)

The *index of reading activities for traditional literature courses* from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read informational texts about writers or books; read poetry; memorize a text by heart; learn about the place of a text in the history of literature; and learn about the life of the writer [RFS00101–2, RFS00204, RFS00206–7]. Students responded to each statement on a four-point scale: *many times, two or three times, once, or not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent reading activities for traditional literature courses. The variable names are listed as they appear in the IDE.

Use of Functional Texts (RFSFUMAT)

The *index of use of functional texts* from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read newspaper reports and magazine articles; read instructions or manuals telling how to make or do something (e.g., how a machine works); read advertising material (e.g., advertisements); and explain the connection between different parts of a text [RFS00105–6, RFS00108, RFS00209]. Students responded to each statement on a four-point scale: *many times*, *two or three times*, *once*, or *not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent use of functional texts. The variable names are listed as they appear in the IDE.

iii. Interest in Mathematics

Mathematics Intentions (MATINTFC)

The *index of mathematics intentions* (MATINTFC) from PISA 2012 was constructed asking students to choose, for each pair of the following statements, the item that best described them: I intend to take additional mathematics courses after school finishes vs. I intend to take additional <test language> courses after school finishes; I plan on majoring in a subject in <college> that requires mathematics skills vs. I plan on majoring in a subject in <college> that requires science skills; I am willing to study harder in my mathematics classes than is required vs. I am willing to study harder in my <test language> classes than is required; I plan on <taking> as many mathematics classes as I can during my education vs. I plan on <taking> as many science classes as I can during my education; I am planning on pursuing a career that involves a lot of mathematics vs. I am planning on pursuing a career that involves a lot of science [ST016401-5].

Interest in and Enjoyment of Mathematics (INTMAT12)

The *index of intrinsic motivation to learn mathematics* (INTMAT12) for PISA 2012 and 2003 was constructed using student responses over the extent they strongly agreed, agreed, disagreed or strongly disagreed to the statements when asked to think about their views on mathematics: I enjoy reading about mathematics; I look forward to my mathematics lessons; I do mathematics because I enjoy it; I am interested in the things I learn in mathematics [ST007001, ST007003–4, ST007006]. Positive scores indicate higher levels of interest in and enjoyment of mathematics. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of intrinsic motivation to learn mathematics were rescaled to be comparable to those in PISA 2012. As a result, values for the index of intrinsic motivation to learn mathematics for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004). In PISA 2003 the index of intrinsic motivation to learn mathematics was named the index of interest and enjoyment in mathematics. Given that both are based on the same questionnaire items, they are comparable over time.

Interest in Mathematics (INSMAT)

The *index of interest in mathematics* from PISA 2000 was derived from students' responses concerning the extent to which they agreed with the following three items: when I do mathematics, I sometimes get totally absorbed; because doing mathematics is fun, I wouldn't want to give it up; and mathematics is important to me personally [CC000201, CC000210, CC000221]. Students responded to each statement on a four-point scale: *disagree*, *disagree somewhat*, *agree somewhat*, and *agree*. Positive values indicate a greater interest in mathematics, and negative values a lower interest. The variable names are listed as they appear in the IDE.

iv. Enjoyment of and Interest in Science

Broad Interest in Science Topics (INTBRSCI)

The *index of broad interest in science topics* (INTBRSCI) was constructed using students' responses to a new question developed for PISA 2015. Students reported on a five-point Likert scale with the categories "not interested", "hardly interested", "interested", "highly interested", and "I don't know what this is", their interest in the following topics: biosphere (e.g. ecosystem services, sustainability); motion and forces (e.g. velocity, friction, magnetic and gravitational forces); energy and its transformation (e.g. conservation, chemical reactions); the Universe and its history; how science can help us prevent disease [ST021201-05]. The last response category ("I don't know what this is") was recoded as a missing for the purpose of deriving the index INTBRSCI. Higher values on the index reflect greater levels of agreement with these statements.

Enjoyment of Science Learning (JOYSCIE)

The *index of enjoyment of science learning* from PISA 2015 and PISA 2006 was derived from students' responses concerning the extent to which they agreed with the following statements: I generally have fun when I am learning broad science topics; I like reading about broad science; I am happy doing broad science problems; I enjoy acquiring new knowledge in broad science; and I am interested in learning about broad science [ST009401–5]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of enjoyment of science learning. The variable names are listed as they appear in the IDE.

Interest in and Enjoyment of Science (INTSCIE)

The *index of interest in and enjoyment of science learning* from PISA 2006 was derived from students' responses concerning their interest in learning about the following broad science topics: topics in physics; topics in chemistry; the biology of plants; human biology; topics in astronomy; topics in geology; how scientists design experiments; and what is required for scientific explanations [ST009901–8]. Students responded to each statement on a four-point scale: *high interest*; *medium interest*; *low interest*; and *no interest*. All items were inverted for scaling so that positive scores indicate higher levels of interest in science learning. The variable names are listed as they appear in the IDE.

v. Value of Science

General Value of Science (GENSCIE)

The *index of the general value of science* from PISA 2006 was derived from students' responses concerning their level of agreement with the following statements: advances in broad science and technology usually improve people's living conditions; broad science is important for helping us to understand the natural world; advances in broad science and technology usually help improve the economy; broad science is valuable to society; and advances in broad science and technology usually bring social benefits [ST009601–2, ST009604, ST009606, ST009609]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate positive perceptions of the general value of science. The variable names are listed as they appear in the IDE.

Personal Value of Science (PERSCIE)

The *index of the personal value of science* from PISA 2006 was derived from students' responses concerning their level of agreement with the following statements: some concepts in broad science help me see how I relate to other people; I will use broad science in many ways when I am an adult; broad science is very relevant to me; I find that broad science helps me to understand the things around me; and when I leave school there will be many opportunities for me to use broad science [ST009603, ST009605, ST009607–8, ST009610]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate positive perceptions of the personal value of science. The variable names are listed as they appear in the IDE.

vi. Self-Related Cognition Related to Learning

Achievement motivation

The *index of achievement motivation* (MOTIVAT) from PISA 2015 was constructed using students' responses to a new question developed for PISA 2015. Students reported, on a four-point Likert scale with the answering categories "strongly disagree", "disagree", "agree", and "strongly agree", their agreement with the following statements: I want top grades in most or all of my courses [ST021801]; I want to be able to select from among the best opportunities available when I graduate [ST021802]; I want to be the best, whatever I do [ST021803]; I see myself as an ambitious person [ST021804]; I want to be one of the best students in my class [ST021805]. Higher values indicate that students have greater achievement motivation.

Test Anxiety (ANXTEST)

The *index of test anxiety* (ANXTEST) from PISA 2015 was constructed using student responses [ST118Q01NA-05NA] to the following statements: I often worry that it will be difficult for me taking a test; I worry that I will get poor <grades> at school; Even if I am well prepared for a test I feel very anxious; I get very tense when I study for a test; and I get nervous when I don't know

how to solve a task at school. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*.

Openness for Problem Solving (OPENPS)

The *index of openness to problem solving* (OPENPS) from PISA 2012 was constructed using student responses [ST018505-06, ST018509-10, ST018514] over whether they report that the following statements describe them *very much, mostly, somewhat, not much, not at all*: I can handle a lot of information; I am quick to understand things; I seek explanations of things; I can easily link facts together; I like to solve complex problems.

Perceived Self-Efficacy (SELFEF)

The *index of perceived self-efficacy* from PISA 2000 was derived from students' responses concerning how often the following statements apply to them: I'm certain I can understand the most difficult material presented in texts; I'm confident I can do an excellent job on assignments and tests; and I'm certain I can master the skills being taught [CC000102, CC000118, CC000126]. Students responded to each statement on a four-point scale: *almost never, sometimes, often, and almost always*. Positive values indicate a higher sense of perceived self-efficacy, and negative values indicate a lower sense of perceived self-efficacy. The variable names are listed as they appear in the IDE.

Effort and Perseverance (EFFPER)

The *index of effort and perseverance* from PISA 2000 was derived from students' responses concerning how often the following statements apply to them when they study: I work as hard as possible; I keep working even if the material is difficult; I try to do my best to acquire the knowledge and skills taught; and I put forth my best effort [CC000107, CC000112, CC000120, CC000128]. Students responded to each statement on a four-point scale: *almost never, sometimes, often, and almost always*. Positive values indicate a higher frequency of effort and perseverance as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Instrumental Motivation (INSMOT)

The *index of instrumental motivation* from PISA 2000 was derived from students' responses concerning how often they study to increase their job opportunities; ensure that their future will be financially secure; and enable them to get a good job [CC000106, CC000114, CC000122]. Students responded to each statement on a four-point scale: *almost never, sometimes, often, and almost always*. Positive values indicate higher levels of instrumental motivation for learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

Student Academic Self-Concept (SCACAD)

The *index of student academic self-concept* from PISA 2000 was derived from students' responses concerning their level of agreement with the following statements: I learn things quickly in most school subjects; I'm good at most school subjects; and I do well in tests in most

school subjects [CC000203, CC000207, CC000220]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. Positive scores indicate higher levels of academic self-concept, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

Self-Concept in Reading (SCVERB)

The *index of self-concept in reading* from PISA 2000 was derived from students' responses concerning their level of agreement with the following statements: I'm hopeless in test language classes; I learn things quickly in test language class; and I get good marks in test language [CC000205, CC000209, CC000223]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. Positive values indicate a higher level of self-concept in reading, and negative values indicate a lower level. The variable names are listed as they appear in the IDE.

Perseverance (PERSEV)

The *index of perseverance* (PERSEV) from PISA 2012 was constructed using student responses [ST018401-07] over whether they report that the following statements describe them *very much*, *mostly*, *somewhat*, *not much*, *not at all*: When confronted with a problem, I give up easily; I put off difficult problems; I remain interested in the tasks that I start; I continue working on tasks until everything is perfect; when confronted with a problem, I do more than what is expected of me.

vii. Self-Related Cognition in Mathematics

Attributions to Failure in Mathematics (FAILMAT)

The *index of perceived self-responsibility for failing in mathematics* (FAILMAT) from PISA 2012 was constructed using student responses when examining the following scenario defined in [ST016201, ST016203-05, ST016207-08]: "Suppose that you are a student in the following situation: each week, your mathematics teacher gives a short quiz. Recently you have done badly on these quizzes. Today you are trying to figure out why. Are you *very likely*, *likely*, *slightly likely* or *not at all likely* to have the following thoughts or feelings in this situation? 1) I'm not very good at solving mathematics problems; 2) my teacher did not explain the concepts well this week; 3) this week I made bad guesses on the quiz; 4) sometimes the course material is too hard; 5) the teacher did not get students interested in the material; 6) sometimes I am just unlucky.

Mathematics Self-Efficacy (MATHEFF12)

The *index of mathematics self-efficacy* (MATHEFF12) for PISA 2012 and 2003 was derived from students' responses concerning their level of confidence doing the following calculations: using a train timetable, calculating how long it would take to get from one place to another; calculating how much cheaper a TV would be after a 30 percent discount; calculating how many square meters of tiles you need to cover a floor; understanding graphs presented in newspapers; solving an equation like $3x + 5 = 17$; finding the actual distance between two places on a map with a 1:10,000 scale; solving an equation like $2(x+3) = (x + 3)(x - 3)$; and calculating the gas

consumption rate of a car [ST016901-09]. Students responded to each statement on a four-point scale: *very confident*, *confident*, *not very confident*, and *not at all confident*. All items were inverted for scaling so that positive scores indicate higher levels of confidence in self-efficacy regarding mathematics, and negative scores indicate lower levels of confidence. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of mathematics self-efficacy were rescaled to be comparable to those in PISA 2012. As a result, values for the index of mathematics self-efficacy for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Mathematics Work Ethic (MATWKETH)

The *index of mathematics work ethic* (MATWKETH) for PISA 2012 was derived from students' responses concerning their level of agreement with the following statements: I have my homework finished in time for mathematics class; I work hard on my mathematics homework; I am prepared for my mathematics exams; I study hard for mathematics quizzes; I keep studying until I understand the mathematics material; I pay attention in mathematics class; I listen in mathematics class; I avoid distractions when I am studying mathematics; and I keep my mathematics work well organized [ST016301-09]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. Positive values indicate a higher level of mathematics work ethic, and negative values indicate a lower level. The variable names are listed as they appear in the IDE.

Instrumental Motivation in Mathematics (INSTMOT12)

The *index of instrumental motivation to learn mathematics* (INSTMOT12) for PISA 2012 and 2003 was constructed using student responses over the extent they *strongly agreed*, *agreed*, *disagreed* or *strongly disagreed* to a series of statements in question when asked to think about their views on mathematics: Making an effort in mathematics is worth because it will help me in the work that I want to do later on; learning mathematics is worthwhile for me because it will improve my career <prospects, chances>; Mathematics is an important subject for me because I need it for what I want to study later on; I will learn many things in mathematics that will help me get a job [ST007002, ST007005, ST007007, ST007008]. All items were inverted for scaling so that positive scores indicate higher levels of instrumental motivation to learn mathematics. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of instrumental motivation to learn mathematics were rescaled to be comparable to those in PISA 2012. As a result, values for the index of instrumental motivation to learn mathematics for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Mathematics Anxiety (ANXMAT12)

The *index of mathematics anxiety* from PISA 2012 and 2003 (ANXMAT12) was derived from students' responses concerning their level of agreement with the following statements: I often worry that it will be difficult for me in mathematics classes; I get very tense when I have to do mathematics homework; I get very nervous doing mathematics problems; I feel helpless when doing a mathematics problem; and I worry that I will get poor grades in mathematics [ST007201, ST007203, ST007205, ST007208, ST007210]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of mathematics anxiety, and negative scores indicate lower levels. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of anxiety towards mathematics were rescaled to be comparable to those in PISA 2012. As a result, values for the index of anxiety towards mathematics for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Mathematics Self-Concept (SCMAT12, MATCON)

The *index of mathematics self-concept* was derived from students' responses concerning their level of agreement on their performance in mathematics. **SCMAT12** in PISA 2012 and 2003 included the following items: I am just not good at mathematics; I get good marks in mathematics; I learn mathematics quickly; I have always believed that mathematics is one of my best subjects; and in my mathematics class, I understand even the most difficult work [ST007202, ST007204, ST007206-07, ST007209]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. **MATCON** in PISA 2000 included the following items: I get good marks in mathematics; mathematics is one of my best subjects; and I have always done well in mathematics [CC000212, CC000215, CC000218]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. All items were inverted for scaling, except one item in PISA 2003 that was negatively phrased and therefore not inverted. Positive values indicate a greater self-concept in mathematics, and negative values indicate a lower self-concept. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of mathematics self-concept were rescaled to be comparable to those in PISA 2012. As a result, values for the index of mathematics self-concept for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

viii. Self-Related Cognition in Science

Epistemic Beliefs about Science (EPIST)

The *index of epistemological beliefs about science* from PISA 2015 was derived from students' responses about students' views on scientific approaches. Students reported, on a four-point Likert scale with the answering categories "strongly disagree", "disagree", "agree", and

“strongly agree”, their agreement with the following statements: A good way to know if something is true is to do an experiment [ST022501]; Ideas in <broad science> sometimes change [ST022503]; Good answers are based on evidence from many different experiments [ST022504]; It is good to try experiments more than once to make sure of your findings [ST022506]; Sometimes <broad science> scientists change their minds about what is true in science [ST022508]; The ideas in <broad science> science books sometimes change [ST022511]. Higher levels of the index correspond to greater levels of agreement with these statements.

