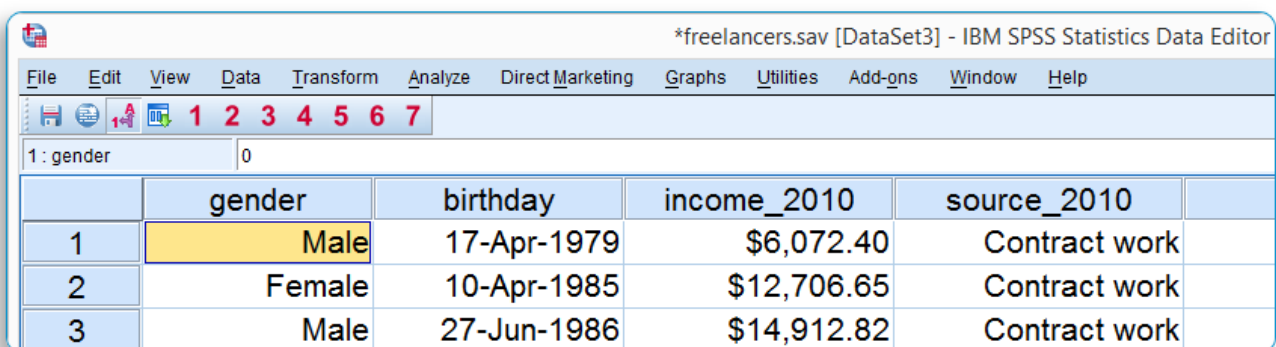# SPSS

An introduction

SPSS – What Is It?

Summary

SPSS is software for editing and analyzing data. This data may come from basically any imaginable source: a customer database, scientific research, or even the server log files of a website. SPSS can open all file formats that are commonly used for structured data such as Excel, plain text files and relational (SQL) databases.

Let's now make things a bit more tangible by walking through SPSS' interface.

SPSS Data View

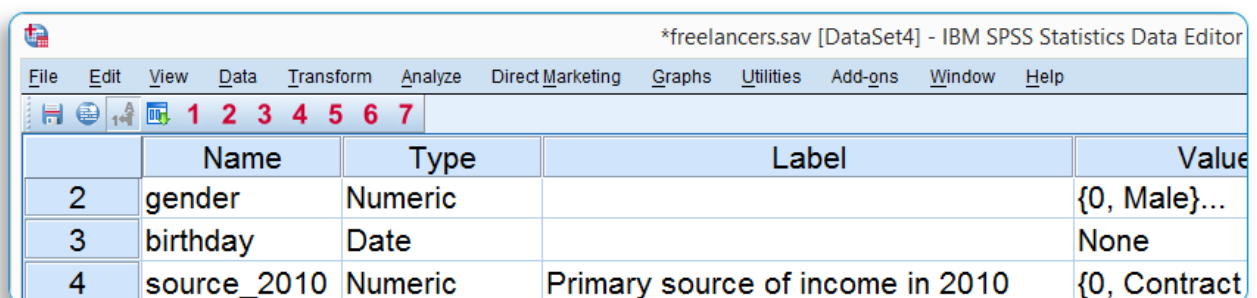After opening data, SPSS displays them in a spreadsheet-like fashion as shown in the screenshot below.

SPSS Dictionary

SPSS' Data Editor window always contains two sheets: the first sheet - the one we just saw- displays our data. A second sheet, shown below, shows the metadata associated with the data. Metadata is information about the meaning of data values and variables. This is generally known as the "codebook" but in SPSS it's called the dictionary. The next screenshot shows how SPSS' dictionary is represented in the second sheet of the data window.

For non SPSS users, the look and feel of SPSS' Data Editor window probably come closest to an Excel workbook containing two different but strongly related sheets.

