STATISTICS FOR SOCIAL SCIENCE

VOLUME: SPSS

CHAPTER: USING THE SOFTWARE

Abstract: This chapter provides step-by-step instructions on how to obtain basic statistical output using SPSS, both visually with screenshots and via written instructions. Simple examples for most undergraduate-level between-subjects and within-subjects research designs are provided.

Keywords: SPSS, screenshots, directions for use

Original: July 2009
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This document is part of an online statistics sourcebook.

A browser-friendly viewing platform for the sourcebook is available:
https://cwendorf.github.io/Sourcebook

All data, syntax, and output files are available:
https://github.com/cwendorf/Sourcebook

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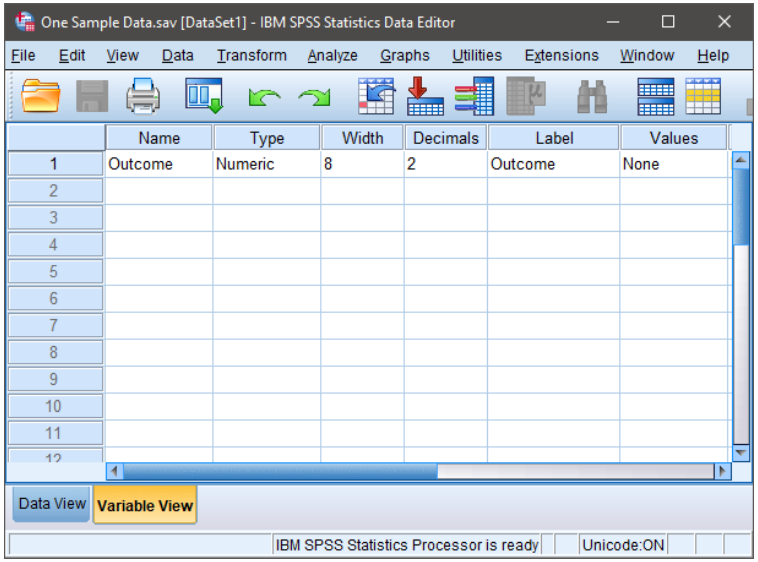
Steps for Defining All Variables

1. First, click on the "Variable View" tab on the bottom left-hand corner of the screen. Generally speaking, this is where you will define all of the variables in the data set.

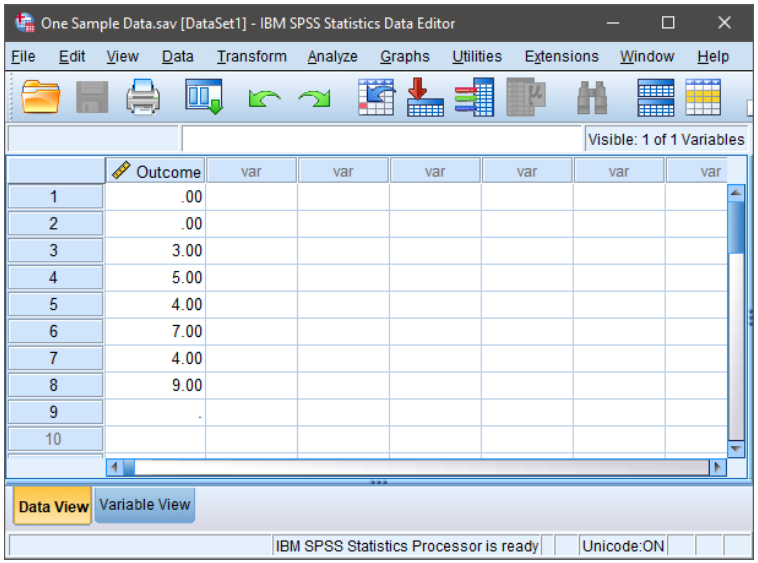
2. Type in the "Name" of the variable in the first cell. You may wish to enter a "Label" (or longer name) for the variable.



Steps for Entering Data

3. Click on the "Data View" tab on the bottom left-hand corner. In this view, you will be able to enter the data.

4. Enter the data in the individual cells of the column for the variable. Note that each cell should contain a single score for an individual person. There will be as many rows as people.



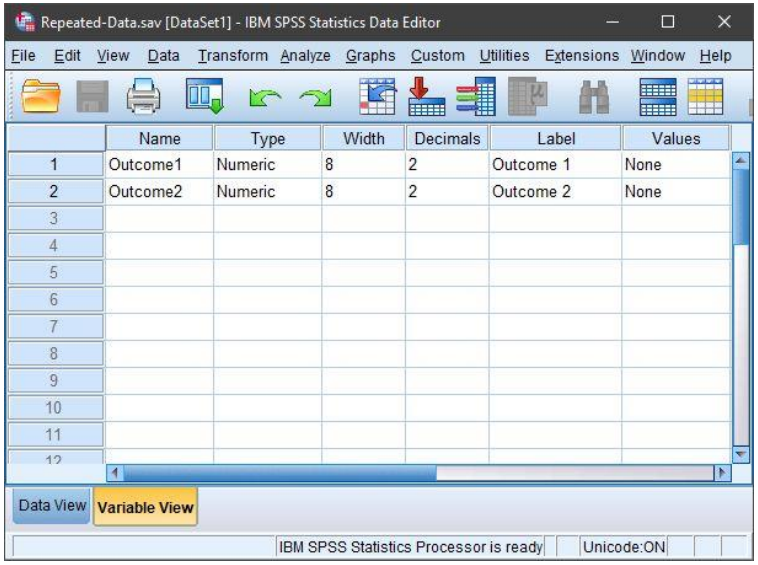
Your data are now ready to be analyzed!

Entering Repeated Measures Data

Steps for Defining All Variables

1. First, click on the "Variable View" tab on the bottom left-hand corner of the screen. Generally speaking, this is where you will define all of the variables in the data set.

2. Type in a "Name" for each of the variables in the first column. You may wish to enter a "Label" (or longer name) for each variable in your data set.

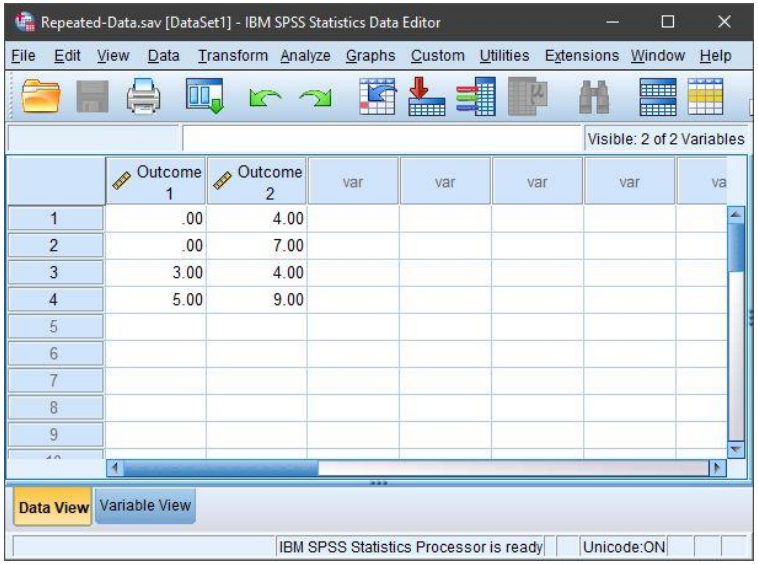


Steps for Entering Data

3. Click on the "Data View" tab on the bottom left-hand corner. In this view, you will be able to enter the data.

4. Enter the data in the individual cells of the column for the variable. Note that each cell should contain a single score for an individual person. There will be as many rows as people.

5. Notice that each individual (i.e., the rows) has values for each instance of the within-subjects variable (i.e., the columns).



Your data are now ready to be analyzed!

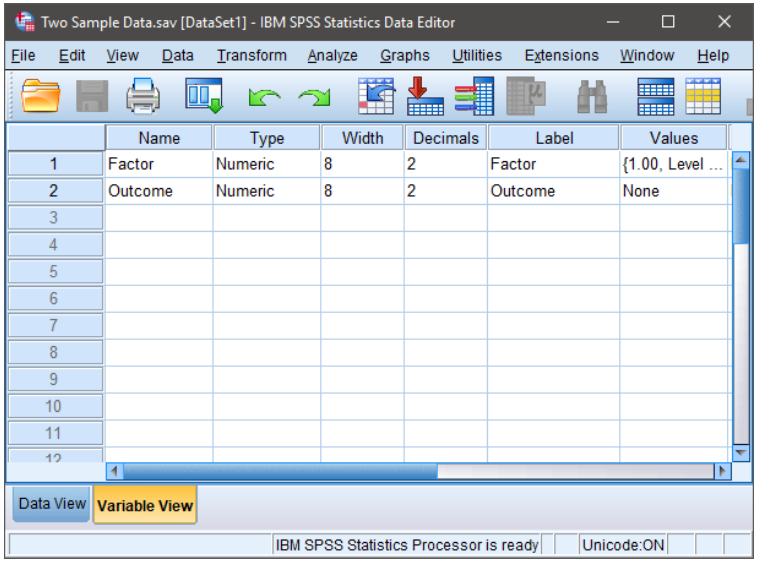
Entering Multiple Sample Data

Steps for Defining All Variables

1. First, click on the "Variable View" tab on the bottom left-hand corner of the screen. Generally speaking, this is where you will define all of the variables in the data set.

2. Type in the "Name" of the variables in the first column. You may wish to enter a "Label" (or longer name) for each variable in your data set.

3. One variable will represent the Factor (Independent Variable) and the other will represent the Outcome (Dependent) Variable.

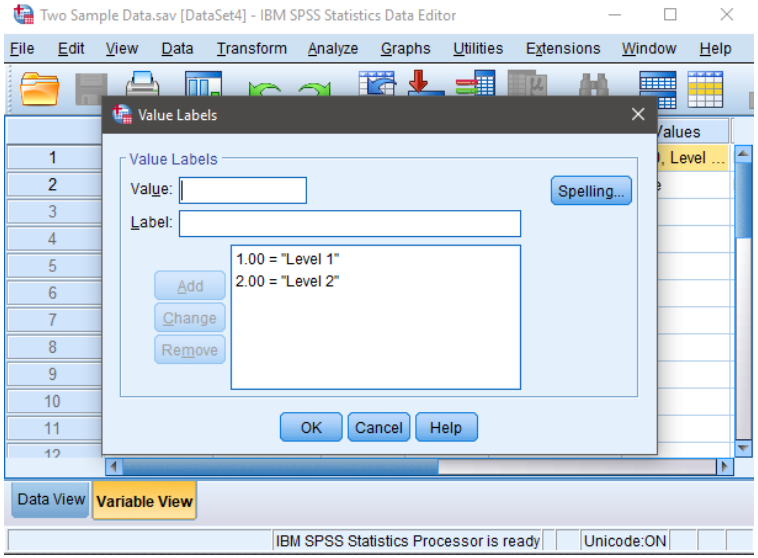


Steps for Providing Labels for All Values

4. For categorical variables, you should also provide labels for the different categories. Do this by clicking on the "values" cell for the variable of interest. A button will appear and clicking on this button will make another dialog box appear.

5. You will use numbers to represent the two categories (or "levels") of the variable. Do this by entering the number representing the value in the "value" box and the actual value in the "label" box. Click "Add" after entering the information for each value. If your data set includes more than two groups, simply specify values and labels for each of the groups.

6. When you have labeled all the values, click "OK" to return to the "Variable View."



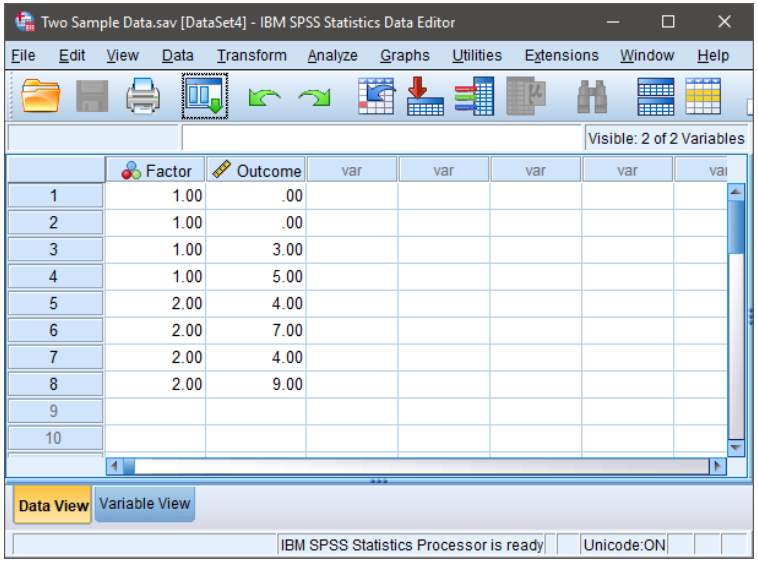
Steps for Entering Data

7. Click on the "Data View" tab on the bottom left-hand corner. In this view, you will be able to enter the data.

8. Enter the data for all the participants. Notice that each participant has scores on both the Factor and Outcome Variables. There will be as many rows as people.