Science Self-Efficacy (SCIEEFF)

The *index of science self-efficacy* from PISA 2015 and 2006 was derived from students’ responses concerning their level of confidence doing the following science-related tasks: recognize the science question that underlies a newspaper report on a health issue; explain why earthquakes occur more frequently in some areas than in others; describe the role of antibiotics in the treatment of disease; identify the science question associated with the disposal of garbage; predict how changes to an environment will affect the survival of certain species; interpret the scientific information provided on the labeling of food items; discuss how new evidence can lead you to change your understanding about the possibility of life on Mars; and identify the better of two explanations for the formation of acid rain [ST009501–8]. Students responded to each statement on a four-point scale: *do easily*; *with some effort*; *struggle on own*; and *couldn't do it*. These items cover important themes identified in the science literacy framework: identifying scientific questions, explaining phenomena scientifically, and using scientific evidence. All items were inverted for scaling so that positive scores indicate higher levels of self-efficacy in science-related tasks. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2006 values of the index of science self-efficacy were rescaled to be comparable to those in PISA 2015. As a result, values for the index of science self-efficacy for PISA 2006 reported in the PISA IDE may differ from those reported in *Science Competencies for Tomorrow's World: Volume 1: Analysis* (OECD, 2007).

Instrumental Motivation in Science (INSTSCIE)

The *index of instrumental motivation to learn science* from PISA 2015 and 2006 was derived from students’ responses concerning their level of agreement with the following statements: making an effort in my school science subject(s) is worth it because this will help me in the work I want to do later on; what I learn in my school science subject(s) is important for me because I need this for what I want to study later on; I study school science because I know it is useful for me; studying my school science subject(s) is worthwhile for me because what I learn will improve my career prospects; and I will learn many things in my school science subject(s) that will help me get a job [ST011301-05]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of instrumental motivation to learn science. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2006 values of the index of instrumental motivation to learn science were rescaled to be comparable to those in PISA 2015. As a result, values for the index of instrumental motivation to learn science for PISA 2006 reported in the PISA IDE may differ from those reported in *Science Competencies for Tomorrow's World: Volume 1: Analysis* (OECD, 2007).

Future-Oriented Science Motivation (SCIEFUT)

The *index of future-oriented science motivation* from PISA 2006 was derived from students' responses concerning their level of agreement with the following statements: I would like to work in a career involving broad science; I would like to study broad science after secondary school; I would like to spend my life doing advanced broad science; and I would like to work on broad science projects as an adult [ST010701-04]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of motivation to take up a science-related career. The variable names are listed as they appear in the IDE.

Science Self-Concept (SCSCIE)

The *index of science self-concept* from PISA 2006 was derived from students' responses concerning their level of agreement with the following statements: learning advanced school science topics would be easy for me; I can usually give good answers to test questions on school science topics; I learn school science topics quickly; school science topics are easy for me; when I am being taught school science, I can understand the concepts very well; and I can easily understand new ideas in school science [ST011501–6]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of self-concept in science. The variable names are listed as they appear in the IDE.

ix. Learning Strategies – Reported by Student

Enjoy Cooperation (COOPERATE)

The *index of enjoy cooperation (COOPERATE)* from PISA 2015 was derived from students' responses to the following statements: I am a good listener; I enjoy seeing my classmates be successful; I take into account what others are interested in; and I enjoy considering different perspectives. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*.

Value Cooperation (CPSVALUE)

The *index of value cooperation (CPSVALUE)* from PISA 2015 was derived from students' responses to the following statements: I prefer working as part of a team to working alone; I find that teams make better decisions than individuals; I find that teamwork raises my own efficiency; and I enjoy cooperating with peers. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*.

Memorization Strategies (MEMOR)

The *index of memorization* was derived from students' responses concerning the frequency with which they used memorization as a learning strategy when studying. **MEMOR09** in PISA 2009 included the following items: I try to memorize everything that is covered in the text; I try to memorize as many details as possible; I read the text so many times that I can recite it; and I read the text over and over again [ST014201, ST014203, ST014205, ST014207]. **MEMOR03** in PISA 2003 included the following items: I go over some problems in mathematics so often that I feel as if I could solve them in my sleep; when I study for mathematics, I try to learn as much as I can by heart; in order to remember the method for solving a mathematics problem, I go through examples again and again; to learn mathematics, I try to remember every step in a procedure [ST007406–7, ST007409, ST007413]. **MEMOR00** in PISA 2000 included the following items: I try to memorize everything that might be covered; I memorize as much as possible; I memorize all new material so that I can recite it; and I practice by saying the material to myself over and over [ST014201, ST014203, ST014205, ST014207]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (MEMOR09 and MEMOR00); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (MEMOR03). Items for MEMOR03 were inverted for scaling. Positive values indicate a higher frequency of self-reported use of memorization as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Control Expectation (CEXP)

The *index of control expectation* from PISA 2000 was derived from students' responses concerning the frequency with which the following statements applied to them: when I sit myself down to learn something really difficult, I can learn it; if I decide not to get any bad grades, I can really do it; if I decide not to get any problems wrong, I can really do it; and if I want to learn something well, I can [CC000104, CC000111, CC000116, CC000124]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always*. Positive values indicate higher control expectation, and negative values indicate lower control expectation. The variable names are listed as they appear in the IDE.

Use of Elaboration Strategies (ELAB)

The *index of elaboration* was derived from students' responses concerning the frequency with which they used elaboration (e.g., making connections to related areas) as a learning strategy when studying. **ELAB09** in PISA 2009 included the following items: I try to relate new information to prior knowledge acquired in other subjects; I figure out how the information might be useful outside school; I try to understand the material better by relating it to my own experiences; and I figure out how the text information fits in with what happens in real life [ST014204, ST014208, ST014210, ST014212]. **ELAB03** in PISA 2003 included the following items: when I am solving mathematics problems, I often think of new ways to get the answer; I think how the mathematics I have learned can be used in everyday life; I try to understand new concepts in mathematics by relating them to things I already know; when I am solving a mathematics problem, I often think about how the solution might be applied to other interesting questions; and when learning mathematics, I try to relate the work to things I have learned in

other subjects [ST007402, ST007405, ST007408, ST007411, ST007414]. **ELAB00** in PISA 2000 included the following items: I try to relate new material to things I have learned in other subjects; I figure out how the information might be useful in the real world; I try to understand the material better by relating it to things I already know; and I figure out how the material fits in with what I have already learned [ST014204, ST014212, CC000121, CC000125]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (ELAB09 and ELAB00); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (ELAB03). Items for ELAB03 were inverted for scaling. Positive values indicate a higher frequency of the self-reported use of elaboration as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Control Strategies (CSTRAT)

The *index of control strategies* was derived from students' responses concerning the frequency with which they used strategies that involve planning, monitoring, and regulation when studying. **CSTRAT** in PISA 2009 and 2000 included the following items: I start by figuring out what exactly I need to learn; I check if I understand what I have read; I try to figure out which concepts I still haven't really understood; I make sure that I remember the most important points in the text; and if I don't understand something, I look for additional information to clarify this [ST014202, ST014206, ST014209, ST014211, ST014213]. **CSTRAT03** in PISA 2003 included the following items: when I study for a mathematics test, I try to work out what are the most important parts to learn; when I study mathematics, I make myself check to see if I remember the work I have already done; when I study mathematics, I try to figure out which concepts I still have not understood properly; when I cannot understand something in mathematics, I always search for more information to clarify the problem; when I study mathematics, I start by figuring out exactly what I need to learn [ST007401, ST007403, ST007404, ST007410, ST007412]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (CSTRAT); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (CSTRAT03). Items for CSTRAT03 were inverted for scaling. Positive values indicate a higher frequency of the self-reported use of control strategies, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Understanding and Remembering (UNDREM)

The *index of understanding and remembering* from PISA 2009 was derived from students' responses concerning the usefulness of the following strategies for understanding and memorizing text: I concentrate on the parts of the text that are easy to understand; I quickly read through the text twice; after reading the text, I discuss its content with other people; I underline important parts of the text; I summarize the text in my own words; and I read the text aloud to another person [ST015601-06]. Students responded to each statement on a six-point scale where *not useful at all* was scored as 1, and *very useful* was scored as 6. Higher values on this index indicate a greater perception of the usefulness of this strategy. The variable names are listed as they appear in the IDE.

Preference for Competitive Learning Situations (COMPLRN)

The *index of preference for competitive learning situations* from PISA 2003 was derived from students' responses concerning the extent to which they agreed with the following statements: I would like to be the best in my class in mathematics; I try very hard in mathematics because I want to do better in the exams than the others; I make a real effort in mathematics because I want to be one of the best; in mathematics I always try to do better than the other students in my class; I do my best work in mathematics when I try to do better than others [ST007701, ST007703, ST007705, ST007707, ST007710]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate a preference for competitive learning situations. The variable names are listed as they appear in the IDE.

Preference for Cooperative Learning Situations (COOPLRN)

The *index of preference for cooperative learning situations* from PISA 2003 was derived from students' responses concerning the extent to which they agreed with the following statements: in mathematics I enjoy working with other students in groups; when we work on a project in mathematics, I think that it is a good idea to combine the ideas of all the students in a group; I do my best work in mathematics when I work with other students; in mathematics, I enjoy helping others to work well in a group; and in mathematics I learn most when I work with other students in my class [ST007702, ST007704, ST007706, ST007708-09]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate a preference for cooperative learning situations. The variable names are listed as they appear in the IDE.

Cooperative Learning (COPLRN)

The *index of cooperative learning* from PISA 2000 was derived from students' responses concerning their level of agreement with the following statements: I like to work with other students; I learn most when I work with other students; I like to help other people do well in a group; it is helpful to put together everyone's ideas when working on a project [CC000202, CC000208, CC000219, CC000222]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. Positive scores indicate higher levels of preference for cooperative learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

Summarizing (METASUM)

The *index of summarizing* from PISA 2009 was derived from students' responses concerning the usefulness of the following strategies for writing a summary of a long and rather difficult two-page text about fluctuations in the water levels of a lake in Africa: (a) I write a summary. Then I check that each paragraph is covered in the summary, because the content of each paragraph should be included; (b) I try to copy out accurately as many sentences as possible; (c) before writing the summary, I read the text as many times as possible; (d) I carefully check whether the most important facts in the text are represented in the summary; and (e) I read through the text,

underlining the most important sentences, then I write them in my own words as a summary [ST015701-05]. Students responded to each statement on a six-point scale where *not useful at all* was scored as 1 and *very useful* was scored as 6. Higher values on this index indicate a greater perception of the usefulness of this strategy. The variable names are listed as they appear in the IDE.

Competitive Learning (CPMLRN)

The *index of competitive learning* from PISA 2000 was derived from students' responses concerning their level of agreement with the following statements: I like to try to be better than other students; trying to be better than others makes me work well; I would like to be the best at something; I learn faster if I'm trying to do better than the others [CC000204, CC000211, CC000216, CC000224]. Students responded to each statement on a four-point scale: *disagree*, *disagree some*, *agree some*, and *agree*. Positive scores indicate higher reported levels of preference for competitive learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

x. Classroom Instruction in Reading-Teacher Strategies

Teachers' Stimulation of Students' Reading Engagement (STIMREAD)

The *index of teachers' stimulation of students' reading engagement* from PISA 2009 was derived from students' responses concerning how often the following occurred in their lessons of the language of instruction: the teacher asks students to explain the meaning of a text; the teacher asks questions that challenge students to get a better understanding of a text; the teacher gives students enough time to think about their answers; the teacher recommends a book or author to read; the teacher encourages students to express their opinion about a text; the teacher helps students relate the stories they read to their lives; and the teacher shows students how the information in texts builds on what they already know [ST015201-07]. Students responded to each statement on a four-point scale: *never or hardly ever*, *some lessons*, *most lessons*, and *all lessons*. Higher values on this index indicate higher teachers' stimulation of students' reading engagement. The variable names are listed as they appear in the IDE.

Use of Structuring and Scaffolding Strategies (STRSTRAT)

The *index of the use of structuring and scaffolding strategies* from PISA 2009 was derived from students' responses concerning how often the following occurred in their lessons of the language of instruction (e.g., English in the U.S.): the teacher explains beforehand what is expected of the students; the teacher checks that students are concentrating while working on the reading assignment; the teacher discusses students' work, after they have finished the reading assignment; the teacher tells students in advance how their work is going to be judged; the teacher asks whether every student has understood how to complete the reading assignment; the teacher marks students' work; the teacher gives students the chance to ask questions about the reading assignment; the teacher poses questions that motivate students to participate actively; and the teacher tells students how well they did on the reading assignment immediately after [ST015301-09]. Students responded to each statement on a four-point scale: *never or hardly*

ever, some lessons, most lessons, and all lessons. Higher values on this index indicate a greater use of structured teaching. The variable names are listed as they appear in the IDE.

xi. Instructional Experiences in Math

Cognitive Activation in Mathematics (COGACT)

The *index of teacher's use of cognitive activation strategies* (COGACT) from PISA 2012 was constructed using student responses [ST017601, ST017604-11] over how often a series of situations happened with the mathematics teacher that taught them their last mathematics class: the teacher asks questions that make students reflect on the problem; the teacher gives problems that require students to think for an extended time; the teacher asks students to decide, on their own, procedures for solving complex problems; the teacher presents problems in different contexts so that students know whether they have understood the concepts; the teacher helps students to learn from mistakes they have made; the teacher asks students to explain how they solved a problem; the teacher presents problems that require students to apply what they have learned in new contexts; and the teacher gives problems that can be solved in different ways. Students were asked to report whether these behaviours and situations occur *always or almost always, often, sometimes or never or rarely.*

Teacher Behavior: Student Orientation (TCHBEHSO)

The *index of teachers' student orientation* (TCHBEHSO) from PISA 2012 was constructed using students' reports [ST017503-04, ST017507, ST017510] on the frequency (*every lesson, most lessons, some lessons, never or hardly ever*) with which, in mathematics lessons, the teacher gives students different work to classmates who have difficulties learning and/or to those who can advance faster; the teacher assigns projects that require at least one week to complete; the teacher has students work in small groups to come up with a joint solution to a problem or task; and the teacher asks students to help plan classroom activities or topics.

