

1-Way ANOVA in SPSS Lab 10

Goals for this lab:

- a. Learn how to set up data for analysis in a 1-Way ANOVA design.
- b. Execute a 1-Way ANOVA on a very simple data set in SPSS.
- c. Generate a plot of cell means in ANOVA.
- d. Practice the learned skills on a more complex data set, taken from a textbook.

Setting Up Data for Factorial ANOVA Analysis

The 1-Way ANOVA is the simplest example of a completely randomized factorial ANOVA design. For the basic idea behind ANOVA and the general method for performing ANOVA calculations, consult the course handout *Computational Procedures for 1-Way ANOVA* available on the course website. Data entry for these designs is simple, and uses a consistent mechanism. To understand how this mechanism works, consider the very simple data set we used in the introductory ANOVA handout to demonstrate ANOVA calculations:

Group 1	Group 2	Group 3
1	4	7
2	5	8
3	6	9

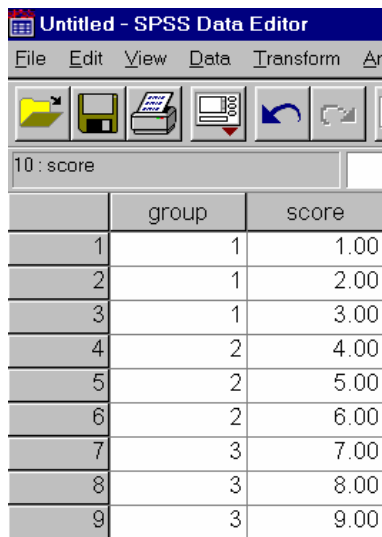
These data are in a matrix, and the natural inclination might be to enter the data in SPSS, which uses a matrix spreadsheet format, in the same way, i.e., have 3 variables with 3 scores on each variable. However, for a variety of reasons, statistical packages generally require a different kind of input to generate ANOVA calculations. This method treats each dependent variable (there is only one in this design, which is hence referred to as a *univariate 1-Way ANOVA* in more advanced texts) as a single variable, and uses a “categorizing variable,” or “grouping variable” to indicate which group a score is in.

Consequently, the above data would be entered in a format like this:

Group	Score
1	1
1	2
1	3
2	4
2	5
2	6
3	7
3	8
3	9

This takes a little getting used to, but after a bit of practice it will become second nature to you.

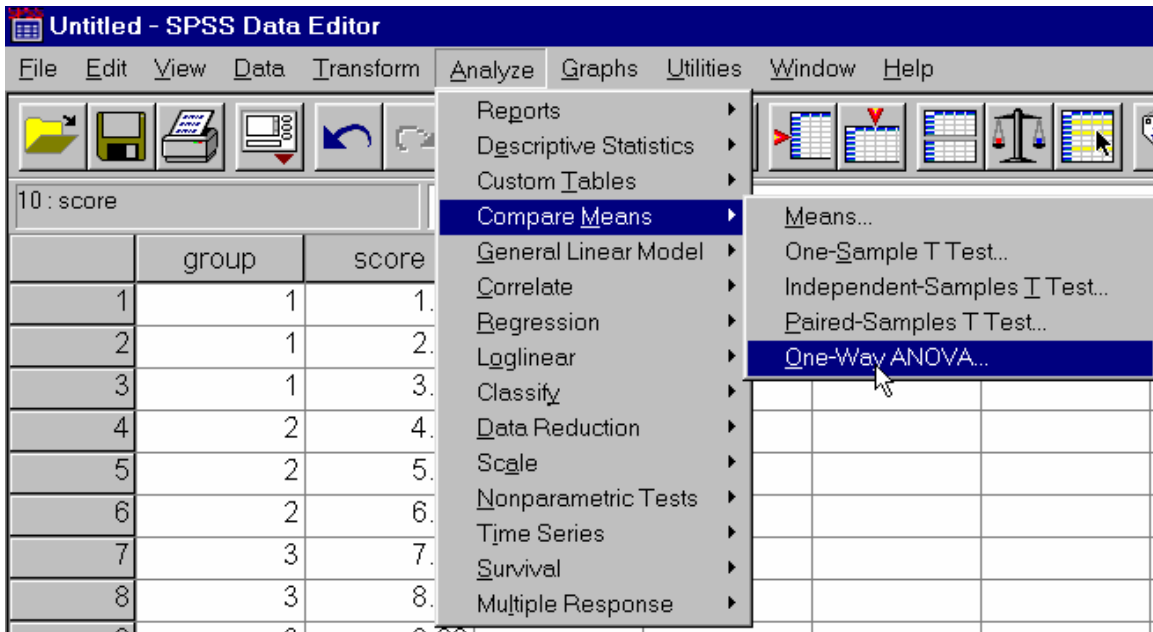
In what follows, we assume you are already familiar with how to set up a data file with variable names in SPSS. After entering the above data, your SPSS data spreadsheet file should look like this:



