HOW TO IMPROVE OUR CURRENT ON-CAMPUS PARKING SYSTEM?

36302 SAMPLING SURVEY SOCIETY

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Section 1: Introduction

1.1 Overview

On January 1st, 2011 the rates for the metered parking spots behind CMU were increased by the Pittsburgh Parking Authority to $2 per hour from $1 per hour, and the hours of enforcement for these meters were increased from 6 p.m. to 10 p.m. for all days except Sunday (UOP, 2012). The reason for this increase, and others before it in recent years, was in part to pay for a bailout of the city's pension system. Other results of this increase as noted by the Pittsburgh Parking Authority were an increase in the number of employees hired to check the meters and write tickets, as well as an increase in broken meters from overfilling (the number of quarters needed to park doubled, and in some areas of Pittsburgh tripled, resulting in meters filling twice as quickly with quarters) (Vidonic, 2011).

Given all of this information, the Pittsburgh Parking Authority has considered updating the meters to be able to accept credit cards, but this change has not yet occurred for meters surrounding the CMU campus. There have been many outspoken critics of the rate hike and other changes, including even CMU professors who were cited in articles explaining why the rate hike was not necessarily a good economic idea (citation needed – my article with marketing prof). However, there have also been numerous sources of praise for the new income stream generated by the higher rates.

Being members of the Carnegie Mellon community, we noticed the rift in opinions regarding the metered parking situation at CMU, with some people claiming that it has unclogged the previously impenetrable parking area on Frew Street, and others claiming that rates were too high to be reasonable. We were curious whether the Carnegie Mellon Community is overall pleased with the metered parking system on Frew Street, Tech Street, and Schenley Park, or whether there were improvements, such as the updated meters the Pittsburgh Parking Authority has considered, which could improve both use and satisfaction levels of the metered spots.

We found that both students and faculty are unsatisfied with the current metered parking system, and more data will be available in the Data Analysis section of this report on the breakdown demographically of our findings.

We also asked students and faculty members questions both regarding how satisfied they are with the current metered parking at CMU as well as questions regarding how satisfied they would be if meters would accept credit cards or coins other than quarters. We wanted to test separately the level of satisfaction with parking availability, costs of parking, number of tickets received, and times when the meters were checked, and also asked for input on what would be considered most fair in those categories by our respondents. For instance, we asked what time is most fair to stop collecting payment at the meters.

We hope that the survey could be used by the Pittsburgh Parking Authority to determine whether their strategy for increasing rates and collection times is producing the effects that they want. While we don't have figures to indicate whether the new system is bringing in more money than before (or how much more money),

we can offer statistics on prices which may create an optimal level of supply and demand for the meters, and on enforcement times which may better allow the Pittsburgh Parking Authority to match their marginal cost of patrolling the meters with their marginal benefit of money collected from tickets.

It is important not only to the campus community, but to the Pittsburgh Parking Authority as well, that the people using their services feel the services are satisfactory, and this survey aims to give a glimpse into one segment of their consumer population and how effectively this sector feels it is being served.

Since we found dissatisfaction in all of our demographics, it may be beneficial for the Parking Authority to analyze whether the current system is working as profitably as expected, and perhaps make changes for the benefit of our community.

1.2 Relevant Prior Studies

In beginning our research into the opinions surrounding the on-campus parking at CMU and potential methods of improvement, we tasked ourselves with building upon already completed relevant research while ensuring substantially different methods and end results in order to expand the field of research conducted in the area of parking satisfaction. We understand that without baseline meter price and availability data, it becomes more difficult to understand information we may gather. As such we located Financial Analysis of Parking Assets of the Public Parking Authority of Pittsburgh (DA, 2010), an analysis conducted by Desman Associates regarding the state of the current Pittsburgh Parking Authority. The data in this article is used throughout our analysis as a baseline for meter prices and availability data. Additionally, in order to gain a better understanding of the parking situation in Pittsburgh, and specifically , why the rates at CMU have been increasing we consulted an analysis conducted by the Finance Scholars Group entitled *Analysis of Pittsburgh's Parking Assets* (Spatt, 2010). This analysis suggested a number of potential ways to increase revenues from parking, one of which was an increase in parking meter costs. However, as we are interested in what factors motivate people to park at meters, as well as what factors determine a person's satisfaction with their parking system, we consulted more diverse literature than merely financial analyses. Using *On Street Meter Parking Behavior* (Adiv and Wang, 1987) and *The Urban Project and Policy Planning University Survey*[1] we were able to identify we would create positive and negative aspects of prior survey's in order to measure attitudes and preferences of on campus parking in a more effective manner.

Section 2: Methods

2.1 Target population and Frame

In our survey, the target population for sampling is the population of all students and faculties at Carnegie Mellon University. In order to get a random sample from this population, we have decided to

[1] Evans-Cowely, Jennifer. *Urban Project and Policy Planning University Survey*. Rep. 2005. Print.

use the C-Book as our sampling frame. C-book is a student and faculty directory produced by Alpha Phi Omega that contains students and faculties' Andrew IDs, associated colleges/departments, and other information. Because we are uncertain how information are collected in the C-Book (i.e. how it treats new hired professors, study abroad students, etc.), our sampling frame might contain coverage errors as it can be potentially smaller than our target population.

To ensure a random sampling process where every member has the equal chance of being selected, we used a computer-based random number generator to generate a set of three numbers each time. According to our designed stratified sample sizes, we have generated 1500 sets of numbers, expecting a response rate of approximately 20%. For each set of three numbers, it is shown in the form of 21-1-38 (Exhibit 1). The first number represents the page number, the second represents the column number and the third represents item number. So the 38th person in column 1 of page 21 is randomly chosen to be in our sample.

2.2 Sample Size and Sampling Scheme

In electing our Margin of Error (hereafter known as MOE) we aimed to balance the strength of our survey with the possibility of attaining the necessary sample size. As MOE decreases as sample size increases, the lower MOE we would like, the larger sample size we would need. Our MOE was determined based on two primary questions, "Do you own a car which you use (either regularly or occasionally) to commute to and from CMU?" and " Do you use a friend's or family member's car to commute to and from CMU (either regularly or occasionally)?", however, as both questions can be assumed to have the same Standard Error, one MOE calculation with suffice for both questions. The logic behind choosing these questions is simple. As our aim is to determine satisfaction with on campus parking, it is vital for us to be able to accurately estimate the number of people who drive to campus and are thus involved with our topic of interest.

Our sampling method is a Stratified Random Sample, stratifying between faculty and students at Carnegie Mellon, as we believe these groups will differ significantly on their views about the on-campus parking system, and additionally, the proportion of car owners. Through online sources, we determined the faculty population at CMU was 1,368 and the student population was 11,955 coming to a total of 13,323. Additionally, two assumptions were made regarding Standard Deviations to make calculations possible. We assumed the proportion of car owners and car users for faculty to be .8 as most faculties live off campus (and excluding the .2 who take the bus or carpool) will drive. The proportion of students was assumed to be .5 as we did not know the true proportion.

Using $1.96\times\sqrt{\sum_{h=1}^{H} W_h^2(1-f_h)\frac{s_h^2}{n_h}}$ formula to determine the MOE for a n=300, we find:

Why n=300?

$$1.96\times\sqrt{\left[\left(\frac{11,955}{13,323}\right)\left(1-\frac{168}{11,955}\right)\frac{.5^2}{168}\right]+\left[\left(\frac{1,368}{13,323}\right)\left(1-\frac{132}{1,368}\right)\frac{.4^2}{132}\right]}=.076$$

To determine n_h two calculations were needed, the first was s_h where s_1 corresponded with faculty sd, and where s_2 corresponded with student sd. The second was $n_h=\frac{s_h}{\sum_h s_h}$ where the same s_1 and s_2 apply. The calculations were as follows.

$$s_1=\sqrt{.8(.2)}=.4 \qquad n_1=\frac{.4}{.9}$$
$$s_2=\sqrt{.5(.5)}=.5 \qquad n_2=\frac{.5}{.9}$$

The values of .4444, and .5556 correspond to the fractions of the total sample of 300 for faculty and students. These fractions correspond to strata sizes of 133 and 166 for faculty and students respectively.

Why these numbers of e-mails? Were you expecting different response rates for students and faculty? How did you use your MOE and strata size calculations in section 2.2 to choose these numbers?

2.3 Data Collection

After we entered students' contact information into a list, we at the initial phase sent out 800 emails to students and 320 emails to faculties. We chose the CSAQ (Computerized Self-Administered Questionnaires) through a web-based survey on www.surveymonkey.com. In the email, we attached the survey link, explained our motivation to conduct the survey and emphasized why the completion of our survey is. To ensure the participants' confidentiality is protected, we also stressed the fact that no confidential or identifiable information will be included in our final report and we will not allow others to access their information.

