

# LESSON 3: THE SPSS ENVIRONMENT

## Introduction:

SPSS is a powerful tool for statistical analysis that plays a crucial role in conducting statistical analysis, making it an essential skill for researchers and analysts in various fields. This lesson will introduce you to the SPSS environment by covering its definition, the version you need for this course, and some important related concepts and operations that will help you become familiar with the interface and various features and learn how to make your SPSS experience even more effective. We'll provide valuable SPSS Tips throughout the lesson so as you'll be well-prepared to navigate the SPSS environment confidently and begin your dive into data analysis.

### 1. What is SPSS?

SPSS, which stands for "Statistical Package for the Social Sciences," is a widely used software application for statistical analysis and data management. It provides a user-friendly interface that allows researchers, statisticians, and analysts to perform various tasks related to data analysis, including data entry, manipulation, visualization, and statistical testing. SPSS is particularly popular in the social sciences, but it is used in various fields to explore data, conduct statistical tests, generate reports, and make data-driven decisions. It offers a range of tools for both descriptive and inferential statistics, making it a valuable resource for researchers and analysts working with data sets of different sizes and complexities.

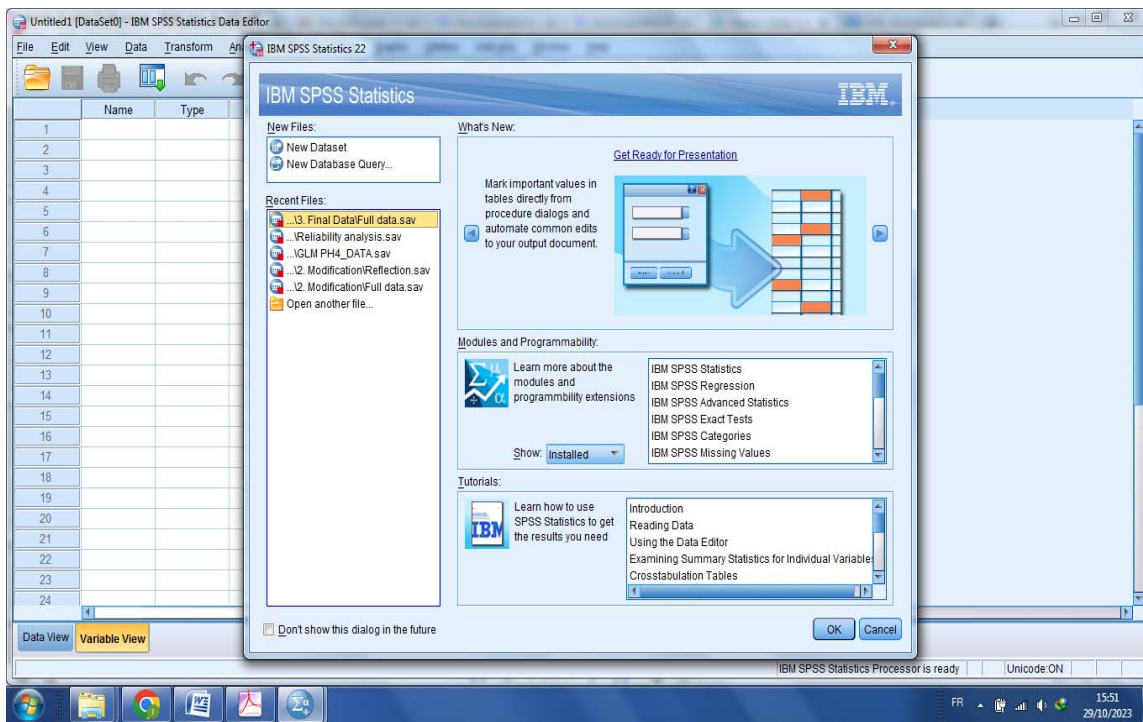
### 2. What Version Do I Need for this Course?

SPSS has a track record of releasing multiple versions, each promising improved features and capabilities. However, it's important not to get overly fixated on version numbers, as SPSS frequently brings out 'new' releases. While this strategy is lucrative for SPSS and fuels the market for SPSS-related books, most users might not discern substantial differences in these frequent updates. Occasionally, there are major overhauls. For this course, we will utilize SPSS Version 22. This edition, launched in 2013, introduced several enhancements. It boasted an upgraded user interface, enhanced data visualization options, and more advanced statistical techniques. The update significantly simplified complex analyses, data management, and the creation of high-quality charts and graphs. SPSS Version 22 marked a notable advancement in terms of user-friendliness and analytical capabilities, rendering it a valuable tool for researchers and analysts working with data in the social sciences and beyond.

### 3. Getting Started!

SPSS primarily utilizes two main windows: the data editor for inputting data and conducting statistical operations, and the viewer for viewing analysis results. There are additional windows, like the SPSS Syntax Editor for manually entering SPSS commands, which can be handy for certain advanced functions. When you launch SPSS, you'll see a start-up window (see figure 1) with various options. To open an existing data file, you can choose it from a list of recent files or browse your computer for the file you want. If you need to open something other than a data file, such as a document with previous analysis results, you can select that option. If you're starting a new analysis and need to input data, you'll choose the "Type in data" option, and it will open a blank data editor where you can begin entering your data.

Figure 1: Start-up Window



#### 4. The Data Editor:

The primary SPSS window is dominated by the data editor, where most actions are performed. It features a menu bar at the top, similar to those found in other software programs. This menu bar can be accessed using a computer mouse by moving the on-screen arrow to the desired menu and clicking with the left mouse button. Selecting a menu displays a list of options, often leading to the appearance of dialog boxes. The data editor offers two views: data view for data entry and variable view for defining variable characteristics. You can switch between these views by clicking on the corresponding tabs at the bottom. Within the menus, some letters are underlined, representing keyboard shortcuts to access functions. For instance, Alt + F + A activates the "Save As..." option within the File menu. Below is a brief overview of the menus and select options, but we will explore each menu's functions as we progress:

**File** This menu provides essential functions like saving data, graphs, or output. You can also open saved files and print graphs, data, or output. Essentially, it encompasses the typical options found in File menus.

