

ISyE 2028 – Basic Statistical Methods - Fall 2015
 Bonus Project: “Big” Data Analytics
 Final Report

Abstract

“Freshman 15” is a term commonly used in the United States to describe the amount of weight gained during a student’s first year in college. The “Freshman 15” can be caused by multiple factors introduced to a student’s first year in college: the consumption of fat and carbohydrate rich foods offered in an all-you-can-eat style in university dining halls, an increase in alcohol intake, an increase in stress levels, and a decrease in hours of sleep. During my first year at Georgia Tech, I always joked about getting the “freshman 15,” but I never actually gained any significant weight. I talked to some of my other classmates, who all had similar stories. I decided to look more into this matter and see whether the “freshman 15” is just a myth among college freshmen.

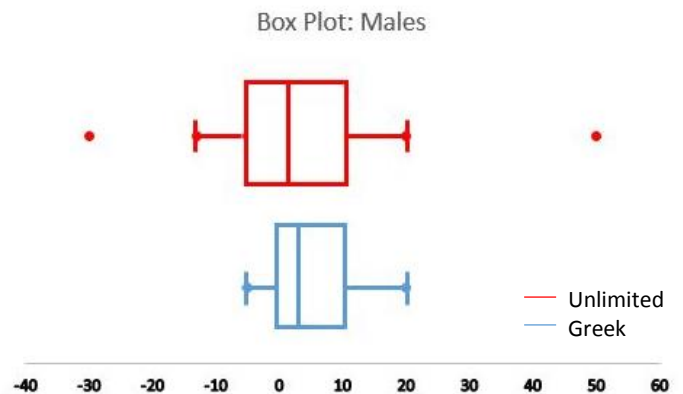
Methodology

- The use of “Google forms” to collect survey information from current Georgia Tech students
 - Questions used on survey
 - “Male or Female?”
 - “Freshman meal plan?”
 - “Approximately how much weight did you gain during your freshman year?”
- 5-numerical summaries using Excel software
- Hypothesis testing using t-distribution
 - $H_0: \mu = 15$
 - $H_1: \mu \neq 15$

Results

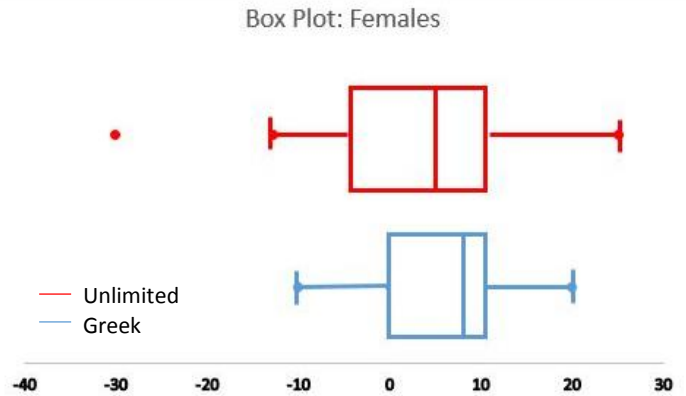
MALE STUDENTS

| Meal plan | Greek/Other | Unlimited |
|-------------|-------------|--------------|
| Sample size | 16 | 32 |
| Minimum | -5 | -13 |
| Q1 | 0 | -5 |
| Median | 3 | 1.5 |
| Q3 | 10 | 10 |
| Maximum | 20 | 20 |
| Mode | 0 | 10 |
| Outliers | None | -30, -30, 50 |
| Sample mean | 5.125 | 2.52 |
| Sample SD | 7.19 | 8.81 |



FEMALE STUDENTS

| Meal plan | Greek/Other | Unlimited |
|-------------|-------------|-----------|
| Sample size | 44 | 29 |
| Minimum | -10 | -12.75 |
| Q1 | 0 | -4 |
| Median | 8 | 5 |
| Q3 | 10 | 10 |
| Maximum | 20 | 25 |
| Mode | 10 | 10 |
| Outliers | None | -30 |
| Sample mean | 6.136 | 4.72 |
| Sample SD | 8.028 | 10.376 |



Hypothesis Testing

For each case, I want to try and prove that the “Freshmen 15” is a myth, and students do not gain 15 pounds during their first year at Georgia Test.

- H0: $\mu = 15$
- H1: $\mu \neq 15$

Using the data collected, I calculated my test statistic using this formula to get these results

$$t_0 = \frac{\bar{x} - \mu_0}{S/\sqrt{n}}$$

| | Male | Female |
|--------------------|--------------|--------------|
| Greek/Other | -5.49 | -7.23 |
| Unlimited | -8.01 | -5.23 |

We will reject the null hypothesis if $|t_0| > t_{\alpha/2, n-1}$, testing at the 95% confidence level ($\alpha=.05$)
In all four cases, we rejected the null hypothesis.

Conclusion

Originally, before conducting my research, I was under the impression that many freshmen gained more than fifteen pounds during their first year in college. Because of this impression, I set my hypothesis test to only prove that a freshmen’s weight didn’t change by 15 pounds. To my surprise, after collecting my data and analyzing the numbers, more students than I was expecting either lost weight or stayed the same throughout their freshmen year. For all four cases, I calculated smaller sample means which resulted in bigger test statistics which ultimately led me to reject my null hypothesis that freshmen gain fifteen pounds during their first year in college. Even if I set my alternative hypothesis to be $\mu < 15$ (due to the smaller sample means calculated), I would still reject my null hypothesis due to the significant difference between the sample mean and 15 pound weight change that I’m trying to prove.

In three out of the four sets of data, although the most recurring weight change that freshmen encountered was 10lbs, the sample mean for all four cases were relatively close to 5lbs. Another result that I found to be interesting was that for both cases in males and females, the sample mean for students on the unlimited dining meal plan for both males and females were lower than other students who are not on the unlimited meal plan. Before the experiment, I thought college freshmen would gain more weight while being on the unlimited meal plan due to infinite access to dining hall food, but the results say otherwise. One factor that could lead to the

result of a bigger weight increase among students in the Greek/other meal plan is possibly heavy drinking.

As far as methods of improving, although I used relatively large sample sizes for all four cases, I would say that the results are somewhat biased. I gathered my data using social media, so my sample is only focused on students that are active social media users. Also, because I am using a survey to collect my data, my information is all based on voluntary results. In order to try and get a more representative sample of the whole student body at Georgia Tech, I would possibly try targeting the student body by possibly doing random samples throughout Georgia Tech. Despite the slight bias, however, I feel that this information is somewhat representative of the student body. A similar study conducted at Ohio State University concluded similar results, which technically further enforces my results as being an accurate representation of college freshmen.