Teacher Behavior: Teacher-directed Instruction (TCHBEHTD)

The *index of teacher-directed instruction* (TCHBEHTD) from PISA 2012 was constructed using students' reports [ST017501-02, ST017506, ST017508, ST017515] on the frequency (*every lesson, most lessons, some lessons, never or hardly ever*) with which, in mathematics lessons, the teacher sets clear goals for student learning; the teacher asks students to present their thinking or reasoning at some length; the teacher asks questions to check whether students understood what was taught; and the teacher tells students what they have to learn.

xii. Instructional Experiences in Science

Adaptive instruction (ADINST)

The *index of adaptive instruction* (ADINST) from PISA 2015 was constructed from students' reports on how often ("never or almost never"; "some lessons"; "many lessons"; "every lesson or almost every lesson") the following happened in their science lessons: The teacher adapts the lesson to my class's needs and knowledge [ST021501]; The teacher provides individual help when

a student has difficulties understanding a topic or task [ST021502]; The teacher changes the structure of the lesson on a topic that most students find difficult to understand [ST021503].

Science Teaching: Interaction (SCINTACT)

The *index of science teaching: interaction* from PISA 2006 was derived from students' responses concerning the frequency of the following interactive teaching in science lessons: students are given opportunities to explain their ideas; the lessons involve students' opinions about the topics; there is a class debate or discussion; and the students have discussions about the topics [ST011201, ST011205, ST011209, ST011213]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of interactive science teaching. The variable names are listed as they appear in the IDE.

Science Teaching: Hands-on Activities (SCHANDS)

The *index of science teaching: hands-on activities* from PISA 2006 was derived from students' responses concerning the frequency of the following hands-on activities in science lessons: students spend time in the laboratory doing practical experiments; students are required to design how a school science question could be investigated in the laboratory; students are asked to draw conclusions from an experiment they have conducted; students do experiments by following the instructions of the teacher [ST011202, ST011203, ST011206, ST011214]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

Science Teaching: Student Investigations (SCINVEST)

The *index of science teaching: student investigations* from PISA 2006 was derived from students' responses concerning the frequency of the following activities that occur at school: students are allowed to design their own experiments; students are given the chance to choose their own investigations; and students are asked to do an investigation to test out their own ideas [ST011208, ST011211, ST011216]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

Science Teaching: Focus on Applications or Models (SCAPPLY)

The *index of science teaching: focus on applications or models* from PISA 2006 was derived from students' responses concerning the frequency with which the following activities occur at school: the teacher explains how a school science idea can be applied to a number of different phenomena (e.g., the movement of objects, substances with similar properties); the teacher uses science to help students understand the world outside school; the teacher clearly explains the relevance of broad science concepts to our lives; and the teacher uses examples of technological application to show how school science is relevant to society [ST011207, ST011212, ST011214,

ST011217]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

6.C. Learning Environment

i. Learning Environment – Home

Parental Cultural Communication (CULTCOM)

The *index of cultural communication* from PISA 2000 was derived from students' responses concerning the frequency with which their parents (or guardians) engaged with them in discussing political or social issues; discussing books, films, or television programs; and listening to classical music [ST001901-03]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of cultural communication, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Parental Social Communication (SOCCOM)

The *index of social communication* from PISA 2000 was derived from students' responses concerning the frequency with which their parents (or guardians) engaged with them in the following activities: discussing how well they are doing at school; eating the main meal with them around a table; and spending time simply talking with them [ST001904-06]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of social communication, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Family Educational Support (FAMEDSUP)

The *index of family educational support* from PISA 2000 was derived from students' reports on how frequently the following people worked with the student on schoolwork: mother; father; and brothers and sisters [ST002001-03]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of family (parents and siblings) support for the student's schoolwork, while negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

ii. Learning Environment – Classroom for Test Language

Perceived feedback (PERFEED)

The *index of perceived feedback* (PERFEED) from PISA 2015 was constructed from students' reports on how often (“never or almost never”; “some lessons”; “many lessons”; “every lesson or almost every lesson”) the following happened in their science lessons: The teacher tells me how I am performing in this course [ST021401]; The teacher gives me feedback on my strengths in this <school science> subject [ST021402]; The teacher tells me in which areas I can still improve [ST021403]; The teacher tells me how I can improve my performance [ST021404]; The teacher advises me on how to reach my learning goals [ST021405].

Achievement Press (ACHPRESS)

The *index of achievement press* from PISA 2000 was derived from students' reports on the frequency with which, in their test language lesson, the teacher wants students to work hard; tells students that they can do better; does not like it when students deliver careless work; and students have to learn a lot [ST002602, ST002603, ST002604, ST002615]. Students responded to each statement on a four-point scale: *never*, *some lessons*, *most lessons*, and *every lesson*. Positive values indicate higher levels, and negative values indicate lower levels, of achievement press. The variable names are listed as they appear in the IDE.

Teacher Support in Test Language (TCHSUP00)

The *index of teacher support* from PISA 2000 was derived from students' reports on the frequency with which the teacher supports learning in their test language class by doing the following: shows an interest in every student's learning; gives students an opportunity to express opinions; helps students with their work; continues teaching until the students understand; does a lot to help students; and helps students with their learning [ST002605-10]. Students responded to each statement on a four-point scale: *never*, *some lessons*, *most lessons*, and *every lesson*. Positive values indicate higher levels, and negative values indicate lower levels, of teacher support. The variable names are listed as they appear in the IDE.

iii. Teacher Support for Learning Mathematics

Teacher Support in Mathematics (TEACHSUP15, TEACHSUP12)

The *index of teacher support (in mathematics)* from PISA 2015 (TEACHSUP15), 2012 and 2003 (TEACHSUP12) was derived from students' reports on the frequency with which the teacher supports learning in their mathematics class by doing the following: shows an interest in every student's learning; gives extra help when students need it; helps students with their learning; continues teaching until the students understand; and gives students an opportunity to express opinions [ST007801, ST007803, ST007805, ST007807, ST007810]. Students responded to each statement on a four-point scale: *never or hardly ever*, *some lessons*, *most lessons*, and *every lesson*. All items were inverted for scaling so that positive values on this index indicate students' perceptions of higher levels of teacher support. The variable names are listed as they appear in the IDE.

iv. Parent and Peer Support for Learning Mathematics

Subjective Norms in Mathematics (SUBNORM)

The *index of subjective norms in mathematics* (SUBNORM) from PISA 2012 was constructed using student responses [ST015901-06] over whether, thinking about how people important to them view mathematics, they *strongly agreed, agreed, disagreed or strongly disagreed* to the following statements: Most of my friends do well in mathematics; most of my friends work hard at mathematics; my friends enjoy taking mathematics tests; my parents believe it's important for me to study mathematics; my parents believe that mathematics is important for my career; my parents like mathematics.

6.D. Learning Time and Course Work

Instructional Time

PISA 2015, 2012, 2009, 2003, and 2000 collected data on the number of minutes spent each week at school. The variable names are listed as they appear in the IDE.

Reading Courses (RMINS) – The index RMINS from PISA 2009 and 2000 was computed by multiplying students' responses on the number of minutes on average in the test language class by number of test language class periods per week [SC000603, ST014301, ST014401]

Number of Minutes per Week in Language Courses (LMINS) – The index LMINS from PISA 2015 and 2012 was computed by multiplying how many class periods the students spend in courses during the last full week for test language courses and the number of instructional minutes in the average single class period from the school questionnaire [ST014401, ST014301].

Mathematics Courses (MMINS) – The index from 2015, 2012, 2009, 2003, and 2000 was derived from the product of the number of class periods in mathematics per week [ST014402 in 2015, 2012, 2009 and 2000; ST007502 in 2003] and the number of minutes per single class period [ST014302 in 2012 and 2009; SC000603 in 2000].

Science Courses (SMINS) – The index from 2015, 2012, 2009 and 2000 was derived from the product of the number of class periods in science per week [ST014403 in 2015, 2012, 2009 and 2000] and the number of minutes per single class period [ST014303 in 2012 and 2009; SC000603 in 2000].

Total Minutes of Instructional Time per Week (TMINS) – The index from 2015 and 2003 was calculated by multiplying the median length of a class period by the number of class periods with instruction in all subjects (including mathematics).

Relative Instructional Time on Mathematics (PCMATH) – The index from 2003 was calculated by dividing the instructional time in minutes on mathematics (MMINS in 2003) by the overall instructional time in minutes (TMINS in 2003).

Out-of-School Study Time (OUTHOURS)

Students were asked in a slider-format question how much time they spent studying in addition to their required school schedule. The index OUTHOURS from PISA 2015 and 2012 was computed by summing the time spent studying for different school subjects.

Hours of Schooling (TOTHRS)

The *index of hours of schooling* from PISA 2000 was based on information provided by principals on the number of instructional weeks in the school year; the number of class periods in the school week; and the number of teaching minutes in the average single class period [SC000601-03]. The index was derived from the product of these three factors, divided by 60. The variable names are listed as they appear in the IDE.

i. Homework

Time Spent on Homework (HMWKTIME)

The *index of time spent on homework* from PISA 2000 was derived from students' reports on the amount of time they devoted to homework in the test language; mathematics; and science [ST003301-03]. Students responded to each statement on a four-point scale: *no time, less than 1 hour a week, between 1 and 3 hours a week, and 3 hours or more a week*. Positive values indicate more time spent on homework, and negative values indicate less time. The variable names are listed as they appear in the IDE.

Relative Time Spent on Mathematics Homework (RMHMWK)

The *index of relative time spent on mathematics homework* from PISA 2003 was derived from the ratio of students' responses to the following items: how much time do you spend per week doing mathematics homework; and how much time do you spend per week doing homework [ST007301, ST006901]. The variable names are listed as they appear in the IDE.

ii. Mathematics and Problem-Solving Behavior

Mathematics Behavior (MATBEH)

The *index of mathematics behavior* (MATBEH) of PISA 2012 was constructed using student responses over how often (*always or almost always, often, sometimes, never, rarely*) they do the following things at school and outside of school: I talk about mathematics problems with my friends; I help my friends with mathematics; I do mathematics as an <extracurricular> activity; I take part in mathematics competitions; I do mathematics more than 2 hours a day outside of school; I play chess; I program computers; I participate in a mathematics club.

Problem-Solving Behavior

PISA 2012 collected data on student responses to the following questions concerning problem-solving behavior. The variable names are listed as they appear in the IDE.

Problem Text Message: Press every button (ST018601), Trace Steps (ST018602), Manual (ST018603), Ask a friend (ST018605)

The full question from the 2012 student questionnaire for this variable is as follows: *Suppose that you have been sending text messages from your cell phone for several weeks. Today, however, you can't send text messages. You want to try to solve the problem. What do you do? For each suggestion, darken the option that best applies to you. a.) I press every button possible to find out what is wrong. b.) I think about what might have caused the problem and what I can do to solve it. c.) I read the manual. d.) I ask a friend for help. Students responded to each statement on a four-point scale: I would definitely do this, I would probably do this, I would probably not do this, and I would definitely not do this.*

Problem Route Selection: Read brochure (ST018701), Study map (ST018702), Leave it to brother (ST018703), Just drive (ST018705)

The full question from the 2012 student questionnaire for this variable is as follows: *Suppose that you are planning a trip to the zoo with your brother. You don't know which route to take to get there. What would you do? For each suggestion, darken the option that best applies to you. a.) I read the zoo brochure to see if it says how to get there. b.) I study a map and figure out the best route. c.) I leave it to my brother to worry about how to get there. d.) I know roughly where it is, so I suggest we just start driving. Students responded to each statement on a four-point scale: I would definitely do this, I would probably do this, I would probably not do this, and I would definitely not do this.*

Problem Ticket Machine: Similarities to Known Machines (ST018801), Try buttons (ST018804), Ask for help (ST018805), Find ticket office (ST018806)

The full question from the 2012 student questionnaire for this variable is as follows: *Suppose that you arrive at the train station. There is a ticket machine that you have never used before. You want to buy a ticket. What do you do? For each suggestion, darken the option that best applies to you. a.) I check how similar it is to other ticket machines I have used. b.) I try out all the buttons to see what happens. c.) I ask someone for help. d.) I try to find a ticket office at the station to buy a ticket. Students responded to each statement on a four-point scale: I would definitely do this, I would probably do this, I would probably not do this, and I would definitely not do this.*

iii. Familiarity with Math Concepts

Experience with Applied Mathematics Tasks (EXAPPLM)

The *index of student experience with applied mathematics tasks* (EXAPPLM) from PISA 2012 was constructed using student responses [ST016901-04, ST016906, ST016908-09] on whether they have *frequently, sometimes, rarely or never* encountered the following types of mathematics tasks during their time at school: working out from a <train timetable> how long it would take to get from one place to another; calculating how much more expensive a computer would be after adding tax; calculating how many square metres of tiles you need to cover a floor; understanding

scientific tables presented in an article; finding the actual distance between two places on a map with a 1:10,000 scale; calculating the power consumption of an electronic appliance per week.

Experience with Pure Mathematics Tasks at School (EXPUREM)

The *index of student experience with pure mathematics tasks* (EXPUREM) from PISA 2012 was constructed using student responses [ST016905, ST016907] on whether they have *frequently, sometimes, rarely or never* encountered the following types of mathematics tasks during their time at school: solving an equation like $6x^2+5=29$; solving an equation like $2(x+3)=(x+3)(x-3)$; solving an equation like $3x+5=17$.

Familiarity with Mathematical Concepts (FAMCON)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Algebraic Word Problem in Math Lesson (ST017101); Algebraic Word Problem in Tests (ST017102)

The full question from the 2012 student questionnaire for this variable is as follows: *In this box are two problems. Each requires you to understand a problem written in text and perform the appropriate calculations. Usually the problem talks about practical situations, but the numbers, people and places mentioned are made up. All the information you need is given. Here are two examples.* 1.) Ann is two years older than Betty and Betty is four times as old as Sam. When Betty is 30, how old is Sam? 2.) Mr. Smith bought a television and a bed. The television cost \$625 but he got a 10% discount. The bed cost \$200. He paid \$20 for delivery. How much money did Mr. Smith spend? We want to know your experience with this type of word problem at school. Do not solve them! Students responded to each statement on a four-point scale: *frequently, sometimes, rarely, and never*.

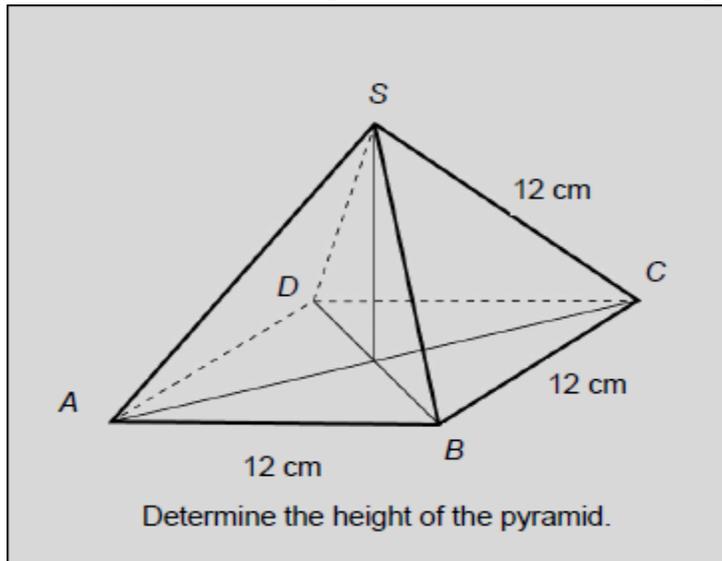
Procedural Task in Math Lessons (ST017201); Procedural Task in Tests (ST017202)

The full question from the 2012 student questionnaire for this variable is as follows: *Below are examples of another type of mathematics problem.* 1.) Solve $2x+3=7$. 2.) Find the volume of a box with sides 3m, 4m, and 5m. We want to know about your experience with this type of problem at school. Do not solve them! Students responded to each statement on a four-point scale: *frequently, sometimes, rarely, and never*.

