Program for the International Assessment of Adult Competencies (PIAAC) International Data Explorer Help Guide

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PIAAC International Data Explorer Help Guide

I. Background on the Program for the International Assessment of Adult Competencies (PIAAC) and the PIAAC International Data Explorer (IDE)

The Program for the International Assessment of Adult Competencies (PIAAC) International Data Explorer (IDE) is a web-based application for accessing data from PIAAC, supported by the U.S. National Center for Education Statistics (NCES) and the Organization for Economic Cooperation and Development (OECD). The PIAAC IDE is available on both the NCES and OECD websites, however only the NCES PIAAC IDE includes the U.S. National Supplement adult sample population variables and all variables following national routing for analysis. Meanwhile, for other jurisdictions, NCES PIAAC IDE disseminates data contained in their public-use files, resulting in some variables being available for all jurisdictions in OECD PIAAC IDE, but not available in NCES PIAAC IDE (such as [EARNHR] 'Averages for hourly earnings excluding bonuses for wage and salary earners (derived)'); or some variables available for all jurisdictions in OECD PIAAC IDE, but not available for certain jurisdictions in NCES PIAAC IDE (such as [BQ02B] 'Education – Current qualification – Level' for Canada and Estonia).

PIAAC is a household study that has been developed under the auspices of the OECD. Adults were surveyed in the U.S. and 23 other participating jurisdictions in 2012, 9 additional jurisdictions in 2014, and 5 more countries in 2017. Internationally these three rounds of data collection in PIAAC are combined for international comparisons.

The goal of PIAAC is to assess and compare the basic skills and the broad range of competencies of adults around the world. The assessment focuses on cognitive and workplace skills needed for successful participation in 21st-century society and the global economy. Specifically, PIAAC measures relationships between individuals' educational background, workplace experiences and skills, occupational attainment, use of information and communications technology, and cognitive skills in the areas of literacy, numeracy, and problem solving in technology-rich environments (PS-TRE).

PIAAC is a complex assessment. The data collection is conducted in multiple languages and in numerous jurisdictions with diverse populations, cultures, education and life experiences. All participating jurisdictions follow the quality assurance guidelines set by the OECD consortium, and closely follow all the agreed-upon standards set for survey design, implementation of the assessment, and the reporting of results.

PIAAC builds on knowledge and experiences gained from previous international adult assessments - the International Adult Literacy Survey (IALS) and the Adult Literacy and Lifeskills Survey (ALL). PIAAC enhances and expands on these previous assessments' frameworks and, at the same time, improves upon their design and methodologies. Trends in

literacy have been established between the three surveys and trends in numeracy have been established between PIAAC and ALL. Data from all three surveys are available in the PIAAC IDE.

In the United States, the PIAAC assessment is conducted in English only; however, the PIAAC survey background questions are in both English and Spanish. PIAAC is named the International Survey of Adult Skills (ISAS) in the United States. Data collection for the first PIAAC field test was conducted in 2010, and its first main assessment began in August 2011 and finished in April 2012.

The U.S. PIAAC National Supplement is the second PIAAC data collection in the United States. These data are included in the NCES PIAAC IDE. Conducted from August 2013 through April 2014, the National Supplement's household data collection surveyed a sample of approximately 3,600 adults to represent three key U.S. subgroups of interest:

- unemployed adults (age 16 to 65),
- young adults (age 16 to 34), and
- older adults (age 66 to 74).

In addition to a household data collection, the National Supplement also surveyed a sample of 1,200 adult inmates (age 16 to 74) detained in federal and state prisons in the United States. The National Supplement household data collection used the same procedures, instruments, and assessments that were used for the 2012 PIAAC Main Study, which surveyed approximately 5,000 adults. This was done so that data from the National Supplement could be combined with data from the 2012 Main Study. The combined U.S. 2012 and 2014 PIAAC data provide an augmented nationally representative sample of 8,600 adults in the United States between the ages of 16 and 74. It is important to note that the National Supplement household data are not by themselves nationally representative and, hence, can only be used when combined with the Main Study data. The NCES PIAAC IDE only provides these data together in a combined form, labeled "PIAAC 2012/2014."

The 2017 U.S. PIAAC is the third round of PIAAC data collection in the United States. Conducted from March 2017 to September 2017, the 2017 U.S. PIAAC household data collection surveyed a sample of approximately 3,600 adults (age 16 to 74). The 2017 data are nationally representative and provide a second point in time for comparison to the 2012/2014 data. In the NCES PIAAC IDE, U.S. PIAAC 2017 data is only available in the U.S. Adults, 16–74 (Household and Prison) display. This allows for a comparison to the U.S. PIAAC 2012/2014 data, while comparisons to other countries or to the international adult assessments of ALL 2003–2008 and IALS 1994–1998 data are not available.

The Young Adults, 16–34 and the Adults, 16–65 displays do not include a separate PIAAC 2017 and PIAAC 2012/2014 Year/Study and instead include a PIAAC 2012-2017 Year/Study, containing U.S. PIAAC 2012/2014 data along with data for other jurisdictions that participated in the three international rounds of PIAAC (see Table 1). In the NCES PIAAC IDE and other national U.S. reporting, the 2012/2014 U.S. sample is used as the point for international comparison to the samples in other countries that participated in Cycle 1 (Rounds 1, 2, and 3).

Although the 2017 sample is also nationally representative, the U.S. has decided to use the 2012/2014 data for international comparison in order to keep a single point of comparison for the U.S. and to keep the reporting of where the U.S. stands internationally and the international average more consistent with previous NCES reporting. Additionally, using 2012/2014 data rather than 2017 data provides a larger sample size and a data collection time point closer to when the majority of Cycle 1 participating countries collected their data.

Table 1. PIAAC reporting scales currently available in the IDE, by display and year/study

Display	Year/Study	Reporting scale			
		Literacy overall scale	Reading components[1] scale	Numeracy overall scale	Problem Solving in technology-rich environments (PS-TRE) overall scale
U.S. Adults, 16–74 (Household and Prison)	PIAAC 2017	X	X	X	X
	PIAAC 2012/2014	X	X	X	X
Young Adults, 16–34	PIAAC 2012–2017	X	X	X	X
	ALL 2003–2008	X		X	
	IALS 1994–1998	X			
Adults, 16–65	PIAAC 2012–2017	X	X	X	X
	ALL 2003–2008	X		X	
	IALS 1994–1998	X			

[1] Reading Components is a domain used to measure literacy at the very low end of the spectrum, with components such as sentence completion, passage comprehension, and vocabulary. It is included in the IDE as Criteria accessed under any Display. For more information regarding the definition of reading components domain, please see Chapter 3, Literacy and Reading Component in the framework for the OECD Survey of Adult Skills (http://www.oecd.org/site/piaac/PIAAC%20Framework%202012--%20Revised%2028oct2013_ebook.pdf).

NOTE: For more information regarding the literacy, numeracy, and problem solving in technology-rich environments scale frameworks, go to http://nces.ed.gov/surveys/piaac/framework.asp for each framework in brief, or go to the complete framework for the OECD Survey of Adult Skills (http://www.oecd.org/site/piaac/PIAAC%20Framework%202012--%20Revised%2028oct2013_ebook.pdf).

II. Computer Requirements for the IDE

- Screen resolution should be 1024 x 768 pixels.
- Browsers: Internet Explorer (IE) version 7 or higher, Safari, Firefox, or Google Chrome. For rendering and scrolling pages with large tables, Firefox 2.0 is faster than IE7 (Firefox 3.0 or higher is recommended).
- 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.
- Screen reader software should be Jaws 8.0 or higher.

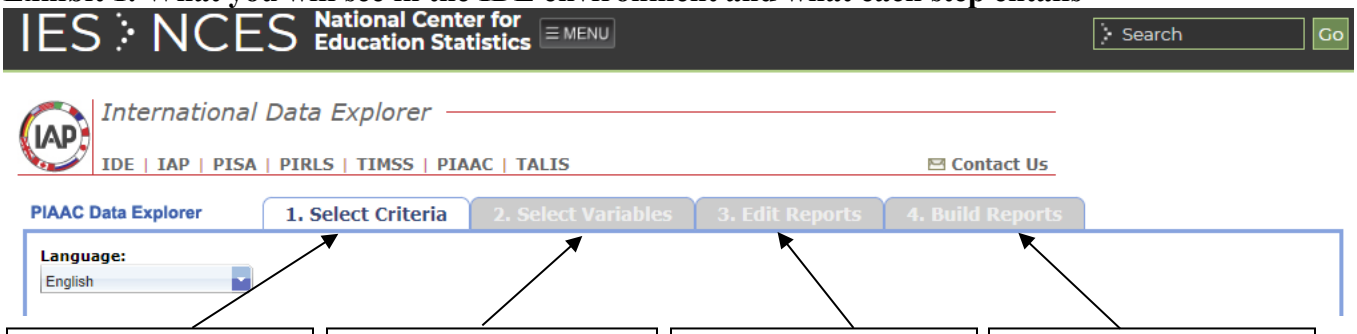
If you encounter an error, please send us the details through **Contact Us** (located in the upper-right portion of the screen on each page of the IDE website). When writing, include your browser version and operating system version, and as many other details as possible. Be sure to provide an e-mail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

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

III. General Overview and Steps to Explore Data

There are four general steps for exploring PIAAC data using the PIAAC IDE (see exhibit 1).

Exhibit 1. What you will see in the IDE environment and what each step entails



1. Select criteria: Choose your measure(s), year/study, and jurisdiction(s).

2. Select variables: Select at least one variable from the selection of categories and subcategories.

3. Edit reports: Preview how your data will look, and edit your report format options and statistics options as desired.

4. Build reports: Retrieve the data, make charts and graphs, and save and print reports.

To create your own custom tables, charts, and graphs, follow this sequence of steps when using the PIAAC IDE.

Each of these steps is discussed in detail throughout the remainder of this guide, starting with step 1, **Select Criteria** (below).

1. Select Criteria

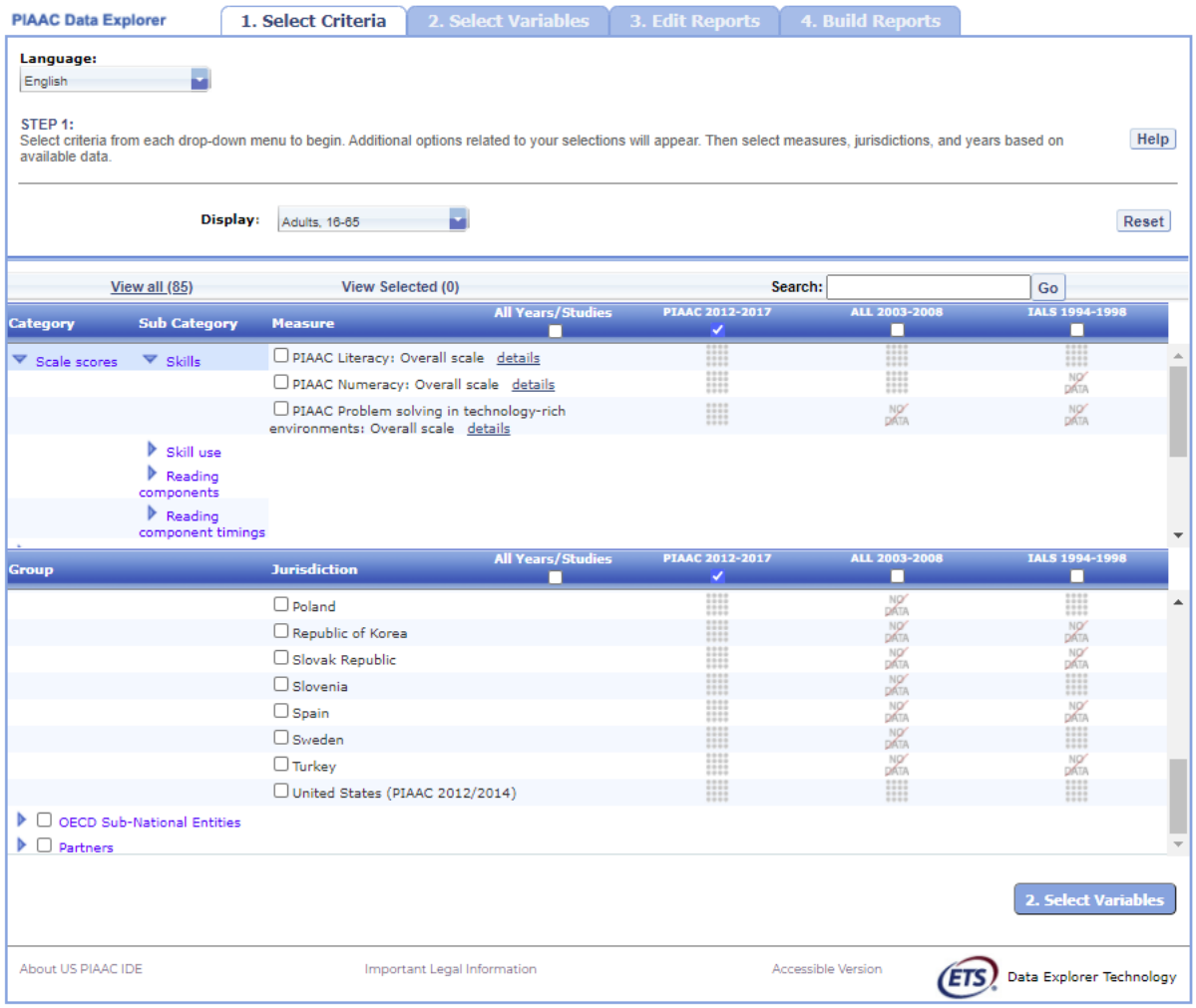
1.A. Overview

Your data query in the PIAAC IDE begins on the Step 1. **Select Criteria** screen (see exhibit 2, on next page).

Select a **Display** from the drop-down menus. Once the screen resets, you can choose one or more of the years and studies or **All Years/Studies**, **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 clear selections and start over.

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 2. Selecting criteria



1.B. Display

Under **Display**, choose one of the three different NCES PIAAC IDE adult sample populations:

> **U.S. Adults, 16–74 (Household and Prison):** This display contains U.S.-only comparable data from the PIAAC, including the 2017 U.S. Household Data (for ages 16–74, and 16–65), combined 2012 and 2014 U.S. Household Data (for ages 16–74, and 16–65), and Prison Data (for ages 16–74).
>
> **Young Adults, 16–34**: This display contains internationally comparable data from the 3 international rounds of PIAAC (2012–2017 for all countries, except the U.S. which combined 2012–2014 data only) Household Data, ages 16–34. This display does not include the 2017 U.S. Household Data.
>
> **Adults, 16–65**: This display contains internationally comparable data from the 3 international rounds of PIAAC (2012–2017 for all countries, except the U.S. which

combined 2012-2014 data only) Household Data, ages 16–65. This display does not include the 2017 U.S. Household Data.

Once a display is chosen, the screen resets and you can select one or more of the years and studies or **All Years/Studies**, **Measure**(s), and **Jurisdiction**(s).

1.C. Choose Year/Study(s)

In the same horizontal bar as the **Measure** and **Jurisdiction** sections, you have the choice of selecting **PIAAC 2017** and/or **PIAAC 2012/14** by checking the appropriate box if the Display chosen is **U.S. Adults, 16–74 (Household and Prison)**. You have the choice of selecting **PIAAC 2012–2017**, **ALL 2003–2008**, and/or **IALS 1994–1998** if the **Display** chosen is **Adults, 16–65**, or **Young Adults, 16–34**. To include data from all studies, check the **All Years/Studies** box to the left of the individual year and study options.

1.D. Choose Measure(s)

After choosing a **Display**, you can choose a **Measure** within the **Select Criteria** tab. Note that the **PIAAC overall scales** are the default and you can select more than one overall scale although analysis for each scale will be done separately. You can browse for other reporting scales using the **Category** and **Sub Category** lists or by using the **Search** function.

There are a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables are generally continuous variables from the international and U.S. national background questionnaires (such as earnings or hours of work per week) and derived variables from PIAAC, ALL, and IALS. Derived variables from PIAAC include indices of literacy, numeracy, and computer use at work and at home and imputed years of formal education, among others. Analysis of the continuous variables in terms of the continuous literacy, numeracy and problem solving TRE scale scores is not possible, but it is possible to analyze the continuous variables in terms of the literacy, numeracy, and problem solving proficiency level variables available in the list of **Variables**. For example, one cannot analyze the average number of hours of work per week in relationship to score, but one can analyze the average number of hours of work per week for adults at each proficiency level.

