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Agenda

- Recapping our project.
- Sample size calculations.
- Exploratory data analysis.
- Tests.
- Problems, improvements, and conclusions.


FOUR
10.0% ALC/VOL
Liquid
CHARGE
JOOSE
SPARKS
SPARKS
PLUS
7.0%

Survey Topic and Goals

- Survey about alcoholic energy drinks.
- Intent: Assess undergraduate students' attitudes towards and use of alcoholic energy drinks.

About Alcoholic Energy Drinks

- Any beverage that contains both caffeine and alcohol
- Recent concern over the safety of using alcohol and caffeine in combination
- FDA ban on manufacturing of beverages containing caffeine & alcohol

Methods

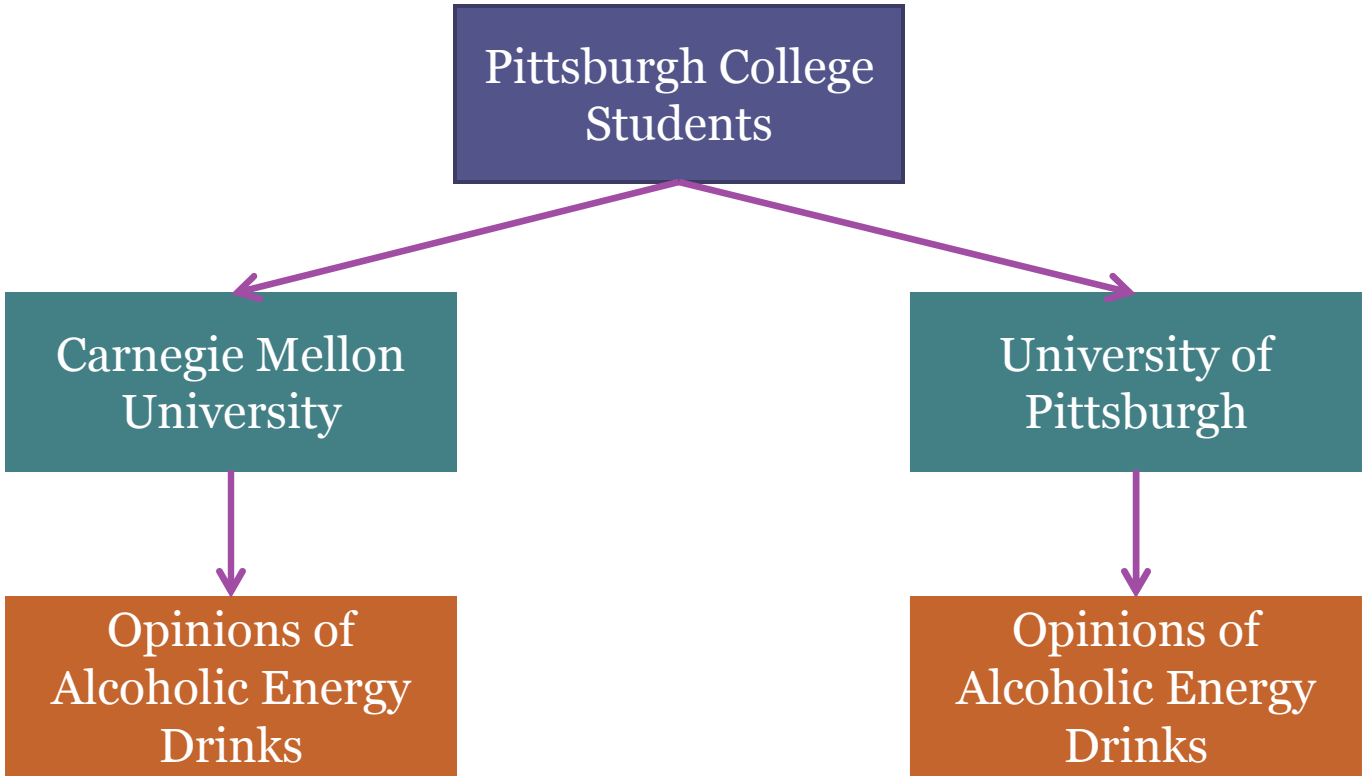
- “Man on the street” type survey.
- Strategic selection of sampling locations.
- Each group member spent between 15-20 hours sampling

Motivation

- No prior research about safety or usage for products like Four Loko, or Joose
- Products like Redbull/Vodkas are still legal for consumption
- Did widespread concern/ban have an affect on their opinions?