Pure Math Reasoning in Math Lesson (ST017301); Pure Math Reasoning in Tests (ST017302)

The full question from the 2012 student questionnaire for this variable is as follows: *In the next type of problem, you have to use mathematical knowledge and draw conclusions. There is no practical application provided. Here are two examples.*

1.) Here you need to use geometrical theorems: (see figure below from questionnaire)

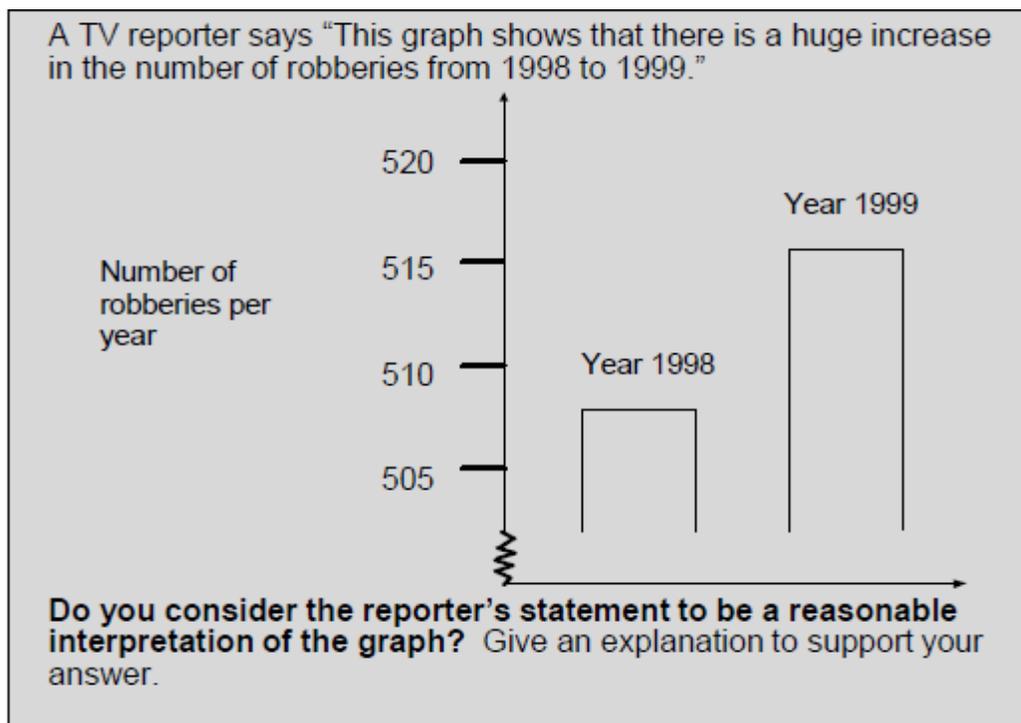


2.) Here you have to know what a prime number is: If n is any number: can $(n+1)^2$ be a prime number? We want to know your experience with this type of problem at school. Do not solve them! Students responded to each statement on a four-point scale: *frequently*, *sometimes*, *rarely*, and *never*.

Applied Math Reasoning in Math Lesson (ST017401); Applied Math Reasoning in Tests (ST017402)

The full question from the 2012 student questionnaire for this variable is as follows: *In this type of problem, you have to apply suitable mathematical knowledge to find a useful answer to a problem that arises in everyday life or work. The data and information are about real situations. Here are two examples.*

Example 1:



Example 2:

For years the relationship between a person’s recommended maximum heart rate and the person’s age was described by the following formula:

$$\text{Recommended maximum heart rate} = 220 - \text{age}$$

Recent research showed that this formula should be modified slightly. The new formula is as follows:

$$\text{Recommended maximum heart rate} = 208 - (0.7 \times \text{age})$$

From which age onwards does the recommended maximum heart rate increase as a result of the introduction of the new formula? Show your work.

We want to know about your experience with this type of problem at school. Do not solve them! Students responded to each statement on a four-point scale: *frequently*, *sometimes*, *rarely*, and *never*.

iv. Learning Time IN & OUT-of-School – ALL Subjects

Teacher-Directed Science Instruction

The *index of teacher-directed science instruction* (TDTEACH) from PISA 2015 was constructed from students’ reports on how often (“never or almost never”; “some lessons”; “many lessons”; “every lesson or almost every lesson”) the following happened in their science lessons: The

teacher explains scientific ideas [ST021301]; A whole class discussion takes place with the teacher [ST021303]; The teacher discusses our questions [ST021308]; The teacher demonstrates an idea [ST021311].

Additional Instruction Support

Comparison: Science School Lessons and Additional Instruction Support (COMSCSUP)

Comparison: Science School Lessons and Additional Instruction Structuredness Content (COMSCSTRCO)

Comparison: Science School Lessons and Additional Instruction Structuredness Lessons (COMSCSTRLE)

Comparison: Science School Lessons and Additional Instruction Tacher-Student Relation (COMSCTSREL)

Comparison: Mathematics School Lessons and Additional Instruction Support (COMMASUP)

Comparison: Mathematics School Lessons and Additional Instruction Structuredness Content (COMMASTRCO)

Comparison: Mathematics School Lessons and Additional Instruction Structuredness Lessons (COMMASTRLE)

Comparison: Mathematics School Lessons and Additional Instruction Tacher-Student Relation (COMMATSREL)

For further information on this these variable, see the [OECD PISA 2015 datafiles](#).

6.E. Careers and Further Education

i. Educational Expectations

Expected Educational Level (SISCED)

The *index of the expected educational level* from PISA 2003 was derived from students' responses about their educational aspirations [ST006301-06]. Educational levels were classified according to the International Standard Classification of Education (ISCED) in the following categories: (1) ISCED 2 (lower secondary); (2) ISCED 3B or 3C (vocational/prevocational upper secondary); (3) ISCED 3A (upper secondary); (4) ISCED 4 (nontertiary postsecondary); (5) ISCED 5B (vocational tertiary); (6) ISCED 5A, 6 (theoretically oriented tertiary and postgraduate). The variable names are listed as they appear in the IDE.

ii. Career Expectations

Students' Self-Expected Socio-Economic Index of Occupational Status (BTHR)

The *student self-expected socioeconomic index of occupational status* from PISA 2000 was based upon students' responses concerning their expected occupation at age 30. The responses were transformed into socioeconomic indices (SEI) that capture the attributes of occupations that convert education into income and were derived by the optimal scaling of occupation groups to maximize the indirect effect of education on income by occupation and to minimize the direct effect of education on income net of occupation. Higher scores of BTHR indicate higher levels of expected socioeconomic status. The variable names are listed as they appear in the IDE.

Students' Expected Occupational Status (BSMJ)

The *index of the expected occupational status* from PISA 2015, 2006 and 2003 was based on students' responses concerning their expected occupation at age 30 and a description of this job. The index is derived from recoding the responses into four-digit International Standard Classification of Occupations (ISCO) codes, which are then mapped to the International Socio-Economic Index of Occupational Status (ISEI) index. Higher scores of BSMJ indicate higher levels of expected occupational status. The variable names are listed as they appear in the IDE.

iii. Preparedness for Science-Related Career

School Preparation for Science-Related Careers (CARPREP)

The *index of school preparation for science careers* from PISA 2006 was derived from students' responses to the following statements regarding the usefulness of schooling as preparation for a science-related career: the subjects available at my school provide students with the basic skills and knowledge for a science-related career; the school science subjects at my school provide students with the basic skills and knowledge for many different careers; the subjects I study provide me with the basic skills and knowledge for a science-related career; and my teachers equip me with the basic skills and knowledge I need for a science-related career [ST010501-04]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive values on this index indicate higher levels of agreement with the usefulness of schooling for this purpose. The variable names are listed as they appear in the IDE.

Student Information on Science-Related Careers (CARINFO)

The *index of student information on science careers* for PISA 2006 was derived from students' responses regarding how informed they were about the following topics concerning science-related careers: science-related careers that are available in the job market; where to find information about science-related careers; the steps students need to take if they want a science-related career; and employers or companies that hire people to work in science-related careers [ST010601-04]. Students responded to each statement on a four-point scale: *very well informed*, *fairly informed*, *not well informed*, and *not informed at all*. All items were reverse coded so that

positive scores indicate higher levels of information about science-related careers. The variable names are listed as they appear in the IDE.

iv. Preparedness for Future Study or Career [No U.S. data collected]

Information about the Labor Market in School (INFOJOB1)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Information about the Labor Market Outside School (INFOJOB2)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Information about Careers (INFOCAR)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

6.F. Libraries

i. Library Use

Use of Libraries (LIBUSE)

The *index of the use of libraries* from PISA 2009 was derived from students' responses on the frequency with which they visited a library for the following activities: borrow books to read for pleasure; borrow books for schoolwork; work on homework, course assignments, or research papers; read magazines or newspapers; read books for fun; learn about things that are not course-related, such as sports, hobbies, people, or music; and use the Internet [ST015401-07]. Students responded to each statement on a five-point scale: *never*, *a few times a year*, *about once a month*, *several times a month*, and *several times a week*. Positive values on this index indicate a greater use of libraries. The variable names are listed as they appear in the IDE.

6.G. Computer Usage

i. Comfort With Computers

Comfort and Ability with Computers (COMAB)

The *index of comfort with and perceived ability to use computers* from PISA 2000 was derived from students' responses to the following questions: how comfortable are you using a computer; how comfortable are you using a computer to write a paper; how comfortable are you taking a test on a computer; and if you compare yourself with other 15-year-olds, how would you rate your ability to use a computer [IT000201-03, IT000301]. For the first three questions, students responded to each statement on a four-point scale: *very comfortable*, *comfortable*, *somewhat comfortable*, and *not at all comfortable*. For the last question, students responded to each statement on a four-point scale: *excellent*, *good*, *fair*, and *poor*. Positive values indicate a higher

self-perception of computer abilities, and negative values indicate a lower self-perception of computer abilities. The variable names are listed as they appear in the IDE.

ii. Confidence with Computer-related Tasks

Perceived ICT Competence (COMPICT)

The *index of perceived ICT competence (COMPICT)* of PISA 2015 was derived from students' responses in the optional information and communication technology (ICT) familiarity questionnaire to the following statements about their experience with digital media and digital devices: I feel comfortable using digital devices that I am less familiar with; If my friends and relatives want to buy new digital devices or applications, I can give them advice; I feel comfortable using my digital devices at home; When I come across problems with digital devices, I think I can solve them; If my friends and relatives have a problem with digital devices, I can help them. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*.

Confidence in Information, Communication and Technology (ICT) High-Level Tasks (HIGHCONF)

The *index of confidence in ICT high-level tasks* of PISA 2009, 2006, and 2003 was derived from students' responses to how well they could perform certain computer tasks. **HIGHCONF** in PISA 2009 and 2006 asked students about their confidence doing the following: use software to find and get rid of computer viruses; edit digital photographs or other graphic images; create a database (e.g., using Microsoft Access); use a word processor (e.g., to write an essay for school); use a spreadsheet to plot a graph; create a presentation (e.g., using Microsoft PowerPoint); create a multimedia presentation (with sound, pictures, video); and construct a web page [IC000602, IC002201-02, IC001403-04, IC001410-12, IC001414, IC000623]. **HIGHCONF** in PISA 2003 asked about the following tasks: use software to find and get rid of computer viruses; use a database to produce a list of addresses; create a computer program (e.g., in Logo, Pascal, Basic); use a spreadsheet to plot a graph; create a presentation (e.g., using Microsoft PowerPoint); create a multimedia presentation (with sound, pictures, video); and construct a web page [IC000602, IC000606, IC000615, IC000616-17, IC000620, IC000623]. Students responded to each statement on a four-point scale: *I can do this very well by myself, I can do this with help from someone, I know what this means but I cannot do it, and I don't know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT high-level tasks. The variable names are listed as they appear in the IDE.

Confidence in Information, Communication and Technology (ICT) Routine Tasks on a Computer (ROUTCONF)

The *index of confidence in ICT routine tasks on a computer* from PISA 2003 was derived from students' responses to the following items: start a computer game; open a file; create/edit a document; scroll a document up and down a screen; copy a file from a floppy disk; save a computer document or file; print a computer document or file; delete a computer document or file; moves files from one place to another on a computer; play computer games; and draw

pictures using a mouse [IC000601, IC000603-05, IC000607-11, IC000618, IC000621]. Students responded to each statement on a four-point scale: *I can do this very well by myself, I can do this with help from someone, I know what this means but I cannot do it, and I don't know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT routine tasks. The variable names are listed as they appear in the IDE.

Confidence in Information, Communication and Technology (ICT) Internet tasks (INTCONF)

The *index of confidence in ICT internet tasks* was derived from students' responses to how well they could perform certain computer tasks. **INTCONF** in PISA 2006 included the following items: chat online; search the Internet for information; download files or programs from the Internet; attach a file to an e-mail message; download music from the Internet; and write and send e-mails [IC001401, IC001407, IC000613-14, IC000619, IC000622]. **INTCNF03** in PISA 2003 included the following items: get on to the Internet; copy or download files from the Internet; attach a file to an e-mail message; download music from the Internet; and write and send e-mails [IC000612-14, IC000619, IC000622]. Students responded to each statement on a four-point scale: *I can do this very well by myself, I can do this with help from someone, I know what this means but I cannot do it, and I don't know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT internet tasks. The variable names are listed as they appear in the IDE.

iii. Attitudes Towards Computers

Attitudes Towards Computers: Limitations (ICTATTNEG)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Attitudes Towards Computers: Tool for Learning (ICTATTPOS)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Attitudes Towards Computers (ATTCOMP)

The *index of attitudes towards computers* from PISA 2003 was derived from students' responses to the following items: it is very important to me to work with a computer; to play or work with a computer is really fun; I use a computer because I am very interested; and I lose track of time when I am working with the computer [IC002401-04]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. All items were inverted for scaling so that positive values on this index indicate positive attitudes towards computers. The variable names are listed as they appear in the IDE.

Interest in Computers (COMATT)

The *index of interest in computers* from PISA 2000 was derived from students' responses to the following items: it is very important to me to work with a computer; to play or work with a computer is really fun; I use a computer because I am very interested in this; I forget the time,

when I am working with the computer [IT000701, IT000801, IT000901, IT001001]. Students responded to each statement with a *yes* or *no*. Positive values indicate more interest in computers, and negative values indicate less interest. The variable names are listed as they appear in the IDE.

iv. Usage and Availability of Computers

Availability of computers (RATCMP1), Computers Connected to the Internet (RATCMP2)

School principals were asked to report the number of computers available at school. The *index of availability of computers* (RATCMP1) from PISA 2015 is the ratio of computers available to 15-year olds for educational purposes to the total number of students in the modal grade for 15-year olds. The index of computers connected to the Internet (RATCMP2) was calculated as the percentage of computers available to 15-year olds for educational purposes that are connected to the Internet.