Percentage across full sample: The adults in the sample population that did not answer the assessment will be displayed along with those that did answer the assessment if you select the **Percentage across full sample** measure under the **Population** category and **Population** subcategory.

Reading components: There is a separate reporting scale for the Reading Components domain of the PIAAC survey. The Reading Components domain is used to measure literacy at the very low end of the spectrum, with components such as sentence completion, passage comprehension, and vocabulary. This domain was given to respondents who decided not to take the computer-based assessment or who did not pass a set of core information and computer technology tasks and failed a set of core literacy/numeracy tasks.

1.E. Choose Jurisdiction(s)

With your **Measure**(s), one or more of the years and studies or **All Years/Studies** selected, next choose at least one **Jurisdiction.**

Jurisdictions are found under **OECD National Entities**, **OECD Sub-National Entities** and **Partners.**

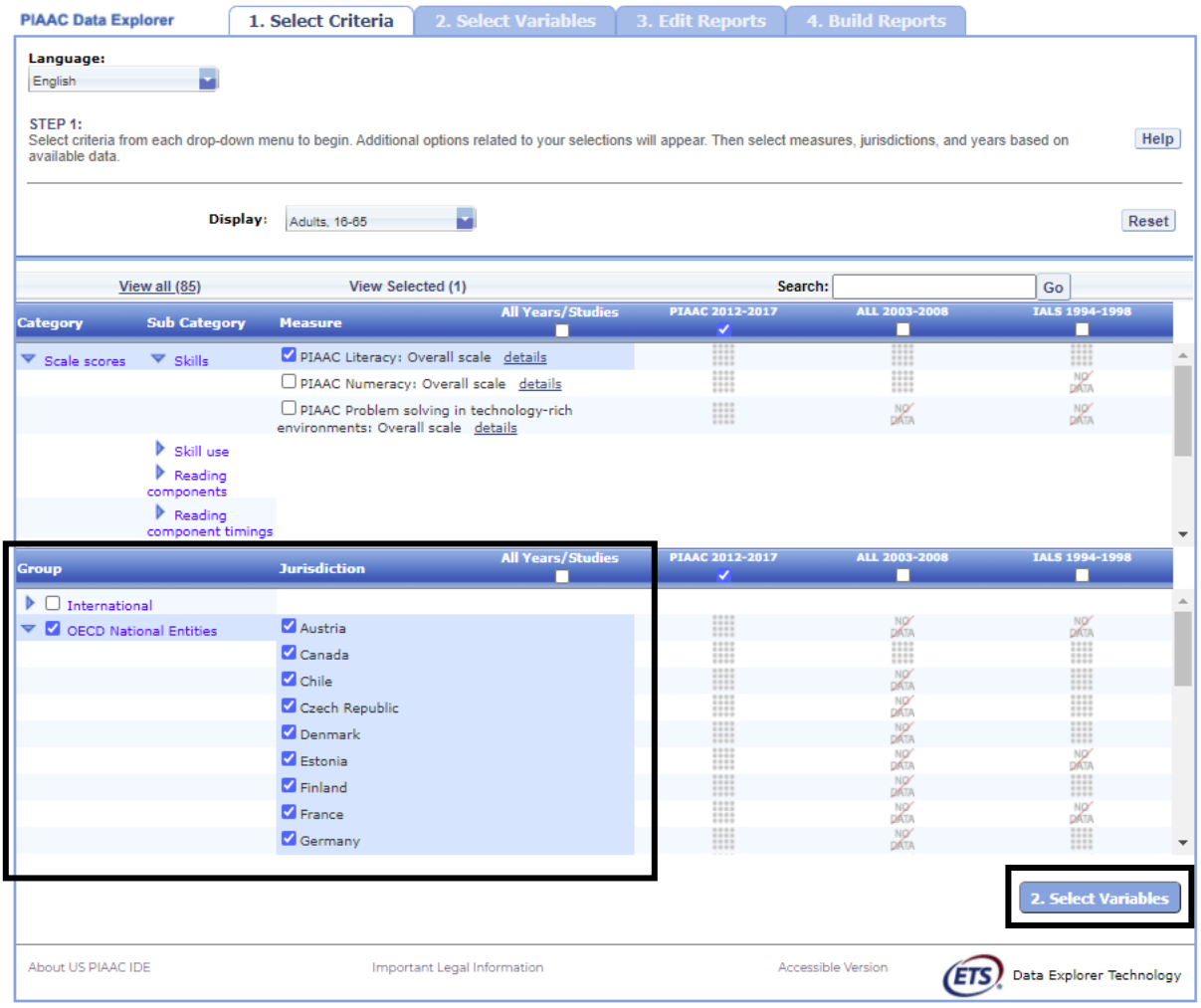
There is also a group category called **International**, with options to display the **Average of All Jurisdictions** and the **Average of the Selected Jurisdictions.** Please note that selecting **Average of All Jurisdictions** or **Average of the Selected Jurisdictions** increases the frequency of receiving an error message in the **Build Reports** step due to the high volume of information contained in these groups.

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

1. To open groups of jurisdictions, click on the arrow (►). Jurisdictions in the group are open and can be selected when the blue arrow points down (▼) (see exhibit 3).
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 National Entities**"), 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 National Entities** jurisdictions in order to readily see the **OECD Sub-National Entities** jurisdictions), click the blue arrow pointing down (▼) next to the group name. The closed group's arrow will now point to the right (►). Be advised that closing the group will not deselect your choices.

NOTE: The U.S. Adults 16–74 (Household and Prison) Display only includes data for the United States. The U.S. Household (16–74 years old), U.S. Prison (16–74 years old), and U.S. Household (16–65) are the only selections available in the **Jurisdiction** menu. However, users may choose to work with the U.S. prison sample, or one of the U.S. household samples, or select more than one for analysis as jurisdictions.

Exhibit 3. Choosing jurisdictions



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 3).

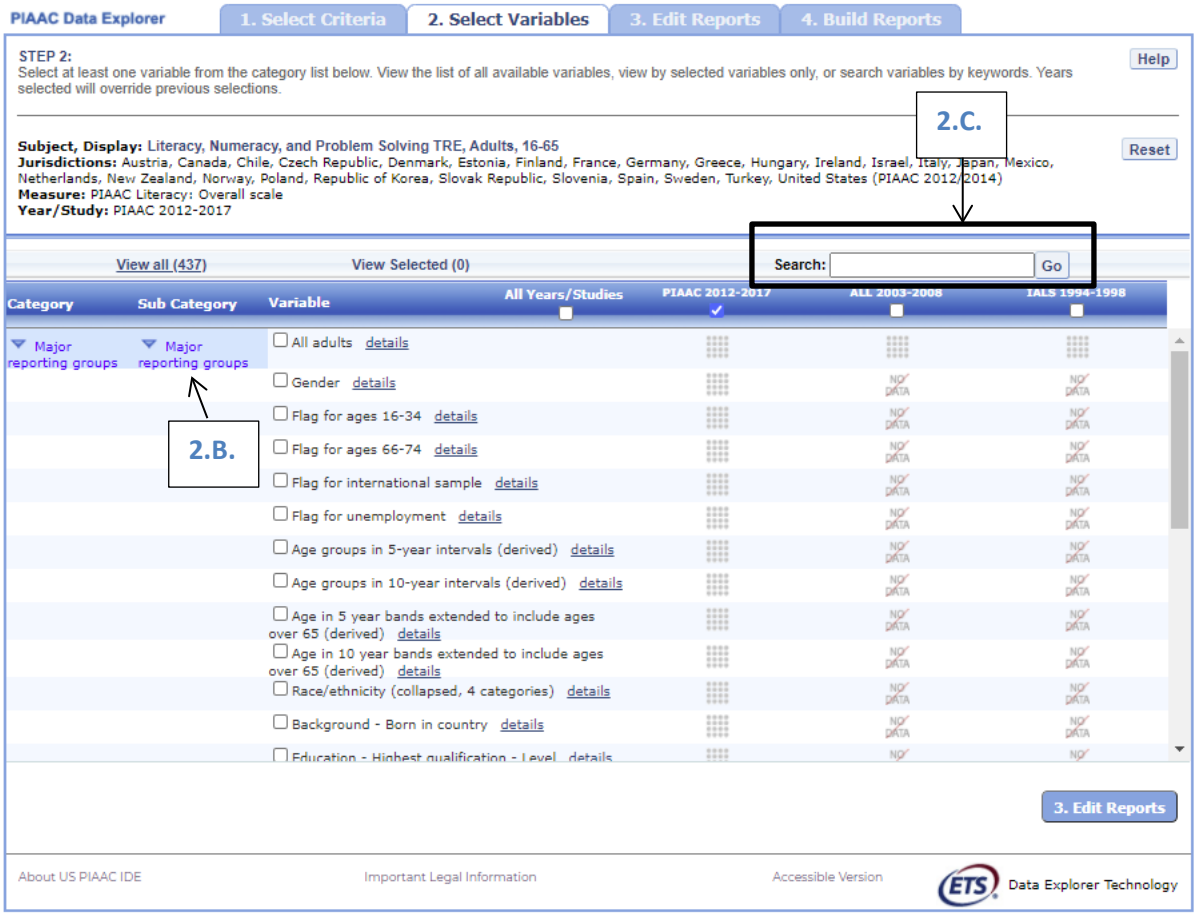
2. Select Variables

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 4). You can return to this screen to change variable selections at any time.

Exhibit 4. Select variables overview



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 do not wish to choose from any of the specified categories and subcategories, then select **All adults** in the **Major reporting groups** sub category.

The variables shown are tied to the criteria you selected at step 1 (**Measure,** one or more of the years and studies or **All Years/Studies** selected**,** and **Jurisdiction**), which are indicated at the top of the screen. To change any of these criteria, return to step 1, by clicking on **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 5).
2. Click **details** or **hide details** to show or hide the full title of a given variable, the PIAAC ID (e.g., GENDERR), and the values (i.e., variable labels). Note that some

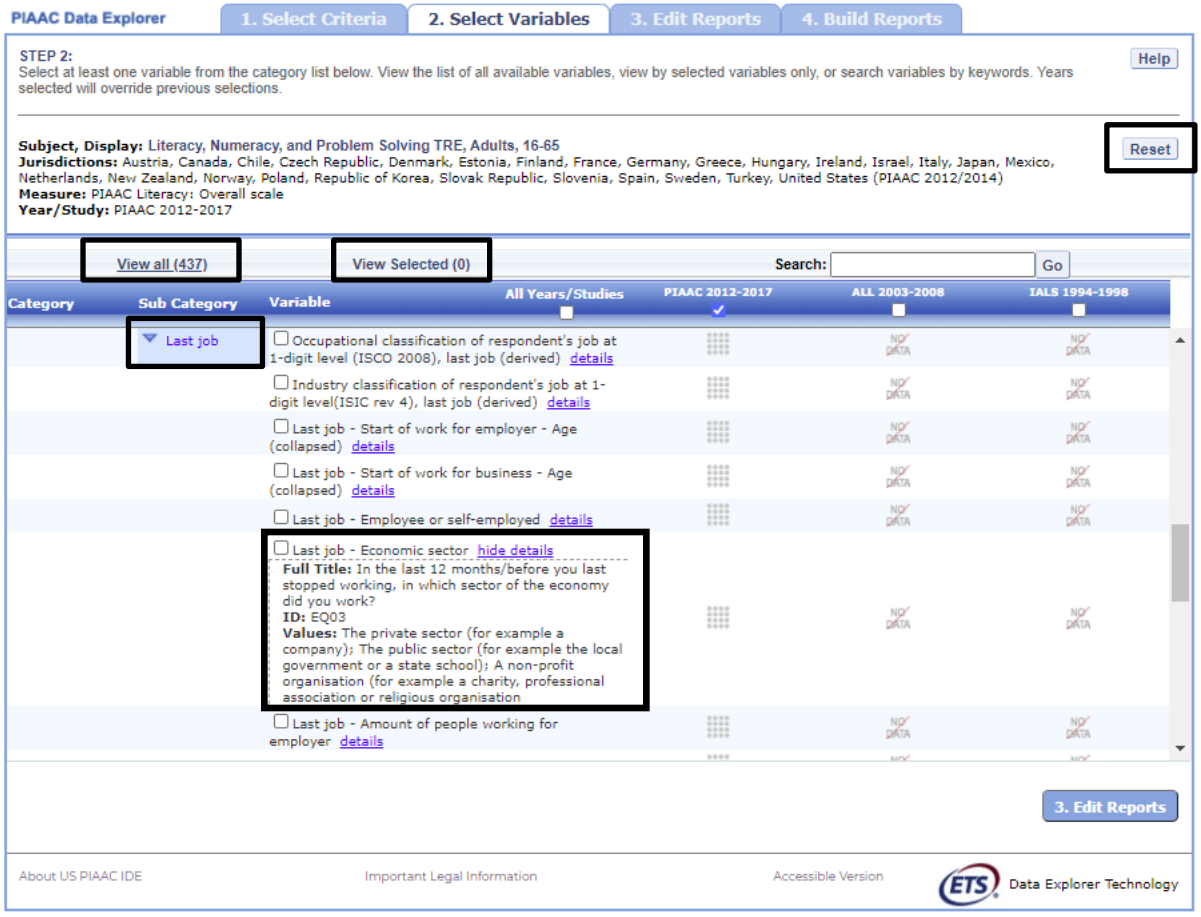
variables have the same or similar short titles, but comparing details will show you how they differ. See the example in exhibit 5, which shows **Last job - Employee or self-employed** and **Last Job - Economic sector.** The differences between these two variables are described in the details.

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** that appears above the Variable list.
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 to the left of the **View Selected** tab.
5. Click **Reset** button in the upper-right portion of the screen if you wish to deselect all the selected variables.

NOTE: Remember to select the year/study for which you wish to build a report and make sure that data are available for your chosen year/study and variables.

Searching variables is an option from the Search box. See **Section 2.C Search Function** (on next page) for more details about this function.

Exhibit 5. Select variables using category and sub category lists



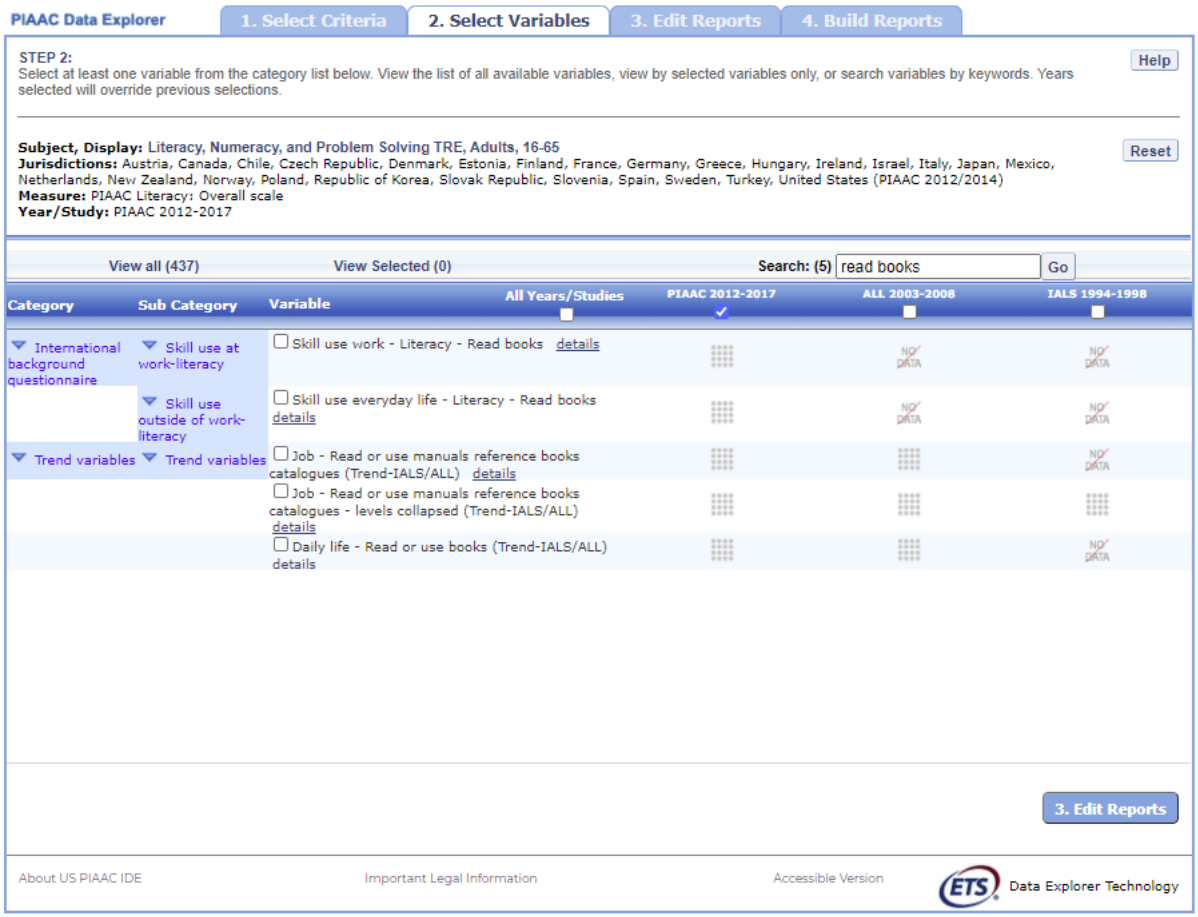
When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

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 6). The search function operates on whole words or on an exact phrase (if it is contained in quotes). To search for less than a whole word or exact phrase, include an asterisk (*) after the search term. If you use multiple keywords, "and" is assumed. You can narrow your search by using "or," "not," or "and not."

