# APPLIED STATISTICS INSTRUCTION SHEET

**INDEPENDENT-SAMPLES T-TEST IN SPSS AND PSPP**

# Instructions

Independent-samples t-tests are a bivariate statistic used when one variable is numeric and the other is a categorical variable with two categories. The path in both SPSS and PSPP is Analyze>Compare Means>Independent-samples t-test.

*Instructions for both SPSS and PSPP*

* Toggle the numeric variable into the Test Variable(s) box on the upper right-hand side. You can perform multiple t-tests at the same time by toggling in multiple numeric variables.
* Toggle the categorical variable into the Grouping Variable box on the lower right-hand side.
* Click on the Define Groups button and specify the values for Group 1 and Group 2. For example, if the variable is Gender with 1=Male and 2=Female, one could designate Group 1 as 1 (for Male) and Group 2 as 2 (for Female). Note: A numeric variable can be used here as categorical by specifying the cut point that divides the numeric variable into two groups.
* By default, the procedures tests for a 95% confidence interval. The size of the confidence interval can be changed using the Options button, which results in a change in the Lower and Upper Bounds of the confidence interval in the output.

# Effect Size

# Cohen’s d is used as the effect size for a t-test. The formula is the following:

$$d= \frac{Mean2-Mean1}{SDpooled}$$

where the pooled standard deviation is SDpooled=$\sqrt{((SD12 + SD22) ⁄ 2) }$.

A calculator for this statistic can be found at <https://www.socscistatistics.com/effectsize/default3.aspx>

The interpretation of the effect size is passed on the absolute value of Cohen’s d with the following thresholds:

 Weak .02

 Medium .05

 Strong .08

# APA Tables

APA does not provide firm guidance on the use of t-tests in APA tables, and if there are a small number of tests, the results are often written into the text without an accompanying table. Two excellent examples of table formats are Tables 3 and 4 at <http://korbedpsych.com/R17dTable.html> on Katrina Korb’s *Educational Psychology* website.

# Written Interpretation

Written comments should highlight the direction of the difference (the distance between the two group means), the effect size, and the statistical significance.

Statistics can be included in the text parenthetically when accompanied by a statement that conveys the key result in plain English (t=3.85, d=.47, p<.01). In such cases, the plain-language statement should include the direction and effect size—it is sufficient to convey statistical significance in the parenthesis as long as there is a significant effect. If there is no significant effect, this fact should be stated in the text.