Student Consumption of Caffeine on Campus

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Agenda

- Recap of:
  - Research Questions
  - Sample Size and Construction
  - Survey Methodology
- Survey Responses
- Analysis
- Future Work

Introduction - Research Question

- Caffeine consumption patterns at Carnegie Mellon University?
- Correlation to various factors such as GPA/activity level, etc.?
- Student perception of consumption

Reason for Survey

- Damaging health effects of excessive caffeine consumption
- Concern that students today consume large amounts of caffeine
  - Keeping up with academic workload or athletics

Goal of Survey Questions

- Demographic Information
  - Year; College
  - Gender
- Academic Performance
  - Major & Minor
  - GPA and Units taken this semester
  - Time spent on class work
- Extracurricular Involvement
  - Activities
  - Part-time work
  - Leisure Time

Some more questions

- General Well-being:
  - Sleeping patterns.
  - Exercise schedule
  - What caffeine products are consumed and in what quantity?
- Student Perception:
  - Reason for consumption
  - Comfort with amount currently consumed

Sample Construction

Sample Size

- Initially we considered a 500 student non stratified sample
- Switched to stratified by year (including 5th)
- Wanted a ME of 0.1
- ME formula for stratified sample:

$$ME = (1.96) \times \sqrt{\sum_{h-1}^{H} W_h^2 (1 - f_h) \frac{s_h^2}{(f \times N_h)}}$$

Sample Size

- Modified the formula to include only info. we know/can estimate. $ME = (1.96) \times \sqrt{\sum_{h=1}^{H} W_h^2 (1 - f_h) \frac{s_h^2}{(f \times N_h)}}$
- ME = 0.1
- N_n= Population size of the strata
- N = overall population
- S_h= 2 for the question "How many servings of caffeine?" based on our group and pretesting
- f = proportion of the strata we need to sample (what we don't know)

Selecting the Sample

- When we plug the strata and overall population numbers into the equation we need

Year	Number Needed	Number Selected
Freshmen	20	120
Sophomores	18	108
Juniors	18	108
Seniors	17	102
5th Years	3	18
Total	**76**	**456**

- Assuming a (conservative) 15% response rate
- Students were randomly selected from C-Book

Survey Methodology

Google Form

- Used a Google Form to create the survey
- Responses are automatically entered into a spreadsheet for easy processing
- Modifications:
  - Changing question type to allow for multiple responses

Sample Selection

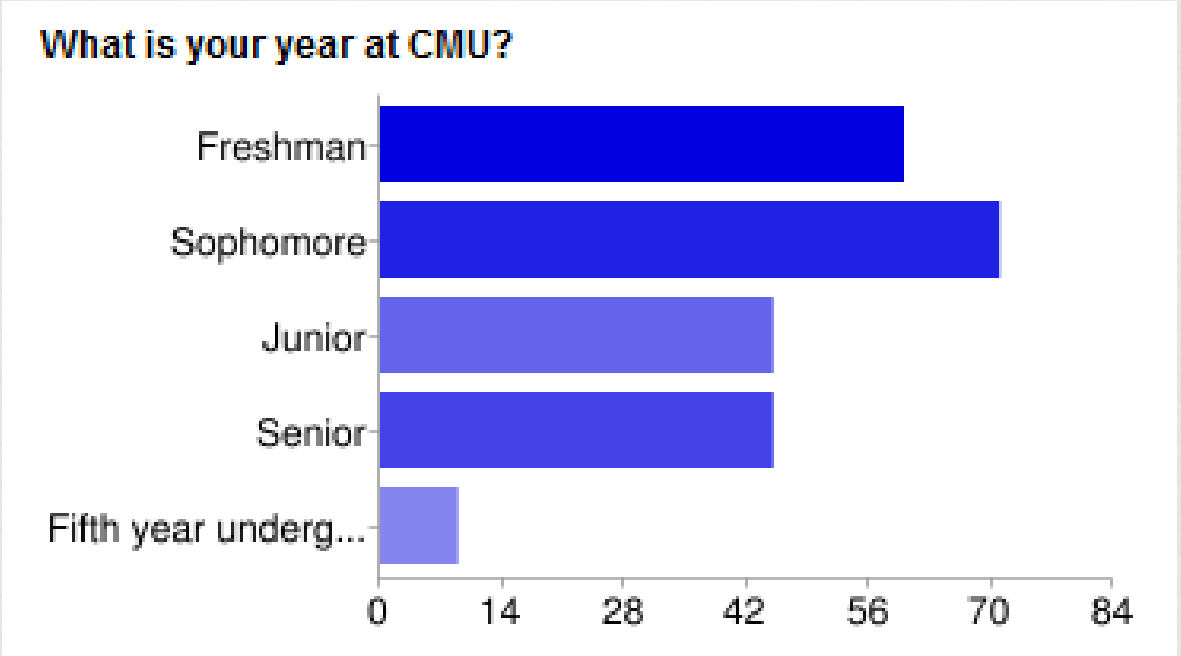
- Random Number Generator
  - First number: Page number
  - Second number: Line number on that page
- Problem of Duplication
- Master d-list created
- Composed email with link to survey
  - Included incentive description

Responses

Responses

- 230 Responses
- Response rate:
- **50.43%**

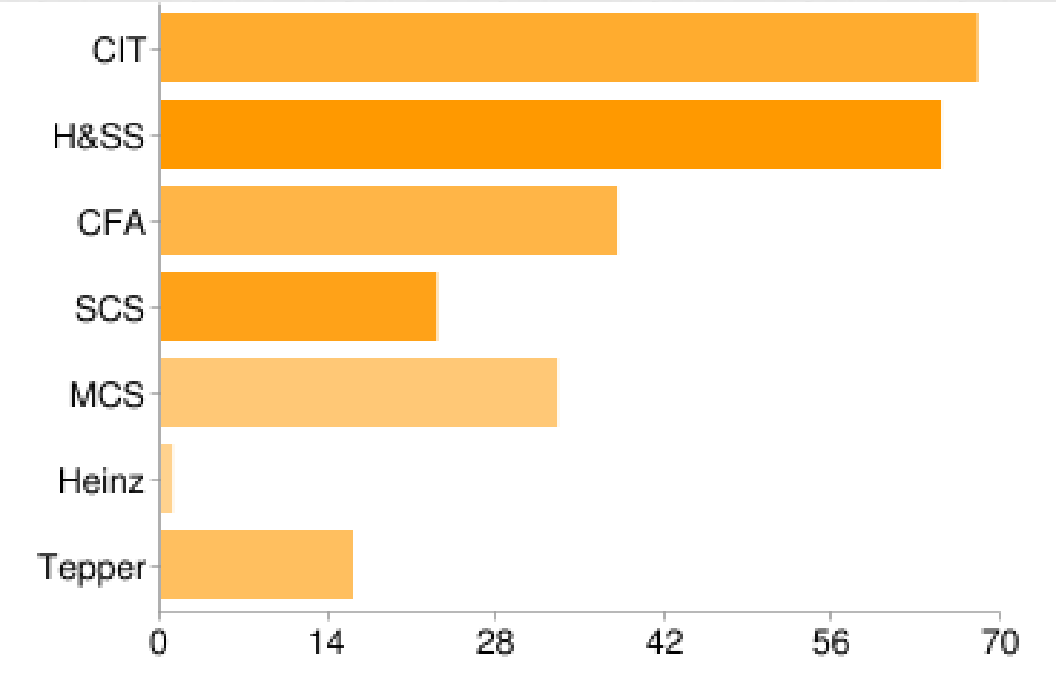
- Nonresponse:
  - $50 Incentive
  - Reminder Email