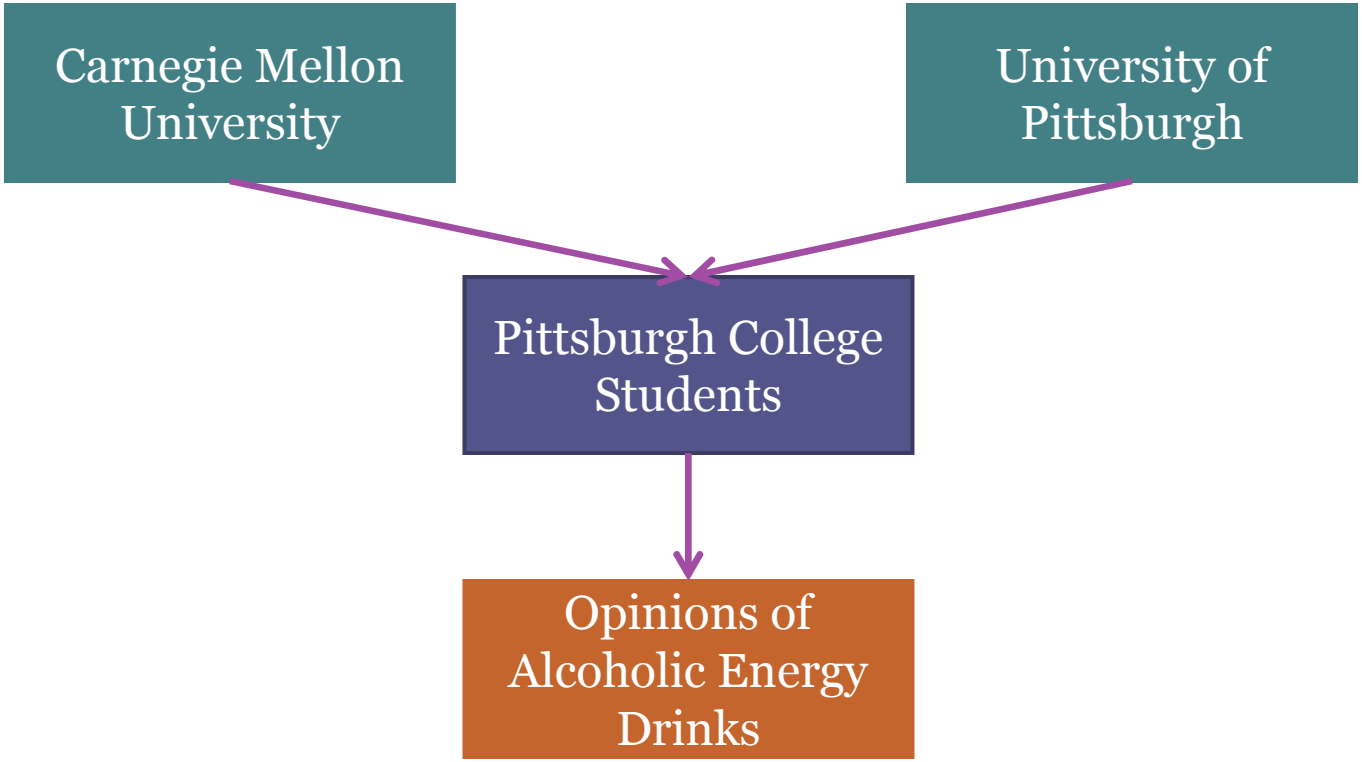

Loko
LEMONADE FLAVOR
FOUR
Loko
PREMIUM MALT BEVERAGE WITH NATURAL AND ARTIFICIAL FLAVORS • GUARANA • TAURINE • CAFFEINE
23.5 FL OZ. (1PT 7.5 FL OZ)
12.0%
CONTAINS ALCOHOL

Our Population



Two distinct surveys $\frac{n}{2}$

Our Population



Initial Sample Size Calculation

- Conservative approach
  - 90% Confidence Interval
  - .05 Margin of Error
    - Bernoulli Distributions

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

- SRS Without Replacement: $n \geq 270$
- First wave of surveys: 261, of which 215 were "Yes" observations

Stratified Sample Size Calculation

- Two main strata: CMU & Pitt.

- Use Margin.Of.Error function
  - Balance confidence levels/margin of error with *n*
  - Need population variances
    - Estimate using our surveys & inflate result

