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MATH-115
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Purpose: Does gender or lifestyle have an impact on a person's physical status? We will provide some statistics hopefully to provide some insight on this question. We will be using descriptive statistics, graphical data, confidence intervals and hypothesis testing.

Intro: Students participated in a simple experiment. Each student recorded his or her height, weight, gender, smoking preference, usual activity level, resting pulse, and the pulse after a one-minute run. We will be using the weights of 32 males and 35 females to test.

After observing the data, I've come to the conclusion that the mean weights of males differ from females. By looking at the graphical data, we can see that males have higher mean weight. Then if we take a look at our hypothesis test we can see that we've rejected that the means are the same with only 5% probability of error.

Descriptive Statistics of Male and Female Weights

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Weight M	32	0	163.22	3.48	19.66	130.00	150.00	158.50	175.00	215.00
Weight F	35	0	123.80	2.26	13.37	95.00	115.00	122.00	131.00	150.00

Graphical Data of Male and Female Weights

Histogram of Weight M, Weight F

Boxplot of Weight M, Weight F
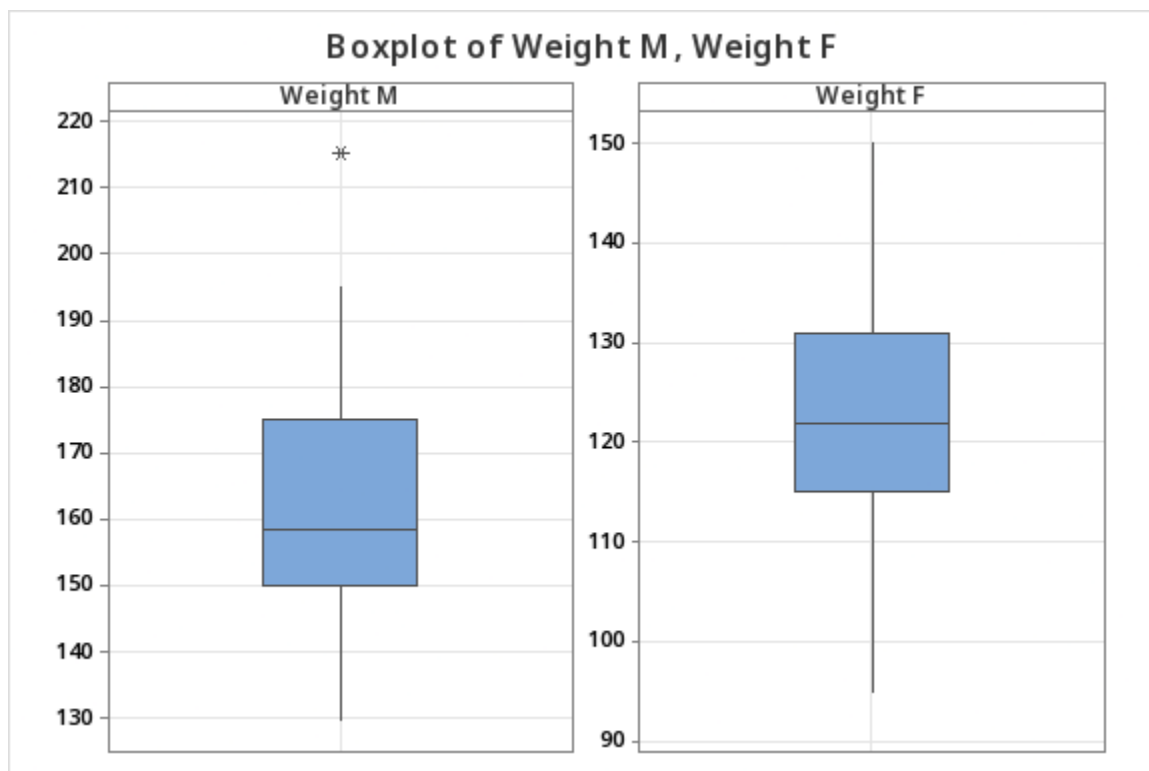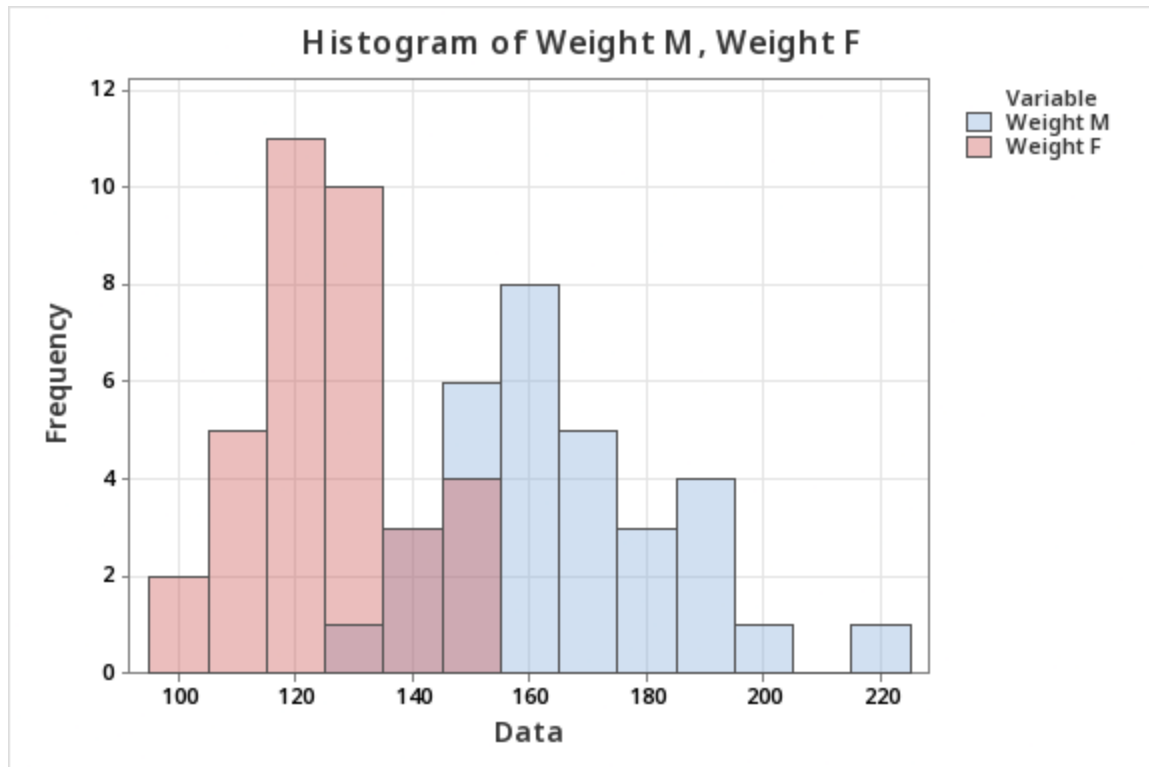
Looking at the data, there is a clear difference in means. The mean weight for male is significantly higher than females, also having higher standard deviation. You can see this