9. On the categorical Factor, use the values that you indicated when defining the variables earlier.

10. If your data set has more than two groups, simply be sure to add a group indicator (a value on the "Factor" variable) and an "Outcome" for each additional person.



Your data are now ready to be analyzed!

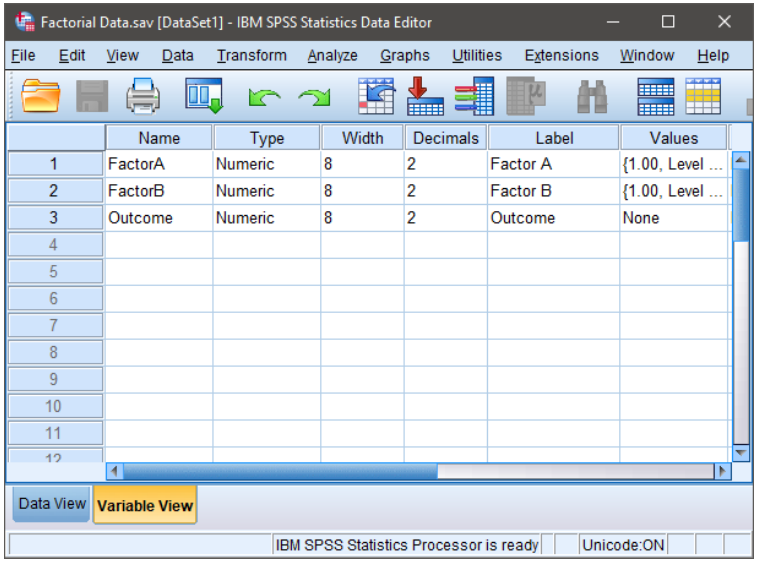
Entering Factorial Data

Steps for Defining All Variables

1. First, click on the "Variable View" tab on the bottom left-hand corner of the screen. Generally speaking, this is where you will define all of the variables in the data set.

2. Type in a "Name" for each of the variables in the first column. You may wish to enter a "Label" (or longer name) for each variable in your data set.

3. Two variables will represent the Factors (Independent Variables) and the other will represent the Outcome (Dependent) Variable.

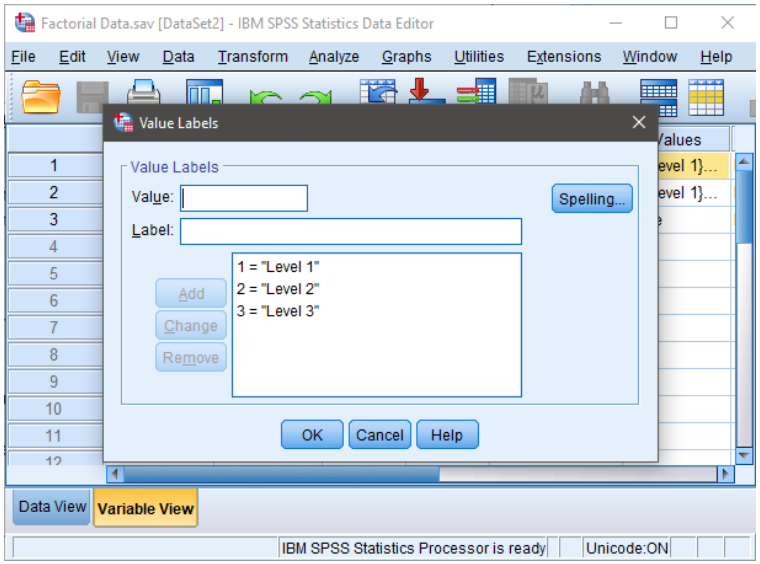


Steps for Providing Labels for All Values

4. For categorical variables, you should also provide labels for the different categories. Do this by clicking on the "values" cell for the variable of interest. A button will appear and clicking on this button will make another dialog box appear.

5. You will use numbers to represent the two categories (or "levels") of the variable. Do this by entering the number representing the value in the "value" box and the actual value in the "label" box. Click "Add" after entering the information for each value. If your data set includes more than two groups, simply specify values and labels for each of the groups.

6. When you have labeled all the values, click "OK" to return to the "Variable View."



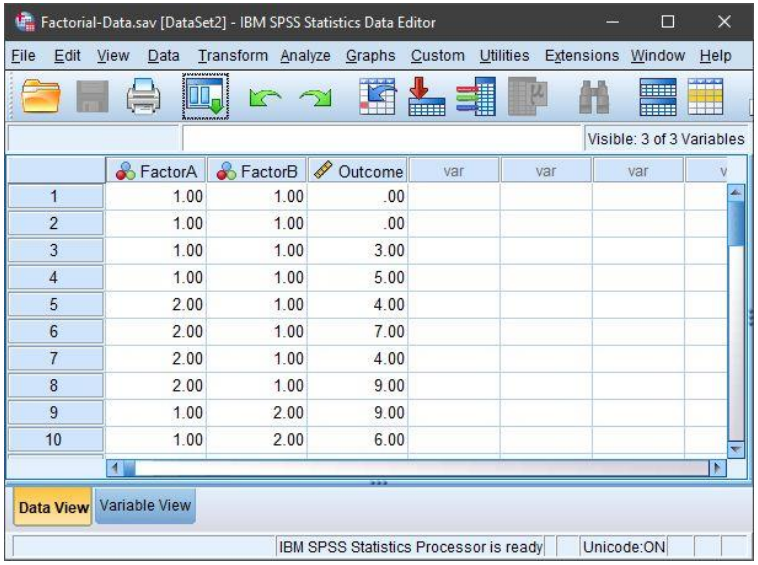
Steps for Entering Data

7. Click on the "Data View" tab on the bottom left-hand corner. In this view, you will be able to enter the data.

8. Enter the data for all of the participants. Notice that each participant has scores on both of the Factors and on the Outcome Variable. There will be as many rows as people.

9. On the categorical Factors, use the values that you indicated when defining the variables earlier. Note that the combination of values in the Factors will define the multiple groups of the factorial design.

10. If your data set has more than two levels for either (or both) of the Factors, simply be sure to add an indicator and an outcome value for each additional person.



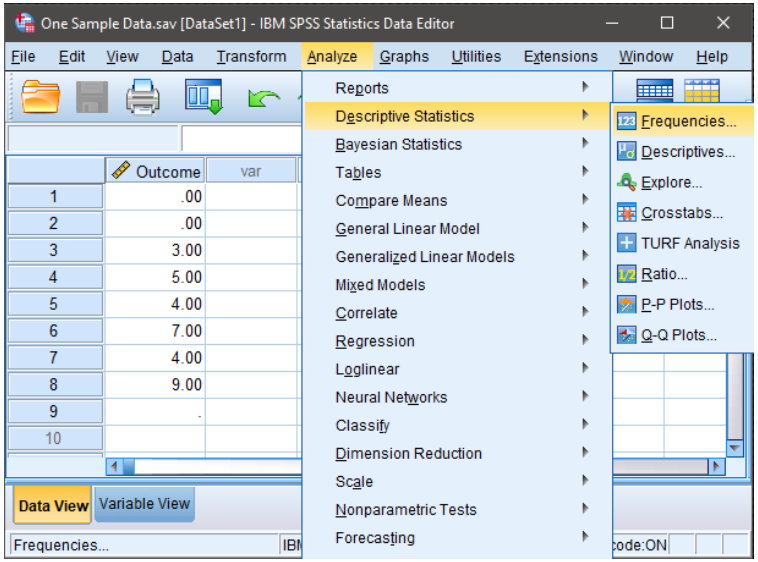
Your data are now ready to be analyzed!

Frequencies (Frequencies and Descriptives)

Steps for Obtaining Frequency-Related Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Descriptive Statistics → Frequencies" option from the main menu.



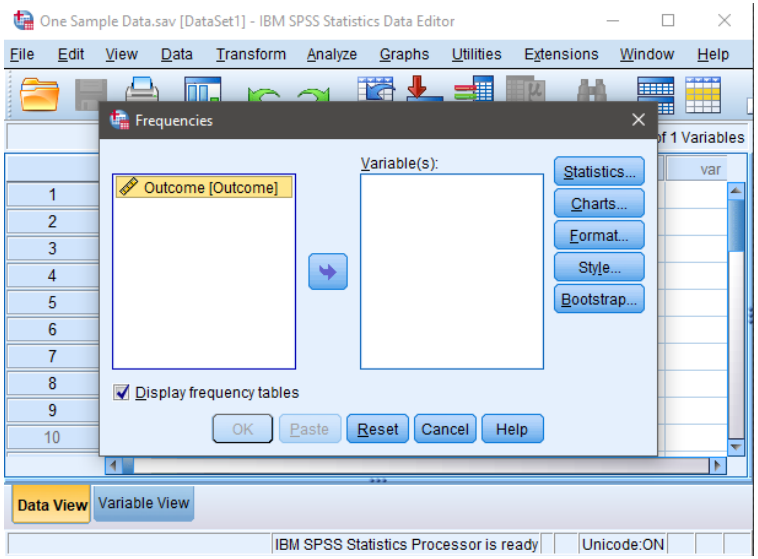
Steps for Obtaining a Frequency Distribution

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on them and then the arrow to move them into the "variables" box.

5. Be sure that "Display frequency tables" is checked. Without this checked, you will not get a frequency distribution.

6. If all you wish is a frequency table (with no histogram or summary statistics), click "OK." A separate window with the output will appear.

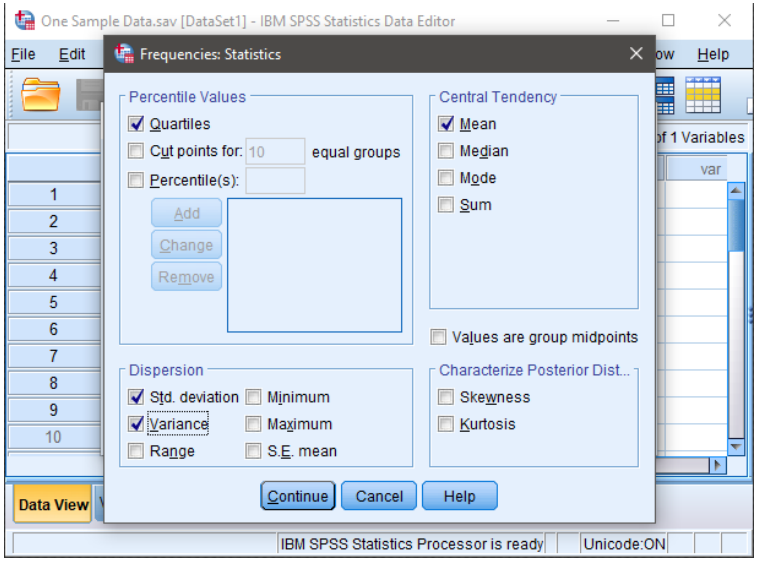


Steps for Obtaining Summary Statistics

7. To obtain summary statistics, select “Statistics.” Another dialogue box will appear.

8. In this box, you can request that SPSS calculate the mean, variance, and standard deviation (or median and quartiles).