Exhibit 6. Select variables using the search function



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

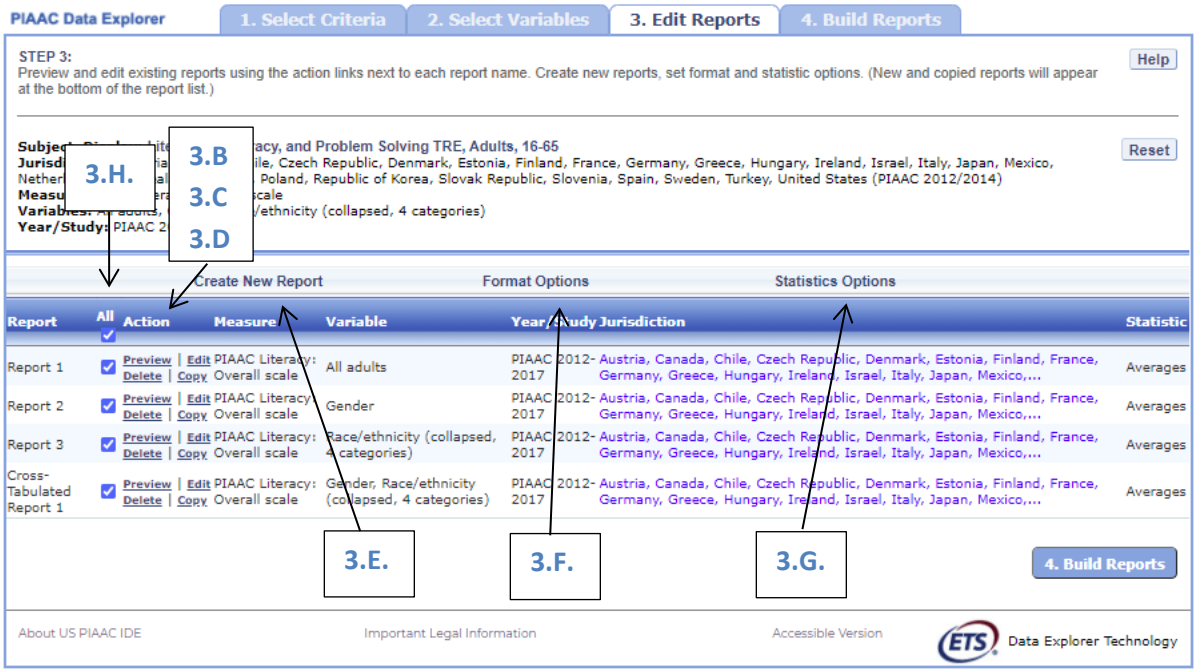
3.A. Overview

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 average scale scores and achievement levels, 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 PIAAC IDE will return a separate data report for each variable you have chosen. If you have selected two or three variables (not counting **All adults**), 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 a cross-tabulation report will not be produced. If your selected criteria include more than one **Measure** (e.g., overall literacy scale and one or more continuous variable from step 1, **Select Criteria**), a separate set of data reports will be generated for each **Measure** (see exhibit 7).

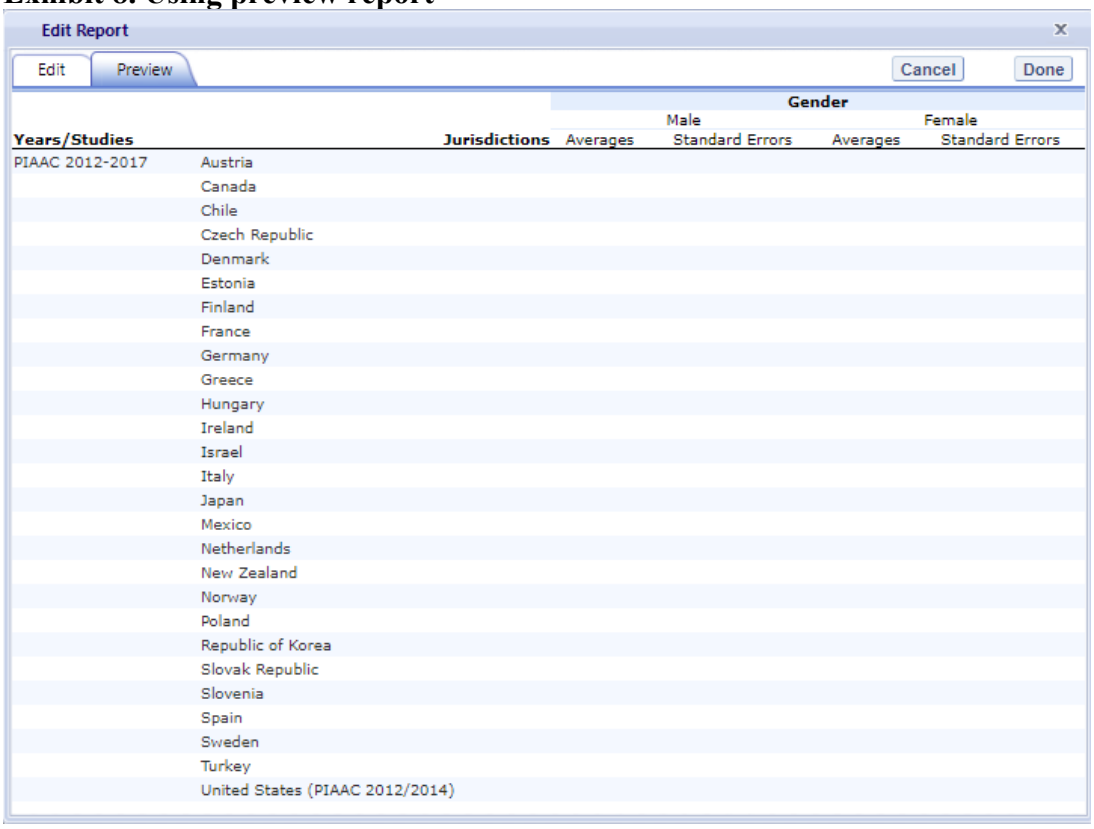
Exhibit 7. Edit reports overview



3.B. Preview Report

Select **Preview,** in the **Action** column (see exhibit 7), 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 8). You can select **Preview** at any time to see how your changes will affect the report's final layout.

Exhibit 8. Using preview report



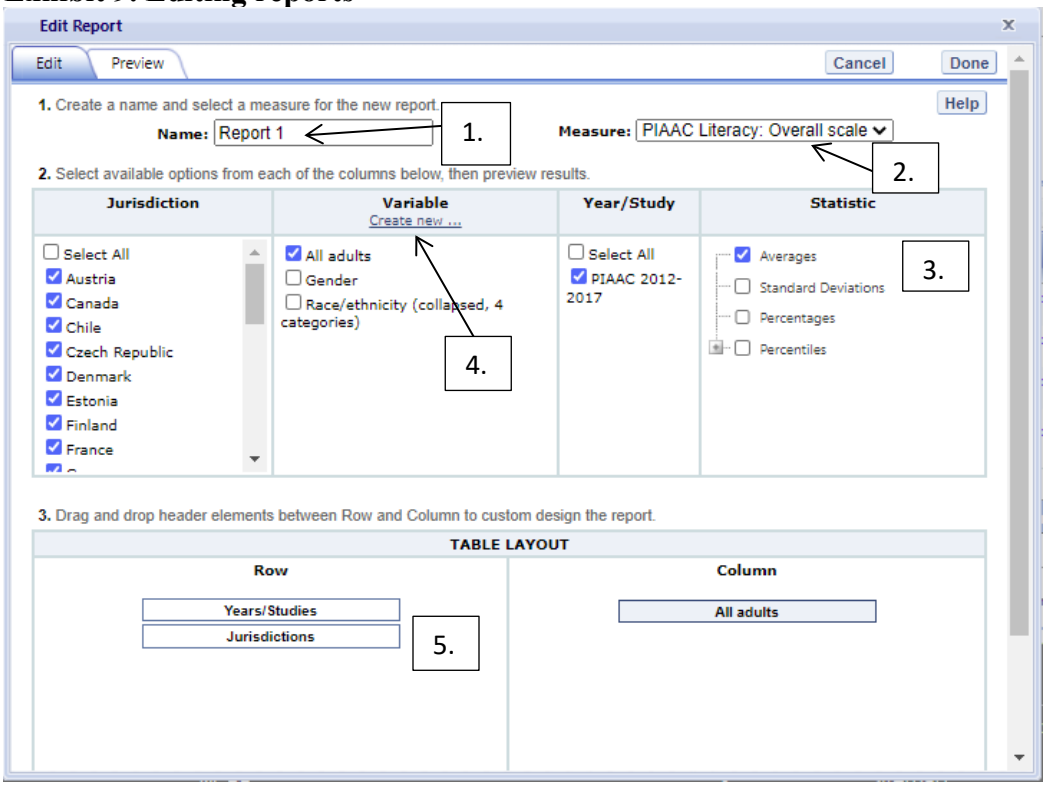
3.C. Edit Report

To edit the report, select the **Edit** command, in the **Action** column, next to the report number (see exhibit 7). (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** command (see exhibit 9):

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, Select Criteria.
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. Create a new variable. To create a new variable while editing a report, click on **Create New…** under the **Variable** heading. Section 3.D 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 permissible, but a pop-up alert will explain this.

Exhibit 9. Editing reports



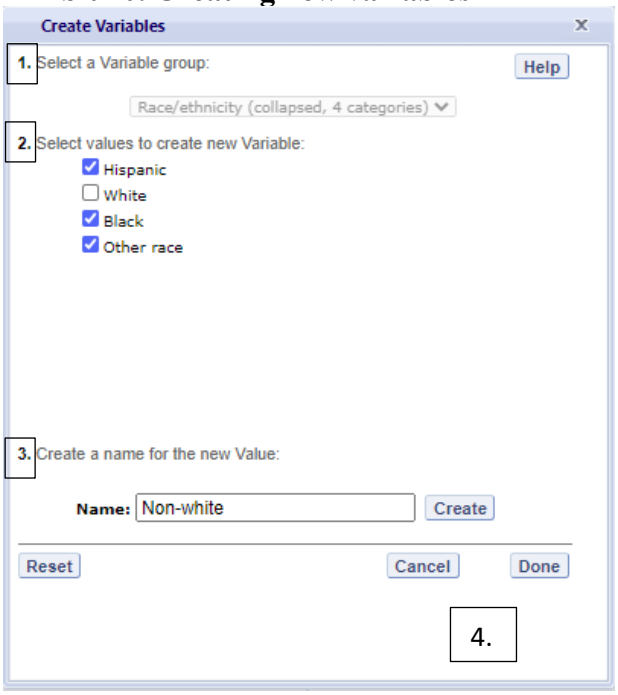
To save changes, make sure to select **Done** in the upper-right portion of the screen before closing the **Edit Report** window. If the **Done** button is not pressed before the Edit window is closed, you may encounter a system error.

3.D. Create New Variables

To create a new variable, select **Edit,** in the **Action** column, and select **Create new…** under **Variable** (see exhibit 9). The new variable is created by combining values for an existing variable. The steps are as follows:

1. Select the variable for which you wish to combine values.
2. Select the values you want to combine by checking the boxes to the left of the values (see exhibit 10).
3. 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.
4. Wait for the screen to refresh, and press **Done**.

Exhibit 10. Creating new variables



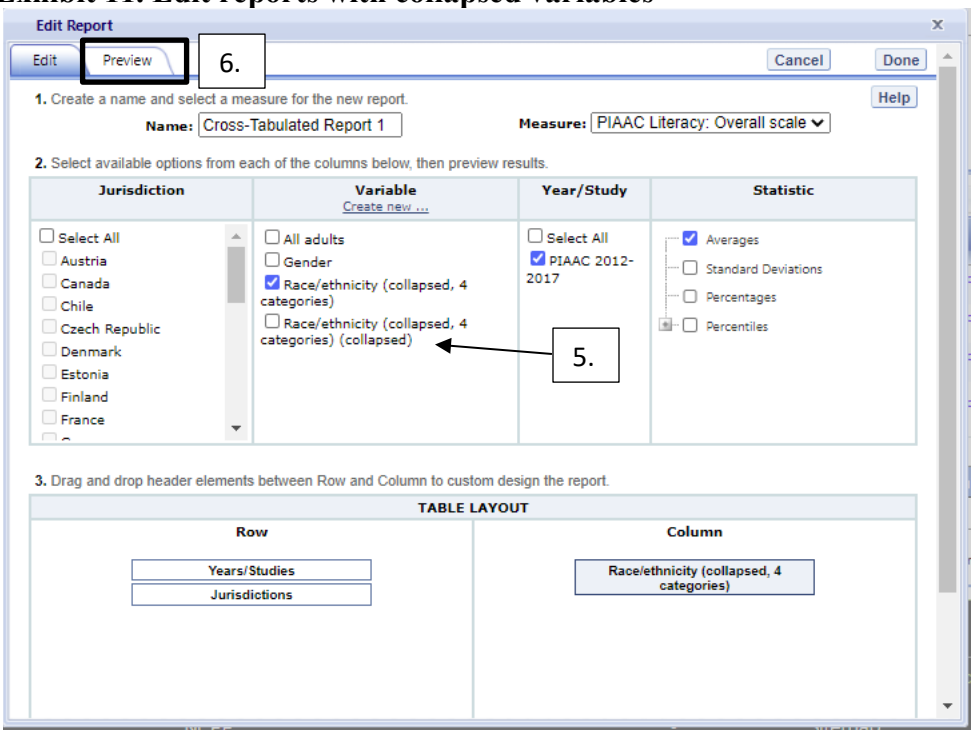
5. The new variable will appear in the **Variable** list in the **Edit Report** window or **Create New Report** window, designated as "collapsed."
6. Check the box next to the new variable to view it in the report. You can click **Preview** to see how the table will be laid out before retrieving data.

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 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 cannot save the new variable for reference or future use.

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**.)

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 11). If you have chosen four or more variables (not counting **All adults**) you will not get the cross-tabulation. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 11. Edit reports with collapsed variables



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** (see exhibit 12a and 12b) provides a clean slate for your selections from the first two steps, **Select Criteria** and **Select Variables**. 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.” If you create a second new report, the system will attempt to save it with the “New Report” name again; however, it will fail and will prompt you to enter a different name in the Name text box.