Respondent Attributes

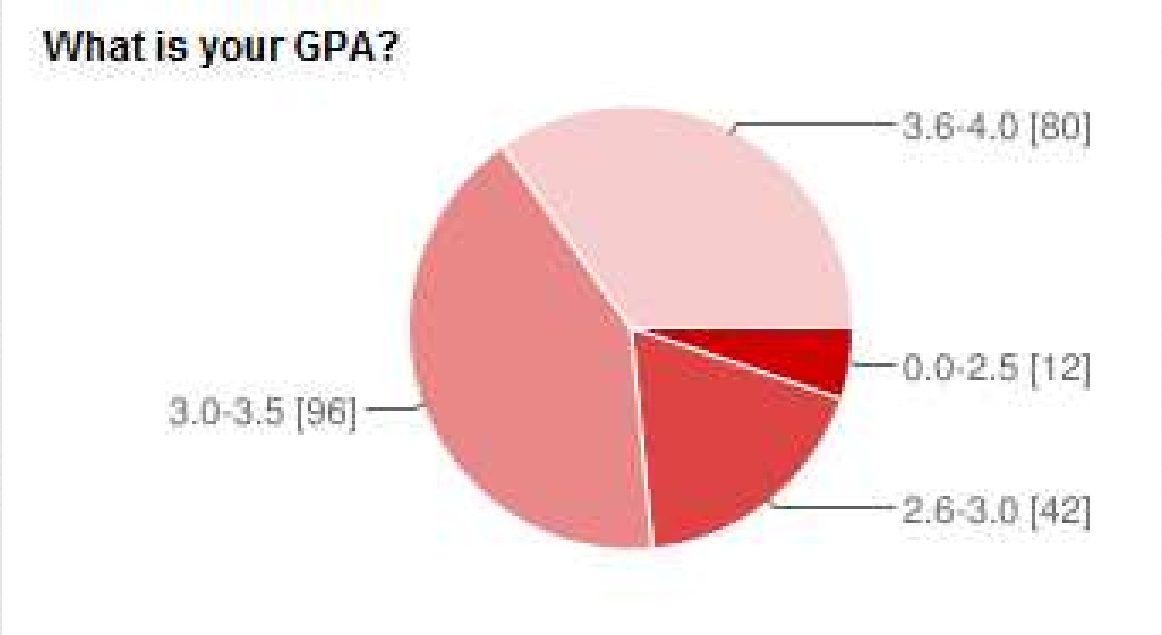
- Opposite of campus population

Respondent Attributes



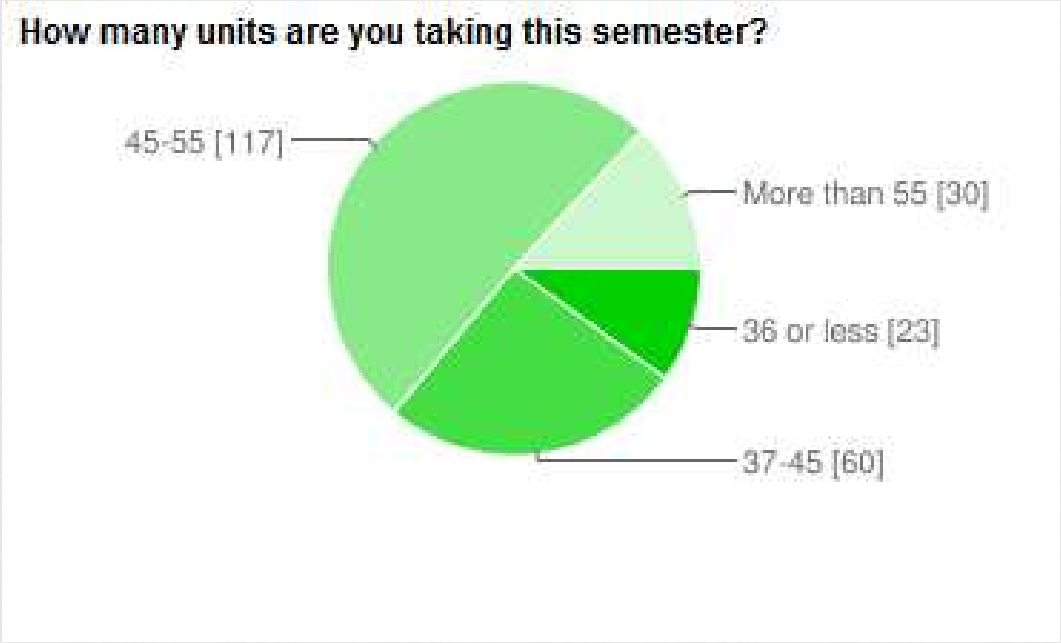
- Good distribution across college

Respondent Attributes



- Good distribution across GPA