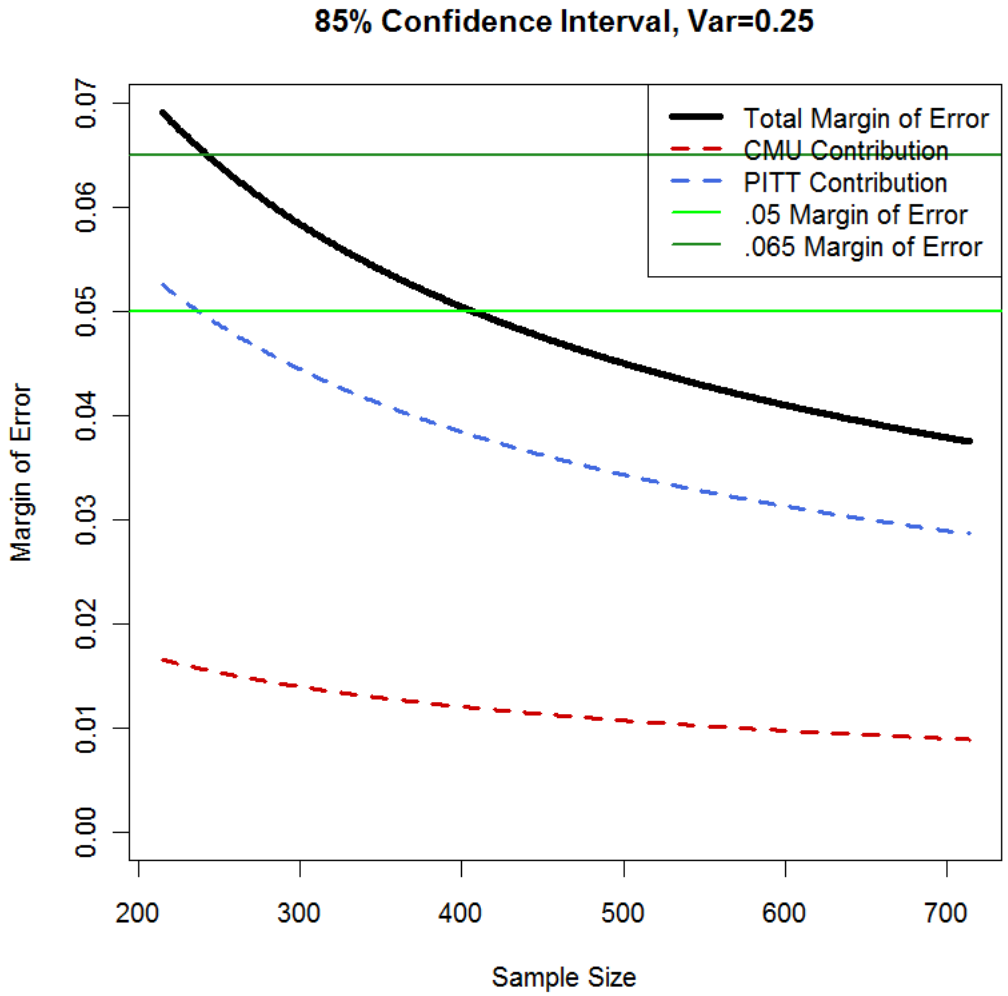
```
Margin.Of.Error = function(N, Z) {

      CMU=Z*sqrt(((5705/23736)^2)*(1-((N/2)/5705))*(.25/(N/2)))
      PITT=Z*sqrt(((18031/23736)^2)*(1-((N/2)/18031))*(.25/(N/2)))
      MOE=CMU+PITT
      return(MOE)

}
```

How Many More Surveys?

-

```
sample.siz                                    , nmore) {
        ...
}
```

Cons 500



Manipulating Margin of Error

- Number of responses $n = 290$
  - Not all questions were answered by respondents
  - Not all questions were applicable to respondents
    - Sample size varies $n \leq 290$ given each question

- Variances are different among each question
  - Confidence levels will vary for each parameter

Sample Construction & Interpretation of Confidence Intervals

- Q: Have you ever heard of Four Loko?
  - Yes: 256, No: 20
    - $p \approx .928$, variance $\approx .067$

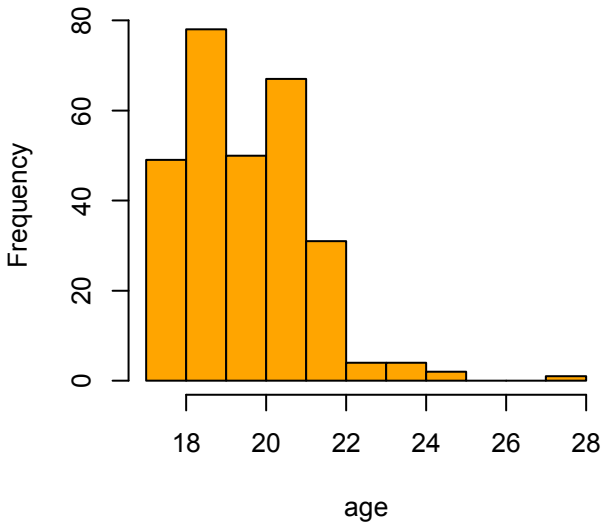
```
> Margin.Of.Error(276, conf.level[1], var.heard.4)$TOTAL.MOE
[1] 0.06511325
>
```