Data Analysis

Right, so SPSS can open all sorts of data and display them -and their associated metadata- as two sheets in its Data Editor window. So how can you actually analyze such data in SPSS? Well, one option is using SPSS' elaborate menu options. For instance, if our data contain a variable holding respondents' incomes over 2010, we can compute the average income by clicking SPSS' *D*escriptive Statistics dialog window as shown below.
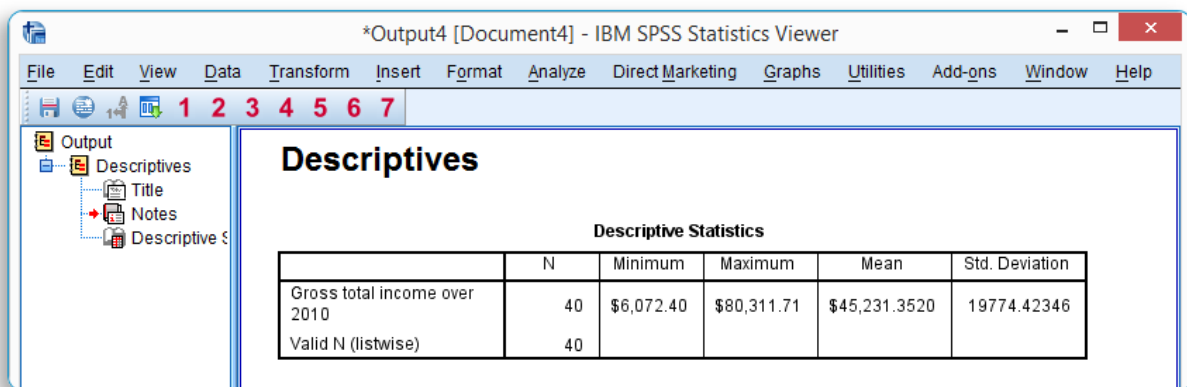
SPSS Output Window

After running D*e*scriptive Statistics, the results appear in a different window, known as SPSS' Output Viewer window. This second window has a different layout and structure than the Data Editor window we saw earlier. The screenshot below shows what it looks like.
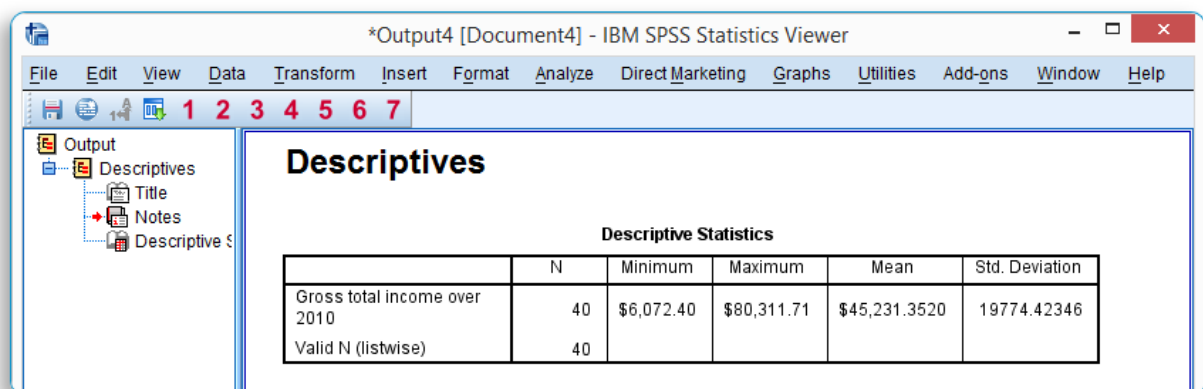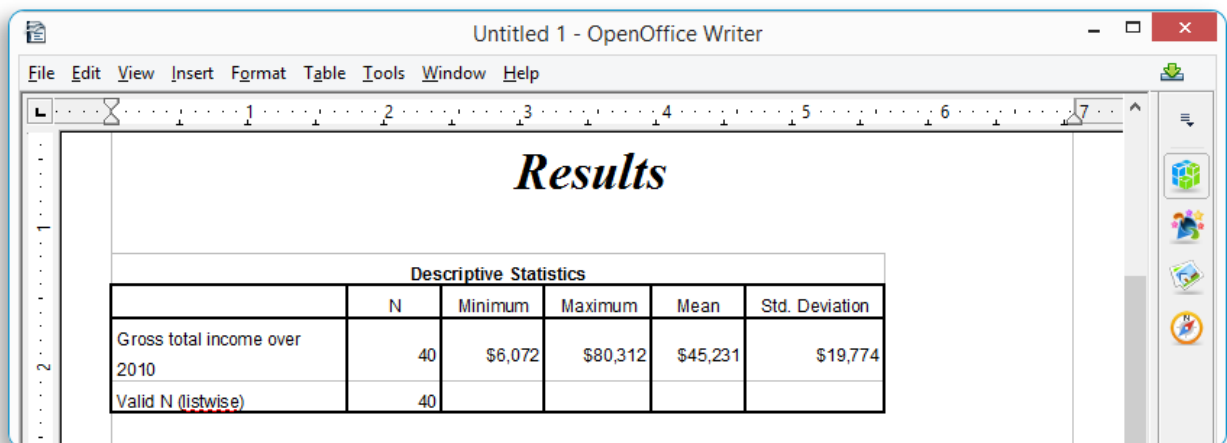

Creating output in SPSS does not change your data sheets in any way whatsoever; data and output are strictly separated by SPSS using different windows for them. For non SPSS users,

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the look and feel of SPSS' Output Viewer window probably comes closest to a Powerpoint slide holding items such as blocks of text, tables and charts.