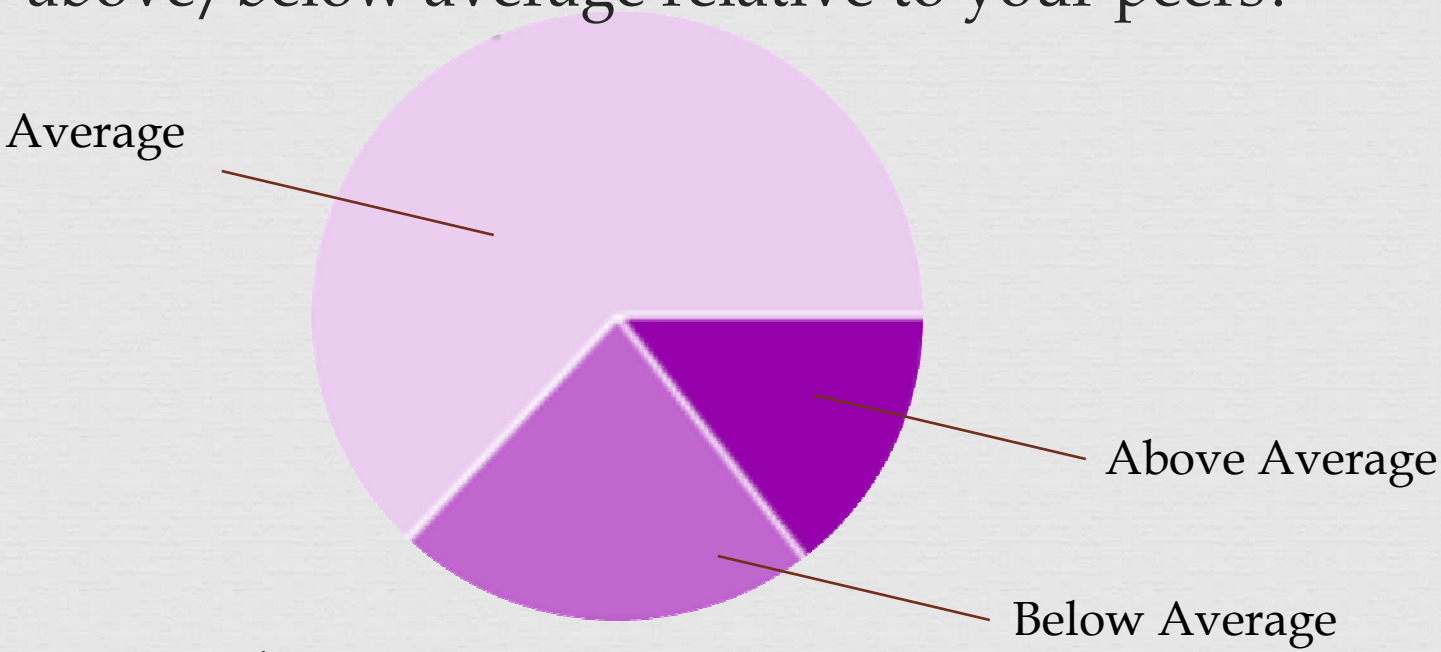
Respondent Attributes



- Good "busyness" distribution

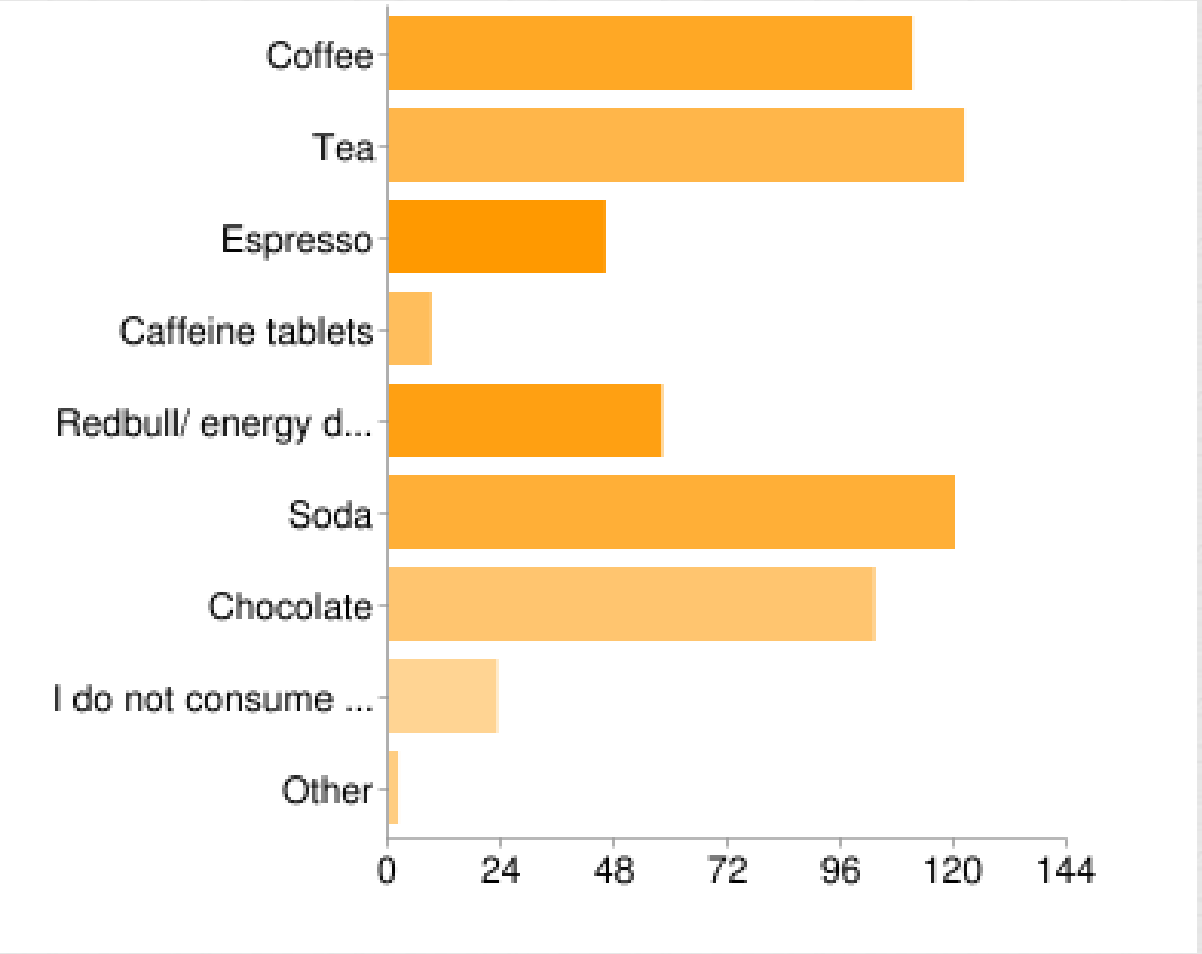
Respondent Attributes

- Do you believe your caffeine consumption is above/below average relative to your peers?



