Conditions

1. An LU professor is interested in whether there is a difference between undergraduate students and graduate students in the amount of time spent praying each day. The professor gathers information from random samples of undergraduate and graduate students on the LU campus. The amount of time praying is normally distributed and is measured on an interval/ratio scale.

Graduate	Undergraduate
15	9
17	11
10	9
13	6
11	5
17	6

a. What statistical test should be used to analyze the data?
b. Is this a one- or two tailed test?
c. Identify H0 and Ha for this study.
d. Conduct the appropriate analysis. Should H0 be rejected?

Solution

Here must be used an independent two-sample t-test.

For this test, the null hypothesis is that the means of samples are equal:

$$H_0: M_1 = M_2$$

$$H_a: M_1 \neq M_2$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{X_1X_2}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}},$$

$$S_{X_1X_2} = \sqrt{\frac{1}{2}\left(S_{X_1}^2 + S_{X_2}^2\right)}$$

$$S_{X_1}^2 = \frac{\sum_{i=1}^{6}(X_1 - \bar{X}_1)^2}{n}$$

$$S_{X_2}^2 = \frac{\sum_{i=1}^{6}(X_2 - \bar{X}_2)^2}{n}$$

For this example:

$$t = 1.438357$$

The degrees of freedom:

$k = 6 + 6 - 2 = 10$

For these degrees of freedom the t-criteria value is:

1.3720 – for p=0.80

1.8125 – for p=0.9

2.2281 – for p=0.95

2.7638 – for p=0.98

We can make a conclusion, that with probability 95% there is no difference between undergraduate students and graduate students in the amount of time spent praying each day. H0 is approved