Perceived Autonomy related to ICT Use (AUTICT)

The *index of perceived autonomy related to ICT use* (AUTICT) of PISA 2015 was derived from students' responses in the optional information and communication technology (ICT) familiarity questionnaire to the following statements about their experience with digital media and digital devices: If I need new software, I install it by myself; I read information about digital devices to be independent; I use digital devices as I want to use them; If I have a problem with digital devices I start to solve it on my own; If I need a new application, I choose it by myself.

ICT as a topic in Social Interaction (SOIAICT)

The *index of ICT as a topic in Social Interaction* (SOIAICT) of PISA 2015 was derived from students' responses in the optional information and communication technology (ICT) familiarity questionnaire to the following statements about their experience with digital media and digital devices: To learn something new about digital devices, I like to talk about them with my friends; I like to exchange solutions to problems with digital devices with others on the internet; I like to meet friends and play computer and video games with them; I like to share information about digital devices with my friends; I learn a lot about digital media by discussing with my friends and relatives.

Information, Communication and Technology (ICT) Internet/Entertainment Use (INTUSE)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Information, Communication and Technology (ICT): Use of Computers in Mathematics Lessons (USEMATH)

Information, Communication and Technology ICT: use of computers in mathematics lessons was derived from students' reports on how often they use a computer for math lessons. For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Time of Computer Use (TIMEINT)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#).

Information, Communication and Technology (ICT) for School Related Tasks (HOMSCH)

The *index of computer use at home for schoolwork* from PISA 2015, 2012 and 2009 was derived from students' responses regarding how often they used a computer at home for the following activities: browse the Internet for schoolwork; use e-mail to communicate with other students about schoolwork; use e-mail to communicate with teachers and submit homework or other schoolwork; download, upload, or browse material from the school's website; and check the school's website for announcements [IC001901-05]. Students responded to each statement on a four-point scale: *almost every day*, *once or twice a week*, *once or twice a month*, and *never or hardly ever*. The variable names are listed as they appear in the IDE.

Computer Usage and Experience (COMUSE)

The *index of computer usage* from PISA 2000 was derived from students' responses regarding how often they used computers or computer software as follows: the computer to help you learn school material; the computer for programming; word processing (e.g., Word or WordPerfect); spreadsheets (e.g., Lotus or Excel); drawing, painting, or graphics software; and educational software [IT000503-04, IT000602-05]. Students responded to each statement on a five-point scale: *almost every day*, *a few times each week*, *between once a week and once a month*, *less than once a month*, and *never*. Positive values indicate a higher frequency of computer use, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Availability at Home (ICTHOME)

The *index of ICT availability at home* from PISA 2015, 2012, and 2009 was derived from students' reports on whether any of the following are available for them to use at home: a desktop computer; a portable laptop; an internet connection; a video games console; a cell phone; Mp3/Mp4 player; a printer; and a USB memory stick [IC001501-03, IC001507-08]. Students responded to each statement on a three-point scale: *yes, I use it*; *yes, but I don't use it*; and *no*. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Internet/Entertainment Use (INTUSE)

The *index of ICT internet/entertainment use* from PISA 2006 and 2003 was based on students' responses to the following items measuring the frequency of different types of ICT use: the Internet to look up information about people, things, or ideas; games on a computer; the Internet to collaborate with a group or team; the Internet to download software; the Internet to download music; and a computer for electronic communication (e.g., e-mail or "chat rooms") [IC000501-02, IC000504, IC000506, IC000510, IC000512]. Students responded to each statement on a five-point scale: *almost every day, a few times each week, between once a week and once a month, less than once a month, and never*. All items were inverted for scaling so that positive values on this index indicate higher frequencies of ICT internet/ entertainment use. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Internet/Entertainment Use (ENTUSE)

The *index of computer use at home for leisure* from PISA 2015, 2012, and 2009 was derived from students' reports on how often they used a computer for the following activities at home: play one-player games; play collaborative online games; use e-mail; chat on line; browse the Internet for fun; download music, films, games or software from the Internet; publish and maintain a personal website, weblog or blog; and participate in online forums, virtual communities or spaces [IC001501-08]. Students responded to each statement on a four-point scale: *almost every day, once or twice a week, once or twice a month, and never or hardly ever*. All items were inverted for scaling so that positive values on this index indicate high levels of computer use at home for leisure. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Program/Software Use (PRGUSE, PRGUSE03)

The *index of ICT program/software use* was derived from students' responses to how often they used various programs and software. **PRGUSE** in PISA 2006 included the following items: word processing (e.g., Microsoft Word or Corel WordPerfect); spreadsheets (e.g., IBM Lotus 1-2-3 or Microsoft Excel); drawing, painting, or graphics programs on a computer; educational software, such as mathematics programs; and the computer for programming [IC000503, IC000505, IC000507-08, IC000511]. **PRGUS03** in PISA 2003 included the following items: word processing (e.g., Microsoft Word or Corel WordPerfect); spreadsheets (e.g., IBM Lotus 1-2-3 or Microsoft Excel); drawing, painting, or graphics programs on a computer; educational software, such as mathematics programs; the computer to help you learn school material; and the computer for programming [IC000503, IC000505, IC000507-9, IC000511]. Students responded to each statement on a five-point scale: *almost every day, a few times each week, between once a week and once a month, less than once a month, and never*. All items were inverted for scaling so that positive values on this index indicate high frequencies of ICT program/software use. The variable names are listed as they appear in the IDE.

Use of Information, Communication and Technology (ICT) Computers at School (USESCH)

The *index of computer use at school* from PISA 2015, 2012, and 2009 was derived from students' reports on how often they used a computer for the following activities at school: chat; e-mail; browse for school; download from website; post on website; simulations; practice and drilling; homework; and group work [IC003201-09 in 2015 and 2012; IC002001–9 in 2009]. Students responded to each statement on a four-point scale: *almost every day, once or twice a week, once or twice a month, and never or hardly ever*. All items were inverted for scaling so that positive values on this index indicate higher levels of computer use at school. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Resources (ICTRES12)

The *index of ICT resources at home* from PISA 2009, 2006, 2003, and 2000 was derived from students' reports on whether they had the following at home: educational software; a link to the Internet; and a computer you can use for schoolwork [ST013504-06]. Students responded to each statement with a *yes* or *no*. The variable names are listed as they appear in the IDE.

Information, Communication and Technology (ICT) Availability at School (ICTSCH)

The *index of ICT availability at school* from PISA 2015, 2012, and 2009 was derived from students' reports on whether any of the following were available for them to use at school: desktop computer; portable laptop; internet connection; printer; and USB (memory) stick [IC001601-02, IC001605, IC001608-12]. Students responded to each statement with a *yes* or *no*. The variable names are listed as they appear in the IDE.

6.H. Students and Environmental Issues

i. Environmental Awareness

Awareness of Environmental Issues (ENVAWARE)

The *index of awareness of environmental issues* from PISA 2015 and 2006 was based on students' responses regarding how informed they were about the following environmental issues: the increase of greenhouse gases in the atmosphere; the use of genetically modified organisms (GMOs); acid rain; nuclear waste; and the consequences of clearing forests for other land use [ST010001–5]. Students responded to each statement on a five-point scale: *I have never heard of this; I have heard about this but I would not be able to explain what it is; I know something about this and could explain the general issue; I am familiar with this; and I would be able to explain this well*. Positive scores on this index indicate higher levels of awareness of environmental issues. The variable names are listed as they appear in the IDE.

ii. Environmental Issues and Responsibility

Concern for Environmental Issues (ENVPERC)

The *index of concern for environmental issues* from PISA 2006 was derived from student responses as to whether the following six items were a serious concern for themselves and others: air pollution; energy shortages; extinction of plants and animals; clearing of forests for other land use; water shortages; and nuclear waste [ST010201–6]. Students responded to each statement on a four-point scale: *this is a serious concern for me personally as well as others; this is a serious concern for other people in my country but not me personally; this is a serious concern only for people in other countries; and this is not a serious concern to anyone*. The items were reverse scored for scaling so that positive scores on this index indicate higher levels of concerns about environmental issues. The variable names are listed as they appear in the IDE.

Environmental Optimism (ENVOPT)

The *index of environmental optimism* from PISA 2015 and 2006 was based on students' responses regarding whether they felt the following environmental problems would improve or get worse in the next 20 years: air pollution; energy shortages; extinction of plants and animals; clearing of forests for other land use; water shortages; and nuclear waste [ST010301–6]. Students responded to each statement on a three-point scale: *improve, stay about the same, and get worse*. All items were inverted for scaling so that positive values on this index indicate higher levels of optimism about environmental issues. The variable names are listed as they appear in the IDE.

Responsibility for Sustainable Development (RESPDEV)

The *index of responsibility for sustainable development* from PISA 2006 was derived from students' level of agreement with the following statements: it is important to carry out regular checks on the emissions from cars as a condition of their use; it disturbs me when energy is wasted through the unnecessary use of electrical appliances; I am in favor of having laws that regulate factory emissions even if this would increase the price of products; to reduce waste, the use of plastic packaging should be kept to a minimum; industries should be required to prove that they safely dispose of dangerous waste materials; I am in favor of having laws that protect the habitats of endangered species; and electricity should be produced from renewable sources as much as possible, even if this increases the cost [ST010401–7]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. The items were reverse scored for scaling so that positive scores on this index indicate higher levels of responsibility for sustainable development. The variable names are listed as they appear in the IDE.

6.I. School Composition, SES, and Organization

i. School Enrollment

School Size (SCHSIZE)

The *index of school size* from PISA 2015, 2012, 2009, 2006, 2003, and 2000 was derived from summing school principals' responses to the total number of girls and boys at a school. Values on this index indicate total enrollment at a school. Responses were recoded as follows: 0 to 500 – 1; 501 to 1,000 – 2; 1,001 to 1,500 – 3; more than 1,500 – 4. The variable names are listed as they appear in the IDE.

Percentage of Girls in the School (PCGIRLS)

The *index of the percentage of girls enrolled at school* from PISA 2012, 2009, 2006, 2003, and 2000 was based on the enrollment data provided by school principals regarding the number of girls at the school divided by the total number of girls and boys at the school. The variable names are listed as they appear in the IDE.

National modal grade for 15-year-olds (SC008801 – Total number of students)

This PISA 2015, 2012, and 2009 school variable asks for the total number of students in the school. Each of the participating countries in PISA selects a nationally representative sample of 15-year-olds, regardless of grade level. This generally corresponds to 10th grade in the United States, but grade levels vary across countries.

Class Size (CLSIZE)

The *index of the average class size* from PISA 2015, 2012, and 2006 was derived from one of nine possible categories, ranging from “15 students or fewer” to “more than 50 students.” **CLSIZE** takes the midpoint of each response category, a value of 13 for the lowest category, and a value of 53 for the highest. The variable names are listed as they appear in the IDE.

ii. School Type and Community

School Type (SCHTYPE)

Schools are classified as either public or private, according to whether a private entity or a public agency has the ultimate power to make decisions concerning their affairs. The *index of school type* from PISA 2015, 2012, 2009, 2006, 2003, and 2000 was derived from school principals' responses to questions asking them to specify the percentage of the school's total funding received in a typical school year from government sources; student fees or school charges paid by parents; benefactors, donations, bequests, sponsorships, or parental fund-raising; and other sources [SC002501, SC008101-4]. The PISA index on school type has three categories: (1) public schools controlled and managed by a public education authority or agency; (2) government-dependent private schools controlled by a nongovernmental organization (or with a governing board not selected by a government agency) that receive more than 50 percent of their

core funding from government agencies; and (3) government-independent private schools controlled by a nongovernmental organization (or with a governing board not selected by a government agency) that receive less than 50 percent of their core funding from government agencies. The variable names are listed as they appear in the IDE.

iii. School Grade Composition

Grade 13 (SC007913)

This variable can be found in PISA 2009, 2006, 2003, and 2000. While schools in the United States generally end at grade 12, students in some countries begin school at an earlier age and consequently have 13 years of primary and secondary schooling.

iv. Ability Tracking

Ability Grouping for Mathematics Classes (ABGMATH)

The *index of ability grouping in mathematics classes* (ABGMATH) from PISA 2012 was derived from the two items of school principals' reports on whether their school organizes mathematics instruction differently for student with different abilities "for all classes", "for some classes", or "not for any classes" (SC003801 for mathematics classes study similar content but at different levels and SC003802 for different classes study different content or sets of mathematics topics that have different levels of difficulty). This index has the following three categories: (1) no mathematics classes study different levels of difficulty or different content (i.e. "not for any classes" for both SC003801 and SC003802); (2) some mathematics classes study different levels of difficulty or different content (i.e. "for some classes" for either SC003801 or SC003802); (3) all mathematics classes study different levels of difficulty or different content (i.e. "for all classes" for either SC003801 or SC003802).

Ability Grouping (ABGROUP)

The *index of ability grouping between classes* was derived from school principals' reports on whether the school organizes instruction differently for students with different abilities. **ABGROUP** in PISA 2009 and 2006 reports organization into different classes [SC009001] or within classes [SC009002] "for all subjects," "for some subjects," or "not for any subjects" for students with different abilities. This index has the following three categories: (1) schools that do not group students by ability in any subjects, either between or within classes; (2) schools that group students by ability for some, but not all, subjects, and that do so either between or within classes; and (3) schools that group students by ability in all subjects either between or within classes. **ABGRP03** in PISA 2003 reports organization into mathematics classes studying similar content, but at different levels of difficulty [SC003801] and different classes studying different content or sets of mathematics topics that have different levels of difficulty [SC003802] for students with different abilities. This index has the following three categories: (1) schools with no ability grouping between any classes; (2) schools with one of these forms of ability grouping between classes for some classes; and (3) schools with one of these forms of ability grouping for all classes. The variable names are listed as they appear in the IDE.

6.J. School Staffing and Resources

i. Staffing and Professional Development

Teacher-Student Ratio (STRATIO, DSTRATIO)

The *index of teacher-student ratio* or **STRATIO** from PISA 2015, 2012, 2009, 2006, 2003, and 2000 and the *index of teacher-student ratio* or **DSTRATIO** from PISA 2009, 2006, 2003, and 2000 was obtained by dividing the school size [SCHSIZE] by the total number of teachers (full-time teachers [SC008711] and part-time teachers [SC008712]). Values on this index indicate the number of students per teacher. To convert head counts into full-time equivalents, a full-time teacher employed for at least 90 percent of the statutory time as a classroom teacher received a weight of 1, and a part-time teacher employed for less than 90 percent of the time as a classroom teacher received a weight of 0.5. The variable names are listed as they appear in the IDE.

Proportion of Teachers with an ISCED 5A Bachelor's Qualification (PROAT5B15)

The *proportion of teachers with an ISCED 5A bachelor's qualification* (PROAT5B15) from PISA 2015 was calculated by dividing the number of these teachers by the total number of teachers.