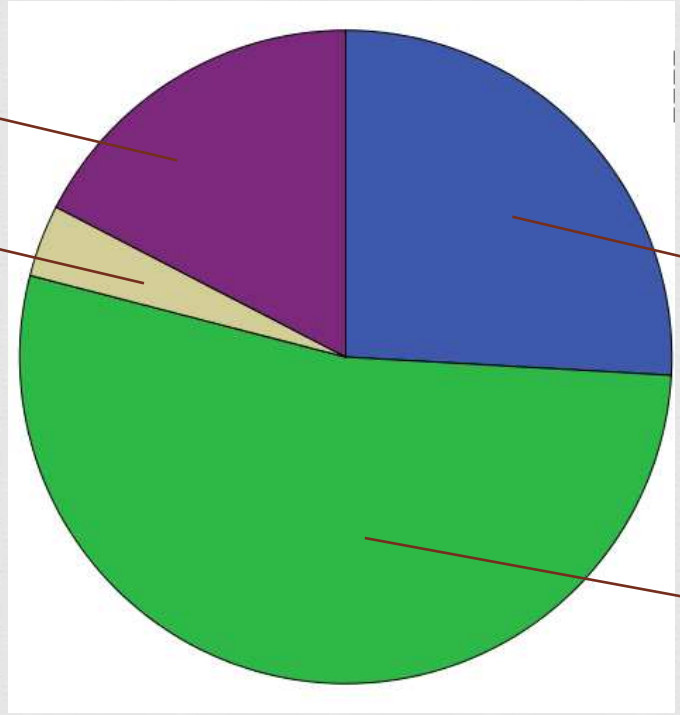
- Egocentric bias?

Types of Caffeine



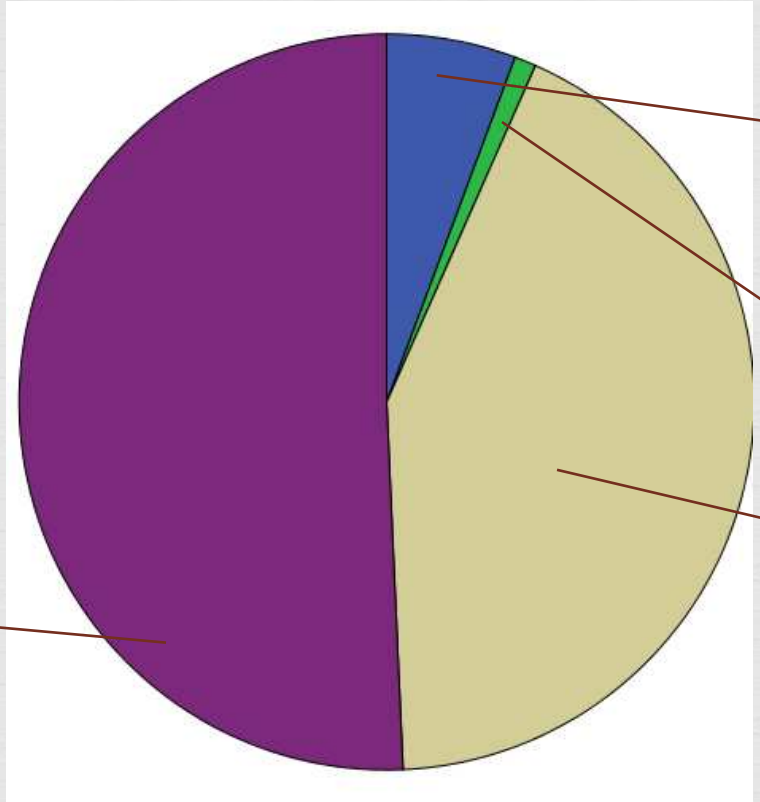
Caffeine Consumption

- How many caffeinated beverages do you consume per day?



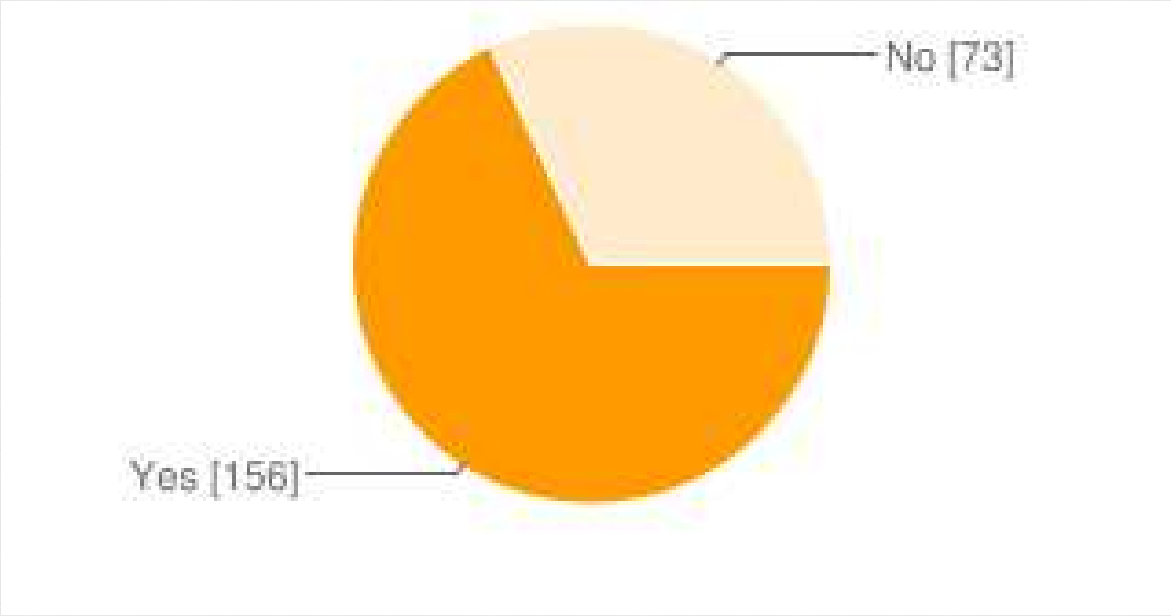
Caffeine Motivation

- What is your primary motivation for consuming caffeine?



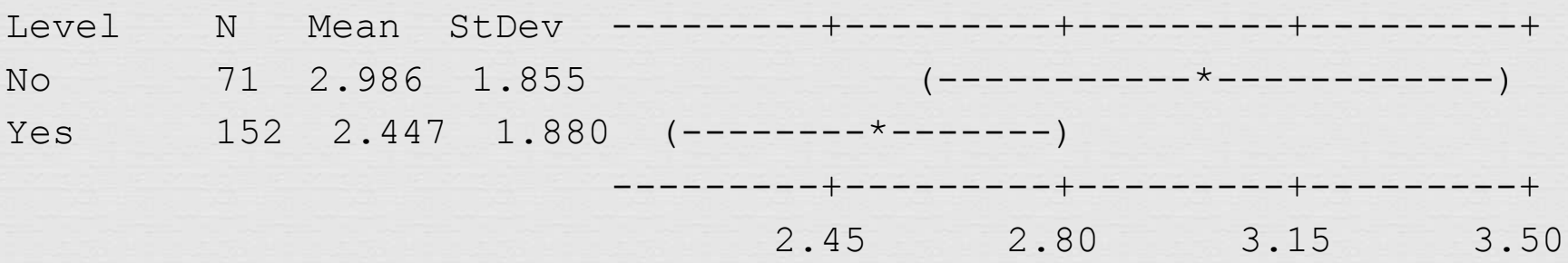
Caffeine and Health

- Do you believe that consuming caffeine negatively affects your health?



