Answer on Question #49817-Math-Statistics and Probability

In a particular country, it is known that college students report falling in love an average of 2.20 times during their college years. A sample of five college students originally from that country but who have spent their entire college career in Canada, were asked how many times they had fallen in love during their college years. Their numbers were 2, 3, 5, 5, and 2.

Using the .05 significance level, do exchange students like these who go to college in Canada fall in love more often than those who complete their studies in their country of origin?

Solution

Hypotheses (verbal) are

H_o: Students like these who go to college in the Canada do not fall in love more often than those from their country who go to college in their own country

H_a: Students like these who go to college in the Canada fall in love more often than those from their country who go to college in their own country.

$n = 5; \mu = 2.2.$

$$\bar{x} = \frac{\Sigma(x)}{n} = \frac{2 + 3 + 5 + 5 + 2}{5} = 3.4.$$

$$\sum (x)^2 = (2)^2 + (3)^2 + (5)^2 + (5)^2 + (2)^2 = 67.$$

$$s = \sqrt{\frac{\Sigma(x)^2 - n\bar{x}^2}{n-1}} = \sqrt{\frac{67 - 5 \cdot (3.4)^2}{5-1}} = 1.52.$$

Hypotheses:

$H_o: \mu \leq 2.2$

$H_a: \mu > 2.2$

Decision Rule:

$\alpha = 0.05$

Degrees of freedom $n - 1 = 5 - 1 = 4.$

Critical t-score from t-table $t^* = 2.132.$

Reject H_0 if $t > 2.132.$

Test Statistic:

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{3.4 - 2.2}{\frac{1.52}{\sqrt{5}}} = 1.77.$$

Decision (in terms of the hypotheses):

Since $t = 1.77 < t^* = 2.132$ we fail to reject H_0.

Conclusion (in terms of the problem):

There is no sufficient evidence at 0.05 significance level that students like these who go to college in the Canada fall in love more often than those from their country who go to college in their own country.