PSYC 2317: Statistical Methods for Psychology

Tarleton State University | Week 7 Homework | Fall 2019

1. Give definitions for *Type I error* and *Type II error*, and explain the practical consequences of each.

2. If the alpha level is changed from $\alpha = 0.05$ to $\alpha = 0.01$,

   (a) What happens to the boundaries for the critical region?

   (b) What happens to the probability of a Type I error?

3. The value of the z statistic in a hypothesis test is influenced by a variety of factors. Assuming that all other variables are held constant, explain how the value of z is influenced by each of the following. In other words, what happens to the value of the z statistic? Does it increase/decrease/stay the same? Why?

   (a) Increasing the difference between the sample mean and the original population mean.

   (b) Increasing the population standard deviation.

4. Although there is popular belief that herbal supplements such as Ginkgo biloba and Ginseng may improve memory and learning in healthy adults, such results are usually not supported by well-controlled studies. In a typical study, a researcher asks a participant to take an herbal supplement every day for 90 days. At the end of the 90 days, the participant takes a standardized memory test. For the general population, it is known that the scores for the test form a normal distribution with $\mu = 50$ and $\sigma = 12$. The research participant scores a 64 on the memory test.

   (a) Assuming a two-tailed test, state the null hypothesis for the study.

   (b) Conduct a two-tailed hypothesis test with $\alpha = 0.05$ to evaluate the effect of the supplements.

5. Using the same data and the same method of analysis, the following hypotheses are tested regarding whether mean height is 72 inches. Researcher A uses $\alpha = 0.05$, whereas Researcher B uses $\alpha = 0.01$.

$$H_0 : \mu = 72$$
$$H_1 : \mu \neq 72$$

   (a) If Researcher A rejects H_0, what is the conclusion of Researcher B? Why?

   (b) If Researcher B rejects H_0, what is the conclusion of Researcher A? Why?

   (c) If Researcher A fails to reject H_0, what is the conclusion of Researcher B? Why?

   (d) If Researcher B fails to reject H_0, what is the conclusion of Researcher A? Why?