Analysis

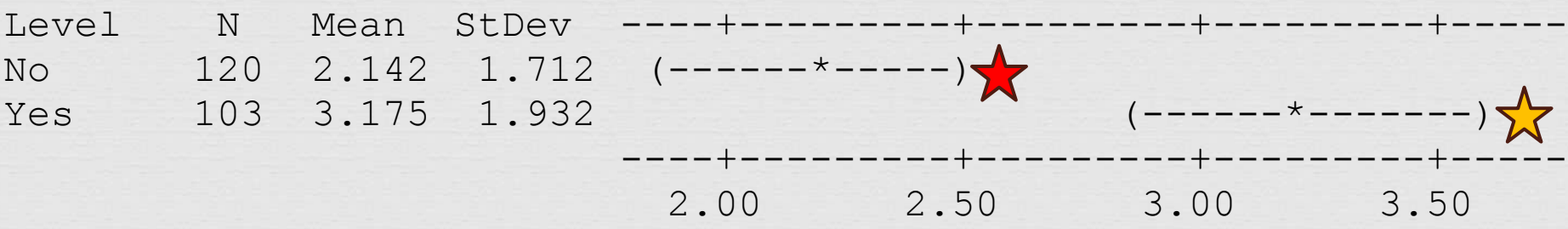
Health Concerns Do Not Affect Caffeine Consumption



P-value is 0.047
Pooled StDev = 1.872

Since these two intervals overlap, we can not conclude statistical significance however there is still a note-worthy difference.

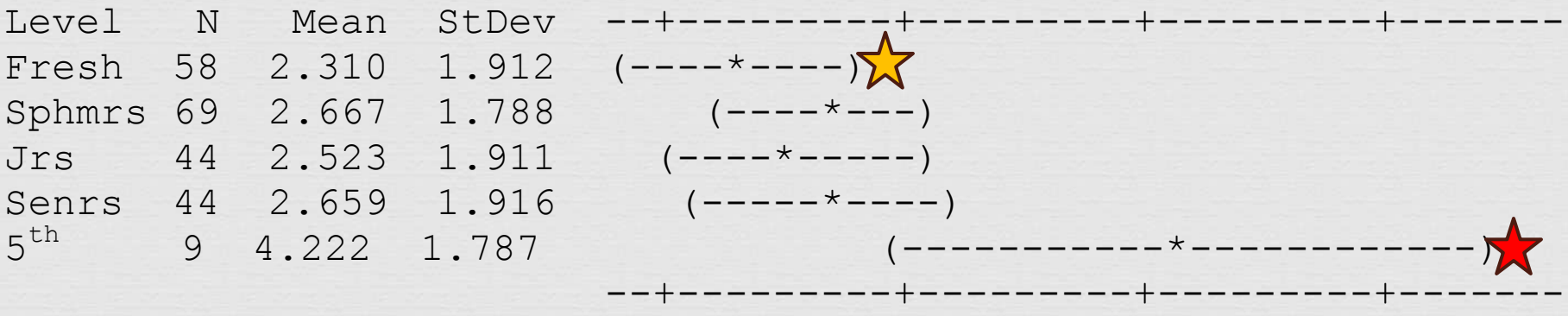
Students Who Think That Caffeine Positively Impacts Performance Consume More Caffeine



P-value = 0
Pooled StDev = 1.817

Statistically significant difference!

Fifth Years Consume the Most Caffeine on Campus



P-value=0.083
Pooled SD = 1.870

More Caffeine Means More Symptoms of Caffeine Addiction

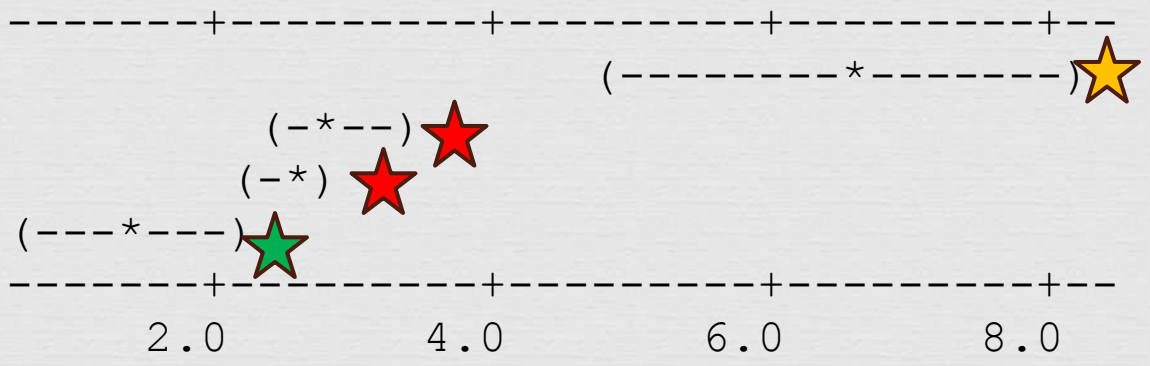
Level	N	Mean	StDev
None	38	0.868	1.212
<2	112	1.098	1.530
2-5	56	1.750	2.029
7+	8	2.625	3.378

P-value = 0.007
Pooled StDev = 1.719

Statistically Significant Difference!!

More Caffeine Means Less Sleep

Level	N	Mean	StDev
<3	4	6.500	1.000
3-5	48	2.833	2.046
5-8	153	2.575	1.708
8+	19	1.474	1.896

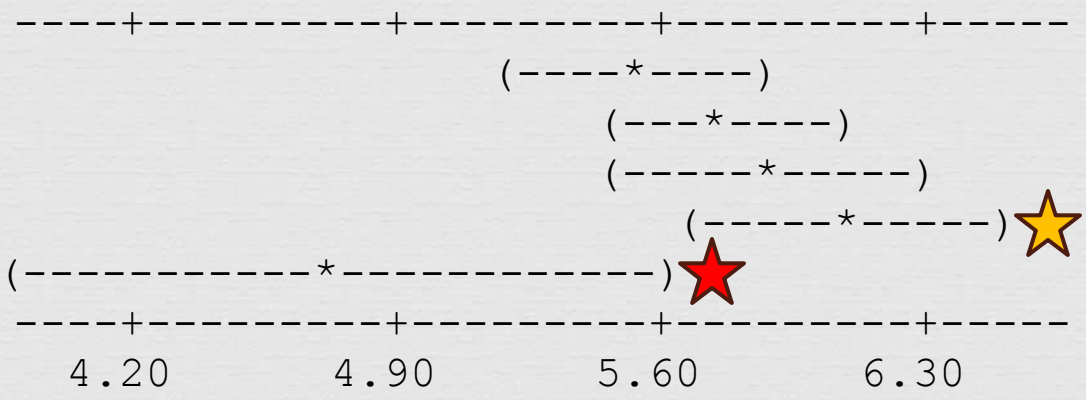


P-value = 0
Pooled StDev = 1.794

Statistically Significant Difference!!