9. Once you have selected the desired statistics, click “Continue.” This will return you to the original dialogue box.



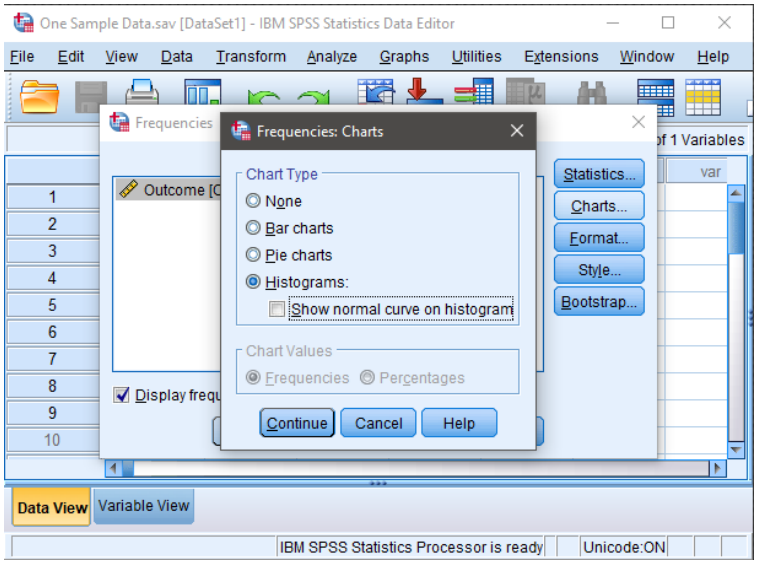
Steps for Obtaining a Histogram

10. To obtain a histogram, click on the “Charts” button. Another dialogue box will appear.

11. In this box, select “Histogram.”

12. Click “Continue.” This will return you to the original dialogue box.

13. After clicking on “OK” in the original dialogue box, a separate window with the output will appear.



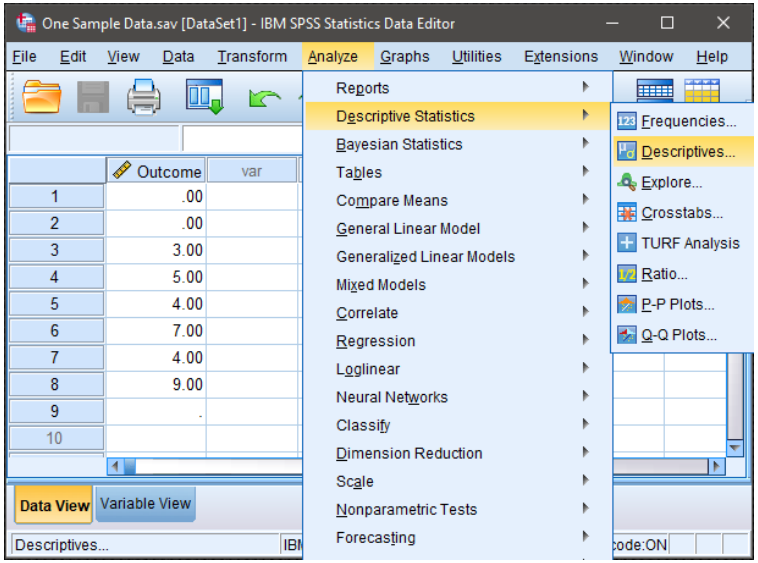
Your data have now been analyzed!

Descriptives (Standardized Scores and Transformations)

Steps for Obtaining Descriptive-Related Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Descriptive Statistics → Descriptives" option from the main menu.



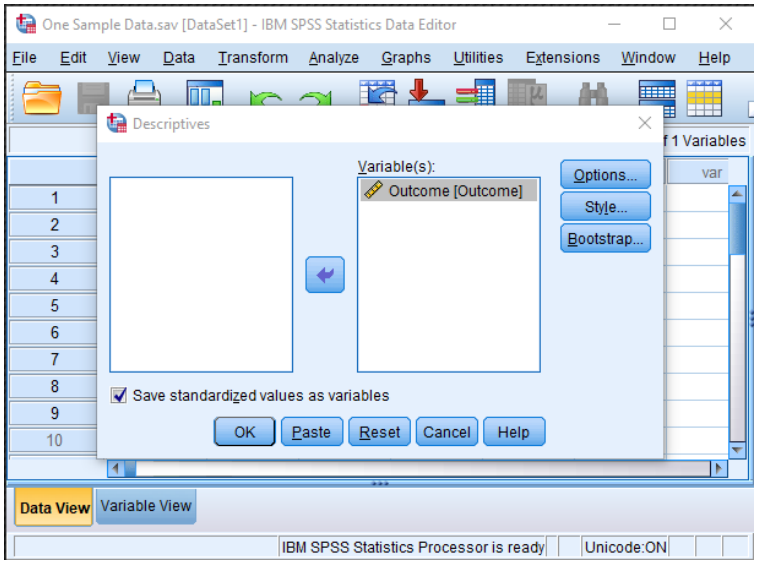
Steps for Obtaining a Standardized (z) Scores

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on them and hitting the arrow to move them into the "variables" box.

5. Be sure that "Save standardized values as variables" is checked. Without this checked, you will not get the standardized scores.

6. If all you wish are the standardized scores (with descriptive summary statistics), click "OK." A separate window with the output will appear.

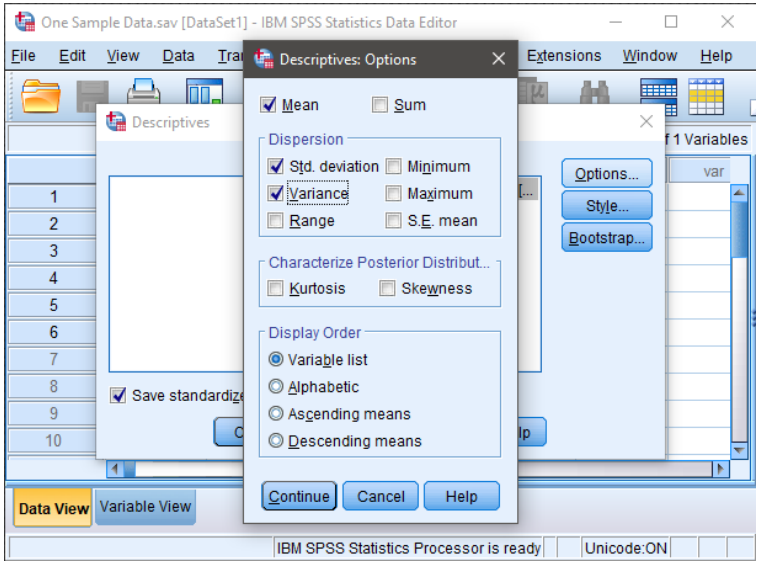


Steps for Obtaining Summary Statistics

7. To obtain summary statistics, select “Options.” Another dialogue box will appear.

8. In this box, you can request that SPSS calculate the mean, variance, and standard deviation (and other statistics).

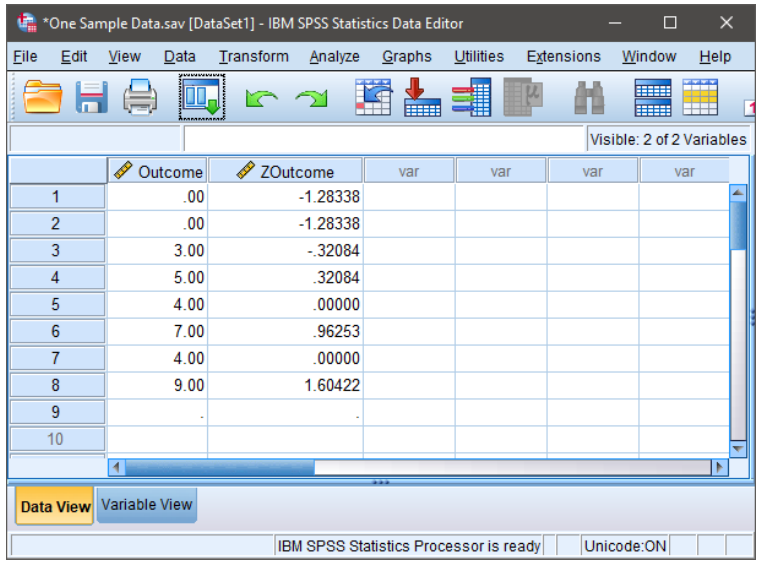
9. Once you have selected the desired statistics, click “Continue.” This will return you to the original dialogue box.



Steps for Viewing the Standardized Scores

10. After clicking on “OK” in the original dialogue box, a separate window with the output will appear.

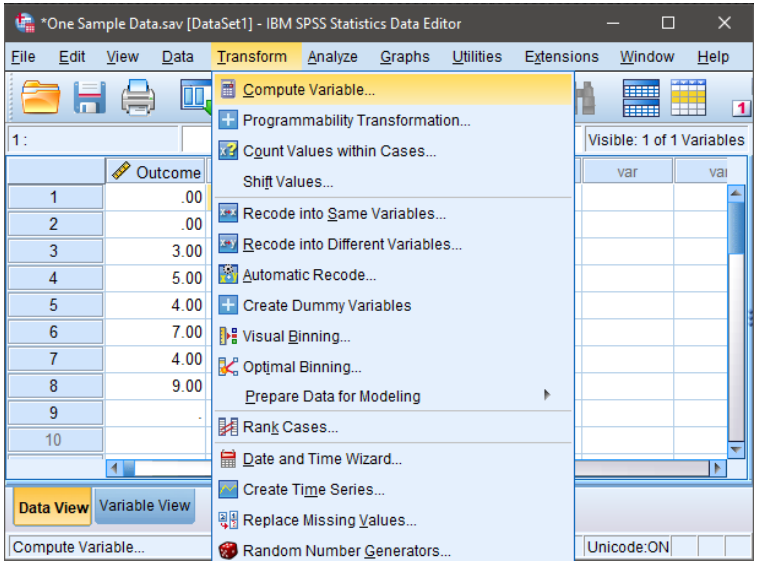
11. Finally, note that the standardized variables are not included in the output. Rather, they are saved as new variables in the data view window. These variables can be used in subsequent analyses.



Steps for Obtaining the Compute Menu

12. In addition to (or instead of) calculating standardized scores, you can perform other data transformations. First, enter the data (described elsewhere).

13. After the data are entered, select the "Transform → Compute Variable" option from the main menu.



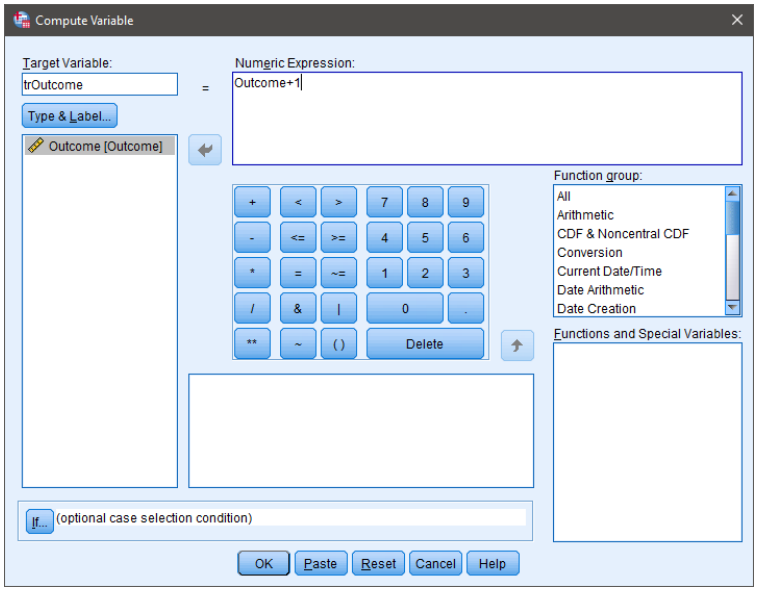
Steps for Calculating Other Transformations

14. A dialogue box will then appear for you to choose the variables of interest to transform.

15. Under "Target Variables," type the name of the new variable that you are creating. Here "trOutcome" is the name of the new variable.

16. In the "Numeric Expression" box, type the formula that will be used in the transformation. In this example, the "trOutcome" is calculated by taking the original score and adding one.

17. After clicking on "OK" in the original dialogue box, the transformed variables will appear in the data view window. These variables can be used in subsequent analyses.



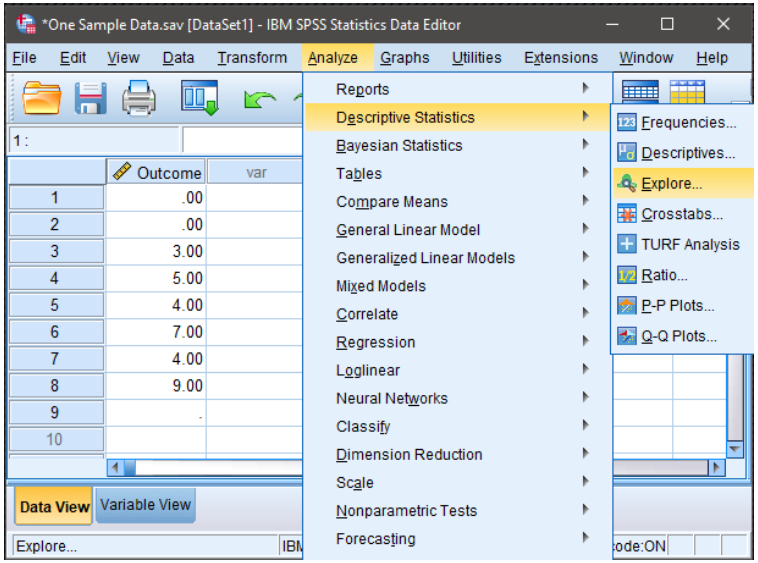
Your data have now been analyzed!

