2019

Lime User Survey Analysis

DIFFERENCES BETWEEN RIDERS AND NON-RIDERS

XIAOJUN GE FOR BIKE WALK TOMPKINS

2019 Lime User Survey

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Introduction

In 2019, Bike Walk Tompkins (BWT) and the Ithaca-Tompkins County Transportation Council (ITCTC) developed a survey that was distributed by Lime. The survey collected people's demographic information, transportation mode change, and perceptions about the Ithaca's Lime bikeshare system.

The sample selection process is not entirely random, and some measures were taken to minimize sample biases. Initially, Lime sent a link to approximately 12,000 registered Ithaca Lime riders who provided an email address. Later on, the link made its way onto Facebook groups where members see the Lime system negatively. Therefore, to minimize the sample biases, the data were organized into rider and non-rider categories for further studying. The categorization also helps identify factors influencing people's choice of becoming Lime riders.

In total, 569 people responded to the survey. As survey respondents were entered to a raffle for a gift card after completing the survey, only a small portion of the sample contained skipped questions. Empirically, 569 is a significant sample size. Also, the respondents are mostly members of the Ithaca community, so the conclusion inferred from this sample could represent the entire population of Ithaca's urbanized area.

Methods

Fisher's exact test based on the 2-by-2 contingency table was taken to identify what demographic factors (for example, gender, education, income, etc.) are correlated with people's likelihood of using the Lime system. All the samples were classified into two categories: riders and non-riders. Afterwards, all the samples were classified into two groups based on some other demographic factors, such as male and female for gender (see table 1). Then, we calculated the odds ratio and p-value to determine if there's any correlation between the demographic factor being examined and whether people are more likely to be riders or non-riders.

Table 1 – Example of contingency table

	Male	Female
Rider	x_{11}	x_{12}
Non-rider	x_{21}	x_{22}

The odds ratio was calculated by the following formula. An odds ratio higher than one indicates a positive correlation between "male" and "rider," while a ratio smaller than one indicates a negative correlation.

$$\text{odds ratio} = (x11 * x22) / (x12 * x21)$$

Fisher's exact test's confidence level was evaluated based on a threshold (i.e. P-value < 0.05), which indicates the correlation is statistically significant. In other words, a P-value >= 0.05 suggests that there is no correlation between rider/non-rider and the demographic factor being examined.

Demographic Factors & Lime System Use

Length of residency in Tompkins County

As shown in Figures 1 and 2, among non-riders, the majority are residents who lived in Tompkins County (TC) for more than 15 years. In the rider data, however, nearly half are residents who resided in the county for less than 5 years.

Figure 1 - Rider's Residency Length

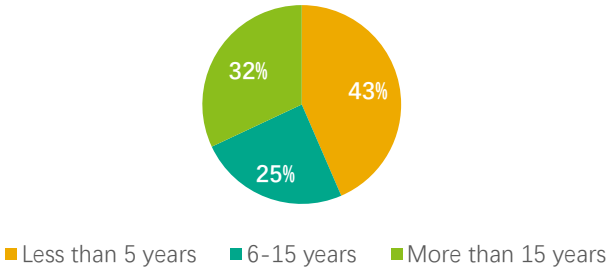
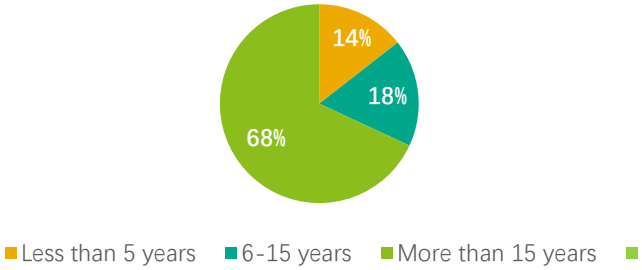


Figure 2 - Non-rider's Residency Length



A closer examination shows more details about the correlation between residency length and the likelihood of riding Lime bikes. For comparison purposes, we separated riders and non-riders into three residency length groups (see Table 2): Group One (<5 years), Group Two (6-15 years), Group Three (>15 years).

Table 2 – Residency Length categorizations

	Group One (<5 year)	Group Two (6-15 years)	Group Three (>15years)
Rider	117 (43.5%)	66 (24.5%)	86 (31.9%)
Non-rider	24 (13.6%)	29 (16.4%)	113 (63.8%)

*"Other" counts and skipped answers are excluded

Then, we conducted the Fisher's exact test between Group One and two, Group Two and Three, and Group One and Three separately. The results are in Table 3-5:

Table 3 – Fisher's exact test between Group One and Group Two.

Data			Results	
	Group One (6-15 years)	Group Two (>15 years)	Odds Ratio	p-value
Rider	117 (43.5%)	66 (24.5%)	2.1420	0.0173
Non-rider	24 (13.6%)	29 (16.4%)		

Table 4 – Fisher's exact test between Group Two and Group Three.

Data			Results	
	Group Two (6-15 years)	Group Three (>15 years)	Odds Ratio	p-value
Rider	66 (24.5%)	86 (31.9%)	2.9904	0.0001
Non-rider	29 (16.4%)	113 (63.8%)		

Table 5 – Fisher's exact test between Group One and Group Three.

Data			Results	
	Group One (<5 years)	Group Three (>15 years)	Odds Ratio	p-value
Rider	117 (43.5%)	86 (31.9%)	6.4055	0.0001
Non-rider	24 (13.6%)	113 (63.8%)		

In all three tests above, the p-value is smaller than 0.05, indicating the results are statistically significant. The odds ratio are 2.1420, 2.9904, and 6.4055, respectively. Therefore, the order of the tendency of using Lime bikes is that Group One (residents who lived in TC for less than 5 years) > Group Two (residents who resided in TC between 6 to 15 years) > Group Three (residents who lived in TC for more than 15 years). This means that, in general, people with shorter residency length in Tompkins County are more likely to be Lime bike riders.