Fifth Years get Less Sleep Than Seniors

Level	N	Mean	StDev
Frsh	58	5.552	1.477
Soph	69	5.754	1.049
Jr	44	5.886	1.401
Sr	44	6.091	1.378
5th	9	4.778	1.986

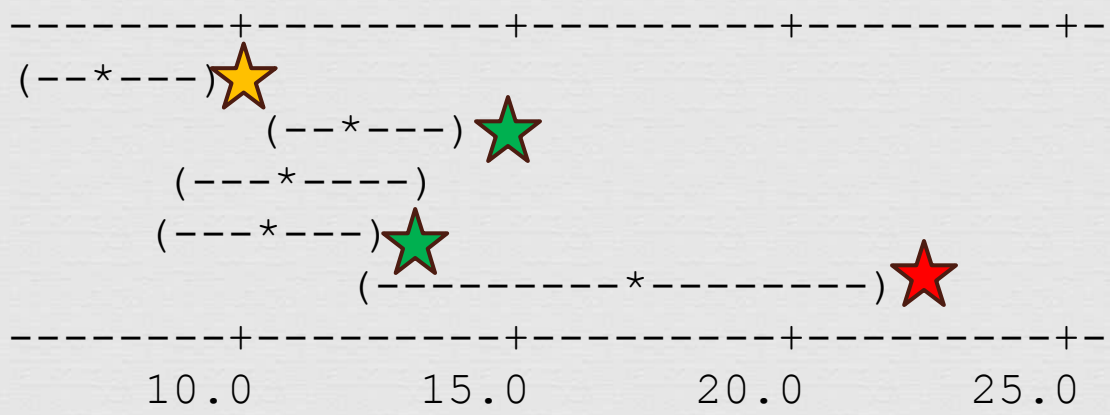


P-value = 0.059
Pooled StDev = 1.346

Statistically Significant Difference!!

Freshmen are Less Busy Than Sophomores & Juniors; Fifth Years More Busy Than Seniors

Level	N	Mean	StDev
Fresh	59	7.644	6.351
Sphmrs	69	12.188	7.303
Jrs	44	11.182	7.565
Senrs	44	10.386	6.560
5th	9	17.333	9.798

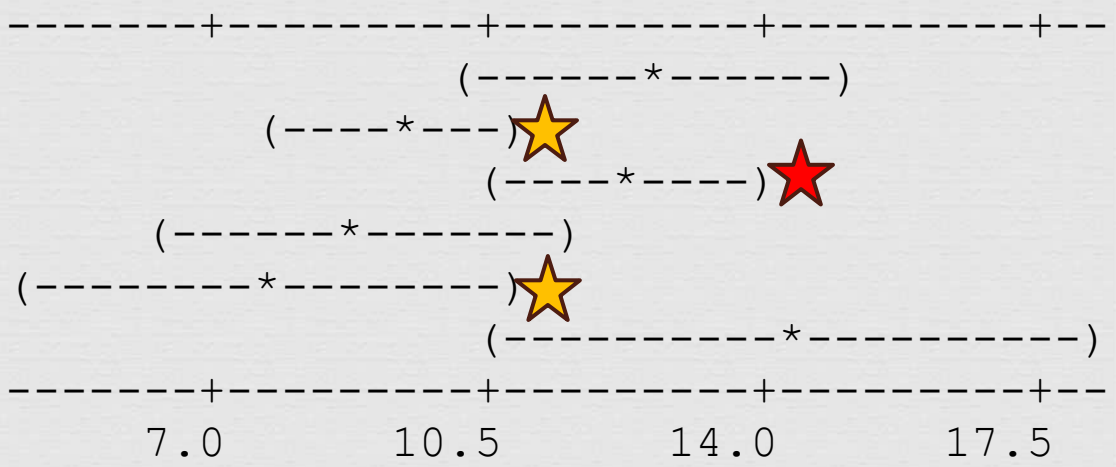


P-value = 0
Pooled StDev = 7.086

Statistically Significant Difference!!

Tepper and HSS more Busy than SCS and CIT

Level	N	Mean	StDev
CFA	32	12.719	7.912
CIT	68	9.294	6.227
H&SS	62	12.194	7.971
MCS	30	8.833	7.808
SCS	20	7.550	6.004
Tepper	13	14.308	5.893

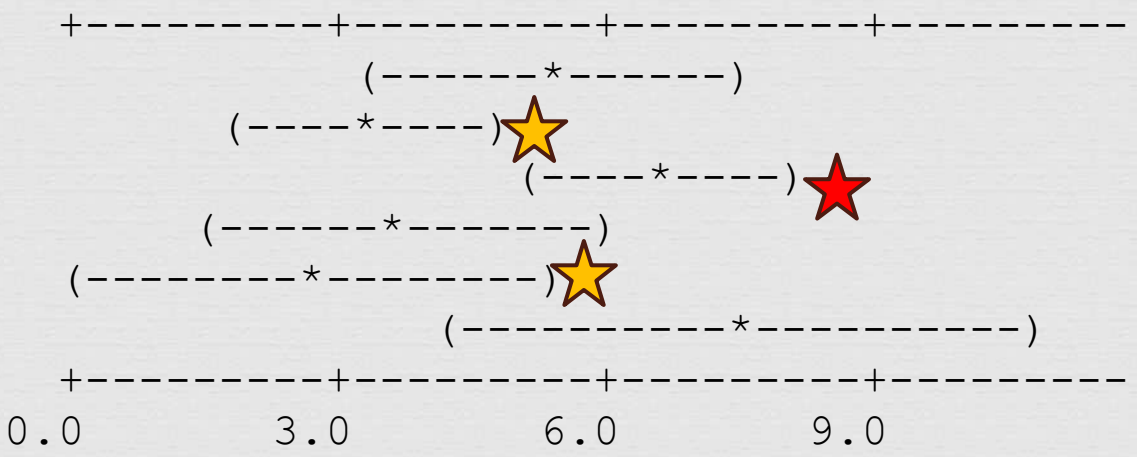


Pooled StDev = 7.178
P-value = 0.006

Statistically Significant Difference!!

