

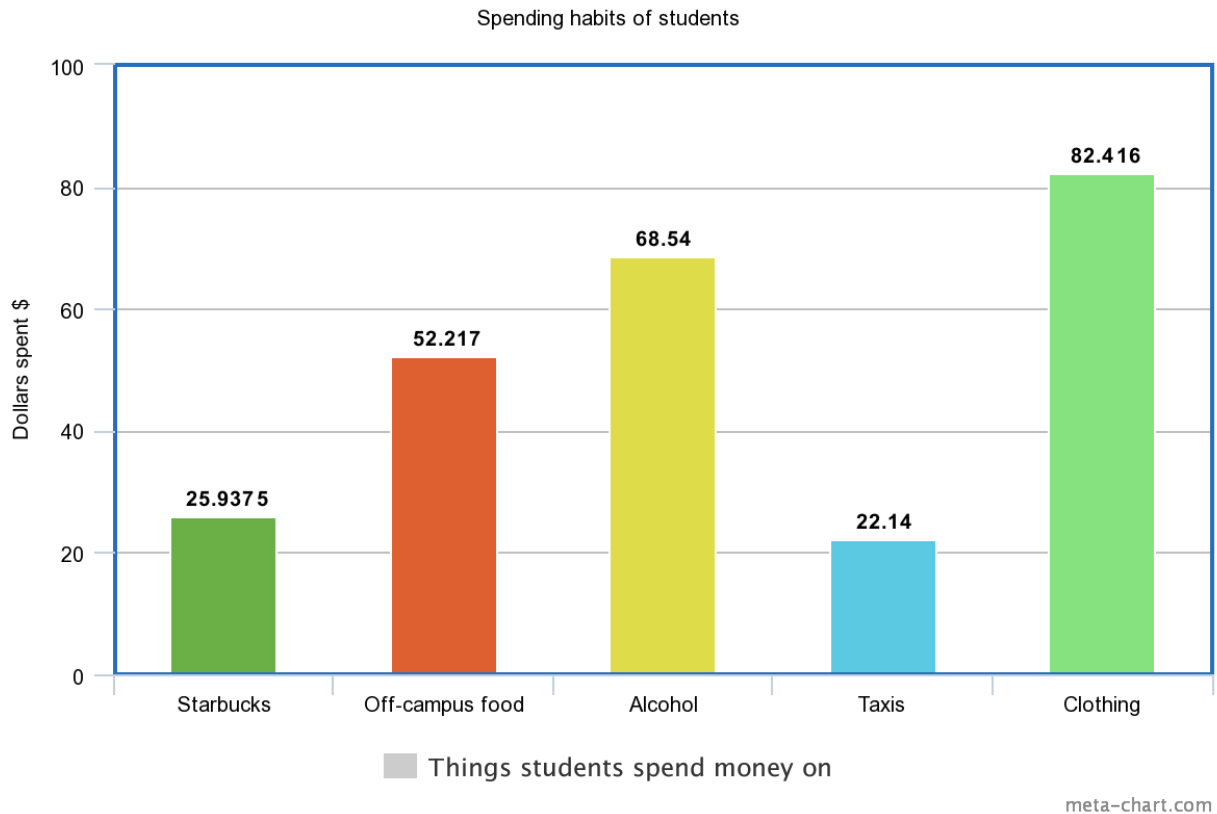
Survey project

My survey explores the spending habits of students at Marist College. I chose this topic because I am surprised how much money I see being spent at school on a day to day basis, whether it be Starbucks coffee or money spent on weekends for alcohol and food. Furthermore, this data can provide incoming freshman what college can really cost.

My survey includes an almost equal distribution of class years, I was able to survey 22 freshmen, 18 sophomores, 17 juniors, and 15 seniors. I asked professors to simply hand out the survey to a few of their classes and figured intro classes will have more freshmen and sophomores while higher-level classes would have more juniors and seniors. After collecting the surveys I randomly chose 12 surveys from each class year, in total 48 surveys will be tested. The main questions in my survey is "how much did you spend on off-campus food, clothing, taxis, alcohol, and Starbucks last month". I am testing to compare the spending habits of students from each class year. For this I will be doing a one tailed t test for clothing, starbucks and alcohol, I believe seniors spend more money on alcohol and starbucks while freshman spend more money on clothing.

