**SPSS Lab 6: Handling Repeated Measures Data**
**Section 1**

In this lab we will be using everything we have learned in our text and applying that information to understand how different conclusions can be reached depending upon whether data was collected using the same or different participants

THERE WILL BE **TWO** SECTIONS FOR THIS LAB EACH CONTAINING TASKS TO COMPLETE. SEE ME WHEN YOU FINISH ONE SECTION TO RECEIVE THE NEXT SECTION.

## Task 1: Your Data

Go to our course webpage (http://laura.goadrich.com/stats/lab.html). Under the lab section you will find SpiderBG.SAV and SpiderRM.SAV

The data set relates to whether arachnophobia (fear of spiders) is specific to real spiders or whether pictures of spiders can evoke similar levels of anxiety. Twenty-four arachnophobes were used in all. Twelve (group 1) were asked to play with a live tarantula and their subsequent anxiety was measured. The remaining 12 (group 0) were shown only pictures of the same big hairy tarantula and their anxiety was measured.

Each row of in the data editor represents a different participant's data.

1. **Download** SpiderBG.SAV (BG is for between-group) and SpiderRM.SAV (RM is for repeated-measures) to your computer to use for the assignment.
2. **Create** a Word file Lab6.doc to put your solutions to the tasks below. Put your name at the top of the file.

## Task 2: Error Bars Revisited

Create an error bar of the graph to get an overall summary of the data's behavior.

1. Open up SpiderBG.sav
2. First go to Graphs -> Error Bar …
3. Now select the simple error bar graph.
4. Select summaries for groups of cases when the data collected is using different participants (as is the case here).
5. Click Define and then select the **anxiety** variable from the variable list and insert it into the space labeled Variable by clicking the arrow.
6. Highlight the **group** in the variables list and transfer it to the space labeled *Category Axis* by clicking on the arrow.

You can plot numerous things using this type of graph and the default option is to plot the 95% confidence interval. This is the most useful type of graph and so the default options can be left as they are.

7. Copy the resulting error bar graph to your Word document.

Answer the following questions in your Word document about the error bar

a. What is the average level of anxiety when the picture of the spider was used?
b. What values is it likely that the population mean will fall between for the picture of the spider?
c. What is the average level of anxiety when the real spider was used?
d. What values is it likely that the population mean will fall between for the real spider?
e. Are the samples likely to be from different populations? Why?

**Task 2: Error Bars for Repeated-Measures Designs**

The problem with creating an error bar graph of repeated-measures data is that SPSS treats the data as though different groups of participants were used. To illustrate this

1. Open SpiderRM.sav

The values of anxiety are identical to the SpiderBG.sav data, but the data is arranged as if the same participants were used in each condition (so each participant was exposed to a picture of a spider and their anxiety was measured, and at some other time the same participants were exposed to the real spider and their anxiety was measured again).

Since each row in the data editor represents a participant in SPSS, the data is arranged in two columns (one representing the **picture** condition and one representing the **real** condition).

2. Go to Graphs -> Error Bar …
3. Now select the simple error bar graph.
4. Select summaries of separate variables when the data was collected using the same participants.
5. Click Define
6. Then select the **picture** and **real** variables from the variable list and insert it into the space labeled Error Bars by clicking the arrow.
7. Copy the resulting error bar graph to your Word document.

Answer the following question in your Word document

f. What differences do you notice between this graph and the previous one?

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**Section 2**

**Task 3: Mean for Every Participant**

By plotting the repeated-measures data as done above we ignore the repeated-measures component of the data. One way to overcome this problem is to eliminate the between-subject variability by normalizing participant means (ensuring that all participants have the same mean across conditions).

1. Click on Transform -> Compute …
2. Enter the name **mean** into the box labeled *Target Variable*
3. Under *Function Group* click All.
4. Scroll down the list of *Functions and Special Variables* until you find the one called **Mean**
5. Highlight this function and transfer it to the command area by clicking on the up arrow.
6. Replace the question marks with the variable names so that it looks like MEAN(picture,real) in the *Numeric Expression* box by either typing in the variables or double clicking on the variables in the box on the left-hand side.
7. Click OK

Answer the following question in your Word document:

g. What does it imply for the mean values to be different for each participant?

**Task 4: Calculate the Grand Mean**

The grand mean is the mean of all scores. We can easily do this by hand (just add up all the scores and divide by 24- the total number of scores), but an easier way is to use the means you found in Task 3 using the *descriptives* command.

1. From the menu select Analyze-> Descriptive Statistics-> Descriptives …
2. Move **mean** to the variables box using the arrow.
3. Click on Options
4. Make sure that the only box checked (for what is displayed) is for mean.
5. Copy your result from the output window into Lab6.doc

**Task 5: Calculate the adjustment factor**

The differences in natural anxiety to spiders for an individual contaminate the error bar graphs so we need to adjust the values that we plot. One method to eliminate the contamination is to equalize the means between participants (i.e. adjust the scores in each condition such that when we take the mean score across conditions, it is the same for all populations.

To do this we need to calculate an adjustment factor by subtracting each participant's mean score from the grand mean.

1. Open the compute dialog box (as done in task 3).

2. Name your *Target Variable* **adjust**
3. Enter 43.5-mean in the *Numeric expression* box.
4. Click OK
5. Select the nonempty cells in your Data View, copy them and paste them in your Word document. (Note that this will not copy the column titles, so type those into your word document.)

Answer the following question in your Word document:

h. What does it mean for some of the "adjust" values to be positive and others negative?

**Task 6: Create adjusted values for each variable.**

So far we have calculated the difference between each participant's mean score and the mean score of all participants (the grand mean). This difference can be used to adjust the existing scores for each participant.

First we will adjust the scores in the picture condition.

1. Open the compute dialog box (as done in task 3).
2. Name your *Target Variable* **picture2**
3. Click on the *TypeLabel* button and give the variable the label such as "adjusted values for the picture condition"
4. Double click on the variable **picture** to transfer it to the *Numeric expression* box.
5. Click on the "+" button
6. Double click on the variable **adjust** to transfer it to the *Numeric expression* box after the "+" symbol
7. Click OK

Now repeat the above steps for the **real** variable (create a variable called **real2** that contains the values of **real** added to the value in the **adjust** column).

Note: The **real2** and **picture2** represent the anxiety experienced in each condition, adjusted so as to eliminate any between-subject differences. To check this create the **mean2** variable using the compute command.

Answer the following question in your Word document:

i. Explain why the values of the **mean2** are all the same.

**Task 7: Drawing the error bar graph**

Drawing the graph itself is similar to the between-group scenario.

1. Go to Graphs -> Error Bar …
2. Now select the <u>simple</u> error bar graph.
8. Select <u>summaries of separate variables</u>.
9. Click <u>Define</u>

10. Then select the **picture2** and **real2** variables from the variable list and insert it into the space labeled Error Bars by clicking the arrow.
11. Click OK.
12. Copy the resulting error bar graph to your Word document.

Answer the following question in your Word Document:

j. What do you notice different between this new Error Bar Graph and the one you created in Task 2?
k. What can you conclude about the populations your samples came from?
l. Looking at the means, what can you conclude about the effect of real spiders using the repeated-measures version of these data values?

**Task 8: Submission**

You will be turning in your work in two forms:

1. Turn in Lab6.doc to me on **paper** and via **Blackboard** for a backup copy.
2. **Print** your updated SpiderRM.SAV for the Data View using Landscape mode (To get landscape mode, go to File -> Print, click on Properties, select the Basic tab, and select landscape).