One reason that more recent Tompkins County residents are more likely to use Lime bikes is that the majority of these residents are students. In our sample, out of the 117 respondents who are Lime riders and have resided in the county for less than 5 years, 60 (51%) are students. According to the 2020 Ithaca Bicycle Use and Attitudes Survey, students rely more on Lime bikes as they are less likely to have access to their own bikes. The 2020 Survey also shows that non-students, who are more likely to have lived in Tompkins County for more than 5 years, use Lime bikes less often or not at all. This finding is also consistent with the results above.

Residency Location

Figures 3 and 4 show that 2/3 of people who have used a Lime bike live in the City of Ithaca, while 2/3 of people who did not use a Lime bike live outside the City. The City of Ithaca was the primary location for Lime bike service. Therefore, residents who live in the City have better access to the bikeshare service. In 2019, only the City of Ithaca, and parts of the Town of Ithaca, the Village of Trumansburg, and the Village of Dryden had Lime bikes actively placed within their boundaries. A Fisher's exact test (see Table 6) shows residents living in these four locations are much more likely to use Lime bikes.

Figure 3 - Rider Residency Locations

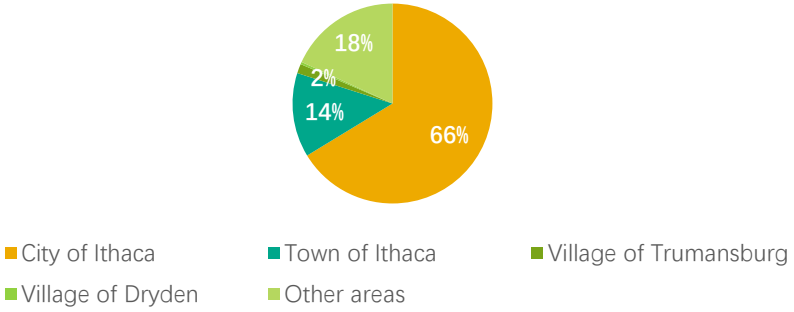


Figure 4 - Non-rider Residency Locations

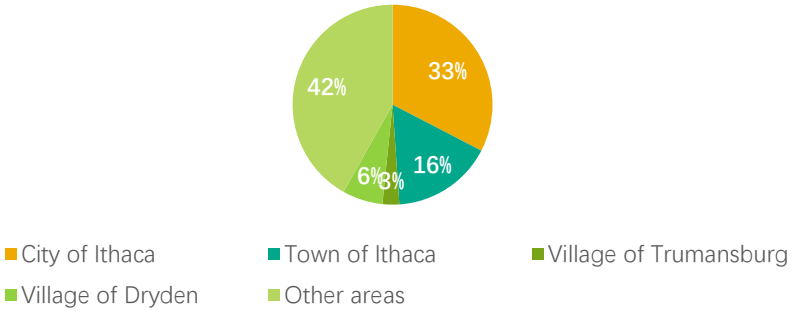


Table 6 – Fisher's exact test for Residency Location

	Data		Results	
	City of Ithaca/ Town of Ithaca/ Village of Trumansburg/Village of Dryden	Other Areas	Odds Ratio	p-value
Rider	216(80.3%)	48(17.8%)	3.6474	0.0001
Non-rider	95(53.7%)	77(43.5%)		

*"Other" counts and skipped answers are excluded

In this test, the odds ratio is 3.6474 and the p-value is 0.0001. The result is statistically significant as the p-value is smaller than 0.05. Therefore, there is a correlation between living location and the tendency to use the Lime system. Because the odd ratio of 3.6474 is greater than 1, people who live in an area with reliable access to the Lime system have a higher tendency to be Lime bike riders.

Gender

As shown in Figure 5, women make up a slightly higher percentage in the non-rider data than the rider data. However, the difference is not significant, and Fisher's exact test is needed to identify if gender affects people's choice of being a rider or non-rider (see Table 7).

Figure 5 - Gender distribution

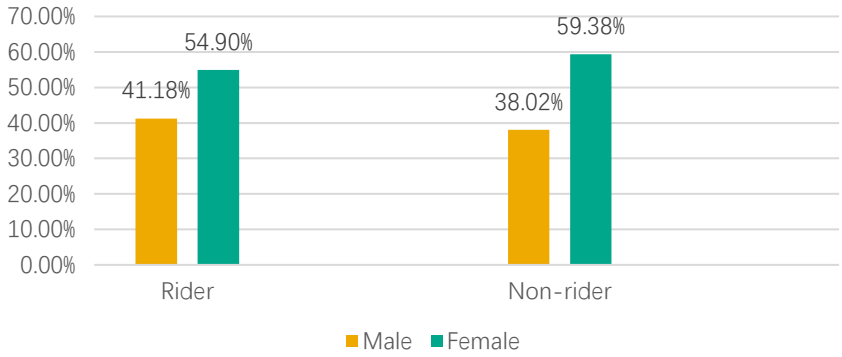


Table 7 – Fisher's exact test for Gender

Data			Results	
	Male	Female	Odds Ratio	p-value
Rider	126(41.2%)	168(54.9%)	1.1712	0.4477
Non-rider	73(38%)	114(59.4%)		

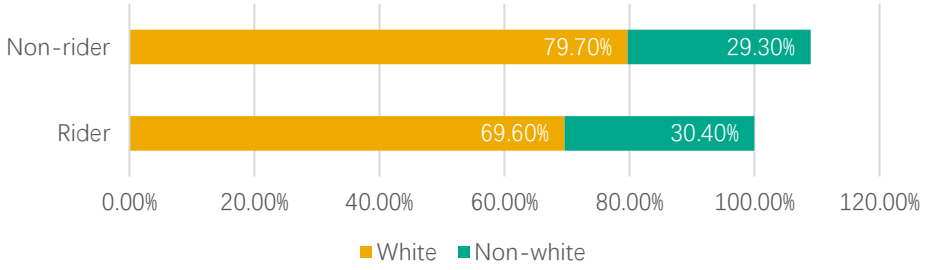
*"Other" and Not-conforming counts are excluded

In this test, the p-value is 0.4477, which is higher than 0.05, so the result is not statistically significant. Therefore, there is no correlation between gender and whether the person is a rider or a non-rider.