One of the possible biases is one of my surveys went out to an early morning Friday class, a lot of students don't have classes Friday and a lot of athletes tend to take these classes because it fits their schedule better. Another bias I could've encountered is what a student considers non essential clothing, a jacket that someone needs because they are cold is essential, opposed to a new pair of shoes they don't need, however I tried to be as clear as possible in my survey.

The first calculation I conducted was mean. This gave me an understanding of what to look for and let me really visualize my surveys.



As seen above the average student of the 48 surveys used spent \$251.24 last month on luxury expenses. If you extrapolate this number for a semester which is a little longer than 4 months one may spend over \$1130 in a semester.

Next I wanted to compare how much money freshman spends vs how much money seniors spend on starbucks, alcohol and clothing in order to do this I did a t-test at a 90% level.

T Tests:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

1. **Alcohol** - I believe that seniors spend more on alcohol than freshman thus my hypothesis test looks like this. I then used google sheets to run the numbers.

Alcohol

$$H_0: \bar{x}_1 = \bar{x}_2$$

$$H_a: x_1 > x_2$$

$x_1 = \text{Seniors}$
 $x_2 = \text{Freshman}$

Alcohol				90%=0.10
Senior Avg	95.4166667	t top	36.25	
Senior Stdev	58.24939849	t bottom	29.43464555	
N seniors	12	t value	1.231541924	
		t critical	1.321	
Freshman Avg	59.16666667	df	22	
Freshman Stdev	83.6886365			
N freshman	12			

Based on this test we reject the null hypothesis because our **critical t** value is greater than our **t value**, thus at 90 percent confidence we cannot say that seniors spend more than freshman on alcohol. This was surprising to me considering most seniors are 21 years old, I think my survey had too much variance because I only took 12 surveys from each year. Also maybe because a lot of freshmen have illegal Id's.

2. **Starbucks**- For this t test I also believe seniors spend more money than freshman.

Starbucks

$$H_0: \bar{x}_1 = \bar{x}_2$$

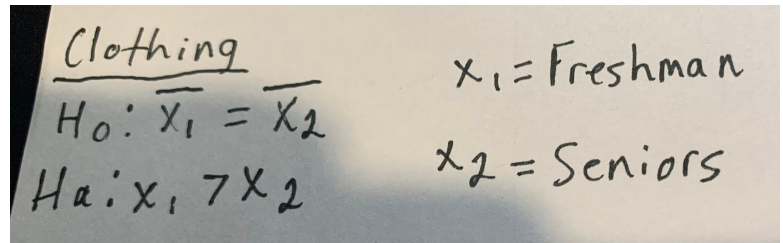
$$H_a: x_1 > x_2$$

$x_1 = \text{Seniors}$
 $x_2 = \text{Freshman}$

Starbucks				
SR Avg	31.25	t top	19	
SR Stdev	21.11925016	t bottom	12.42019982	
SR N	12	t value	1.529766048	
		t critical	1.321	
FR Avg	12.25	df	22	
FR Stdev	37.48484542			
FR N	12			

In the case of starbucks there is sufficient evidence to accept the alternative hypothesis at 90 percent confidence and can say seniors on average spend more on starbucks than freshman. This makes sense, most seniors are several years older than freshman and may be daily coffee drinkers because of a heavier workload and busier schedule.

3. **Non essential clothing-** For this t test I believe freshman spend more than seniors on clothing.