We used the online survey over other methods of data collection because it helps us to reach to a variety of target population conveniently. This CSAQ through survey monkey's website will help protect respondents' credential information, collecting their responses in a more effective and accurate way. We have considered the problem associated with low response rate, and to increase the response rate, we will a reminder email a week after the initial email to the same group of people in case they accidently missed the first email or forgot to answer the survey for some reason. We have yet entered the phrase to follow up, and we will try to understand whether the follow-up email has actually increased the response rate.

I assume you have actually done the follow-up and just didn't change this section from the rough draft.

Both emails can be found in the appendix section of this paper (Appendix 3).

2.4 Questionnaire

Our outcome variables are satisfaction scores, which contain students and faculties' current satisfaction towards on-campus parking system and their "future" satisfaction if the assumed scenarios happen. Our independent variables are demographic information such as class year, gender, college, their parking habits such as how many times in a week they park on Tech Street, Frew Street or Schenley Park and how often they get tickets, as well as their opinions such as what time of day they consider to be the most fair to start requiring payment and what they think the most reasonable amount should be.

Some sample questions from our survey included, but were not limited to:

Type A: Demographic based questions

In what college do you belong to? (Only apply to undergraduate students)

Please select your gender

Type B: stratum-designating question

a) Class year and status

Please select which of the following best describe you:

Undergraduate-first year; Undergraduate-second year; Undergraduate-third year; Undergraduate-fourth year; Undergraduate-fifth year; Graduate-Master program; Graduate-PhD program; Faculty

b) Car ownership

Do you own a car that you use (either regularly or occasionally) to commute to and from CMU?

Do you use a friend's or family member's car to commute to and from CMU (either regularly or occasionally)?

c) Questions regarding parking habits

How many times in an average week in the past semester have you parked at a metered spot on Tech Street, Frew Street, or surrounding Schenley Park? If you leave campus and return on the same day please count each distinct number of times you have parked.

d) Overall satisfaction/fairness toward pricing

Please state your overall satisfaction with the metered parking spots on Tech Street, Frew Street, or surrounding Schenley Park. Think about the time periods in which the meters are checked, costs of parking, space availability, etc.

e) Possible improvements

How much more or less satisfied would you be if the following scenario happened?

(Check one box in each column)

	Much Less Satisfied	*Less Satisfied*	*Equally Satisfied*	*More Satisfied*	*Much More Satisfied*	*I don't know*
You are allowed to pay with multiple kinds of coins (quarters, dimes, nickels) at the metered spots.						
You are allowed to pay with credit and debit cards at the metered spots.						

2.5 Response

These are different number than you reported in section 2.3

As mentioned in section 2.3, in the first phase of our data collection process, we sent out 799 emails to students and 274 emails to faculties and got 87 responses. Since we were unsatisfied with such a low response rate (8.1%), after one week, we sent reminders to 700 students and 164 faculties, and got 113 responses in total. The overall response rate was 10.5%. Although we still did not get the sample size we wanted, we had to cut off data collection after the second phase because of time constraint. The response rate for students was 7.5% and that for faculties was 19.3%.

Why send reminders to only some people?

Among all of the respondents, many did not complete the survey. The item non-response rate and reasons will be talked about in later section.

2.6 Post-Survey Processing

After getting our data set, we first looked at outcome variables: cost satisfaction and overall satisfaction. We used case-wise deletion to delete people who did not answer either one of them from our data set because we believe they were missing completely at random, or MCAR. Therefore, we deleted 9 data in this stage and our data set contains 104 data.

For people who do not own a car, there were many item non-responses since they were unable to answer questions like "How many times in an average week do you park on XX Street". But as long as they answered opinion-based questions such as "What do you think of the current rate for on-campus parking", their answers are valid and they stay in our data set. For the questions they could not answer, we just filled in "NA" in the spreadsheet.

Another problem similar to item non-response was that for questions that need numerical answers for the purpose of coding, some people failed to provide that. For example, for the above question "How many times in an average week do you park on XX Street", some people filled in "once every two weeks" and we changed that into "0.5". Also some people filled in "several times" because they could not

remember the exact number, thus we used mean-value imputation to fill in the average value for all other car owners.

Section 3: Results

We deleted 9 data due to misses of outcome variables: cost satisfaction and overall satisfaction. Therefore, we have 104 data in our data set.

3.1 Exploratory Data Analysis - Unweighted

Class:

Freshman	Sophomore	Junior	Senior	Fifth-year	Master	PhD	Faculty
6	8	11	9	1	9	10	50

Gender:

Male	Female
58	46

College:

HSS	MCS	CIT	CFA	Tepper	SCS	Heinz	CMU
20	14	22	17	11	14	3	3

Ownership:

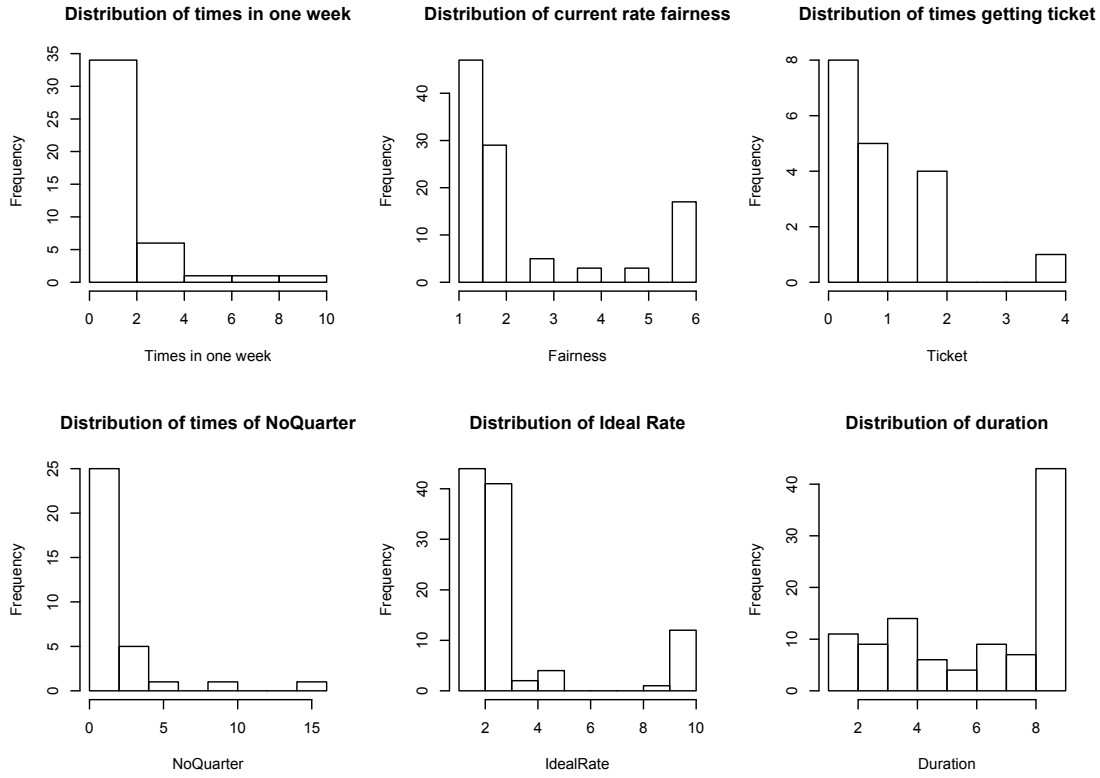
Yes	No
75	29

Friend's car:

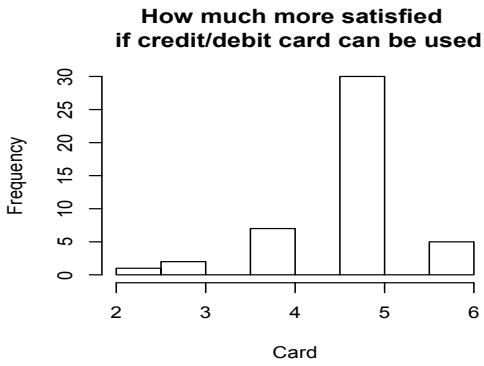
Yes	No
21	83

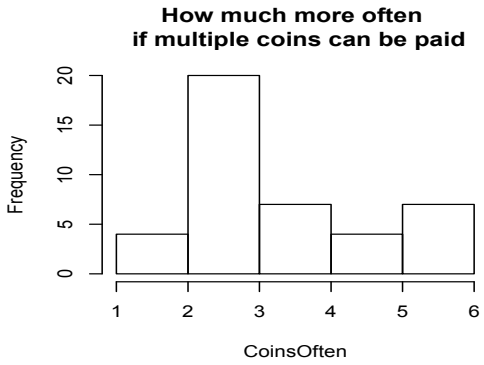
The demographic information and car ownership for our 104 respondents are listed above. Among all of them, 55.8% (58) are males and 44.2% (46) are females. We have samples from each college, but Heinz and CMU populations (intercollege program) are underrepresented. We got the same number of samples for students and faculty, which clearly do not match the actual population proportion, therefore, we will do the weighted analysis in later sections, and this section just focuses on unweighted analysis. For car ownership, 75 respondents (72.1%) have their own cars and the rest do not. 21 respondents (20.2%) use friend's car.