Race and Ethnicity

The race and ethnicity question in this survey was a multiple choice question. Multiracial respondents could select more than one race or ethnicity choice. Therefore, people who chose “White or Caucasian” with one or more additional options were added to the non-white for our analysis, which also includes other people of color.

Figure 6 - Race and Ethnicity Distribution



We conducted a Fisher's exact test between the white and non-white groups to identify how race and ethnicity affect people's choice of using the Lime bikeshare system (see Table 8).

Table 8 – Fisher’s exact test for Race and Ethnicity

Data			Results	
	White	Non-white	Odds Ratio	p-value
Rider	213(69.6%)	93(30.4%)	0.5838	0.0162
Non-rider	153(79.7%)	39(20.3%)		

In this test, the odds ratio is 0.5838 and the p-value is 0.0162. The result is statistically significant as the p-value is smaller than 0.05. Therefore, there is a correlation between race and the tendency to use the Lime system. Because the odd ratio 0.5838 is less than 1, people of color (including mixed race) are more likely to be Lime bike users than white people.

Age

As shown in Figure 7 below, the riders' data is approximately evenly divided by three age groups: one-third of riders are less than 30, another third are between 30-39, the rest are people 40 years and older. In the non-rider data (see Figure 8), however, roughly 2/3 are above 40 years old. Based on the graphs, we separated riders and non-riders into three age categories (see Table 9), Group One (<29 years old), Group Two (30-39 years old), Group Three (>40 years old). Then, we conducted the Fisher's exact test between Groups One and Two, Group Two and Three, and Group One and Three separately. The results are in Table 10-12.

Figure 7 - Rider Age Distribution

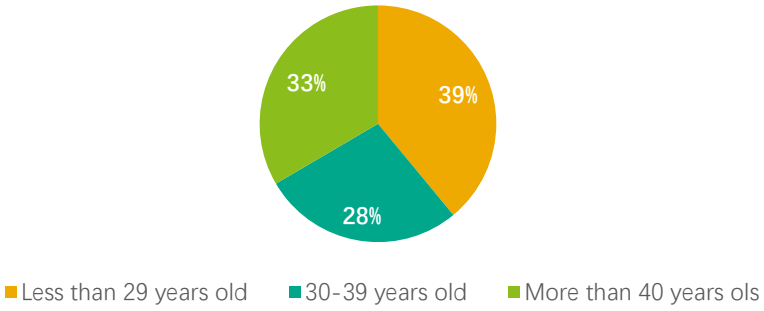


Figure 8 - Non-rider Age Distribution

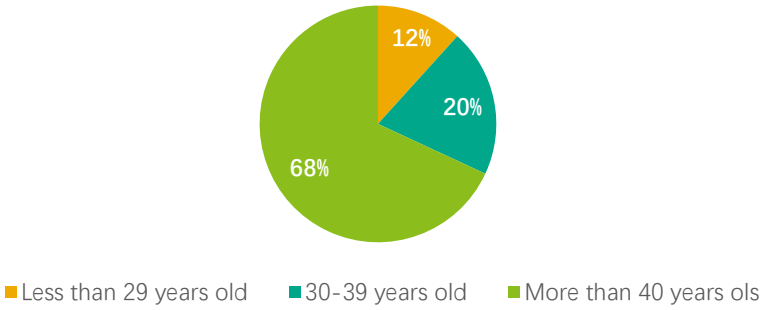


Table 9 – Age Categorization

	Group One (< 29 years old)	Group Two (30-39 years old)	Group Three (>40 years old)
Rider	119(38.9%)	84(27.5%)	102(33.3%)
Non-rider	22(11.5%)	38(19.8%)	128(66.7%)

*people who “Prefer not to answer” the question are excluded in the counting.

Table 10 – Fisher's exact test for Age (Group One and Two)

Data			Results	
	Group One (< 29 years old)	Group Two (30-39 years old)	Odds Ratio	p-value
Rider	119(38.9%)	84(27.5%)	2.4470	0.0032
Non-rider	22(11.5%)	38(19.8%)		

Table 11 – Fisher's exact test for Age (Group Two and Three)

Data			Results	
	Group Two (30-39 years old)	Group Three (>40 years old)	Odds Ratio	p-value
Rider	84(27.5%)	102(33.3%)	2.7740	0.0001
Non-rider	38(19.8%)	128(66.7%)		

Table 12 – Fisher's exact test for Age (Group One and Three)

Data			Results	
	Group One (< 29 years old)	Group Three (>40 years old)	Odds Ratio	p-value
Rider	119(38.9%)	102(33.3%)	6.7879	0.0001
Non-rider	22(11.5%)	128(66.7%)		

In all three tests, the p-value is smaller than 0.05, meaning the results are statistically significant. The odds ratio for pair one, pair two, and pair three are 2.4470, 2.7740, 6.7879, respectively. Therefore, the order of the tendency to use Lime bikes is that Group One (<29) > Group Two (30-39) > Group Three (>40). Therefore, younger generations, especially people under 29 years old, have a higher tendency to ride Lime bikes. The finding is not surprising as students, who make up a significant portion of riders, are often younger in age.

Employment/Student status

As shown in Figure 9 and 10 below, full-time employees are the majority in both rider and non-rider of all occupancies. The percentage of students, primarily undergraduate and graduate students, is much higher in rider data and low in non-rider data. Therefore, we examine the employment/student status and the tendency to ride the Lime bikes by taking Fisher's exact test (see Tables 13 and 14).

