College Students' Attitudes towards Alcoholic Energy Drinks

By: Emily Butler, Meggie Hayes, Douglas Heckmann, Christopher Peter Makris, & Thomas Todd

Introduction

In recent years there has been an ongoing debate concerning the health repercussions of combining alcohol and energy drinks. This debate has been brought to the forefront of the media with the recent events surrounding Four Loko, an alcoholic energy drink, which has had increased popularity since the summer of 2010. We would like to understand college students' attitudes towards alcohol and energy drinks in general. Some questions that we attempted to answer include: what are the differences in attitudes about alcoholic energy drinks between students at Carnegie Mellon University and the University of Pittsburgh? Are attitudes regarding alcoholic energy drinks different for different demographic groups? How has the media affected students' attitudes and habits regarding these types of beverages? How has students' attitudes and patterns of use of Four Loko been affected by the release of a new non-caffeinated product? Has the recent media coverage of health problems associated with
mixing alcohol and energy drinks changed students' habits of manually mixing these two types of drinks?.

There has been little research done previous to our investigation. In one article by Jonathan Strong, "Is Four Loko Dangerous? The FDA doesn't say," he points this fact out and goes on to discredit the FDA's ban of caffeine in Four Loko by claiming that the studies used to support the argument did not use pre-mixed alcoholic energy drinks. The concept of an alcoholic drink like Four Loko is appealing to many college students because of its high alcohol content and strong intoxication effects and its low cost Steve Woods points out in his article "Four Loko energy drink raises health concerns among youth." He highlights that students are ignoring the health risks because they perceive a large benefit from the high levels of intoxication. These perceived attitudes of college students are echoed by Nina Mandell in her article "Caffeinated Four Loko will be off shelves across the country by Dec. 13." She describes how many people were stocking up in anticipation of the ban and were throwing Four Loko "vigils" or "goodbye" parties. Actions and attitudes such at these have prompted the New York State Office of Alcoholism and Substance Abuse Service to claim that the consumption patterns of caffeinated alcoholic beverages by young people has changed and points to the negative affects, such as binge drinking and black outs, that have been associated with their consumption.

In an attempt to asses undergraduate college students' attitudes towards and usage of alcoholic energy drinks and alcohol and energy drinks we conducted a man on the street type survey at Carnegie Mellon University and The University of Pittsburgh. A strategic selection of locations was used at each university in order to elicit a sample that was most representative of the population. We had a response rate of 88.9% with 177 people surveyed at The University of Pittsburgh and 113 surveyed at CMU.

Some of the main results we obtained were: 1 that almost every undergraduate student at Carnegie Mellon and the University of Pittsburgh has heard of the alcoholic energy drink Four Loko, 2 Undergrads that are under the age of 21 are less likely to report being aware of the health risks associated with consuming alcoholic energy drinks than undergrads over the age of 21, 3 More Greek students consume Four Loko than non-Greek students.

Methods

For our survey, the target population is all undergraduate students at The University of Pittsburgh and Carnegie Mellon who have experimented with the consumption of alcohol. We may have experienced coverage error due to the times we conducted our survey. The University of Pittsburgh and Carnegie Mellon University have the same class structure for the week, which will allow us to pick out the optimal time to survey students on each campus. Depending on what time we were out surveying, we may have missed students of particular majors or fields of study because of when certain classes occur. We tried to choose locations on both campuses that are main meeting points that a large variety of students pass through.

We also attempted to conduct our survey on different days in order to counteract certain types of classes occurring on Tuesdays and Thursdays vs. the other days of the week. For example, certain majors may have a required class at a certain time, or there may be sporting events or other campus events that day that draw a specific demographic of students away from our survey location, etc. To mitigate this problem, we will sample at multiple times on different dates at these locations. Furthermore, we may experience measurement error because the terminology in our questions could potentially have various interpretations. For example, students may have a different interpretation of the definition of a "blackout." Also, students may have varying levels of familiarity with the coverage of the physical effects of alcoholic energy drinks. To minimize measurement error due to the terminology we used, we included definitions of certain potentially confusing words.

- Have you ever experienced complete or partial memory loss (i.e. a "blackout") while drinking?

  -Yes

  -No

Given that our survey deals with attitudes towards and consumption habits of alcohol, and the fact that roughly half of our target population is not legally eligible to consume alcohol, possible negative repercussions that could arise should any responses be associated with a respondent. In order to obtain honest responses and to protect the respondents we had them sign a form, attached to the clipboard they were using, that contained our informed consent statement.

you did not actually do a random sample, so you should discuss here how you did get your data...

We wanted to obtain a comprehensive random sample of students from both Carnegie Mellon University and the University of Pittsburgh that was representative of the overall population (i.e. we want to survey as many different types of students as possible). Our sampling population consists of a stratified random sample of Carnegie Mellon University and the University of Pittsburgh undergraduate students who have presumably experimented with the consumption of alcohol. For Carnegie Mellon, we first stratified our sample in an effort to get all demographics of the college: we assume surveying outside near Doherty Hall would give us a good mix of primarily Science,

Engineering, and Humanities & Social Science students, the cafe Taza de Oro in the Gates-Hillman Center would help cover primarily Computer Science and Mathematics students, and the Zebra Cafe in the College of Fine Arts would help cover Art and Design students. Furthermore, we also surveyed near general areas of traffic like Kirr Commons and the corner of Forbes and Morewood where we expected to receive sufficient cover of students of all demographics including, but not limited to: age, gender, and Greek life affiliation. Our plan for surveying the students of the University of Pittsburgh was very similar. We believe students of all classes and Greek life affiliations are commonly located at Schenley Commons, Soldiers and Sailors Hall, and the campus Starbucks. Therefore, we surveyed these areas to solicit responses. Additionally, by surveying students near the Petersen Events Center we assume we also covered students enrolled in the university honors program. In general, we believe that by surveying these specific areas of the University of Pittsburgh campus we were able to obtain a sample that covered all demographics of students sufficiently.

There were two main types of questions on our survey. The first type pertained to demographic information like age, sex, Greek affiliation etc.

What university do you attend? Please choose one:

-Carnegie Mellon University

-The University of Pittsburgh

-Other _____

What is your age? _____

What is your gender?

-Male

-Female

Are you affiliated with Greek life your University?

-Yes

-No

The second type of questions dealt with attitudes towards and consumption patterns of alcohol and alcoholic energy drinks.

On average, how frequently do you consume at least one alcoholic beverage? Please choose one:

-Less than 1 time per week

-From 1 to 2 times per week

-From 3 to 5 times per week

-Greater than 5 times per week

Have you ever experienced complete or partial memory loss (i.e. a “blackout”) while drinking?

-Yes

-No

Do you mix energy drinks and alcohol?

-Yes

-No

Sample Size Calculations

Initial Calculation: Worst Case Scenario

As an initial diagnostic, we chose to calculate what our estimated sample size would be if we took a simple random sample from a population that consisted of the combined subpopulations of the undergraduate students at both Carnegie Mellon University and the University of Pittsburgh. Because our survey consists of primarily "yes" or "no" answers, we consider most of our parameters to be from a Bernoulli distribution. Therefore, we will consider our standard deviation to be of the worst case scenario, by setting p = .5:

$$SD_{Worst\ Case\ Scenario} = \sqrt{(.5)(1-.5)} = .5$$

It may be difficult to receive a large sample size since there are many groups conducting surveys within our class. Therefore, we will allow our margin of error to be up to 5%, allowing for a 90% confidence interval. We can calculate n_0 as follows:

$$n_0 = \frac{(z_{\alpha/2})^2\,(SD)^2}{(ME)^2}$$

$$n_0 = \frac{(1.645)^2(.5)^2}{(.05)^2}$$

$$n_0 = 270.6025$$

Overall, the total number of undergraduate students attending both Carnegie Mellon University and the University of Pittsburgh is approximately 23,736. Because we are under the assumption that we are taking a random sample without replacement, we must make the following adjustment to our calculation above:

$$n \geq \frac{Nn_0}{N + n_0}$$

$$n \geq \frac{(23{,}736)(270.6025)}{(23{,}736) + (270.6025)}$$

$$n \geq 267.552268$$

Therefore, to make inferences about our population concerning the questions we plan to ask with a margin of error of 5%, we must sample at least 268 total individuals.

Since we are conducting a "face to face" survey, with practice we may be able to get a response rate up to 70% (as noted in the lecture slides). Therefore, for the worst case scenario we will consider our response rate to be approximately 50%. If we take our response rate into account, we may need to physically ask more individuals for their participation in our survey. Specifically:

the man-on-the-street methodology should be discussed much earlier!

$$n_{With\ .5\ Response\ Rate} \geq \frac{267.552268}{.5}$$

$$n_{With\ .5\ Response\ Rate} \geq 535.104536$$

Thus, for a worst case scenario calculation, we need to ask approximately 536 individuals to take our survey, but only have approximately 268 of those individuals completely fill out our survey, to be able to make inferences with a 5% margin of error.

We note that our target population specifically contains two main strata: one from Carnegie Mellon University and another from the University of Pittsburgh. We will specifically survey from both locations, but then combine the responses into one pool where we will attempt to make inferences about the undergraduate students of Carnegie Mellon University and the University of Pittsburgh as a whole. Therefore, we may be able to reduce our required sample size. As a result, we may also be able to reduce our margin of error and increase our confidence level for the answers on each of our survey's questions. With a given sample size and confidence level (mapped to the z-score of a standard normal curve), we can calculate both the Carnegie Mellon University and University of Pittsburgh contributions to the total margin of error as follows:

$$CMU_{Error} = Z * \sqrt{\left(\frac{5{,}705}{23{,}736}\right) * \left(1 - \frac{\frac{N}{2}}{5{,}705}\right) * \left(\frac{.25}{\frac{N}{2}}\right)}$$

$$Pitt_{Error} = Z * \sqrt{\left(\frac{18{,}031}{23{,}736}\right) * \left(1 - \frac{\frac{N}{2}}{18{,}031}\right) * \left(\frac{.25}{\frac{N}{2}}\right)}$$

$$MOE_{Total} = CMU_{Error} + Pitt_{Error}$$

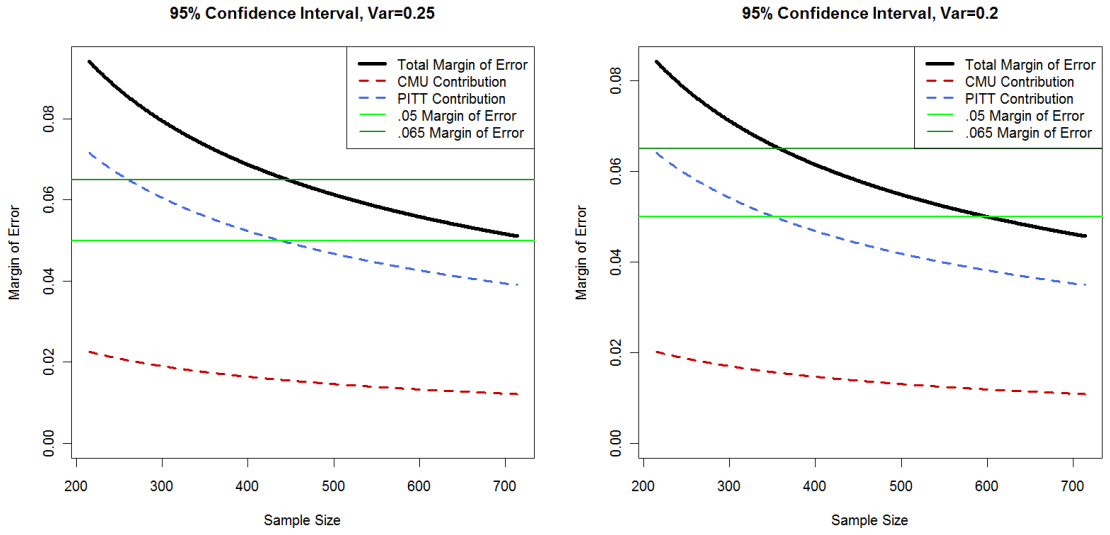
After an initial wave of sampling, we received approximately 261 complete survey responses, of which 215 were applicable to our study (respondents noted that they were undergraduate students who drank alcoholic beverages). Given our sample size at the time, we wanted to determine approximately how many more individuals we needed to sample in order to make the inferences we desired to make. Essentially, we sought to both increase our confidence levels while decreasing our margin of error and required *n* as much as possible. This type of optimization is very much a balancing act, because each of these parameters is inter-related, and changing one inevitably changes the other.

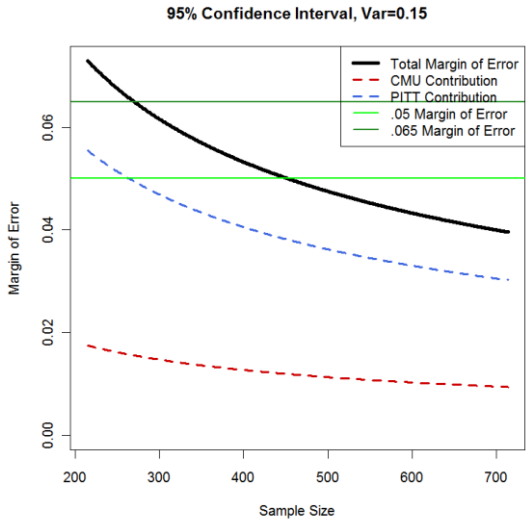
Confidence Level, Variance, & Margin of Error

To be able to estimate the margin of error of our parameter inferences, we needed to have an idea of the true population parameter variances; however, there was no appropriate pilot study or applicable numerical information on our topic otherwise. Therefore, we decided to use the information from our survey responses to estimate our

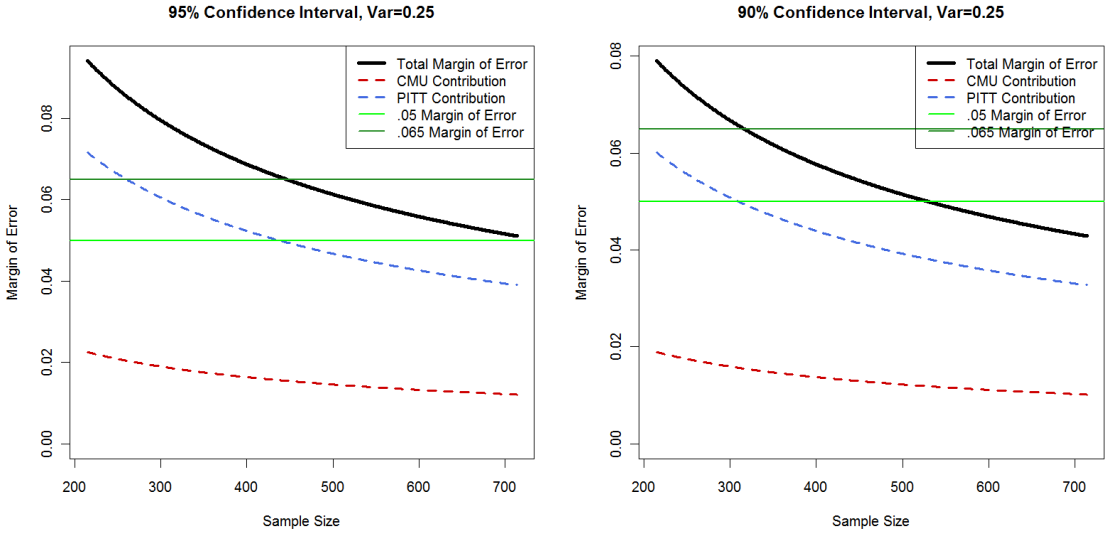
parameter variances, and then inflate the result by approximately 20% as a penalty for essentially using our data twice in the same analysis.

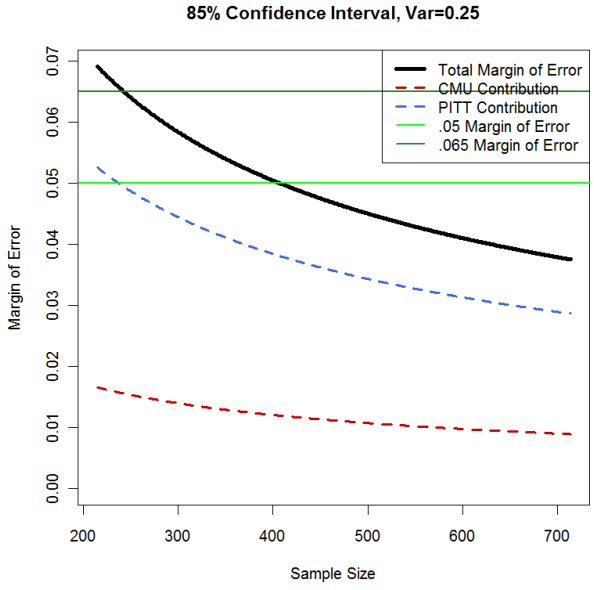
The series of graphs below illustrate how the confidence level, variance of our parameters, and margin of error of our estimations relate to each other. The *x*-axis represents the sample size of our study, whereas the *y*-axis corresponds to the margin of error of our parameter estimates. The solid black curve corresponds to the overall margin of error, whereas the dotted blue and dotted red curves correspond to the specific University of Pittsburgh and Carnegie Mellon University contributions to the margin of error, respectively. The light green and dark green horizontal lines represent margins of error of 0.5 and 0.65, respectively. Within these first three images, we hold the confidence level constant and only change the variance from 0.25, to 0.2, to 0.15. Note that we can attain a smaller margin of error with a smaller sample size as the variance gets smaller.





Below, we illustrate the changes in the margin of error if we hold the variance constant, but vary the confidence level from 95%, to 90%, to 85%. Once again, note that as the confidence level gets smaller, the margin of error gets smaller for a given sample size.





In general, the confidence level and total sample size have a direct relationship: as we increase our confidence level, we increase our total sample size. On the other hand, the margin of error and total sample size have an inverse relationship: as we decrease our margin of error, we increase our total sample size. Thus, we need to find some type of balance of both maximizing our confidence level and minimizing our margin of error while still being able to keep our total sample size within a feasible amount.

Parameter Confidence Intervals

Ultimately, we received a total of approximately 286 observations that would be useful for our study. By calculating and inflating the variances of our parameters and iterating through different confidence levels (see attached R code appendix), we come up with the following conclusions for the parameters involved in our study:

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that consume at least one alcoholic beverage less than once per week on average is within the interval (0.1760218, 0.3169360)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that consume at least one alcoholic beverage once or twice per week on average is within the interval (0.4147367, 0.5782211)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that consume at least one alcoholic beverage three to five times per week on average is within the interval (0.1507730, 0.2858468)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that consume at least one alcoholic beverage greater than five times per week on average is within the interval (-0.009034161, 0.086498950). [Note: Since the lower bound is negative, and theoretically this is not possible, we can substitute in the value 0 for the lower bound]

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have ever experienced a blackout is within the interval (0.5177025, 0.7550248)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that mix energy drinks and alcohol is within the interval (0.3383492, 0.4996789)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that were drinking alcoholic energy drinks when they blacked out is within the interval (0.2226210, 0.4173790)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that drink alcoholic energy drinks because of the price is within the interval (0.08898077, 0.25041317)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that drink alcoholic energy drinks because of the taste is within the interval (0.3179671, 0.5305177)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that drink alcoholic energy drinks because of the alcoholic content is within the interval (0.2432028, 0.4477063)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that drink alcoholic energy drinks because of its availability is within the interval (0.1987161, 0.3952233)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that drink alcoholic energy drinks because of its caffeine is within the interval (0.1823664, 0.3752094)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have heard of the product Four Loko before is within the interval (0.8624230, 0.9926495)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have consumed the product Four Loko before is within the interval (0.5185916, 0.6814084)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have consumed the product Four Loko before January 1, 2011 is within the interval (0.6174943, 0.8798879)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have consumed the product Four Loko after January 1, 2011 is within the interval (0.00894993, 0.19000295)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that have consumed the product Four Loko both before and after January 1, 2011 is within the interval (0.0432921, 0.2603728)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that would consider the drinking Four Loko since the removal of caffeine is within the interval (0.2989914, 0.5135086)

- We are 99.7% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that are aware of the health risks of Four Loko is within the interval (0.8131303, 0.9694784)

- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that would consider drinking alcoholic energy drinks in the future is within the interval (0.4425344, 0.6081902)

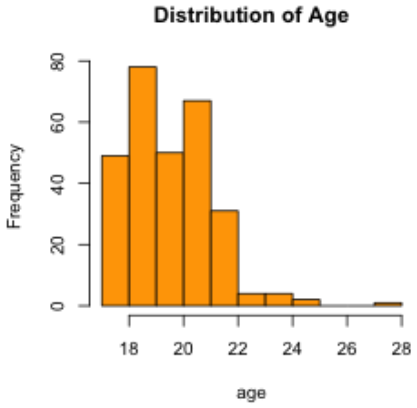
- We are 95% confident that the true proportion of undergraduate students attending Carnegie Mellon University or the University of Pittsburgh that believe the risks associated with alcoholic energy drinks affect their likelihood of drinking alcoholic energy drinks in the future is within the interval (0.3012329, 0.4794689)

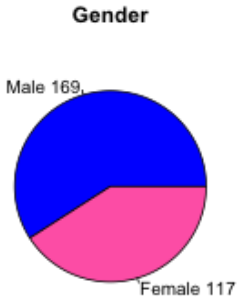
Results

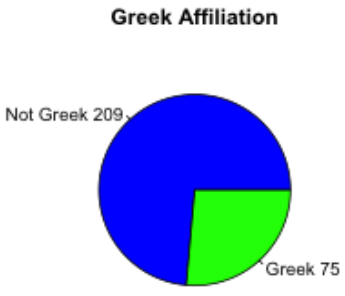
Once the surveying was completed and all of the data coded we analyzed the data in a few distinct ways. The first was an analysis of all of the demographic data and attitudes and consumption pattern data. The second way we analyzed the data was by drawing comparisons and correlations between the demographic and attitudes/consumption data. Finally we analyzed the independence of each of our variables relative to each other.

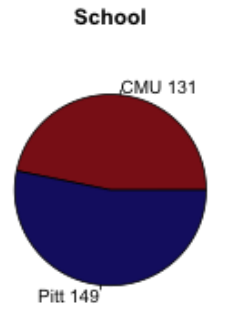
Demographics

The first few questions of the survey pertained to demographics. Respondents were asked to report what school they attended, their sex, age, and possible Greek affiliation. Of the students surveyed, 131 attend CMU, 149 attend The University of Pittsburgh and 4 attended other schools. Six students did not respond to the question. Given that it is illegal for anyone under the age of 21 to consume alcohol age was specifically pertinent to our survey. Our youngest respondent was 17 years old and our oldest respondent was 28 years old. The median respondent age was 20 and the mean was 19.99. Looking at a histogram of the distribution, it is skewed to the right with a sharp decline in respondents over the age of 22. The standard deviation of age is 1.55. 17% of our respondents were 18 and under, 27% were 19, 17.5% were 20, and 38% were 21 or older. 177 of the respondents surveyed were under 21, 82 were Pitt students, and 92 were CMU students. Of the 286 respondents, 169 were males and 117 were female. 75 of students reported an affiliation with their campus' Greek Life.









Attitudes and Consumption

The next group of questions on our survey dealt with attitudes towards and consumption patterns of alcohol, alcoholic energy drinks, and alcohol mixed with energy drinks. 71 of the students, approximately 25%, reported that they consume at least one alcoholic beverage less than 1 time per week. 141 of the students, 49.5%, reported a consumption rate of at least 1 alcoholic beverage 1-2 times per week. 62 reported that they consume alcoholic beverages 3-5 times per week and 11 students said they consume alcoholic beverages more than 5 times per week. 182 of the students, about 63%, reported having experienced a complete or partial memory loss known as a blackout. 119 students, about 41%, mix energy drinks and alcohol. 56 students reported having experienced a blacked-out from mixing energy drinks and alcohol.