Revisiting: Problems With Sample Size

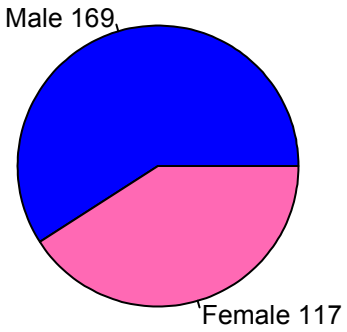
- No pilot study
  - Worst case scenario assumptions
    - Use survey variances, inflate final margin of error
- Response rate
  - Penalty to determine how many extra people to ask
    - Extremely high response rate, sometimes 100%
- Cumbersome trial & error
  - Determining confidence levels & margin of error in respect to sample size
    - Use Margin.Of.Error within sample.size.graph


FOUR
Loko
ORANGE BLEND
BLUE RASPBERRY FLAVOR
LOKO UVA
CONTAINS ALCOHOL

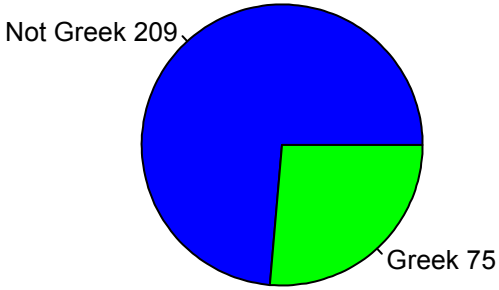
Distribution of Age



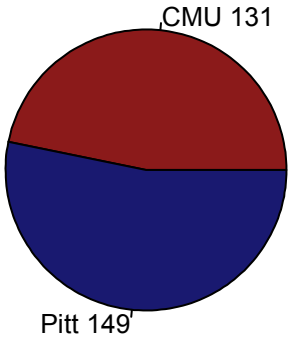
Gender

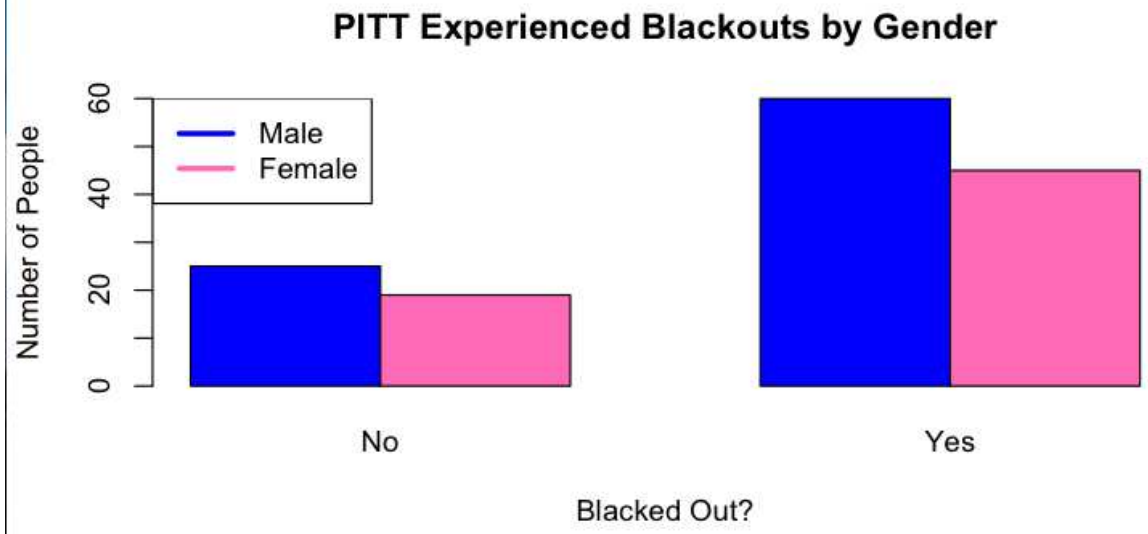


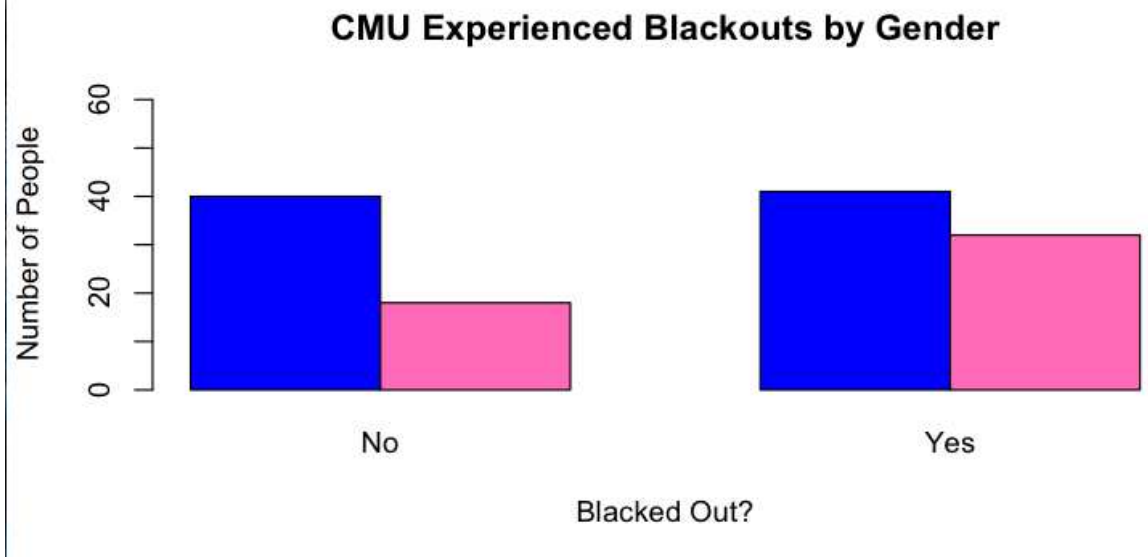
Greek Affiliation



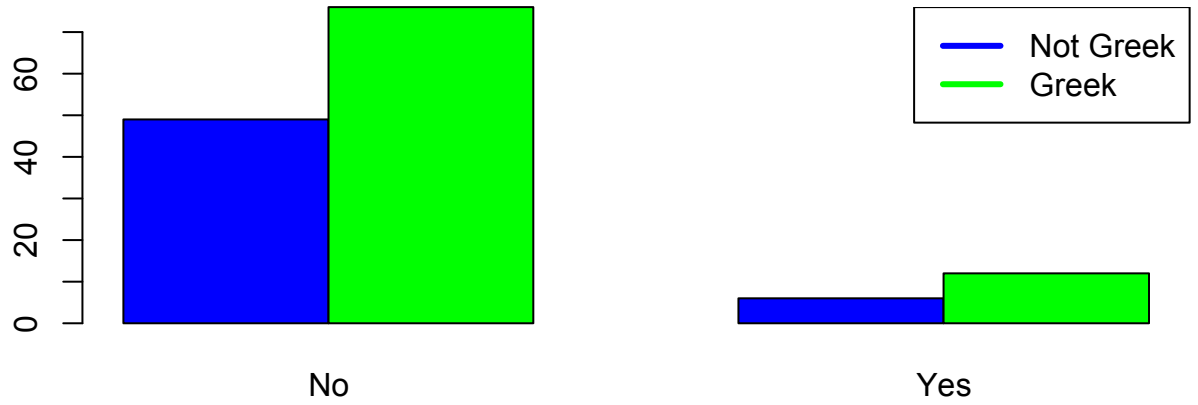
School



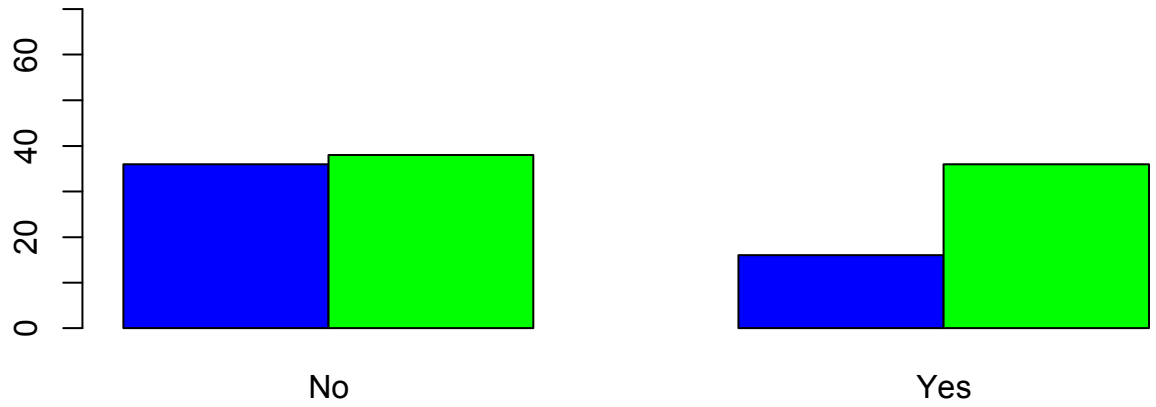

PITT Experienced Blackouts by Gender
Number of People
0
20
40
60
Male
Female
No
Yes
Blacked Out?