Figure 9 - Employment Status

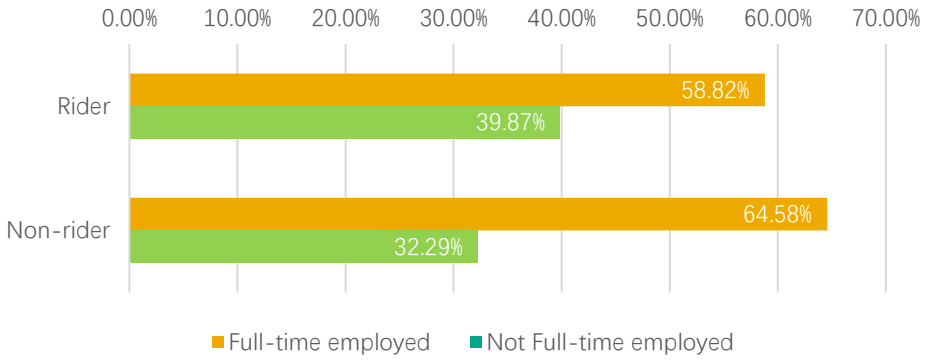


Figure 10 - Student Status

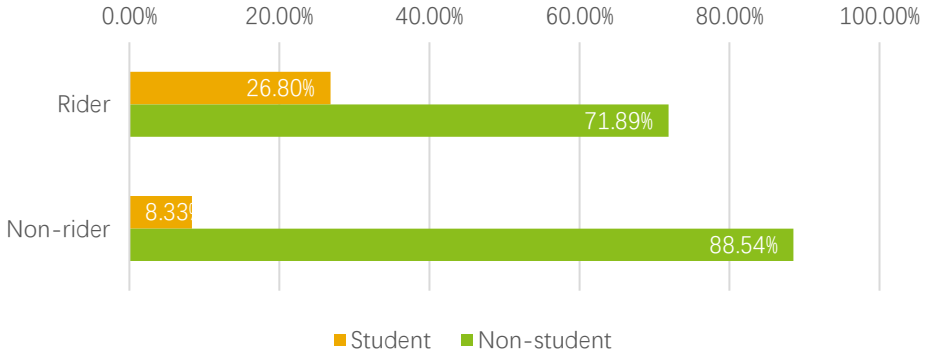


Table 13 – Fisher's exact test for Employment Status

Data			Results	
	Full-time Employed	Not Full-time Employed	Odds Ratio	p-value
Rider	180(58.9%)	122(39.9%)	0.7377	0.1248
Non-rider	124(64.6%)	62(32.3%)		

*"Other" counts are excluded

In this test, the p-value is 0.1248, higher than 0.005, so the result is not statistically significant. Therefore, there is no correlation between full-time employment and ridership.

Table 14 – Fisher's exact test for Student Status

Data			Results	
	Student	Non-student	Odds Ratio	p-value
Rider	82(26.8%)	220(71.9%)	3.9602	0.0001
Non-rider	16(8.3%)	170(88.5%)		

*"Other" counts are excluded

In this test, the odds ratio is 3.9602 and the p-value is 0.0001. The result is statistically significant as the p-value is much smaller than 0.05. Therefore, there is a strong correlation between student status and ridership. Because the odd ratio of 3.9602 is much higher than 1, students are more likely to be Lime biker riders than people who are not students. This result also echoes with the 2020 Ithaca Bicycle Use and Attitudes Survey, which indicates that a slightly higher percentage of students used the Lime bike system compared to people who are not students. That survey showed 26% of students used the Lime bikeshare system, while 21% of non-students used it. It should be stated, however, there were more non-students than students who made up the rider group among the respondents in the Lime User Survey.

Highest Level of Education

Based on Figure 11 and 12, people who received higher education are the majority in the rider dataset. Therefore, we conducted a Fisher's exact test to confirm the correlation between higher education and Lime bike use (see Table 15).

Figure 12 - Rider's highest education level

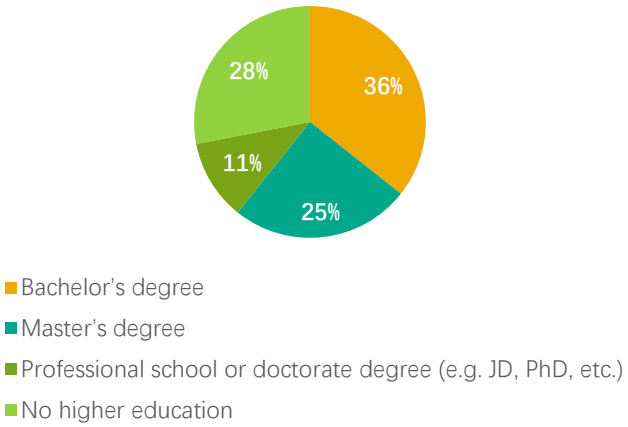


Figure 11 - Non-rider's highest education level

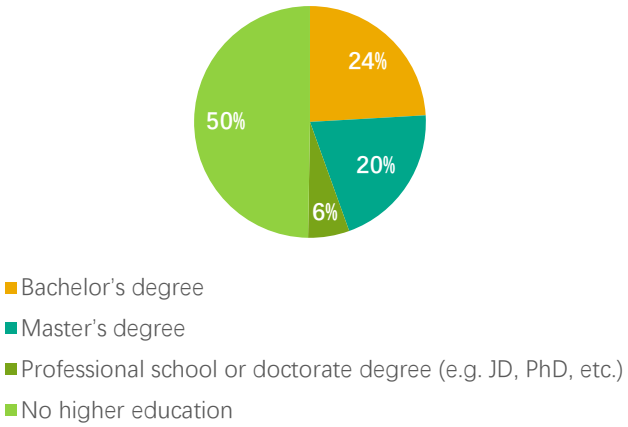


Table 15 – Fisher's exact test for Highest Level of Education

	Data		Results	
	Received higher education	No higher education	Odds Ratio	p-value
Rider	218(71.3%)	85(27.8%)	2.5380	0.0001
Non-rider	96(50%)	95(49.5%)		

*"Other" counts are excluded

In this test, the odds ratio is 2.5380; the p-value is 0.0001. The result is statistically significant as the p-value is much smaller than 0.05. Therefore, there is a correlation between higher education and ridership. As the odd ratio of 2.5380 is greater than 1, people who received higher education are more likely to be Lime biker riders than people who did not receive higher education.

Household Income

In this survey, we only asked respondents for their gross household income but did not include household size in the question for privacy concerns. In New York State, the poverty line for a household of three is 40,182. Therefore, we assume a household with an annual gross income lower than 34,999 as disadvantaged households. As shown in Figure 13, the percentage of riders is higher than that of non-riders within this low income range.