The Alcoholic energy beverage Four Loko was of specific interest to our study because of its recent flood of media coverage and ensuing F.D.A. ban. Another specific parameter of interest was what students' attitudes and usages were in regards to the new Four Loko, which was released in January 2011 without the original energy supplements. 256 of the survey respondents had heard of Four Loko, 20 respondents had not heard of it, and 10 people did not respond to the question. 172 respondents had consumed the original Four Loko (before January 2011), and 110 people had not consumed it. Of the 172 people drank Four Loko before the removal of caffeine, 29 had drank it both before and after the caffeine was removed, and 19 people had drank it only after the caffeine was removed. Of the people who had only drank Four Loko before the energy supplements had been removed, only 65 or 40% said they would consider drinking Four Loko in the future while 95 or 59% said they would not. Not surprisingly, given the amount of media attention Four Loko received in the fall of 2010, 86% of respondents, or 246 people, said they were aware of the health risks associated with drinking alcoholic energy drinks. Only 30 people, or about 10%, were unaware of the health risks associated with consuming alcoholic energy drinks.

Given the negative nature of the media coverage of alcoholic energy drinks we were interested in assessing students' future outlook towards alcoholic energy drinks. 145 respondents, about 52%, said they would consider drinking alcoholic energy drinks in the future while 131 about 47% said they would not consider drinking them. The association between people's perception of alcoholic energy drinks, a parameter that is likely influenced by media, is most evident in the responses to our final question. The final question was "Did the risks associated with drinking alcoholic energy drinks affect your answer as to whether or not you would consider consuming alcoholic energy drinks in the future. 89 people, or 39% said that the risks associated with drinking alcoholic energy drinks affected whether they would consider drinking alcoholic energy drinks in the future, but 139 about 61% said that the risks do not affect their consideration of drinking alcoholic energy drinks in the future.

Comparisons between CMU and Pitt

We also chose to look at the correlations between the different questions in our survey post-stratified by different factors. First we separated CMU and Pitt. We first looked at correlations with frequency of drinking at Pitt. The correlation coefficient between frequency of drinking and the experience of a blackout was 0.291, a weak positive correlation. The correlation coefficient between frequency of drinking and the

experience of a blackout due to mixing alcohol and energy drinks is 0.145 also a weak, positive correlation. The correlation between frequency of drinking and having drank Four Loko is 0.289. The correlation between frequency and mixing alcohol with energy drinks as well as the correlation between frequency and the consideration of drinking alcoholic energy drinks in the future is 0.108. We then looked at correlations with frequency of drinking at CMU. The correlation with blacking out is 0.524 which is a moderate positive correlation and much higher than the correlation at Pitt. The correlation between frequency and blacking out due to mixing alcohol and energy drinks is 0.2799 a weak, positive correlation. The correlation between frequency and having drank Four Loko is 0.34 a moderate positive correlation. The correlation between frequency and mixing alcohol and energy drinks is 0.379 a moderate positive correlation. The correlation between frequency and considering drinking alcoholic energy drinks in the future is 0.279 a weak positive correlation.

Next we looked at the correlations with having experienced a blackout at Pitt. The correlation between having experienced a blackout and blacking out due to mixing alcohol and energy drinks was 0.259, a weak positive correlation. The correlation between blacking out and having drank Four Loko was 0.208. The correlation between blacking out and mixing alcohol and energy drinks was 0.204. The correlation between blacking out and considering drinking alcoholic energy drinks in the future was 0.12, a very weak positive correlation. In general, at Pitt, there were very low correlations with blacking out.

After looking at Pitt, we looked at the correlations with having experienced a blackout at CMU. The correlation between blacking out and blacking out due to mixing alcohol & energy drinks was 0.23 a weak positive correlation. The correlation between blacking out and having drank Four Loko was 0.288 a weak positive correlation. The correlation between blacking out and mixing alcohol with energy drinks is 0.33 a weak positive correlation. The correlation between blacking out and drinking alcoholic energy drinks in the future was 0.196. In general, there were very weak correlations with blacking out at both schools.

Next we looked at correlations between blacking out due to mixing alcohol and energy drinks at Pitt. The correlation with drinking Four Loko is 0.23, the correlation with mixing alcohol and energy drinks is 0.43, the correlation with consideration of drinking alcoholic energy drinks in the future is 0.42. These are all moderately positive correlations, which are not surprising given the variables are all associated with blacking out from alcoholic energy drinks. We then looked at the correlations with blacking out due to alcoholic energy drinks at CMU. The correlation with having drank Four Loko is 0.415, the correlation with mixing alcohol and energy drinks was 0.279 and the correlation with considering alcoholic energy drinks in the future was 0.417. Again, these are all moderate positive correlations. There does not appear to be much of a distinction between Pitt and CMU.

We also looked at the correlation between mixing alcoholic energy drinks and considering their use in the future. At Pitt, the correlation was 0.53 and at CMU the correlation was 0.401. Both are moderate positive correlations although the correlation at Pitt is higher than CMU which may imply some difference in judgment between universities, but correlation does not imply causation and conclusions cannot be inferred.

After comparing correlations for the two Universities in our sample, we wanted to see if there were differences in correlations due to gender. First, we looked at the correlations with frequency of drinking. The correlation with blacking out was 0.418, the correlation with blacking out due to mixing alcohol and energy drinks was 0.335, the correlation with having drank Four Loko is 0.311, the correlation with mixing alcohol and energy drinks was 0.22 and the correlation with considering drinking alcoholic energy drinks in the future was 0.176. All of these were weak to moderate positive correlations. For females the correlation with blacking out was 0.402, the correlation with blacking out due to mixing alcohol and energy drinks was 0.134, the correlation with having drank Four Loko was 0.308, the correlation with mixing alcohol and energy drinks was 0.24 and the correlation with considering alcoholic energy drinks in the future was 0.185. In general, the correlations for females were all weaker than those for males except considering alcoholic energy drinks in the future.

Comparison by Gender

Next, we looked for distinctions in correlations due to gender from experiencing a blackout. In males, the correlation between blacking out and blacking out due to mixing alcohol and energy drinks was 0.336, the correlation with having drank Four Loko was 0.327, the correlation with mixing alcohol and energy drinks was 0.382, and the correlation with considering drinking alcoholic energy drinks in the future was 0.212. All of these are fairly weak positive correlations. In females, the correlation with blacking out due to mixing alcohol and energy drinks was 0.176, the correlation with having drank Four Loko was 0.169, the correlation with mixing alcholo and energy drinks was 0.155, the correlation with considering drinking alcoholic energy drinks in the future was 0.074. There are all weak positive correlations and are all weaker for females than for males.

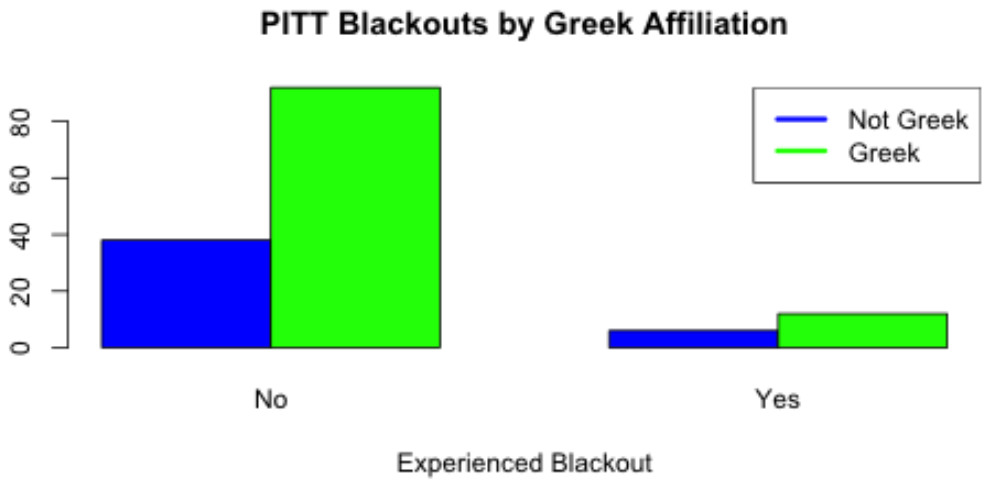
We then looked at correlations with blacking out due to mixing alcohol and energy drinks. In males, the correlation with having drank Four Loko was 0.387, the correlation with mixing alcohol and energy drinks was 0.36, the correlation with considering drinking alcoholic energy drinks in the future was 0.496. It is surprising that the correlation with mixing alcohol and energy drinks is so low since in order to black out from mixing alcohol and energy drinks, you need to mix them, that could mean that people had trouble understanding our question. For females, the correlation with having drank Four Loko was 0.268, the correlation with mixing alcohol and energy drinks was 0.346, the correlation with considering drinking alcoholic energy drinks in the future was 0.35. Once again we saw the low correlation between blacking out due to mixing alcoholic energy drinks and mixing alcoholic energy drinks. In general, once again, the correlations for females were lower than for males.

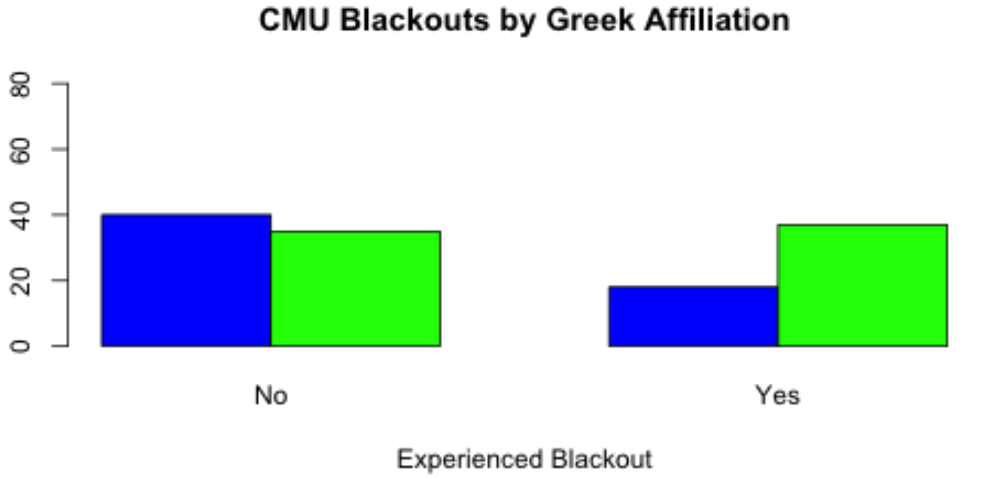
Finally, we looked at correlations with having drank Four Loko. For males, the correlation with mixing alcohol and energy drinks was 0.305 and the correlation for considering alcoholic energy drinks in the future was 0.632. For females, the correlation with mixing alcohol and energy drinks was 0.229 and the correlation with considering alcoholic energy drinks in the future was 0.493. Again, the correlations for females were weaker than for males but they are moderate positive correlations.

Comparison by Greek Affiliation.

Our third demographic variable of interest was Greek Life Affiliation and we wanted to compare correlations among Greek-affiliated students and non-Greeks. The first variable we looked at correlations with was frequency of drinking. For Greeks, the correlation with blacking out was 0.528, the correlation with blacking out due to mixing alcohol and energy drinks was 0.122, the correlation with having drank Four Loko was 0.248, the correlation with mixing alcohol and energy drinks was 0.169, and the correlation with considering alcoholic energy drinks in the future was 0.202. These are mostly weak, positive correlations aside from blacking out, which has a moderate positive correlation. For non-Greeks the correlation between frequency and blacking out was 0.366, the correlation with blacking out due to mixing alcohol and energy drinks was 0.243, the correlation with having drank Four Loko was 0.343, the correlation with mixing alcohol and energy drinks was 0.254, and the correlation with considering alcoholic energy drinks in the future was 0.178. These correlations are all weak, positive correlations. While we did not statistically test the difference in the correlations, Greeks blacked out more than non-Greeks.

Next, we looked at correlations with experiencing a blackout. For Greeks, the correlation with experiencing a blackout due to mixing alcohol and energy drinks was 0.207, the correlation with having drank Four Loko was 0.166, the correlation with mixing alcohol and energy drinks was 0.219, the correlation with considering alcoholic energy drinks in the future was 0.089. These are weak positive correlations. The weakness of these correlations is somewhat surprising since often Greek-affiliated students are stereotyped by risky behavior. For non-Greeks the correlation between blacking out and blacking out due to mixing alcohol and energy drinks was 0.259, the correlation with having drank Four Loko was 0.258, the correlation with mixing alcohol and energy drinks was 0.246, and the correlation with considering drinking alcoholic energy drinks in the future was 0.154. These are all weak positive correlations, but for the most part, the correlations are higher than those of Greeks, which is surprising due to the stereotypes. It seems as though non-Greeks are engaging in more risky behavior than Greeks.





The next variable we looked at was blacking out due to mixing alcohol and energy drinks. For Greeks, the correlation with having drank Four Loko was 0.438, the correlation with mixing alcohol and energy drinks was 0.12, and the correlation with considering alcoholic energy drinks in the future was 0.425. For non-Greeks, the correlation between blacking out due to mixing alcohol and energy drinks and having drank Four Loko was 0.246, the correlation with mixing alcohol and energy drinks was 0.461, and the correlation with considering alcoholic energy drinks in the future was 0.412. Again we saw the phenomenon of a low correlation between blacking out due to mixing alcohol and energy drinks and mixing alcohol and energy drinks. This leads us to believe that there must have been some confusion in the question since every person who said yes to blacking out due to mixing should have said yes they mixed alcohol and energy drinks.

The next variable we considered was having drank Four Loko. For Greeks, the correlation with mixing alcohol and energy drinks was 0.148, the correlation with considering drinking alcoholic energy drinks in the future was 0.575. For non-Greeks, the correlation with mixing alcohol and energy drinks was 0.291, the correlation with considering drinking alcoholic energy drinks in the future was 0.546. It seems as though there is a pretty large difference in correlations with mixing alcohol and energy drinks.

Maybe Greeks don't consider drinking Four Loko as mixing alcohol and energy drinks while non-Greeks do.

Finally we looked at the correlation between mixing alcoholic energy drinks and considering them in the future. For Greeks, the correlation was 0.419 and for non-Greeks the correlation was 0.492. Again we see a higher correlation with non-Greeks, which could imply that non-Greeks are engaging in riskier behavior. However, correlation does not imply causation.

Independence Tests Between Variables

While looking at all of these correlations has been useful, correlations do not provide statistical evidence of independence. We used Chi-Square tests to look for independence between variables and we also used the Cochran Mantel Haenszel test to look for independence stratified by our demographic factors. The following is Cochran Mantel Haenszel the Chi-Square tests tables for the variables Black Out, Mix, and School. The tables for the other variables can be found in the appendix.

Mantel Haenszel Test

CMU		
	Blackout	
Mix	0	1
0	42	30
1	15	44

Pitt		
	Blackout	
Mix	0	1
0	34	57
1	11	49

Pvalue	1.63E-05
X-Square	18.5849
Common Odds	3.3133

Chi Square Test

	Blackout	
Mix	0	1
0	76	87
1	26	93

	School	
Blackout	CMU	PITT
0	58	46
1	74	106

	School	
Mix	CMU	PITT
0	72	91
1	59	60

Pvalue	3.31E-05
X-Square	17.2324
Pvalue	0.02366
X-Square	5.1193
Pvalue	0.4363
X-Square	0.606

First we tested for independence between blacking out and blacking out due to alcoholic energy drinks. The Chi-Square statistic was 11.416 on 2 degrees of freedom and the p-value was 0.0032. Therefore we can conclude that backing out and blacking out due to alcoholic energy drinks are not independent. We then ran the Mantel-Haenszel test to check for independence given school, gender, and Greek-affiliation. In all three cases, we found that given the factor, blacking out and blacking out due to mixing alcoholic energy drinks are not independent. The respective p-values were 0.0038, 0.0036, and 0.0033. Next we looked to see if frequency of drinking and experiencing a blackout were independent. The Chi-Square statistic was 58.15 on 5 degrees of freedom and had a p-value of 2.93×10^{-11}. Given school, the p-value was 1.699×10^{-10}, given gender the p-value was 5.391×10^{-11}, given Greek-affiliation the p-value was 4.132×10^{-11}.

Therefore, frequency of drinking and blacking out are not independent. We also looked at a Chi-Square test between frequency of drinking and the demographic factors. Frequency of drinking and school are independent with a Chi-square statistic of 8.292 of 5 degrees of freedom with a p-value of 0.14. Frequency of drinking and gender are independent with a Chi-Square statistic of 4.05 on 5 degrees of freedom with a p-value of 0.542. Frequency and Greek-affiliation are also independent with a Chi-Square statistic of 5.47 on 5 degrees of freedom and a p-value of 0.36.

Next we looked for an association between blacking out and mixing alcohol and energy drinks. We performed a Chi-Square test for independence first and found a Chi-Square statistic of 17.2 on 1 degree of freedom with a resulting p-value of $3.3x10^{-5}$ leading us to conclude that blacking out and mixing alcohol and energy drinks are not independent. When performing the Mantel-Haenszel test to look for independence given factors, all of the p-values were less than $5x10^{-5}$ leading us to conclude that given our demographic factors, blacking out and mixing alcoholic energy drinks is not independent.

Next we looked at frequency of drinking and blacking out due to mixing alcohol and energy drinks. Given school, frequency and blacking out due to mixing are independent with a p-value of 0.213. Given gender, frequency and blacking out due to mixing are independent with a p-value of 0.189. Given Greek-affiliation, blacking out due to mixing and frequency of drinking are independent with a p-value of 0.205. We also wanted to see if having experienced a blackout and having drank Four Loko were independent. We performed Chi-Square test and found a chi-square statistic of 26.77 on 2 degrees of freedom resulting in a p-value of $1.54x10^{-6}$. This leads us to conclude that experiencing a blackout and drinking Four Loko are not independent. We also wanted to look for independence given our strata and we found, given school, gender, and Greek-affiliation that blacking out and having drank Four Loko are not independent.

Finally we looked at the association between drinking frequency and having drank Four Loko. The Chi-Square test returned a statistic of 47.56 on 10 degrees of freedom resulting in a p-value of $7.5x10^{-7}$. This leads us to conclude that they are not independent. We also wanted to check for independence given our stratifying variables. We performed the Mantel-Haenszel test and our results show that given school, gender, and Greek-affiliation, frequency of drinking and having tried Four Loko are not independent.

Discussion

Like any project we encountered our share of difficulties in the course of conducting our survey. The first such difficulty that we encountered is that we printed the first 100 copies of our survey with the informed consent statement on the top of each survey. Quickly we realized that this eliminated the anonymity that the statement promised and we immediately scraped the majority of those first 100 surveys printed.

Although we pretested, the next set of problems had to do with our responders' approaches to the survey. At the completion of the survey it was clear that the fact that the answers to certain questions relied on an individual's answers to a prior question created some confusion amongst our respondents.

Formatting of our survey was the last problem we encountered. Although we were careful to design a survey that on paper was physically manageable (only one page, reasonably sized font, enough space between questions), there was significant non-response to our question about drinking/considering Four Loko before and after the removal of caffeine. As there was really no pattern to this missingness it seemed that the cause was the physical print layout of the question and answer.

We even realized that we had a slight problem with our pretesting that may or may not have affected the problems mentioned above. This is because while pretesting we would ask subjects, who were mainly our friends, to take the survey and see if they saw any problems with it or any item that was confusing. It is possible that we biased their reaction to the survey in some way by asking them if they could see any problems with the survey.

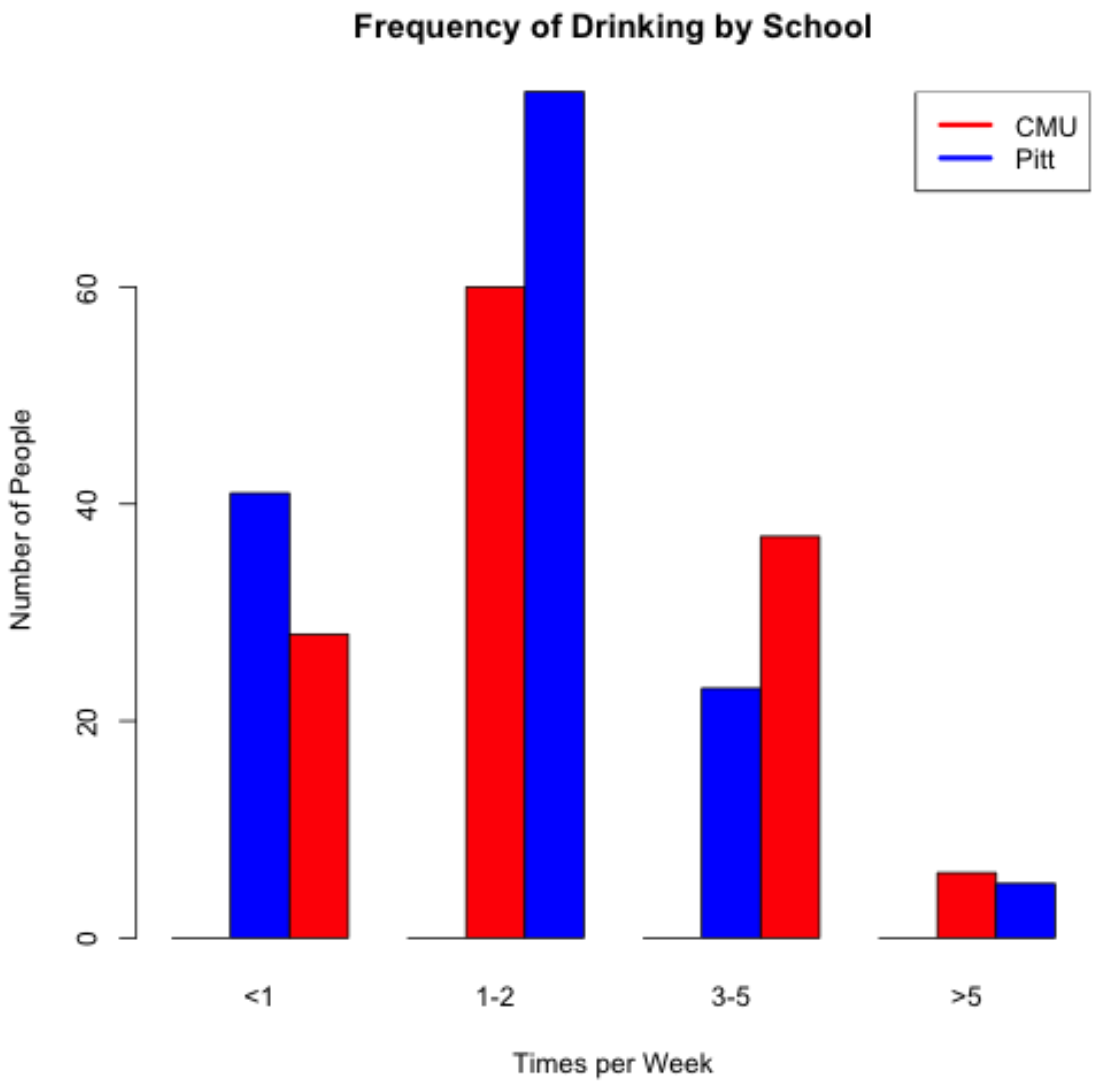
General Conclusions and Implications

Based on the analysis of the data we collected we can conclude the following items in regard to undergraduate students at Carnegie Mellon and the University of Pittsburgh.

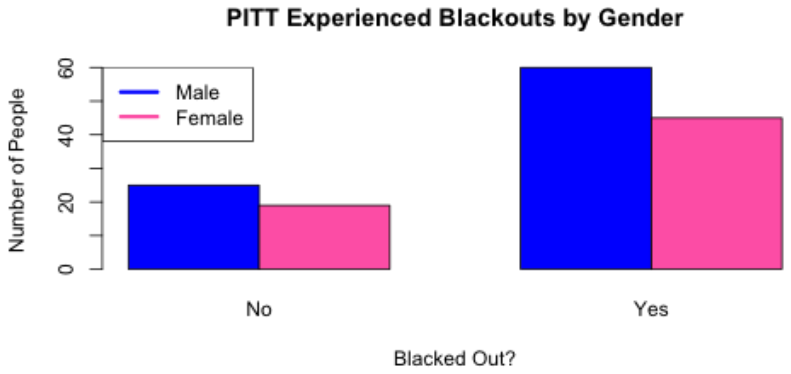
- Almost all undergraduate college students have heard of the drink Four Loko.
- There is a higher rate of consumption of Four Loko amongst Greeks than Non-Greeks.
- Undergraduate students that were 21 or older were more likely to be aware of the health risks associated with consuming alcoholic energy beverages than undergraduate students under the age of 21.
- Undergraduates with a Greek affiliation are more likely than those who are not Greek affiliated to consider consuming alcoholic energy drinks in the future.