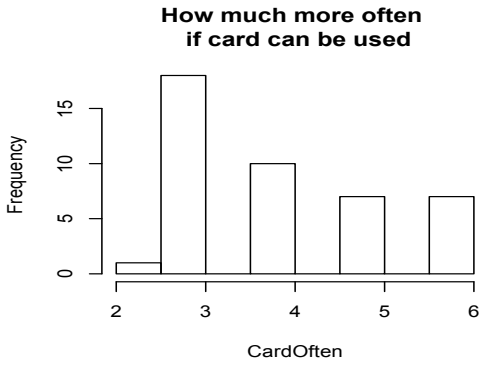
It would be good to give these plots more informative x axis labels.
The variable names are meanigful to you, but are hard to interpret by someone who hasn't worked with your data.
Also, make your x axis informative by putting, for instance, the actual cost for IdealRate instead of 2-10.



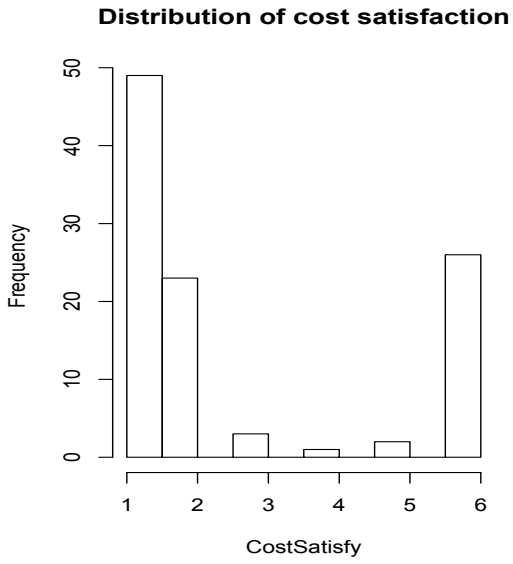
The distributions of several predictor variables are shown above. As we can see, the distribution of times of parking in an average week is skewed to the right with most of the people park on Tech Street, Frew Street, or surrounding Schenley Park area 0-4 times a week. For the distribution of fairness, after we deleted the answers of “No Opinion”, it is skewed to the right with an average of 1.69, which is between “Very unfair” and “A bit unfair”. The standard deviation is 0.98. Consider the number of times people get tickets this semester, most people have got less than 2. For the distribution of times they failed to pay because they did not have enough quarter, most people had 0-5 times, there are some outliers with large number of times, but I did not include values larger than 20 in my graph. When asked about their ideal rate, most people chose 0-3. After deleted answers of “I don’t know”, we have an average of 2.57, which is between “Less than $0.50 per hour” and “$0.50 per hour”. At last, we have the distribution of duration, means how long people normally park on Tech Street, Frew Street, or surrounding Schenley Park at any given time. Except for the “I don’t park there” option, the distribution is approximately uniform.

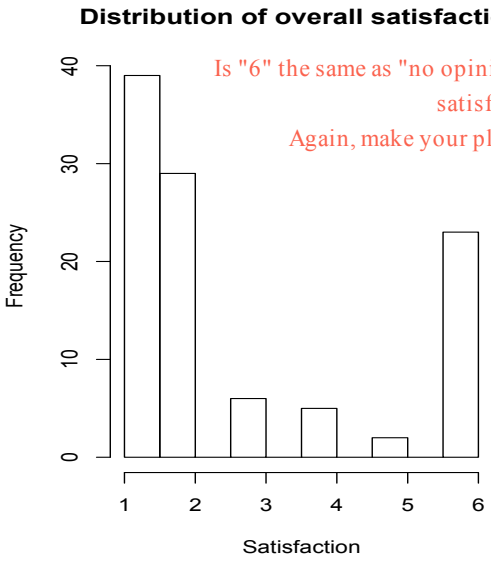






For the future expectations, we have four distributions corresponding to how much more satisfied will you be if multiple coins/credit card can be paid at the metered spots and how much more often will you park there. For multiple coins, people are pretty much equally satisfied and won't park there more often. But if they are able to pay with credit/debit cards at the metered spots, most people will be much more satisfied and park there more often, therefore, one way to improve our on-campus parking system is to allow people to pay with credit/debit cards.

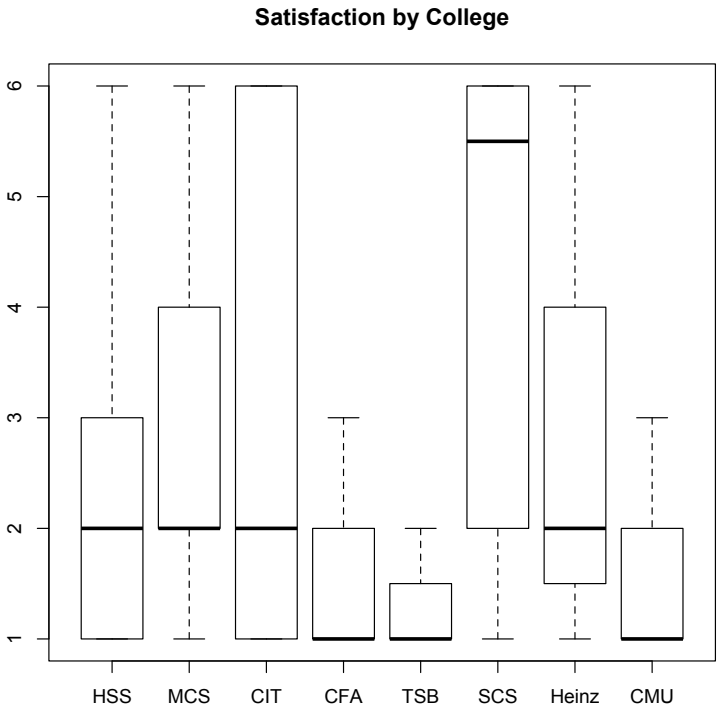




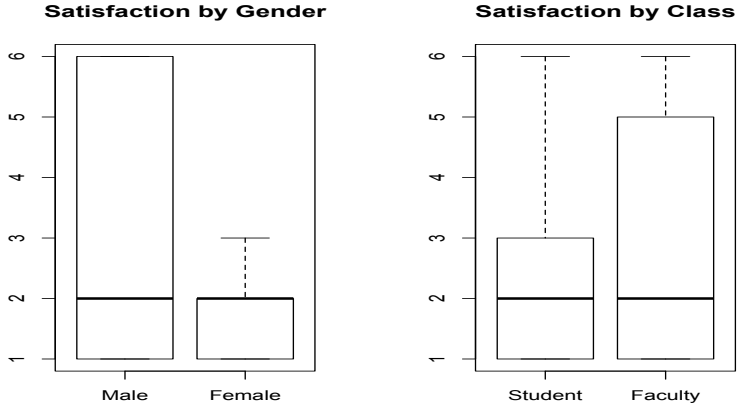
Is "6" the same as "no opinion"? Are lower numbers less satisfaction?
Again, make your plots clear to the reader.

For the outcome variables cost satisfaction and overall satisfaction, except for the choice of "No opinion",

both distributions are skewed to the right with most of the people chose “Very unsatisfied” or “Slightly unsatisfied”. Therefore we get a general sense of how satisfied people are with our current parking system, we will look into more details in later sections.



When looking at the boxplot for satisfaction by college, we can see that the mean satisfaction for HSS, MCS, CIT and Heinz are the same (slightly unsatisfied) and that for CFA, TSB and CMU are also the same (very unsatisfied). The average for SCS is between 5 and 6, reason might be that most SCS students do not own a car, thus they chose “No Opinion” for this question.



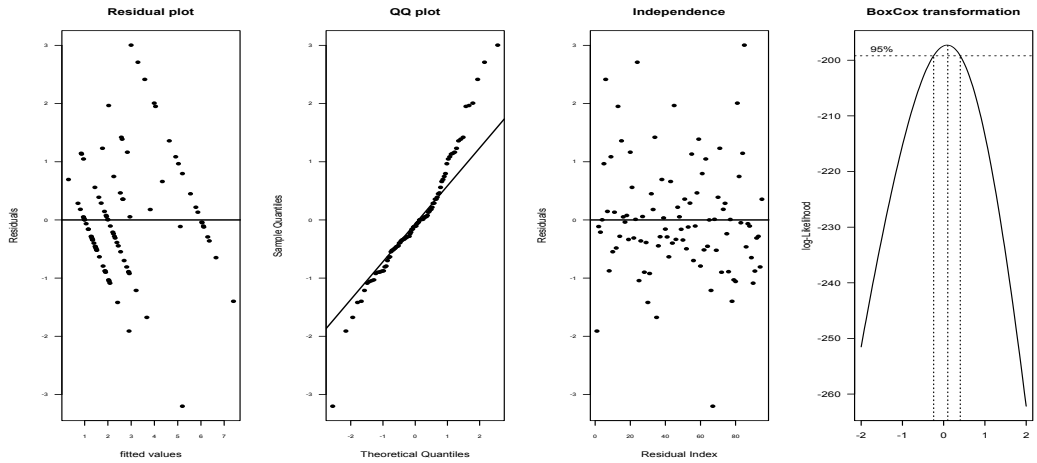
By the above plots, we can see that the average satisfaction is the same for males/females and for student/faculty (I combined students from each class and recoded as “0”, faculty is “1”). But there is still

a significant difference between males and females since 50% of the males have satisfaction score above 2 but the max value for females is only 3.