Proportion of Teachers with an ISCED 5A master's Qualification (PROAT5M15)

The *proportion of teachers with an ISCED 5A master's qualification* (PROAT5M15) from PISA 2015 was calculated by dividing the number of these teachers by the total number of teachers.

Proportion of Teachers with an ISCED 6 Qualification (PROAT615)

The *proportion of teachers with an ISCED level 6 qualification* (PROAT615) from PISA 2015 was calculated by dividing the number of these teachers by the total number of teachers.

Proportion of Teachers With ISCED 5A Qualification in Pedagogy (ROPQUAL)

The *index of the proportion of teachers who have an ISCED 5A qualification in pedagogy* from PISA 2012, PISA 2009, 2006, 2003, and 2000 (**PROPQUAL**) was derived from school principals' reports by dividing the number of teachers with an International Standard Classification of Education (ISCED) level 5A (bachelor's in the U.S.) qualification in pedagogy [(SC008731 plus 0.5 * SC008732)] by the total number of teachers [(SC008711] plus 0.5 * SC008712)] The variable names are listed as they appear in the IDE. Although both PISA 2003 and PISA 2012 asked school principals about the school's teaching staff for admitting students, the wording of the questions on the proportion of teachers with an ISCED 5A qualification changed, rendering comparisons impossible.

Proportion of Mathematics Teachers with ISCED 5A Qualification in Math (PROPMA5A)

The *index of the proportion of mathematics teachers with an ISCED 5A qualification in math* from PISA 2012, 2003 and 2000 was derived from school principals' reports by dividing the

number of mathematics teachers with an ISCED level 5A (bachelor's in the U.S.) qualification and a major in mathematics [(SC004112 plus 0.5 * SC004122)] by the number of mathematics teachers [(SC004111 plus 0.5 * SC004121)]. The variable names are listed as they appear in the IDE.

Proportion of Teachers Fully Certified (PROATCE15)

The *index of the proportion of fully certified teachers* from PISA 2015 was derived from school principals' reports by dividing the number of fully certified teachers by the total number of teachers. The variable names are listed as they appear in the IDE.

Proportion of Teachers Fully Certified (PROPCERT)

The *index of the proportion of teachers fully certified by the appropriate authority* from PISA 2012, 2009, 2006, 2003, and 2000 was derived from school principals' reports by dividing the number of fully certified teachers [(SC008721 plus 0.5 * SC008722)] by the total number of teachers [(SC008711 plus 0.5 * SC008712)]. The variable names are listed as they appear in the IDE.

Proportion of Language Teachers with ISCED 5A Qualification (PROPREAD)

The *index of the proportion of test language teachers with an ISCED 5A qualification* from PISA 2000 was derived from school principals' reports by dividing the number of test language teachers who have an ISCED level 5A (bachelor's in the U.S.) qualification [(SC001409) plus 0.5 * [SC001410)] by the total number of test language teachers [(SC001407) plus 0.5 * [SC001408)]. The variable names are listed as they appear in the IDE.

Index Student-Mathematics Teacher Ratio (SMRATIO)

The *index of the student-mathematics teacher ratio* from PISA 2012 and 2003 (SMRATIO) was obtained by dividing the school size by the total number of mathematics teachers [SC004111 and SC004121] for PISA 2012. The number of part-time mathematics teachers was weighted by 0.5 and the number of full time mathematics teachers was weighted by 1.0 in the computation of this index.

Proportion of Mathematics Teachers (PROPMATH)

The *index of the proportion of mathematics teachers* from PISA 2012 and 2003 (PROPMATH) was derived from school principals' reports by dividing the number of mathematics teachers [(SC004111 plus 0.5 * SC004121)] by the total number of teachers [(SC008711 plus 0.5 * SC008712)]. The variable names are listed as they appear in the IDE.

Proportion of Fully Certified Science Teachers (PROSTCE)

The *proportion of fully certified science teachers* (PROSTCE) from PISA 2015 was computed by dividing the number of fully certified science teachers by the total number of teachers.

Proportion of Science Teachers with an ISCED 5A Qualification and a Major in Science (PROSTMAS)

The *proportion of science teachers with an ISCED 5A qualification and a major in science* (PROSTMAS) was calculated by dividing the number of these teachers by the total number of science teachers.

Proportion of Science Teachers with ISCED 5A Qualification (PROPSCIE)

The *index of the proportion of science teachers* who have an ISCED 5A qualification from PISA 2000 was derived from school principals' reports by dividing the number of science teachers with an ISCED level 5A (bachelor's in the U.S.) qualification ([SC001417] plus 0.5 * [SC001418]) by the total number of science teachers ([SC001415] plus 0.5 * [SC001416]). The variable names are listed as they appear in the IDE.

ii. Shortage of School Staff Including Teachers

Shortage of Educational Staff (STAFFSHORT)

The *index of shortage of educational staff* (STAFFSHORT) from PISA 2015 was derived from four items from school principal's responses to the question "Is your school's capacity to provide instruction hindered by any of the following issues?": a lack of teaching staff; inadequate or poorly qualified teaching staff; a lack of assisting staff; and inadequate or poorly qualified assisting staff. School principals responded to each item on a four-point scale: *not at all, very little, to some extent, and a lot*. Positive values on this index mean that schools principals view the amount and/or quality of resources in their schools as an obstacle to providing instruction to a greater extent than the average.

Shortage of Teachers (TCSHORT12, TCSHORT)

The *index of teacher shortage* or **TCSHORT12** from PISA 2012 and 2003, and **TCSHORT** from 2006 and 2000 was derived from four items measuring the school principal's perceptions of potential factors hindering instruction at school. These factors are a lack of: *i*) qualified science teachers; *ii*) a lack of qualified mathematics teachers; *iii*) qualified <test language> teachers; and *iv*) qualified teachers of other subjects [SC008904, SC003001-3]. Principals responded to each statement on a four-point scale: *not at all, very little, to some extent, and a lot*. All items were inverted for scaling so that positive values on this index indicate a perception of higher teacher shortage, and negative values indicate a perception of lower teacher shortage. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of teacher shortage were rescaled to be comparable to those in PISA 2012. As a result, values for the index of teacher shortage for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

iii. School Educational Resources

Shortage of Educational Material (EDUSHORT)

The *index of shortage of educational material* (EDUSHORT) from PISA 2015 was scaled using the following four items from school principal's responses to the question "Is your school's capacity to provide instruction hindered by any of the following issues?": a lack of educational material (e.g. textbooks, IT equipment, library or laboratory material); inadequate or poor quality educational material (e.g. textbooks, IT equipment, library or laboratory material); a lack of physical infrastructure (e.g. building, grounds, heating/cooling, lighting and acoustic systems); and inadequate or poor quality physical infrastructure (e.g. building, grounds, heating/cooling, lighting and acoustic systems). School principals responded to each item on a four-point scale: *not at all, very little, to some extent, and a lot*. Positive values on this index mean that schools principals view the amount and/or quality of resources in their schools as an obstacle to providing instruction to a greater extent than the average.

Science-Specific Resources (SCIERES)

The *index of Science-Specific Resources* (SCIERES) from PISA 2015 was constructed using principals' responses to a series of statements about the school science department. It was constructed by summing up the principals' answers to the eight statements (yes/no question): Compared to other departments, our school's science department is well equipped; If we ever have some extra funding, a big share goes into improvement of our science teaching; Science teachers are among our best educated staff members; Compared to similar schools, we have a well-equipped laboratory; The material for hands-on activities in science is in good shape; We have enough laboratory material that all courses can regularly use it; We have extra laboratory staff that helps support science teaching; and Our school spends extra money on up-to-date science equipment [SC013801-08].

Quality of Schools' Educational Resources (SCMATEDU12, SCMATE00)

The *index of the quality of a school's educational resources* was derived from school principals' reports on the extent to which learning by 15-year-olds in their school was hindered by a lack of resources. **SCMATEDU12** in PISA 2012 and 2003 included the following items: shortage or inadequacy of science laboratory equipment; shortage or inadequacy of instructional materials; shortage or inadequacy of computers for instruction; lack or inadequacy of Internet connectivity; shortage or inadequacy of computer software for instruction; and shortage or inadequacy of library materials. [SC003009, SC003015-16, SC003018, SC003020, SC008910]. **SCMATE00** in PISA 2000 included the following items: shortage of instructional materials (e.g., textbooks); shortage of computers for instruction; lack of instructional materials in the library; lack of multimedia resources for instruction; inadequate science laboratory equipment; and inadequate facilities for the fine arts [SC001109, SC003009, SC003015, SC003018-20]. Principals responded to each statement on a four-point scale: *not at all, very little, to some extent, and a lot*. All items were inverted for scaling so that positive values on this index indicate that the unavailability of educational resources was not a hindrance to learning, and negative values

indicate that the unavailability of educational resources was a hindrance to learning. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of quality of educational resources were rescaled to be comparable to those in PISA 2012. As a result, values for the index of quality educational resources for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004). One of the questions included to compute the index of quality of educational resources in PISA 2012 (“lack or inadequacy of internet connection”) was not included in the PISA 2003 questionnaire. Estimation of the PISA 2003 index treats this question as missing and, under the assumption that the relationship between the items remains unchanged with the inclusion of the new questions, the PISA 2003 and PISA 2012 values on the index of quality of educational resources are comparable after the rescaling.

Quality of Schools' Physical Infrastructure (SCMATBUI12, SCMATBUI)

The *index of the quality of a school's physical infrastructure* or **SCMATBUI12** from PISA 2012 and 2003 and **SCMATBUI** from PISA 2000 was derived from three items measuring school principals' perceptions of potential factors hindering instruction at their school. These factors are: shortage or inadequacy of school buildings and grounds; shortage or inadequacy of heating/cooling and lighting systems; and shortage or inadequacy of instructional space (e.g. classrooms) [SC001101–03]. Principals responded to each statement on a four-point scale: *not at all*, *very little*, *to some extent*, and *a lot*. All items were inverted for scaling so that positive values on this index indicate that the quality of the school's physical infrastructure was not a hindrance to learning, and negative values indicate that the school's physical infrastructure was a hindrance to learning. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of quality of physical infrastructure were rescaled to be comparable to those in PISA 2012. As a result, values for the index of quality of physical infrastructure for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

iv. Computer Resources

Proportion of Computers Connected to Internet/Web (COMPWB09, COMPWB06, COMPWEB)

The *index of the proportion of computers connected to the Internet/Web* was computed by dividing the number of computers connected to the Web by the total number of computers in the school. **COMPWB09** in PISA 2012 and 2009 [SC008802-03]. **COMPWB06** in PISA 2006 [SC006201, SC006203]. **COMPWEB** in PISA 2003 [SC003101, SC003105]. The variable names are listed as they appear in the IDE.

Ratio of Computers for Instruction to School Size (IRATCO06)

The *index ratio of computers for instruction to school size* from PISA 2012 and 2006 was obtained by dividing the number of computers available for educational instruction at school

[SC008802 in 2012; SC006202 in 2006] by the number of students at school [SC008801 in 2012; SC008401 and SC008402 in 2006]. The variable names are listed as they appear in the IDE.

Total Number of Computers to School Size (RATCOMP)

The *index of computer availability* (RATCOMP) for PISA 2012, 2009, 2006, 2003, and 2000 was derived from dividing the number of computers available for educational purposes available to students in the modal grade for 15-year-olds [SC008802] by the number of students in the modal grade for 15-year-olds [SC008801] [see the subcategory Computer Resources in the category School Staffing and Resources]. The variable names are listed as they appear in the IDE. The wording of the questions asking about computer availability changed between 2006 and 2009. Comparisons involving RATCOMP are possible for 2012 data with 2009 data, but not with 2006 or earlier.

Proportion of Computers Connected to Local Area Network (COMPLAN)

The *index of the proportion of computers connected to the local area network* from PISA 2003 was computed by dividing the number of computers connected to a local network [SC001306] by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

Percentage of Computers Available for 15-year-olds (PERCOMP1)

The *index of the percentage of computers available for 15-year-olds* from PISA 2000 was derived from the number of computers available for 15-year-olds [SC001302] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

Percentage of Computers Available for Teachers Only (PERCOMP2)

The *index of the percentage of computers available for teachers only* from PISA 2000 was derived from the number of computers available for teachers only [SC001303] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

Percentage of Computers Available to Administrative Staff (PERCOMP3)

The *index of the percentage of computers available to administrative staff* from PISA 2000 was derived from the number of computers available only for administrative staff [SC001304] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

Percentage of Computers Connected to the Internet/Web (PERCOMP4)

The *index of the percentage of computers connected to the Internet/Web* from PISA 2000 was derived from the number of computers connected to the Internet/World Wide Web [SC001305]

divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

Percentage of Computers Connected to a Local Area Network (PERCOMP5)

The *index of the percentage of computers connected to a local area network* from PISA 2000 was derived from the number of computers connected to a local area network/intranet [SC001306] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

6.K. Governance

i. Teacher Participation and School Responsibility

School Responsibility (RESPRES)

School principals were asked to report whether “principals”, “teachers”, “school governing board”, “regional or local education authority” or “national education authority” has a considerable responsibility for the following tasks (SC33): i) selecting teachers for hire; ii) firing teachers; iii) establishing teachers’ starting salaries; iv) determining teachers’ salary increases; v) formulating the school budget; and vi) deciding on budget allocations within the school [SC0102A1-A3, SC0102B1-B3, SC0102C1-C3, SC0102D1-D3, SC0102E1-E3, SC0102F1-F3]. The *index of school responsibility for resource allocation* (RESPRES) from PISA 2015, 2012, 2009, and 2006 was derived from these six items. The ratio of the number of responsibility that “principals” and/or “teachers” have for these six items to the number of responsibility that “regional or local education authority” and/or “national education authority” have for these six items was computed. Positive values on this index indicate relatively more responsibility for schools than local, regional or national education authority. This index has an OECD mean of 0 and a standard deviation of 1.

Although both PISA 2003 and PISA 2012 asked school principals about the school’s responsibility for resource allocation, the wording of the questions changed, rendering comparisons impossible.

School Autonomy (SCHAUTON)

The *index of school autonomy* from PISA 2015, 2012, 2003 and 2000 was based on school principals’ reports about whether teachers, department heads, the school principal, an appointed or elected board, or higher level education authorities were primarily responsible for the following 12 tasks: hiring teachers; firing teachers; establishing teachers’ starting salaries; determining teachers’ salary increases; formulating the school budget; allocating school budgets; establishing student disciplinary policies; establishing student assessment policies; approving students for admission; choosing textbooks; determining course content; and deciding which courses were offered [see the subcategories Teacher Participation and School Responsibility, Responsibilities Assigned to Other Groups and Organizations, and School Responsibility:

Curriculum in the category Governance]. All items were inverted for scaling so that positive values indicate higher levels, and negative values indicate lower levels, of school autonomy. The PISA 2003 index used items whose wording had been modified slightly from PISA 2000. To adjust for differences, responses indicating that decision making was not a school responsibility were recoded to 0, and those with responses in all other categories but decision making was not a school responsibility were recoded to 1. The variable names are listed as they appear in the IDE.