Exhibit 12a. Creating new reports

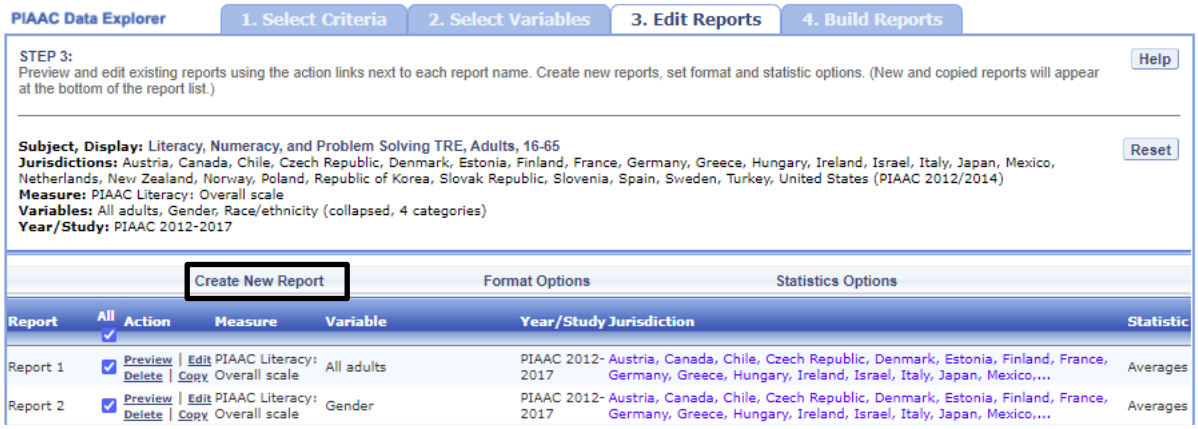
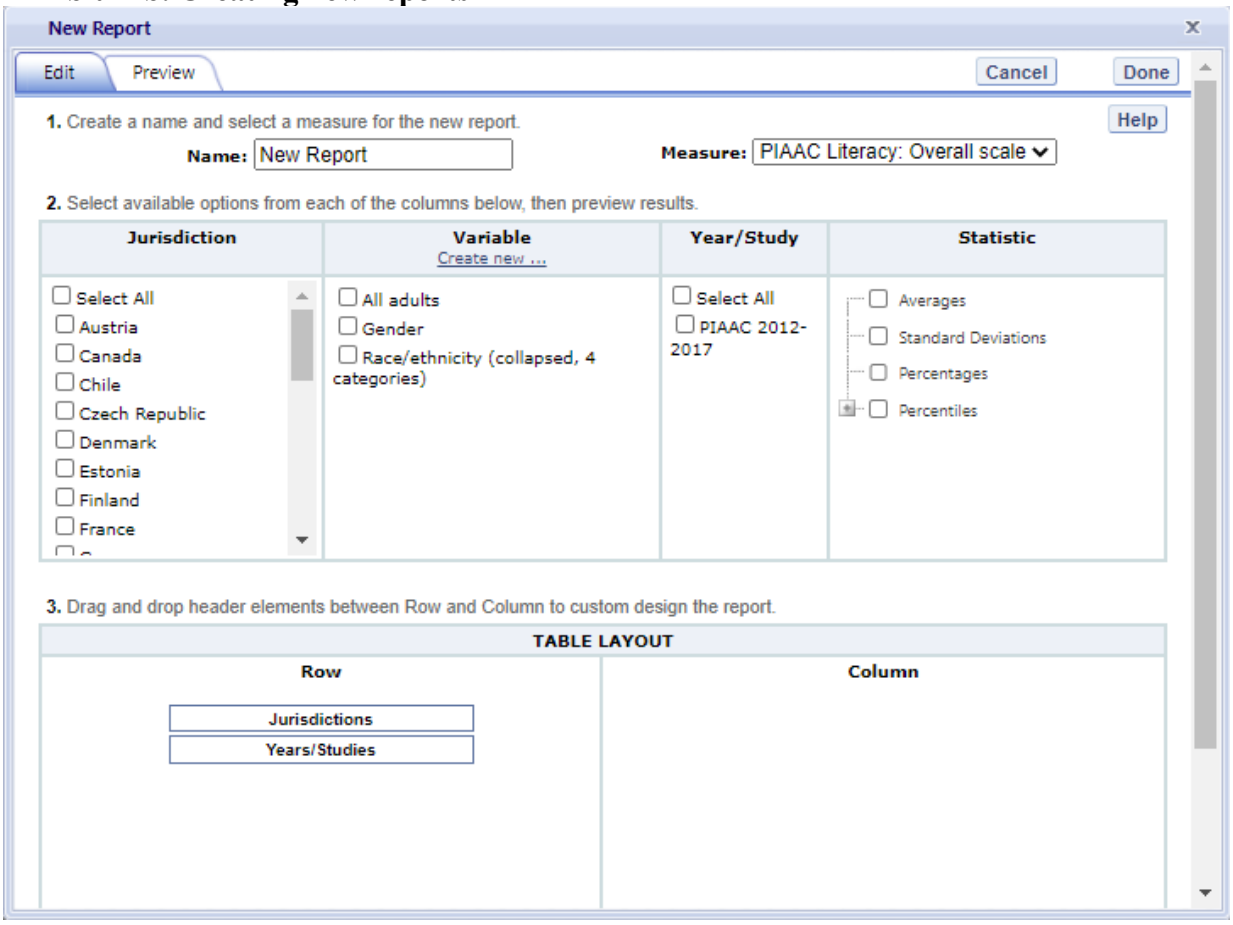


Exhibit 12b. Creating new reports



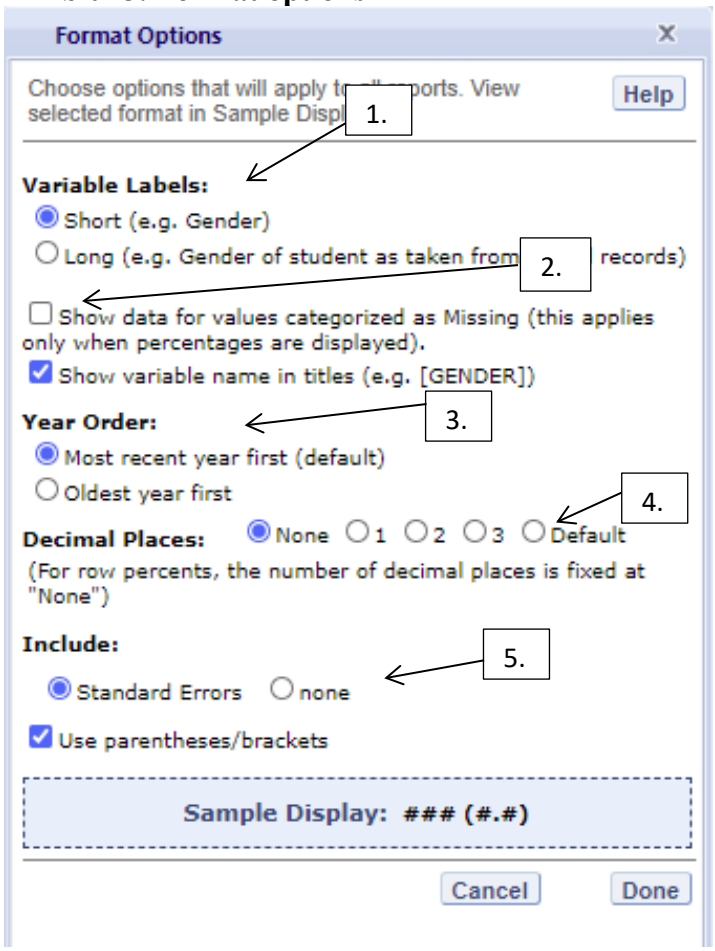
3.F. Format Options

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 13):

1. **Variable Labels (Long)** displays a more detailed description of the variables selected in a query than the default short label. For variables from the background questionnaire, 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 adults 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 adults. 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. **Year Order** allows you the option to display the most recent year first or the oldest year first.
4. **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 "PIAAC Literacy: Overall scale [PVLIT]" ranges from 0 to 1000; the dependent variable "Index of use of ICT skills at home (derived) [ICTHOME]" ranges from 0 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.
5. **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 13).

Exhibit 13. Format options



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**.)

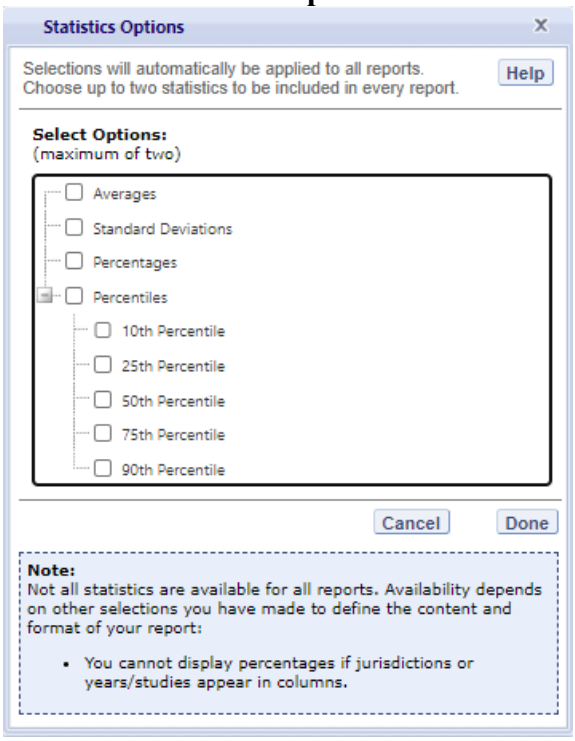
The following statistics options are available (see exhibit 14):

1. **Averages.** For the PIAAC assessment, adult performance is reported on scales that range from 0 to 500. PIAAC reports the average scale score for a variety of demographic samples of the adult population (e.g., the average scale score in literacy for female

adults). Averages for other continuous variables are in the same units as the variables themselves (e.g., average hourly earnings for hourly earnings variable). By default, the standard errors of the scale scores are shown in parentheses.

2. **Percentages.** This statistic shows the percentage of adults as a row percentage. For example, if the first column lists jurisdictions, then each jurisdiction 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 variable. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average value of a variable is 500 and the standard deviation is 100, it means that 95 percent of the values in this variable fall between 300 and 700. The standard deviation is the square root of the variance.
4. **Percentiles.** This statistic shows the threshold (or cutpoint) for the following:
    - 10th percentile—the bottom 10 percent of adults
    - 25th percentile—the bottom quarter of adults
    - 50th percentile—the median (half the adults scored below the cutpoint and half scored above it)
    - 75th percentile—the top quarter of adults
    - 90th percentile—the top 10 percent of adults

Exhibit 14. Statistics options



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 if you use the **Edit** command in the **Action** column. 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 the average 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 or in the OECD PIAAC IDE, due to differences in certain statistical standards. In particular, NCES and the OECD may differ in the minimum sample sizes required for publishing adult scores, as well as in the requirements for stability of estimates for results to be reportable. For more details on the differences in statistical standards, refer to the technical notes in the NCES First Look report.[1]

3.H. Select Reports to Build

As you edit your reports, you can give 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.

Before proceeding to step 4, **Build Reports**, you can preview each report for which you want to retrieve data by using the **Preview** action. 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 15), data will be retrieved for all reports.

[1] Goodman, M., Finnegan, R., Mohadjer, L., Krenzke, T., and Hogan J. (2013). Literacy, Numeracy, and Problem Solving in Technology-Rich Environments Among U.S. Adults: Results from the Program for International Assessment of Adult Competencies 2014 (NCES 2014-008). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Exhibit 15. Selecting reports to build

If you wish to delete a report from the list of reports, click **Delete** (see 1 in exhibit 15) in the **Action** column. Use the **Reset** button (see 2 in exhibit 15), located in the upper-right portion of the screen (just below the **Help** button), to restore the deleted reports with the criteria and variables selected in the previous steps (although caution is advised, as this will not restore any new reports or variables that you created in the session and will delete any new reports and variables that you most recently created; the **Reset** action will also 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 in exhibit 15) or the tab at the top of the page to go to the next screen.

4. Build Reports

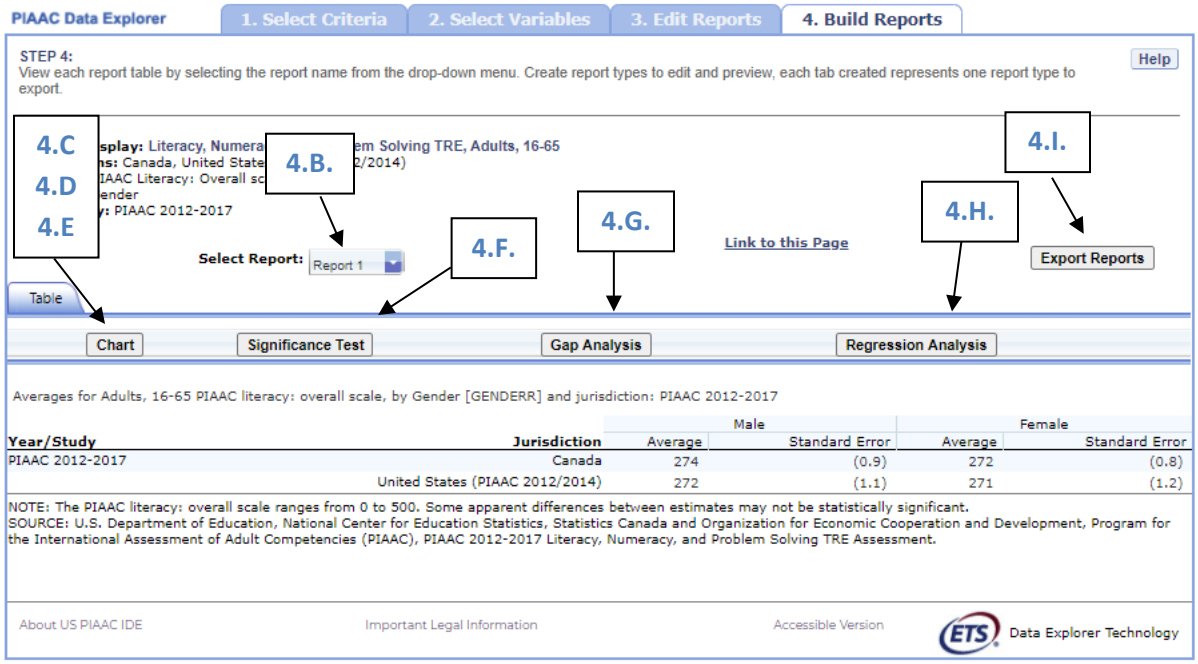
4.A. Overview

You can access step 4, **Build Reports**, after choosing criteria at step 1, **Select Criteria**, in which case the default report built will provide average data for the **All Adults** 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:

- Generate a data table for each report selected in step 3, as shown by the **Select Reports** drop-down feature. By default, all reports are checked, 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**.)

- Export and save data tables into various formats using the **Export Reports** button. The output formats include HTML (print-friendly), Microsoft Word, Microsoft Excel, and Adobe PDF (in NCES PIAAC only)
- Select the **Chart** tab to create and customize charts for each report and save them for export in the above formats.
- Select the **Significance Test** tab to run a significance test on your results and customize it.

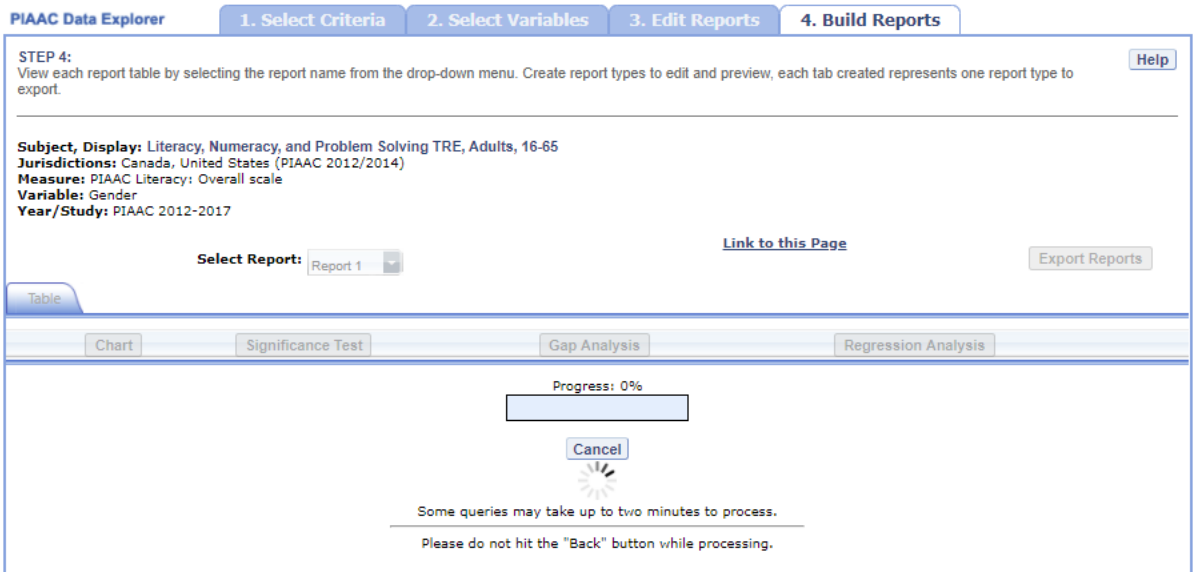
Exhibit 16. Building reports overview



4.B. View Reports as Data Tables

Once you click on **Build Reports,** the sentence "Some queries may take up to two minutes to process." will appear on your screen (see exhibit 17). Some reports will take longer than others to process, so please do not hit the "Back" button on your browser during this stage. Your table will appear once the processing is complete. To select a different table to view, go to the **Select Report** drop-down menu 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 17. Processing data



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 18).