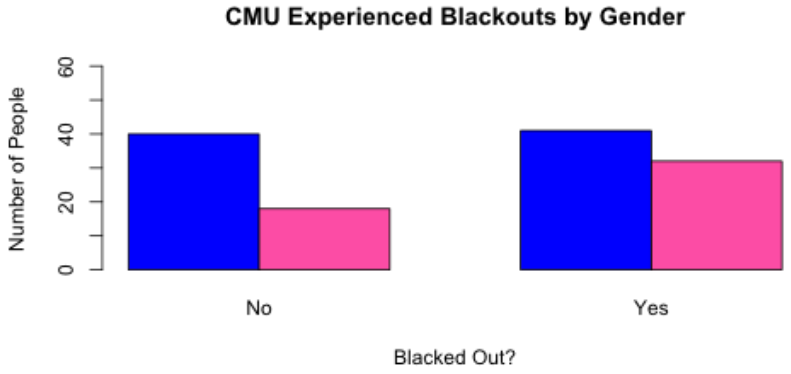
We also obtained some unexpected results from the analysis of our data.

- A higher percentage of Carnegie Mellon undergraduates drink more than three times per week than undergraduates at the University of Pittsburgh.

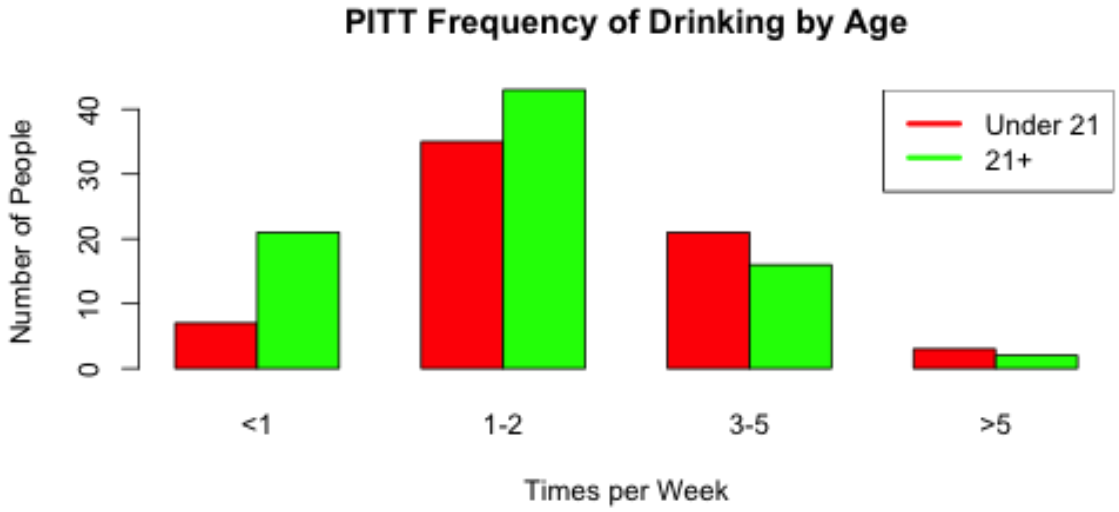


- A greater percentage of males have experienced a blackout than females.





- At the University of Pittsburgh, students under the age of 21 have a higher rate of drinking three or more times per week than students over the age of 21.



Strengths and Weaknesses

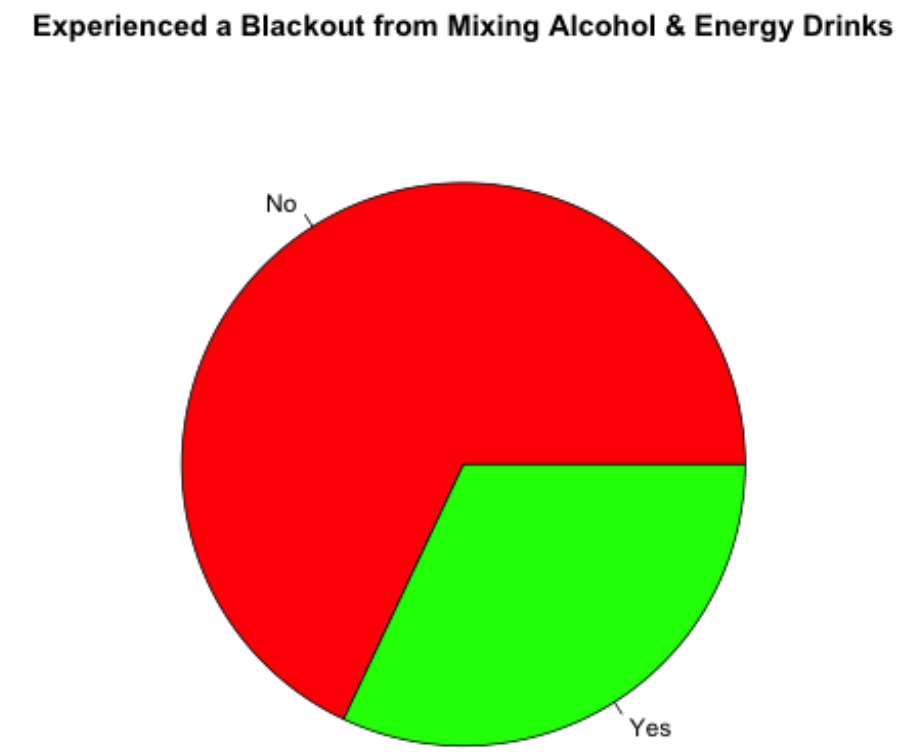
One of the major strengths of our survey was our very high response rate of 88.9%(290/326). Since we chose to conduct a "Man on the Street" survey we benefited from peoples want to please the interviewer by actually taking our survey.

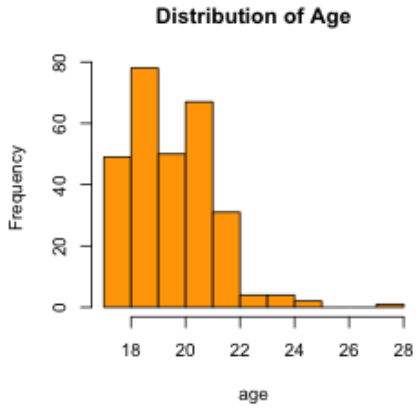
Although it was of great benefit to our analysis to have such a high response rate, the fact that we physically had to go out and survey individuals was one of our weaknesses. Each group member spent approximately 15-20 hours surveying at locations at Carnegie Mellon and the University of Pittsburgh. Each member also had to spend money on the materials (clipboards, pens, hundreds of copies of the survey, etc.) needed to conduct the survey

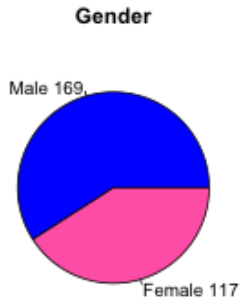
Take Home Message

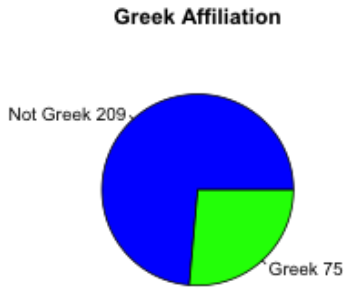
In general, we found that a sizeable proportion of undergraduate students attending Carnegie Mellon University and the University of Pittsburgh do mix alcoholic beverages and energy drinks together. Furthermore, nearly all of the students have heard of Four Loko and the recent health concerns and controversies over alcoholic energy drinks in general. Regardless, many students report that they will continue to mix alcoholic energy drinks for various different reasons. In the long run, we hope that our survey will at least somewhat bring to light the physical damage one can cause by consuming alcoholic energy drinks. Hopefully, by conducting this survey we have raised some awareness towards the adverse effects of misusing alcoholic and energy beverages, and our results may help deter students from choosing to mix the two in the future.

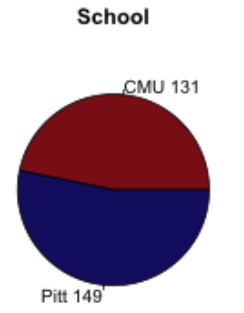
Appendix 1: Graphs

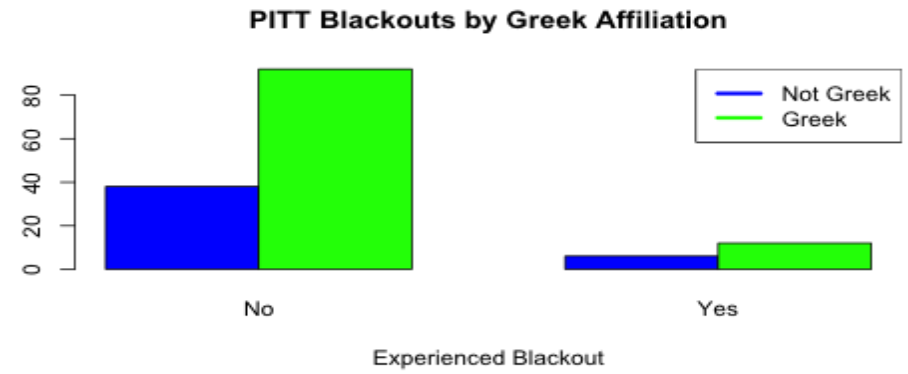


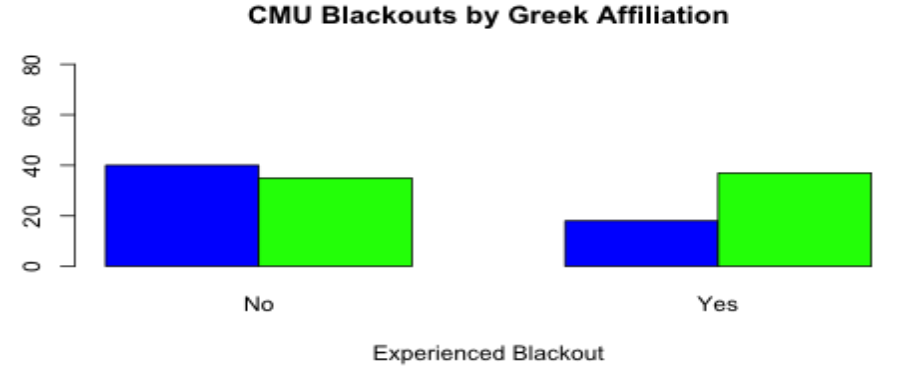


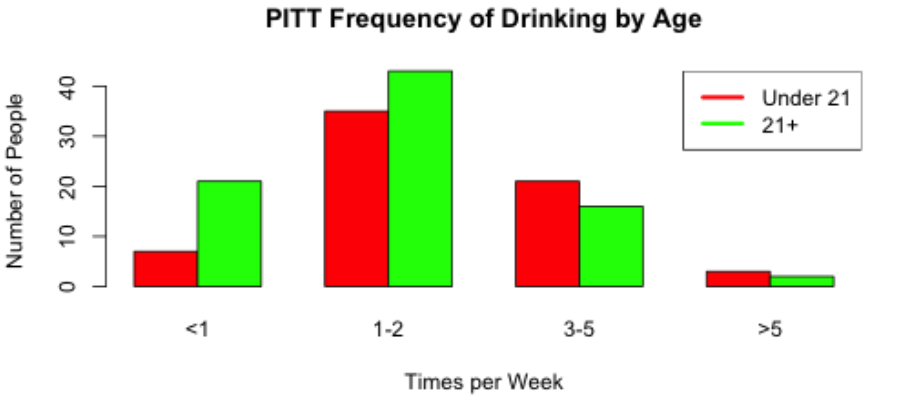


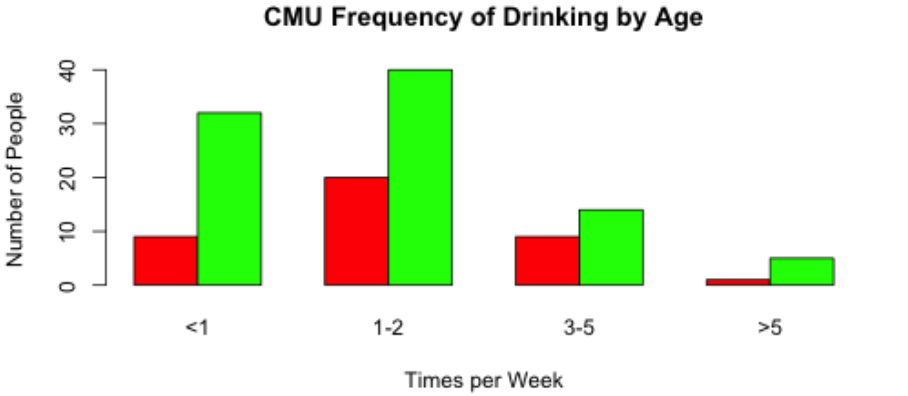


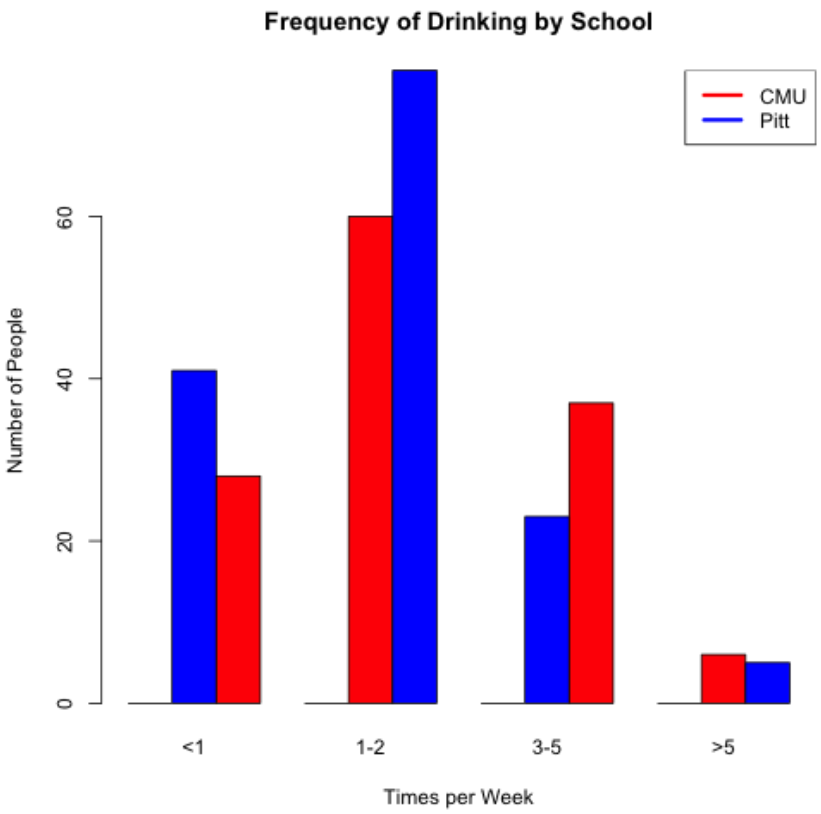


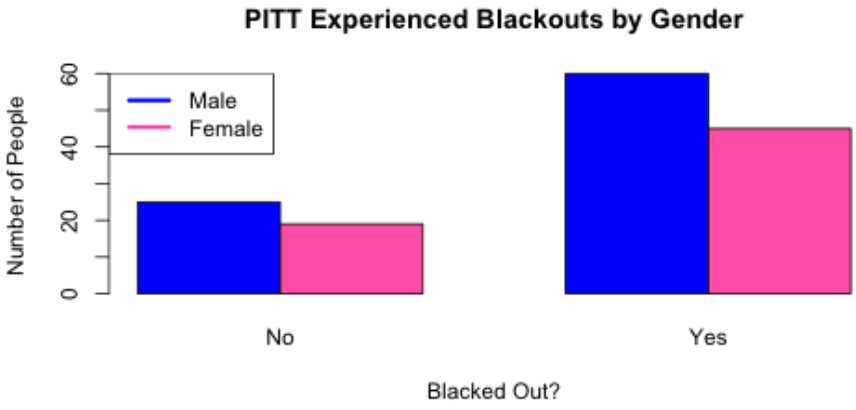

PITT Blackouts by Greek Affiliation
Not Greek
Greek
0
20
40
60
80
No
Yes
Experienced Blackout

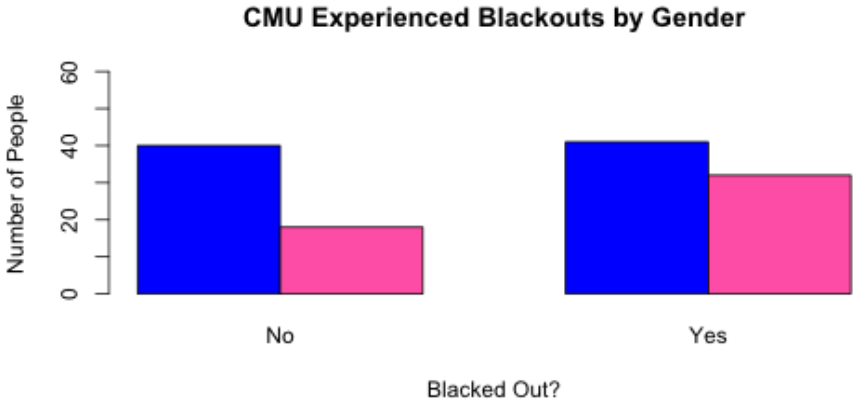

CMU Blackouts by Greek Affiliation
0
20
40
60
80
No
Yes
Experienced Blackout

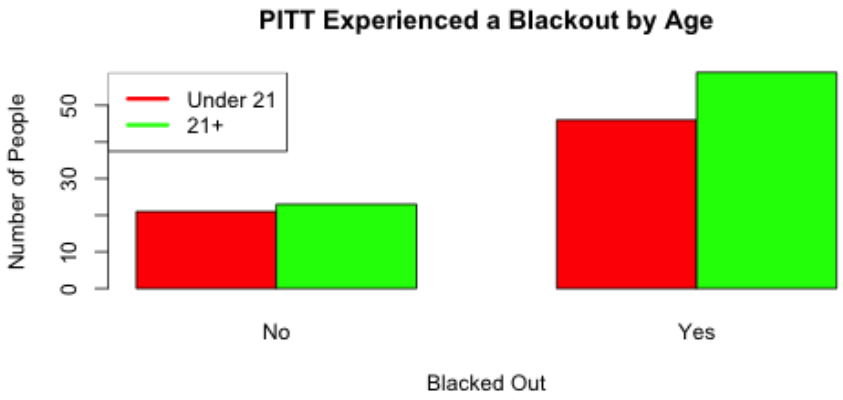

PITT Frequency of Drinking by Age
Under 21
21+
Number of People
0
10
20
30
40
<1
1-2
3-5
>5
Times per Week

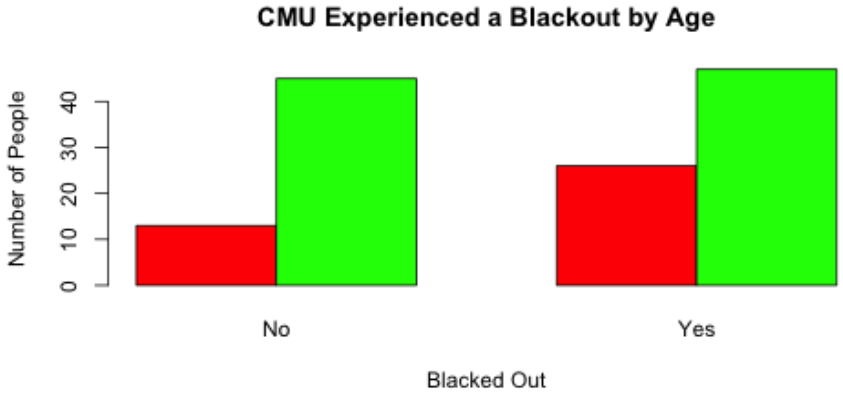

CMU Frequency of Drinking by Age
Number of People
0
10
20
30
40
<1
1-2
3-5
>5
Times per Week

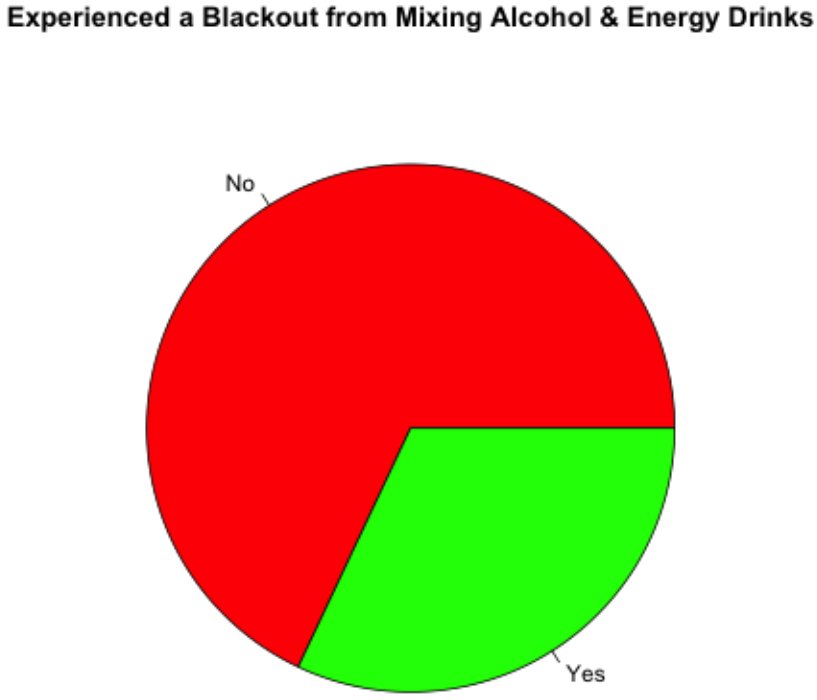

Frequency of Drinking by School
CMU
Pitt
Number of People
0
20
40
60
<1
1-2
3-5
>5
Times per Week

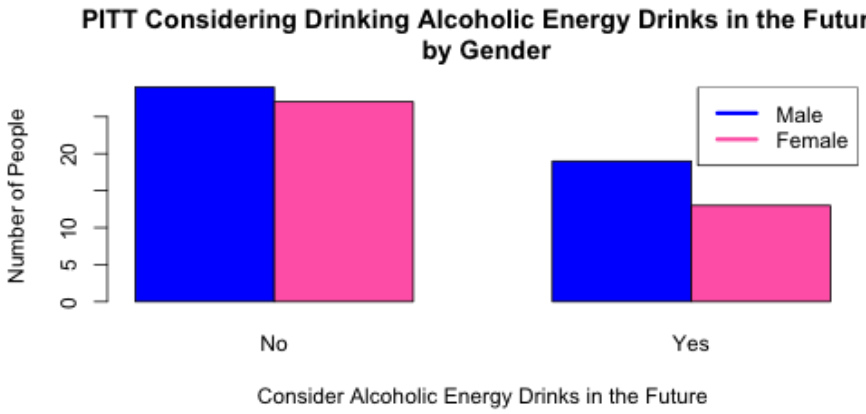

PITT Experienced Blackouts by Gender
Male
Female
Number of People
0
20
40
60
No
Yes
Blacked Out?


CMU Experienced Blackouts by Gender
Number of People
0
20
40
60
No
Yes
Blacked Out?