Explore (Descriptives and Confidence Intervals)

Steps for Obtaining Exploratory-Related Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Descriptive Statistics → Explore" option from the main menu.



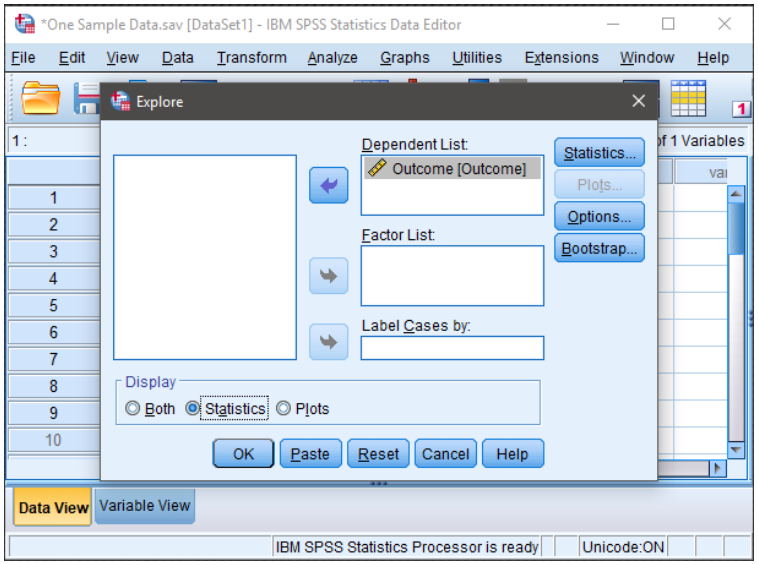
Steps for Obtaining the Exploratory Statistics

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Dependent List" box.

5. Be sure that "Statistics" is checked. This will limit your output to basic descriptive statistics and confidence intervals.

6. If you do not wish to alter the default (95%) confidence level, click "OK." A separate window with the output will appear.

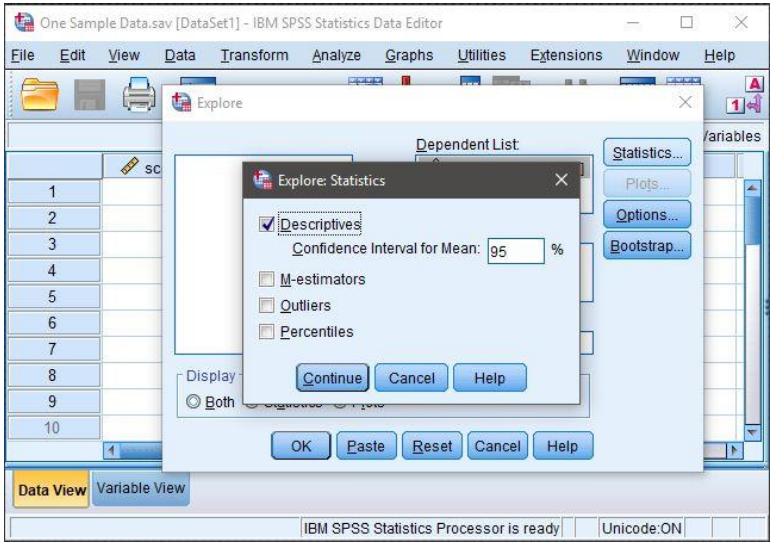


Steps for Altering the Confidence Interval

7. If you wish to alter the width of the confidence interval, select the "Statistics" button.

8. Another dialogue box will appear where you can change the confidence level. When you are done, click "Continue." This will return you to the original dialogue box.

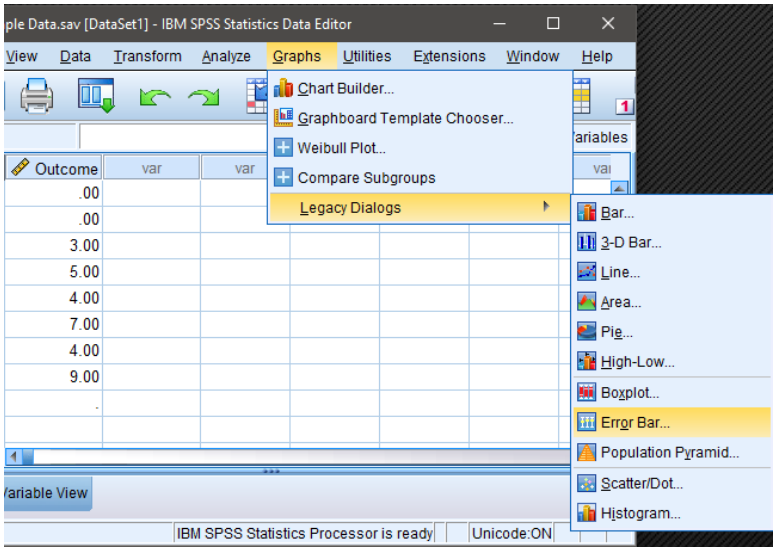
9. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



Steps for Obtaining a Graph of the Confidence Intervals

10. First, enter the data (described elsewhere).

11. To obtain a graph, select the "Graphs → Legacy Dialogs → Error Bar" option from the main menu.



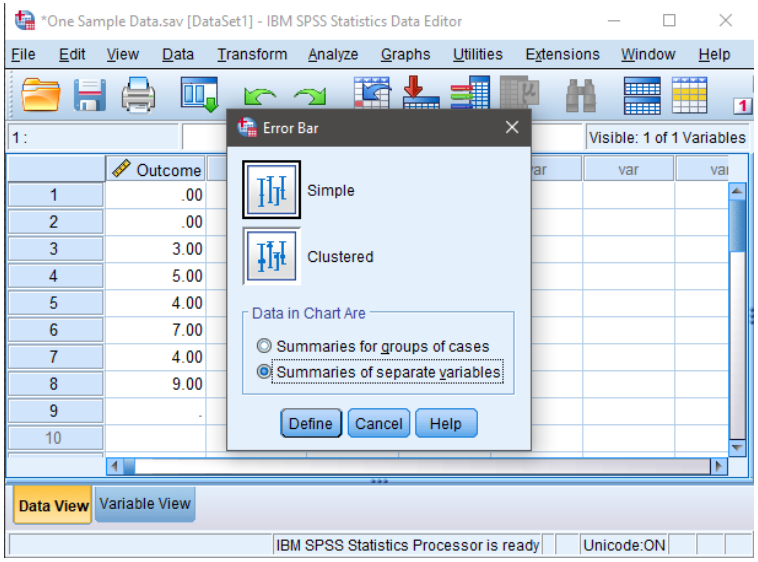
Steps for Choosing the Graph Layout

12. A dialogue box will then appear for you to choose the general graph layout of interest.

13. Click on the box labeled “Simple” (it should then be highlighted).

14. Then click on the option that states that you want “Summaries of separate variables.”

15. Click “Define.”



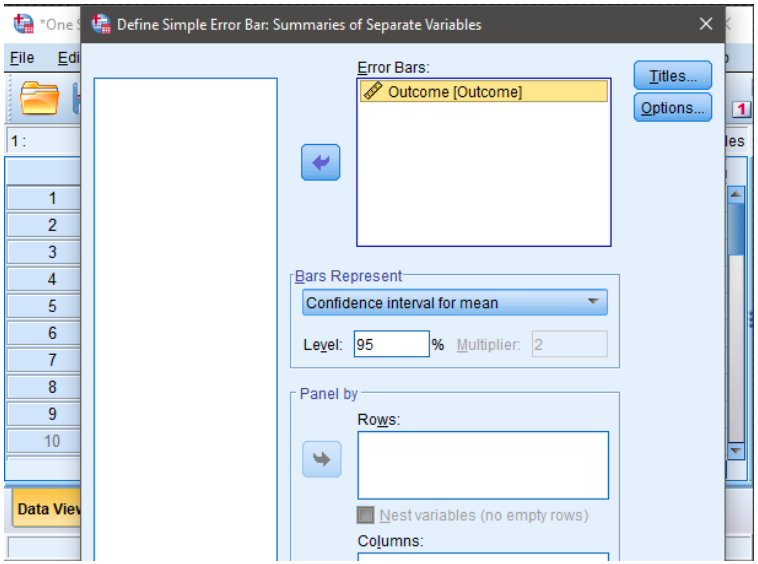
Steps for Obtaining the Confidence Interval Graph

16. A dialogue box will then appear for you to choose the variables of interest to graph.

17. Under “Error Bars,” move the name(s) of the variable(s) you want to include in the graph.

18. If you want to change the width of the confidence intervals, type the appropriate percentage in the “Level” box.

19. After clicking on “OK”, a separate window with the output will appear.



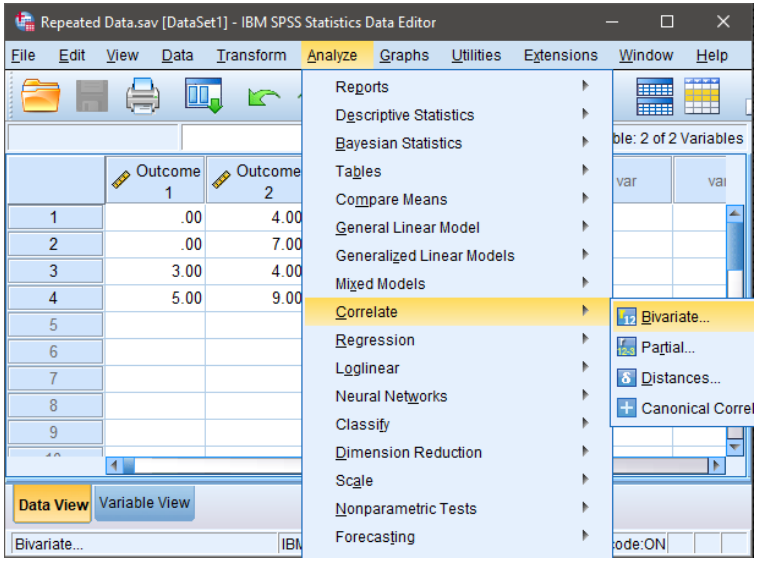
Your data have now been analyzed!

Correlations (Bivariate)

Steps for Obtaining Correlational Statistics

1. First, enter data involving multiple variables. This is described elsewhere.

2. After the data are entered, select the "Analyze → Correlate → Bivariate" option from the main menu.



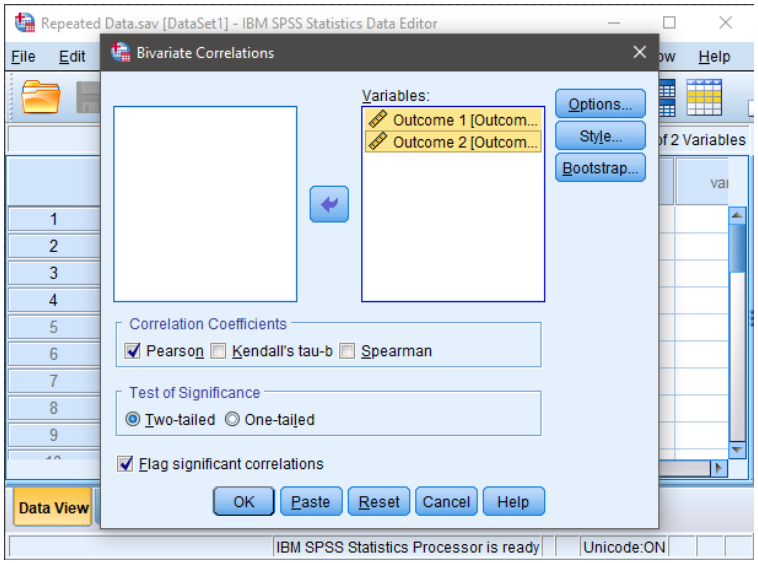
Steps for Obtaining the Correlations (and Significance Tests)

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Variables" box.