**Edit** This menu comprises editing functions for the data editor. SPSS allows you to cut and paste sets of numbers within the data editor, which can be quite useful when you need to correct data entry errors. Additionally, you can utilize it to adjust various preferences, including choosing the font for output. The default preferences typically suffice for most tasks.

**View** This menu handles system specifications, allowing you to configure settings like grid lines in the data editor and the display of value labels (more on value labels will be explained later)..

**Data** This menu provides options for modifying the data editor. Key features include, which inserts a new variable (column) into the data editor;, which adds a new data row between existing

rows;, which separates the file by a grouping variable; and, which conducts analyses on a selected sample of cases.

**Transform** This menu is your go-to for modifying variables. It's handy for tasks like recoding variable values, perhaps adjusting coding schemes. Additionally, the compute function is valuable for data transformations, such as calculating a new variable as the average of two existing ones. This feature empowers you to perform various calculations on your variables.

**Analyze** Now, the real excitement begins because this menu hosts a variety of statistical procedures. Here's a concise guide to some of the options within the statistics menu that we'll explore in this course (keep in mind this is just a portion of what's available):

**Descriptive Statistics** This menu is for conducting descriptive statistics (mean, mode, median, etc.), frequencies and general data exploration. There is also a command called crosstabs that is useful for exploring frequency data and performing tests such as chi-square, Fisher's exact test and Cohen's kappa.

**Compare Means** This is where you can find t-tests (related and unrelated ; and one-way independent ANOVA.

**General Linear Model** This menu is for complex ANOVA such as two-way (unrelated, related or mixed), one-way ANOVA with repeated measures and multivariate analysis of variance (MANOVA).

**Mixed Models** This menu can be used for running multilevel linear models (MLMs).

**Correlate** It doesn't take a genius to work out that this is where the correlation techniques are kept! You can do bivariate correlations such as Pearson's R, Spearman's *rho* and Kendall's *tau* as well as partial correlations.

**Regression** There are a variety of regression techniques available in SPSS. You can do simple linear regression, multiple linear regression and more advanced techniques such as logistic regression.

**Loglinear** Loglinear analysis is hiding in this menu, waiting for you, and ready to pounce like a tarantula from its burrow.

**Data Reduction** You'll find factor analysis here.

**Scale** Here you'll find reliability analysis.

**Nonparametric Tests** There are a variety of non-parametric statistics available such as the chi-square goodness-of-fit statistic, the binomial test, the Mann-Whitney test, the Kruskal-Wallis test, Wilcoxon's test and Friedman's ANOVA.

**Graphs** SPSS offers graphing capabilities, and you can access the Chart Builder through this menu. You can create various types of graphs, including bar charts, histograms, scatterplots, box-whisker plots, pie charts, and error bar graphs, among others.

**Window** This menu enables you to navigate between different windows. If you're viewing the output and want to return to your data sheet, you can do so from this menu. Most of the options in this menu also have shortcut icons, making it less frequently used.

**Utilities** Within this menu, there's an option called "Notes" that permits you to add comments or annotations to your dataset. This feature is valuable for documenting details like the data source, collection date, and other relevant information.

**Add-ons** SPSS offers various add-ons that can be accessed through this menu. One of these is Sample Power, which calculates the necessary sample size for research studies and power statistics. However, it's important to note that not everyone will have access to these add-ons.

**Help** This is an invaluable menu because it offers you online help on both the system itself and the statistical tests. The statistics help files are fairly incomprehensible at times (the program is not designed to teach you statistics).

## 5. Entering Data into the Data Editor

When launching SPSS, it opens a blank data editor titled "Untitled1" (which becomes rather ironic once it's titled "Untitled"). To input data effectively, it's crucial to organize it logically. In the SPSS Data Editor, each row represents data from one entity, and each column signifies a variable. It doesn't differentiate between independent and dependent variables; both belong in separate columns. Each row encapsulates one entity's data, whether it's a person, animal, plant, business, or water sample. For instance, if you were studying gender differences in pain perception caused by hot and cold stimuli, each participant's data would be in a single row, with columns for their name, gender, pain perception for cold water, and pain perception for a hot potato (e.g., Andy, male, 7, 10).

Columns indicating the entities' groupings are termed grouping variables, which are typically represented by numbers rather than words in SPSS. For instance, you might assign 0 for male and 1 for female, informing SPSS of this mapping. Between-group variables utilize this approach. Furthermore, for repeated measures like pain perception under hot and cold stimuli, each level of the variable is placed in separate columns. The SPSS Data Editor comprises cells where data values are entered, with the active cell highlighted in blue. You can navigate cells using arrow keys or by clicking with the mouse. To input data, move to the desired cell, type the value, and press the appropriate arrow key to proceed to the next cell on the right. The first step involves creating variables in the "Variable View" and then inputting data in the "Data View." We will demonstrate this through an example.

## 6. SPSS Tips

In SPSS Data Editor, data from different entities go in rows, while data from the same entities occupy separate columns. Each entity gets a unique row, and data specific to them are placed in distinct columns. For instance, multiple measurements for a single entity result in separate columns. In experimental research, repeated measures use multiple columns, each representing a level of the variable. Between-group variables use single columns. This rule streamlines data organization, with exceptions in mixed models.