

some overall comments:

\* your methods section is not very clear in some places

\* Do not forget list of references and appendices at the end of the paper.

# College Students' Attitudes Towards Alcoholic Energy Drinks

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## 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 student attitudes towards alcohol and energy drinks in general. Some questions that we would like answers to include, but are not limited to: 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? We plan on answering these questions with information collected through a survey.

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 as 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.

[INSERT QUICK SUMMARY OF MAIN RESULTS FROM OUR FINDINGS]

### Population & Sampling Method

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 experience coverage error due to the times we conduct 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 are out surveying, we may miss students of particular majors or fields of study because of when certain classes occur. Each major tends to have a specific time their core classes are held. We also may experience a problem with a non-representative sample if we don't survey near a building where all of the classes of a particular major take place. We tried to choose locations on both campuses that are main meeting points that a large variety of students will pass through. We also will attempt 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.

Because the specific days and times we choose to survey individuals may have implications on who responds to our survey, we may also encounter non-response error. 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 account for this, we plan to include definitions of certain potentially confusing words and have the option to read a small unbiased paragraph of background information so all respondents will be on common ground. We also will ask for an honest disclosure of answers and will try to ensure anonymity of survey answers. This is further described in the following section.

We would like to have a comprehensive random sample of students from both Carnegie Mellon University and the University of Pittsburgh (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 would like to stratify our sample in an effort to get all demographics of 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 would like to

As far as I can tell, you are not incorporating any stratification into the (pre-data-collection) design of your survey. Am I wrong??

However, it may be the case that you will want to do some post-stratification....

survey near general areas of traffic like Kirr Commons and the corner of Forbes and Morewood where we expect to receive sufficient cover of students of all demographics including, but not limited to: age, gender, and Greek life orientation. Likewise, our plan for surveying the students of the University of Pittsburgh is very similar. We believe students of all classes and Greek life orientation are commonly located at Schenley Commons, Soldiers and Sailors Hall, and the campus Starbucks. Therefore, these are areas where we plan to solicit survey responses. Additionally, by surveying students near the Petersen Events Center we assume we will also cover students enrolled in the university honors program. In general, we believe these specific areas of the University of Pittsburgh campus may cover all demographics of students sufficiently. 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.

### Sample Size Calculation

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:

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

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

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. 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:

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

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

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

By continually permutating these calculations using various confidence levels and overall sample sizes, we can gain an idea of what type of margin of error we may ultimately end up with. Some example calculations are given in the table below:

<u>Confidence Interval</u>	<u>Margin of Error</u>	<u>Z-Score</u>	<u>N</u>
90%	.05	1.64485	529
85%	.075	1.43953	182
82.5%	.0875	1.35631	119
80%	.1	1.28155	81

this is not quite right for stratified sampling.

if you are really doing stratified sampling, there is a way to combine variances across strata to help calculate a margin of error.

If you are just doing two separate surveys (one at pitt and one at CMU) or combining results in a single unstratified survey, then the SRS calculations from the first few days of class will be helpful

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.

At this point, our estimates above are under the worst case scenario assumption of the maximum variance for survey responses of both Carnegie Mellon University and the University of Pittsburgh; however, if we had any intuition of our target populations' true variances, we may be able to greatly increase our confidence while decreasing our margin of error and total sample size. Furthermore, the worst case scenario assumption forces us to split the total sample size equally among both Carnegie Mellon University and the University of Pittsburgh. This may change depending on our final calculations.

After conducting our survey, we were able to collect [INSERT TOTAL AMOUNT OF RESPONSES FROM CMU] survey responses from Carnegie Mellon University, and [INSERT TOTAL AMOUNT OF RESPONSES FROM PITT] from the University of Pittsburgh, for a total of [INSERT TOTAL AMOUNT OF RESPONSES] overall survey responses.

[INSERT ANALYSIS OF EACH QUESTION'S ESTIMATED VARIANCE]

[STATE EACH QUESTION'S RECALCULATED CONFIDENCE INTERVAL & MARGIN OF ERROR BASED ON FINAL SAMPLE SIZE FROM EACH STRATA AND NEW VARIANCE ANALYSIS]

## Testing & Results

[SUMMARIZE RESULTS USING ANOVA, TWO-WAY ANOVA, AND CHI-SQUARED TESTS]

## Discussion

[OVERALL DISCUSSION, SURPRISING RESULTS, TAKE HOME MESSAGE]

As with many surveys, there are various strengths and weaknesses. One of our strengths is that we have a very high response rate [INSERT MORE STRENGTHS]. A weakness we had was our first round of blunders. Our last question referred to question number “19,” which did not exist on our survey. We realized it while handing out our first 5 surveys, and readily fixed it.

[INSERT MORE WEAKNESSES]

**References section.... (follow  
<http://www.library.cornell.edu/resrch/citmanage/apa>)**

**appendices....**