5. By default, SPSS will have the "Pearson" box checked. This provides the correlation coefficient we discussed. Similarly, having "two-tailed" and "flag significant correlations" will create and display the significance tests (discussed later in the class).

6. If all you wish is a table of correlations (with no descriptive statistics), click "OK." A separate window with the output will appear.



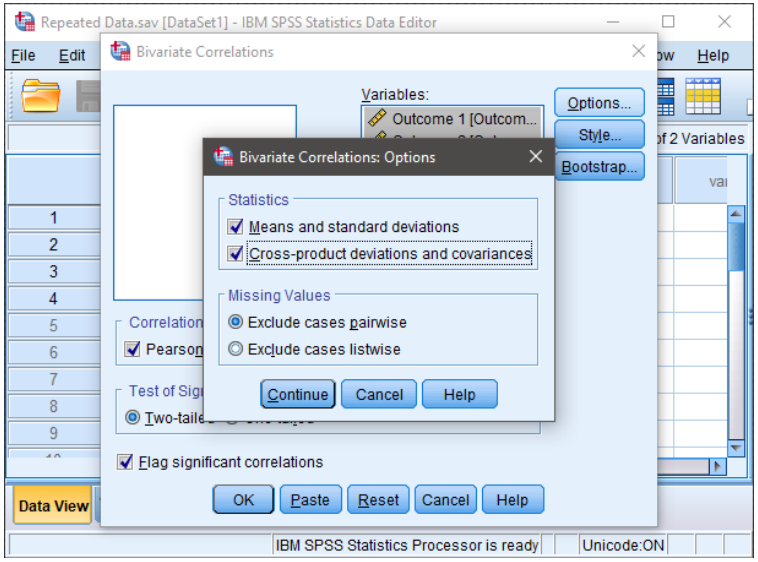
Steps for Obtaining Descriptive Statistics

7. If you wish to get the descriptive statistics as well, select the “Options” button.

8. Another dialogue box will appear where you can choose various statistics. Select “Means and standard deviations” and “cross-product deviations and covariances.”

9. When you are done, click “Continue.” This will return you to the original dialogue box.

10. Now click “OK” in the original dialogue box. A separate window with the output will appear.



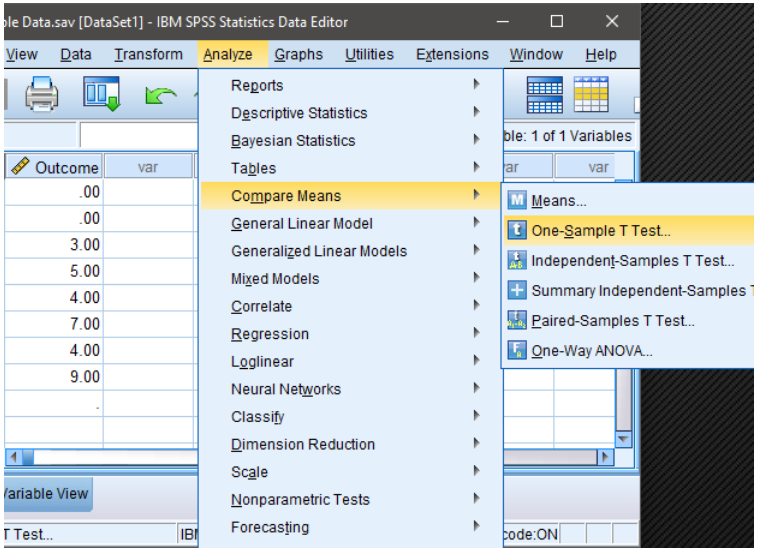
Your data have now been analyzed!

T Test (One Sample)

Steps for Obtaining One-Sample Inferential Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Compare Means → One-Sample T Test" option from the main menu.



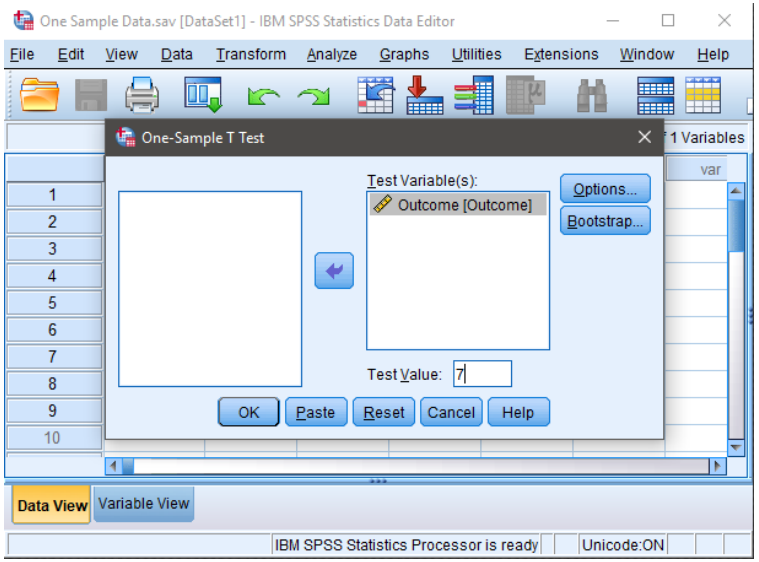
Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Test Variables" box.

5. Be sure to enter a known or hypothesized mean into the "Test Value" field. If you do not enter a value here, SPSS will automatically use zero as the comparison mean.

6. If you do not wish to alter the default (95%) confidence level, click "OK." A separate window with the output will appear.

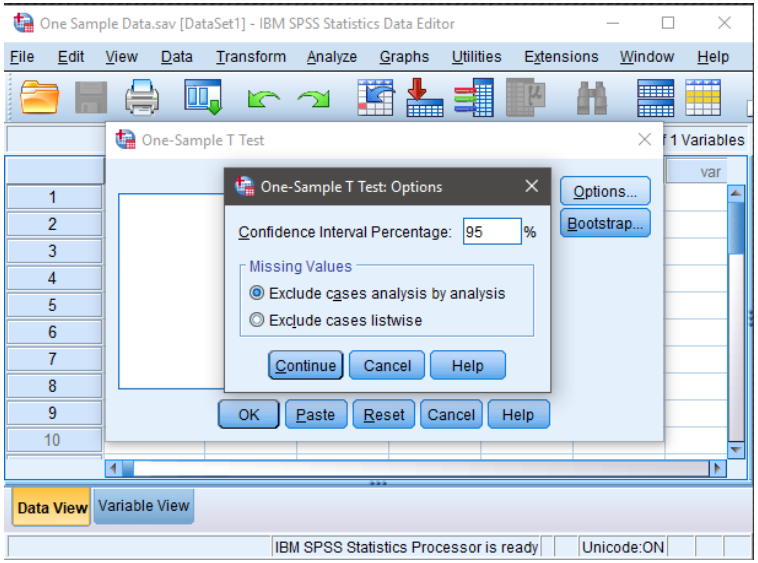


Steps for Altering the Confidence Interval

7. If you wish to alter the width of the confidence interval, select the "Options" button.

8. Another dialogue box will appear where you can change the confidence level. When you are done, click "Continue." This will return you to the original dialogue box.

9. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



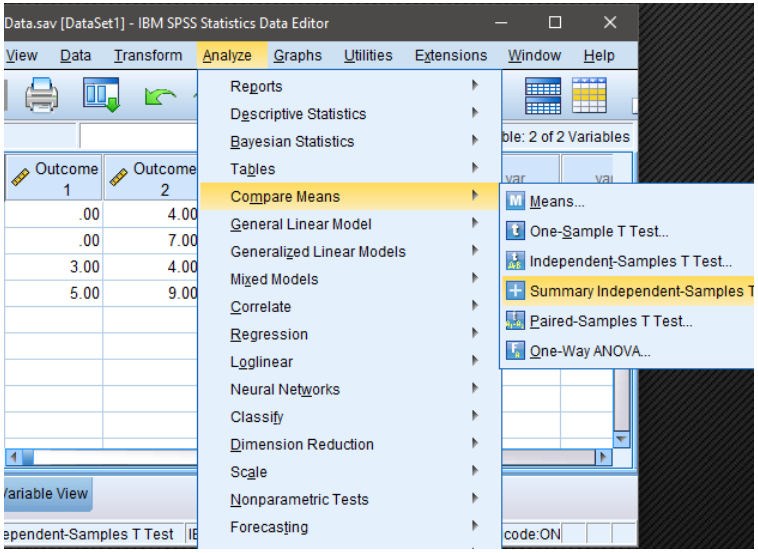
Your data have now been analyzed!

T Test (Paired Samples)

Steps for Obtaining Paired-Sample Inferential Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Compare Means → Paired-Samples T Test" option from the main menu.

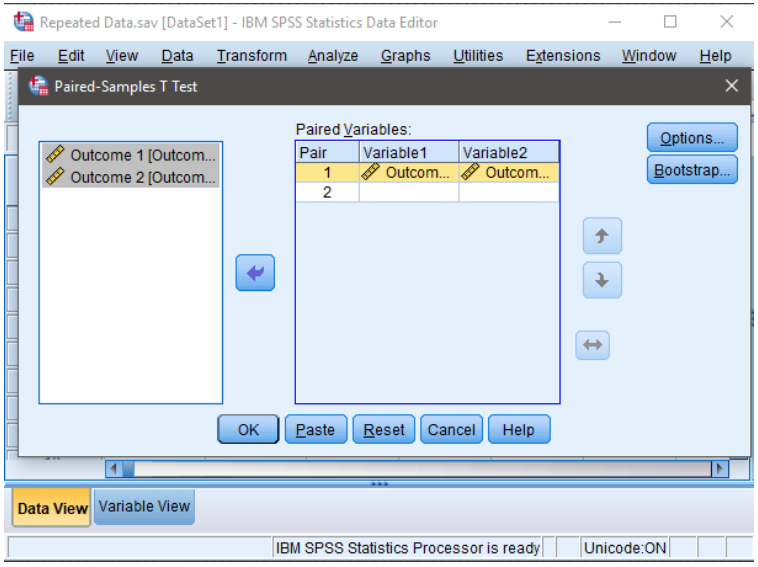


Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the variables you wish to analyze by clicking on both of them while holding down the "CTRL" key. Then click on the arrow to move the pair of variables to the "Paired Variables" box.

5. If you do not wish to alter the default (95%) confidence level, click "OK." A separate window with the output will appear.

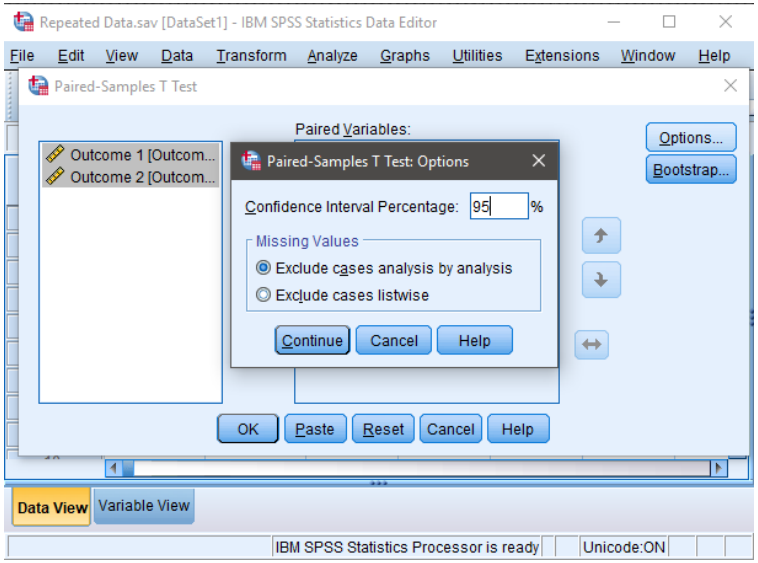


Steps for Altering the Confidence Interval

6. If you wish to alter the width of the confidence interval, select the "Options" button.

7. Another dialogue box will appear where you can change the confidence level. When you are done, click "Continue." This will return you to the original dialogue box.

8. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



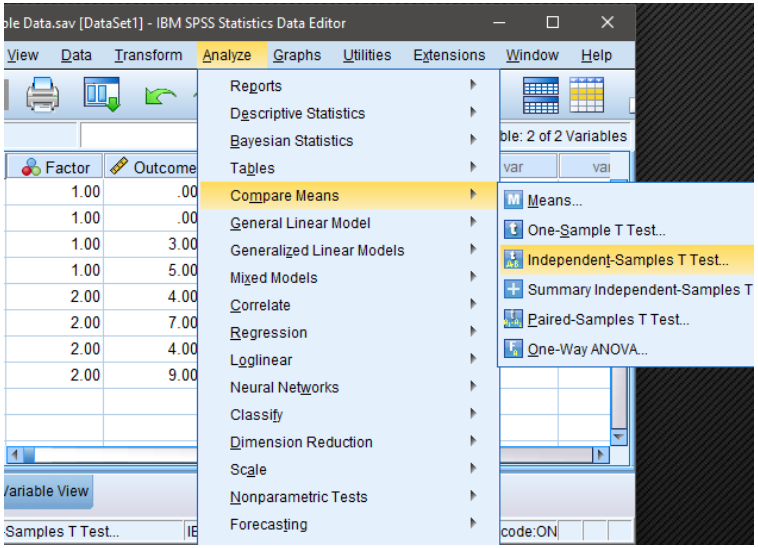
Your data have now been analyzed!

T Test (Independent Samples)

Steps for Obtaining Two-Sample Inferential Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → Compare Means → Independent-Samples T Test" option from the main menu.

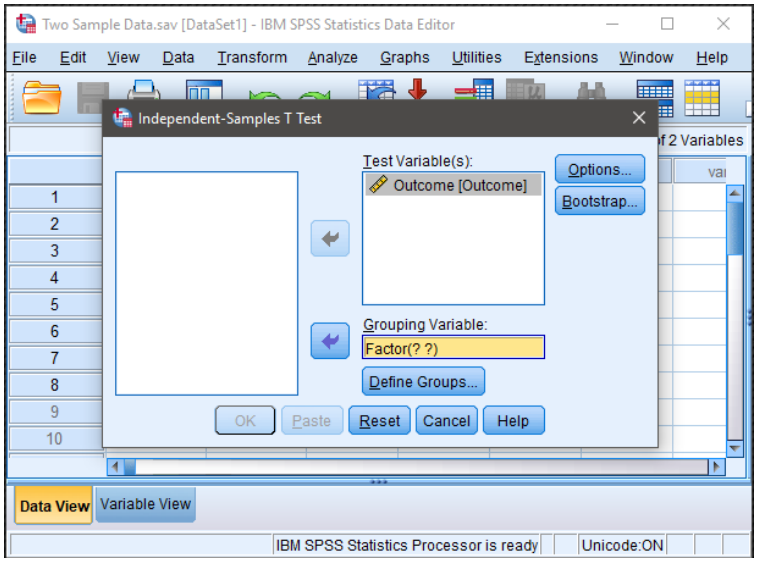


Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the outcome variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Test Variables" box.

5. Move the variable that defines the different groups to the "Grouping Variable" box. Note that question marks will appear here and that you will need to follow the next set of steps in order to run the analyses.



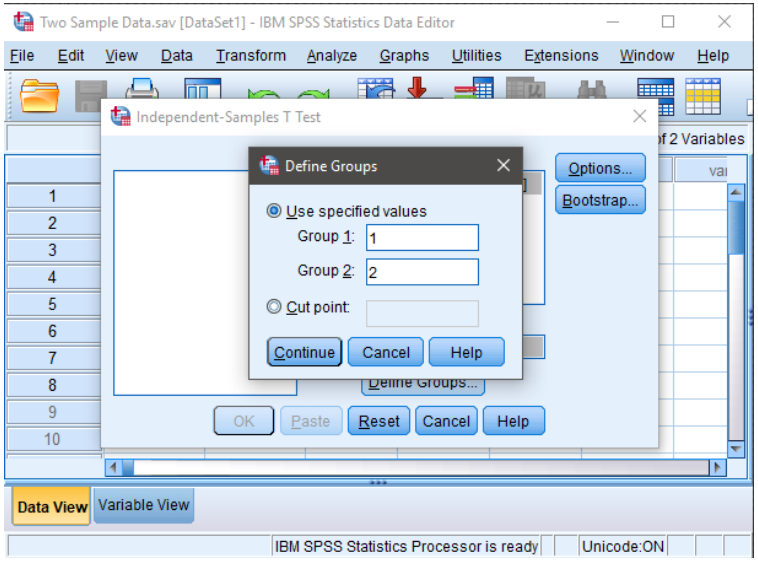
Steps for Defining the Groups to be Analyzed

6. In order to tell SPSS which two groups you wish to compare, click on the “Define Groups” box.

7. A new dialog box will appear. Here you will need to indicate the numeric values you used in setting up the data file to refer to the groups. In this example, a value of 1 for the variable “group” referred to Group 1 and a value of 2 for the variable “group” referred to Group 2.

8. When you are done, click “Continue.” This will return you to the original dialogue box.

9. If you do not wish to alter the default (95%) confidence level, click “OK.” A separate window with the output will appear.

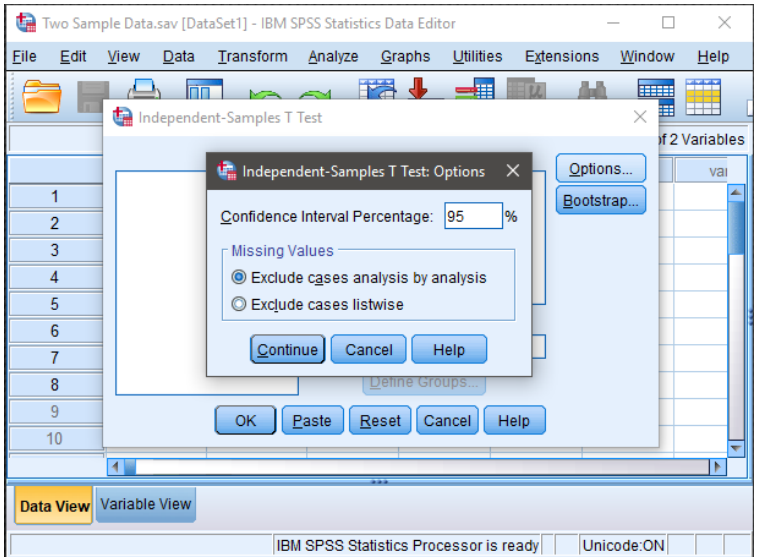


Steps for Altering the Confidence Interval

10. If you wish to alter the width of the confidence interval, select the “Options” button.

11. Another dialogue box will appear where you can change the confidence level. When you are done, click “Continue.” This will return you to the original dialogue box.

12. After clicking on “OK” in the original dialogue box, a separate window with the output will appear.



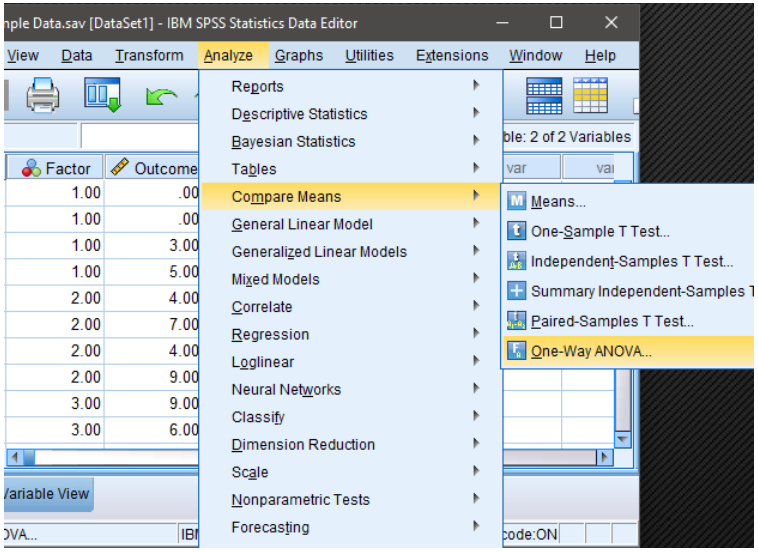
Your data have now been analyzed!

One-Way (OneWay ANOVA)

Steps for Obtaining Multiple-Sample Inferential Statistics

1. First, enter the data. This is done in the same manner as entering two sample data (described elsewhere) but with additional groups.

2. After the data are entered, select the "Analyze → Compare Means → One-Way ANOVA" option from the main menu.



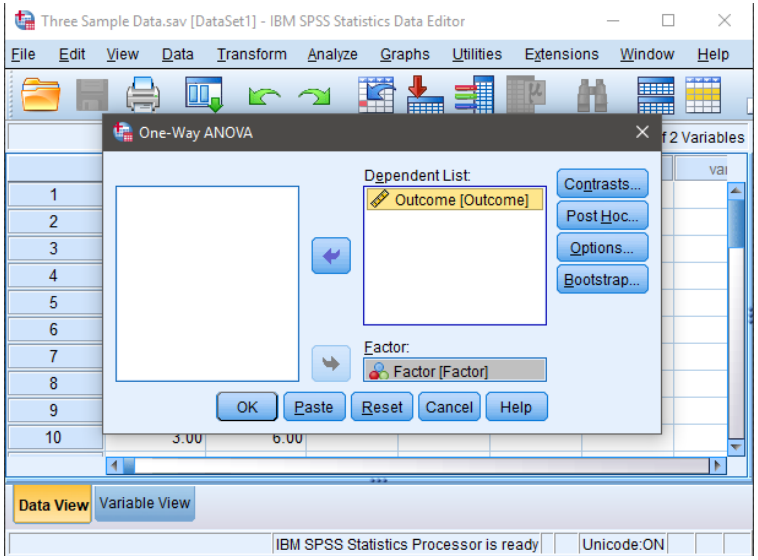
Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the outcome variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Dependent List" box.

5. Move the variable that defines the different groups to the "Factor" box. SPSS will not ask you to define the groups you wish to compare; it simply will compare all groups defined by the factor.

6. If all you wish is an ANOVA source table (with no descriptive statistics or post hoc tests), click "OK." A separate window with the output will appear.

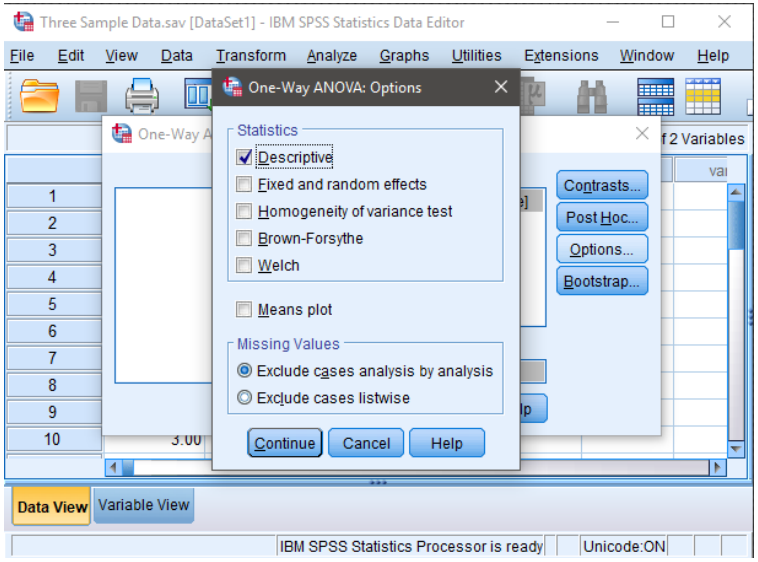


Steps for Obtaining Descriptive Statistics

7. If you wish to get the means, standard deviations, standard errors, and 95% confidence intervals for each group, select the “Options” button.

8. Another dialogue box will appear where you can choose various statistics. Select “Descriptive.” When you are done, click “Continue.” This will return you to the original dialogue box.

9. If all you wish is an ANOVA with the descriptive statistics (and no post hoc tests), click “OK.” A separate window with the output will appear.