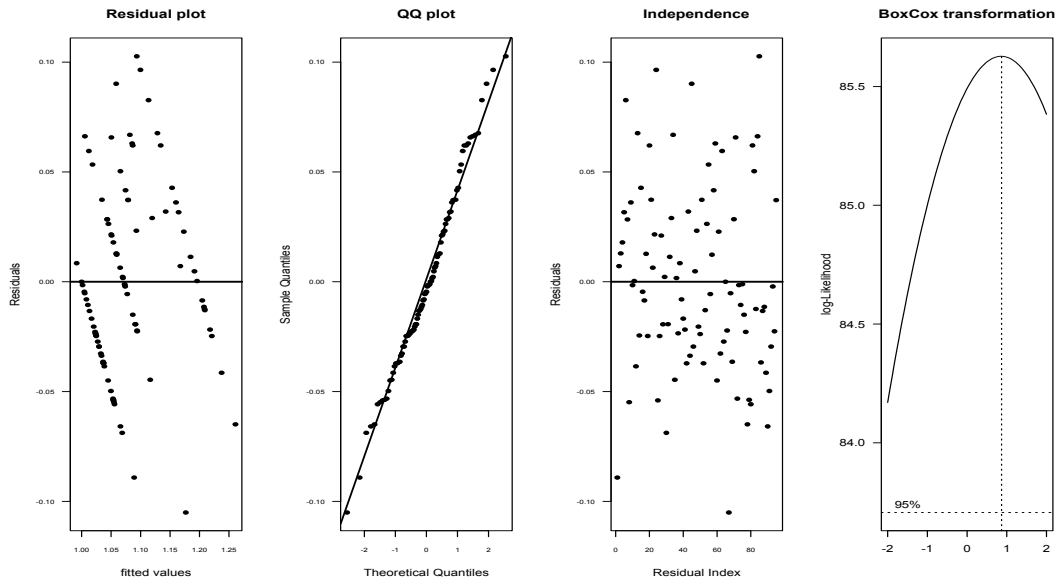
I assume this means using all your predictors,
though you never list what these are.
Restate the questions are you trying to answer with this regression.

3.2 Regression - Unweighted

First of all, we did the diagnostic for the full model with overall satisfaction as the outcome variable. As we can see from the plots below, the QQ plot shows strong violation of normal distribution, and the boxcox suggests to model Satisfaction$^{0.1}$.



After the transformation, our QQ plot becomes much better and both the residual vs. fit plot and residual index plot show random patterns. And since 1 is in 95% CI for the transformation, we do not have to transform again. Therefore, we ran regression on the model with Satisfaction$^{0.1}$ as the outcome variable.



```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.501e-01  3.772e-02  25.188  < 2e-16 ***
class       -1.340e-02  1.124e-02  -1.191   0.2369
gender      -1.227e-02  1.027e-02  -1.195   0.2354
college     -4.426e-03  2.669e-03  -1.659   0.1010
Ownership    3.417e-02  1.349e-02   2.533   0.0132 *
FriendCar    1.906e-02  1.336e-02   1.426   0.1576
Weekly      -1.405e-04  5.313e-04  -0.265   0.7920
RateFair     2.391e-02  3.473e-03   6.883 1.03e-09 ***
Ticket      -1.417e-02  7.514e-03  -1.886   0.0628 .
NoQuarter   -6.286e-08  4.642e-08  -1.354   0.1794
IdealRate    4.472e-03  2.286e-03   1.956   0.0538 .
HowLong      4.169e-03  1.993e-03   2.092   0.0395 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.04457 on 83 degrees of freedom
  (9 observations deleted due to missingness)
Multiple R-squared: 0.6977, Adjusted R-squared: 0.6576
F-statistic: 17.41 on 11 and 83 DF,  p-value: < 2.2e-16
```

The output shows a significant regression of the model ($p=2.2e^{-16}$) and we can see some of the predictor variables have significant linear relationships with the overall satisfaction. But we want to delete the variable with the largest p-value and run the regression again in order to avoid multicollinearity.
Therefore, we deleted the variable "Weekly" since it has p-value of 0.79 and ran the regression again. This time some variables become more significant due to multicollinearity and the summary output is shown below.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.518e-01  3.724e-02  25.558  < 2e-16 ***
class       -1.424e-02  1.104e-02  -1.290   0.2007
gender      -1.210e-02  1.006e-02  -1.202   0.2326
college     -4.630e-03  2.617e-03  -1.769   0.0805 .
Ownership    3.282e-02  1.312e-02   2.501   0.0143 *
FriendCar    1.991e-02  1.293e-02   1.539   0.1275
RateFair     2.390e-02  3.433e-03   6.962 6.59e-10 ***
Ticket      -1.539e-02  6.527e-03  -2.358   0.0207 *
NoQuarter   -6.357e-08  4.595e-08  -1.383   0.1702
IdealRate    4.502e-03  2.253e-03   1.999   0.0489 *
HowLong      4.112e-03  1.968e-03   2.090   0.0396 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.04413 on 85 degrees of freedom
  (8 observations deleted due to missingness)
Multiple R-squared: 0.6965, Adjusted R-squared: 0.6608
F-statistic:  19.5 on 10 and 85 DF,  p-value: < 2.2e-16
```

Based on the output, we can conclude that ownership has a significant relationship with satisfaction ($p=0.014$) that car owners are significantly less satisfied with our parking system than non-car owners. Also, RateFair is very significant ($p=6.59*10^{-10}$) that the more fair people think the current rate is, the more satisfied they are, which makes sense because people's satisfactions are closely related to their opinions of current rate. Moreover, the more tickets people get, the less they are satisfied with our

parking system (p=0.02). At last, the variables “IdealRate” and “HowLong” are also significant and we can see that the less they think the rate should be, the less they are satisfied as well as that the longer they park on Tech Street, Frew Street and surrounding Schenley Park, the more satisfied they are. But we cannot conclude any causal relationships from modeling.

We followed the same procedure for the outcome variable “Cost satisfaction”, transformed it to CostSatisfy$^{(-0.18)}$ and ran the regression. We deleted the variables “class”, “FriendCar” and “Weekly” since they have large p-values (p=0.98, 0.6 and 0.39) and got similar summary output as for overall satisfaction except that “Ticket” is no longer significant, the number of tickets people get does not reflect their satisfaction toward cost although it might be possible that people’s low satisfaction leads to their failure of paying the meters. The final summary output is shown below.