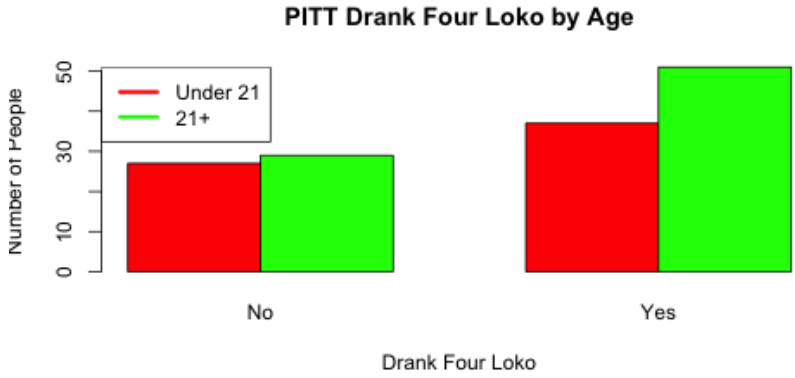

PITT Experienced a Blackout by Age
Under 21
21+
Number of People
0
10
30
50
No
Yes
Blacked Out

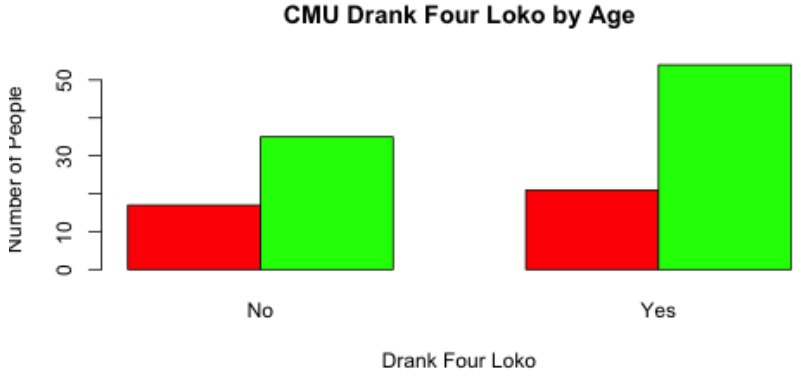

CMU Experienced a Blackout by Age
Number of People
0
10
20
30
40
No
Yes
Blacked Out

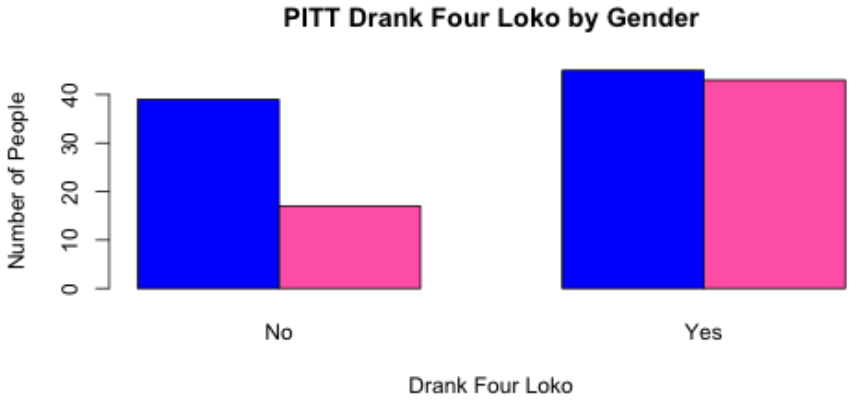

Experienced a Blackout from Mixing Alcohol & Energy Drinks
No
Yes

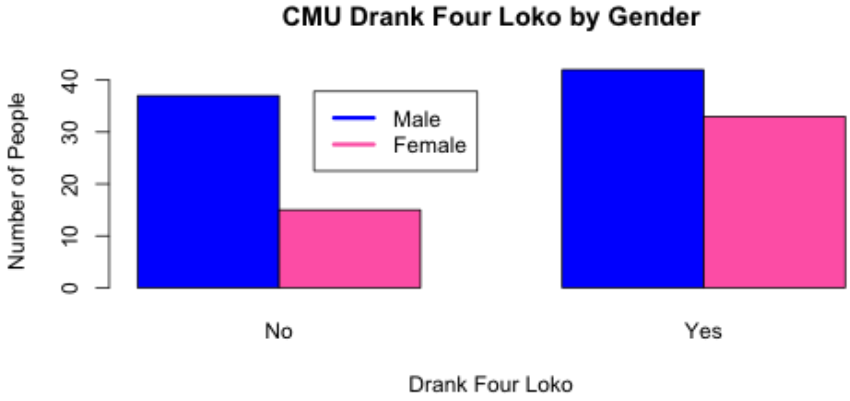

PITT Considering Drinking Alcoholic Energy Drinks in the Future by Gender
Number of People
0
5
10
20
Male
Female
No
Yes
Consider Alcoholic Energy Drinks in the Future

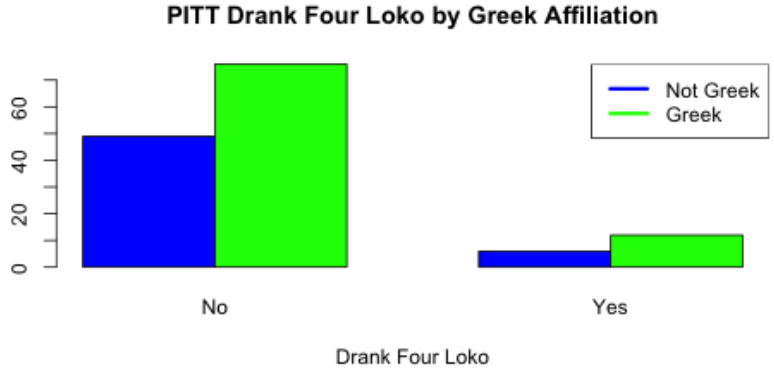

CMU Considering Drinking Alcoholic Energy Drinks in the Future by Gender
Number of People
0
5
10
15
20
No
Yes
Consider Alcoholic Energy Drinks in the Future

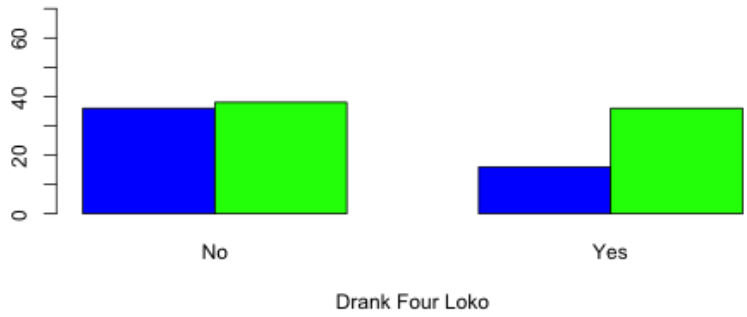

PITT Drank Four Loko by Age
Number of People
0
10
30
50
Under 21
21+
No
Yes
Drank Four Loko

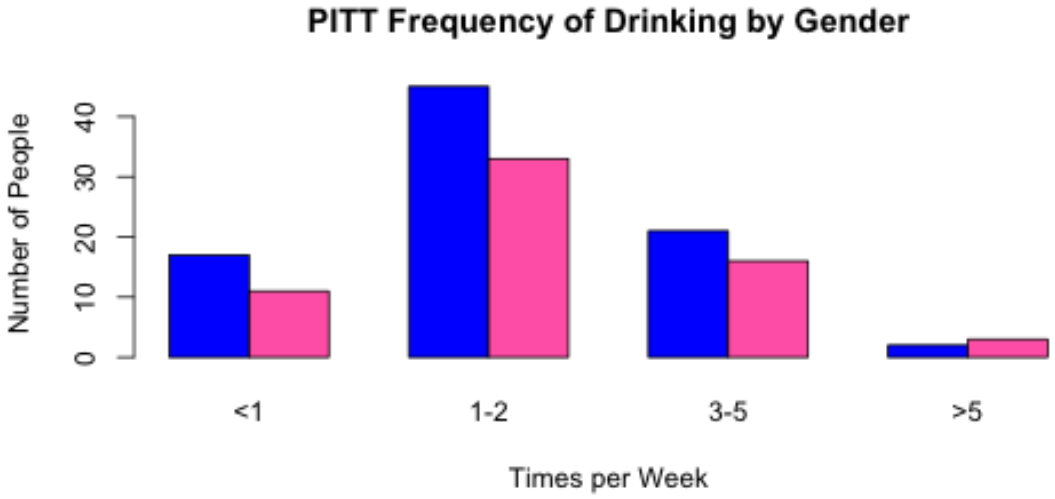

CMU Drank Four Loko by Age
Number of People
0
10
30
50
No
Yes
Drank Four Loko

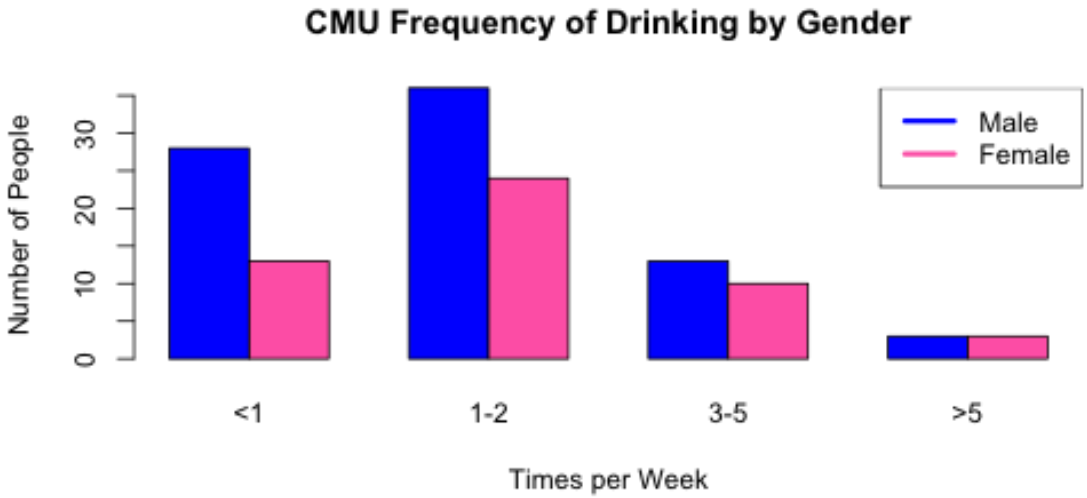

PITT Drank Four Loko by Gender
Number of People
0
10
20
30
40
No
Yes
Drank Four Loko

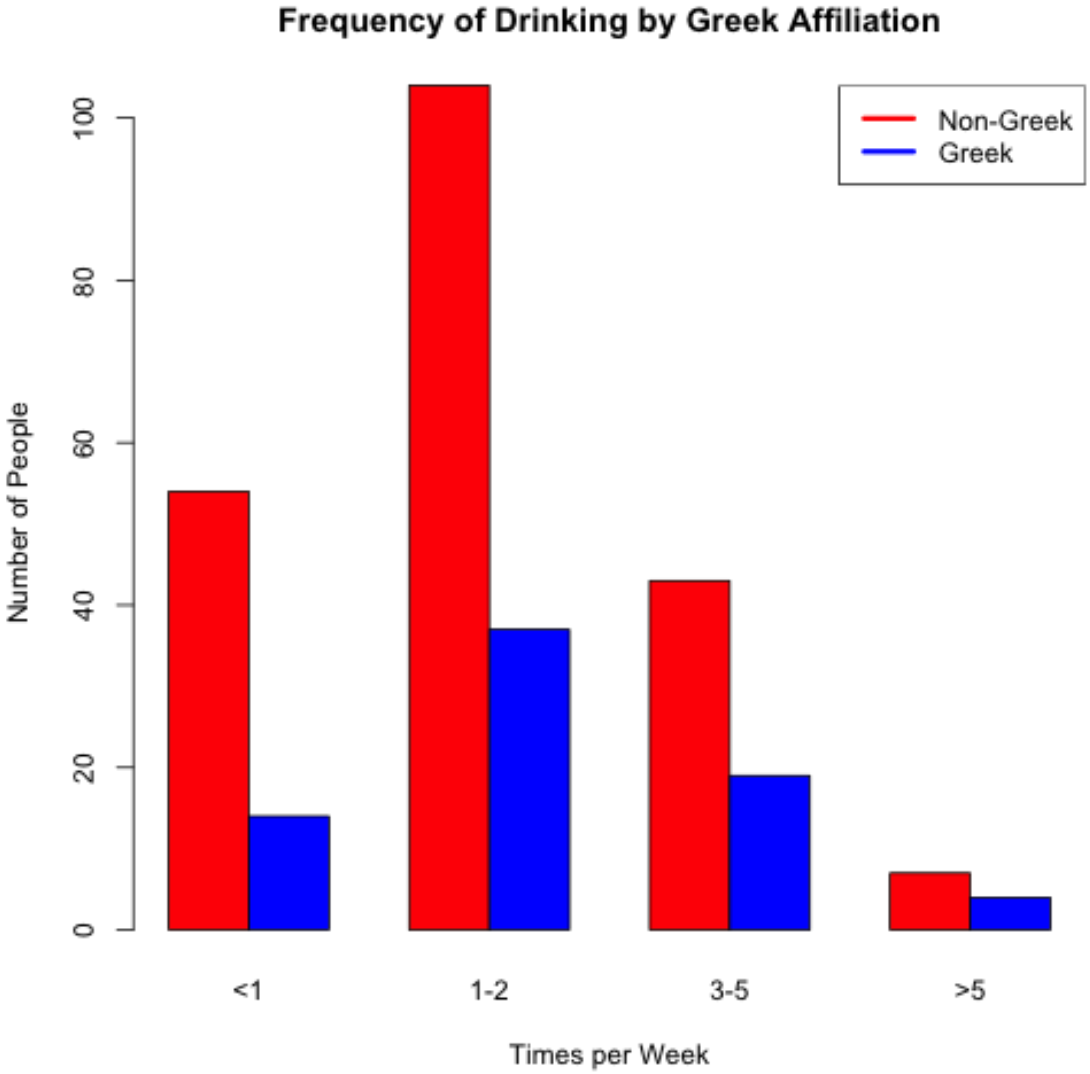

CMU Drank Four Loko by Gender
Number of People
0
10
20
30
40
Male
Female
No
Yes
Drank Four Loko


PITT Drank Four Loko by Greek Affiliation
0
20
40
60
Not Greek
Greek
No
Yes
Drank Four Loko


CMU Drank Four Loko by Greek Affiliation
0
20
40
60
No
Yes
Drank Four Loko


PITT Frequency of Drinking by Gender
Number of People
0
10
20
30
40
<1
1-2
3-5
>5
Times per Week

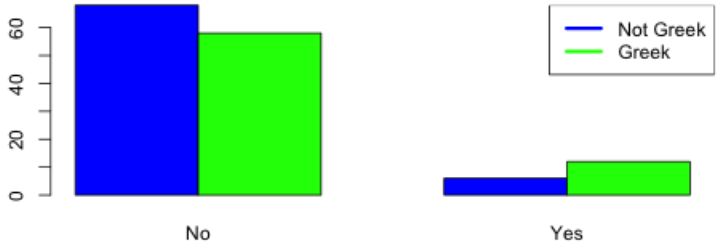

CMU Frequency of Drinking by Gender
Number of People
0
10
20
30
Male
Female
<1
1-2
3-5
>5
Times per Week


Frequency of Drinking by Greek Affiliation
Non-Greek
Greek
Number of People
0
20
40
60
80
100
<1
1-2
3-5
>5
Times per Week

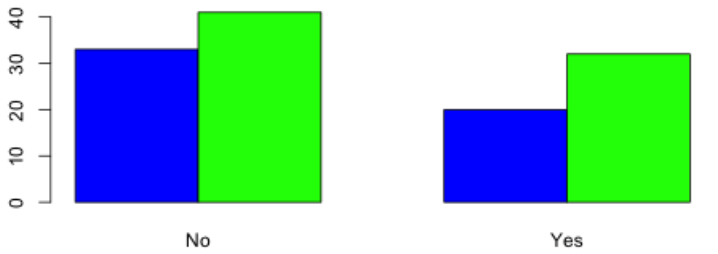
PITT Consideration of Alcoholic Energy Drinks in the Future by Age

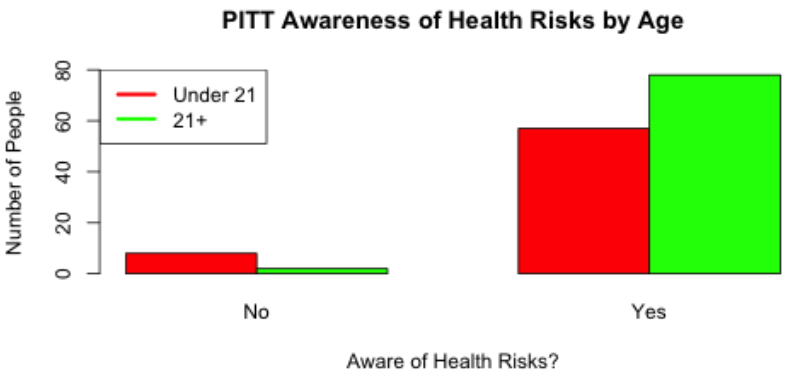
CMU Consideration of Alcoholic Energy Drinks in the Future by Age

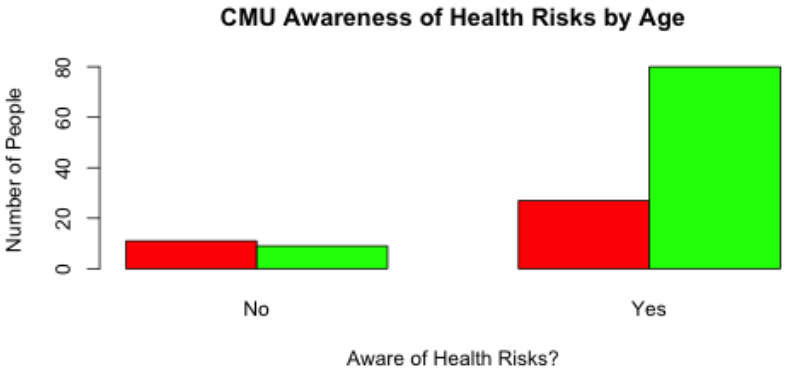
PITT Students Considering Alcoholic Energy Drinks in the Future by Greek Affiliation

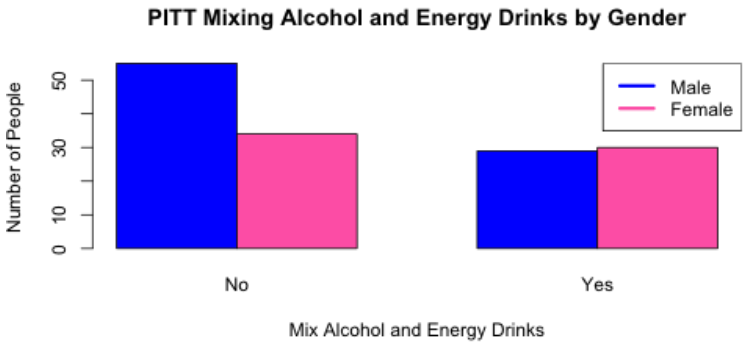


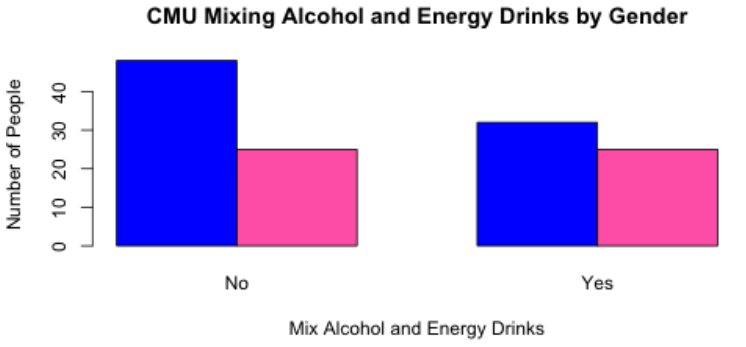
CMU Students Considering Alcoholic Energy Drinks in the Future by Greek Affiliation

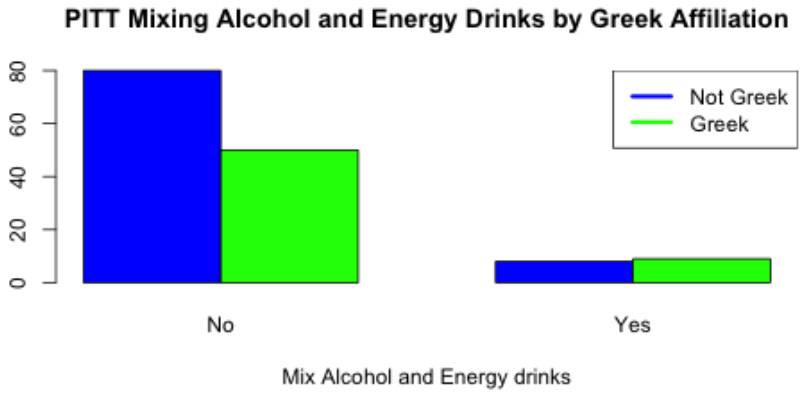


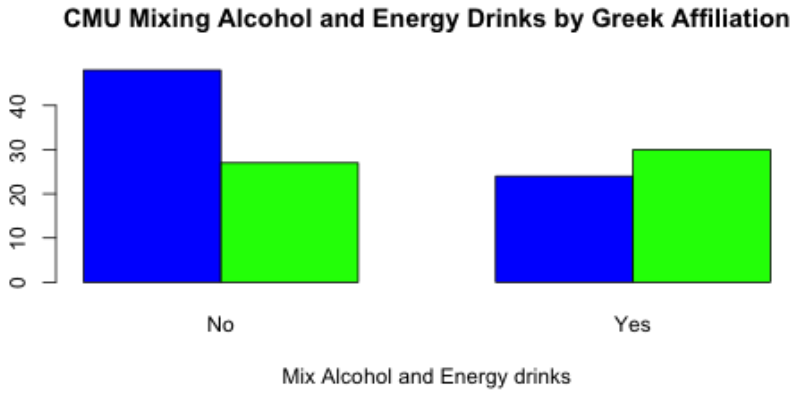

PITT Awareness of Health Risks by Age
Number of People
0
20
40
60
80
Under 21
21+
No
Yes
Aware of Health Risks?

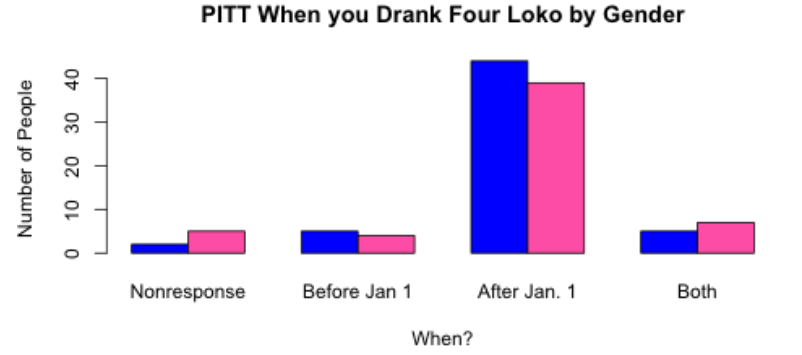

CMU Awareness of Health Risks by Age
Number of People
0
20
40
60
80
No
Yes
Aware of Health Risks?