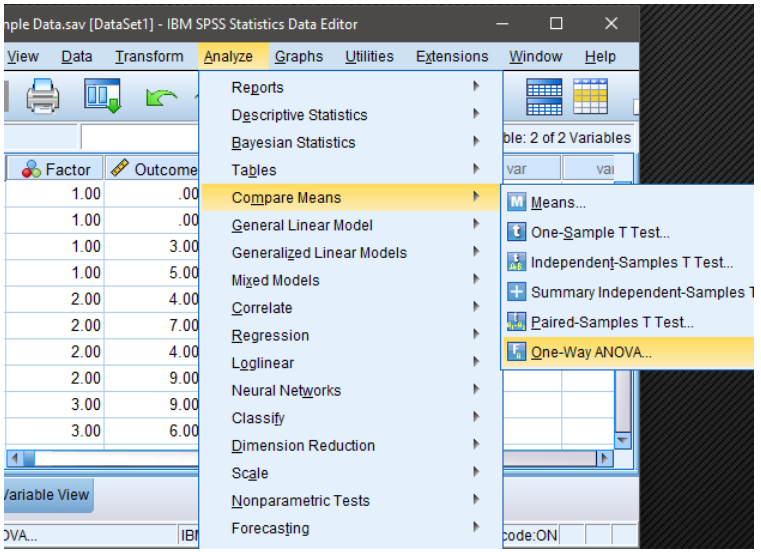
Your data have now been analyzed!

Post Hoc Tests (OneWay ANOVA)

Steps for Obtaining Multiple-Sample Inferential Statistics

1. First, enter the data. This is done in the same manner as entering two sample data (described elsewhere) but with additional groups.

2. After the data are entered, select the "Analyze → Compare Means → One-Way ANOVA" option from the main menu.



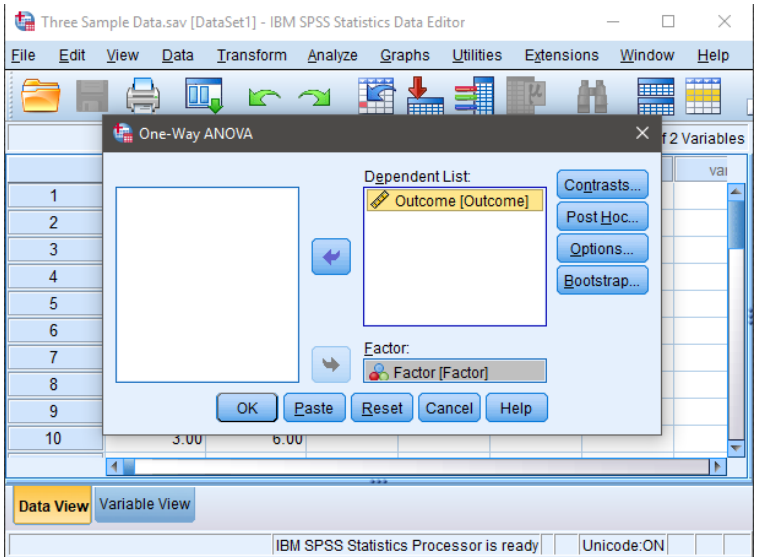
Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the outcome variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Dependent List" box.

5. Move the variable that defines the different groups to the "Factor" box. SPSS will not ask you to define the groups you wish to compare; it simply will compare all groups defined by the factor.

6. If all you wish is an ANOVA source table (with no descriptive statistics or post hoc tests), click "OK." A separate window with the output will appear.

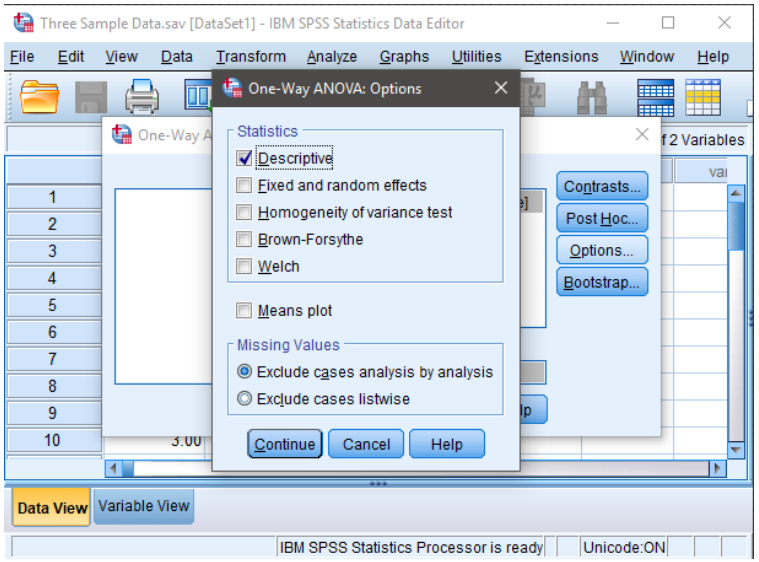


Steps for Obtaining Descriptive Statistics

7. If you wish to get the means, standard deviations, standard errors, and 95% confidence intervals for each group, select the "Options" button.

8. Another dialogue box will appear where you can choose various statistics. Select "Descriptive." When you are done, click "Continue." This will return you to the original dialogue box.

9. If all you wish is an ANOVA with the descriptive statistics (and no post hoc tests), click "OK." A separate window with the output will appear.

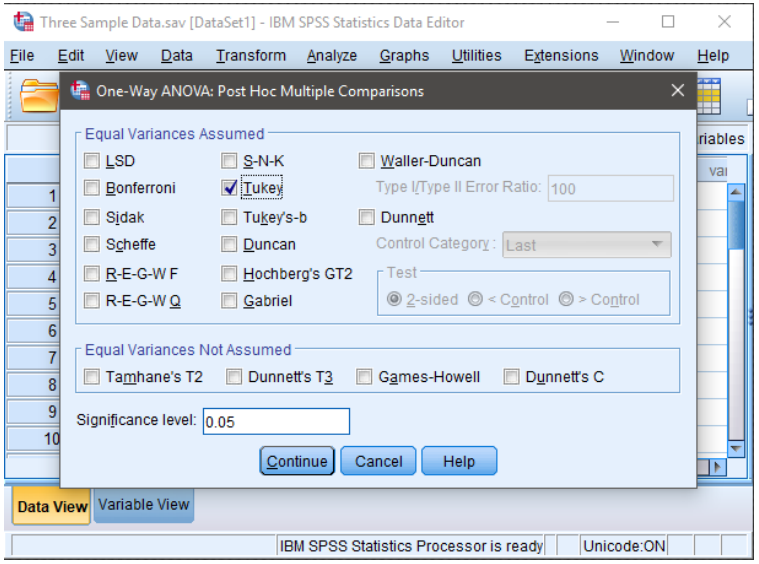


Steps for Obtaining Post Hoc Tests

10. If you wish to obtain post hoc tests for the purpose of making comparisons between groups, click the "Post Hoc" button.

11. Another dialogue box will appear where you can choose which post hoc tests you wish. Select "Tukey" to get Tukey HSD post hoc tests. When you are done, click "Continue."

12. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



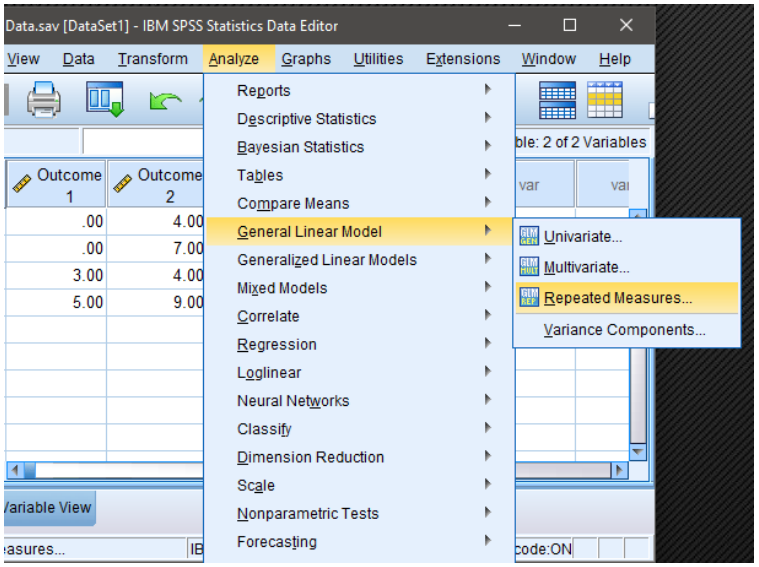
Your data have now been analyzed!

General Linear Model (Repeated Measures ANOVA)

Steps for Obtaining Repeated Measures Inferential Statistics

1. First, enter the repeated measures data. This is described elsewhere.

2. After the data are entered, select the "Analyze → General Linear Model → Repeated Measures" option from the main menu.

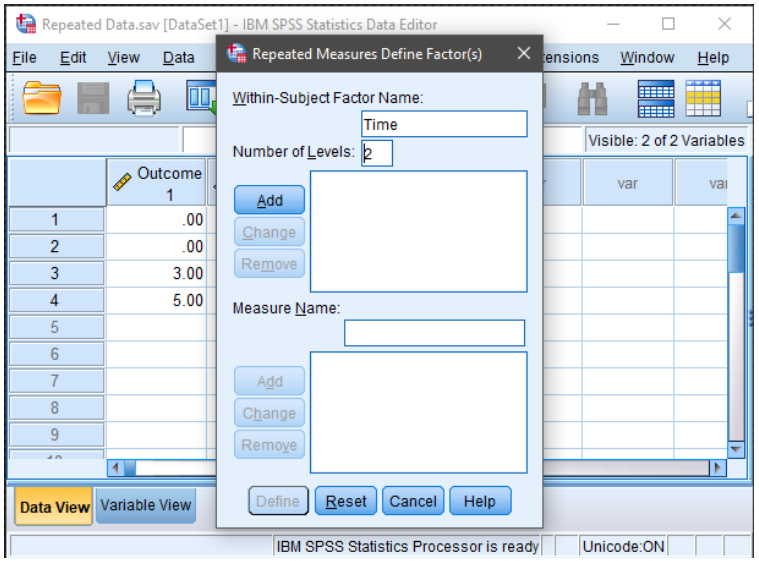


Steps for Labeling the Within-Subjects Variable/Factor

3. A dialogue box will then appear for you to create the repeated measures factor. This box is necessary because SPSS does not yet know which columns you wish to identify as repeated measurements of the same underlying factor.

4. In the "Within-Subject Factor Name" box, type in the name you wish to give to the repeated measures factor. In this example, since the measurements/columns reflect quizzes at two different times, "Time" is used as the name.

5. In the "Number of Levels" box, indicate the number of levels of the within-subjects factor. In this example, the quiz was given twice, so there were 2 levels of the factor.

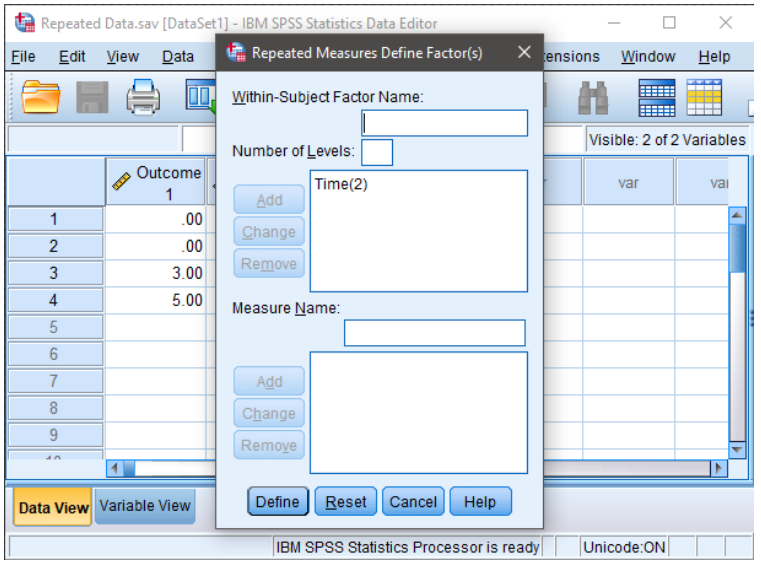


Steps for Creating the Within-Subjects Factor

6. It is then important that you finalize the creation of the within-subjects factor by clicking on the "Add" button. This officially declares the new factor in SPSS.

7. Note that this factor only exists in the computer's memory. For examples, nowhere in the data set will you see a variable called "Time."