especially in the histogram. In the overlapping histogram males have a higher frequency of higher weights.

While performing a 95% confidence interval test to test the difference between the two columns of data, I decided to use the 2 sample t-test. That is because we have two independent samples of data.

2 Sample t-test

Estimation for Difference

Difference	95% CI for Difference
39.42	(31.10, 47.73)

Observing the outcome of the test, there is a 95% confidence that the difference between the Males and Females is between 31.10 and 47.73 pounds.

Hypothesis Testing

How much of a difference in weight is there between the males and females of a given sample?

H0: Mean Weight of Males - Mean Weight of Females = 0
Ha: Mean Weight of Males - Mean Weight of Females != 0

There is a sample size of 32 for males and 35 for females. Since there is two independent columns of data I will use 2 Sample t-test.

Alpha is the probability of rejecting a null hypothesis when it is actually true. P-value is the probability of obtaining data like the data given. If Alpha is less than P then we fail to reject H0 meaning the mean weights of male and females are the same. If Alpha is more than P then we reject that the mean weights of male and females are the same.

Test

Null hypothesis	$H_0: \mu_1 - \mu_2 = 0$
Alternative hypothesis	$H_1: \mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
9.51	53	0.000

After observation the P value is less than Alpha showing that we reject our null hypothesis showing that the mean weights of male and females are different. With this way of testing an error of Type 1 can occur. Meaning that we have a false positive. Or if we reject H0 but it's actually true. The probability of type 1 error happening is 5% because our alpha is 0.5.