SPSS Reporting

SPSS Output items, typically tables and charts, are easily copy-pasted into other applications. For instance, many SPSS users use a word processor such as MS Word, OpenOffice or GoogleDocs for reporting. Tables are usually copied in rich text format, which means they'll retain their styling such as fonts and borders. The screenshot below illustrates the result.

SPSS Syntax

The output table we showed was created by running D*escriptive Statistics from SPSS' menu. Now, SPSS offers a second option for running this (or any other) command: besides the Data Editor window and the Output Viewer window, we can open a third window known as the Syntax Editor window. In the Syntax Editor window we can type the commands we'd like to run. For instance, running

```
descriptives income_2010.
```

has the exact same effect as running this command from SPSS' menu like we did earlier.
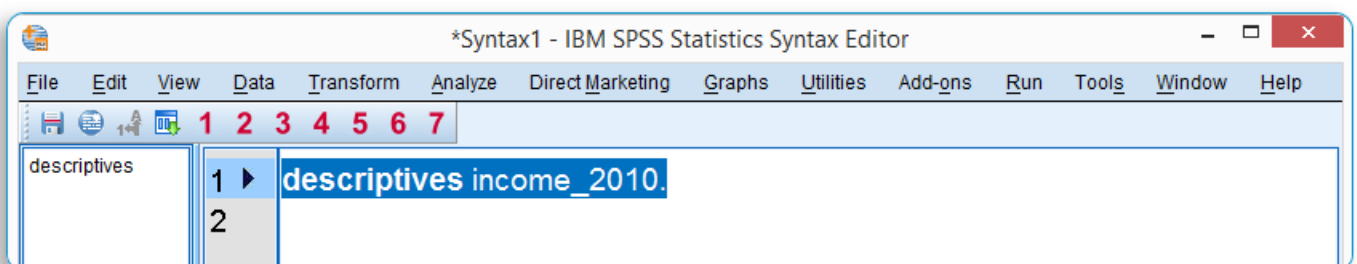
Besides typing commands into the Syntax Editor window, most of them can also be pasted into it by clicking through SPSS' menu options. Like so, SPSS users unfamiliar with syntax can still use it. But why not skip syntax altogether?

The basic point in using syntax as opposed to the menu is that syntax can be saved, edited, rerun and shared between projects or users. This allows for a very solid -yet utterly flexible- workflow during projects.

For non SPSS users, the look and feel of SPSS' Syntax Editor window probably come closest to Notepad: a single window basically just containing plain text.
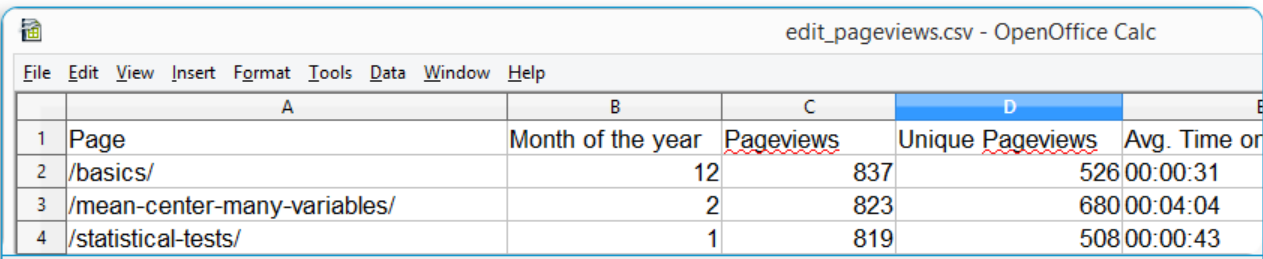
SPSS - Overview Main Features

Now that we have a basic idea of how SPSS works, let's take a look at what it can do. Following a typical project workflow, SPSS is suitable for

- Opening data files, either in SPSS' own file format or many others;
- editing data such as computing sums and means over columns or rows of data;
- creating tables and charts containing frequency counts or summary statistics over (groups of) cases;
- running inferential statistics such as ANOVA, regression and factor analysis;
- saving data and output in a wide variety of file formats.

We'll now take a closer look at each one of these features.