8. When you have done this, click on "Define." This will take you to the next step in setting up the analysis.

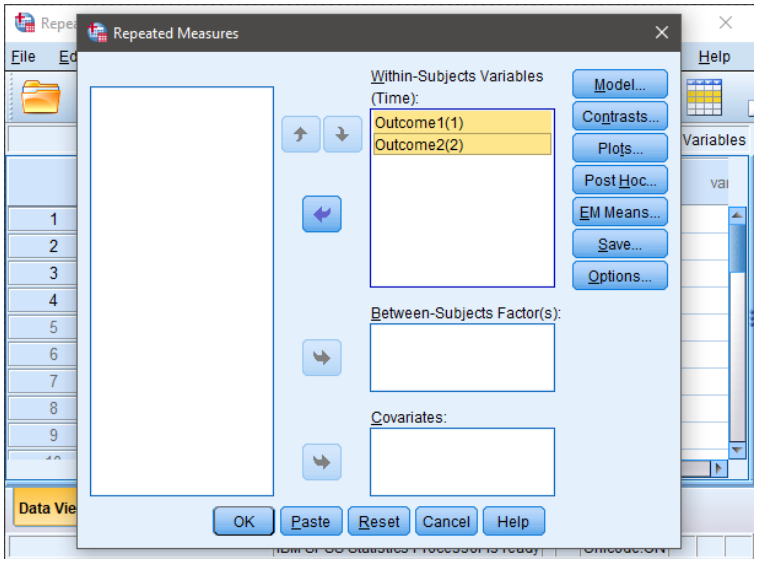


Steps for Obtaining the Significance Test

9. A dialogue box will then appear for you to define which columns/variables reflect the levels of the within-subjects factor.

10. Select the outcome variables you wish to analyze by clicking on them and hitting the arrow to move them into the "Within-Subjects Variable" box. In this example, "Outcome1" reflects the first level of the factor and "Outcome2" reflects the second level of the factor.

11. If all you wish is are ANOVA source tables (with no descriptive statistics or comparisons), click "OK." A separate window with the output will appear.

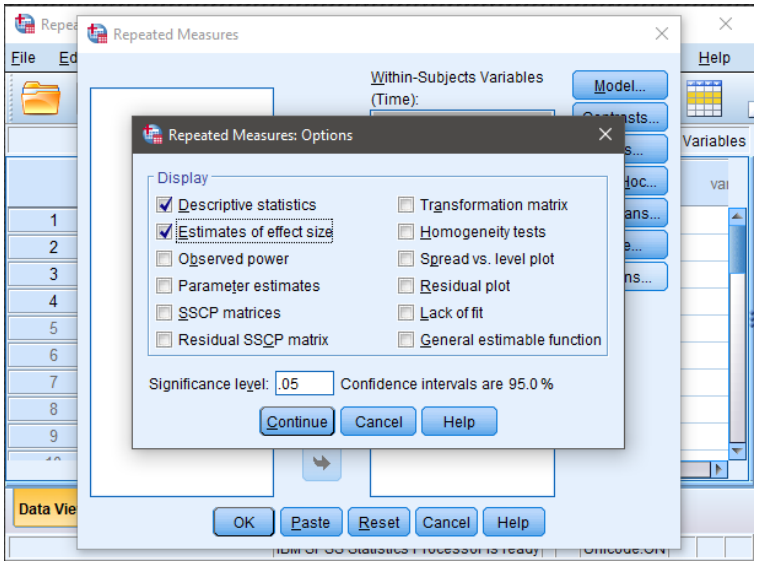


Steps for Obtaining Descriptive Statistics

12. If you wish to get the means, standard deviations, standard errors, and 95% confidence intervals for each group, select the "Options" button.

13. Another dialogue box will appear where you can choose various statistics. For means and standard deviations, select "Descriptive." When you are done, click "Continue." This will return you to the original dialogue box.

14. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



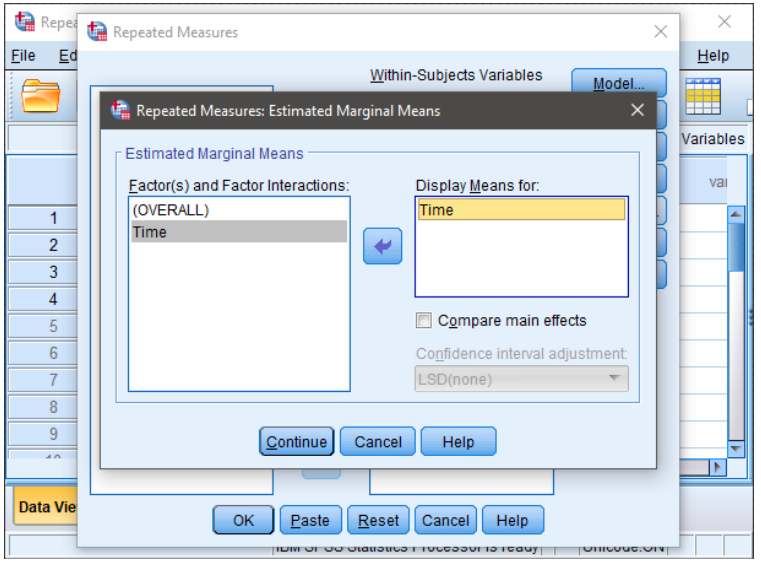
Steps for Obtaining Confidence Intervals

15. If you wish to get the confidence intervals for each mean, select the "EM Means" button.

16. Another dialogue box will appear where you can specify the Factor. Move the relevant term to the "Display Means" box.

17. When you are done, click "Continue." This will return you to the original dialogue box.

18. After clicking on "OK" in the original dialogue box, a separate window with the output will appear.



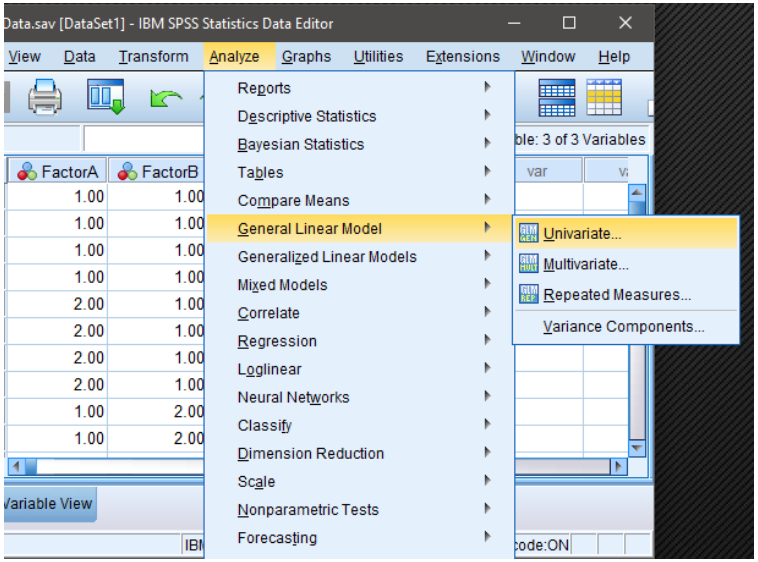
Your data have now been analyzed!

Univariate Analysis of Variance (Factorial ANOVA)

Steps for Obtaining Factorial Inferential Statistics

1. First, enter the data (described elsewhere).

2. After the data are entered, select the "Analyze → General Linear Model → Univariate" option from the main menu.



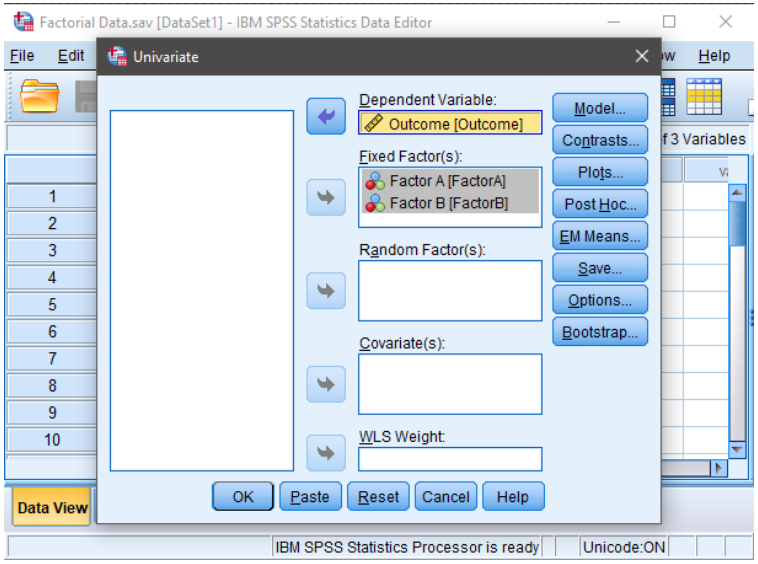
Steps for Obtaining the Significance Test

3. A dialogue box will then appear for you to choose the variables of interest.

4. Select the outcome variable you wish to analyze by clicking on it and hitting the arrow to move them into the "Dependent Variable" box.

5. Move the variable(s) that defines the different groups to the "Fixed Factor(s)" box. Note that SPSS will not require you to enter anything for the interaction if there are multiple factors; it will automatically create the interactions defined by the factor(s).

6. If all you wish is an ANOVA source table (with no descriptive statistics), click "OK." A separate window with the output will appear.



Steps for Obtaining Descriptive Statistics

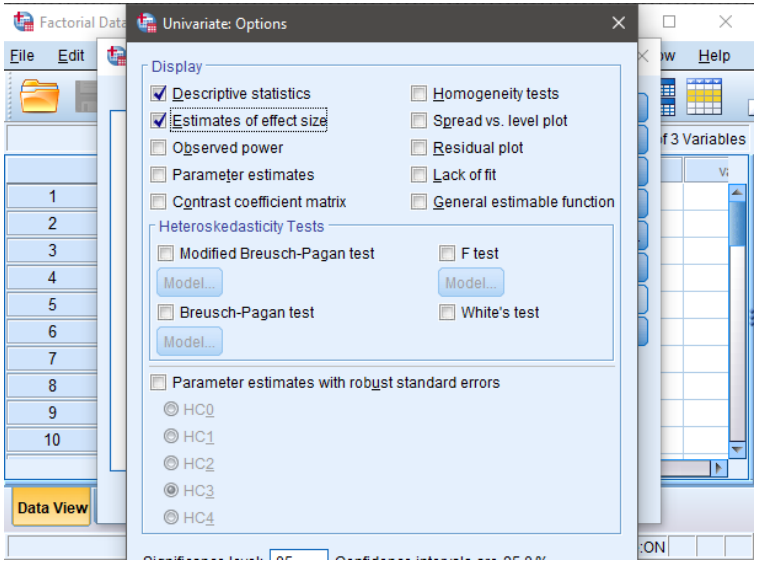
7. If you wish to get the means and standard deviations for each group, select the “Options” button.

8. Another dialogue box will appear where you can choose various statistics. Select “Descriptive statistics.”

9. If you wish to get eta-squared measures for each factor (and the interaction), click on “Estimates of effect size.”

10. When you are done, click “Continue.” This will return you to the original dialogue box.

11. After clicking on “OK” in the original dialogue box, a separate window with the output will appear.



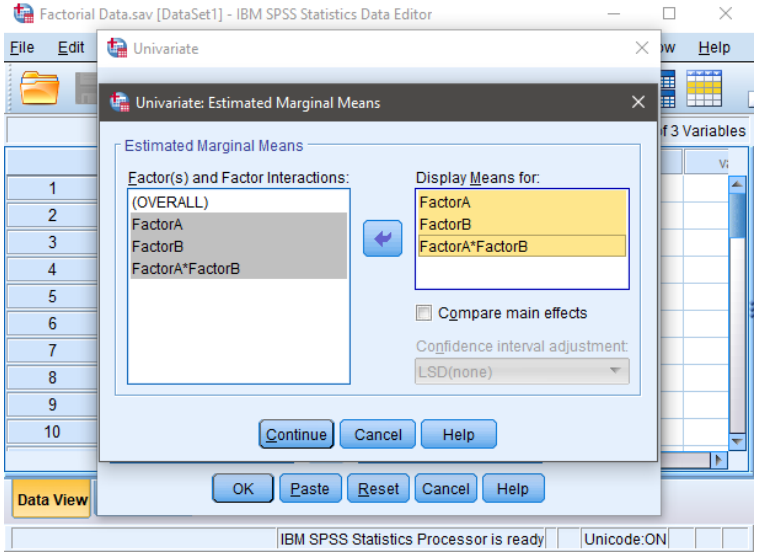
Steps for Obtaining Confidence Intervals

12. If you wish to get the confidence intervals for each mean, select the “EM Means” button.

13. Another dialogue box will appear where you can specify which effects (main effects and interactions) to analyze. Move the relevant terms to the “Display Means” box.

14. When you are done, click “Continue.” This will return you to the original dialogue box.

15. After clicking on “OK” in the original dialogue box, a separate window with the output will appear.



Your data have now been analyzed!