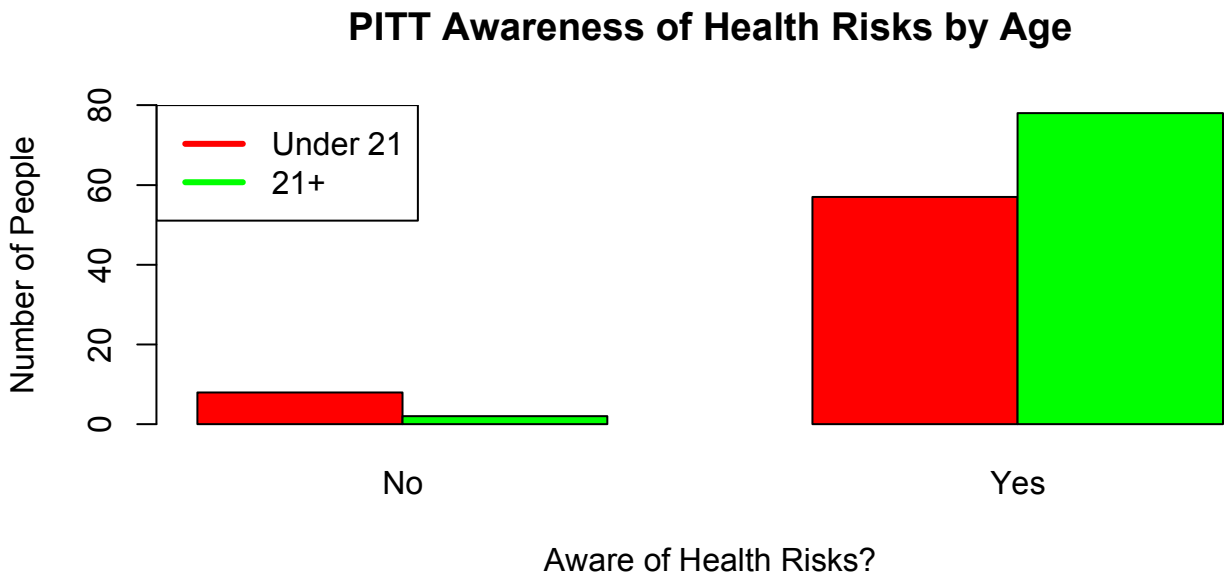

CMU Experienced Blackouts by Gender
Number of People
0
20
40
60
No
Yes
Blacked Out?

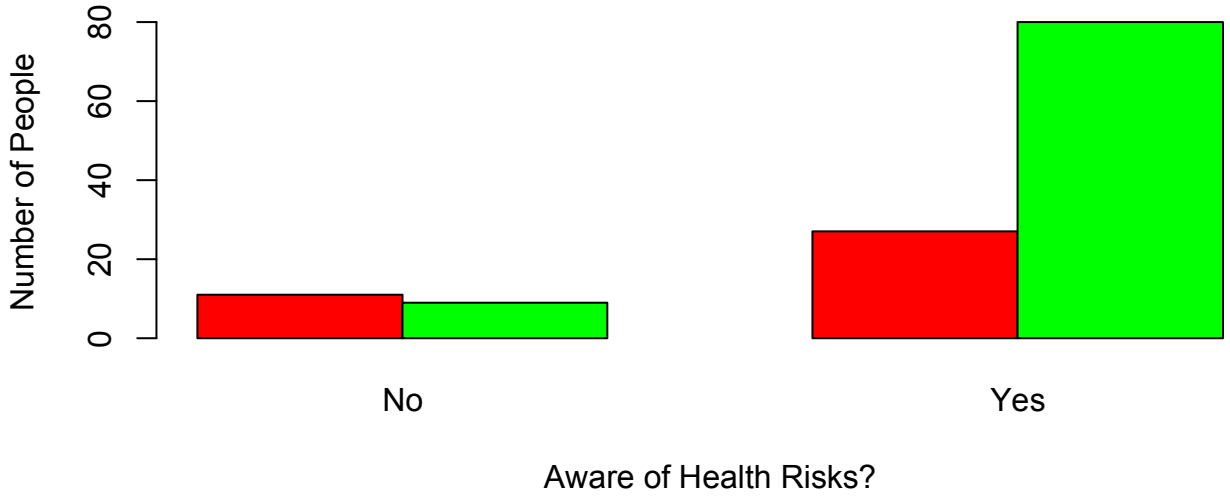
PITT Drank Four Loko by Greek Affiliation