```
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.076e+00  3.357e-02  32.062  < 2e-16 ***
gender       1.637e-02  1.276e-02   1.283 0.203005
college      3.351e-03  3.290e-03   1.018 0.311319
Ownership   -5.156e-02  1.440e-02  -3.582 0.000562 ***
RateFair    -3.958e-02  4.433e-03  -8.928 6.31e-14 ***
Ticket       1.350e-02  8.436e-03   1.600 0.113223
NoQuarter    5.651e-08  5.889e-08   0.960 0.339952
IdealRate   -6.950e-03  2.909e-03  -2.389 0.019057 *
HowLong     -5.988e-03  2.356e-03  -2.542 0.012787 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.05739 on 87 degrees of freedom
  (8 observations deleted due to missingness)
Multiple R-squared: 0.7659, Adjusted R-squared: 0.7444
F-statistic: 35.59 on 8 and 87 DF,  p-value: < 2.2e-16
```

3.3 Exploratory Data Analysis - Weighted

In our creation of the margin of error for different sample sizes we made certain assumptions about the population that made stratification an improvement over not stratifying. Both to determine whether our margin of error calculations are accurate, as well as to determine the true validity of stratification it is important to check whether the assumptions made hold. We assumed that the proportion of faculty car owners who use their car to drive to campus was .8 and that the proportion of student drivers who used their cars to drive to campus was .5. After basic exploratory analysis the proportion of faculty drivers who use their car to drive to campus in our sample was 30/37=.81, and the proportion of student drivers who use their car to drive to campus in our sample was 64/112=.57. As both of these estimates are relatively close to the values in our assumption and (for the purposes of stratification)

extremely different, we can conclude that our margin of error calculation was accurate, and that the decision to stratify was the correct one.

Due to our decision to stratify, it became necessary to maintain the correct proportion of students and faculty (our strata) in our sample as in the population as a whole. Using statistics collected about Carnegie Mellon University we determined that faculty make up 10% of the CMU community and students make up 90%. In order to correct the proportion we observed in our sample to the actual population proportion, weights of 1.32 for students, and .3 for faculty were used.

To begin with we determined the means of the dependent variables to get an idea of the population as a whole. From this EDA we discovered that the mean "Overall Satisfaction" was 1.97 out of 5. This corresponds to a value of just below "Unsatisfied" which was measured as 2. Additionally, the mean of "Cost Satisfaction", which measures the satisfaction of the respondent in regards to the price of parking on campus was measured to be 1.85, which corresponds with a value of just below "Unsatisfied".

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Overall Satisfaction	110	1.00	5.00	1.9744	.88489
Cost Satisfaction	110	1.00	5.00	1.8545	.88375
Valid N (listwise)	110				

In addition, we wanted to see whether our explanatory variables correlated as knowing whether the cost satisfaction plays a role in overall satisfaction is important to understanding the views regarding on-campus parking. To do so we ran a standard univariate linear regression model with "Overall Satisfaction" as the dependent variable and "Cost Satisfaction" as the explanatory variable. The results showed (at an alpha value of .00) that 69% of the variance in "Overall Satisfaction" could be explained by the "Cost Satisfaction"

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.830[a]	.689	.686	.50308

a. Predictors: (Constant), CostSatisfaction

b. Dependent Variable: OverallSatisfaction

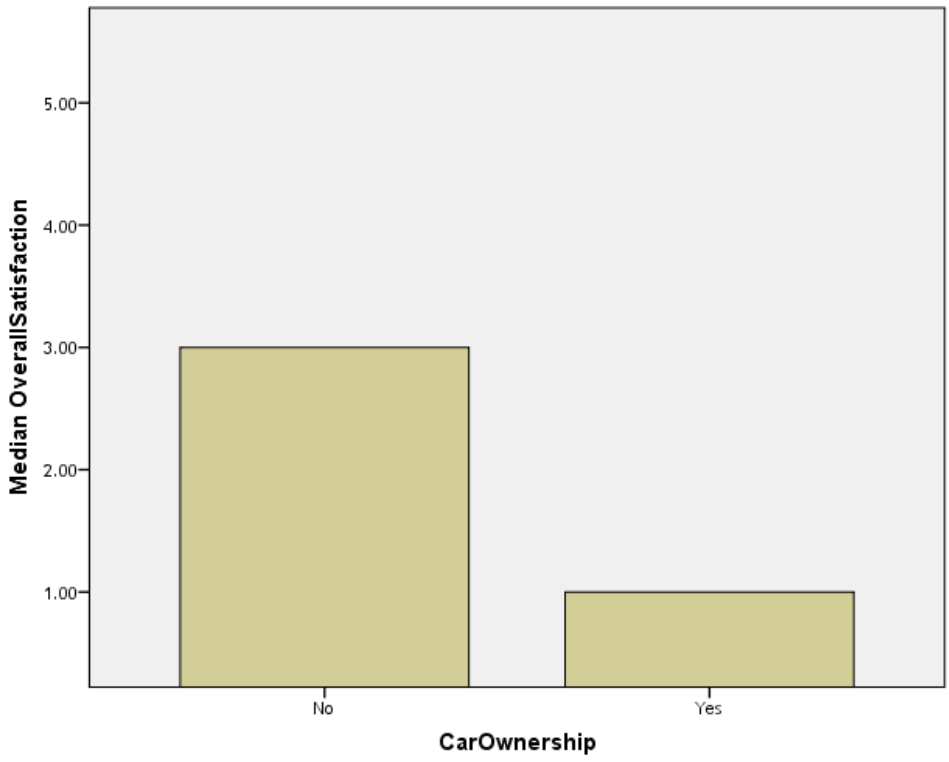
While it is certainly interesting that the mean of the responses was overwhelmingly negative, there are far more interesting facts to note about the data we collected.

What are they? Instead of including all the output from your analyses, emphasize to the reader what your important results were.

3.4 Test of Means - Weighted

We wanted to determine whether there were more specific claims we could make about the negativity of opinions regarding the on-campus parking. In order to do so independent sample t-tests were run using overall and cost satisfaction as thee dependent variables, and a number of different factor variables. In the end there were two major factors that led to significant differences in people's opinion regarding the dependent variables.. The first was whether an individual drove to campus using a car. While it would make sense that car owners and non-car owners would differ in their opinions of the on-campus parking, if the system was believed to be effective we would expect to see higher opinions from car owners than from non car owners. However, this is not the directional difference that was observed.

Why? What would lead non-owners to have a lower opinion?



Group Statistics

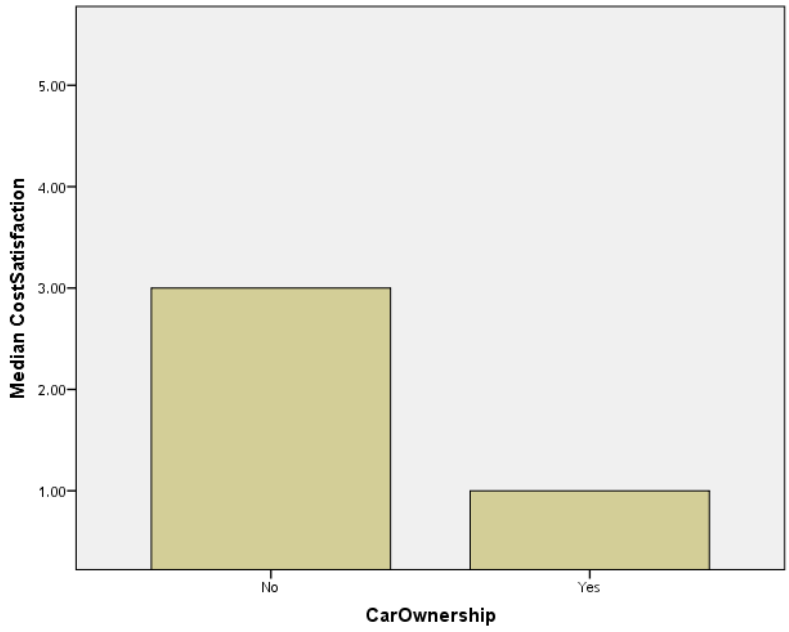
	Car Ownership	N	Mean	Std. Deviation	Std. Error Mean
Overall Satisfaction	Yes	54	1.5122	.77281	.10528
	No	56	2.4173	.75300	.10043

Independent Samples Test

	t-test for Equality of Means					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Overall Satisfaction	-6.224	108	.000	-.90504	-1.19328	-.61680

Rather, as can be seen above Car Owners were in fact far less positive about the parking system in Overall terms than non-owners. In terms of mean satisfaction, non-owners were significantly (at the .05 alpha level)) less satisfied with the true mean of the difference between owners and non-owners lying somewhere between 1.1 and .61 points lower for owners. Additionally, as there were upper outliers (any values of Satisfaction of 5 were considered outliers) the resulting mean was higher than the median. The difference in median between owners and non-owners in regards to Overall Satisfaction was a two point decrease from Neither satisfied nor Unsatisfied for non- car owners to a median of Very Unsatisfied for car owners.

Similarly, the results for Cost Satisfaction were influenced by whether the respondent was a car-owner or not.



Group Statistics

	Car Ownership	N	Mean	Std. Deviation	Std. Error Mean
Cost Satisfaction	Yes	54	1.3107	.66207	.09020
	No	56	2.3757	.74715	.09965

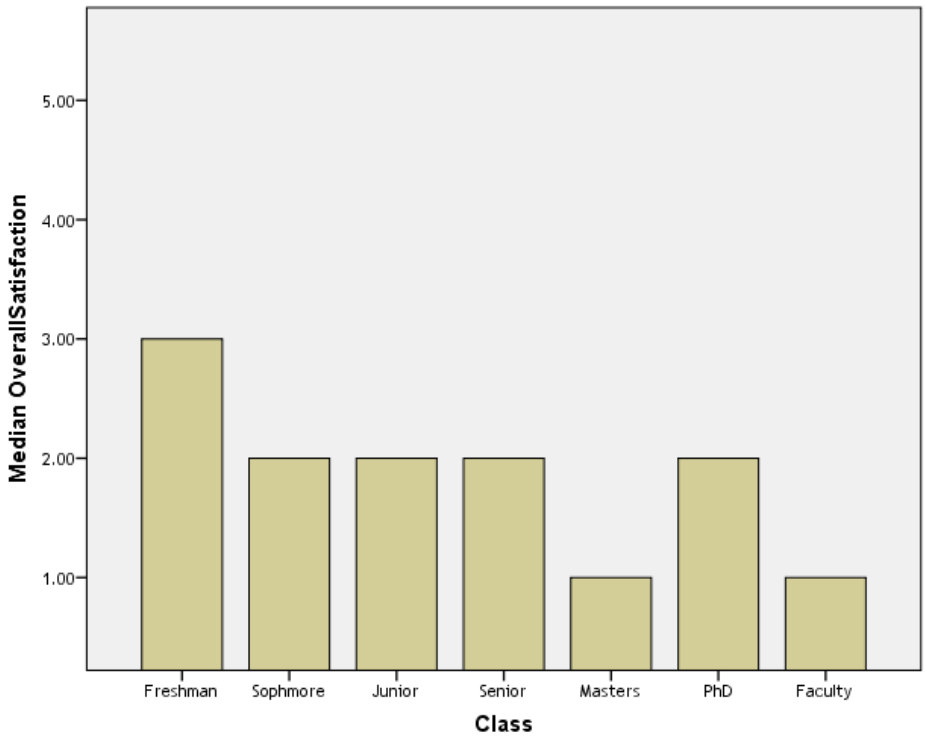
Independent Samples Test

	t-test for Equality of Means			
	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
			Lower	Upper
Cost Satisfaction	.000	-1.06498	-1.33208	-.79788

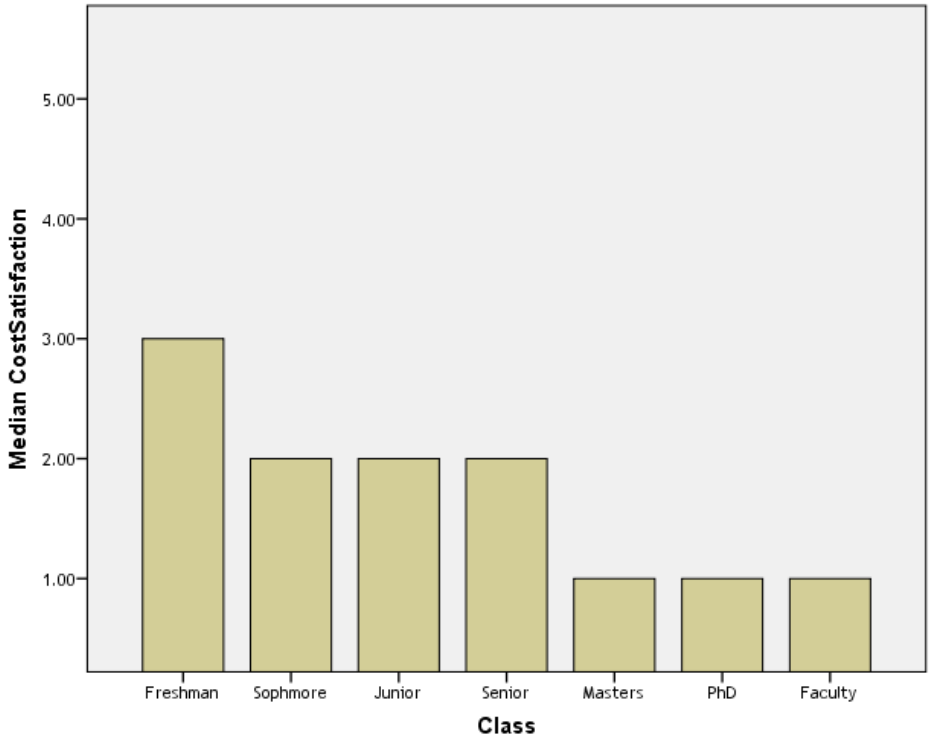
As is seen in the above output, car owners had a mean difference that lies somewhere between 1.3 and .79 points lower on the cost satisfaction scale than non-car owners did. Additionally, we can note that the mean cost satisfaction for car owners was 1.3 (out of 5) which corresponds with a value of just above "Very Unsatisfied"

Additionally, we were interested in determining whether different years (freshman, sophomore....Ph.D., Faculty) in the university system had different views on the parking system. In order to do so, a one-way ANOVA test was conducted using year in the system as the factor variable, and (in two separate ANOVA tests) "Overall Satisfaction" and "Cost Satisfaction" as the response variables. In order to better understand the relationship between satisfaction and year between individual levels of year, a Tukey's HSD test was performed post-hoc.