Interestingly, Figure 13 shows a higher percentage of riders than non-riders in households with an income exceeding 100,000. Therefore, we use Fisher's exact test to identify the correlation between income status and Lime bike use (see Table 16).

Figure 13 - Houshold Income Distribution

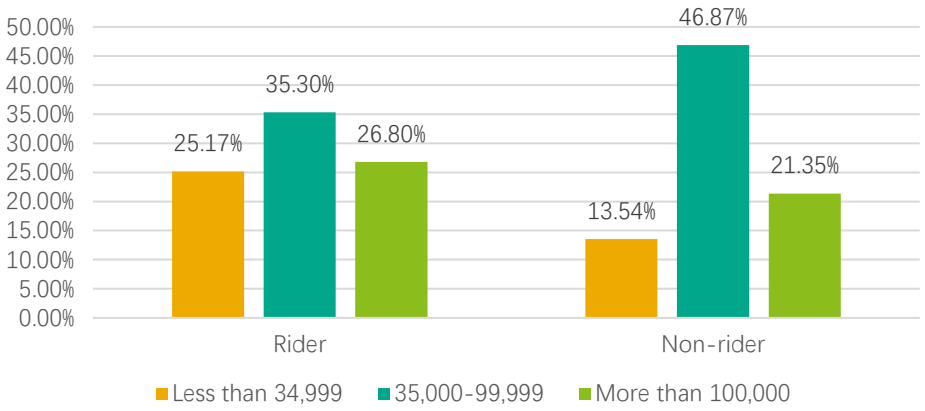


Table 16 – Fisher's exact test for Household Income

	Data		Results	
	0-34,999 or >100,000	>34,999-99,999	Odds Ratio	p-value
Rider	159(51.9%)	108(35.3%)	1.977	0.0009
Non-rider	67(34.9%)	90(46.9%)		

* "Prefer not to answer" answers in the income question not included in the calculation.

In this test, the odds ratio is 1.977; the p-value is 0.0009. The result is statistically significant as the p-value is smaller than 0.05. Therefore, there is a correlation between household income and ridership. As the odds ratio, 1.977, is greater than 1, people living in households with a gross income of fewer than 34,999 dollars or higher than 100,000 dollars are more likely to be Lime biker riders than people living in households with income between 35,000 to

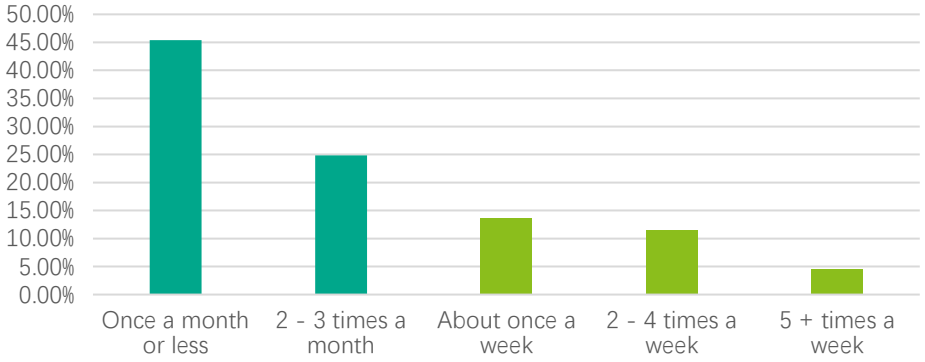
99,999. The result shows people from both financially disadvantaged households and higher income households are more likely to ride Lime bikes. More importantly, the results indicate that bikeshare is an essential mode of transportation for members of financially disadvantaged households, and can support higher income households to transition to a lower-carbon lifestyle.

Frequency of Use of Lime Bikes

Overall, 306 (60.84% of survey respondents) reported they are Lime bike riders, and 192 (38.17% of survey respondents) said they never used Like bikes; the rest 5 (0.99%) respondents answered Don't know/not sure.

Among riders, almost 30% (29.75%) reported they use Lime bikes weekly. To be more specific, 4.58%, 11.44%, and 13.73% reported using Lime 5+ times a week, 2-4 times a week, and about once a week, respectively. The other 24.84% of riders used Lime bikes 2-3 times a month. The remaining 45.42% use Lime bikes once a month or less (see Figure 14).

Figure 14: Riders' Lime Bike Use Frequency



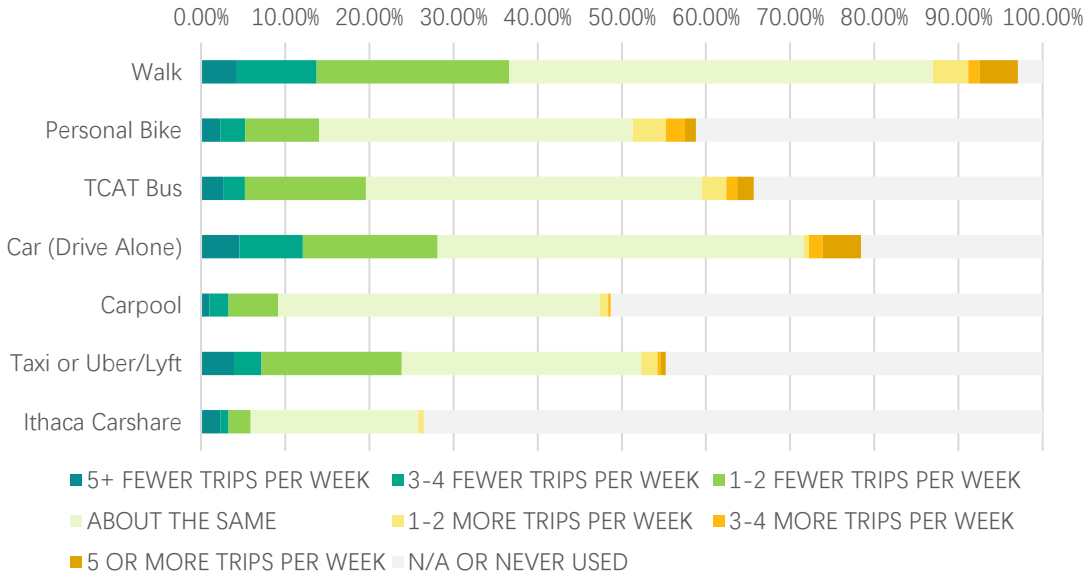
Change of Transportation Mode

We asked respondents to estimate their weekly transportation change in walking, using personal bikes, taking TCAT bus, driving alone, carpooling, taxi/Uber/Lyft usage, and Ithaca Carshare usage after using Lime bikes.