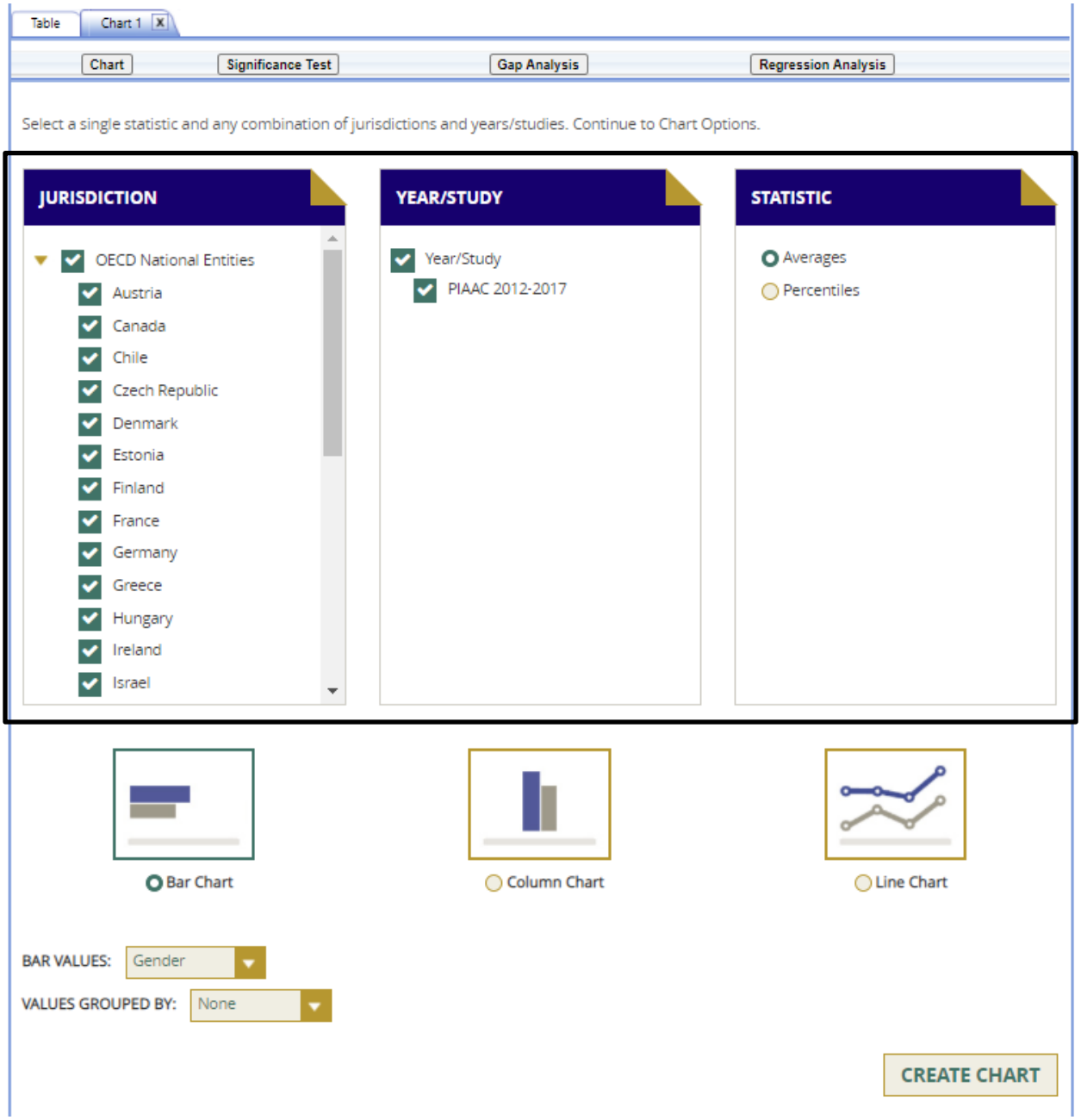
You will be able to create many types of charts and customize them. **Section 4.E. Create Charts – Chart Options** provides a summary of the available features and how they can be customized.

Exhibit 18. Viewing reports as charts

4.D. Create Charts

When you click **Chart,** you will first make selections pertaining to **Jurisdiction, Year/Study**, and **Statistic**, which are data options of the chart (see exhibit 19). All **Jurisdictions** and **Studies** are selected by default, while you can only choose one **Statistic**. Uncheck any of the criteria that you do not wish to chart, as long as you have one selected in each category.

Exhibit 19. Data options for charts

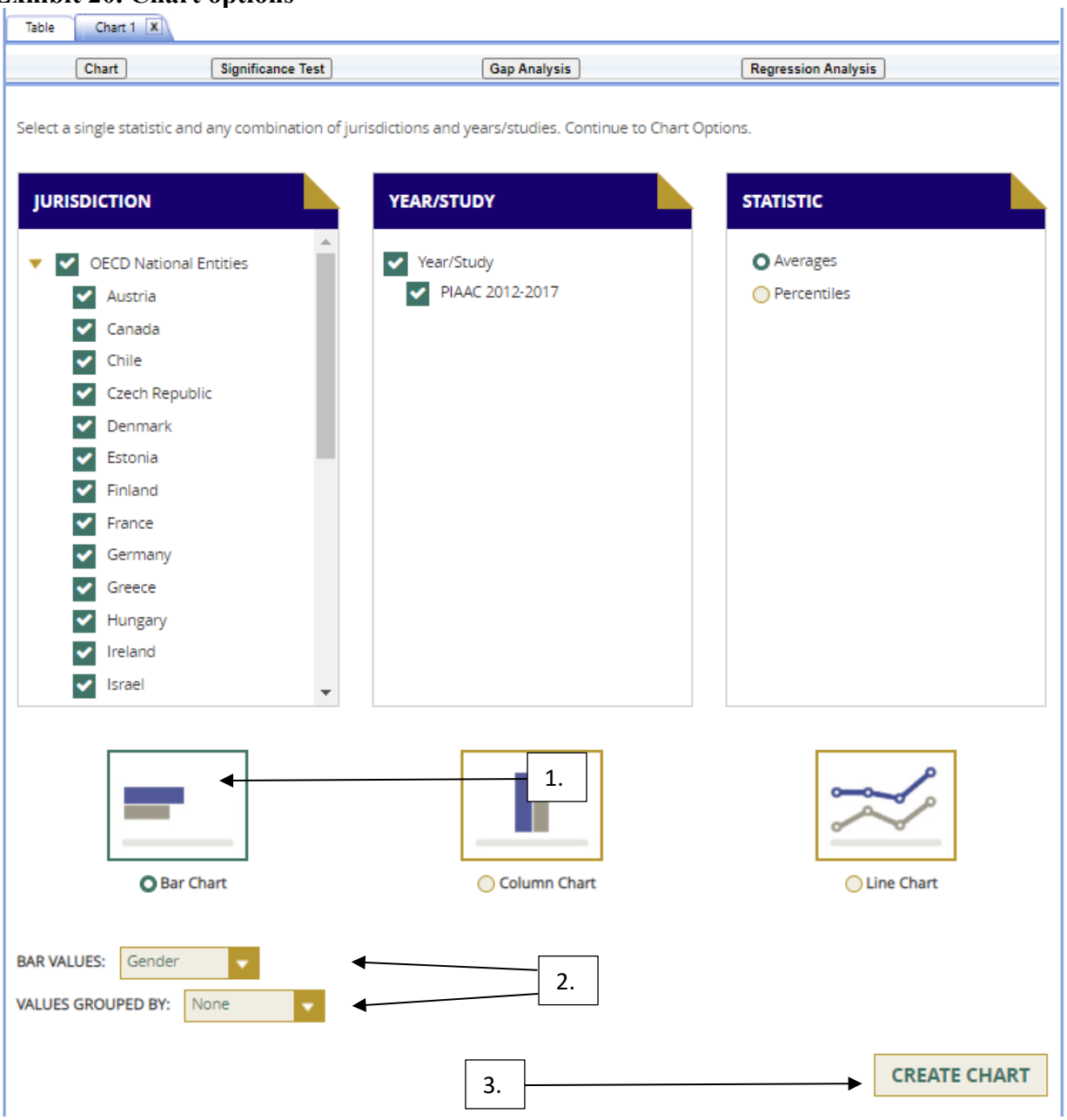


Next, you can make selections regarding the chart options located below on the same page.

1. Select **Bar Chart**, **Column Chart**, or **Line Chart** (see 1 in exhibit 20). If the Percentiles Statistic is selected, you can also select from a **Percentiles Chart** option.

2. After selecting a chart type, change any data dimensions from the drop-down menus for **Bar**, **Column**, or **Line Values** and **Values Grouped by** (see 2 in exhibit 20). 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.
3. Create your chart by clicking the **Create Chart** button in the lower-right corner (see 3 in exhibit 20).

Exhibit 20. Chart options



After creating your chart, you can do the following (see exhibit 21 as an example of a **Percentile Chart** and exhibit 22 as an example of a **Bar Chart**):

1. Use the drop-down menus to change the jurisdiction and other variables as applicable (see 1 in exhibit 21).
2. Place your cursor over the bars of the chart to see the data points and value label(s) (see 2 in exhibit 21).

Exhibit 21. Percentile chart

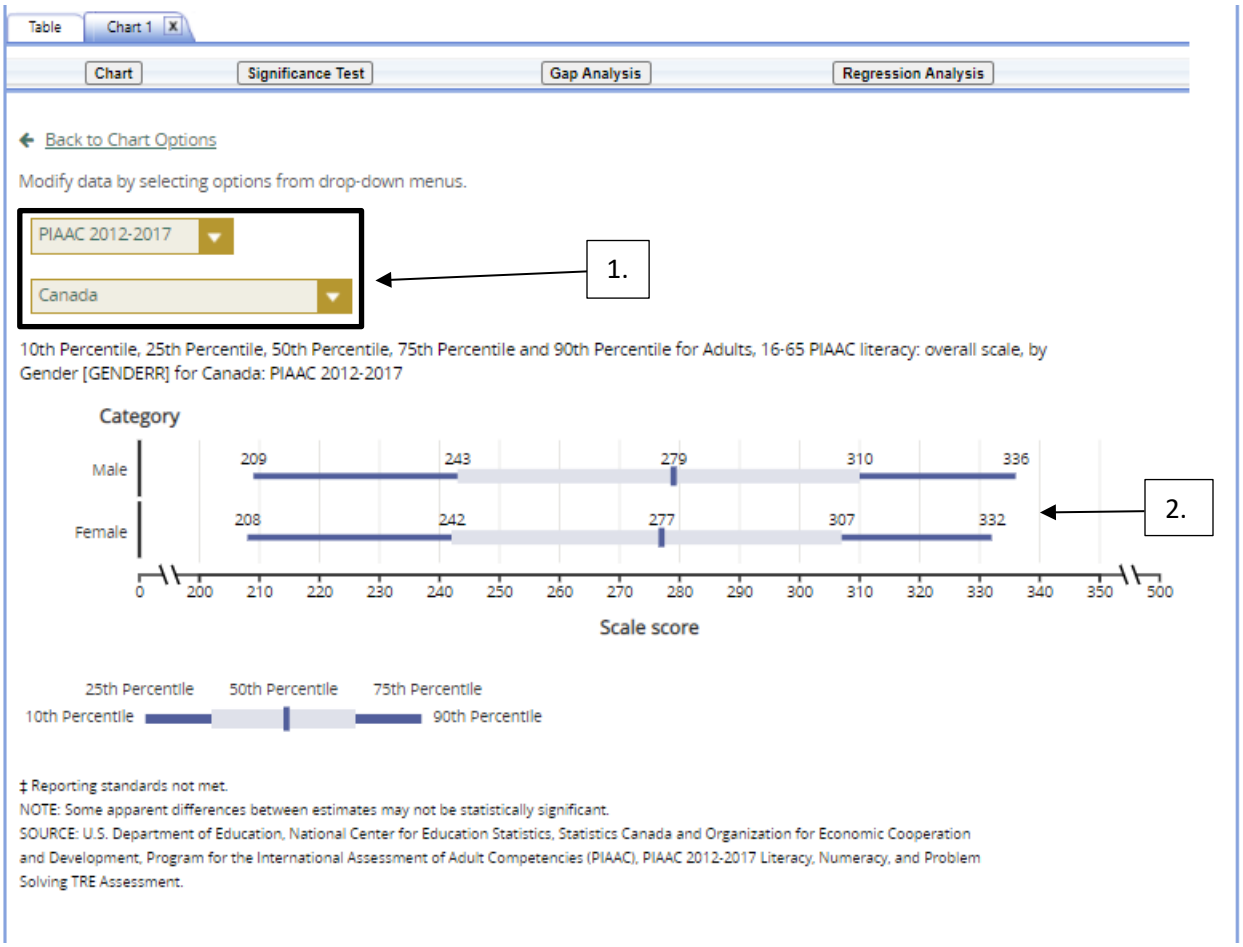
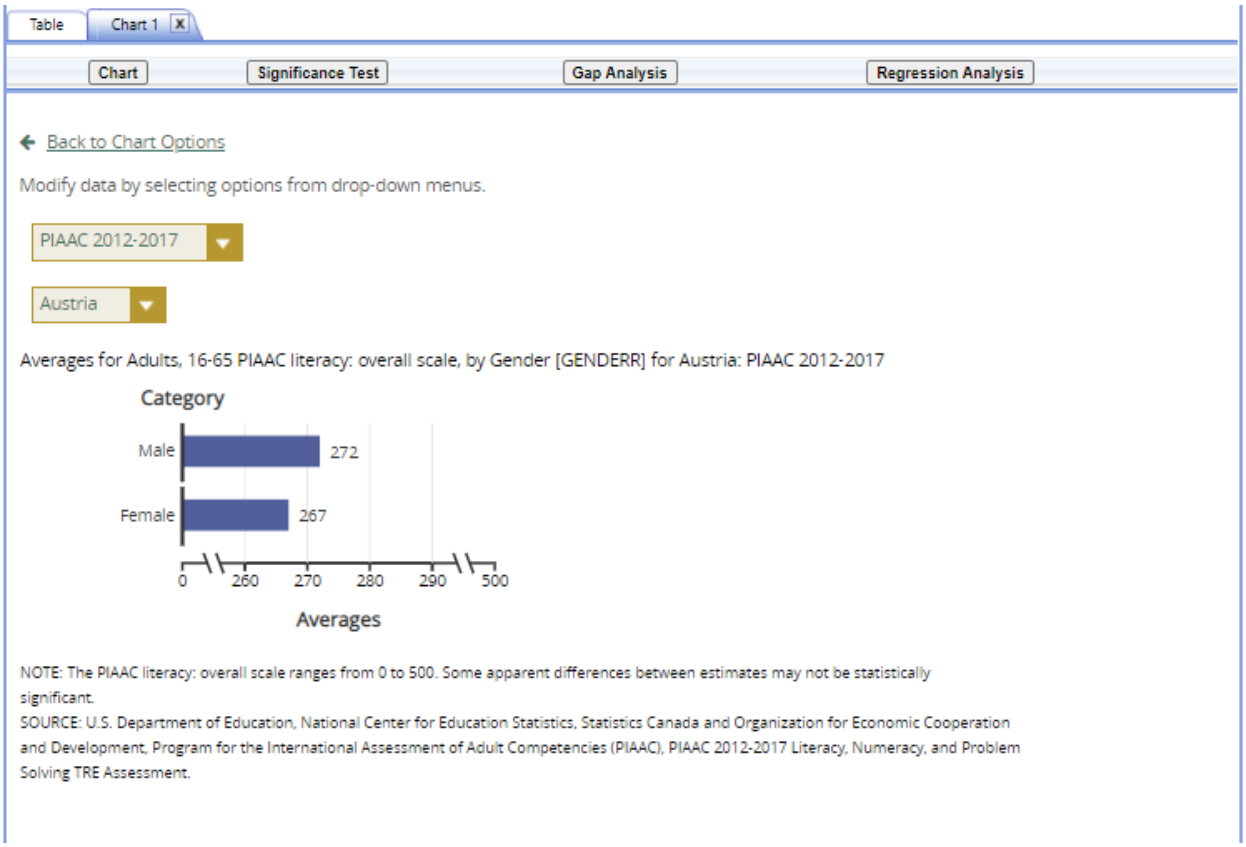


Exhibit 22. Bar chart



You can choose **"Back to Chart Options"** (located in the upper-left corner, below the **Chart** link) to make more changes.