For "Overall Satisfaction" there was a decrease in the median from 3 for freshman to 2 for sophomore, a constant median of 2 for sophomores to seniors, a decrease to 1 for Masters, increase to 2 for Ph.D. and a decrease to 1 for Faculty. While the output for the Tukey HSD is too long to be included in the text of this analysis, it is attached in the attachment section of this analysis for reading. The Tukey HSD shows us that there is a significant difference in mean between freshman and all other years, however, there is no statistically certain decrease in means between any other years. This is incredibly interesting as freshman has a mean of 3 demonstrating a significant overall dissatisfaction for all years aside from freshman.



Again, we see a similar relationship between Cost Satisfaction and Class as between Overall Satisfaction and Class. Freshman has the highest mean at 3 followed by sophomore, Junior, and Senior at 2, with Masters, Ph.D. and Faculty at one. Additionally, there was a statistically significant difference between freshman and all other years, resulting with freshman having the statistically highest mean.



3.5 Attachment Cost Satisfaction-Class, Tukey HSD Results - Weighted

Multiple Comparisons

Dependent Variable: Cost Satisfaction

Tukey HSD

(I) Class	(J) Class	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Freshman	Sophomore	.88889*	.29516	.049	.0012	1.7766
	Junior	1.11111*	.28204	.003	.2629	1.9593
	Senior	.97222*	.30463	.030	.0561	1.8884
	Masters	1.55556*	.32567	.000	.5761	2.5350
	PhD	1.50427*	.29957	.000	.6033	2.4052
	Faculty	1.02402*	.33134	.040	.0276	2.0205
Sophomore	Freshman	-.88889*	.29516	.049	-1.7766	-.0012
	Junior	.22222	.24618	.971	-.5181	.9626
	Senior	.08333	.27178	1.000	-.7340	.9007
	Masters	.66667	.29516	.274	-.2210	1.5543
	PhD	.61538	.26609	.248	-.1849	1.4156
	Faculty	.13514	.30141	.999	-.7713	1.0416
Junior	Freshman	-1.11111*	.28204	.003	-1.9593	-.2629
	Sophomore	-.22222	.24618	.971	-.9626	.5181
	Senior	-.13889	.25746	.998	-.9132	.6354
	Masters	.44444	.28204	.698	-.4038	1.2926
	PhD	.39316	.25145	.706	-.3631	1.1494
	Faculty	-.08709	.28857	1.000	-.9549	.7808
Senior	Freshman	-.97222*	.30463	.030	-1.8884	-.0561
	Sophomore	-.08333	.27178	1.000	-.9007	.7340
	Junior	.13889	.25746	.998	-.6354	.9132
	Masters	.58333	.30463	.475	-.3328	1.4995
	PhD	.53205	.27656	.470	-.2997	1.3638
	Faculty	.05180	.31069	1.000	-.8826	.9862
Masters	Freshman	-1.55556*	.32567	.000	-2.5350	-.5761
	Sophomore	-.66667	.29516	.274	-1.5543	.2210
	Junior	-.44444	.28204	.698	-1.2926	.4038
	Senior	-.58333	.30463	.475	-1.4995	.3328
	PhD	-.05128	.29957	1.000	-.9522	.8496
	Faculty	-.53153	.33134	.680	-1.5280	.4649
PhD	Freshman	-1.50427*	.29957	.000	-2.4052	-.6033
	Sophomore	-.61538	.26609	.248	-1.4156	.1849
	Junior	-.39316	.25145	.706	-1.1494	.3631
	Senior	-.53205	.27656	.470	-1.3638	.2997
	Masters	.05128	.29957	1.000	-.8496	.9522

Faculty	Faculty	-.48025	.30573	.701	-1.3997	.4392
	Freshman	-1.02402*	.33134	.040	-2.0205	-.0276
	Sophomore	-.13514	.30141	.999	-1.0416	.7713
	Junior	.08709	.28857	1.000	-.7808	.9549
	Senior	-.05180	.31069	1.000	-.9862	.8826
	Masters	.53153	.33134	.680	-.4649	1.5280
	PhD	.48025	.30573	.701	-.4392	1.3997

*. The mean difference is significant at the 0.05 level.

Overall Satisfaction-Class Tukey HSD

Multiple Comparisons

Dependent Variable: Overall Satisfaction

Tukey HSD

(I) Class	(J) Class	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Freshman	Sophomore	.92857*	.28921	.028	.0588	1.7983
	Junior	.94444*	.27635	.015	.1134	1.7755
	Senior	.91667*	.29849	.042	.0190	1.8143
	Masters	1.77778*	.31910	.000	.8181	2.7374
	PhD	1.46154*	.29353	.000	.5788	2.3443
	Faculty	1.13514*	.32466	.012	.1588	2.1115
Sophomore	Freshman	-.92857*	.28921	.028	-1.7983	-.0588
	Junior	.01587	.24122	1.000	-.7096	.7413
	Senior	-.01190	.26629	1.000	-.8128	.7890
	Masters	.84921	.28921	.060	-.0206	1.7190
	PhD	.53297	.26072	.394	-.2511	1.3171
	Faculty	.20656	.29533	.992	-.6816	1.0947
Junior	Freshman	-.94444*	.27635	.015	-1.7755	-.1134
	Sophomore	-.01587	.24122	1.000	-.7413	.7096
	Senior	-.02778	.25227	1.000	-.7865	.7309
	Masters	.83333*	.27635	.049	.0022	1.6644
	PhD	.51709	.24638	.361	-.2239	1.2581
	Faculty	.19069	.28275	.994	-.6596	1.0410
Senior	Freshman	-.91667*	.29849	.042	-1.8143	-.0190
	Sophomore	.01190	.26629	1.000	-.7890	.8128
	Junior	.02778	.25227	1.000	-.7309	.7865
	Masters	.86111	.29849	.069	-.0366	1.7588
	PhD	.54487	.27098	.414	-.2701	1.3598
	Faculty	.21847	.30442	.991	-.6971	1.1340
Masters	Freshman	-1.77778*	.31910	.000	-2.7374	-.8181

	Sophomore	-.84921	.28921	.060	-1.7190	.0206
	Junior	-.83333*	.27635	.049	-1.6644	-.0022
	Senior	-.86111	.29849	.069	-1.7588	.0366
	PhD	-.31624	.29353	.933	-1.1990	.5665
	Faculty	-.64264	.32466	.434	-1.6190	.3337
	Freshman	-1.46154*	.29353	.000	-2.3443	-.5788
	Sophomore	-.53297	.26072	.394	-1.3171	.2511
PhD	Junior	-.51709	.24638	.361	-1.2581	.2239
	Senior	-.54487	.27098	.414	-1.3598	.2701
	Masters	.31624	.29353	.933	-.5665	1.1990
	Faculty	-.32640	.29956	.930	-1.2273	.5745
	Freshman	-1.13514*	.32466	.012	-2.1115	-.1588
	Sophomore	-.20656	.29533	.992	-1.0947	.6816
	Junior	-.19069	.28275	.994	-1.0410	.6596
Faculty	Senior	-.21847	.30442	.991	-1.1340	.6971
	Masters	.64264	.32466	.434	-.3337	1.6190
	PhD	.32640	.29956	.930	-.5745	1.2273

*. The mean difference is significant at the 0.05 level.

Section 4: Discussion

One of the strengths in our survey is the demographic questions where students and faculty members provided their class status. Because we have this critical piece of information, we are able to understand whether the dissatisfaction of the current parking system is related to their class status in the post-survey process.

Another strength in our survey is the stratifications, where we believe that students and faculty members would have different concerns regarding the parking choices on-campus. As we observed in the responses rate for students segment and the faculty members segment, they were significantly different. Of the ___emails sent to students, only 60 were answered, and only 33% of all responses belonged to undergraduate students. On the other hand, of ___ emails sent to faculty members, 53 were answered. This validates our assumption that faculty and students have different level of concerns over the current on-campus parking system.

A potential weakness in our survey is that participants in our study might overstate their dissatisfaction regarding the cost and the quality of the current parking system. To alleviate the errors by overstatement, we attempt to validate the responses by asking specific multiple-choices question pertaining to the parking tickets and their past experiences as well as open-ended questions collecting their comments.

Another weakness in our survey is the high non-response rate. Specifically, our response rate is particularly low with the student populations, and a potential explanation might be the lack of

incentives. We do not provide monetary rewards (such as gift card raffles), so students might be less inclined to fill out the survey, increasing the unit non-response rate. We attempt to correct this bias through re-assigning weights for our stratified samples because our survey data show that all respondents answered the questions regarding their status, allowing us to better understand what are factors affecting students and faculty members' choices for parking on campus.