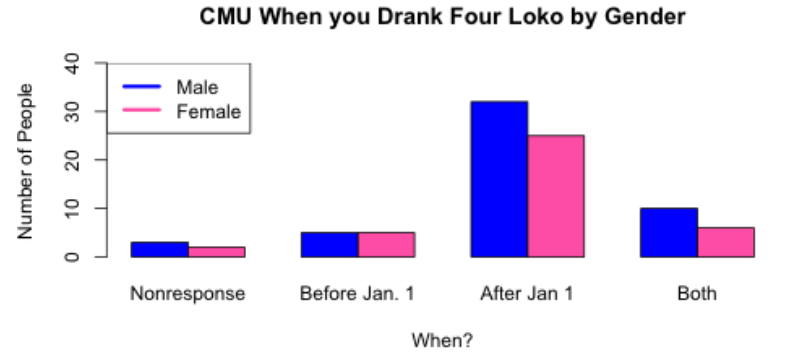

PITT Mixing Alcohol and Energy Drinks by Gender
Number of People
0
10
30
50
Male
Female
No
Yes
Mix Alcohol and Energy Drinks

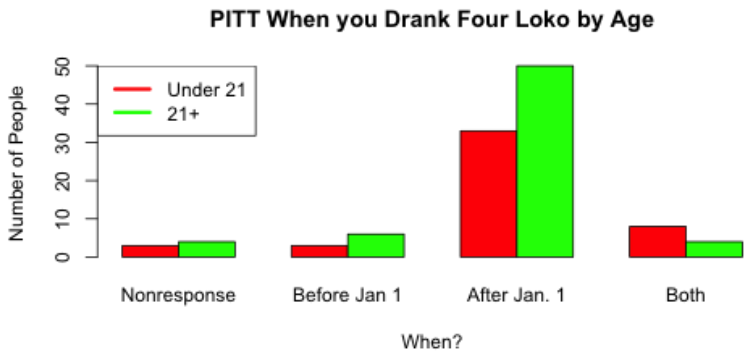

CMU Mixing Alcohol and Energy Drinks by Gender
Number of People
0
10
20
30
40
No
Yes
Mix Alcohol and Energy Drinks

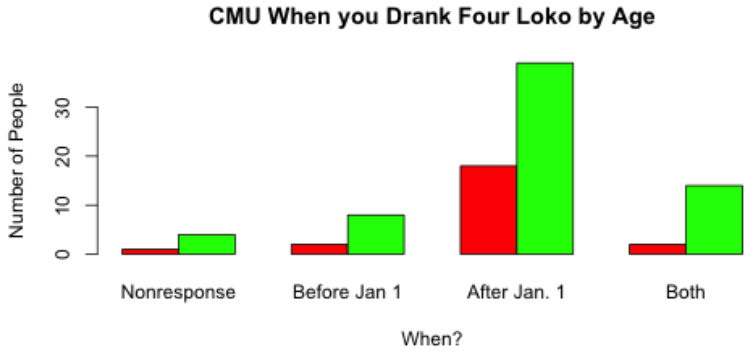

PITT Mixing Alcohol and Energy Drinks by Greek Affiliation
0
20
40
60
80
Not Greek
Greek
No
Yes
Mix Alcohol and Energy drinks

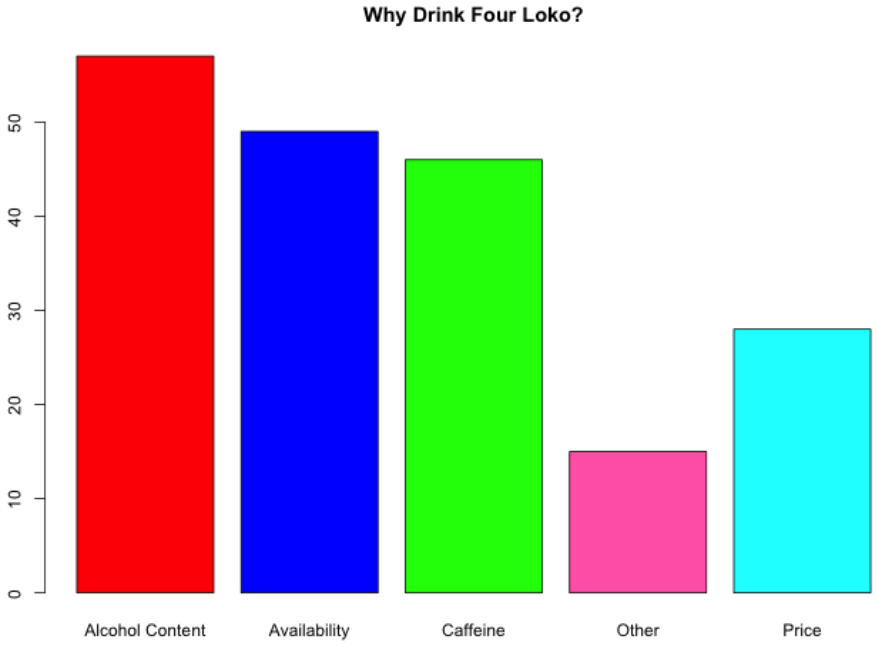

CMU Mixing Alcohol and Energy Drinks by Greek Affiliation
0
10
20
30
40
No
Yes
Mix Alcohol and Energy drinks


PITT When you Drank Four Loko by Gender
Number of People
0
10
20
30
40
Nonresponse
Before Jan 1
After Jan. 1
Both
When?


CMU When you Drank Four Loko by Gender
Number of People
0
10
20
30
40
Male
Female
Nonresponse
Before Jan. 1
After Jan 1
Both
When?


PITT When you Drank Four Loko by Age
Number of People
0
10
20
30
40
50
Under 21
21+
Nonresponse
Before Jan 1
After Jan. 1
Both
When?


CMU When you Drank Four Loko by Age
Number of People
0
10
20
30
Nonresponse
Before Jan 1
After Jan. 1
Both
When?


Why Drink Four Loko?
0
10
20
30
40
50
Alcohol Content
Availability
Caffeine
Other
Price

Appendix 2: Independence Tables

Mantel Haenszel Test

CMU		
	Blackout	
Mix	0	1
0	42	30
1	15	44

Pitt		
	Blackout	
Mix	0	1
0	34	57
1	11	49

Pvalue	1.63E-05
X-Square	18.5849
Common Odds	3.3133

Chi Square Test

	Blackout	
Mix	0	1
0	76	87
1	26	93

	School	
Blackout	CMU	PITT
0	58	46
1	74	106

	School	
Mix	CMU	PITT
0	72	91
1	59	60

Pvalue	3.31E-05
X-Square	17.2324
Pvalue	0.02366
X-Square	5.1193
Pvalue	0.4363
X-Square	0.606

Mantel Haenszel Test

Non-Greek		
	Blackout	
Mix	0	1
0	61	69
1	18	61

Greek		
	Blackout	
Mix	0	1
0	15	18
1	8	32

Pvalue	5.20E-05
X-Square	16.3731
Common Odds	3.08005

Chi Square Test

	Blackout	
Mix	0	1
0	76	87
1	26	93

	Greek	
Blackout	0	1
0	79	25
1	130	50

	Greek	
Mix	0	1
0	130	33
1	79	40

Pvalue	3.31E-05
X-Square	17.2324
Pvalue	0.583
X-Square	0.3014
Pvalue	0.01699
X-Square	5.7291

Mantel Haenszel Test		
Female		
	Blackout	
Mix	0	1
0	50	53

Chi Square Test

	Blackout	
Mix	0	1
0	76	87
1	26	93

Pvalue	3.31E-05
X-Square	17.2324

1	14	49

Pvalue	4.80E-05	
X-Square	16.5248	
Common Odds	3.082601	

Male		
	Blackout	
Mix	0	1
0	26	34
1	12	44

	Sex	
Mix	0	1
0	103	60
1	63	56

	Sex	
Blackout	0	1
0	66	38
1	102	78

Pvalue	0.1085
X-Square	2.5756

Pvalue	0.3188
X-Square	0.994

Appendix 3: Survey/Informed Consent Statement

Do you consume alcoholic beverages? Yes No

-If response is "no," please stop this survey and return it to your surveyor.

What university do you attend? Please choose one:

-Carnegie Mellon University

-The University of Pittsburgh

-Other _____

What is your age? _____

What is your gender?

-Male

-Female

Are you affiliated with Greek life your University?

-Yes

-No

On average, how frequently do you consume at least one alcoholic beverage? Please choose one:

-Less than 1 time per week

-From 1 to 2 times per week

-From 3 to 5 times per week

-Greater than 5 times per week

Have you ever experienced complete or partial memory loss (i.e. a "blackout") while drinking?

-Yes

-No

Do you mix energy drinks and alcohol?

-Yes

-No

Were you drinking alcoholic energy drinks when you "blacked out"?

-Yes

-No

-N/a

Why do you drink alcoholic energy drinks? Choose all that apply:

-Price

-Taste

-Alcoholic content

-Availability

For the caffeine

-Other_____

Have you ever heard of Four Loko?

-Yes

-No

Have you ever drank Four Loko?

-Yes

-No

The caffeine was removed from Four Loko by January 1, 2011. When did you drink Four Loko?

-Before January 1, 2011

Would you consider drinking Four Loko since the removal of caffeine?

-Yes

-No

-After January 1, 2011

-Both before & after January 1, 2011

Do you know the health risks associated with drinking alcoholic energy drinks?

-Yes

-No

Will you consider drinking alcoholic energy drinks in the future?

-Yes

-No

Did the risks associated with drinking alcoholic energy drinks affect your answer to 19?

-Yes

-No

-N/a

This survey is being conducted as a course requirement for 36-303: Sampling, Surveys and Society at Carnegie Mellon University. The purpose of the survey is to find out about students' habits and attitudes regarding alcoholic energy drinks, on the main campuses of the University of Pittsburgh and Carnegie Mellon University. Participation in this survey is voluntary and you can stop at any time. Your answers are anonymous, and are in no way attached to your name or any other type of identifiable information about you. If you have any questions, problems, or concerns, please contact the course instructor,
Brian Junker (brian@stat.cmu.edu).

I have read and understand the above statements and agree to participate in the survey