To make an additional chart from the same report or table, click the **Chart** link on the **Build Reports** screen. If you do not 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 a different report from the **Select Report** drop-down list. If you do not see the other reports that you would like to make charts from, they may not have been selected in step 3, **Edit Reports**. Go back to step 3 and check the reports you want to use for making charts. 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 using the **Export Reports** function before leaving the **Build Reports** screen. Otherwise, you will lose the charts you have created when going back to step 1, **Select Criteria**. (For further information, see **Section 4.H. Export Reports**.)

4.E. Significance Tests

Tests for statistical significance indicate whether observed differences between assessment results 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 exhibit 22). 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 two or more jurisdictions) or you can look across the values within a variable for a single jurisdiction. Once the primary criterion is chosen, all other criteria must be restricted to a single value.

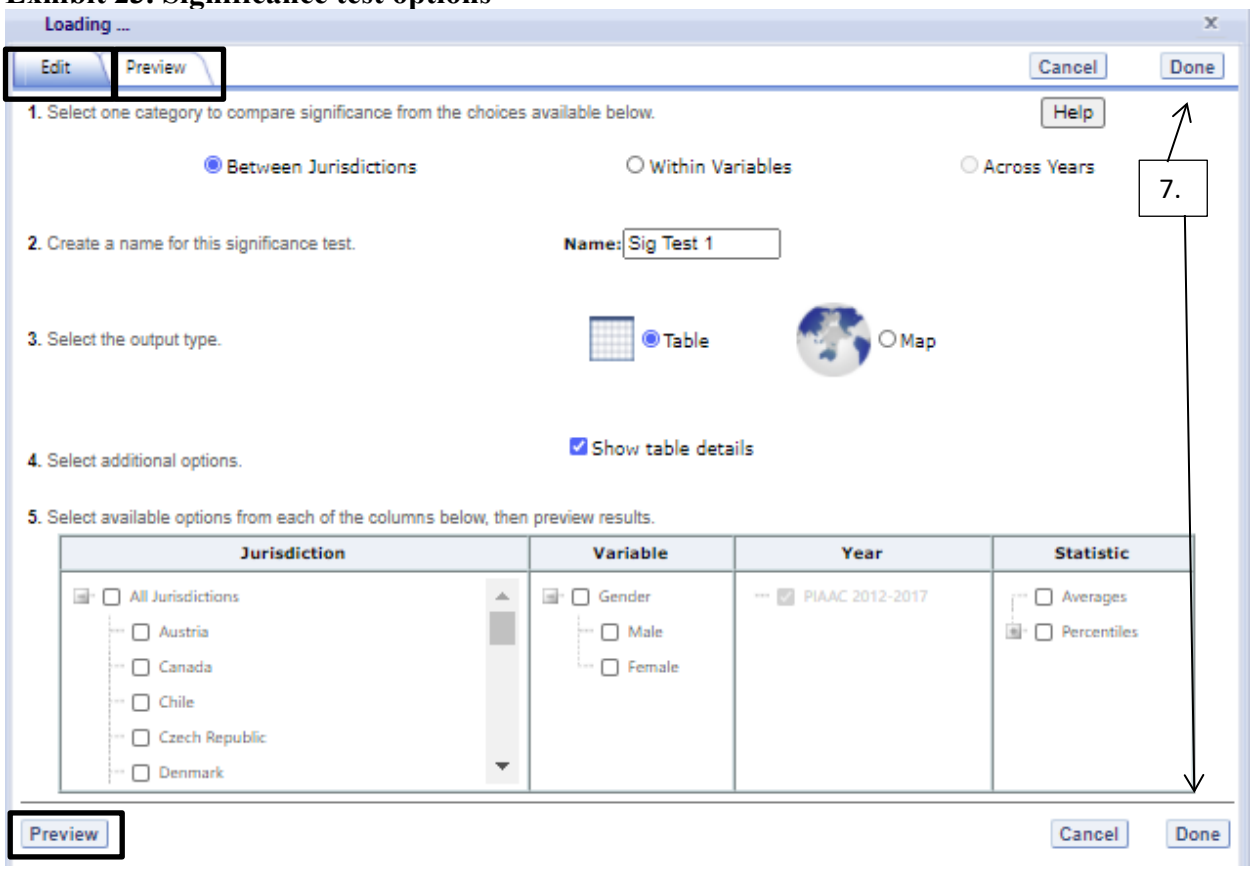
The general steps for running significance tests are as follows (see exhibit 23):

1. In the **Significance Test** window, select **Between Jurisdictions**, **Within Variables**, or **Across Years**. Then, select the appropriate jurisdiction(s), variable(s), one or more of the years and studies, 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/study needs to be selected.
2. Enter a **Name** 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** or **Comparison**. The table option will show the significance test results as a matrix. The comparison option will show the jurisdictions selected which are significantly higher, not different, or lower to each other in score and statistical significance. The map option will show the significance test results on a world map, highlighting the selected jurisdictions different from the one that has been identified as the benchmark. Identifying a benchmark jurisdiction is done on the

map itself (see exhibit 25). 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 23. Significance test options



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 24). Most comparisons are independent with an alpha level of .05, except for within-jurisdiction comparisons on any given year, which are dependent with an alpha level of .05. For example, gender differences are treated as dependent samples with standard errors computed taking this dependency into account.

For more information on the significance testing between years/studies, see section **5. Statistical Notations and Other Notes** under *Linking error*.

Exhibit 24. Significance test table output

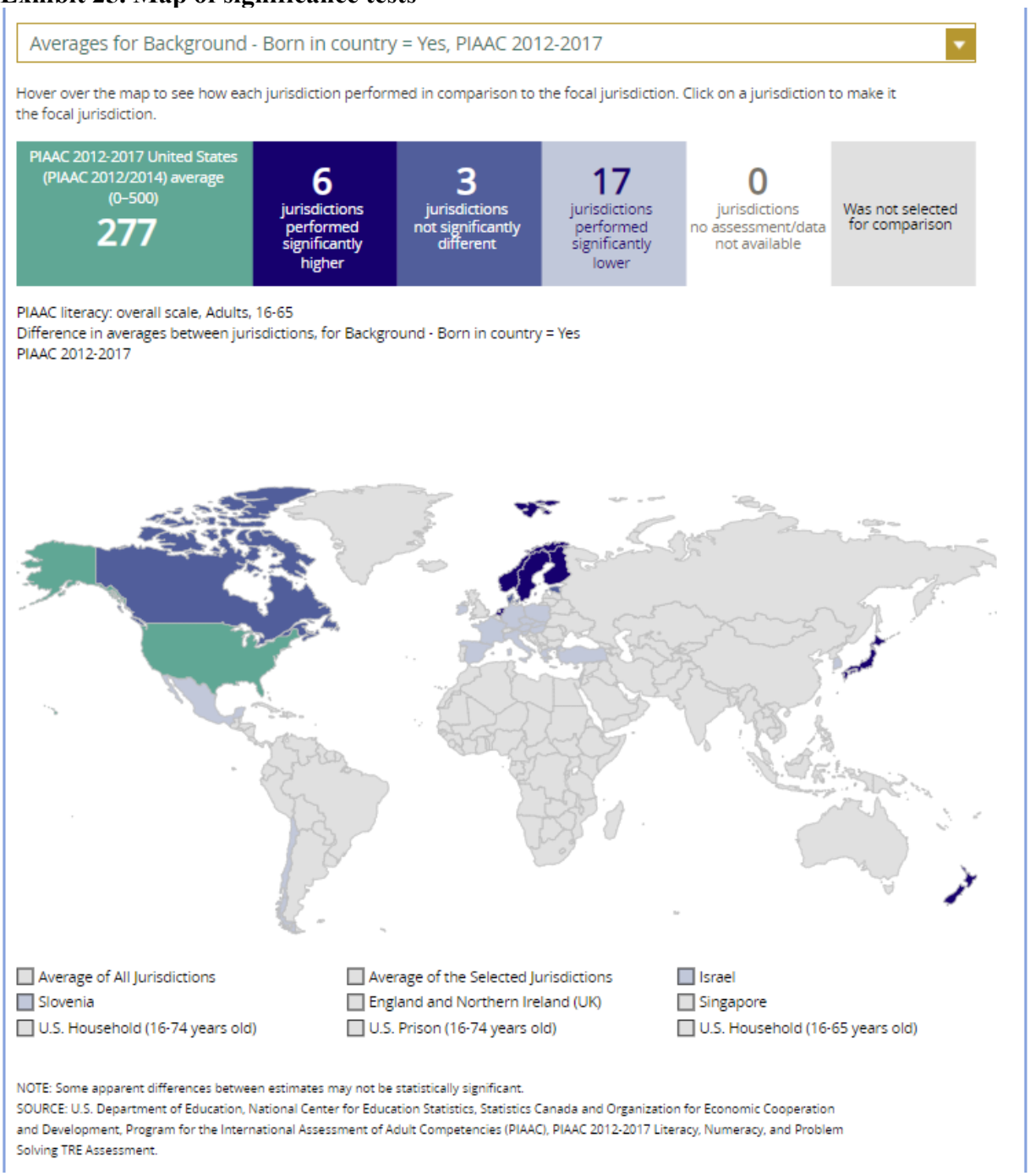
PIAAC literacy: overall scale, Adults, 16-65
Difference in averages between jurisdictions, for Gender [GENDERR] = Male
PIAAC 2012-2017

	Canada (274)	United States (PIAAC 2012/2014) (272)
Canada (274)		x Diff = 2 (1.4) P-value = 0.1201
United States (PIAAC 2012/2014) (272)	x Diff = -2 (1.4) P-value = 0.1201	

LEGEND:	
<	Significantly lower.
>	Significantly higher.
x	No significant difference.

NOTE: Standard errors are in parentheses in the table body. All comparisons within a jurisdiction, within the same year, are made using dependent *t*-tests. Comparisons of achievement across years/studies are made using independent *t*-tests with a linking error taken into account. Comparisons between jurisdictions are also treated as independent. The alpha level for all *t*-tests is .05. For more information see the Statistical Notations and Other Notes section in the Help Guide.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Statistics Canada and Organization for Economic Cooperation and Development, Program for the International Assessment of Adult Competencies (PIAAC), PIAAC 2012-2017 Literacy, Numeracy, and Problem Solving TRE Assessment.

Exhibit 25. Map of significance tests



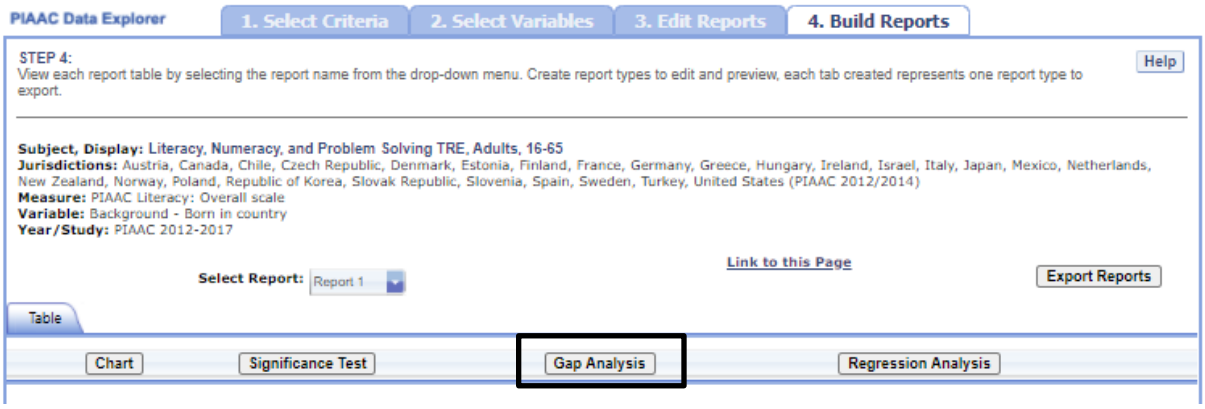
When the map option is selected, a global map is shown with the selected jurisdictions shaded (see exhibit 25). The focal jurisdiction is shaded in teal green and represents a comparison for all the other jurisdictions. The other jurisdictions are shaded in colors that indicate whether they are higher, lower, or not significantly different from the focal jurisdiction on whatever measure has been selected. (Note that a light shade of gray is the default color for jurisdictions categorized as "not selected for comparison.") When you scroll over a jurisdiction a text bubble pops up

describing the difference between that jurisdiction and the focal jurisdiction. At any point, you may choose a different focal jurisdiction by selecting another jurisdiction of your choosing. You may also choose a different variable category for comparison by using the drop down menu above the map.

4.F. 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.

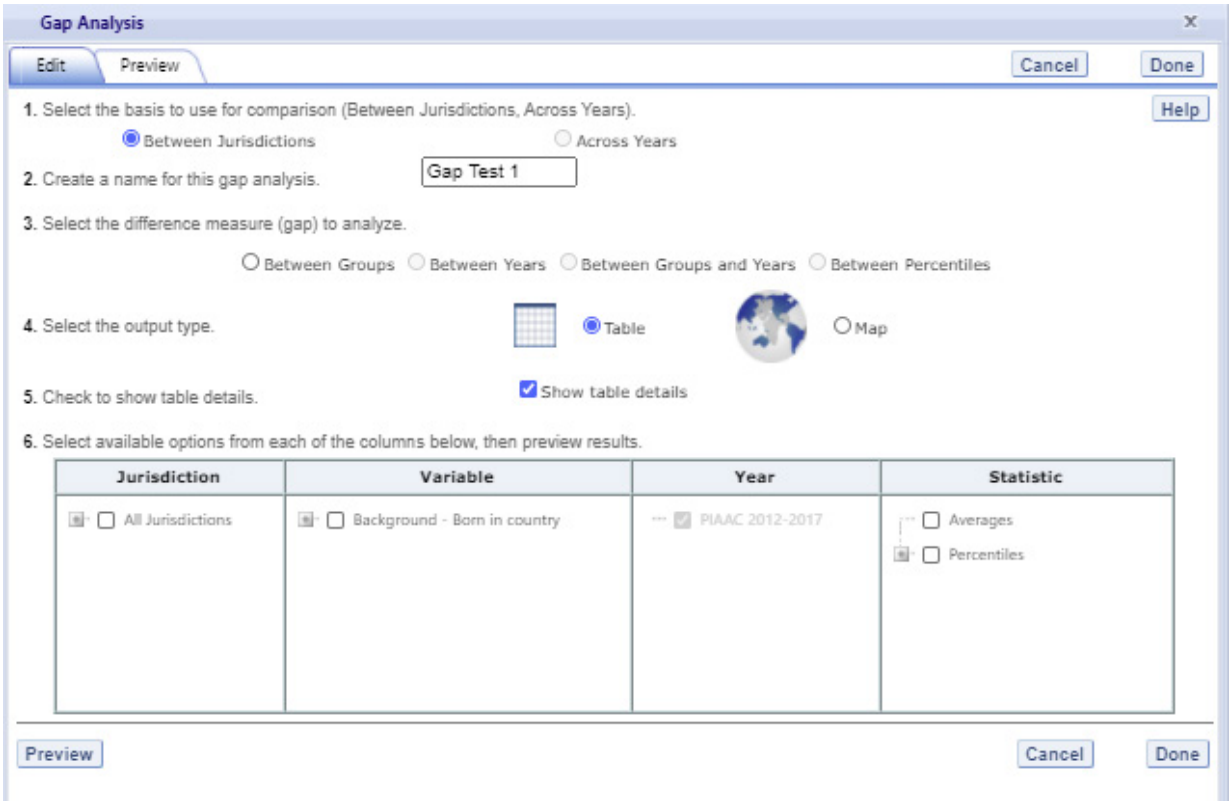
Exhibit 26. Gap analysis link selection



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 26). You will need to decide which variable you would like to test (e.g., gender) and the basis to use for comparison (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 literacy scores for two jurisdictions at two time points for males and females, you can:

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

Exhibit 27. Gap analysis options



The steps for running a gap analysis are similar to those for conducting a statistical significance test (see exhibit 27). Thus, to run a gap analysis, follow the instructions under **Section 4.E. Significance Tests**, noting the following differences:

- The **Gap Analysis** link should be selected, not the **Significance Test** link.
- The gap analysis does not have a **Within Variables** option for analysis; the options are **Between Jurisdictions** and **Across Years.**
- 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 28 shows the difference between jurisdictions in the average problem solving in technology-rich environments score gap between males and females.