Unit non-response is also related to the failure of making contact with the sample units as C-Book does not have the most up-to-date information regarding students and faculty members' contact and status. Therefore, a major weaknesses leading to greater errors in unit non-response is the inability to reach the sample unit using the Andrew ID listed in the C-Book. Because students and faculty members might have updated their information without disclosing it on the C-Book, we have encountered some returning emails as we cannot deliver the message.

As far as the item non-response, three questions are often skipped, where approximately 60% of the total respondents did not provide the answer. The three questions are "How much more or less satisfied would you be if the following scenario happened with regard to the metered spots on Tech Street, Frew Street, or surrounding Schenley Park?" "How much more or less often would you park at the metered spots on Tech Street, Frew Street, or surrounding Schenley Park if the following scenario happened?" and "How crowded do you perceive the metered parking spots on Tech Street, Frew Street, or surrounding Schenley Park to be during the following hours on a regular day?" An explanation that these three questions are skipped is many people did not have a pleasant experience parking on the metered spots on Tech Street, Frew Street, or surrounding Schenley Park, making them less willing to park in the area. Another explanation is that students might not own cars and cannot tell whether or not they would actually be willing to park in those spaces. Therefore, this leads to the third weakness in our survey as we assumed that all respondents were interested in parking in those spaces. Some respondents explicitly stated in the final comment section they have parking spaces on campus so they do not care much about parking metered spots in our given choices.

As our survey's weaknesses tend to center around the non-response rate, we believe that for the future survey projects, incentives such as raffle for gift cars should be available to motivate the students for participation. In addition, we also recommend making fewer assumptions about the target population's behavior and explore more analyses in the post-survey processes. As some assumptions about the results might be valid, others might potentially lead to lower response rate.

The take-home message from our particular survey is that a majority of the CMU community members are dissatisfied with both the cost and the quality of the metered parking spots on campus. As the Pittsburgh government intended to raise the parking costs for greater revenue, many have negative opinions regarding such increased fees. In addition to the poor quality in the metered parking spots, fewer car owners intended to choose to park in those spaces. Our survey has identified the lack of satisfaction of the metered spots on Tech Street, Frew Street, or surrounding Schenley Park, and we have received some comments regarding other parking facilities around the campus. We have yet

understood whether there is a competition between the parking spaces in East Campus Garage and University Center Parking, and it would be interesting to discover the difference between the parking meters and the other parking locations available.

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Appendix 1: Random Number Generator (Selected)

Student Emails

Silvia				Nick				Shu				Yijia			
Identifier	P	C	L	Identifier	P	C	L	Identifier	P	C	L	Identifier	P	C	L
11-1-23	11	1	23	11-2-16	11	2	16	11-2-1	11	2	1	123-2-8	123	2	8
11-1-35	11	1	35	11-2-24	11	2	24	11-2-9	11	2	9	122-1-20	122	1	20
12-1-12	12	1	12	11-2-28	11	2	28	12-1-11	12	1	11	121-1-3	121	1	3
12-2-25	12	2	25	12-1-20	12	1	20	12-1-14	12	1	14	121-1-19	121	1	19
13-1-36	13	1	36	12-1-32	12	1	32	12-2-13	12	2	13	120-1-33	120	1	33
13-2-1	13	2	1	12-2-31	12	2	31	12-2-27	12	2	27	120-2-12	120	2	12
13-2-16	13	2	16	13-2-12	13	2	12	14-1-21	14	1	21	118-2-18	118	2	18
14-1-22	14	1	22	14-2-9	14	2	9	14-2-12	14	2	12	118-2-36	118	2	36
14-1-31	14	1	31	14-2-10	14	2	10	15-1-10	15	1	10	118-2-38	118	2	38
14-2-37	14	2	37	14-2-14	14	2	14	16-2-28	16	2	28	117-1-11	117	1	11
15-2-3	15	2	3	15-2-25	15	2	25	17-1-4	17	1	4	116-1-14	116	1	14
15-2-4	15	2	4	16-1-9	16	1	9	17-2-12	17	2	12	116-1-19	116	1	19
16-1-37	16	1	37	16-1-26	16	1	26	18-2-13	18	2	13	116-2-26	116	2	26
16-2-19	16	2	19	16-2-1	16	2	1	18-2-36	18	2	36	116-2-35	116	2	35
17-1-10	17	1	10	16-2-18	16	2	18	19-1-32	19	1	32	115-1-20	115	1	20
17-1-29	17	1	29	17-1-2	17	1	2	20-1-36	20	1	36	114-1-1	114	1	1
18-1-3	18	1	3	17-1-12	17	1	12	20-2-8	20	2	8	114-1-15	114	1	15

Faculty Emails

Silvia				Nick				Shu				Yijia			
Identifier	P	C	L	Identifier	P	C	L	Identifier	P	C	L	Identifier	P	C	L
128-1-11	128	1	11	126-2-8	126	2	8	126-2-27	126	2	27	128-1-19	128	1	19
134-1-25	134	1	25	134-1-2	134	1	2	134-2-14	134	2	14	140-1-1	140	1	1
133-2-35	133	2	35	138-2-17	138	2	17	133-2-40	133	2	40	136-1-32	136	1	32
132-1-19	132	1	19	139-1-39	139	1	39	139-2-19	139	2	19	135-2-24	135	2	24
132-1-4	132	1	4	134-1-34	134	1	34	127-2-8	127	2	8	124-1-11	124	1	11
137-1-27	137	1	27	125-1-40	125	1	40	131-1-13	131	1	13	129-1-16	129	1	16
125-1-27	125	1	27	134-2-26	134	2	26	132-2-39	132	2	39	127-1-33	127	1	33
137-1-28	137	1	28	133-1-40	133	1	40	140-1-12	140	1	12	133-2-33	133	2	33
125-2-40	125	2	40	129-1-4	129	1	4	141-2-19	141	2	19	130-2-30	130	2	30
140-1-31	140	1	31	141-1-33	141	1	33	131-2-35	131	2	35	129-2-7	129	2	7
133-2-21	133	2	21	128-1-16	128	1	16	124-1-27	124	1	27	130-1-30	130	1	30
135-2-35	135	2	35	137-2-7	137	2	7	141-2-20	141	2	20	139-1-2	139	1	2

Appendix 2 (Complete Survey Questions):

1. Please select which of the following best describes you:
   a) Undergraduate – first year
   b) Undergraduate – second year
   c) Undergraduate – third year
   d) Undergraduate – fourth year
   e) Undergraduate – fifth year
   f) Graduate – Master's program
   g) Graduate –PhD program
   h) Faculty
   i) Others _____

2. Please select your gender:
   a) Male
   b) Female

3. Please select the college you are enrolled in (college of your primary major). If you are a faculty member, please select the college you are employed in.
   a) HSS
   b) MCS
   c) CIT
   d) CFA
   e) Tepper
   f) SCS
   g) Heinz
   h) CMU (BSA, BXA, and other intercollege programs)
   i) Others _____

4. Do you own a car that you use (either regularly or occasionally) to commute to and from CMU? If you live on campus this can include trips to the grocery store and back, etc.
   a) Yes
   b) No

5. Do you use a friend's or family member's car to commute to and from CMU (either regularly or occasionally)?
   a) Yes
   b) No

For the following questions, please think about how often in THIS SEMESTER (starting January 16, 2012), you have parked at the METERED parking spots on Tech Streets, Frew Street, or surrounding Schenley Park.

6. How many times in an average week in the past semester have you parked at a metered spot on Tech Street, Frew Street, or surrounding Schenley Park? If you leave campus and return on the same day

please count each distinct number of times you have parked. Please enter your answer in the blank below.

7. How fair do you think the rates for the metered spots on Tech Street, Frew Street, or surrounding Schenley Park are? The rate is $1 for 30 minutes ($2 per hour).