Signature _____ Date _____

Appendix 4: R Code

```
data= read.csv("survey.responses.4.csv",header=TRUE)
attach(data)
#The different tables stratified on school. There are also the chi.sq test of
#independence for the small tests and mantelhaenszel test for that large tables#
table(blackout,black.mix,school)
mantelhaen.test(table(blackout,black.mix,school))
mantelhaen.test(table(blackout,black.mix,sex))
mantelhaen.test(table(blackout,black.mix,data$greek))
#Given school, blackout and blackout from mixing alcohol & energy drinks are not independent
table(blackout,black.mix)
chisq.test(table(blackout,black.mix))

######
library(graphics)
fourfoldplot(table(blackout[-which(black.mix==-1)], black.mix[-which(black.mix==-1)]))
######

table(blackout,school)
chisq.test(table(blackout,school))
table(black.mix,school)
chisq.test(table(black.mix,school))

table(blackout,freq,school)
mantelhaen.test(table(blackout,freq,school))
mantelhaen.test(table(blackout,freq,sex))
mantelhaen.test(table(blackout,freq,data$greek))
table(blackout,freq)
chisq.test(table(blackout,freq))
table(blackout,school)#already did this one
table(freq,school)
chisq.test(table(freq,school))
chisq.test(table(freq,sex))
chisq.test(table(freq,data$greek))

table(mix,blackout,school)
mantelhaen.test(table(mix,blackout,school))
mantelhaen.test(table(mix,blackout,sex))
mantelhaen.test(table(mix,blackout,data$greek))
table(mix,blackout)
chisq.test(table(mix,blackout))
table(blackout,school)#already did this one
table(mix,school)
chisq.test(table(mix,school))

table(freq,black.mix,school)
mantelhaen.test(freq,black.mix,school)
mantelhaen.test(freq,black.mix,sex)
mantelhaen.test(freq,black.mix,data$greek)
table(freq,black.mix)
chisq.test(table(freq,black.mix))
table(freq,school)#already did this one
table(black.mix,school)#already did this one
```

```
table(freq[freq>=0],mix,school)
mantelhaen.test(table(freq[freq>=1],mix[freq>=1],school[freq>=1]))######
table(freq,mix)
chisq.test(table(freq,school))
table(freq,school)#already did this one
table(mix,school)#already did this one

table(blackout,drank.4,school)
mantelhaen.test(table(blackout,drank.4,school))
mantelhaen.test(table(blackout,drank.4,sex))
mantelhaen.test(table(blackout,drank.4,data$greek))
table(blackout,drank.4)
chisq.test(table(blackout,drank.4))
table(blackout,school)
table(drank.4,school)
chisq.test(table(drank.4,school))

table(drank.4,freq,school)
mantelhaen.test(table(drank.4,freq,school))
mantelhaen.test(table(drank.4,freq,sex))
mantelhaen.test(table(drank.4,freq,data$greek))
table(drank.4,freq)
chisq.test(drank.4,freq)
table(drank.4,school)
table(freq,school)

#Stratified by Greek
table(blackout,black.mix,greek)
mantelhaen.test(table(blackout,black.mix, greek))
table(blackout,black.mix)
chisq.test(table(blackout,black.mix))
table(blackout, greek)
chisq.test(table(blackout, greek))
table(black.mix, greek)
chisq.test(table(black.mix, greek))

table(blackout,freq, greek)
mantelhaen.test(table(blackout,freq, greek))
table(blackout,freq)
chisq.test(table(blackout,freq))
table(blackout, greek)#already did this one
table(freq, greek)
chisq.test(table(freq, greek))

table(mix,blackout, greek)
mantelhaen.test(table(mix,blackout, greek))
table(mix,blackout)
chisq.test(table(mix,blackout))
table(blackout, greek)#already did this one
table(mix, greek)
chisq.test(table(mix, greek))

table(freq,black.mix, greek)
mantelhaen.test(freq,black.mix, greek)
table(freq,black.mix)
chisq.test(table(freq,black.mix))
```

```
table(freq, greek)#already did this one
table(black.mix, greek)#already did this one

table(freq,mix, greek)
mantelhaen.test(table(freq,mix, greek))
table(freq,mix)
chisq.test(table(freq, greek))
table(freq, greek)#already did this one
table(mix, greek)#already did this one

table(blackout,drank.4, greek)
mantelhaen.test(table(blackout,drank4, greek))#
table(blackout,drank.4)
chisq.test(table(blackout,drank.4))
table(blackout, greek)
table(drank.4, greek)
chisq.test(table(drank.4, greek))

table(drank.4,freq, greek)
mantelhaen.test(table(drank.4,freq, greek))
table(drank.4,freq)
chisq.test(drank.4,freq)
table(drank.4, greek)
table(freq, greek)

#Stratified by sex
table(blackout,black.mix,sex)
mantelhaen.test(table(blackout,black.mix, sex))
table(blackout,black.mix)
chisq.test(table(blackout,black.mix))
table(blackout, sex)
chisq.test(table(blackout, sex))
table(black.mix, sex)
chisq.test(table(black.mix, sex))

table(blackout,freq, sex)
mantelhaen.test(table(blackout,freq, sex))
table(blackout,freq)
chisq.test(table(blackout,freq))
table(blackout, sex)#already did this one
table(freq, sex)
chisq.test(table(freq, sex))

table(mix,blackout, sex)
mantelhaen.test(table(mix,blackout, sex))
table(mix,blackout)
chisq.test(table(mix,blackout))
table(blackout, sex)#already did this one
table(mix, sex)
chisq.test(table(mix, sex))

table(freq,black.mix, sex)
mantelhaen.test(freq,black.mix, sex)
table(freq,black.mix)
chisq.test(table(freq,black.mix))
table(freq, sex)#already did this one
```

```
table(black.mix, sex)#already did this one

table(freq,mix, sex)
mantelhaen.test(table(mix, freq,sex))
table(freq,mix)
chisq.test(table(freq, sex))
table(freq, sex)#already did this one
table(mix, sex)#already did this one

table(blackout,drank.4, sex)
mantelhaen.test(table(blackout,drank.4, sex))
table(blackout,drank.4)
chisq.test(table(blackout,drank.4))
table(blackout, sex)
table(drank.4, sex)
chisq.test(table(drank.4, sex))

table(drank.4,freq, sex)
mantelhaen.test(table(drank.4,freq, sex))
table(drank.4,freq)
chisq.test(drank.4,freq)
table(drank.4, sex)
table(freq, sex)

#Correlation Stratified by School
pitt=which(school=="PITT")
data.pitt=data[pitt,]
data.cmu=data[-pitt,]

cor(data.pitt$freq,data.pitt$blackout,use="complete")
cor(data.pitt$freq,data.pitt$black.mix,use="complete")
cor(data.pitt$freq,data.pitt$drank.4,use="complete")
cor(data.pitt$freq,data.pitt$mix,use="complete")
cor(data.pitt$freq,data.pitt$future,use="complete")
#cor(data.pitt$freq,data.pitt$risk,na.rm=TRUE)

cor(data.cmu$freq,data.cmu$blackout,use="complete")
cor(data.cmu$freq,data.cmu$black.mix,use="complete")
cor(data.cmu$freq,data.cmu$drank.4,use="complete")
cor(data.cmu$freq,data.cmu$mix,use="complete")
cor(data.cmu$freq,data.cmu$future,use="complete")
#cor(data.cmu$freq,data.cmu$risk)

cor(data.pitt$blackout,data.pitt$black.mix,use="complete")
cor(data.pitt$blackout,data.pitt$drank.4,use="complete")
cor(data.pitt$blackout,data.pitt$mix,use="complete")
cor(data.pitt$blackout,data.pitt$future,use="complete")
#cor(data.pitt$freq,data.pitt$risk,use="complete")

cor(data.cmu$blackout,data.cmu$black.mix,use="complete")
cor(data.cmu$blackout,data.cmu$drank.4,use="complete")
cor(data.cmu$blackout,data.cmu$mix,use="complete")
cor(data.cmu$blackout,data.cmu$future,use="complete")

cor(data.pitt$black.mix,data.pitt$drank.4,use="complete")
cor(data.pitt$black.mix,data.pitt$mix,use="complete")
```

```
cor(data.pitt$black.mix,data.pitt$future,use="complete")
#cor(data.pitt$freq,data.pitt$risk,use="complete")

cor(data.cmu$black.mix,data.cmu$drank.4,use="complete")
cor(data.cmu$black.mix,data.cmu$mix,use="complete")
cor(data.cmu$black.mix,data.cmu$future,use="complete")

cor(data.pitt$drank.4,data.pitt$mix,use="complete")
cor(data.pitt$drank.4,data.pitt$future,use="complete")
cor(data.cmu$drank.4,data.cmu$mix,use="complete")
cor(data.cmu$drank.4,data.cmu$future,use="complete")

cor(data.pitt$mix,data.pitt$future,use="complete")
cor(data.cmu$mix,data.cmu$future,use="complete")

#Correlation Stratified by Sex
male=which(sex==1)
data.male=data[male,]
data.fmale=data[-male,]
cor(data.male$freq,data.male$blackout,use="complete")
cor(data.male$freq,data.male$black.mix,use="complete")
cor(data.male$freq,data.male$drank.4,use="complete")
cor(data.male$freq,data.male$mix,use="complete")
cor(data.male$freq,data.male$future,use="complete")
#cor(data.male$freq,data.male$risk,na.rm=TRUE)
cor(data.fmale$freq,data.fmale$blackout,use="complete")
cor(data.fmale$freq,data.fmale$black.mix,use="complete")
cor(data.fmale$freq,data.fmale$drank.4,use="complete")
cor(data.fmale$freq,data.fmale$mix,use="complete")
cor(data.fmale$freq,data.fmale$future,use="complete")
#cor(data.fmale$freq,data.fmale$risk)
cor(data.male$blackout,data.male$black.mix,use="complete")
cor(data.male$blackout,data.male$drank.4,use="complete")
cor(data.male$blackout,data.male$mix,use="complete")
cor(data.male$blackout,data.male$future,use="complete")
#cor(data.male$freq,data.male$risk,use="complete")
cor(data.fmale$blackout,data.fmale$black.mix,use="complete")
cor(data.fmale$blackout,data.fmale$drank.4,use="complete")
cor(data.fmale$blackout,data.fmale$mix,use="complete")
cor(data.fmale$blackout,data.fmale$future,use="complete")
cor(data.male$black.mix,data.male$drank.4,use="complete")
cor(data.male$black.mix,data.male$mix,use="complete")
cor(data.male$black.mix,data.male$future,use="complete")
#cor(data.male$freq,data.male$risk,use="complete")
cor(data.fmale$black.mix,data.fmale$drank.4,use="complete")
cor(data.fmale$black.mix,data.fmale$mix,use="complete")
cor(data.fmale$black.mix,data.fmale$future,use="complete")
cor(data.male$drank.4,data.male$mix,use="complete")
cor(data.male$drank.4,data.male$future,use="complete")
cor(data.fmale$drank.4,data.fmale$mix,use="complete")
cor(data.fmale$drank.4,data.fmale$future,use="complete")
cor(data.male$mix,data.male$future,use="complete")
cor(data.fmale$mix,data.male$future,use="complete")

#Stratified by Greek life
ngreek=which(greek==0)
```

```
data.ngreek=data[ngreek,]
greek=which(greek==1)
data.greek=data[greek,]
cor(data.greek$freq,data.greek$blackout,use="complete")
cor(data.greek$freq,data.greek$black.mix,use="complete")
cor(data.greek$freq,data.greek$drank.4,use="complete")
cor(data.greek$freq,data.greek$mix,use="complete")
cor(data.greek$freq,data.greek$future,use="complete")
#cor(data.greek$freq,data.greek$risk,na.rm=TRUE)
cor(data.ngreek$freq,data.ngreek$blackout,use="complete")
cor(data.ngreek$freq,data.ngreek$black.mix,use="complete")
cor(data.ngreek$freq,data.ngreek$drank.4,use="complete")
cor(data.ngreek$freq,data.ngreek$mix,use="complete")
cor(data.ngreek$freq,data.ngreek$future,use="complete")
#cor(data.ngreek$freq,data.ngreek$risk)
cor(data.greek$blackout,data.greek$black.mix,use="complete")
cor(data.greek$blackout,data.greek$drank.4,use="complete")
cor(data.greek$blackout,data.greek$mix,use="complete")
cor(data.greek$blackout,data.greek$future,use="complete")
#cor(data.greek$freq,data.greek$risk,use="complete")
cor(data.ngreek$blackout,data.ngreek$black.mix,use="complete")
cor(data.ngreek$blackout,data.ngreek$drank.4,use="complete")
cor(data.ngreek$blackout,data.ngreek$mix,use="complete")
cor(data.ngreek$blackout,data.ngreek$future,use="complete")
cor(data.greek$black.mix,data.greek$drank.4,use="complete")
cor(data.greek$black.mix,data.greek$mix,use="complete")
cor(data.greek$black.mix,data.greek$future,use="complete")
#cor(data.greek$freq,data.greek$risk,use="complete")
cor(data.ngreek$black.mix,data.ngreek$drank.4,use="complete")
cor(data.ngreek$black.mix,data.ngreek$mix,use="complete")
cor(data.ngreek$black.mix,data.ngreek$future,use="complete")
cor(data.greek$drank.4,data.greek$mix,use="complete")
cor(data.greek$drank.4,data.greek$future,use="complete")
cor(data.ngreek$drank.4,data.ngreek$mix,use="complete")
cor(data.ngreek$drank.4,data.ngreek$future,use="complete")
cor(data.greek$mix,data.greek$future,use="complete")
cor(data.ngreek$mix,data.ngreek$future,use="complete")

##########################################################
price<-rep("price", length(which(why.price==1)))
alcohol<-rep("alcohol", length(which(why.alcohol==1)))
availability<-rep("available", length(which(why.availability==1)))
caffeine <- rep("caffeine", length(which(why.caffeine==1)))
other<- rep("other", 15)

why.4 <- c(price, alcohol, availability, caffeine, other)

barplot(table(why.4), main="Why Drink Four Loko?", col=c("red", "blue", "green", "hotpink", "cyan"),
names=c("Alcohol Content", "Availability", "Caffeine", "Other", "Price"))
```

```
data=read.csv("surveyDataset.csv", header=T)
attach(data)
colnames(data)

#Stuff for Chris
```

```
stand.dev=function(variable){
#n=length(variable)
n=(length(which(variable==1)) + length(which(variable==0)))
p=(length(which(variable==1))/n)
value=(p*(1-p))
return(value)
}
stand.dev(blackout)
stand.dev(mix)
stand.dev(black.mix)
stand.dev(heard.4)
stand.dev(drank.4)
#stand.dev(consider)
stand.dev(health)
stand.dev(future)
stand.dev(risk)

#Stuff for analysis
#########EDA
#data description:
table(location)#extra info where 1 is cmu and 0 is pitt
table(date)#extra info
table(location,date)

#Only use this to talk about why people said they drink energy drinks
table(why.price)
table(why.taste)
table(why.alcohol)
table(why.availability)
table(why.caffeine)
table(why.other)#the most interesting, I'm not sure the best way to display this

#Removed irrelevent data: removed the four people who aren't from cmu or pitt
table(school)#stratify everything by school
dim(data)
data.cp=matrix(0,nrow=286,ncol=24)
remove=c(which(school=="PHILADELPHIA"),which(school=="POINTPARK"),which(school=="VASSAR"), which(school=="UCLA"))
data.cp=data[-remove,]
dim(data.cp)
attach(data.cp)
school.s=factor(as.character(school))
table(school.s)

#demographics and a little data management
n=length(age)
table(age, exclude=NULL);table(age)/n #table of ages, just so you (meg doug) can see how its distributed
hist(age,ylab="Frequency",xlab="Age",main="Histogram of Age")#same with histogram, but include in paper
mean(age)
sd(age)
age.4=rep(0, nrow(data.cp)) #this is so that we have 4 different caregories of age, eaiser to analyze
for (i in 1:nrow(data.cp)) {
        if (age[i]<=18) {
                age.4[i]=1
        }
```

```
        else if (age[i]==19) {
                age.4[i]=2
        }
        else if (age[i]==20) {
                age.4[i]=3
        }
        else {
                age.4[i]=4
        }
}
table(age.4);table(age.4)/n
age.21<-ifelse(age<21,1,0)#so we can look at things if people are underage or not
data.cp=cbind(data.cp,school.s,age.4,age.21)
table(age.21);table(age.21)/n;table(age.21, school.s)
table(sex); table(sex)/n
table(greek)#there are two typos: where someone entered 2 and 3, I forget what kind of errors they're called
table(greek[-which(greek>1)]); table(greek[-which(greek>1)])/(n-2)

#variables of interest
table(freq,exclude=NULL); table(freq[-which(freq<0)])/(length(freq)-1)
table(blackout, exclude=NULL);table(blackout)/length(blackout)
table(mix, exclude=NULL); table(mix,exclude=NULL)/n
table(black.mix,exclude=NULL); table(black.mix,exclude=NULL)/n
table(black.mix[-which(black.mix==-1)]);table(black.mix[-which(black.mix==-1)])/(119+56)

pie(table(black.mix[-which(black.mix==-1)]), labels=c("No", "Yes"), main="Experienced a Blackout from
Mixing Alcohol & Energy Drinks", col=c("red", "green"))

table(blackout,mix)#just interesting to compare to the previous question
table(blackout,mix)/(76+26+89+93)
table(heard.4,exclude=NULL);table(heard.4,exclude=NULL)/n
table(heard.4[-which(heard.4==-1)]); table(heard.4[-which(heard.4==-1)])/(20+256)
table(drank.4,exclude=NULL); table(drank.4,exclude=NULL)/n
table(drank.4[-which(drank.4==-1)]); table(drank.4[-which(drank.4==-1)])/(110+165)

table(when.4,exclude=NULL);table(when.4,exclude=NULL)/n
table(when.4[-(which(when.4=="-1"))]); table(when.4[-(which(when.4=="-1"))])/(19+143+29)
table(consider,exclude=NULL); table(consider,exclude=NULL)/n
table(consider[-which(consider<0)]); table(consider[-which(consider<0)])/(95+65)
table(consider,when.4)#this lets us look at how many people screwed up and didn't answer consider ONLY
if they answered before
table(health, exclude=NULL); table(health)/n
table(health[-which(health=="-1")])
table(health[-which(health=="-1")])/(276)
table(future,exclude=NULL); table(future,exclude=NULL)/n
table(future[-which(future=="-1")]); table(future[-which(future=="-1")])/(131+145)
table(risk,exclude=NULL);table(risk)/n
table(risk[-which(risk=="-1")]); table(risk[-which(risk=="-1")])/(139+89)

###multivariate EDA: broke everything down by school, then by the demographic
#i'm assuming that we're only interested in when the people responded (so I didnt look at -1 or NA)
#demographics
with(data.cp[-which(greek>1),], table(greek[-which(greek>1)],sex[-which(greek>1)],school.s[-
which(greek>1)]))
with(data.cp[-which(greek>1),], table(greek,age.4,school.s))
with(data.cp[-which(greek>1),], table(greek,age.21,school.s))
```

```
with(data.cp,table(sex,age.4,school.s))
with(data.cp,table(sex,age.21,school.s))

#greek compared to everything
with(data.cp[-c(which(greek>1),which(freq==0)),], table(greek,freq,school.s))

with(data.cp[-c(which(greek>1),which(freq<1)),], table(greek,freq,school.s))

library(graphics)

barplot( table(greek[-c(40, 114, 168, 269)], freq[-c(40, 114, 168, 269)]), beside=T, main="Frequency of
Drinking by Greek Affiliation", xlab="Times per Week", names=c("<1", "1-2", "3-5", ">5"),
ylab="Number of People", col=c("red", "blue") )
legend("topright", c("Non-Greek", "Greek"), col=c("red", "blue"), lwd=3)

####LOOK AT THIS
school.s2=factor(as.character(school.s[-which(school.s==-1)]))
barplot( table(school.s2[-c(1, 14, 114, 159, 178, 230, 266, 269)], freq[-c(1, 14, 114, 159, 178, 230, 266,
269)]), beside=T, main="Frequency of Drinking by School", xlab="Times per Week", names=c("<1", "1-
2", "3-5", ">5"), ylab="Number of People", col=c("red", "blue"), ylim=c(0,80) )
legend("topright", c("CMU", "Pitt"), col=c("red", "blue"), lwd=3)

CMU<- c(which(school.s=="CMU"), 1,  14, 159, 178, 230, 266)
PITT <- c(which(school.s=="PITT"), 1,  14, 159, 178, 230, 266)

par(mfrow=c(2,1))
barplot(table(blackout[-c(CMU, 40, 168)], greek[-c(CMU, 40, 168)]), beside=T, main="PITT Blackouts by
Greek Affiliation", names=c("No", "Yes"), xlab="Experienced Blackout", col=c("Blue", "Green"))
legend("topright", c("Not Greek", "Greek"), col=c("blue", "green"), lwd=3)
barplot(table(blackout[-c(PITT, 40, 168)], greek[-c(PITT, 40, 168)]), beside=T, main="CMU Blackouts by
Greek Affiliation", names=c("No", "Yes"), xlab="Experienced Blackout", col=c("Blue", "Green"),
ylim=c(0,80))

with(data.cp[-which(greek>=1),], table(greek,blackout,school.s))
with(data.cp[-which(greek>1),], table(greek,mix,school.s))

par(mfrow=c(2,1))
barplot(table(mix[-c(CMU, 40, 168)], greek[-c(CMU, 40, 168)]), beside=T, main="PITT Mixing Alcohol
and Energy Drinks by Greek Affiliation", names=c("No", "Yes"), xlab="Mix Alcohol and Energy drinks",
col=c("Blue", "Green"))
legend("topright", c("Not Greek", "Greek"), col=c("blue", "green"), lwd=3)
barplot(table(mix[-c(PITT, 40, 168)], greek[-c(PITT, 40, 168)]), beside=T, main="CMU Mixing Alcohol
and Energy Drinks by Greek Affiliation",  names=c("No", "Yes"), xlab="Mix Alcohol and Energy drinks",
col=c("Blue", "Green"))

with(data.cp[-which(greek>1),], table(greek,black.mix,school.s))
with(data.cp[-which(greek>1),], table(greek,heard.4,school.s))
with(data.cp[-c(which(greek>1),which(heard.4<0)),], table(greek,heard.4,school.s))
with(data.cp[-which(greek>1),], table(greek,drank.4,school.s))

par(mfrow=c(2,1))
barplot(table(drank.4[-c(CMU, 40, 168, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], greek[-c(CMU, 40, 168, 1,  2,
3,  5,  6, 10, 11, 12, 13, 14)]), beside=T, main="PITT Drank Four Loko by Greek Affiliation",
names=c("No", "Yes"), xlab="Drank Four Loko", col=c("Blue", "Green"))
legend("topright", c("Not Greek", "Greek"), col=c("blue", "green"), lwd=3)
barplot(table(drank.4[-c(PITT, 40, 168, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], greek[-c(PITT, 40, 168, 1,  2,
```

```
3,  5,  6, 10, 11, 12, 13, 14)]), beside=T, main="CMU Drank Four Loko by Greek Affiliation",
names=c("No", "Yes"), xlab="Drank Four Loko", col=c("Blue", "Green"), ylim=c(0,70))

with(data.cp[-c(which(greek>1),which(drank.4<0)),], table(greek,drank.4,school.s))
with(data.cp[-which(greek>1),], table(greek,when.4,school.s))
with(data.cp[-c(which(greek>1),which(when.4=="-1")),], table(greek,when.4,school.s))
with(data.cp[-which(greek>1),], table(greek,consider,school.s))
with(data.cp[-c(which(greek>1),which(consider<0)),], table(greek,consider,school.s))
with(data.cp[-which(greek>1),], table(greek,health,school.s))
with(data.cp[-c(which(greek>1),which(health<0)),], table(greek,health,school.s))
with(data.cp[-which(greek>1),], table(greek,future,school.s))

par(mfrow=c(2,1))
barplot(table(future[-c(CMU, 40, 168, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], greek[-c(CMU, 40, 168, 1,  2,  3,
5,  6, 10, 11, 12, 13, 14)]), beside=T, main="PITT Students Considering Alcoholic Energy Drinks in the
Future \nby Greek Affiliation", names=c("No", "Yes"), xlab="Consider Alcoholic Energy Drinks in the
Future", col=c("Blue", "Green"))
legend("topright", c("Not Greek", "Greek"), col=c("blue", "green"), lwd=3)
barplot(table(future[-c(PITT, 40, 168, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], greek[-c(PITT, 40, 168, 1,  2,  3,
5,  6, 10, 11, 12, 13, 14)]), beside=T, main="CMU Students Considering Alcoholic Energy Drinks in the
Future\n by Greek Affiliation", names=c("No", "Yes"), xlab="Consider Alcoholic Energy Drinks in the
Future", col=c("Blue", "Green"))

with(data.cp[-c(which(greek>1),which(future<0)),], table(greek,future,school.s))
with(data.cp[-which(greek>1),], table(greek,risk,school.s))
with(data.cp[-c(which(greek>1),which(risk<0)),], table(greek,risk,school.s))

#sex compared to everything
with(data.cp[-which(freq==0),], table(sex,freq,school.s))

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU, 269)], freq[-c(CMU, 269)]),beside=T, col=c("blue", "hotpink"), xlab="Times
per Week", names=c("<1", "1-2", "3-5", ">5"), ylab="Number of People", main="PITT Frequency of
Drinking by Gender")
barplot(table(sex[-c(PITT, 114, 269)], freq[-c(PITT, 114, 269)]),beside=T, col=c("blue", "hotpink"),
xlab="Times per Week", names=c("<1", "1-2", "3-5", ">5"), ylab="Number of People", main="CMU
Frequency of Drinking by Gender")
legend("topright", c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))

with(data.cp[-which(freq<1),], table(sex,freq,school.s))
with(data.cp, table(sex,blackout,school.s))

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU)], blackout[-c(CMU)]),beside=T, col=c("blue", "hotpink"), xlab="Blacked
Out?", names=c("No", "Yes"), ylab="Number of People", main="PITT Experienced Blackouts by Gender")
legend("topleft", c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))