Figure 15 shows the rider's weekly transportation mode change. In all the transportation modes surveyed, the proportion of riders who reported decreased usage in other transportation modes is much higher than the proportion of riders who had increased usage. The most significant changes happened in walking, driving alone, and taxi or Uber usage.

To be more specific, 36.61% of riders reported reducing walking for at least once a week, while 10.14% reported an increase in walking. 28.11% of riders said they drive alone less, while only 6.86% said they drive more. 23.86% of riders reported a decrease in taxi or Uber use, while only 2.94% reported an increase in taking taxi or Uber. 19.6% of riders took fewer TCAT buses, and 6.21% took more TCAT buses. Lastly, the percentage of riders reporting reductions in use of a personal bike, carpool, and Ithaca Carshare is 14.05%, 9.15%, and 5.88% respectively.

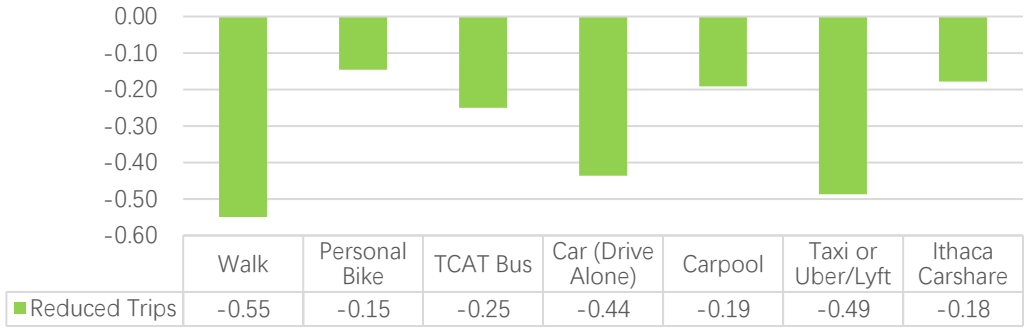
Figure 15 - Rider's Transportation Mode Change after using Lime



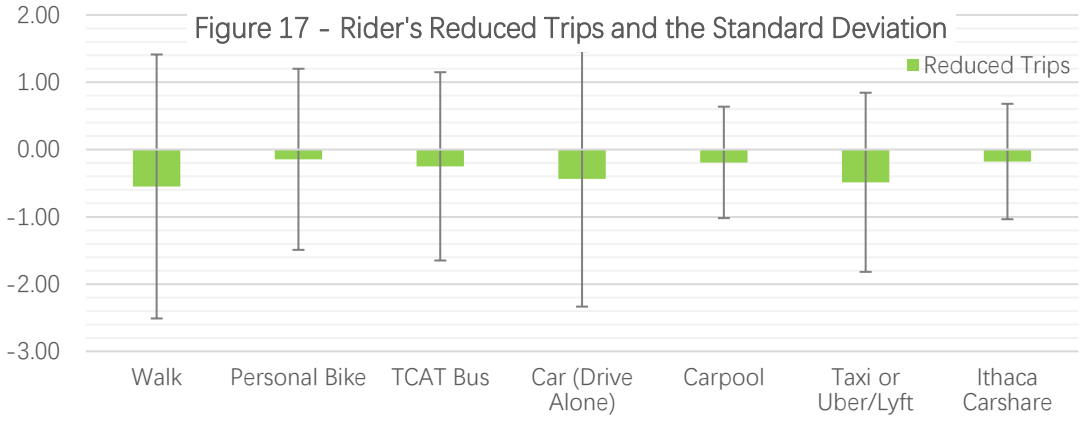
Also, we calculated how many trips on average did all riders reduce after using Lime. By assigning a value to each choice, we could quantify the answers given by respondents and generate the mean and standard deviation of each set of data. We assigned -5 to the option "+5 FEWER TRIPS PER WEEK", -3.5 to "3-4 FEWER TRIPS PER WEEK", -1.5 to "1-2 FEWER TRIPS PER WEEK" , 0 to "ABOUT THE SAME" and "N/A OR NEVER USED", 1.5 to "1-2 MORE

TRIPS PER WEEK", 3.5 to "3-4 MORE TRIPS PER WEEK", and 5 to "+5 MORE TRIPS PER WEEK". As shown in Figure 16, on average, riders reduced the use of every transportation mode being surveyed. On average, they did 0.55 fewer walking trips, 0.15 fewer personal bike trips, 0.25 fewer TCAT trips, 0.44 fewer drive alone trips, 0.19 fewer carpool trips, 0.49 fewer taxi or Uber trips, and 0.18 fewer Ithaca Carshare trips. **In total, an average Lime rider made about 2.2 fewer trips using other transportation modes per week.**

Figure 16 - Average Rider's Reduced Trips



As shown in Figure 17, the standard deviation for the mean is significant. Depending on individual usage, the reduction in trips on various transportation modes could be much more than the average amount.



We also asked the survey respondents how many more trips per week they take using Lime bikes that they would not have done using any other mode of transportation. Then we calculate the mean of the number of additional trips reported by all Lime riders in this survey. **On average, respondents reported 1.8 additional trips they would forgo if there were no Lime bikes.**

Non-riders also reported their transportation mode change after using the Lime system. However, since non-riders did not use the Lime system at all, the question is invalid for them in the first place.

The results above show bikeshare is an efficient and sustainable mode of transportation. Reduced walking shows people use Lime bikes as a substitute to get to their destinations more efficiently. Also, bikeshare helps reduce carbon emissions and promote Ithaca's sustainability as people rely less on driving alone or taking taxis or Ubers.