HSS Have More Working Hours than CIT, SCS

Level	N	Mean	StDev
CFA	32	5.406	6.242
CIT	68	3.279	5.131
H&SS	62	6.565	7.421
MCS	29	3.690	5.484
SCS	20	2.600	5.807
Tepper	13	7.462	5.753



P-Value = 0.010
Pooled StDev = 6.137

Statistically Significant Difference!!

Variable Significance

Variable	P-value
Busyness	$p = 0.033$
Below Average Consumption	$p < 0.0009$
Above Average Consumption	$p < 0.0009$
Comfort Level	$p = 0.024$
Consumes to Stay Awake	$p = 0.593$
Does not consume caffeine	$p < 0.0009$
Is a Fifth Year	$p = 0.315$

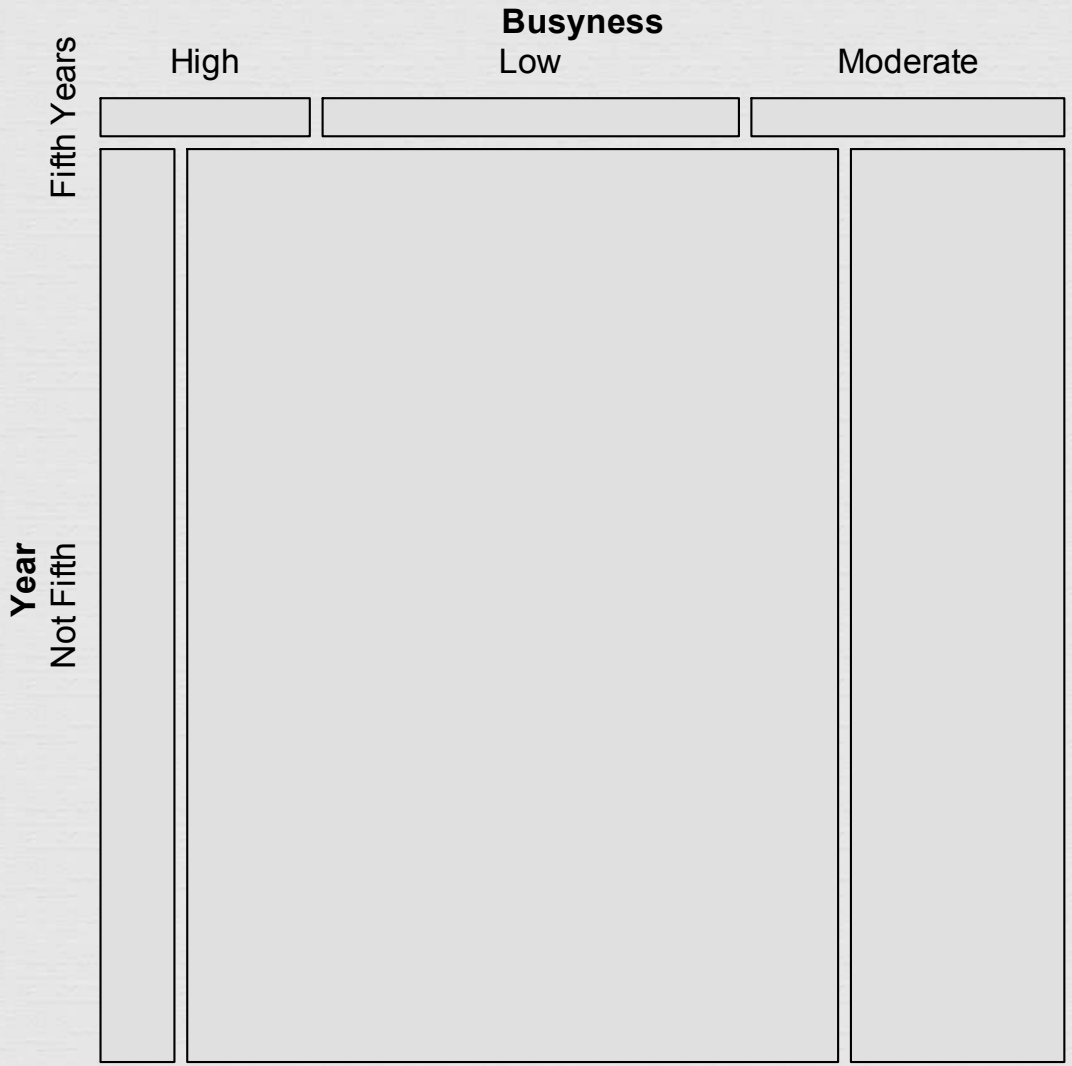
General Regression Model

- Caffeine Consumption =
  - 2.31419 +
  - 0.03118 * (Busyness) +
  - 1.38030 * (Below Average Consumption) +
  - 2.45278 * (Above Average Consumption) +
  - -0.59294 * (Comfort Level) +
  - -0.11757 * (Consumes to Stay Awake) +
  - -1.9187 * (Does not consume caffeine) +
  - 0.54911 * (Is a Fifth Year) +