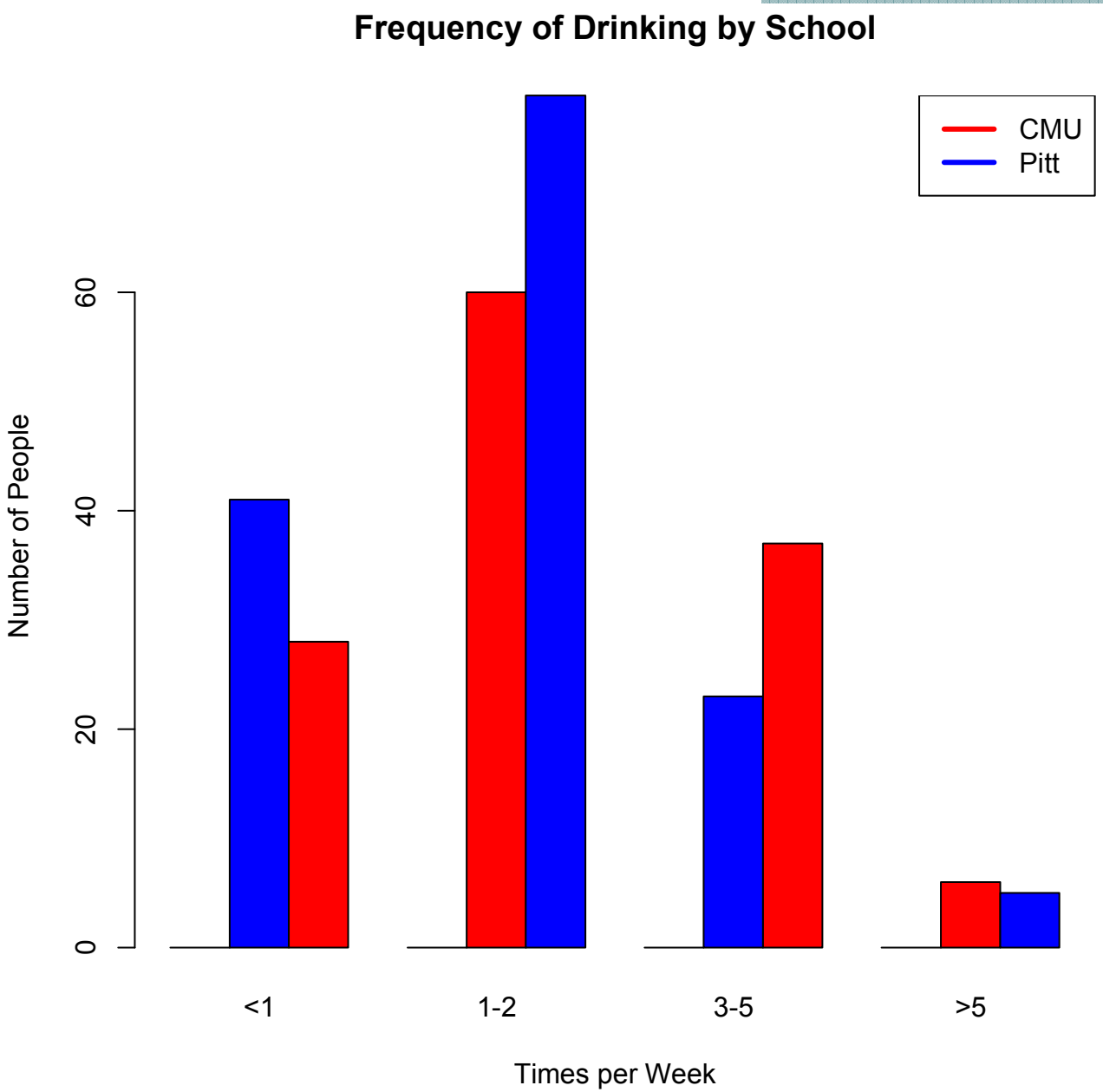


CMU Drank Four Loko by Greek Affiliation

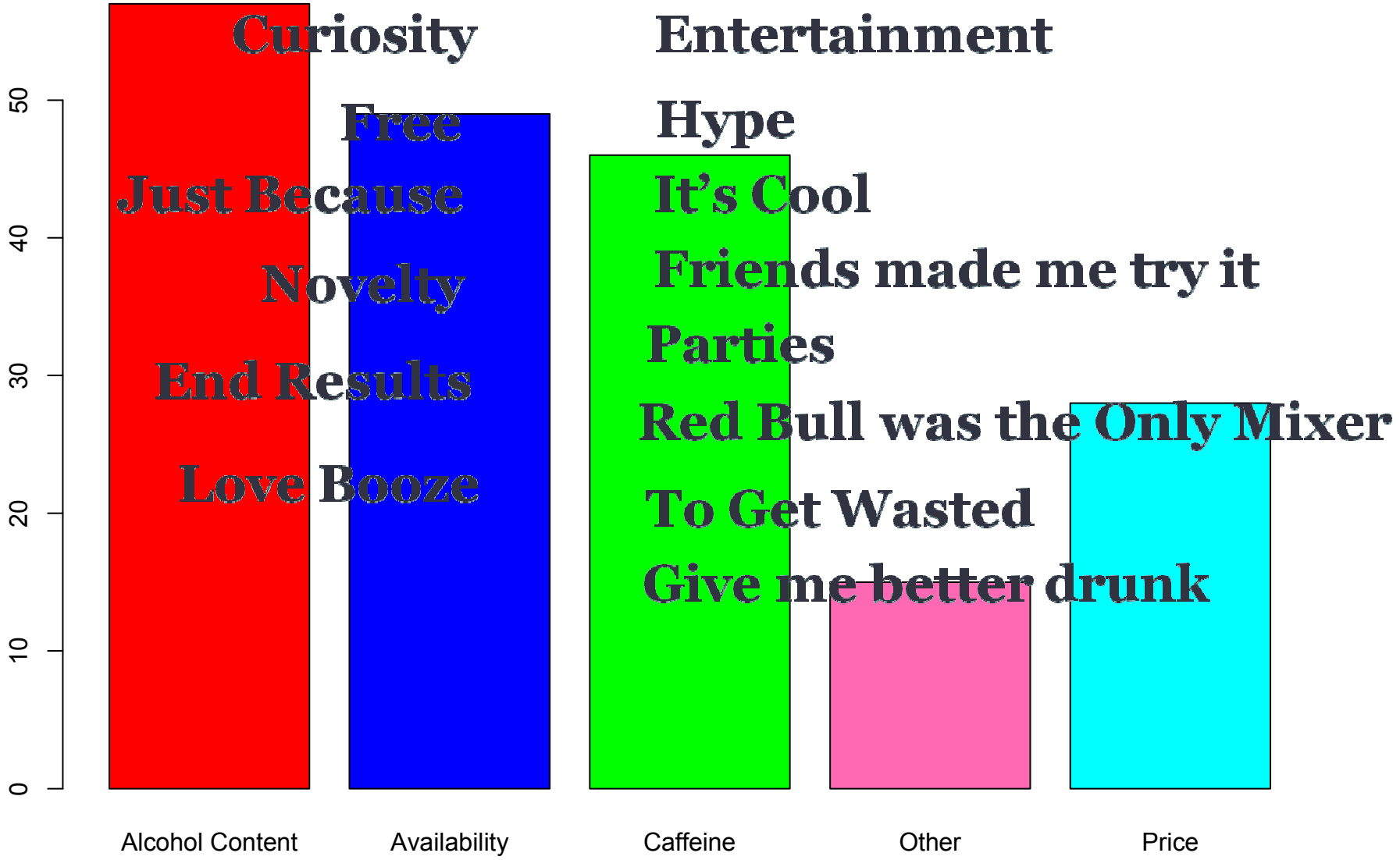



PITT Awareness of Health Risks by Age
Number of People
0
20
40
60
80
Under 21
21+
No
Yes
Aware of Health Risks?


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


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

Why Drink Four Loko?




SMIRNOFF
To Steven
Happy
21st
Love from Jemma x
Red Bull
ENERGY DRINK

Mix and Blackout by School

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

Pvalue= 3.31E-05, X-Square= 17.2324

	School	
Blckt	CMU	PITT
0	72	91
1	74	106

Pvalue= 0.02366, X-Square= 5.1193

	School	
Mix	CMU	PITT
0	72	91
1	59	60

Pvalue= 0.4363, X-Square= 0.606

Mix and Blackout by Greek

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

	Greek	
Blckt	0	1
0	79	25
1	130	50

Pvalue= 0.583, X-Square= 0.3014

	Greek	
Mix	0	1
0	130	33
1	79	40

Pvalue= 0.01699, X-Square= 5.7291

Mix and Blackout by Gender

Mantel Haenszel Test

Female		
	Blackout	
Mix	0	1
0	50	53
1	14	49

Male		
	Blackout	
Mix	0	1
0	26	34
1	12	44

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

Chi Square Test

	Gender	
Blckt	0	1
0	66	38
1	102	78

Pvalue= 0.3188, X-Square= 0.994

	Gender	
Mix	0	1
0	103	60
1	63	56

Pvalue= 0.1085, X-Square= 2.5756


Red Bull
ABSOLUT
VODKA

Problems Encountered

- Informed Consent Form
- Question Dependency
- Formatting of some dependent questions unclear

Ways to Improve our Survey

- More pre-testing to a broader audience
  - Asking friends for feedback did not reveal confusion points
- Improved formatting and clarification od dependent questions
  - i.e. adding NA as an option to a dependent question in case the previous answer was No or NA

General Conclusions

- Almost all college students have heard of Four Loko
- More Greek-Affiliated students drink Four Loko than non-Greeks.
- More under-21 year olds are unaware of the health risks associated with alcoholic energy drinks than over-21 year olds
- Greek-affiliated students are more likely to consider drinking alcoholic energy drinks in the future

Surprising Results

- More CMU students drink more frequently than 3 times per week than Pitt students
- More males have experienced a blackout than females
- At Pitt, more under-21 year olds drink 3-5 times per week than over-21 year olds


Four Loko
12.0% ALC/VOL
11%
2.49