Opening Data Files

SPSS has its own data file format. Other file formats it can open include MS Excel, plain text files in ASCII, UTF-8 or any other encoding, (query results from) relational databases such as MS SQL Server, MySQL, and Oracle, Stata and SAS.

Web analytics data -often downloaded as Excel files- can easily be opened and further analyzed in SPSS

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Editing Data

In real world research, raw data usually need some editing before they can be properly analyzed. Typical examples are creating means or sums as new variables, restructuring data or detecting and removing unlikely observations. SPSS performs such tasks -and more complex ones- with amazing efficiency.

For getting things done fast, SPSS contains many numeric functions, string functions, date functions and other handy routines.

Tables and Charts

All basic tables and charts can be created easily and fast in SPSS. Typical examples are demonstrated under Data Analysis. A real weakness of SPSS is that its charts tend to be ugly

SPSS clustered bar chart with chart template applied
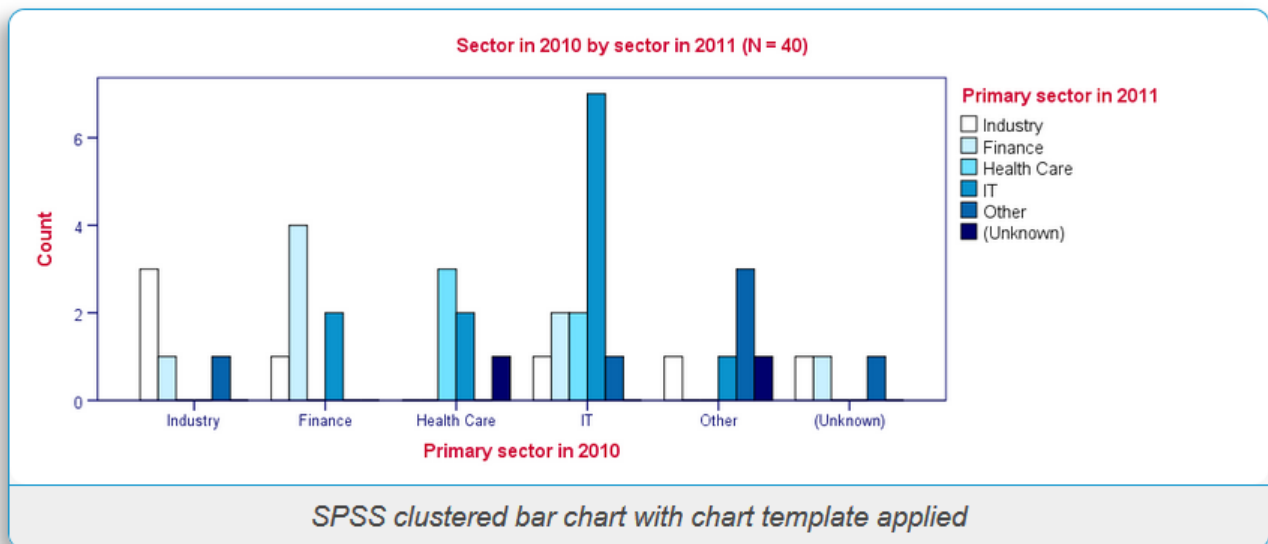
and often have a clumsy layout. A great way to overcome this problem is developing and applying SPSS chart templates. Doing so, however, requires a fair amount of effort and expertise.

Inferential Statistics

SPSS contains all basic statistical tests such as t-tests, chi-square tests, ANOVA and many others. Multivariate analyses such as regression, factor analysis and cluster analysis are included as well.

Some other common analyses such as GLM are available only after purchasing and installing an SPSS add-on module. An overview of all analyses and the modules to which they belong is presented in Overview All SPSS Commands.

	One-Sample Test					
	Test Value = 400					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
body_weight	① -2.428	② 39	③ .020	④ -30.450	-55.81	-5.09

SPSS One Sample T-Test Output Example

Saving Data and Output

SPSS data can be saved as a variety of file formats, including MS Excel, plain text, Stata and SAS. The options for output are even more elaborate: charts are often copy-pasted as images in .png format. For tables, rich text format is often used because it retains the tables' layout, fonts and borders. Furthermore, output items can be batch exported in PDF, HTML, MS Word, or many other common file formats.

SPSS Tutorials Website

Further information about SPSS on the following topics can be found at:

http://www.spss-tutorials.com/

- Basics
- Data Analysis
- Statistical Tests
- Editing Data
- Python
- Tools
- FAQ
- Backgrounds

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