a) Very fair
b) Moderately fair
c) Neither fair nor unfair
d) Slightly unfair
e) Very unfair
f) No opinion

8. How many times have you gotten a ticket in this semester (since January 16, 2012) because you have parked at a metered spot on Tech Street, Frew Street, or surrounding Schenley Park and the meter has run out or you have failed to pay? Please enter your answer in the blank below.

9. How many times in this semester (since January 16, 2012) have you parked at a metered spot on Tech Street, Frew Street, or surrounding Schenley Park and wanted to pay, but have not been able to pay in full or at all because you did not have enough quarters? Please enter your answer in the blank below.

10. What time of day (on every day but Sunday) would you consider to be the most fair to START requiring payment at the meters on Tech Street, Frew Street, or surrounding Schenley Park? Be sure to mention AM or PM, and note 12 pm is noon. Please enter your answer in the blank below.

11. What time of day (on every day but Sunday) would you consider to be the most fair to STOP requiring payment at the meters on Tech Street, Frew Street, or surrounding Schenley Park? Be sure to mention AM or PM, and note 12 pm is noon. Please enter your answer in the blank below.

12. Which of the following rates would you consider to be the most fair for parking at the meters on Tech Street, Frew Street, or surrounding Schenley Park?

a) less than $.5 per hour
b) $.5 per hour
c) $1 per hour
d) $1.5 per hour
e) $2 per hour
f) $2.5 per hour
g) $3 per hour

h) $3.5 per hour
i) More than $3.5 per hour
j) I don't know

13. For how long do you normally park at the metered spots on Tech Street, Frew Street, or surrounding Schenley Park at any given time?

a) Less than 1 hour
b) About 1 hour
c) Between 1 and 2 hours
d) About 2 hours
e) Between 2 and 3 hours
f) About 3 hours
g) Between 3 and 4 hours
h) About 4 hours
i) More than 4 hours
j) I don't park there

14. How many times in a given week do you park at the metered spots on Tech Street, Frew Street, or surrounding Schenley Park in the following time slots?

a) Before 12PM (noon)
b) 12PM – 7PM
c) After 7PM

15. How much more or less satisfied would you be if the following scenario happened with regard to the metered spots on Tech Street, Frew Street, or surrounding Schenley Park?

	Much Less Satisfied	Less Satisfied	Equally Satisfied	More Satisfied	Much More Satisfied	I don't know
You are allowed to pay with multiple kinds of coins (quarters, dimes, nickels) at the metered spots.						
You are allowed to pay with credit and debit cards at the metered spots.						

16. How much more or less often would you park at the metered spots on Tech Street, Frew Street, or surrounding Schenley Park if the following scenario happened?

	Much Less Often	Slightly Less Often	The Same Amount	Slightly More Often	Much More Often	I don't know

You are allowed to pay with multiple kinds of coins (quarters, dimes, nickels) at the metered spots.						
You are allowed to pay with credit and debit cards at the metered spots.						

7. How crowded do you perceive the metered parking spots on Tech Street, Frew Street, or surrounding Schenley Park to be during the following hours on a regular day?

	Almost no cars (close to 0%)	About 0% - 25% spaces taken	About 25% - 50% spaces taken	About 75% - 100% spaces taken	Pretty much 100% spaces taken	I don't know
Before 12 PM (noon)						
12 PM – 7 PM						
After 7 PM						

18. How satisfied are you with the current cost of parking at the metered spots on Tech Street, Frew Street, or surrounding Schenley Park?

a) Very Unsatisfied
b) Slightly Unsatisfied
c) Neither Satisfied nor Unsatisfied
d) Slightly Satisfied
e) Very Satisfied
f) No opinion

19. Please state your overall satisfaction with the metered parking spots on Tech Street, Frew Street, or surrounding Schenley Park. Think about the time periods in which the meters are checked, costs of parking, space availability, etc.

a) Very Unsatisfied
b) Slightly Unsatisfied
c) Neither Satisfied nor Unsatisfied
d) Slightly Satisfied
e) Very Satisfied
f) No opinion

20. Please let us know any comments or suggestions which you may have.

Appendix 3 (Email Initial Invitation):

Dear CMU students/faculty members,

I hope this email finds you well. I am writing to you on behalf of the CMU 36-303 Survey Sampling and Society Group C in order to improve the on campus parking for CMU students. We all understand that parking at CMU is not perfect, and could be greatly improved. However, in order to do so we are collecting student and faculty opinions on a variety of topics regarding the on campus parking. The end goal is to compile a report which demonstrates student and faculty opinions on the matter, and aim to make changes in the parking system.

Your input is extremely valuable and should take fewer than 10 minutes using the link below.

Please click here to participate in the survey:

https://www.surveymonkey.com/s/QNV6P2B

No confidential or identifiable information will be included in the final report, and the list will not be used for any other purposes. We are being sponsored by our professor, Dr. Brian Junker of the Statistics department. I am available at any hour, and on the weekends for contact if you have any questions regarding the project as a whole. If you would be interested in receiving a copy of the final report, we would be more than happy to provide you one when it is completed. This is a topic of importance to all of us on campus, please take a couple of minutes out of your schedule to improve the lives of your fellow students.

We highly appreciate your time and input.

Appendix 4 (Email Follow-up Remainder):

Hello,

I hope this email finds you well. I am writing to you on behalf of the CMU 36-303 Survey Sampling and Society Group C in order to improve the on campus parking for CMU students. Few days ago, the members of Group C sent you an email attempting to get your opinion on parking at CMU. We understand this is a busy time for everybody on campus (in fact, this project is a large part of the reason we are busy), but if you could take 10 minutes out of your day to help some fellow students we would be incredibly appreciative. However, since this survey involves our CMU campus, just by taking this survey you are improving the quality of life on campus.

Your input is extremely valuable and should take fewer than 10 minutes using the link below.

Please click here to participate in the survey:

https://www.surveymonkey.com/s/QNV6P2B

No confidential or identifiable information will be included in the final report, and the list will not be used for any other purposes. We are being sponsored by our professor, Dr. Brian Junker of the Statistics department. I am available at any hour, and on the weekends for contact if you have any questions regarding the project as a whole. If you would be interested in receiving a copy of the final report, we would be more than happy to provide you one when it is completed. For the present I can attach a thorough proposal of our project in the event that it will inform you further about our work. This is a topic of importance to all of us on campus, please take a couple of minutes out of your schedule to improve the lives of your fellow students.

We highly appreciate your time and input.