The gap analysis function computes and statistically tests differences between average value/score, percentage, or percentile gaps. 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 jurisdiction with a 15-point gender gap favoring females in another jurisdiction).

Exhibit 28. Gap analysis output

PIAAC literacy: overall scale, Adults, 16-65
Differences between jurisdictions for gaps in averages between Background - Born in country [JQ04A]=Yes and Background - Born in country [JQ04A]=No
PIAAC 2012-2017

	Austria (26)	Canada (24)	United States (PIAAC 2012/2014) (38)
Austria (26)		x Diff = 2 (2.7) P-value = 0.4634	< Diff = -12 (3.8) P-value = 0.0014
Canada (24)	x Diff = -2 (2.7) P-value = 0.4634		< Diff = -14 (3.4) P-value = 0.0000
United States (PIAAC 2012/2014) (38)	> Diff = 12 (3.8) P-value = 0.0014	> Diff = 14 (3.4) P-value = 0.0000	

LEGEND:	
<	Has a significant negative difference.
>	Has a significant positive difference.
x	No significant difference.

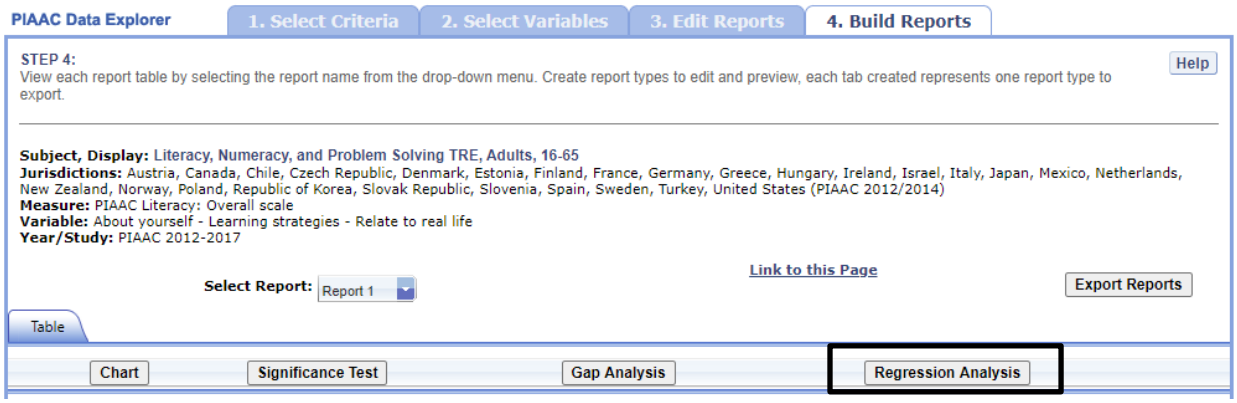
NOTE: Standard errors are in parentheses in the table body. For gap analysis tables, all comparisons are independent tests with an alpha level of 0.05.

NOTE: 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.G. Regression Analysis

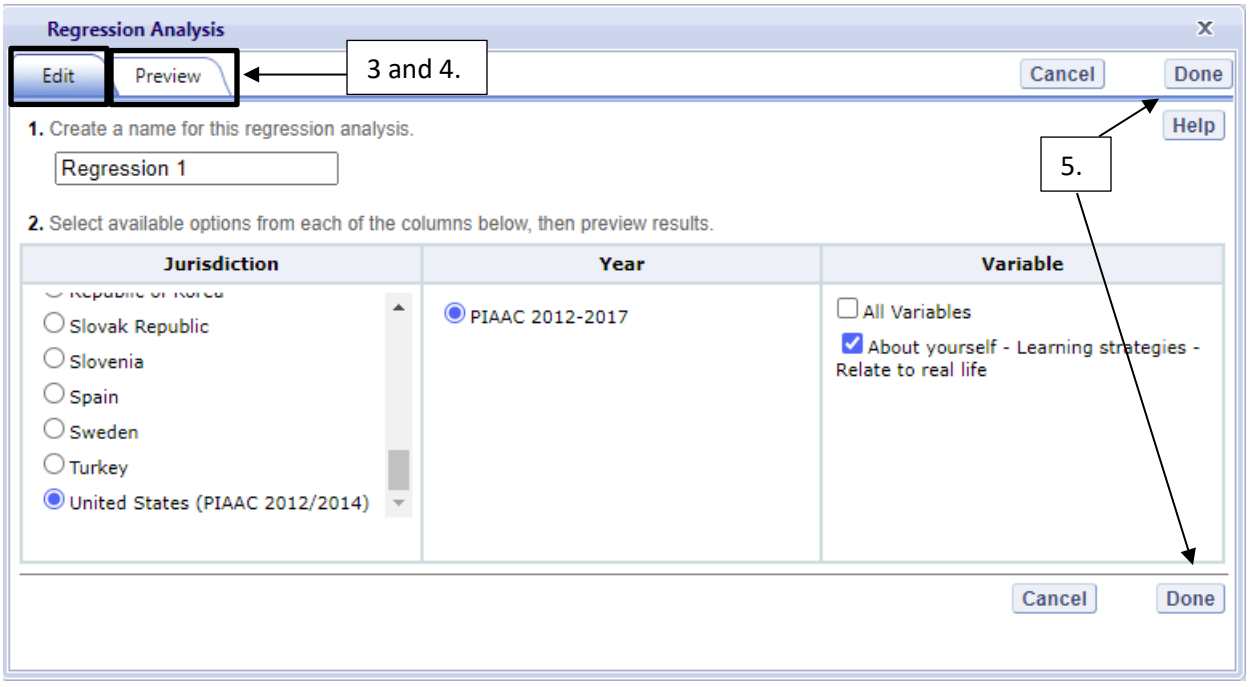
Regression Analysis is included in the IDE to test for trends across more than two data points. The type of analysis performed in this feature of the IDE is referred to as linear regression within the field of statistics.

Exhibit 29. Regression analysis link selection



A regression analysis can be performed based on the selections that were made to build your table in the IDE by selecting the **Regression Analysis** button above the table (see exhibit 29). The Measure, or continuous variable, that you selected in Step 1 and that is displayed in your table will automatically become your dependent variable for the regression analysis (in exhibit 29 this is "PIAAC Literacy: Overall scale"). Please note that continuous variables cannot be used as independent variables. The variables that you selected in Step 2 and that are displayed in your table will become your independent variable options for the regression analysis (in exhibit 29 this is "About yourself – Learning strategies – Relate to real life").

Exhibit 30. Regression analysis options



The general steps for running a regression analysis are as follows (see exhibit 30):

1. In the **Regression Analysis** pop-up window, 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 independent 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 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.

After you have clicked **Done**, your regression analysis output will load onto the screen (see exhibit 31). 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 31, if the subgroup "Not at all" is the reference group for the independent variable **About yourself – Learning strategies – Relate to real life [IQ04B]**, the IDE creates a "Very little" dummy variable (1 for respondents who answered "Very little," 0 otherwise), a "To some extent" dummy variable (1 for respondents who answered "To some extent," 0 otherwise), a "To a high extent" dummy variable (1 for respondents who answered "To a high extent," 0 otherwise), and a "To a very high extent" dummy variable (1 for respondents who answered "To a very high extent," 0 otherwise).

Exhibit 31. Regression analysis output

Literacy, Numeracy, and Problem Solving TRE, Adults, 16-65 PIAAC 2012-2017
Dependent Variable: PIAAC Literacy: Overall scale
Independent Variable(s): About yourself - Learning strategies - Relate to real life [IQ04B]
Contrast Coding Reference Group: Not at all
United States (PIAAC 2012/2014)

Multiple Correlation	0.37
R Squared	0.14

	Degrees of Freedom	Mean square	F Ratio	P Value
Model	4	17198386622	128.98	0
Error	3237.31	133346002.88		

	Standardized Regression Coefficients	S.E. of Standardized Coefficients	Regression Coefficients	S.E. of Regression Coefficients	T Statistic	Probability	Significance
Intercept	0	0	216.0766	4.1806	51.6853	0	>
About yourself - Learning strategies - Relate to real life							
Very little	0.0855	0.0259	14.8473	4.5303	3.2773	0.0016	>
To some extent	0.514	0.0408	52.4207	4.3385	12.0827	0	>
To a high extent	0.6524	0.0388	71.9853	4.5188	15.9301	0	>
To a very high extent	0.4968	0.034	67.3977	4.8226	13.9755	0	>

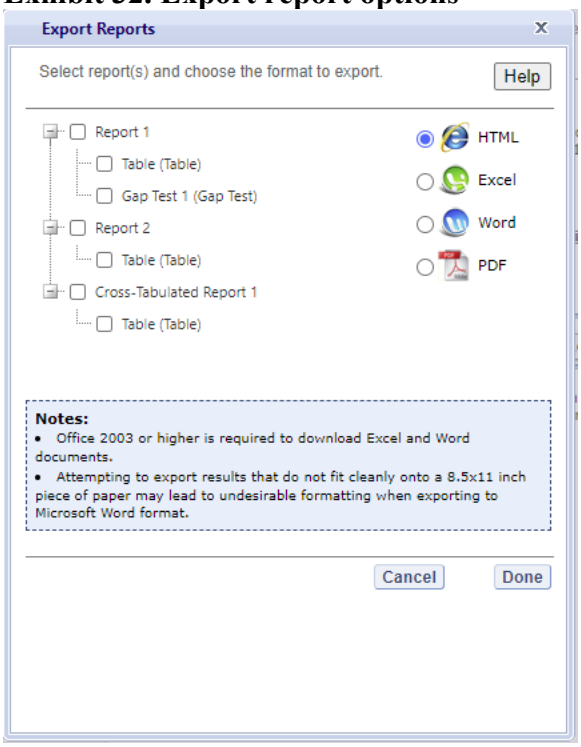
NOTE: A 0-1 contrast coding has been used where the first subgroup of the (independent) variable is the reference group. Except for the reference group, each subgroup is contrasted (code 1) in a separate dummy variable against all the other subgroups of the variable (code 0). For more details about contrast coding with multiple variables see the help documentation.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Statistics Canada and Organization for Economic Cooperation and Development, Program for the International Assessment of Adult Competencies (PIAAC), PIAAC 2012-2017 Literacy, Numeracy, and Problem Solving TRE Assessment.

Using the output from exhibit 31 you can compare the average literacy scores of adults who report "Not at all" to the background question to average literacy scores of adults who report "Very little," "To some extent," "To a high extent," or "To a very high extent" to the background question. When a single dummy-coded variable is used in a regression, the *intercept* is the mean of the reference group (e.g., 216.0766), 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., 14.8473 for adults who report "Very little" to the background question). 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.H. 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**.

Exhibit 32. Export report options



Check the files you want to export and select one of the file formats: **HTML** (print-friendly), **Excel**, **Word**, or **PDF** (see exhibit 32). 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 decimal places visible (wherever more precision is available in the database). 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.

IV. PIAAC 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:

1. **Criteria**
   - Display
   - Years/Studies
   - Measure
   - Jurisdiction
2. **Variables**
3. **Statistics options**
   - Averages
   - Percentages
   - Standard deviations
   - Percentiles
4. **Cross-tabulations**
5. **Statistical notations and other notes**
   - Calculation of averages
   - Linking error

1. Criteria

Each data query must include at least one selection from four criteria choices: display, years/studies, measure, and jurisdiction. Shown below is an outline of these selection criteria followed by a brief description.

a) Display[2]

- U.S. Adults, 16–74 (Household and Prison) (data available for U.S. PIAAC 2017 and 2012/2014)
- Young Adults, 16–34
- Adults, 16–65

b) Years/Studies:

- PIAAC 2017 (data available for literacy, numeracy and problem solving in technology-rich environments)

[2] The NCES PIAAC IDE no longer contains the display "Adults 16–65 (Original Release, 2012 only)"

- PIAAC 2012/2014 (data available for literacy, numeracy and problem solving in technology-rich environments)
- ALL 2003–2008 (data available for literacy and numeracy)
- IALS 1994–1998 (data available for literacy)

c) Measure:

- PIAAC Literacy: Overall scale
    i. PIAAC Reading Components scale
- PIAAC Numeracy: Overall scale
- PIAAC Problem solving in technology-rich environments: Overall scale
- Other continuous variables from the background questionnaire, including international variables, derived variables, and U.S. national adaptations and additions to the International background questionnaire.

d) Jurisdiction:

- Within U.S. Adults, 16–74 (Household and Prison) Display:
    i. U.S. Household (16–74 years old)
    ii. U.S. Prison (16–74 years old)
    iii. U.S. Household (16–65 years old)
- Within Young Adults, 16–34 or Adults, 16–65 Display
    i. Average of All Jurisdictions
    ii. Average of the Selected Jurisdictions
    iii. OECD National Entities
    iv. OECD Sub-National Entities
    v. Partners

Display

The PIAAC IDE contains three different adult sample populations which can be selected for analysis from the **Display** drop down menu.

U.S. Adults, 16–74 (Household and Prison): This display contains U.S.-only comparable data from the PIAAC, including the 2017 U.S. Household Data (for ages 16–74, and 16–65), combined 2012 and 2014 U.S. Household Data (for ages 16–74, and 16–65), and Prison Data (for ages 16–74).

Young Adults, 16–34: This display contains internationally comparable data from the 3 international rounds of PIAAC (2012-2017 for all countries, except the U.S. which combined 2012-2014 data only) Household Data, ages 16–34. This display does not include the 2017 U.S. Household Data.

Adults, 16–65: This display contains internationally comparable data from the 3 international rounds of PIAAC (2012–2017 for all countries, except the U.S. which

combined 2012–2014 data only) Household Data, ages 16–65. This display does not include the 2017 U.S. Household Data.

Measures

You can choose the overall scale, which is each subject's default measure in the PIAAC IDE or there are also a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables are continuous variables from the international and U.S. national background questionnaire (such as earnings or hours of work per week) and derived variables from PIAAC, ALL, and IALS. Derived variables from PIAAC include indices of literacy, numeracy, and computer use at work and at home and imputed years of formal education, among others.

A fourth domain, called Reading Components, measures literacy at the very low end of the spectrum, in areas such as sentence completion, passage comprehension, and vocabulary. This domain was given to respondents who decided not to take the computer-based assessment or who did not pass a set of core information and computer technology tasks and a set of core literacy/numeracy tasks.

The adults in the sample population that did not answer the assessment will be displayed along with those that did answer the assessment if you select **Percentage across full sample** under the **Population** category.

Years/Studies

Currently, data availability in the PIAAC IDE is dependent on the **Display** and **Measure** selected in step 1, **Select Criteria**.

If the **Display** chosen is **U.S. Adults, 16–74 (Household and Prison)** you can choose one or more years and studies between **PIAAC 2017** and **PIAAC 2012/14**. If the **Display** chosen is **Adults, 16–65** or **Young Adults, 16–34** you can choose one or more years and studies between **PIAAC 2012-2017**, **ALL 2003–2008**, and **IALS 1994–1998**.

Jurisdictions

All listed jurisdictions can be selected for any analyses, provided data are available for the selected years/studies range. When PIAAC was first administered in 2012, a total of 24 jurisdictions participated, including the United States. Nine additional jurisdictions administered PIAAC in 2014 and five additional jurisdictions administered PIAAC in 2017. Data for these jurisdictions, with the exception of three, are available within the **Adults, age 16–65** and **Adults, age 16–34** displays. Data for three jurisdictions, Australia, Jakarta (Indonesia), and Russian Federation, are not available: Australia's data are suppressed in the PIAAC IDE because of national restrictions on the use of their data; Jakarta's data are suppressed because their data file is not publicly available; and Russian Federation's data are suppressed in the PIAAC IDE because the data do not represent the entire resident population aged 16–65 years in Russia. Jurisdictions include some subnational entities, such as England/Northern Ireland. Data are not

available for some of the 33 PIAAC-participating jurisdictions for ALL 2003–2008 or IALS 1994–1998, either because they did not participate in that assessment or because their data were suppressed due to reporting standards not being met (see Table 2).