barplot(table(sex[-c(PITT)], blackout[-c(PITT)]),beside=T, col=c("blue", "hotpink"), xlab="Blacked Out?",
names=c("No", "Yes"), ylab="Number of People", main="CMU Experienced Blackouts by Gender",
ylim=c(0,60))

with(data.cp, table(sex,mix,school.s))

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU)], mix[-c(CMU)]),beside=T, col=c("blue", "hotpink"), xlab="Mix Alcohol and
Energy Drinks", names=c("No", "Yes"), ylab="Number of People", main="PITT Mixing Alcohol and
Energy Drinks by Gender")
```

```
legend("topright", c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))
barplot(table(sex[-c(PITT)], mix[-c(PITT)]),beside=T, col=c("blue", "hotpink"), xlab="Mix Alcohol and
Energy Drinks", names=c("No", "Yes"), ylab="Number of People", main="CMU Mixing Alcohol and
Energy Drinks by Gender"
with(data.cp, table(sex,black.mix,school.s))
with(data.cp, table(sex,heard.4,school.s))
with(data.cp[-which(heard.4<0),], table(sex,heard.4,school.s))
with(data.cp, table(sex,drank.4,school.s))
with(data.cp[-which(drank.4<0),], table(sex,drank.4,school.s))

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], drank.4[-c(CMU, 1,  2,  3,  5,  6, 10, 11, 12,
13, 14)]),beside=T, col=c("blue", "hotpink"), xlab="Drank Four Loko", names=c("No", "Yes"),
ylab="Number of People", main="PITT Drank Four Loko by Gender")
barplot(table(sex[-c(PITT, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], drank.4[-c(PITT, 1,  2,  3,  5,  6, 10, 11, 12,
13, 14)]),beside=T, col=c("blue", "hotpink"), xlab="Drank Four Loko", names=c("No", "Yes"),
ylab="Number of People", main="CMU Drank Four Loko by Gender")
legend(locator(1), c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))

with(data.cp, table(sex,when.4,school.s))

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU)], when.4[-c(CMU)]),beside=T, col=c("blue", "hotpink"), xlab="When?",
names=c("Nonresponse","Before Jan 1", "After Jan. 1", "Both"), ylab="Number of People", main="PITT
When you Drank Four Loko by Gender")
barplot(table(sex[-c(PITT)], when.4[-c(PITT)]),beside=T, col=c("blue", "hotpink"), xlab="When?",
names=c("Nonresponse","Before Jan. 1", "After Jan 1", "Both"), ylab="Number of People", main="CMU
When you Drank Four Loko by Gender", ylim=c(0, 40))
legend("topleft", c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))

with(data.cp[-which(when.4=="-1"),], table(sex,when.4,school.s))
with(data.cp, table(sex,consider,school.s))

consider.non<-which(consider==-1)

par(mfrow=c(2,1))
barplot(table(sex[-c(CMU, consider.non)], consider[-c(CMU, consider.non)]),beside=T, col=c("blue",
"hotpink"), xlab="Consider Alcoholic Energy Drinks in the Future", names=c("No","Yes"), ylab="Number
of People", main="PITT Considering Drinking Alcoholic Energy Drinks in the Future\n by Gender")
legend("topright", c("Male", "Female"), lwd=3, col=c("blue", "hotpink"))
barplot(table(sex[-c(PITT, consider.non)], consider[-c(PITT, consider.non)]),beside=T, col=c("blue",
"hotpink"), xlab="Consider Alcoholic Energy Drinks in the Future", names=c("No","Yes"), ylab="Number
of People", main="CMU Considering Drinking Alcoholic Energy Drinks in the Future\n by Gender")


with(data.cp[-which(consider<0),], table(sex,consider,school.s))
with(data.cp, table(sex,health,school.s))
with(data.cp[-which(health<0),], table(sex,health,school.s))
with(data.cp, table(sex,future,school.s))
with(data.cp[-which(future<0),], table(sex,future,school.s))
with(data.cp, table(sex,risk,school.s))
with(data.cp[-which(risk<0),], table(sex,risk,school.s))

#age.4 compared to everything
with(data.cp[-which(freq==0),], table(age.4,freq,school.s))
with(data.cp[-which(freq<1),], table(age.4,freq,school.s))
```

```
with(data.cp, table(age.4,blackout,school.s))
with(data.cp, table(age.4,mix,school.s))
with(data.cp, table(age.4,black.mix,school.s))
with(data.cp, table(age.4,heard.4,school.s))
with(data.cp[-which(heard.4<0),], table(age.4,heard.4,school.s))
with(data.cp, table(age.4,drank.4,school.s))
with(data.cp[-which(drank.4<0),], table(age.4,drank.4,school.s))
with(data.cp, table(age.4,when.4,school.s))
with(data.cp[-which(when.4=="-1"),], table(age.4,when.4,school.s))
with(data.cp, table(age.4,consider,school.s))
with(data.cp[-which(consider<0),], table(age.4,consider,school.s))
with(data.cp, table(age.4,health,school.s))
with(data.cp[-which(health<0),], table(age.4,health,school.s))
with(data.cp, table(age.4,future,school.s))
with(data.cp[-which(future<0),], table(age.4,future,school.s))
with(data.cp, table(age.4,risk,school.s))
with(data.cp[-which(risk<0),], table(age.4,risk,school.s))

#age.21 compared to everything
with(data.cp[-which(freq==0),], table(age.21,freq,school.s))
with(data.cp[-which(freq<1),], table(age.21,freq,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU, 269)], freq[-c(CMU, 269)]),beside=T, col=c("red", "green"), xlab="Times
per Week", names=c("<1", "1-2", "3-5", ">5"), ylab="Number of People", main="PITT Frequency of
Drinking by Age")
legend("topright", c("Under 21", "21+"), lwd=3, col=c("red", "green"))
barplot(table(age.21[-c(PITT, 114, 269)], freq[-c(PITT, 114, 269)]),beside=T, col=c("red", "green"),
xlab="Times per Week", names=c("<1", "1-2", "3-5", ">5"), ylab="Number of People", main="CMU
Frequency of Drinking by Age")

with(data.cp,table(age.21,blackout,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU)], blackout[-c(CMU)]),beside=T, col=c("red", "green"), xlab="Blacked Out",
names=c("No", "Yes"), ylab="Number of People", main="PITT Experienced a Blackout by Age")
legend("topleft", c("Under 21", "21+"), lwd=3, col=c("red", "green"))
barplot(table(age.21[-c(PITT)], blackout[-c(PITT)]),beside=T, col=c("red", "green"), xlab="Blacked Out",
names=c("No", "Yes"), ylab="Number of People", main="CMU Experienced a Blackout by Age")

with(data.cp,table(age.21,mix,school.s))
with(data.cp,table(age.21,black.mix,school.s))
with(data.cp,table(age.21,heard.4,school.s))
with(data.cp[-which(heard.4<0),], table(age.21,heard.4,school.s))
with(data.cp,table(age.21,drank.4,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], drank.4[-c(CMU, 1,  2,  3,  5,  6, 10, 11,
12, 13, 14)]),beside=T, col=c("red", "green"), xlab="Drank Four Loko", names=c("No", "Yes"),
ylab="Number of People", main="PITT Drank Four Loko by Age")
legend("topleft", c("Under 21", "21+"), lwd=3, col=c("red", "green"))
barplot(table(age.21[-c(PITT, 1,  2,  3,  5,  6, 10, 11, 12, 13, 14)], drank.4[-c(PITT, 1,  2,  3,  5,  6, 10, 11,
12, 13, 14)]),beside=T, col=c("red", "green"), xlab="Drank Four Loko", names=c("No", "Yes"),
ylab="Number of People", main="CMU Drank Four Loko by Age")

with(data.cp[-which(heard.4<0),], table(age.21,drank.4,school.s))
```

```
with(data.cp,table(age.21,when.4,school.s))
with(data.cp[-which(when.4=="-1"),], table(age.21,when.4,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU)], when.4[-c(CMU)]),beside=T, col=c("red", "green"), xlab="When?",
names=c("Nonresponse","Before Jan 1", "After Jan. 1", "Both"), ylab="Number of People", main="PITT
When you Drank Four Loko by Age")
legend("topleft", c("Under 21", "21+"), lwd=3, col=c("red", "green"))
barplot(table(age.21[-c(PITT)], when.4[-c(PITT)]),beside=T, col=c("red", "green"), xlab="When?",
names=c("Nonresponse","Before Jan 1", "After Jan. 1", "Both"), ylab="Number of People", main="CMU
When you Drank Four Loko by Age")

with(data.cp,table(age.21,consider,school.s))
with(data.cp[-which(consider<0),], table(age.21,consider,school.s))
with(data.cp,table(age.21,health,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU, which(health==-1))], health[-c(CMU, which(health==-1))]), beside=T,
xlab="Aware of Health Risks?", names=c("No", "Yes"), col=c("red", "green"), ylab="Number of People",
main="PITT Awareness of Health Risks by Age", ylim=c(0,80))
legend("topleft", c("Under 21", "21+"), lwd=3, col=c("red", "green"))
barplot(table(age.21[-c(PITT, which(health==-1))], health[-c(PITT, which(health==-1))]), beside=T,
xlab="Aware of Health Risks?", names=c("No", "Yes"), col=c("red", "green"), ylab="Number of People",
main="CMU Awareness of Health Risks by Age")


with(data.cp[-which(health<0),], table(age.21,health,school.s))
with(data.cp,table(age.21,future,school.s))

par(mfrow=c(2,1))
barplot(table(age.21[-c(CMU, which(future==-1))], future[-c(CMU, which(future==-1))]), beside=T,
xlab="Drink Alcoholic Energy Drinks in the Future?", names=c("No", "Yes"), col=c("red", "green"),
ylab="Number of People", main="PITT Consideration of Alcoholic Energy Drinks in the Future by Age")
barplot(table(age.21[-c(PITT, which(future==-1))], future[-c(PITT, which(future==-1))]), beside=T,
xlab="Drink Alcoholic Energy Drinks in the Future?", names=c("No", "Yes"), col=c("red", "green"),
ylab="Number of People", main="CMU Consideration of Alcoholic Energy Drinks in the Future by Age")
legend("topleft", c("Under 21", "21+"), lwd=3, col=c("red", "green"))

with(data.cp[-which(future<0),], table(age.21,future,school.s))
with(data.cp,table(age.21,risk,school.s))
with(data.cp[-which(risk<0),], table(age.21,risk,school.s))


#########need help deciding which tests to run
mantelhaen.test(with(data.g, table(greek,sex,school.s)))
or summary(table())


###EDA
par(mfrow=c(2,2))
hist(age, main="Distribution of Age", col="orange")
pie(table(sex), col=c("blue", "hotpink"), labels=c("Male 169", "Female 117"), main="Gender")
pie(table(greek[-which(greek>1)]), main="Greek Affiliation", labels=c("Not Greek 209", "Greek 75" ),
col=c("blue", "green"))
school.s2=factor(as.character(school.s[-which(school.s==-1)]))
pie(table(school.s2), col=c("firebrick4", "midnightblue"), main="School", labels=c("CMU 131", "Pitt
```

```
149"))

Margin.Of.Error = function(N, Z, var) {

        CMU.MOE=Z*sqrt(((5705/23736)^2)*(1-((N/2)/5705))*(var/(N/2)))
        PITT.MOE=Z*sqrt(((18031/23736)^2)*(1-((N/2)/18031))*(var/(N/2)))
        TOTAL.MOE=CMU.MOE+PITT.MOE
        return(list(CMU.MOE=CMU.MOE, PITT.MOE=PITT.MOE,
TOTAL.MOE=TOTAL.MOE))

}


sample.size.graph = function(Z, ci, variance, nmore) {

        ci.TOTAL.MOE=ci.CMU.MOE=ci.PITT.MOE=rep(0, nmore)
        sample.size=(215:(214+nmore))

        for (i in 1:nmore) {
                ci.TOTAL.MOE[i]=Margin.Of.Error(214+i, Z, variance)$TOTAL.MOE
                ci.CMU.MOE[i]=Margin.Of.Error(214+i, Z, variance)$CMU.MOE
                ci.PITT.MOE[i]=Margin.Of.Error(214+i, Z, variance)$PITT.MOE
        }

        xmin=214
        xmax=rev(sample.size)[1]
        ymin=0
        ymax=max(c(ci.TOTAL.MOE, ci.CMU.MOE, ci.PITT.MOE))

        plot(sample.size, ci.TOTAL.MOE, xlab="Sample Size", ylab="Margin of Error",
xlim=c(xmin, xmax), ylim=c(ymin, ymax), type="l", lwd=4, main=paste(ci, "%
Confidence Interval, Var=", variance, sep=""))
        points(sample.size, ci.CMU.MOE, type="l", col="red3", lwd=3, lty=2)
        points(sample.size, ci.PITT.MOE, type="l", col="royalblue", lwd=3, lty=2)
        abline(h=.065, lwd=2, col="forestgreen")
        abline(h=.05, lwd=2, col="green")
        legend("topright", c("Total Margin of Error", "CMU Contribution", "PITT
Contribution", ".05 Margin of Error", ".065 Margin of Error"), col=c("black", "red3",
"royalblue", "green", "forestgreen"), lty=c(1, 2, 2, 1, 1), lwd=c(4, 3, 3, 2, 2))
}


data=read.csv("Final Survey Responses.csv")


#####Impute missing school attendance variable
data[1, 4]="PITT"
```

```
data[14, 4]="CMU"
data[161, 4]="PITT"
data[180, 4]="CMU"
data[233, 4]="PITT"
data[270, 4]="PITT"


#####Remove schools that are not CMU or PITT
remove=c(136, 137, 229, 246)

data=data[-remove, ]

attach(data)


##99.7, 99, 95, 90, 85
conf.level=c(2.9677379253, 2.57582930644, 1.95996398612, 1.64485362513,
1.43953147244)


#####Consume at least one alcoholic beverage less than once per week?
summary(as.factor(freq))
p.freq1=70/284
var.freq1=p.freq1*(1-p.freq1)

MOECMU997.freq1=Margin.Of.Error(284, conf.level[1], var.freq1)$CMU.MOE
MOEPITT997.freq1=Margin.Of.Error(284, conf.level[1], var.freq1)$PITT.MOE
MOE997.freq1=Margin.Of.Error(284, conf.level[1], var.freq1)$TOTAL.MOE
c(p.freq1-MOE997.freq1, p.freq1+MOE997.freq1)

MOECMU99.freq1=Margin.Of.Error(284, conf.level[2], var.freq1)$CMU.MOE
MOEPITT99.freq1=Margin.Of.Error(284, conf.level[2], var.freq1)$PITT.MOE
MOE99.freq1=Margin.Of.Error(284, conf.level[2], var.freq1)$TOTAL.MOE
c(p.freq1-MOE99.freq1, p.freq1+MOE99.freq1)

MOECMU95.freq1=Margin.Of.Error(284, conf.level[3], var.freq1)$CMU.MOE
MOEPITT95.freq1=Margin.Of.Error(284, conf.level[3], var.freq1)$PITT.MOE
MOE95.freq1=Margin.Of.Error(284, conf.level[3], var.freq1)$TOTAL.MOE
c(p.freq1-MOE95.freq1, p.freq1+MOE95.freq1)

MOECMU90.freq1=Margin.Of.Error(284, conf.level[4], var.freq1)$CMU.MOE
MOEPITT90.freq1=Margin.Of.Error(284, conf.level[4], var.freq1)$PITT.MOE
MOE90.freq1=Margin.Of.Error(284, conf.level[4], var.freq1)$TOTAL.MOE
c(p.freq1-MOE90.freq1, p.freq1+MOE90.freq1)

MOECMU85.freq1=Margin.Of.Error(284, conf.level[5], var.freq1)$CMU.MOE
```

```
MOEPITT85.freq1=Margin.Of.Error(284, conf.level[5], var.freq1)$PITT.MOE
MOE85.freq1=Margin.Of.Error(284, conf.level[5], var.freq1)$TOTAL.MOE
c(p.freq1-MOE85.freq1, p.freq1+MOE85.freq1)


#####Consume at least one alcoholic beverage once or twice per week?
summary(as.factor(freq))
p.freq2=141/284
var.freq2=p.freq2*(1-p.freq2)

MOECMU997.freq2=Margin.Of.Error(284, conf.level[1], var.freq2)$CMU.MOE
MOEPITT997.freq2=Margin.Of.Error(284, conf.level[1], var.freq2)$PITT.MOE
MOE997.freq2=Margin.Of.Error(284, conf.level[1], var.freq2)$TOTAL.MOE
c(p.freq2-MOE997.freq2, p.freq2+MOE997.freq2)

MOECMU99.freq2=Margin.Of.Error(284, conf.level[2], var.freq2)$CMU.MOE
MOEPITT99.freq2=Margin.Of.Error(284, conf.level[2], var.freq2)$PITT.MOE
MOE99.freq2=Margin.Of.Error(284, conf.level[2], var.freq2)$TOTAL.MOE
c(p.freq2-MOE99.freq2, p.freq2+MOE99.freq2)

MOECMU95.freq2=Margin.Of.Error(284, conf.level[3], var.freq2)$CMU.MOE
MOEPITT95.freq2=Margin.Of.Error(284, conf.level[3], var.freq2)$PITT.MOE
MOE95.freq2=Margin.Of.Error(284, conf.level[3], var.freq2)$TOTAL.MOE
c(p.freq2-MOE95.freq2, p.freq2+MOE95.freq2)

MOECMU90.freq2=Margin.Of.Error(284, conf.level[4], var.freq2)$CMU.MOE
MOEPITT90.freq2=Margin.Of.Error(284, conf.level[4], var.freq2)$PITT.MOE
MOE90.freq2=Margin.Of.Error(284, conf.level[4], var.freq2)$TOTAL.MOE
c(p.freq2-MOE90.freq2, p.freq2+MOE90.freq2)

MOECMU85.freq2=Margin.Of.Error(284, conf.level[5], var.freq2)$CMU.MOE
MOEPITT85.freq2=Margin.Of.Error(284, conf.level[5], var.freq2)$PITT.MOE
MOE85.freq2=Margin.Of.Error(284, conf.level[5], var.freq2)$TOTAL.MOE
c(p.freq2-MOE85.freq2, p.freq2+MOE85.freq2)


#####Consume at least one alcoholic beverage three to five times per week?
summary(as.factor(freq))
p.freq3=62/284
var.freq3=p.freq3*(1-p.freq3)

MOECMU997.freq3=Margin.Of.Error(284, conf.level[1], var.freq3)$CMU.MOE
MOEPITT997.freq3=Margin.Of.Error(284, conf.level[1], var.freq3)$PITT.MOE
MOE997.freq3=Margin.Of.Error(284, conf.level[1], var.freq3)$TOTAL.MOE
c(p.freq3-MOE997.freq3, p.freq3+MOE997.freq3)
```

```
MOECMU99.freq3=Margin.Of.Error(284, conf.level[2], var.freq3)$CMU.MOE
MOEPITT99.freq3=Margin.Of.Error(284, conf.level[2], var.freq3)$PITT.MOE
MOE99.freq3=Margin.Of.Error(284, conf.level[2], var.freq3)$TOTAL.MOE
c(p.freq3-MOE99.freq3, p.freq3+MOE99.freq3)

MOECMU95.freq3=Margin.Of.Error(284, conf.level[3], var.freq3)$CMU.MOE
MOEPITT95.freq3=Margin.Of.Error(284, conf.level[3], var.freq3)$PITT.MOE
MOE95.freq3=Margin.Of.Error(284, conf.level[3], var.freq3)$TOTAL.MOE
c(p.freq3-MOE95.freq3, p.freq3+MOE95.freq3)

MOECMU90.freq3=Margin.Of.Error(284, conf.level[4], var.freq3)$CMU.MOE
MOEPITT90.freq3=Margin.Of.Error(284, conf.level[4], var.freq3)$PITT.MOE
MOE90.freq3=Margin.Of.Error(284, conf.level[4], var.freq3)$TOTAL.MOE
c(p.freq3-MOE90.freq3, p.freq3+MOE90.freq3)

MOECMU85.freq3=Margin.Of.Error(284, conf.level[5], var.freq3)$CMU.MOE
MOEPITT85.freq3=Margin.Of.Error(284, conf.level[5], var.freq3)$PITT.MOE
MOE85.freq3=Margin.Of.Error(284, conf.level[5], var.freq3)$TOTAL.MOE
c(p.freq3-MOE85.freq3, p.freq3+MOE85.freq3)


#####Consume at least one alcoolic beverage greater than five times per week?
summary(as.factor(freq))
p.freq4=11/284
var.freq4=p.freq4*(1-p.freq4)

MOECMU997.freq4=Margin.Of.Error(284, conf.level[1], var.freq4)$CMU.MOE
MOEPITT997.freq4=Margin.Of.Error(284, conf.level[1], var.freq4)$PITT.MOE
MOE997.freq4=Margin.Of.Error(284, conf.level[1], var.freq4)$TOTAL.MOE
c(p.freq4-MOE997.freq4, p.freq4+MOE997.freq4)

MOECMU99.freq4=Margin.Of.Error(284, conf.level[2], var.freq4)$CMU.MOE
MOEPITT99.freq4=Margin.Of.Error(284, conf.level[2], var.freq4)$PITT.MOE
MOE99.freq4=Margin.Of.Error(284, conf.level[2], var.freq4)$TOTAL.MOE
c(p.freq4-MOE99.freq4, p.freq4+MOE99.freq4)

MOECMU95.freq4=Margin.Of.Error(284, conf.level[3], var.freq4)$CMU.MOE
MOEPITT95.freq4=Margin.Of.Error(284, conf.level[3], var.freq4)$PITT.MOE
MOE95.freq4=Margin.Of.Error(284, conf.level[3], var.freq4)$TOTAL.MOE
c(p.freq4-MOE95.freq4, p.freq4+MOE95.freq4)

MOECMU90.freq4=Margin.Of.Error(284, conf.level[4], var.freq4)$CMU.MOE
MOEPITT90.freq4=Margin.Of.Error(284, conf.level[4], var.freq4)$PITT.MOE
MOE90.freq4=Margin.Of.Error(284, conf.level[4], var.freq4)$TOTAL.MOE
c(p.freq4-MOE90.freq4, p.freq4+MOE90.freq4)
```

```
MOECMU85.freq4=Margin.Of.Error(284, conf.level[5], var.freq4)$CMU.MOE
MOEPITT85.freq4=Margin.Of.Error(284, conf.level[5], var.freq4)$PITT.MOE
MOE85.freq4=Margin.Of.Error(284, conf.level[5], var.freq4)$TOTAL.MOE
c(p.freq4-MOE85.freq4, p.freq4+MOE85.freq4)


#####Experienced Blackout?
summary(as.factor(blackout))
p.blackout=182/286
var.blackout=p.blackout*(1-p.blackout)

MOECMU997.blackout=Margin.Of.Error(286, conf.level[1], var.blackout)$CMU.MOE
MOEPITT997.blackout=Margin.Of.Error(286, conf.level[1], var.blackout)$PITT.MOE
MOE997.blackout=Margin.Of.Error(286, conf.level[1], var.blackout)$TOTAL.MOE
c(p.blackout-MOE997.blackout, p.blackout+MOE997.blackout)

MOECMU99.blackout=Margin.Of.Error(286, conf.level[2], var.blackout)$CMU.MOE
MOEPITT99.blackout=Margin.Of.Error(286, conf.level[2], var.blackout)$PITT.MOE
MOE99.blackout=Margin.Of.Error(286, conf.level[2], var.blackout)$TOTAL.MOE
c(p.blackout-MOE99.blackout, p.blackout+MOE99.blackout)

MOECMU95.blackout=Margin.Of.Error(286, conf.level[3], var.blackout)$CMU.MOE
MOEPITT95.blackout=Margin.Of.Error(286, conf.level[3], var.blackout)$PITT.MOE
MOE95.blackout=Margin.Of.Error(286, conf.level[3], var.blackout)$TOTAL.MOE
c(p.blackout-MOE95.blackout, p.blackout+MOE95.blackout)

MOECMU90.blackout=Margin.Of.Error(286, conf.level[4], var.blackout)$CMU.MOE
MOEPITT90.blackout=Margin.Of.Error(286, conf.level[4], var.blackout)$PITT.MOE
MOE90.blackout=Margin.Of.Error(286, conf.level[4], var.blackout)$TOTAL.MOE
c(p.blackout-MOE90.blackout, p.blackout+MOE90.blackout)

MOECMU85.blackout=Margin.Of.Error(286, conf.level[5], var.blackout)$CMU.MOE
MOEPITT85.blackout=Margin.Of.Error(286, conf.level[5], var.blackout)$PITT.MOE
MOE85.blackout=Margin.Of.Error(286, conf.level[5], var.blackout)$TOTAL.MOE
c(p.blackout-MOE85.blackout, p.blackout+MOE85.blackout)


#####Mix energy drinks & alcohol?
summary(as.factor(mix))
p.mix=119/284
var.mix=p.mix*(1-p.mix)

MOECMU997.mix=Margin.Of.Error(284, conf.level[1], var.mix)$CMU.MOE
MOEPITT997.mix=Margin.Of.Error(284, conf.level[1], var.mix)$PITT.MOE
MOE997.mix=Margin.Of.Error(284, conf.level[1], var.mix)$TOTAL.MOE
c(p.mix-MOE997.mix, p.mix+MOE997.mix)
```

```
MOECMU99.mix=Margin.Of.Error(284, conf.level[2], var.mix)$CMU.MOE
MOEPITT99.mix=Margin.Of.Error(284, conf.level[2], var.mix)$PITT.MOE
MOE99.mix=Margin.Of.Error(284, conf.level[2], var.mix)$TOTAL.MOE
c(p.mix-MOE99.mix, p.mix+MOE99.mix)

MOECMU95.mix=Margin.Of.Error(284, conf.level[3], var.mix)$CMU.MOE
MOEPITT95.mix=Margin.Of.Error(284, conf.level[3], var.mix)$PITT.MOE
MOE95.mix=Margin.Of.Error(284, conf.level[3], var.mix)$TOTAL.MOE
c(p.mix-MOE95.mix, p.mix+MOE95.mix)

MOECMU90.mix=Margin.Of.Error(284, conf.level[4], var.mix)$CMU.MOE
MOEPITT90.mix=Margin.Of.Error(284, conf.level[4], var.mix)$PITT.MOE
MOE90.mix=Margin.Of.Error(284, conf.level[4], var.mix)$TOTAL.MOE
c(p.mix-MOE90.mix, p.mix+MOE90.mix)

MOECMU85.mix=Margin.Of.Error(284, conf.level[5], var.mix)$CMU.MOE
MOEPITT85.mix=Margin.Of.Error(284, conf.level[5], var.mix)$PITT.MOE
MOE85.mix=Margin.Of.Error(284, conf.level[5], var.mix)$TOTAL.MOE
c(p.mix-MOE85.mix, p.mix+MOE85.mix)


#####Drinking alcoholic energy drinks when blacked out?
summary(as.factor(black.mix))
p.black.mix=56/175
var.black.mix=p.black.mix*(1-p.black.mix)

MOECMU997.black.mix=Margin.Of.Error(175, conf.level[1],
var.black.mix)$CMU.MOE
MOEPITT997.black.mix=Margin.Of.Error(175, conf.level[1],
var.black.mix)$PITT.MOE
MOE997.black.mix=Margin.Of.Error(175, conf.level[1], var.black.mix)$TOTAL.MOE
c(p.black.mix-MOE997.black.mix, p.black.mix+MOE997.black.mix)

MOECMU99.black.mix=Margin.Of.Error(175, conf.level[2], var.black.mix)$CMU.MOE
MOEPITT99.black.mix=Margin.Of.Error(175, conf.level[2], var.black.mix)$PITT.MOE
MOE99.black.mix=Margin.Of.Error(175, conf.level[2], var.black.mix)$TOTAL.MOE
c(p.black.mix-MOE99.black.mix, p.black.mix+MOE99.black.mix)

MOECMU95.black.mix=Margin.Of.Error(175, conf.level[3], var.black.mix)$CMU.MOE
MOEPITT95.black.mix=Margin.Of.Error(175, conf.level[3], var.black.mix)$PITT.MOE
MOE95.black.mix=Margin.Of.Error(175, conf.level[3], var.black.mix)$TOTAL.MOE
c(p.black.mix-MOE95.black.mix, p.black.mix+MOE95.black.mix)

MOECMU90.black.mix=Margin.Of.Error(175, conf.level[4], var.black.mix)$CMU.MOE
MOEPITT90.black.mix=Margin.Of.Error(175, conf.level[4], var.black.mix)$PITT.MOE
```

```
MOE90.black.mix=Margin.Of.Error(175, conf.level[4], var.black.mix)$TOTAL.MOE
c(p.black.mix-MOE90.black.mix, p.black.mix+MOE90.black.mix)

MOECMU85.black.mix=Margin.Of.Error(175, conf.level[5], var.black.mix)$CMU.MOE
MOEPITT85.black.mix=Margin.Of.Error(175, conf.level[5], var.black.mix)$PITT.MOE
MOE85.black.mix=Margin.Of.Error(175, conf.level[5], var.black.mix)$TOTAL.MOE
c(p.black.mix-MOE85.black.mix, p.black.mix+MOE85.black.mix)


#####Drink because of price?
summary(as.factor(why.price))
p.why.price=28/165
var.why.price=p.why.price*(1-p.why.price)

MOECMU997.why.price=Margin.Of.Error(165, conf.level[1],
var.why.price)$CMU.MOE
MOEPITT997.why.price=Margin.Of.Error(165, conf.level[1],
var.why.price)$PITT.MOE
MOE997.why.price=Margin.Of.Error(165, conf.level[1], var.why.price)$TOTAL.MOE
c(p.why.price-MOE997.why.price, p.why.price+MOE997.why.price)

MOECMU99.why.price=Margin.Of.Error(165, conf.level[2], var.why.price)$CMU.MOE
MOEPITT99.why.price=Margin.Of.Error(165, conf.level[2], var.why.price)$PITT.MOE