Index of Teacher Participation to Decision Making (TCHPARTI)

The *index of teacher participation* from PISA 2015, 2012, 2009, 2003, and 2000 was derived from school principals' reports about whether teachers had the main responsibility for appointing teachers; dismissing teachers; establishing teachers' starting salaries; determining teachers' salary increases; formulating school budgets; allocating budgets within the school; establishing student disciplinary policies; establishing student assessment policies; approving students for admittance to school; choosing which textbooks to use; determining course content; and deciding which courses were offered [see the subcategories Teacher Participation and School Responsibility, Responsibilities Assigned to Other Groups and Organizations, and School Responsibility: Curriculum in the category Governance]. Positive values indicate higher levels, and negative values indicate lower levels, of teacher participation in school decisions. The variable names are listed as they appear in the IDE.

ii. School Responsibility: Curriculum

School Responsibility for Curriculum and Assessment (RESPCUR, RESPCURR)

The *index of school responsibility for curriculum and assessment* from PISA 2015 (RESPCUR), PISA 2012, 2009 and 2006 (RESPCURR) was computed from four items measuring the school principal's report concerning who had responsibility for curriculum and assessment: establishing student assessment policies; choosing which textbooks are used; determining course content; and deciding which courses are offered [SC0102H1-H4, SC0060H4, SC0102J1-J4, SCP5189, SC0102K1-K4, SCP5194, SC0102L1-L4, SCP5199]. The ratio of the number of responsibility that "principals" and/or "teachers" have for these four items to the number of responsibility that "regional or local education authority" and/or "national education authority" have for these four items was computed. Positive values on this index indicate relatively more responsibility for schools than local, regional or national education authority. This index has an OECD mean of 0 and a standard deviation of 1.

Although both PISA 2003 and PISA 2012 asked school principals about the school's responsibility for admission and instruction policies, the wording the questions changed, rendering comparisons impossible.

iii. School Leadership

Overall School Leadership (LEAD)

The *index of overall school leadership* (LEAD) from PISA 2015 was derived from 13 items, which included items from (LEADPD, LEADINST, LEADTCH, and LEADCOM).

Index Instructional and Professional Development (LEADPD)

The *index of promoting instructional improvements and professional development* from PISA 2015 and 2012 was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year [SC011707, SC011709, SC011713]: take the initiative to discuss matters, when a teacher has problems in his/her classroom; pay attention to disruptive behavior in classrooms; and solve a problem together with a teacher, when the teacher brings up a classroom problem.

Instructional Leadership (LEADINST)

The *index of school management: instructional leadership* (LEADINST) from PISA 2015 and 2012 was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year: promote teaching practices based on recent educational research, praise teachers whose students are actively participating in learning, and draw teachers' attention to the importance of pupils' development of critical can social capacities [SC011705-06, SC011708].

Teacher Participation in Leadership (LEADTCH)

The *index of school management: teacher participation* (LEADTCH) from PISA 2015 and 2012 was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year: provide staff with opportunities to participate in school decision-making; engage teachers to help build a school culture of continuous improvement; and ask teachers to participate in reviewing management practices [SC011710-12] Higher values on these indices indicate greater involvement of school principals in school affairs.

School Goals and Curricular Development (LEADCOM)

The *index of school management: framing and communicating the school's goals and curricular development* (LEADCOM) from PISA 2015 and 2012 was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year: use student performance results to develop the school's educational goals; make sure that the professional development activities of teachers are in accordance with the teaching goals of the school; ensure that teachers work according to the school's educational goals; and discuss the school's academic goals with teachers at faculty meetings [SC011702-04, SC011714].

School Leadership (LDRSHP)

The *index of school principal's leadership* from PISA 2009 was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year: make sure that the professional development activities of teachers are in accordance with the teaching goals of the school; ensure that teachers work according to the school's educational goals; observe instruction in classrooms; give teachers suggestions as to

how they can improve their teaching; use student performance results to develop the school's educational goals; monitor students' work; take the initiative to discuss matters, when a teacher has problems in his/her classroom; inform teachers about possibilities for updating their knowledge and skills; check to see whether classroom activities are in keeping with our educational goals; take exam results into account in decisions regarding curriculum development; ensure that there is clarity concerning the responsibility for coordinating the curriculum; solve the problem together, when a teacher brings up a classroom problem; pay attention to disruptive behavior in classrooms; and take over lessons from teachers who are unexpectedly absent [SC010401–14]. Principals responded to each statement on a four-point scale: *never*, *seldom*, *quite often*, and *very often*. Positive values on this index indicate greater involvement of school principals in school affairs. The variable names are listed as they appear in the IDE.

6.L. Curriculum and School Activities

i. Science Activities at School

School Activities to Promote the Learning of Science (SCIPROM)

The *index of school activities to promote the learning of science* from PISA 2006 was derived from school principals' reports concerning which activities to promote students' learning of science occurred at their school: science clubs; science fairs; science competitions; extracurricular science projects (including research); and excursions and field trips [SC006901–5]. Students responded to each statement with a *yes* or *no*. Positive scores indicate higher levels of school activities in this area. The variable names are listed as they appear in the IDE.

School Activities for Learning Environmental Topics (ENVLEARN)

The *index of school activities for learning environmental topics* from PISA 2006 was derived from school principals' reports concerning which activities to promote students' learning of environmental topics occurred at their school: outdoor education; trips to museums; trips to science and/or technology centers; extracurricular environmental projects (including research); and lectures and/or seminars (e.g., guest speakers) [SC007101–5]. Students responded to each statement with a *yes* or *no*. Positive scores indicate higher levels of school activities for learning environmental topics. The variable names are listed as they appear in the IDE.

Science Activities (SCIEACT)

The *index of science-related activities* from PISA 2015 and 2006 was derived from students' engagement and learning in science concerning the frequency with which they engaged in the following activities: watch TV programs about broad science; borrow or buy books on broad science topics; visit websites about broad science topics; listen to radio programs about advances in broad science; read broad science magazines or science articles in newspapers; and attend a science club [ST009701–6]. Students responded to each statement on a four-point scale: *very often*, *regularly*, *sometimes*, *never*, or *hardly ever*. All items were inverted for scaling so that

positive values on this index indicate higher frequencies of students' science activities. The variable names are listed as they appear in the IDE.

ii. Extension Courses

Math Extension Courses Offered (MATHEXC)

For further information on this index variable, see the [OECD PISA 2012 datafiles](#)

School Offering Extension Courses (EXCOURSE)

The *index of the school offering extension courses* from PISA 2003 was derived from the principals' responses to which extensions courses were offered at their school: enrichment mathematics; and remedial mathematics [SC003901-2]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate more extension courses offered at school. The variable names are listed as they appear in the IDE.

iii. Extracurricular Activities related to Mathematics

Mathematics Activity at School (MACTIV12)

The *index of mathematics extracurricular activities at school* (SCP5266) from PISA 2012 was derived from school principals' reports on whether their schools offered the following activities to students in the national modal grade for 15-year-olds in the academic year of the PISA assessment: mathematics club, mathematics competition, club with a focus on computers/Information, Communication Technology, and additional mathematics lessons. This index was developed by summing up the number of activities that a school offers. For "additional mathematics lessons", it is counted as one when school principals responded "enrichment mathematics only", "remedial mathematics only" or "without differentiation depending on the prior achievement level of the students"; and it is counted as two when school principals responded "both enrichment and remedial mathematics" [SCP5060-61, SCP5063, SCP5066].

Mathematics Activity at School (MACTIV)

The *index mathematics activity at school* from PISA 2003 was derived from the principals' responses to which mathematics activities occurred at their school: enrichment mathematics; remedial mathematics; mathematics competitions; mathematics clubs; and computer clubs (specifically related to mathematics) [SC003901-5]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate higher levels of mathematics activity at school. The variable names are listed as they appear in the IDE.

6.M. School and Classroom Climate

i. School Climate (Reported by Students)

Index Student-Related Factors Affecting School Climate (STUBEHA)

The *index of student behavior hindering learning* (STUBEHA) from PISA 2015 is based on five items: student truancy; students skipping classes; students lacking respect for teachers; students using alcohol or illegal drugs; students intimidating or bullying other students

Index Teacher-Related Factors Affecting School Climate (TEACHBEHA)

The *index of teacher behavior hindering learning* (TEACHBEHA) from PISA 2015 is based on five items: teachers not meeting individual students' needs; teacher absenteeism; staff resisting change; teachers being too strict with students; teachers not being well-prepared for classes.

Attitude Towards Learning Activities (ATTLNACT)

The *index of attitudes towards school (learning activities)* (ATTLNACT) from PISA 2012 was constructed using student responses over the extent they *strongly agreed, agreed, disagreed or strongly disagreed* to the following statements when asked to think about their school: Trying hard at school will help me get a good job; trying hard at school will help me get into a good <college>; I enjoy receiving good <grades>; trying hard at school is important [STP5253-56].

Attitude Towards School (ATSCHL12)

The *index of attitude towards school* from PISA 2012, and 2003 was derived from students' level of agreement with the following statements: school has done little to prepare me for adult life when I leave school; school has been a waste of time; school has helped give me confidence to make decisions; and school has taught me things which could be useful in a job [ST014801-4]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. All items that are negatively phrased were inverted for scaling, and positive values on this index indicate the perception of a more positive school climate. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of attitudes towards school were rescaled to be comparable to those in PISA 2012. As a result, values for the index of attitudes towards school for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Sense of Belonging (BELONG12)

The *index of sense of belonging* (BELONG12) from PISA 2015, 2012, and 2003 was constructed using student responses over the extent they *strongly agreed, agreed, disagreed or strongly disagreed* to the following statements: I feel like an outsider (or left out of things) at school; I make friends easily at school; I feel like I belong at school; I feel awkward or out of place in my school; other students seem to like me; I feel lonely at school; I feel happy at school; things are

ideal in my school; I am satisfied with my school [ST003101–06, STP5246-48]. The *index of sense of belonging* from PISA 2000 was derived from students’ reports on whether their school was a place where they feel like an outsider; make friends easily; feel like they belong; feel awkward and out of place; other students seem to like them; and feel lonely [ST003101–6]. Students responded to each statement on a four-point scale: *strongly agree*, *agree*, *disagree*, and *strongly disagree*. Positive values indicate more positive attitudes towards school, and negative values indicate less positive attitudes. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of sense of belonging were rescaled to be comparable to those in PISA 2012. As a result, values for the index of sense of belonging for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow’s World: First Results from PISA 2003* (OECD, 2004). Three of the questions included to compute the index of sense of belonging in PISA 2012 (“I feel happy at school,” “things are ideal in my school,” and “I am satisfied with my school”) were not included in the PISA 2003 questionnaire. Estimation of the PISA 2003 index treats these questions as missing and, under the assumption that the relationship between the items remains unchanged with the inclusion of the new questions, the PISA 2003 and PISA 2012 values on the index of sense of belonging are comparable after the rescaling.

ii. Student-Teacher Relations (Reported by Students)

Teacher-Student Relations (STUDREL12, STUDREL)

The *index of teacher-student relations* or STUDREL12 from PISA 2012, and 2003, and STUDREL from PISA 2000 was derived from students’ level of agreement with the following statements: I get along well with most of my teachers; most of my teachers are interested in my well-being; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly [ST014901–05]. Students responded to each statement on a four-point scale: *strongly agree*, *agree*, *disagree*, and *strongly disagree*. Positive values indicate more positive perceptions of student-teacher relations, and negative values indicate less positive perceptions. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of student-teacher relations were rescaled to be comparable to those in PISA 2012. As a result, values for the index of student-teacher relations for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow’s World: First Results from PISA 2003* (OECD, 2004).

Poor Student-Teacher Relations (school average) (MSTREL)

The *index of poor student-teacher relations* from PISA 2003 was derived from students’ responses to items measuring students’ perception of various aspects of student-teacher relationships: students get along well with most teachers; most teachers are interested in students’ well-being; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly [ST014901–5]. Students responded to each statement on a four-point scale—*strongly agree*, *agree*, *disagree*, and *strongly disagree*—that was recoded into binary variables, with “*strongly disagree*” coded to 1

and other valid responses coded to 0. These responses were summarized by taking the average item response per student and computing the mean for each school. The variable names are listed as they appear in the IDE.

Vignette Teacher Support: Homework Every Other Day/Back in Time (ST017701), Homework Once a Week/Back in Time (ST017702), Homework Once a Week/Not Back in Time (ST017703)

The full question from the 2012 student questionnaire for this variable is as follows: Below you will find descriptions of three mathematics teachers. Read each of the descriptions of these teachers, then let us know to what extent you agree with the final statement. a.) Ms. Anderson assigns mathematics homework every other day. She always gets the answers back to students before examinations. Ms. Anderson concerned about her students' learning. b.) Mr. Crawford assigns mathematics homework once a week. He always gets the answers back to students before examinations. Mr. Crawford is concerned about his students' learning. c.) Ms. Dalton assigns mathematics homework once a week. She never gets the answers back to students before examinations. Ms. Dalton is concerned about her students' learning. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree.*

Vignette Classroom Management: Students Interrupt/Teacher Early (ST017901), Students Calm/Teacher On Time (ST017902), Students Interrupt/Teacher Late (ST017903)

The full question from the 2012 student questionnaire for this variable is as follows: Below you will find descriptions of three mathematics teachers. Read each of the descriptions of these teachers, then let us know to what extent you agree with the final statement. a.) The students in Ms. Franklin's class frequently interrupt her lessons. She is always in her classroom five minutes before class starts. Ms. Franklin is in control of her classroom. b.) The students in Ms. Harris' class are calm and orderly. She is always in her classroom at the start of class. Ms. Harris is in control of her classroom. c.) The students in Mr. Reynolds' class frequently interrupt his lessons. As a result, he often arrives five minutes late to his classroom. Mr. Reynolds Is in control of his classroom. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree.*

iii. Classroom Climate (Reported by Students)

Enquiry-based instruction (IBTEACH)

The *index of enquiry-based instruction* (IBTEACH) from PISA 2015 was constructed from students' reports on how often (“in all lessons”; “in most lessons”; “in some lessons”; “never or hardly ever”) the following happened in their science lessons: Students are given opportunities to explain their ideas [ST011201]; Students spend time in the laboratory doing practical experiments [ST011202]; Students are required to argue about science questions [ST011218]; Students are asked to draw conclusions from an experiment they have conducted [ST011206]; The teacher explains how a science idea can be applied to a number of different phenomena [ST011207]; Students are allowed to design their own experiments [ST011208]; There is a class debate about

investigations [ST011209]; The teacher clearly explains the relevance of science concepts to our lives [ST011215]; Students are asked to do an investigation to test ideas [ST011216].