Data are available for 6 jurisdictions in ALL 2003–2008, and 15 jurisdictions in IALS 1994–1998. Jurisdictions for which data are not available for a selected year are identified by the icon representing "no data"— .

Table 2. PIAAC IDE jurisdictions with available data by year/study

Jurisdiction Groups	PIAAC 2012–2017	ALL 2003–2008	IALS 1994–1998
OECD National Entities	27	7	16
OECD Sub-National Entities	4[1]	0	4[1]
Partners	6	0	0
Total Jurisdictions*	37	7	20

[1] Includes England/Northern Ireland both combined and individually.
*The count of countries and subnational education systems which have data in the PIAAC IDE is different from those listed as participating in the OECD PIAAC International Report. This is due to the omission of Australia, Jakarta (Indonesia), and Russian Federation data from the PIAAC IDE and the inclusion of England and Northern Ireland as individual entities in the PIAAC IDE.

NOTE: In the U.S. Adults 16-74 (Household and Prison) Display, data for the U.S. Household (16–74 years old), U.S. Prison (16–74 years old), and U.S. Household (16–65) are the only selections available in the Jurisdiction menu. However, users may choose to work with the U.S. prison sample, or one of the U.S. household samples, or select more than one for analysis as jurisdictions.

2. Variables

PIAAC requires in-person interviews to complete the background questionnaire before administering the direct assessments (i.e., literacy, numeracy, reading components, and/or problem solving in technology-rich environments (PS-TRE)). In the PIAAC IDE, measures are derived from two instruments: the computer-based assessment (CBA), given to respondents who were comfortable taking the assessment on a computer, and the paper-based assessment (PBA), given to respondents that were not familiar with computers or chose not to take the assessment on a computer. Variables derived from the background questionnaire were administered to each participating adult. Variables are organized into categories that have shared characteristics and can be selected as a group (category) 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. The icon representing "no data"— —will help in identifying the year for which the variable has data available for analysis. Except for the estimates for **All Adults**, the variables that can be compared across years are located under a special category called **Trend Variables**, sub-category **Trends to IALS and ALL**. Note that common variables such as age and gender, among others, can appear in other categories and sub-categories with the "no data" icon, but have data when selected under the **Trends Variables** category.

Proficiency levels

Proficiency levels are available in the Proficiency Levels sub-category in the Major Reporting Groups category. Achievement results for PIAAC are reported using achievement levels for

literacy, numeracy, and problem solving in technology-rich environments (PS-TRE). Increasing levels represent the knowledge, skills, and capabilities needed to perform tasks of increasing complexity. As a result, the findings are reported in terms of percentages of the adult population at each of the predefined levels. Based on the statistics option chosen, the IDE can report the average scores of adults at each proficiency level or the percentage of the adults 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.

The IDE can report percentage distributions of variables among the adults at each proficiency level (for example, the percentage distribution of adult population that are employed, unemployed, and out of the labor force [employment status] within each proficiency level). To conduct this type of analysis, you can select the relevant Overall scale or Percentage across full sample at step 1, **Select Criteria**. At step 2, **Select Criteria**, you can select the relevant proficiency levels in addition to other variable(s) of interest. At the **Edit Reports** step, you can select the **Edit** command for the cross-tabulated report to change the table layout and move the proficiency levels variable to the row and one (or both) of the other selected variables to the column (this step may not be necessary depending on the order of the selected variables) and to select Percentages as the Statistic. Results for combined proficiency levels (for example, the combined level 4/5 proficiency level used in most reporting of PIAAC literacy and numeracy results) can be produced by creating a new variable within the Edit Report page. (For further information, see section **3.D. Create Variables**.) You can then proceed to **the Build Reports** step.

Literacy and numeracy results in **PIAAC 2012–2017** and **ALL 2003–2008**, and literacy results in **IALS 1994–1998** were reported using six achievement levels: **below level 1, level 1, level 2, level 3, level 4**, and **level 5**. **Literacy related non-response** is also available.

The number of achievement levels in problem solving in technology-rich environments (PS-TRE) differs from the number in literacy and numeracy for **PIAAC 2012–2017** where four achievement levels were used: **below level 1, level 1, level 2**, and **level 3**. Four other levels are also available in problem solving in technology-rich environments (PS-TRE) achievement levels: **no computer experience, failed ICT core, refused CBA**, and **literacy related non-response** (which are further explained in the Description of PIAAC problem solving in technology-rich environments (PS-TRE) achievement levels table below.)

Descriptions that characterize typical adult performance in literacy, numeracy, and problem solving in technology-rich environments (PS-TRE) at each achievement level available in the IDE are shown in the following tables.

Description of PIAAC literacy discrete achievement levels

Achievement level and score range	Task descriptions
Below Level 1 **0–175**	The tasks at this level require the respondent to read brief texts on familiar topics to locate a single piece of specific information. There is seldom any competing information in the text and the requested information is identical in form to information in the question or directive. The respondent may be required to locate information in short continuous texts. However, in this case, the information can be located as if the text were non-continuous in format. Only basic vocabulary knowledge is required, and the reader is not required to understand the structure of sentences or paragraphs or make use of other text features. Tasks below Level 1 do not make use of any features specific to digital texts.
Level 1 **176–225**	Most of the tasks at this level require the respondent to read relatively short digital or print continuous, non-continuous, or mixed texts to locate a single piece of information that is identical to or synonymous with the information given in the question or directive. Some tasks, such as those involving non-continuous texts, may require the respondent to enter personal information onto a document. Little, if any, competing information is present. Some tasks may require simple cycling through more than one piece of information. Knowledge and skill in recognizing basic vocabulary determining the meaning of sentences, and reading paragraphs of text is expected.
Level 2 **226–275**	At this level, the medium of texts may be digital or printed, and texts may comprise continuous, non-continuous, or mixed types. Tasks at this level require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to • cycle through or integrate two or more pieces of information based on criteria; • compare and contrast or reason about information requested in the question; or • navigate within digital texts to access and identify information from various parts of a document.

Level 3 **276–325**	Texts at this level are often dense or lengthy, and include continuous, non-continuous, mixed, or multiple pages of text. Understanding text and rhetorical structures become more central to successfully completing tasks, especially navigating complex digital texts. Tasks require the respondent to identify, interpret, or evaluate one or more pieces of information, and often require varying levels of inference. Many tasks require the respondent to construct meaning across larger chunks of text or perform multi-step operations in order to identify and formulate responses. Often tasks also demand that the respondent disregard irrelevant or inappropriate content to answer accurately. Competing information is often present, but it is not more prominent than the correct information.
Level 4 **326–375**	Tasks at this level often require respondents to perform multiple-step operations to integrate, interpret, or synthesize information from complex or lengthy continuous, non-continuous, mixed, or multiple type texts. Complex inferences and application of background knowledge may be needed to perform the task successfully. Many tasks require identifying and understanding one or more specific, non-central idea(s) in the text in order to interpret or evaluate subtle evidence-claim or persuasive discourse relationships. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent. Competing information is present and sometimes seemingly as prominent as correct information.
Level 5 **376–500**	At this level, tasks may require the respondent to search for and integrate information across multiple, dense texts; construct syntheses of similar and contrasting ideas or points of view; or evaluate evidence based arguments. Application and evaluation of logical and conceptual models of ideas may be required to accomplish tasks. Evaluating reliability of evidentiary sources and selecting key information is frequently a requirement. Tasks often require respondents to be aware of subtle, rhetorical cues and to make high-level inferences or use specialized background knowledge.

NOTE: Information about the procedures used to set the achievement levels is available in the OECD PIAAC Technical Standards and Guidelines.
SOURCE: OECD PIAAC International report (http://www.oecd.org/skills/piaac/Skills_Matter_Further_Results_from_the_Survey_of_Adult_Skills.pdf).

Description of PIAAC numeracy discrete achievement levels

Achievement level and score range	Task descriptions
Below Level 1 **0–175**	Tasks at this level require the respondents to carry out simple processes such as counting, sorting, performing basic arithmetic operations with whole numbers or money, or recognizing common spatial representations in concrete, familiar contexts where the mathematical content is explicit with little or no text or distractors.

Level 1 **176–225**	Tasks at this level require the respondent to carry out basic mathematical processes in common, concrete contexts where the mathematical content is explicit with little text and minimal distractors. Tasks usually require one-step or simple processes involving counting, sorting, performing basic arithmetic operations, understanding simple percents such as 50%, and locating and identifying elements of simple or common graphical or spatial representations.
Level 2 **226–275**	Tasks at this level require the respondent to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematical content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percents and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables and graphs.
Level 3 **276–325**	Tasks at this level require the respondent to understand mathematical information that may be less explicit, embedded in contexts that are not always familiar and represented in more complex ways. Tasks require several steps and may involve the choice of problem-solving strategies and relevant processes. Tasks tend to require the application of number sense and spatial sense; recognizing and working with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and interpretation and basic analysis of data and statistics in texts, tables and graphs.
Level 4 **326–375**	Tasks at this level require the respondent to understand a broad range of mathematical information that may be complex, abstract or embedded in unfamiliar contexts. These tasks involve undertaking multiple steps and choosing relevant problem-solving strategies and processes. Tasks tend to require analysis and more complex reasoning about quantities and data; statistics and chance; spatial relationships; and change, proportions and formulas. Tasks at this level may also require understanding arguments or communicating well-reasoned explanations for answers or choices.
Level 5 **376–500**	Tasks at this level require the respondent to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information where considerable translation or interpretation is required; draw inferences; develop or work with mathematical arguments or models; and justify, evaluate and critically reflect upon solutions or choices.

NOTE: Information about the procedures used to set the achievement levels is available in the OECD PIAAC Technical Standards and Guidelines.
SOURCE: OECD PIAAC International report (http://www.oecd.org/skills/piaac/Skills_Matter_Further_Results_from_the_Survey_of_Adult_Skills.pdf).

Description of PIAAC problem solving in technology-rich environments (PS-TRE) discrete achievement levels

Achievement level and score range	Task descriptions
No computer experience **Not applicable**	Adults in this category reported having no prior computer experience; therefore, they did not take part in the computer-based assessment but took the paper-based version of the assessment, which did not include the problem solving in technology-rich environment domain
Failed ICT core **Not applicable**	Adults in this category had prior computer experience but failed the ICT core test, which assesses basic ICT (Information and Communication Technologies) skills, such as the capacity to use a mouse or scroll through a web page, needed to take the computer-based assessment. Therefore, they did not take part in computer-based assessment, but took the paper-based version of the assessment, which does not include the problem solving in technology-rich environment domain.
"Opted out" of taking computer-based assessment **Not applicable**	Adults in this category opted to take the paper-based assessment without first taking the ICT core assessment, even if they reported some prior experience with computers. They also did not take part in the computer-based assessment, but took the paper-based version of the assessment, which does not include the problem solving in technology-rich environment domain.
Below Level 1 **0–240**	Tasks are based on well-defined problems involving the use of only one function within a generic interface to meet one explicit criterion without any categorical or inferential reasoning, or transforming of information. Few steps are required and no sub-goal has to be generated.
Level 1 **241–290**	At this level, tasks typically require the use of widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem. The problem may be solved regardless of the respondent's awareness and use of specific tools and functions (e.g., a sort function). The tasks involve few steps and a minimal number of operators. At the cognitive level, the respondent can readily infer the goal from the task statement; problem resolution requires the respondent to apply explicit criteria; and there are few monitoring demands (e.g., the respondent does not have to check whether he or she has used the appropriate procedure or made progress towards the solution). Identifying content and operators can be done through simple match. Only simple forms of reasoning, such as assigning items to categories, are required; there is no need to contrast or integrate information.

Level 2 **291–340**	At this level, tasks typically require the use of both generic and more specific technology applications. For instance, the respondent may have to make use of a novel online form. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g., a sort function) can facilitate the resolution of the problem. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, though the criteria to be met are explicit. There are higher monitoring demands. Some unexpected outcomes or impasses may appear. The task may require evaluating the relevance of a set of items to discard distractors. Some integration and inferential reasoning may be needed.
Level 3 **341–500**	At this level, tasks typically require the use of both generic and more specific technology applications. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g., a sort function) is required to make progress towards the solution. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, and the criteria to be met may or may not be explicit. There are typically high monitoring demands. Unexpected outcomes and impasses are likely to occur. The task may require evaluating the relevance and reliability of information in order to discard distractors. Integration and inferential reasoning may be needed to a large extent.

NOTE: Information about the procedures used to set the achievement levels is available in the OECD PIAAC Technical Standards and Guidelines.
SOURCE: OECD PIAAC International report (http://www.oecd.org/skills/piaac/Skills_Matter_Further_Results_from_the_Survey_of_Adult_Skills.pdf).

3. Statistics Options

The IDE reports PIAAC data with several statistics options:

- Averages
- Percentages
- Standard deviations
- Percentiles

Averages

This statistic provides the average value for a selected continuous variable or the average scale score. For the PIAAC assessment, adult performance is reported on scales that range from 0 to 500. PIAAC scales are produced using item response theory (IRT) to estimate average scores for literacy, numeracy, and problem solving in technology-rich environments (PS-TRE) 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 adults' achievement in answering other questions. That is, all participants' responses to the assessment questions are compiled and

analyzed to determine the percentage of adults responding correctly to each multiple-choice question and the percentage of adults achieving each of the score categories for constructed-response questions.

Percentages

This statistic shows the percentage of adults as a row percentage. For example, if the first column lists jurisdictions, then each jurisdiction will display its own percentage distribution across its row. By default, percentage distributions do not include missing data, although there is an option to include them.

The adults in the sample population that did not answer the assessment will be displayed along with those that did answer the assessment if you select **Percentage across full sample** under the **Population** category.

Standard deviations

The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular variable. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average value of a variable is 500 and the standard deviation is 100, it means that 95 percent of the values in this variable 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:

- 10^{th} percentile—the bottom 10 percent of adults
- 25^{th} percentile—the bottom quarter of adults
- 50^{th} percentile—the median (half the adults scored below the cutpoint and half scored above it)
- 75^{th} percentile—the top quarter of adults
- 90^{th} percentile—the top 10 percent of adults

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 Adults**), when you go to the **Edit Reports** step, you will automatically get a list with one table for each variable (including one for **All Adults**); 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 Adults**) you will get tables for each variable, but you will not get the cross-tabulation.

Be advised that if you go back to add another variable without removing one variable (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. (Data were not collected or not reported.)
# The statistic rounds to zero.
‡ Reporting standards not met. (Did not meet reporting standard.)
NOTE: A general note pertains to any special characteristics of the data in the table.
SOURCE: Source information is listed for all PIAAC data and should be cited when data are used in a publication or presentation.

5.A. Calculation of averages

The IDE generates the average of all jurisdictions included in the IDE for the selected measures and variables if **Average of All Jurisdictions** is chosen under **Jurisdiction**. This average generated by the IDE is based on 27 OECD national and 2 sub-national entities [Flanders (Belgium), England and Northern Ireland (UK)] and 6 partner jurisdictions in **PIAAC 2012–2017**, 6 OECD national or sub-national entities in **ALL 2003–2008**, and 18 OECD national or sub-national entities in **IALS 1994–1998**.

Please note that there might be differences between the averages generated by the IDE and the OECD averages for literacy, numeracy and problem solving in technology-rich environments (PS-TRE) published in the **PIAAC 2012/2014** OECD and NCES reports. Furthermore, the **Average of All Jurisdictions** generated by the IDE might differ from previously published results in OECD and NCES reports using **PIAAC 2012–2017, ALL 2003–2008**, and **IALS 1994–1998** data. These differences might be due to the jurisdiction composition of the averages.

5.B. Linking error

PIAAC 2012–2017, **ALL 2003–2008**, and **IALS 1994–1998** are linked assessments. That is, the sets of items used to assess literacy and numeracy in these years and studies include a subset of common items, referred to as trend items. To establish common reporting metrics for PIAAC, 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 jurisdiction means due to the sampling of adults.

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 **PIAAC 2012–2017, ALL 2003–2008**, and **IALS 1994–1998** 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.