DIRECTIONS:
Read through the assignment and complete Part 1 and Part 2. Remember to submit your completed assignment for grading to the assignment Dropbox.

One of the skills necessary to succeed in the psychology major is knowing how to analyze psychological data. Many psychologists use Excel for this purpose. Because you will use this software in many of your psychology classes, including research methods, it is important that you start developing familiarity with this application. Another important skill is to be able to use Excel to create graphs (charts). To accomplish these goals, you will practice data entry/analyses and creating graphs (charts) in Excel.

The Experiment: A sport psychologist is interested in psychological interventions to improve basketball skills. He assigns athletes to one of two psychological intervention conditions. One group is given training in a new imaging procedure that they are to use just prior to shooting foul shots; the other group was NOT given any special training. The sport psychologist measures the number of foul shots that are made in a 10-minute period. He hypothesizes that those receiving imaging training will sink more foul shots than those receiving no training. The data (i.e. number of foul shots) are presented below.

Independent Variable (IV) = Psychological Intervention (no training vs. imaging training)
Dependent Variable (DV) = the number of foul shots made

<table>
<thead>
<tr>
<th>No training</th>
<th>Imaging training</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: There are 10 participants per group (no training vs. imaging training), for a total of 20 participants.
Part 1 – Using Excel to Analyze Data

1. **Enter the data into Excel:** *Hint: your Excel Spreadsheet should look like this...*

   ![Excel Spreadsheet](image)

2. **Calculate descriptive statistics using Excel:**
   a. Calculate the average of the no training group.
      - In this example, you would enter the following into cell B14, \[ = \text{AVG}(B4:B13) \]
   b. Calculate the average of the imaging training group.
      - In this example, you would enter the following into cell C14, \[ = \text{AVG}(C4:C13) \]

3. **Conduct an independent samples (i.e. two-samples t-test):**
   a. First, click in a cell where you want the results of the statistical analysis to appear.
   b. Then click on the **Formula Tab** at the top of the Excel window.
   c. Select **More Functions**.
   d. Select Statistical, TTEST
   e. In the Functions Arguments Window, first enter the data for the first level of the IV. This is the data for the No training group
      - In this example, the data is located in cells B4 through B13, so entering \[ B4:B13 \] into the Array1 textbox tells Excel to use the constant values found in cells B4 through B13.
   f. In the Functions Arguments Window, enter the data for the second level of the IV. This is the data for the imaging training group.
      - In this example, the data is located in cells C4 through C13, so entering \[ C4:C13 \] into the Array2 textbox tells Excel to use the constant values found in cells C4 through C13.
   g. In the Functions Arguments Window, enter “1” into the textbox called **Tails**. This tells Excel to conduct a **one-tailed test**. You use a one-tailed test when you have a **directional hypothesis**. In this case, you have a directional hypothesis because the sports psychologists expects the results to go in a specific direction - that is, he expects that the imaging training group will make more foul shots than the no training group.
   h. In the Functions Arguments Window, enter “2” into the textbox called **Type**. This tells Excel what kind of t-test to conduct. In this case the psychologist has a between-subjects
manipulation of our IV, so we need to conduct independent samples (also called two-sample t-test). We are going to assume that we have equal variances.

i. Once you have filled in all four textboxes, the formula result appears in the Functions Argument Window. **This is the significance level.** Click OK to finish.

4. **Answer the following questions about the results of the analysis.**

**Fill in the answers in the accompanying Word Document worksheet provided in the assignment section.**

1. What was the mean number of foul shots sunk by the no training group? ________________ (worth 20%)

2. What was the mean number of foul shots sunk by the imaging training group? ________________ (worth 20%)

3. What was the significant value for the IV? *(hint: the formula result of the t-test)*

   ________________ (worth 20%)

4. Was there a **statistically, significant** difference in the number of foul shots sunk between the group that received no training and the group that received the imaging training? (Yes or No)

   ________________ (worth 10%)

5. If yes, which group sunk more foul shots? __________________________

   (worth 5%)

6. If yes, how do you know there is a **statistically, significant** difference? *(Hint: is the significant value less than .05? If so what does this mean in relation to chance?)*

   _______________________________________________________________________

   _______________________________________________________________________

   _______________________________________________________________________

   _______________________________________________________________________

   (worth 5%)

Page 3 of 5
Part 2 – Using Excel to Create a Chart (graph):

1. In Excel, in the first row, enter data labels of the two psychological intervention groups (no training, imaging training).
2. In the second row, enter the mean number of foul shots of the two groups (6.00, 9.90).

*Hint: your Excel data sheet should look like this...*

3. Use Excel to make a Column Graph
   
a. **If using Excel 97 – 2003, use the following instructions:**
      i. Highlight the data to be graphed, including the data labels.
      ii. Select the Chart Wizard
         1. Go to the Insert menu and select Chart OR
         2. Click on Chart Wizard button on Standard toolbar.
      iii. From the Chart Wizard box that opens, Select COLUMN and hit NEXT.
      iv. In the Source Data window, confirm the SOURCE DATA by hitting NEXT.
      v. In Chart Options window, fill in the chart title (i.e. *Mean number of foul shots as a function of psychological intervention*), appropriately name the horizontal X-axis (i.e. *Psychological Intervention*) and vertical Y-axis (i.e. *Mean number of foul shots*), & hit NEXT.
      vi. In the Chart Location window, either select to insert the chart in a new sheet, or an object in the current sheet in which the data is located.

   b. **If using Excel 2007 or older (Vista), use the following instructions:**
      i. When data has been entered and your cursor is immediately below the entered data, press the F11 key on the top row of your keyboard.
      ii. **Viewing the Chart Tab** - As soon as the chart is created, a new tab appears on the ribbon, the **Chart Tools**. Click away from the chart and this tab will disappear. To bring it back, click on the chart one time. To see the tab, click on the **Chart Tools** tab at the top of the ribbon.
      iii. **Changing the chart type** - Click on the change Chart Type button on the left to see all of the available chart types, click on **Column**, and then **OK**.
      iv. On the Chart Tools tab, the third section from the left is named **Chart Layouts**. Near the bottom right portion of that area you will see a small button that will allow you to see all available layouts. Click one time on the button to see the layouts. Select the layout that will allow you to add a title to the top of the chart and label the horizontal X-axis and the vertical Y-axis. Add in the following title, “*Mean number of foul shots as a function of psychological intervention*”,

Page 4 of 5
and label the X-axis, “Psychological Intervention”, and the label the Y-axis, “Mean number of foul shots.”

Finally, copy and paste the chart (graph) in the accompanying Word Document provided in the assignment section. Submit your assignment to the Dropbox for grading.