Perceptions about the Lime System

We asked survey respondents about their perceptions of Lime's accessibility, convenience, in-app experience, maintenance, parking, and community benefits.

As shown in Figure 18, most riders chose "agree" and "strongly agree" for each statement. The two comments riders agreed on the most are the ones regarding convenience and community benefits. To be more specific, 88.70% and 87.7% of riders answered" agree" or "strongly agree" on "I think Lime bikes are a convenient transportation mode to move around Ithaca" and "Overall, Lime bikes are good for my community," respectively. Only 5.64% and 6.31% answered "disagree "or "strongly disagree" on these two statements. Riders also highly agreed on the statements regarding the in-app experience and accessibility. 86.71% and 73.75% of riders answered" agree" or "strongly agree" on "I think the Lime smartphone app is easy to use" and "I can easily find a Lime bike near me when I need to go somewhere," respectively. Only 4.65% and 15.62% answered "disagree "or "strongly disagree" on these two statements. The last two comments fewer riders agreed on are about maintenance and parking. 72.42% and 62.13% of riders answered "agree" or "strongly agree" on "Lime bikes are well-maintained" and "Lime bikes are often parked properly and not blocking sidewalks, curb ramps or bus stops," respectively. About 14.61% and 22.93% answered "disagree "or "strongly disagree" on these two statements.

Figure 18 - Riders' perception about Lime

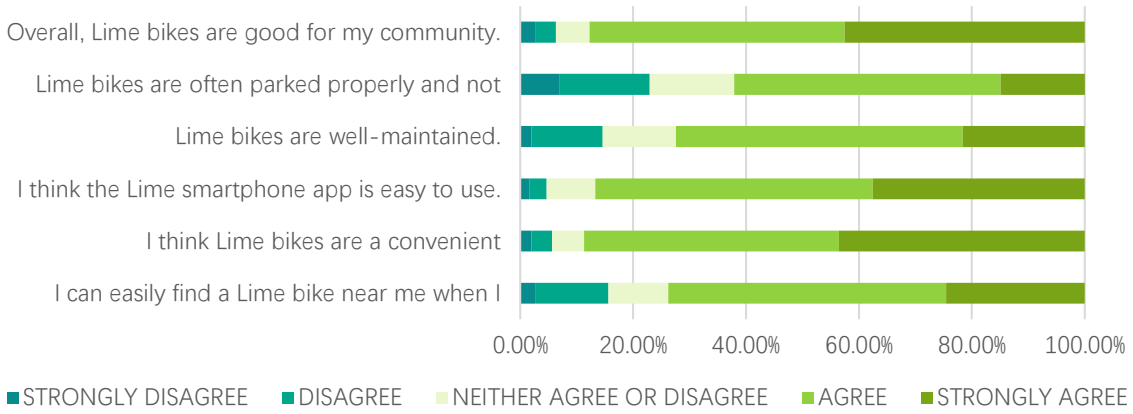
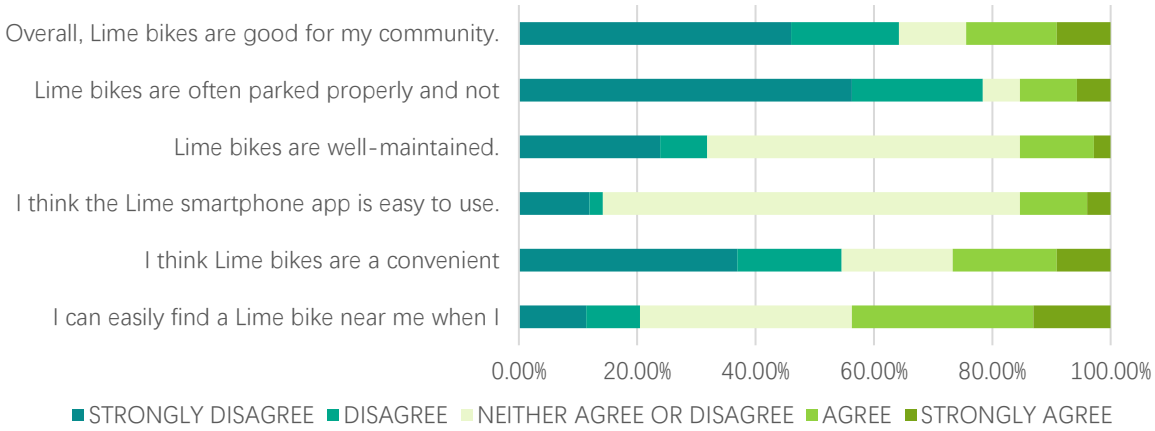


Figure 19 - Non-riders' perception about Lime



Non-riders also gave their opinion about the six statements in this section, and their answers differed from riders' significantly for some statements. As shown in Figure 19, the three statements non-riders disagreed with the most are the statement about good parking, postive community benefit, and convenience at 74.81%, 64.20%, and 54.54% disapproval rates respectively. Agreement is mixed when it comes to the statements about maintenance, in-app experience, and accessibility, likely because they have not used a Lime bike.

Written Comments Analysis

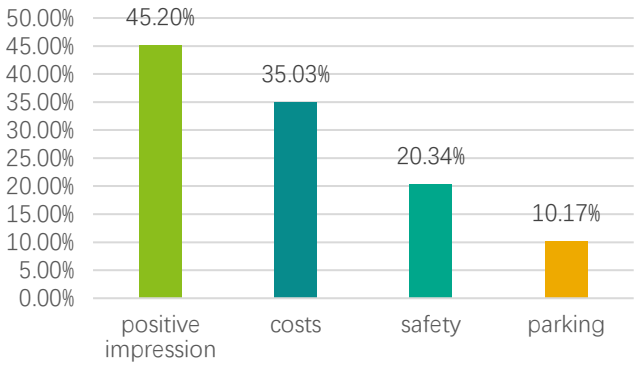
We studied the written comments in this survey for several reasons. Firstly, people tend to

express concerns they care about the most in written comments. Secondly, analyzing the written comments provides information for service improvement.

