

Week 5 practice problems

Psychology



**ASSIGN
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Week 5 Problems Hypothesis Ho: The average sleeping and waking cycle length does not vary significantly from 24 hours.

H1: The average sleeping and waking cycle length varies significantly from 24 hours.

t critical= 1. 86

t calculated= $(25-24)/\sqrt{10/8} = 0. 894$

Since t calculated is less than t critical, do not reject the null hypothesis.

Therefore, I am 95% confident that the average sleeping and waking cycle length does not vary significantly from 24hrs even if one is not exposed to the usual pattern of sunlight. To get the level of confidence, I subtract the level of significance from 100. Therefore, $(100-5) = 95$. I am 95% confident about the results.

The central line represents 0. 5 and the thick red line represents the t critical line of 1. 86. 0. 894 falls in the region between 0. 05 and 1. 86. The region beyond the thick red line represents the rejection areas, where the sleeping and waking cycle length varies significantly from 24hrs. However, after calculating the t value, i have found that it falls within the acceptance region.

2.

Here, I have two groups and therefore, I will use their means to calculate the t statistics. I use the t statistics since one group has a size less than 30. With the information provided, I will follow the steps similar to using one group.

This time, I will use the difference in the means of the two groups.

H0; Instructional training does not increase the level of knowledge in a group.

H1; instructional program increases the level of knowledge in a group

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Let the experimental group be A and the other group B

For Group B; mean= 35, Var= 25, m= 30

For group A; mean= 38, Var= 9, n= 2

t calculated= $(38-35)/\sqrt{9/20+25/30}= 31.0048$

t critical $(n+m-2)= 1.676$

Since the t calculated is greater than the t critical, the reject the null hypothesis. Therefore, at 95% level of confidence, the level of knowledge increases after a group receives instructional training.

3.

Since I have 3 independent groups, I will conduct an ANOVA (analysis of variance) test. I will use the F statistics in the analysis.

Hypothesis

Ho: there is no significant difference in the mean number of hours spent by students in the 3 universities in socializing.

H1: there is a significant difference in the mean number of hours spent by students in the 3 universities in socializing.

I will calculate sum squares between universities.

SSB= $\sum (X_i - \bar{X})^2$ = sample average for group i, overall mean= 5, k is the number of independent groups= 3

n= 25 for each group

SSB= 50

Degrees of freedom= $k-1= 2$

I will then calculate the sum squares for the error

SSE= $24(2+1.5+2.5) = 144$

Then I will calculate the mean sum of squares for between groups and error

MSB= $SSB/df= 50/2= 25$

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$$\text{MSE} = \text{SSE}/\text{df} = 144/72 = 2$$

$$\text{Then, I will compute F statistic} = \text{MSB}/\text{MSE} = 25/2 = 12.5$$

$$\text{F critical} = 3.12.$$

Since F calculated > F critical then reject H_0 . Therefore, the universities differ in their average time socializing at 95% level of confidence

4.

(a) Perfect positive linear correlation

b) large but not perfect positive linear correlation

(c) Small positive linear correlation

(d) Large but not perfect negative linear correlation

Large but Not Perfect Negative Linear

(e) No correlation

No Correlation

(f) Clear curvilinear correlation.

Clear Curvilinear Correlation

Works cited

Anderson, T. W.. An introduction to multivariate statistical analysis. New York: Wiley, 1958. Print.

Richardson, D. H. S., and R. J. Rohr. On the distribution of a structural t statistic. Lawrence, Kan.: Dept. of Economics, University of Kansas, 1970.

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