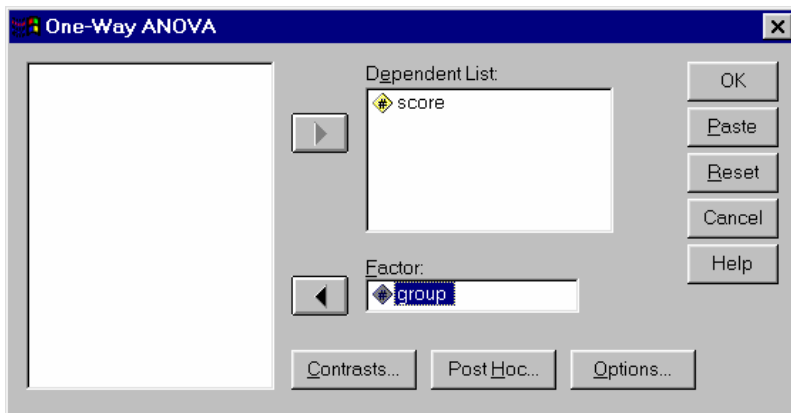
The screenshot shows the SPSS Data Editor window titled "Untitled - SPSS Data Editor". The menu bar includes "File", "Edit", "View", "Data", "Transform", and "Analyze". The toolbar contains icons for opening a file, saving, printing, and undo. The data grid shows 10 rows of data with columns labeled "group" and "score".

	group	score
1	1	1.00
2	1	2.00
3	1	3.00
4	2	4.00
5	2	5.00
6	2	6.00
7	3	7.00
8	3	8.00
9	3	9.00

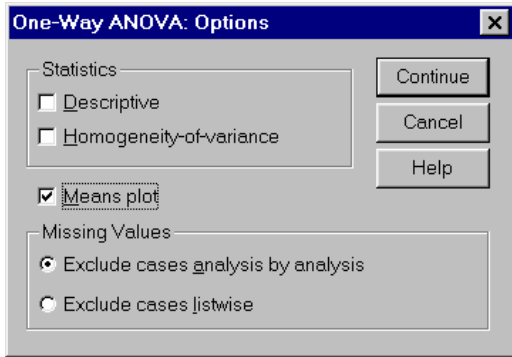
There are two ways to perform the basic calculations for a 1-Way ANOVA. One approach uses a dedicated menu option. Select *Analyze->Compare Means->One-Way ANOVA* from the menu, as shown below.



This will open up a window in which you specify the variables for analysis. The *Dependent List* will have only one variable if the analysis is *univariate* (which it is in this case). This is the variable that contains the actual scores. The *Factor* is the variable that contains the grouping information. In this case, your window should look like the following:



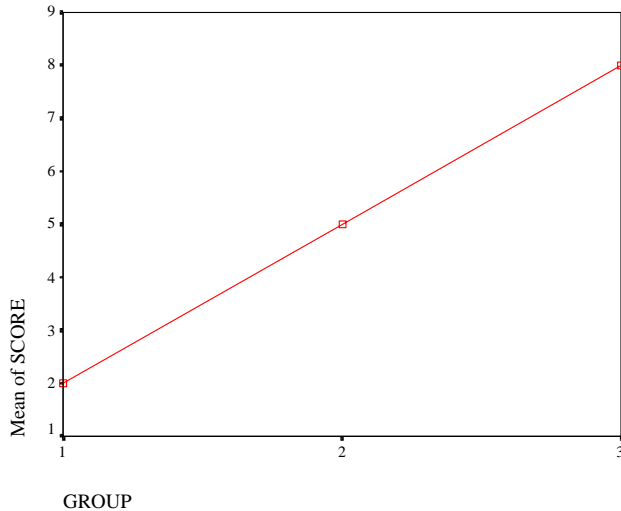
If we wish to obtain a plot of the cell means, we need to click on *Options*, and check off *Means Plot*, as below.



Click *Continue*, then *Ok*, and the analysis will proceed. The results will mirror those from our hand calculations, i.e.,

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	54.000	2	27.000	27.000	.001
Within Groups	6.000	6	1.000		
Total	60.000	8			

The Means Plot will show the cell means, which in this case are 2, 5, and 8 for the three groups.



On Your Own.

- Next, as an exercise, try setting up a data file to match the data in the example of problem 5 on page 417 of the GH textbook. Perform the ANOVA, then generate a cell means plot. Check your answer against the answer in the textbook.

To Hand In

Save the output tables and graphs from both ANOVAs in an output file called *Lab10.spo*.