t-Test for Independent Samples

The t-test for independent samples is used when your experiment has one independent variable with two levels. This test compares the means of the two groups.

- Hand Calculations:
  - A t-test for independent groups has two formulas — use one when the sample sizes are the same and the other when the sample sizes are different. These are used when one independent variable has only two levels.

\[
t = \frac{\bar{X}_{A1} - \bar{X}_{a2}}{\sqrt{\frac{S^2_{A1} + S^2_{A2}}{N_{A1} + N_{A2}}}} \quad \text{or} \quad \sqrt{\frac{N_{A1} - 1}{N_{A1} + N_{A2} - 2} \left( \frac{\bar{X}_{A1} - \bar{X}_{a2}}{\frac{1}{N_{A1}} + \frac{1}{N_{A2}}} \right)^2}
\]

- t-Test for Independent Samples in SPSS

1. Click on the Analyze drop down menu.
2. Highlight Compare Means.
3. Click on Independent Samples t – Test.
4. Move your dependent variable(s) over to the “test variables” field.
5. Move your independent variable over to the “grouping variable” field.

6. Click on **Define Groups**
   a. A small box will appear.
   b. Enter the values that you defined for your groupings. Note: these must be numerical values. You will almost always enter a 1 for group one, and a 2 for group two.
   c. Click on **Continue**.
7. Click on OK.

8. Analyze the output
   a. The output will consist of two boxes.
   b. The first will contain descriptives only.

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>male</td>
</tr>
<tr>
<td>female</td>
</tr>
</tbody>
</table>

c. The second box contains the following:

   i. Note: Look only in the rows labeled “equal variances assumed.”
   ii. The obtained “t” value is listed in the third column. This tells you the distance the mean of the two variables (iv and dv) have from each other.
   iii. Significance is in the fifth column. If the number is less than your pre-determined alpha level (usually .05), reject the null hypothesis. This means the sample mean is significantly different than the population mean. If it is more than the alpha level, accept the null hypothesis – there is no significant difference.