Disciplinary Climate (DISCLISCI, DISCLIMA12, DISCLI00)

The *index of classroom disciplinary climate* summarizes students' reports on the frequency with which teachers create a disciplinary climate in their classrooms. **Disciplinary Climate in Science Classes (DISCLISCI)** in PISA 2015 was constructed from students' reports on how often ("every lesson", "most lessons", "some lessons", "never or hardly ever") the following happened in their science lessons: The teacher shows an interest in every student's learning [ST022601]; The teacher gives extra help when students need it [ST022602]; The teacher helps students with their learning [ST022603]; The teacher continues teaching until students understand the material [ST022604]; The teacher gives students an opportunity to express their opinions [ST022605]. **Disciplinary Climate (DISCLIMA12)** in PISA 2012 and 2003 included how often the followings happened in their lessons of the language of instruction: *i)* students don't listen to what the teacher says; *ii)* there is noise and disorder; *iii)* the teacher has to wait a long time for the students to <quieten down>; *iv)* students cannot work well; and *v)* students don't start working for a long time after the lesson begins [ST007802-11 in 2012; ST015101–05 in 2009]. In this index higher values indicate a better disciplinary climate. **Classroom Disciplinary Climate (DISCLI00)** in PISA 2000 included the following items: the teacher has to wait a long time for students to quiet down; students cannot work well; students don't listen to what the teacher says; students don't start working for a long time after the lesson begins; there is noise and disorder; and at the start of class, more than five minutes are spent doing nothing [ST015101–5, ST002617]. Students responded to each statement on a four-point scale: *never, some lessons, most lessons, and every lesson*. All items were inverted for scaling. Positive values indicate a more positive perception of the disciplinary climate, and negative values indicate a less positive perception. The variable names are listed as they appear in the IDE.

For trends analyses, the PISA 2003 values of the index of disciplinary climate were rescaled to be comparable to those in PISA 2012. As a result, values for the index of disciplinary climate for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Teacher Fairness (UNFAIRTEACHER)

The *index of teacher fairness (UNFAIRTEACHER)* from PISA 2015 was derived from students' responses to the following statements: Teachers called on me less often than they called on other students; Teachers graded me harder than they graded other students; Teachers gave me the impression that they think I am less smart than I really am; Teachers disciplined me more harshly than other students; Teachers ridiculed me in front of others; Teachers said something insulting to me in front of others. Students responded to each statement on a four-point scale: *never or almost never, a few times a year, a few times a month, and once a week or more*.

iv. School Climate (Reported by Principal)

Student Factors Affecting School Climate (STUDCLIM12)

The *index of student-related factors affecting school climate* (STUDCLIM12) from PISA 2012 and 2003 was derived from school principals' reports on the extent to which the learning of students hindered by the following factors in their schools: *i)* student truancy; *ii)* students skipping classes; *iii)* students arriving late for school; *iv)* students not attending compulsory school events (e.g. sports day) or excursions, *v)* student lacking respect for teachers; *vi)* disruption of classes by students; *vii)* student use of alcohol or illegal drugs; and *viii)* students intimidating or bullying other students. As all items were inverted for scaling, higher values on this index indicate a positive student behaviour [SC004702, SC004707-08, SCP5081-82, SC004704, SC004710, SC004712].

For trends analyses, the PISA 2003 values of the index of student-related factors affecting school climate were rescaled to be comparable to those in PISA 2012. As a result, values for the index of student-related factors affecting school climate for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004). Two of the questions included to compute the index of student-related factors affecting school climate in PISA 2012 ("students arriving late for school," and "students not attending compulsory school events (e.g. sports day) or excursions") were not included in the PISA 2003 questionnaire. Estimation of the PISA 2003 index treats these questions as missing and, under the assumption that the relationship between the items remains unchanged with the inclusion of the new questions, the PISA 2003 and PISA 2012 values on the index of student-related factors affecting school climate are comparable after the rescaling.

Teacher Factors Affecting School Climate (TEACCLIM12)

The *index on teacher-related factors affecting school climate* or **TEACCLIM12** from PISA 2012 and 2003 was derived from school principals' reports on the extent to which the learning of students hindered by the following factors in their schools: *i)* students not being encouraged to achieve their full potential; *ii)* poor student-teacher relations; *iii)* teachers having to teach students of heterogeneous ability levels within the same class; *iv)* teachers having to teach students of diverse ethnic backgrounds (i.e. language, culture) within the same class; *v)* teachers' low expectations of students; *vi)* teachers not meeting individual students' needs; *vii)* teacher absenteeism; *viii)* staff resisting change; *ix)* teachers being too strict with students; *x)* teachers being late for classes; and *xi)* teachers not being well prepared for classes [SC004713, SC004703, SCP5089-90, SC004701, SC004705-06, SC004709, SC004711, SCP5096-97]. As all items were inverted for scaling, higher values on this index indicate a positive teacher behaviour.

For trends analyses, the PISA 2003 values of the index of teacher-related factors affecting school climate were rescaled to be comparable to those in PISA 2012. As a result, values for the index of teacher-related factors affecting school climate for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004). Four of the questions included to compute the index of teacher-related factors affecting school climate in PISA 2012 ("teachers having to teach students of heterogeneous

ability levels within the same class,” “teachers having to teach students of diverse ethnic backgrounds (i.e. language, culture) within the same class,” “teachers being late for classes,” and “teachers not being well prepared for classes”) were not included in the PISA 2003 questionnaire. Estimation of the PISA 2003 index treats these indices as missing and, under the assumption that the relationship between the items remains unchanged with the inclusion of the new questions, the PISA 2003 and PISA 2012 values on the index of teacher-related factors affecting school climate are comparable after the rescaling.

Student Behavior (STUDBEHA)

The *index of student behavior* from PISA 2009, 2003, and 2000 was derived from school principals’ reports on the extent to which student learning was hindered by the following student-related factors in their schools: student absenteeism; disruption of classes by students; students skipping classes; student lacking respect for teachers; student use of alcohol or illegal drugs; and students intimidating or bullying other students [SC004702, SC004704, SC004707-8, SC004710, SC004712]. Principals responded to each statement on a four-point scale: *not at all*, *very little*, *to some extent*, and *a lot*. All items were inverted for scaling. Positive values indicate the perception that student-related factors do not hinder learning, whereas negative values indicate the perception that student-related factors do hinder learning. The variable names are listed as they appear in the IDE.

v. Classroom Climate (Reported by Principal)

Teacher Behavior (TEACBEHA)

The *index of teacher behavior* from PISA 2009, 2003, and 2000 was derived from school principals’ reports on the extent to which student learning was hindered by the following teacher-related factors affecting school climate in their schools: teachers’ low expectations of students; poor student-teacher relations; teachers not meeting individual students’ needs; teacher absenteeism; staff resisting change; teachers being too strict with students; and students not being encouraged to achieve their full potential [SC004701, SC004703, SC004705-6, SC004709, SC004711, SC004713]. Principals responded to each statement on a four-point scale: *not at all*, *very little*, *to some extent*, and *a lot*. All items were inverted for scaling. Positive values indicate the perception that teacher-related factors do not hinder learning, whereas negative values indicate the perception that teacher-related factors do hinder learning. The variable names are listed as they appear in the IDE.

Teacher Morale (TCMORALE12, TCMORALE)

The *index of teachers’ morale and commitment* from PISA 2012, 2003 (TCMORALE12) and 2000 (TCMORALE) was derived from the extent to which school principals agreed with the following statements: *i)* the morale of teachers in this school is high; *ii)* teachers work with enthusiasm; *iii)* teachers take pride in this school; and *iv)* teachers value academic achievement [SC002001–4]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive values indicate a higher perception of teacher morale, and negative values indicate a lower perception. The variable names are listed as they

appear in the IDE. For trends analyses, the PISA 2003 values of the index of teacher morale were rescaled to be comparable to those in PISA 2012. As a result, values for the index of student-teacher relations for PISA 2003 reported in the PISA IDE may differ from those reported in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).

Student Morale (STMORALE)

The *index of student morale and commitment* from PISA 2003 was derived from principals' responses concerning the extent to which they agreed with the following statements: students enjoy being in school; students work with enthusiasm; students take pride in this school; students value academic achievement; students are cooperative and respectful; students value the education they can receive in this school; and students do their best to learn as much as possible [SC003301–7]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling, and the categories “*disagree*” and “*strongly disagree*” were collapsed into one category because of the small number of responses in these categories. Positive scores indicate principals' reports of higher levels of student morale and commitment. The variable names are listed as they appear in the IDE.

Mathematics Teacher Consensus (TCHCONS)

The *index of mathematics teacher consensus* from PISA 2003 was based on the level of school principals' agreement with the following items: there are frequent disagreements between “innovative” and “traditional” mathematics teachers; there are frequent disagreements between mathematics teachers who consider each other to be “too demanding” or “too lax”; and there are frequent disagreements between mathematics teachers who consider each other as “too focused on skill acquisition” or “too focused on the affective development” of the student [SC004303, SC004403, SC004503]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive values on this index indicate principals' perception of higher levels of consensus among teachers. The variable names are listed as they appear in the IDE.

6.N. Student and Teacher Assessments

i. Assessment of Students

Teacher Behavior: Formative Assessment (TCHBEHFA)

The *index of teachers' use of formative assessment* (TCHBEHFA) from PISA 2012 was constructed using students' reports on the frequency (*every lesson*, *most lessons*, *some lessons*, *never or hardly ever*) with which, in mathematics lessons, the teacher tells students how well they are doing in mathematics class; the teacher gives students feedback on their strengths and weaknesses in mathematics; and the teacher tells students what they need to do to become better in mathematics.

Estimated Number of Assessments per Year (ASSESS)

The *index of the estimated number of assessments per year* from PISA 2003 was derived from school principals' responses regarding the frequency of the following assessments for 15-year-old students: standardized tests; teacher-developed tests; teachers' judgmental ratings; student portfolios; and student assignments/projects/homework [SC003401–5]. All five items were recoded into numerical values, which approximately reflect the frequency of assessments per year: *never* = 0, *1–2 times a year* = 1.5, *3–5 times a year* = 4, *monthly* = 8, and *more than once a month* = 12. The index of the estimated number of assessments per year was calculated as the sum of these recoded items and then divided into three categories: *less than 20 times a year*, *20–39 times a year*, and *more than 40 times a year*. The variable names are listed as they appear in the IDE.

ii. Use of Student Assessment Data

Teacher Focus (TCFOCST)

The *index of teacher focus* (TCFOCST) from PISA 2012 was derived from school principal's responses to the following statements regarding teacher focus to students: (1) Mathematics teachers are interested in trying new methods and teaching practices; (2) There is consensus among mathematics teachers that it is best to adapt academic standards to the students' levels and needs; (3) There is consensus among mathematics teachers that the social and emotional development of the students is as important as their acquisition of mathematical skills and knowledge in mathematics classes. The four response categories ranged from “*Strongly agree*”, “*Agree*”, “*Disagree*” to “*Strongly disagree*”.

Use of Assessment (USEASSESS)

In PISA 2012, school principals were asked to report whether students' assessments are used for the following purposes: *i)* to inform parents about their child's progress; *ii)* to make decisions about students' retention or promotion; *iii)* to group students for instructional purposes; *iv)* to compare the school to district or national performance; *v)* to monitor the school's progress from year to year; *vi)* to make judgments about teachers' effectiveness; *vii)* to identify aspects of instruction or the curriculum that could be improved; and *viii)* to compare the school with other schools [SC003501-08]. The *index of use of assessment* (SCP5257) was derived from these eight items by summing the number of "yes" in principals' responses to these questions.

6.O. Parental Participation, Expectations, and Accountability

i. Parental Participation and Expectations

School Policies for Parental Involvement (PASCHPOL)

The *index of school policies for parental involvement* (PASCHPOL) from PISA 2015 was derived based on the percentage of the of the following statements that apply to the school: Our school provides a welcoming and accepting atmosphere for parents to get involved; Our school

designs effective forms of school-to-home and home-to-school communications about school program and children's progress; Our school includes parents in school decisions; and Our school provides information and ideas for families about how to help students at home with homework and other curriculum-related activities, decisions, and planning. Each statement is on a four-point scale: *strongly agree*, *agree*, *disagree*, and *strongly disagree*.

Parental Emotional Support (EMOSUPS)

The *index of parental emotional support* (EMOSUPS) from PISA 2015 was derived from students' responses to the following statements: My parents are interested in my school activities; My parents support my educational efforts and achievements; My parents support me when I am facing difficulties at school; and My parents encourage me to be confident.

6.P. Admissions and Transfers

i. Admissions Practices

School Selectivity (SCHSEL)

The *index of academic selectivity* (SCP5278) from PISA 2012 was derived from school principals' responses on how frequently consideration was given to the following factors when students were admitted to the school, based on a scale from the response categories "never", "sometimes" and "always": student's record of academic performance (including placement tests); and recommendation of feeder schools. This index has the following three categories: (1) schools where these two factors are "never" considered for student admittance, (2) schools considering at least one of these two factors "sometimes" but neither factor "always", and (3) schools where at least one of these two factors is "always" considered for student admittance [SC009702 and SC009703].

Although both PISA 2003 and PISA 2012 asked school principals about the school's criteria for admitting students, the wording of the questions changed, rendering comparisons impossible.

School Academic Selectivity (SELSCH09, SELSCH)

The *index of school selectivity* was derived from school principals' reports about admittance policies at their school. **SELSCH09** in PISA 2009, principals were asked how much consideration was given to two factors—students' academic record (including placement tests) [SC009702] and the recommendation of feeder schools [SC009703]— when students are admitted to the school. Principals responded to each statement on a three-point scale: *never*, *sometimes*, and *always*. Based on these responses, an index of school selectivity was computed by assigning schools to three different categories: (1) schools where these two factors are "never" considered for student admittance; (2) schools considering at least one of these two factors "sometimes," but neither factor "always"; and (3) schools where at least one of these two factors is "always" considered for student admittance. **SELSCH** in PISA 2006 and 2003 principals' responded to two factors—students' academic record (including placement tests) [SC003202] and the recommendation of feeder schools [SC003203]— when students are

admitted to the school. Principals responded to each statement on a four-point scale: *not considered*, *considered*, *high priority*, and *prerequisite*. An index of school selectivity was computed by assigning schools to four different categories: (1) schools where neither of these factors is considered for student admittance; (2) schools considering at least one of these factors; (3) schools giving high priority to at least one of these factors; and (4) schools where at least one of these factors is a prerequisite for student admittance. The variable names are listed as they appear in the IDE.

6.Q. Extracurricular Activities Offered by School

i. Extracurricular Activities Offered by School

Extracurricular Activities at School (CREACTIV)

The *index of extracurricular activities at school* from PISA 2015 and from PISA 2012 was computed from school principals' reports as the total number of the following activities that occurred at school: band, orchestra or choir; school play or school musical; art club or art activities.

Extracurricular Activities Offered by School (EXCURACT)

The *index of extracurricular activities* from PISA 2009 was derived from school principals' reports on whether their school offered the following activities to 15-year-old students: band, orchestra, or choir; school play or school musical; school yearbook, newspaper, or magazine; volunteering or service activities; book club; debating club or debating activities; school club or school competition for foreign language mathematics or science; academic club; art club or art activities; sporting team or sporting activities; lectures and/or seminars; collaboration with local libraries; collaboration with local newspapers; and a country-specific option ("school-wide scheduled reading periods" in the U.S.) [SC009101–14]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate higher levels of extracurricular school activities. The variable names are listed as they appear in the IDE.