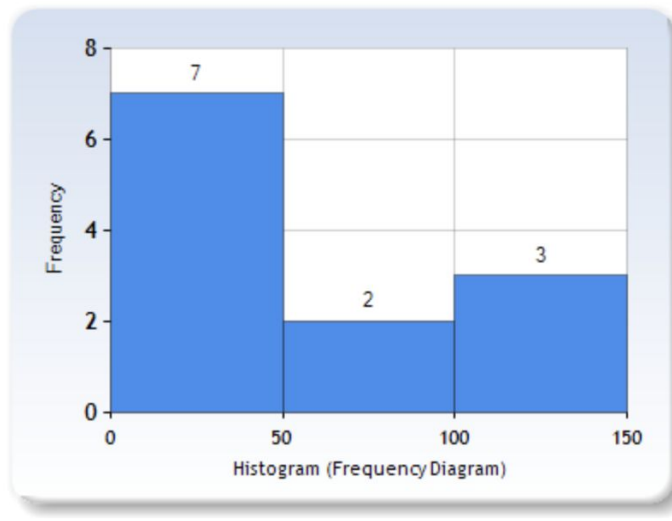


Clothing
 $H_0: \bar{X}_1 = \bar{X}_2$
 $H_a: \bar{X}_1 > \bar{X}_2$
 $X_1 = \text{Freshman}$
 $X_2 = \text{Seniors}$

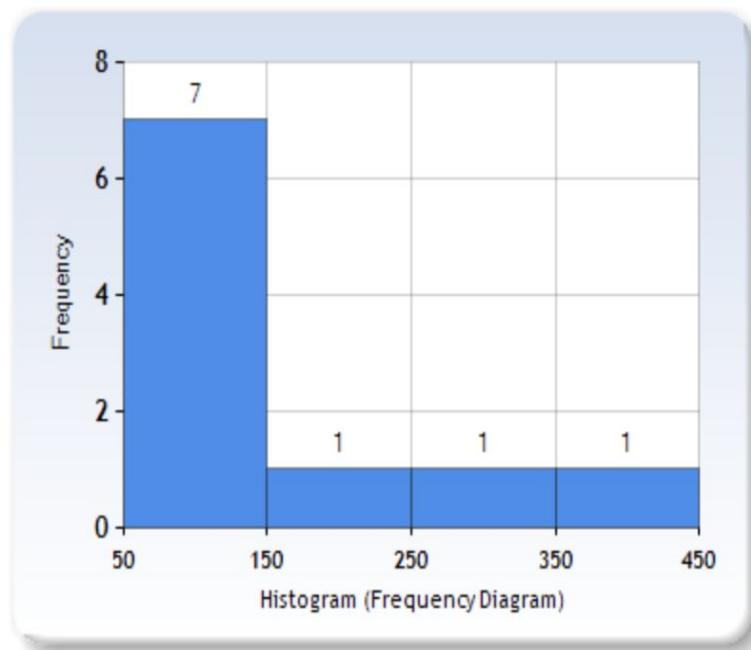
Clothing			
Freshman avg	123.166667	t top	79.83333367
Freshman Stdev	116.6750213	t bottom	16.60121404
Freshman N	12	t value	4.808885272
		t critical	1.321
Senior avg	43.33333333	df	22
Senior Stdev	41.79676659		
Senior N	12		

For clothing my prediction is correct there is sufficient evidence to say with 90 percent confidence that Freshman spend more money on non-essential clothing. This maybe because my sample size was small but also because freshman may try to fit in more. They buy new clothes or shoes to make themselves stand out while still finding friends. Seniors on the other hand may already have clothes from previous years and have a close group of friends.

I created some histograms to help visualize the data for clothing:



This histogram above is for seniors and as you can see it is skewed to the right with most seniors spending money on clothes worth \$0-50.



This histogram above is for freshman and although it is still skewed to the right the frequency intervals are much higher where you have 7 students spending money on clothes worth \$50-150 much greater than seniors.

Reflection:

After conducting this survey and running the numbers I think I met my goal of the survey but, there are some things I would do again. I think I met my goal because my survey has a wide range of answers that most students can relate to. For example one student spent \$425 last month on clothes but also spent \$0 on alcohol. I think this survey and data as a whole does a good job showing students what the true cost of college really can be. I think if I double the number of each class year surveyed I would have much less variance and my answers would have much more evidence to support them. Furthermore I would distribute the survey to professors teaching various subjects, a math major may have different spending habits than a fashion/ marketing major this would help eliminate any bias. One thing that really surprised me is just the sheer differences in spending habits there were many surveys where people spent over \$500 dollars in one month and on the other hand some surveys students spent less than \$30 in a month. Another thing that surprised me was the amount freshman spend on clothes when comparing it with seniors.