- $R^2 = 40.61\%$ and $R^2\,(adj) = 40.61\%$

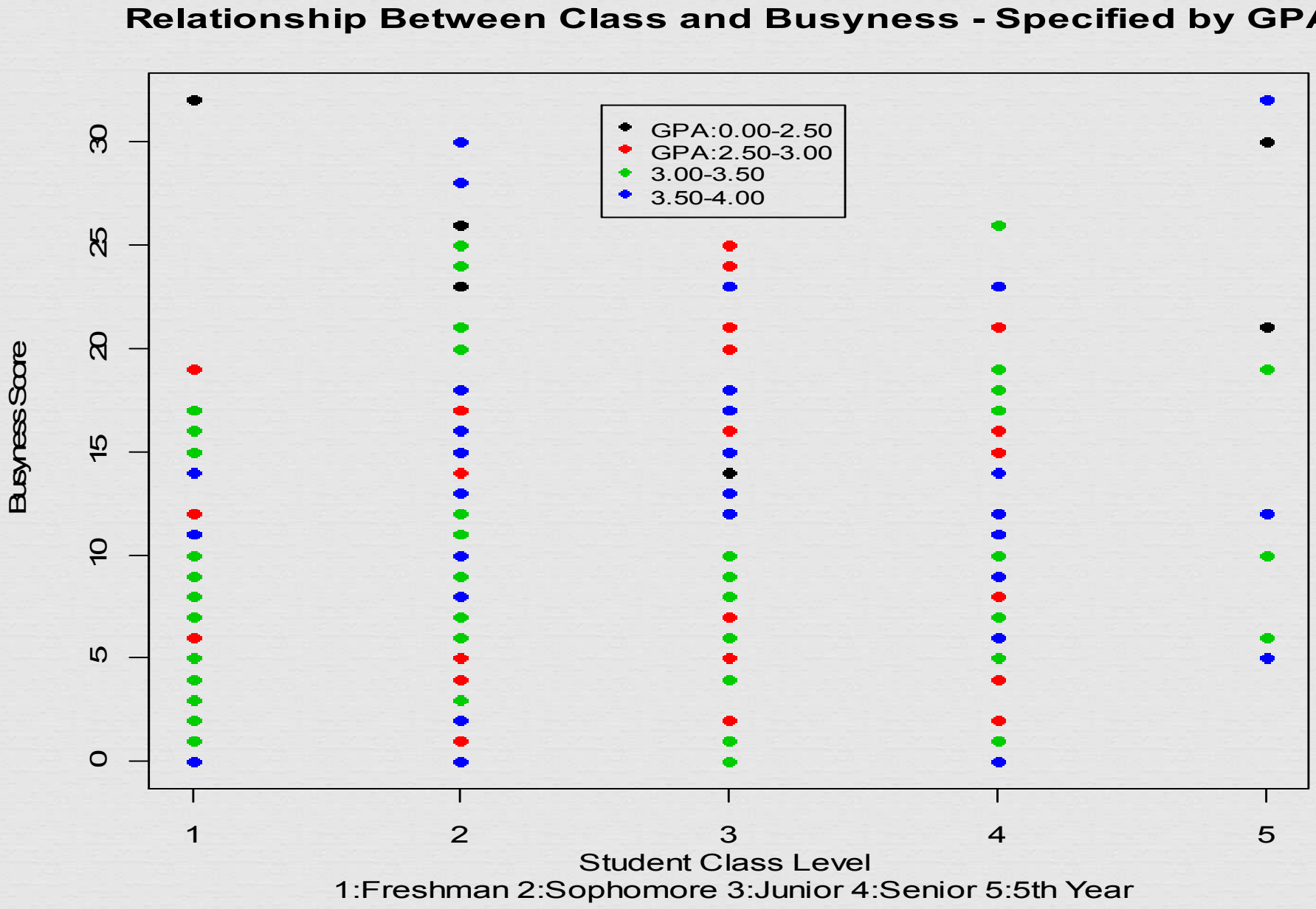
Mosaic Plot

Dependent Relationship Between Busyness and Year

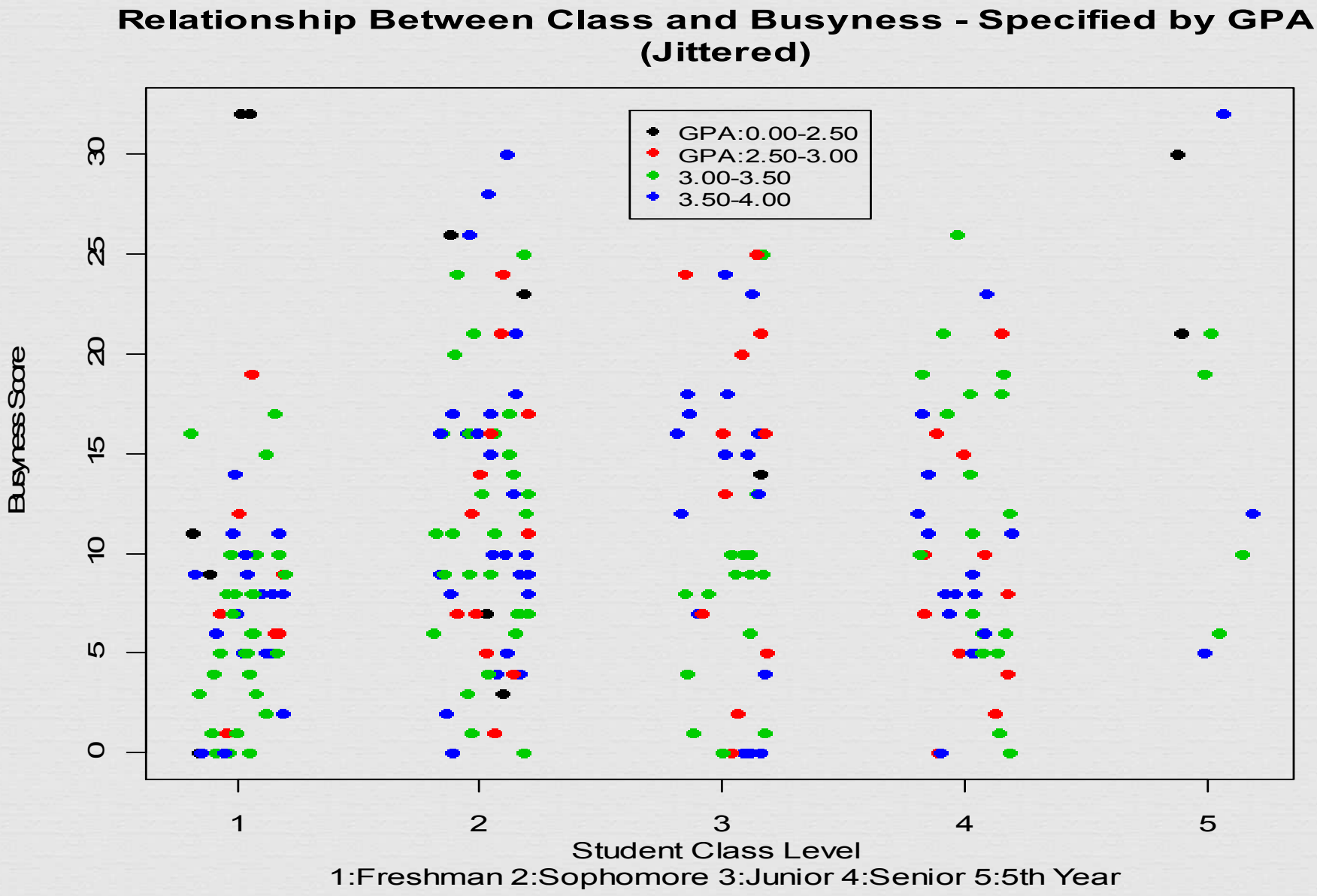


- Class is independent of busyness score

Class vs. Busyness vs. GPA



Jittered Class vs. Busyness vs. GPA



Analysis Yet to be Performed

- Checking for interactions
- Post-stratification exploration

Questions?