However, comprehensive text analysis requires high-level machine learning skills. Hence in this analysis, we will employ a commonly used and simple method. We use Python to pick out written comments that contains a set of keywords relating to a specific attitude. For instance, we used keywords such as “great,” “love,” amazing,” nice,” etc., to identify very positive comments. This method helps provide a general idea about the characteristics of the comments respondents left and how often they appeared.

Among all survey respondents, 284 (50% of all survey participants) wrote comments. In these comments, 177 are from riders, and 107 are from non-riders. Some comments contain multiple issues and may be counted repeatedly in the study below. Figure 20 shows that nearly half of riders expressed very positive impressions about the Lime system. Still, many people also mentioned needed improvement regarding costs, infrastructure, and safety.

Figure 20 - Riders' Written Comments



In the 177 comments written by riders, 80 (45%) contained keywords that suggest a positive impression of the Lime system, such as “great,” “love,” amazing,” nice,” good,” “enjoy,” “wonderful,” “convenient,” “useful,” and so on. One rider said, “I love [bikeshare] and I think it is a greener source of transportation compared to my car. I will usually use it in town.” Other points commonly mentioned in positive written comments are health benefits, saving time, convenience, fun, etc. These reasons are reflected in the 2018 and

2020 Ithaca Bicycle Use and Attitudes Survey. In these surveys, the top three reasons that encouraged people to bike are related to improving health, doing a fun activity, and reducing carbon emissions.

62 (35%) riders mentioned keywords related to the cost of using Lime, such as “expensive,” “unaffordable,” “pricy,” “cheap,” “pedal bike,” “non-electric,” and so on. Generally, these riders think the electric bikes are too expensive compared to the pedal bikes which are much more affordable. A rider said that “there used to be a LOT more Lime pedal bikes around, but lately I’ve been seeing many many Lime electric bikes. I do like the electric ones from time to time, but I would like to see more regular pedal bikes again. It saves me money because they are cheaper to ride.” It is not surprising that riders had concerns about the costs of using Lime bikes. In 2019, the majority of Lime bikes in Ithaca were electric-assist ones, which costs $1 to start plus 15 cents for each additional minute. The year before, the system was primarily pedal bikes which only cost $1 for every 30 minutes of use. As cost-sensitive groups like students and people from lower-income households are more likely to be Lime bike users, the complaints about costs are understandable.

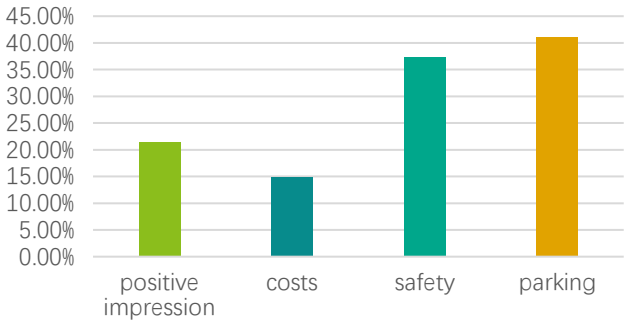
36 (20%) of riders expressed concerns regarding infrastructure and safety of using Lime bikes. The keywords used are “bike lane,” “bike trail,” “bike path,” “bike lane,” “car-free,” “safe,” “infrastructure,” “road condition,” “helmet,” “sign,” “law,” “rule,” and so on. An example comment we received about safety is, “Many of our roads don't have bicycle lanes, making it hazardous for cars and bikes to share the road, which pushes people on bikes to ride on sidewalks, often with disregard for the flow of pedestrian traffic, putting pedestrians at risk.” Many commenters mentioned that they choose to ride on the sidewalks as they feel unsafe riding beside moving vehicles but recognize that their choice also create dangers for pedestrians. Solving this dilemma will require improvement in on-road bike infrastructure and supporting policies. Additionally, helmets are not included with the Lime bike system, which also caused concerns for many.

18（10.1%）riders said the bikes were inappropriately parked by using keywords like

"sidewalk," "block," "parked," and "dumped," "tossed," "everywhere," "anywhere," "wherever." An example comment regarding parking is, "I really like that there is an affordable and accessible bike share program, however, the bikes are constantly left around town in unsafe locations impeding cars and pedestrians." While Lime bikes had parking rules as part of the system, enforcement was difficult and riders have the ability to leave them on sidewalks or other places for convenience. Better education and enforcement of parking regulations, or technology like geofencing or randomized user photo confirmation of parking may help address this problem.

Using the same set of keywords, we calculated how often non-riders expressed positive impressions and the three most frequently mentioned issues studied above in their open-ended comments. Figure 21 shows a small portion of non-riders had positive opinions about the Lime bike system, and most comments from non-riders were related to safety and parking. 23 (21%) non-riders expressed positive impressions about the Lime system, while 16 (15%) non-riders thought the cost of using Lime was too high. 40 (37%) and 44 (41%) non-riders expressed concern about safety and parking issues, a higher rate than riders.

Figure 21 - Non-riders' Written Comments



In sum, based on this survey, nearly half of the riders have very positive impressions about the Lime bike system, but many riders also think the cost of using Lime-E bikes are too high. Also, complaints about safety and parking issues are frequently brought about, especially from people who did not use the service.

Conclusion

1. While a wide cross-section of the Ithaca community ride Lime bikes, people with shorter residency length, people who live in an area with reliable access to the Lime system, people of color (including mixed race), younger generations, students, people who received higher education, and people from both lower-income and higher-income households have a higher tendency to be Lime bike riders.

2. Lime bikes brought significant changes to riders' weekly transportation mode. 36.61%, 28.11%, 23.86% of riders reported reductions of at least one walking, driving alone, and taxi or Uber trip a week, respectively. Fewer riders reported reductions in the use of TCAT buses (19.6%), personal bikes (14.05%), carpool (9.15%), and Ithaca Carshare (5.88%). Bikeshare helps reduce carbon emission and promote Ithaca's sustainability as people rely less on driving alone or taking taxis or Ubers.

3. Riders and non-riders have very distinct perceptions of Lime. Nearly half of riders have very positive impression about Lime. The issue riders cared the most about was cost to ride, while non-riders cared most about safety and parking issues.