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A Comparison of Minutes of Exercise per Week of Male and Female Statistic Students at Longwood University

Introduction:

The purpose of this study is to test if there is a difference in the amount of time (measured in minutes) that male and female statistics students at Longwood University exercise per week. Data was collected from a mandatory survey sent out by Dr. Lunsford to her three sections of statistics students. The data was analyzed by performing a 2 sample t-test. The T-Test showed that there was a difference in the means of the two samples. The mean minutes of exercise per week of male statistics students at Longwood University is greater that the mean minutes of exercise per week of female statistics students.

General Methodology:

Population: The population in this study is all statistics students at Longwood University. There are also two sub-populations, which are all of the male statistics students at Longwood University and all of the female statistics students at Longwood University.

Sample: The samples in this study are comprised of all of Dr. Lunsford's students in her three sections of statistics classes at Longwood University. This sample is not a simple random sample, because the sampled students were not randomly selected from all statistics students from Longwood University, however we can assume that this sample is representative of the population.

Variables: The explanatory variable in this study is sex, which is a categorical variable with two levels (male and female). The responsive variable is a quantitative, minutes exercise per week.

Parameter: The parameter of this study is average minutes spent exercising per week of all male and female statistics students at Longwood University.

The data was collected through an observational study. Dr. Lunsford conducted a survey of all of her students in the three sections of Statistics courses that she teaches at Longwood University. All of her students were required to submit a response to this survey.

Data Description:

Below we see the data graphed in two different ways: a dot plot and two histograms, along with two tables of descriptive statistics. In Figure 1, the mean minutes of exercise per week for male statistics students at Longwood University appears to be higher than the mean for female statistics students at Longwood University. The data for male students also has more spread than female students.

(Figure 1) Oneway Analysis of Minutes Exercise per Week By Sex
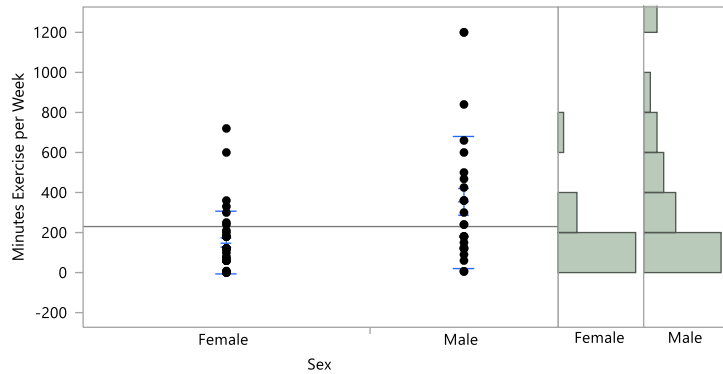
(Table 1) Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
Female	38	149.947	153.948	24.974	99.35	200.55
Male	25	351.600	329.961	65.992	215.40	487.80

(Table 2) t Test

Male-Female

Assuming unequal variances

Difference	201.653	t Ratio	2.857905
Std Err Dif	70.560	DF	30.95458
Upper CL Dif	345.568	Prob > |t|	0.0076*
Lower CL Dif	57.737	Prob > t	0.0038*
Confidence	0.95	Prob < t	0.9962

Data Analysis:

It is hypothesized that $H_0: \mu_m - \mu_f = 0$ versus $H_a: \mu_m - \mu_f \neq 0$ where μ_m is the mean number of minutes exercise per week for all male statistics students at Longwood, and respectively μ_f is the mean number of minutes exercise per week for all female statistics students at Longwood. The hypotheses will be tested by running a 2-sample T-test. The first step with doing a t Test is to determine that all conditions are met. The sample was not random, but we accept that it is representative of the population. The distribution of this data is normal, with no strong outliers, and the two sample groups are independent from each other. The T-Ratio for this data was T(30.95)=2.86. P value was determined to be P=0.0038, which is less than the alpha level 0.05. Therefore we can reject the null hypothesis with a 95% certainty, which suggests that there is a difference in the means of the two sample groups. We can conclude with a 95% certainty that male statistics students at Longwood University exercise between 57.737 and 345.568 minutes a week on average more than female statistics students at Longwood University.