Advanced Psychological Statistics
PSYCH-UA.11
Department of Psychology
Spring 2022

Data Assignment 5

a) Create a vector of 10 numbers using the mean of 100 and a standard deviation of 1. (See the "cookbook" for details about "rnorm()". Find the mean and standard deviation of the vector. (Cut and paste your work.) (5 pts.)

> **scores = rnorm(10, 100, 1)**
> **mean(scores)**
> **sd(scores)**

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. Describe the change. (5 pts.) (What happened?) What can you say about the scores generated using the larger standard deviation? (5 pts.) Cut and paste the output here

> **scores1 = rnorm(10, 100, 10)**
> **mean(scores1)**
> **sd(scores1)**
> **In this case the mean is further from the rnorm stated mean (greater variance) The standard deviation is a bit higher than what was listed in the rnorm command**

c) Repeat the process from above (find the mean and standard deviation), but now change the number of output elements from 10 to 100. Describe the new data. (How is it different from (b) (5 pts.) What does that say about sample size? (5 pts.)

> **scores = rnorm(100, 100, 10)**
> **mean(scores)**
> **sd(scores)**
> **In this case the mean is nearly the mean listed in the rnorm command**
> **In this case the standard deviation is nearly the standard deviation listed in the r command**

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 are 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**

v = c(50, 40, 46, 49, 40, 58, 45, 47, 46, 43)

a) What is the t-value? (3 pts.) **-2.16 (rounding to 2 decimal places)**
b) What is the p-value> (3 pts.) **p=0.06**
c) What is your interpretation of the Null Hypothesis Significance Test? (3 pts.) **Not statistically significant/can't reject the null hypothesis**
d) This is a one-tailed t-test. In which direction (as compared to the mean)? (3pts.) **This is a one-tailed test looking at below (to the left) of the mean**
e) Could this experiment be converted to a two-tailed t-test? If so, state the hypothesis. (5pts.) **Yes. A researcher wants to know if people engage in an "inner dialogue" differently when on vacation as compared to when working**

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.)**
v1 = c(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.)
     t.test(v, v1)
     t = -0.77(or could be positive depending on arrangement)

b) What is the p-value? (3pts.) **p = 0.45**

     If students use the var=T argument in the t.test command
     t = -0. 77, p = 0.45

c) What is your interpretation of the Null Hypothesis Significance Test? (3 pts.)
     This is not statistically significant/the null hypothesis is not rejected

d) This is a one-tailed t-test (the researcher wants to know if people on vacation engage in an "inner dialogue" less than when working). In which direction (as compared to the mean)? (3pts.) **This is a one-tailed test looking at below (to the left) of the mean**

e) Could this experiment be converted to a two-tailed t-test? If so, state the hypothesis. (5pts.)

Yes. A researcher wants to know if people engage in an "inner dialogue" differently when on vacation as compared to when working

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) **t = -2.33**
   b) **p = 0.04**
   c) **The results are statistically significant/reject the null**
   d) **The change is that the results were not originally statistically significant (in the independent t test) but now are. The pairing reduced the variability and increased the resulting t-value and the level of statistical significance**