Advanced Psychological Statistics
PSYCH-UA.11
Department of Psychology
Fall 2021

Assignment 5

1. The command "rnorm" generates random numbers from a normal distribution. The numbers are based on the normal distribution.

   a) Create a vector of 10 numbers using the mean of 100 and a standard deviation of 1. Find the mean and standard deviation of the vector. (Cut and paste your work.) **(5 pts.)**

   b) Repeat the process from above, but change the standard deviation from 1 to 10. Find the mean and standard deviation of the new vector. Characterize the change. **(5 pts.)** (What happened?) What does that say about scores with larger variations? **(5 pts.)** Cut and paste the output here **(5 pts.)**

   c) Repeat the process from above, but now change the number of output elements from 10 to 100. Characterize the change. **(5 pts.)** (What happened?) What does that say about sample size? **(5 pts.)**

2. A researcher wants to know if people on vacation, engage in an "inner dialogue" less than when working. The researcher selects a starts by obtaining a sample of 10 individuals who sare about to go on a week's vacation and agree to note (on an app) each time they "hear" themselves mentally talking. Each person in the sample is asked to keep a log for the week. The daily average instances (based on the week) appears below.

   Create a vector with the following observations **(3 pts.)**
   50, 40, 46, 49, 40, 58, 45, 47, 46, 43

   Complete a one-sample t-test where the population mean is 50. (Cut and paste the output.)
   a) What is the t-value? **(3 pts.)**
   b) What is the p-value? **(3pts.)**
   c) What is your interpretation of the Null Hypothesis Significance Test? **(3 pts.)**
   d) This is a one-tailed t-test. In which direction (as compared to the mean)? **(3pts.)**
   e) Could this experiment be converted to a two-tailed t-test? If so, state the hypothesis. **(5pts.)**

3. From the experiment in (2), the researcher also obtains data from a second sample (of the same size) from individuals during a regular week of work. The daily average instances (based on a week of data) of inner dialogue appear below.

   Create a vector with the following observations **(3 pts.)**
   53, 40, 51, 50,43, 62, 49, 47, 51, 39

Complete a two-sample independent t-test of your first vector against the second. (Cut and paste the output.)

a) What is the t-value? **(3 pts.)**
b) What is the p-value? **(3pts.)**
c) What is your interpretation of the Null Hypothesis Significance Test? **(3 pts.)**
d) This is a one-tailed t-test. In which direction (as compared to the mean)? **(3pts.)**
e) Could this experiment be converted to a two-tailed t-test? If so, state the hypothesis. **(5pts.)**

4. Redo the t-test above, but instead of a two-sample, independent t-test, compute the t-test as a paired samples t-test. (Assume that the same people are measured during vacation and then again at a later time during a workweek. (Cut and paste the output.)

a) What is the t-value? **(3 pts.)**
b) What is the p-value? **(3pts.)**
c) What is your interpretation of the Null Hypothesis Significance Test? **(3 pts.)**
d) Compared to the two-sample, independent t-test, what changed? **(3 pts.)** What explains the change? **(7 pts.)**

Extra (optional)

Create a for loop that creates 10 samples of 10 values. The 10 values would be generated from a normal distribution with a mean of 50 and a standard deviation of 5. For each sample, compute the sample mean and the sample standard deviation