MOE99.why.price=Margin.Of.Error(165, conf.level[2], var.why.price)$TOTAL.MOE
c(p.why.price-MOE99.why.price, p.why.price+MOE99.why.price)

MOECMU95.why.price=Margin.Of.Error(165, conf.level[3], var.why.price)$CMU.MOE
MOEPITT95.why.price=Margin.Of.Error(165, conf.level[3], var.why.price)$PITT.MOE
MOE95.why.price=Margin.Of.Error(165, conf.level[3], var.why.price)$TOTAL.MOE
c(p.why.price-MOE95.why.price, p.why.price+MOE95.why.price)

MOECMU90.why.price=Margin.Of.Error(165, conf.level[4], var.why.price)$CMU.MOE
MOEPITT90.why.price=Margin.Of.Error(165, conf.level[4], var.why.price)$PITT.MOE
MOE90.why.price=Margin.Of.Error(165, conf.level[4], var.why.price)$TOTAL.MOE
c(p.why.price-MOE90.why.price, p.why.price+MOE90.why.price)

MOECMU85.why.price=Margin.Of.Error(165, conf.level[5], var.why.price)$CMU.MOE
MOEPITT85.why.price=Margin.Of.Error(165, conf.level[5], var.why.price)$PITT.MOE
MOE85.why.price=Margin.Of.Error(165, conf.level[5], var.why.price)$TOTAL.MOE
c(p.why.price-MOE85.why.price, p.why.price+MOE85.why.price)


#####Drink because of taste?
summary(as.factor(why.taste))
p.why.taste=70/165
var.why.taste=p.why.taste*(1-p.why.taste)
```

```
MOECMU997.why.taste=Margin.Of.Error(165, conf.level[1],
var.why.taste)$CMU.MOE
MOEPITT997.why.taste=Margin.Of.Error(165, conf.level[1], var.why.taste)$PITT.MOE
MOE997.why.taste=Margin.Of.Error(165, conf.level[1], var.why.taste)$TOTAL.MOE
c(p.why.taste-MOE997.why.taste, p.why.taste+MOE997.why.taste)

MOECMU99.why.taste=Margin.Of.Error(165, conf.level[2], var.why.taste)$CMU.MOE
MOEPITT99.why.taste=Margin.Of.Error(165, conf.level[2], var.why.taste)$PITT.MOE
MOE99.why.taste=Margin.Of.Error(165, conf.level[2], var.why.taste)$TOTAL.MOE
c(p.why.taste-MOE99.why.taste, p.why.taste+MOE99.why.taste)

MOECMU95.why.taste=Margin.Of.Error(165, conf.level[3], var.why.taste)$CMU.MOE
MOEPITT95.why.taste=Margin.Of.Error(165, conf.level[3], var.why.taste)$PITT.MOE
MOE95.why.taste=Margin.Of.Error(165, conf.level[3], var.why.taste)$TOTAL.MOE
c(p.why.taste-MOE95.why.taste, p.why.taste+MOE95.why.taste)

MOECMU90.why.taste=Margin.Of.Error(165, conf.level[4], var.why.taste)$CMU.MOE
MOEPITT90.why.taste=Margin.Of.Error(165, conf.level[4], var.why.taste)$PITT.MOE
MOE90.why.taste=Margin.Of.Error(165, conf.level[4], var.why.taste)$TOTAL.MOE
c(p.why.taste-MOE90.why.taste, p.why.taste+MOE90.why.taste)

MOECMU85.why.taste=Margin.Of.Error(165, conf.level[5], var.why.taste)$CMU.MOE
MOEPITT85.why.taste=Margin.Of.Error(165, conf.level[5], var.why.taste)$PITT.MOE
MOE85.why.taste=Margin.Of.Error(165, conf.level[5], var.why.taste)$TOTAL.MOE
c(p.why.taste-MOE85.why.taste, p.why.taste+MOE85.why.taste)


#####Drink because of alcoholic content?
summary(as.factor(why.alcohol))
p.why.alcohol=57/165
var.why.alcohol=p.why.alcohol*(1-p.why.alcohol)

MOECMU997.why.alcohol=Margin.Of.Error(165, conf.level[1],
var.why.alcohol)$CMU.MOE
MOEPITT997.why.alcohol=Margin.Of.Error(165, conf.level[1],
var.why.alcohol)$PITT.MOE
MOE997.why.alcohol=Margin.Of.Error(165, conf.level[1],
var.why.alcohol)$TOTAL.MOE
c(p.why.alcohol-MOE997.why.alcohol, p.why.alcohol+MOE997.why.alcohol)

MOECMU99.why.alcohol=Margin.Of.Error(165, conf.level[2],
var.why.alcohol)$CMU.MOE
MOEPITT99.why.alcohol=Margin.Of.Error(165, conf.level[2],
var.why.alcohol)$PITT.MOE
MOE99.why.alcohol=Margin.Of.Error(165, conf.level[2],
```

```
var.why.alcohol)$TOTAL.MOE
c(p.why.alcohol-MOE99.why.alcohol, p.why.alcohol+MOE99.why.alcohol)

MOECMU95.why.alcohol=Margin.Of.Error(165, conf.level[3],
var.why.alcohol)$CMU.MOE
MOEPITT95.why.alcohol=Margin.Of.Error(165, conf.level[3],
var.why.alcohol)$PITT.MOE
MOE95.why.alcohol=Margin.Of.Error(165, conf.level[3],
var.why.alcohol)$TOTAL.MOE
c(p.why.alcohol-MOE95.why.alcohol, p.why.alcohol+MOE95.why.alcohol)

MOECMU90.why.alcohol=Margin.Of.Error(165, conf.level[4],
var.why.alcohol)$CMU.MOE
MOEPITT90.why.alcohol=Margin.Of.Error(165, conf.level[4],
var.why.alcohol)$PITT.MOE
MOE90.why.alcohol=Margin.Of.Error(165, conf.level[4],
var.why.alcohol)$TOTAL.MOE
c(p.why.alcohol-MOE90.why.alcohol, p.why.alcohol+MOE90.why.alcohol)

MOECMU85.why.alcohol=Margin.Of.Error(165, conf.level[5],
var.why.alcohol)$CMU.MOE
MOEPITT85.why.alcohol=Margin.Of.Error(165, conf.level[5],
var.why.alcohol)$PITT.MOE
MOE85.why.alcohol=Margin.Of.Error(165, conf.level[5],
var.why.alcohol)$TOTAL.MOE
c(p.why.alcohol-MOE85.why.alcohol, p.why.alcohol+MOE85.why.alcohol)


#####Drink because of availability?
summary(as.factor(why.availability))
p.why.availability=49/165
var.why.availability=p.why.availability*(1-p.why.availability)

MOECMU997.why.availability=Margin.Of.Error(165, conf.level[1],
var.why.availability)$CMU.MOE
MOEPITT997.why.availability=Margin.Of.Error(165, conf.level[1],
var.why.availability)$PITT.MOE
MOE997.why.availability=Margin.Of.Error(165, conf.level[1],
var.why.availability)$TOTAL.MOE
c(p.why.availability-MOE997.why.availability,
p.why.availability+MOE997.why.availability)

MOECMU99.why.availability=Margin.Of.Error(165, conf.level[2],
var.why.availability)$CMU.MOE
MOEPITT99.why.availability=Margin.Of.Error(165, conf.level[2],
var.why.availability)$PITT.MOE
```

```
MOE99.why.availability=Margin.Of.Error(165, conf.level[2],
var.why.availability)$TOTAL.MOE
c(p.why.availability-MOE99.why.availability,
p.why.availability+MOE99.why.availability)

MOECMU95.why.availability=Margin.Of.Error(165, conf.level[3],
var.why.availability)$CMU.MOE
MOEPITT95.why.availability=Margin.Of.Error(165, conf.level[3],
var.why.availability)$PITT.MOE
MOE95.why.availability=Margin.Of.Error(165, conf.level[3],
var.why.availability)$TOTAL.MOE
c(p.why.availability-MOE95.why.availability,
p.why.availability+MOE95.why.availability)

MOECMU90.why.availability=Margin.Of.Error(165, conf.level[4],
var.why.availability)$CMU.MOE
MOEPITT90.why.availability=Margin.Of.Error(165, conf.level[4],
var.why.availability)$PITT.MOE
MOE90.why.availability=Margin.Of.Error(165, conf.level[4],
var.why.availability)$TOTAL.MOE
c(p.why.availability-MOE90.why.availability,
p.why.availability+MOE90.why.availability)

MOECMU85.why.availability=Margin.Of.Error(165, conf.level[5],
var.why.availability)$CMU.MOE
MOEPITT85.why.availability=Margin.Of.Error(165, conf.level[5],
var.why.availability)$PITT.MOE
MOE85.why.availability=Margin.Of.Error(165, conf.level[5],
var.why.availability)$TOTAL.MOE
c(p.why.availability-MOE85.why.availability,
p.why.availability+MOE85.why.availability)


#####Drink because of caffeine?
summary(as.factor(why.caffeine))
p.why.caffeine=46/165
var.why.caffeine=p.why.caffeine*(1-p.why.caffeine)

MOECMU997.why.caffeine=Margin.Of.Error(165, conf.level[1],
var.why.caffeine)$CMU.MOE
MOEPITT997.why.caffeine=Margin.Of.Error(165, conf.level[1],
var.why.caffeine)$PITT.MOE
MOE997.why.caffeine=Margin.Of.Error(165, conf.level[1],
var.why.caffeine)$TOTAL.MOE
c(p.why.caffeine-MOE997.why.caffeine, p.why.caffeine+MOE997.why.caffeine)
```

```
MOECMU99.why.caffeine=Margin.Of.Error(165, conf.level[2],
var.why.caffeine)$CMU.MOE
MOEPITT99.why.caffeine=Margin.Of.Error(165, conf.level[2],
var.why.caffeine)$PITT.MOE
MOE99.why.caffeine=Margin.Of.Error(165, conf.level[2],
var.why.caffeine)$TOTAL.MOE
c(p.why.caffeine-MOE99.why.caffeine, p.why.caffeine+MOE99.why.caffeine)

MOECMU95.why.caffeine=Margin.Of.Error(165, conf.level[3],
var.why.caffeine)$CMU.MOE
MOEPITT95.why.caffeine=Margin.Of.Error(165, conf.level[3],
var.why.caffeine)$PITT.MOE
MOE95.why.caffeine=Margin.Of.Error(165, conf.level[3],
var.why.caffeine)$TOTAL.MOE
c(p.why.caffeine-MOE95.why.caffeine, p.why.caffeine+MOE95.why.caffeine)

MOECMU90.why.caffeine=Margin.Of.Error(165, conf.level[4],
var.why.caffeine)$CMU.MOE
MOEPITT90.why.caffeine=Margin.Of.Error(165, conf.level[4],
var.why.caffeine)$PITT.MOE
MOE90.why.caffeine=Margin.Of.Error(165, conf.level[4],
var.why.caffeine)$TOTAL.MOE
c(p.why.caffeine-MOE90.why.caffeine, p.why.caffeine+MOE90.why.caffeine)

MOECMU85.why.caffeine=Margin.Of.Error(165, conf.level[5],
var.why.caffeine)$CMU.MOE
MOEPITT85.why.caffeine=Margin.Of.Error(165, conf.level[5],
var.why.caffeine)$PITT.MOE
MOE85.why.caffeine=Margin.Of.Error(165, conf.level[5],
var.why.caffeine)$TOTAL.MOE
c(p.why.caffeine-MOE85.why.caffeine, p.why.caffeine+MOE85.why.caffeine)


#####Heard of Four Loko?
summary(as.factor(heard.4))
p.heard.4=256/276
var.heard.4=p.heard.4*(1-p.heard.4)

MOECMU997.heard.4=Margin.Of.Error(276, conf.level[1], var.heard.4)$CMU.MOE
MOEPITT997.heard.4=Margin.Of.Error(276, conf.level[1], var.heard.4)$PITT.MOE
MOE997.heard.4=Margin.Of.Error(276, conf.level[1], var.heard.4)$TOTAL.MOE
c(p.heard.4-MOE997.heard.4, p.heard.4+MOE997.heard.4)

MOECMU99.heard.4=Margin.Of.Error(276, conf.level[2], var.heard.4)$CMU.MOE
MOEPITT99.heard.4=Margin.Of.Error(276, conf.level[2], var.heard.4)$PITT.MOE
MOE99.heard.4=Margin.Of.Error(276, conf.level[2], var.heard.4)$TOTAL.MOE
```

```
c(p.heard.4-MOE99.heard.4, p.heard.4+MOE99.heard.4)

MOECMU95.heard.4=Margin.Of.Error(276, conf.level[3], var.heard.4)$CMU.MOE
MOEPITT95.heard.4=Margin.Of.Error(276, conf.level[3], var.heard.4)$PITT.MOE
MOE95.heard.4=Margin.Of.Error(276, conf.level[3], var.heard.4)$TOTAL.MOE
c(p.heard.4-MOE95.heard.4, p.heard.4+MOE95.heard.4)

MOECMU90.heard.4=Margin.Of.Error(276, conf.level[4], var.heard.4)$CMU.MOE
MOEPITT90.heard.4=Margin.Of.Error(276, conf.level[4], var.heard.4)$PITT.MOE
MOE90.heard.4=Margin.Of.Error(276, conf.level[4], var.heard.4)$TOTAL.MOE
c(p.heard.4-MOE90.heard.4, p.heard.4+MOE90.heard.4)

MOECMU85.heard.4=Margin.Of.Error(276, conf.level[5], var.heard.4)$CMU.MOE
MOEPITT85.heard.4=Margin.Of.Error(276, conf.level[5], var.heard.4)$PITT.MOE
MOE85.heard.4=Margin.Of.Error(276, conf.level[5], var.heard.4)$TOTAL.MOE
c(p.heard.4-MOE85.heard.4, p.heard.4+MOE85.heard.4)


#####Did you ever drink Four Loko?
summary(as.factor(drank.4))
p.drank.4=165/275
var.drank.4=p.drank.4*(1-p.drank.4)

MOECMU997.drank.4=Margin.Of.Error(275, conf.level[1], var.drank.4)$CMU.MOE
MOEPITT997.drank.4=Margin.Of.Error(275, conf.level[1], var.drank.4)$PITT.MOE
MOE997.drank.4=Margin.Of.Error(275, conf.level[1], var.drank.4)$TOTAL.MOE
c(p.drank.4-MOE997.drank.4, p.drank.4+MOE997.drank.4)

MOECMU99.drank.4=Margin.Of.Error(275, conf.level[2], var.drank.4)$CMU.MOE
MOEPITT99.drank.4=Margin.Of.Error(275, conf.level[2], var.drank.4)$PITT.MOE
MOE99.drank.4=Margin.Of.Error(275, conf.level[2], var.drank.4)$TOTAL.MOE
c(p.drank.4-MOE99.drank.4, p.drank.4+MOE99.drank.4)

MOECMU95.drank.4=Margin.Of.Error(275, conf.level[3], var.drank.4)$CMU.MOE
MOEPITT95.drank.4=Margin.Of.Error(275, conf.level[3], var.drank.4)$PITT.MOE
MOE95.drank.4=Margin.Of.Error(275, conf.level[3], var.drank.4)$TOTAL.MOE
c(p.drank.4-MOE95.drank.4, p.drank.4+MOE95.drank.4)

MOECMU90.drank.4=Margin.Of.Error(275, conf.level[4], var.drank.4)$CMU.MOE
MOEPITT90.drank.4=Margin.Of.Error(275, conf.level[4], var.drank.4)$PITT.MOE
MOE90.drank.4=Margin.Of.Error(275, conf.level[4], var.drank.4)$TOTAL.MOE
c(p.drank.4-MOE90.drank.4, p.drank.4+MOE90.drank.4)

MOECMU85.drank.4=Margin.Of.Error(275, conf.level[5], var.drank.4)$CMU.MOE
MOEPITT85.drank.4=Margin.Of.Error(275, conf.level[5], var.drank.4)$PITT.MOE
MOE85.drank.4=Margin.Of.Error(275, conf.level[5], var.drank.4)$TOTAL.MOE
```

```
c(p.drank.4-MOE85.drank.4, p.drank.4+MOE85.drank.4)


#####Drink Four Loko before January 1, 2011?
summary(as.factor(when.4))
p.when.4before=143/191
var.when.4before=p.when.4before*(1-p.when.4before)

MOECMU997.when.4before=Margin.Of.Error(191, conf.level[1],
var.when.4before)$CMU.MOE
MOEPITT997.when.4before=Margin.Of.Error(191, conf.level[1],
var.when.4before)$PITT.MOE
MOE997.when.4before=Margin.Of.Error(191, conf.level[1],
var.when.4before)$TOTAL.MOE
c(p.when.4before-MOE997.when.4before, p.when.4before+MOE997.when.4before)

MOECMU99.when.4before=Margin.Of.Error(191, conf.level[2],
var.when.4before)$CMU.MOE
MOEPITT99.when.4before=Margin.Of.Error(191, conf.level[2],
var.when.4before)$PITT.MOE
MOE99.when.4before=Margin.Of.Error(191, conf.level[2],
var.when.4before)$TOTAL.MOE
c(p.when.4before-MOE99.when.4before, p.when.4before+MOE99.when.4before)

MOECMU95.when.4before=Margin.Of.Error(191, conf.level[3],
var.when.4before)$CMU.MOE
MOEPITT95.when.4before=Margin.Of.Error(191, conf.level[3],
var.when.4before)$PITT.MOE
MOE95.when.4before=Margin.Of.Error(191, conf.level[3],
var.when.4before)$TOTAL.MOE
c(p.when.4before-MOE95.when.4before, p.when.4before+MOE95.when.4before)

MOECMU90.when.4before=Margin.Of.Error(191, conf.level[4],
var.when.4before)$CMU.MOE
MOEPITT90.when.4before=Margin.Of.Error(191, conf.level[4],
var.when.4before)$PITT.MOE
MOE90.when.4before=Margin.Of.Error(191, conf.level[4],
var.when.4before)$TOTAL.MOE
c(p.when.4before-MOE90.when.4before, p.when.4before+MOE90.when.4before)

MOECMU85.when.4before=Margin.Of.Error(191, conf.level[5],
var.when.4before)$CMU.MOE
MOEPITT85.when.4before=Margin.Of.Error(191, conf.level[5],
var.when.4before)$PITT.MOE
MOE85.when.4before=Margin.Of.Error(191, conf.level[5],
var.when.4before)$TOTAL.MOE
```

```
c(p.when.4before-MOE85.when.4before, p.when.4before+MOE85.when.4before)


#####Drink Four Loko after January 1, 2011?
summary(as.factor(when.4))
p.when.4after=19/191
var.when.4after=p.when.4after*(1-p.when.4after)

MOECMU997.when.4after=Margin.Of.Error(191, conf.level[1],
var.when.4after)$CMU.MOE
MOEPITT997.when.4after=Margin.Of.Error(191, conf.level[1],
var.when.4after)$PITT.MOE
MOE997.when.4after=Margin.Of.Error(191, conf.level[1],
var.when.4after)$TOTAL.MOE
c(p.when.4after-MOE997.when.4after, p.when.4after+MOE997.when.4after)

MOECMU99.when.4after=Margin.Of.Error(191, conf.level[2],
var.when.4after)$CMU.MOE
MOEPITT99.when.4after=Margin.Of.Error(191, conf.level[2],
var.when.4after)$PITT.MOE
MOE99.when.4after=Margin.Of.Error(191, conf.level[2],
var.when.4after)$TOTAL.MOE
c(p.when.4after-MOE99.when.4after, p.when.4after+MOE99.when.4after)

MOECMU95.when.4after=Margin.Of.Error(191, conf.level[3],
var.when.4after)$CMU.MOE
MOEPITT95.when.4after=Margin.Of.Error(191, conf.level[3],
var.when.4after)$PITT.MOE
MOE95.when.4after=Margin.Of.Error(191, conf.level[3],
var.when.4after)$TOTAL.MOE
c(p.when.4after-MOE95.when.4after, p.when.4after+MOE95.when.4after)

MOECMU90.when.4after=Margin.Of.Error(191, conf.level[4],
var.when.4after)$CMU.MOE
MOEPITT90.when.4after=Margin.Of.Error(191, conf.level[4],
var.when.4after)$PITT.MOE
MOE90.when.4after=Margin.Of.Error(191, conf.level[4],
var.when.4after)$TOTAL.MOE
c(p.when.4after-MOE90.when.4after, p.when.4after+MOE90.when.4after)

MOECMU85.when.4after=Margin.Of.Error(191, conf.level[5],
var.when.4after)$CMU.MOE
MOEPITT85.when.4after=Margin.Of.Error(191, conf.level[5],
var.when.4after)$PITT.MOE
MOE85.when.4after=Margin.Of.Error(191, conf.level[5],
var.when.4after)$TOTAL.MOE
```

```
c(p.when.4after-MOE85.when.4after, p.when.4after+MOE85.when.4after)


#####Drink Four Loko both before and after January 1, 2011?
summary(as.factor(when.4))
p.when.4both=29/191
var.when.4both=p.when.4both*(1-p.when.4both)

MOECMU997.when.4both=Margin.Of.Error(191, conf.level[1],
var.when.4both)$CMU.MOE
MOEPITT997.when.4both=Margin.Of.Error(191, conf.level[1],
var.when.4both)$PITT.MOE
MOE997.when.4both=Margin.Of.Error(191, conf.level[1],
var.when.4both)$TOTAL.MOE
c(p.when.4both-MOE997.when.4both, p.when.4both+MOE997.when.4both)

MOECMU99.when.4both=Margin.Of.Error(191, conf.level[2],
var.when.4both)$CMU.MOE
MOEPITT99.when.4both=Margin.Of.Error(191, conf.level[2],
var.when.4both)$PITT.MOE
MOE99.when.4both=Margin.Of.Error(191, conf.level[2],
var.when.4both)$TOTAL.MOE
c(p.when.4both-MOE99.when.4both, p.when.4both+MOE99.when.4both)

MOECMU95.when.4both=Margin.Of.Error(191, conf.level[3],
var.when.4both)$CMU.MOE
MOEPITT95.when.4both=Margin.Of.Error(191, conf.level[3],
var.when.4both)$PITT.MOE
MOE95.when.4both=Margin.Of.Error(191, conf.level[3],
var.when.4both)$TOTAL.MOE
c(p.when.4both-MOE95.when.4both, p.when.4both+MOE95.when.4both)

MOECMU90.when.4both=Margin.Of.Error(191, conf.level[4],
var.when.4both)$CMU.MOE
MOEPITT90.when.4both=Margin.Of.Error(191, conf.level[4],
var.when.4both)$PITT.MOE
MOE90.when.4both=Margin.Of.Error(191, conf.level[4],
var.when.4both)$TOTAL.MOE
c(p.when.4both-MOE90.when.4both, p.when.4both+MOE90.when.4both)

MOECMU85.when.4both=Margin.Of.Error(191, conf.level[5],
var.when.4both)$CMU.MOE
MOEPITT85.when.4both=Margin.Of.Error(191, conf.level[5],
var.when.4both)$PITT.MOE
MOE85.when.4both=Margin.Of.Error(191, conf.level[5],
var.when.4both)$TOTAL.MOE
```

```
c(p.when.4both-MOE85.when.4both, p.when.4both+MOE85.when.4both)


#####Would you consider drinking since the removal of caffeine?
summary(as.factor(consider))
p.consider=65/160
var.consider=p.consider*(1-p.consider)

MOECMU997.consider=Margin.Of.Error(160, conf.level[1], var.consider)$CMU.MOE
MOEPITT997.consider=Margin.Of.Error(160, conf.level[1], var.consider)$PITT.MOE
MOE997.consider=Margin.Of.Error(160, conf.level[1], var.consider)$TOTAL.MOE
c(p.consider-MOE997.consider, p.consider+MOE997.consider)

MOECMU99.consider=Margin.Of.Error(160, conf.level[2], var.consider)$CMU.MOE
MOEPITT99.consider=Margin.Of.Error(160, conf.level[2], var.consider)$PITT.MOE
MOE99.consider=Margin.Of.Error(160, conf.level[2], var.consider)$TOTAL.MOE
c(p.consider-MOE99.consider, p.consider+MOE99.consider)

MOECMU95.consider=Margin.Of.Error(160, conf.level[3], var.consider)$CMU.MOE
MOEPITT95.consider=Margin.Of.Error(160, conf.level[3], var.consider)$PITT.MOE
MOE95.consider=Margin.Of.Error(160, conf.level[3], var.consider)$TOTAL.MOE
c(p.consider-MOE95.consider, p.consider+MOE95.consider)

MOECMU90.consider=Margin.Of.Error(160, conf.level[4], var.consider)$CMU.MOE
MOEPITT90.consider=Margin.Of.Error(160, conf.level[4], var.consider)$PITT.MOE
MOE90.consider=Margin.Of.Error(160, conf.level[4], var.consider)$TOTAL.MOE
c(p.consider-MOE90.consider, p.consider+MOE90.consider)

MOECMU85.consider=Margin.Of.Error(160, conf.level[5], var.consider)$CMU.MOE
MOEPITT85.consider=Margin.Of.Error(160, conf.level[5], var.consider)$PITT.MOE
MOE85.consider=Margin.Of.Error(160, conf.level[5], var.consider)$TOTAL.MOE
c(p.consider-MOE85.consider, p.consider+MOE85.consider)


#####Do you know the health risks associated with?
summary(as.factor(health))
p.health=246/276
var.health=p.health*(1-p.health)

MOECMU997.health=Margin.Of.Error(276, conf.level[1], var.health)$CMU.MOE
MOEPITT997.health=Margin.Of.Error(276, conf.level[1], var.health)$PITT.MOE
MOE997.health=Margin.Of.Error(276, conf.level[1], var.health)$TOTAL.MOE
c(p.health-MOE997.health, p.health+MOE997.health)

MOECMU99.health=Margin.Of.Error(276, conf.level[2], var.health)$CMU.MOE
MOEPITT99.health=Margin.Of.Error(276, conf.level[2], var.health)$PITT.MOE
```

```
MOE99.health=Margin.Of.Error(276, conf.level[2], var.health)$TOTAL.MOE
c(p.health-MOE99.health, p.health+MOE99.health)

MOECMU95.health=Margin.Of.Error(276, conf.level[3], var.health)$CMU.MOE
MOEPITT95.health=Margin.Of.Error(276, conf.level[3], var.health)$PITT.MOE
MOE95.health=Margin.Of.Error(276, conf.level[3], var.health)$TOTAL.MOE
c(p.health-MOE95.health, p.health+MOE95.health)

MOECMU90.health=Margin.Of.Error(276, conf.level[4], var.health)$CMU.MOE
MOEPITT90.health=Margin.Of.Error(276, conf.level[4], var.health)$PITT.MOE
MOE90.health=Margin.Of.Error(276, conf.level[4], var.health)$TOTAL.MOE
c(p.health-MOE90.health, p.health+MOE90.health)

MOECMU85.health=Margin.Of.Error(276, conf.level[5], var.health)$CMU.MOE
MOEPITT85.health=Margin.Of.Error(276, conf.level[5], var.health)$PITT.MOE
MOE85.health=Margin.Of.Error(276, conf.level[5], var.health)$TOTAL.MOE
c(p.health-MOE85.health, p.health+MOE85.health)


#####Consider drinking alcoholic energy drinks in the future?
summary(as.factor(future))
p.future=145/276
var.future=p.future*(1-p.future)

MOECMU997.future=Margin.Of.Error(276, conf.level[1], var.future)$CMU.MOE
MOEPITT997.future=Margin.Of.Error(276, conf.level[1], var.future)$PITT.MOE
MOE997.future=Margin.Of.Error(276, conf.level[1], var.future)$TOTAL.MOE
c(p.future-MOE997.future, p.future+MOE997.future)

MOECMU99.future=Margin.Of.Error(276, conf.level[2], var.future)$CMU.MOE
MOEPITT99.future=Margin.Of.Error(276, conf.level[2], var.future)$PITT.MOE
MOE99.future=Margin.Of.Error(276, conf.level[2], var.future)$TOTAL.MOE
c(p.future-MOE99.future, p.future+MOE99.future)

MOECMU95.future=Margin.Of.Error(276, conf.level[3], var.future)$CMU.MOE
MOEPITT95.future=Margin.Of.Error(276, conf.level[3], var.future)$PITT.MOE
MOE95.future=Margin.Of.Error(276, conf.level[3], var.future)$TOTAL.MOE
c(p.future-MOE95.future, p.future+MOE95.future)

MOECMU90.future=Margin.Of.Error(276, conf.level[4], var.future)$CMU.MOE
MOEPITT90.future=Margin.Of.Error(276, conf.level[4], var.future)$PITT.MOE
MOE90.future=Margin.Of.Error(276, conf.level[4], var.future)$TOTAL.MOE
c(p.future-MOE90.future, p.future+MOE90.future)

MOECMU85.future=Margin.Of.Error(276, conf.level[5], var.future)$CMU.MOE
MOEPITT85.future=Margin.Of.Error(276, conf.level[5], var.future)$PITT.MOE
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```
MOE85.future=Margin.Of.Error(276, conf.level[5], var.future)$TOTAL.MOE
c(p.future-MOE85.future, p.future+MOE85.future)


#####Risks associated affect answer to previous question?
summary(as.factor(risk))
p.risk=89/228
var.risk=p.risk*(1-p.risk)

MOECMU997.risk=Margin.Of.Error(228, conf.level[1], var.risk)$CMU.MOE
MOEPITT997.risk=Margin.Of.Error(228, conf.level[1], var.risk)$PITT.MOE
MOE997.risk=Margin.Of.Error(228, conf.level[1], var.risk)$TOTAL.MOE
c(p.risk-MOE997.risk, p.risk+MOE997.risk)

MOECMU99.risk=Margin.Of.Error(228, conf.level[2], var.risk)$CMU.MOE
MOEPITT99.risk=Margin.Of.Error(228, conf.level[2], var.risk)$PITT.MOE
MOE99.risk=Margin.Of.Error(228, conf.level[2], var.risk)$TOTAL.MOE
c(p.risk-MOE99.risk, p.risk+MOE99.risk)

MOECMU95.risk=Margin.Of.Error(228, conf.level[3], var.risk)$CMU.MOE
MOEPITT95.risk=Margin.Of.Error(228, conf.level[3], var.risk)$PITT.MOE
MOE95.risk=Margin.Of.Error(228, conf.level[3], var.risk)$TOTAL.MOE
c(p.risk-MOE95.risk, p.risk+MOE95.risk)

MOECMU90.risk=Margin.Of.Error(228, conf.level[4], var.risk)$CMU.MOE
MOEPITT90.risk=Margin.Of.Error(228, conf.level[4], var.risk)$PITT.MOE
MOE90.risk=Margin.Of.Error(228, conf.level[4], var.risk)$TOTAL.MOE
c(p.risk-MOE90.risk, p.risk+MOE90.risk)

MOECMU85.risk=Margin.Of.Error(228, conf.level[5], var.risk)$CMU.MOE
MOEPITT85.risk=Margin.Of.Error(228, conf.level[5], var.risk)$PITT.MOE
MOE85.risk=Margin.Of.Error(228, conf.level[5], var.risk)$TOTAL.MOE
c(p.risk-MOE85.risk, p.risk+MOE85.risk)
```

Appendix 5: References

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