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FINAL REPORT

BELTLINE BICYCLIST FACILITY PREFERENCES AND EFFECTS ON INCREASING TRIPS

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16. Abstract:
The objectives of this study were to investigate perceptions of users and potential users of bicycle infrastructure and to investigate the impact of multi-use paths on bicycle trips. Data were collected through a before-and-after survey in 2017 and 2018 (wave 1 N=1,335, wave 2 N=713) of residents near the Eastside Atlanta BeltLine extension and the Westside Atlanta BeltLine trail, along with residents in neighboring control communities of Grant Park and South Atlanta. Survey data was analyzed using statistical models such as analysis of variance, ordinary least squared regression, and segmented models. The analyses indicate positive perceptions of comfort and safety along with willingness to try biking on facilities with a greater degree of separation from traffic. Although results suggest that those residing near the BeltLine projects perceived a greater degree of neighborhood improvements for both biking and walking, there does not appear to be any statistically significant difference between the BeltLine and control communities in terms of actual changes in frequency of bicycling. The findings of this research suggest that although the BeltLine has had a positive impact on perceptions of the bikeability of the neighborhood it is not enough to spur substantial changes in behavior.

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Final Report

BELTLINE BICYCLIST FACILITY PREFERENCES AND EFFECTS ON INCREASING TRIPS

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Executive Summary

The BeltLine is a major infrastructure initiative in the city of Atlanta that is ultimately intended to convert a 22-mile ring of a former rail corridor into a multimodal walk/bike/transit corridor around the dense urban center of Atlanta. In spite of the interest in implementing multimodal transportation infrastructure there is little known in terms of the actual impacts of such projects on perceptions and travel behavior. The objective of the project summarized by this report is to use the opening of two of these segments in Fall 2017, the Westside trail (3 miles) and the Eastside trail extension (1.25 miles), to investigate the impact of such multi-use paths on perceptions of bikeability and bicycle trip making for those who reside near these facilities.

The data for this project was collected using a two-wave panel survey deployed in May 2017 (N=1,335) and May 2018 (N=713). Those residing within a half-mile of the two segments were included in the "treatment" group, and nearby neighborhoods (in South Atlanta and Grant Park) with similar land-use and demographic makeup were also included in the study as a "control" group. Thus, the research had a quasi-experimental design with the survey serving as an instrument for a before-and-after-with-controls natural experiment.

The first-wave survey was 12 pages and took approximately 30 minutes to complete. To keep from biasing responses towards those who are more interested in biking, the survey was designed as a general transportation survey including questions regarding attitudes, technology usage, home/work/commute, mode characteristics (for driving, transit, biking, and walking), perceptions of bicycle infrastructure, and sociodemographics. Respondents were also shown several images of hypothetical roadways including variations in bicycle accommodations, the number of vehicular lanes, and the presence of on-street parking, and asked to rate the extent to which cycling on such a road would be comfortable, safe, or something they would try.

Responses to questions on the perceptions of cycling images were used to estimate a linear regression model. Respondents showed a significant increase in perceptions for bicycle facility types that provided greater degrees of separation from automobiles, while the presence of on-street parking was also a clear deterrent to perceptions. The presence of an additional lane of automobile traffic was a negative factor for perceptions in some cases, though this variable was not consistently significant in all models. Respondents were also segmented into different rider type groups: potential cyclists (N=648), recreational cyclists (N=330), utilitarian cyclists (N=234), and those who cannot bike (N=97). Segmented regression models reveal that the perceptions of some characteristics may vary amongst rider types. For example, those identified as recreational cyclists had coefficients in models of safety and comfort that were significantly different (and negative) from the rest of the sample for the number of vehicular lanes, indicating that this factor may be strongest among the potential cyclist group.

The second-wave survey was a condensed version (20 minutes) of the first-wave survey that was sent to all those who responded to the first survey. Additional questions were added asking about perceptions and recognition of changes that may have occurred in transportation in the community in the previous year. This survey revealed that respondents near the recently completed BeltLine segments perceived a more positive change in both walkability and bikeability than those in the respected control sites. Those near the Westside trail recognized drastically more positive improvements in bikeability than those in their control site of South Atlanta, though the difference in perceived improvement between those near the Eastside extension and those in the control site of Grant Park were much less pronounced. Despite the apparent differences in perceptions of bikeability attributed to the treatment, there appears to be very little in terms of changes in bicycle trip frequency.

The findings from this research project provide GDOT and other agencies with evidence regarding the impact of multi-use trails. GDOT and other agencies should use this document to give priority to the implementation of protected bicycle facilities. Multi-use paths such as the

BeltLine should also be implemented, particularly in areas that may be lacking in bikeability and walkability. Finally, this project shows the importance of conducting regular before-and-after studies on further infrastructure projects, such as projects like these using the same or a similar survey instrument.

Introduction

Pursuit of cycling as a sustainable transportation alternative is desirable for several reasons. However, accurate and robust data to support decisions on where and how to best develop new cycling infrastructure remain elusive. Data on current bicycling has many gaps, but more importantly, there is almost no data on potential cyclists—who they are, the barriers that inhibit their cycling, and how infrastructure investments may help to overcome these barriers. As a result, planners have little understanding of the latent demand from either current or potential cyclists who do not feel safe due to current infrastructure.

This project is an addition to the National Academies' Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Project 08-102, *Bicyclist Facility Preferences and Effects on Increasing Bicycle Trips,* to be published by the study team in 2019. The objective of that study is to understand how both *current and potential* cyclists respond to different types of cycling infrastructure, thus facilitating a quantification of demand that is both *induced and generated through mode and route shifts*. In contrast to previous research that has predominantly been conducted in communities where cycling is widely accepted and automobile drivers are conditioned to the presence of cyclists, this study focuses on communities in the southern United States, where cycling for transportation is relatively new and rapidly expanding. Using such communities as illustrative examples of evolving cycling infrastructure, the study team is conducting a comprehensive investigation of personal preferences and attitudes, current behaviors, and propensities to bicycle in response to different types of bicycle infrastructure investments and facility designs.

One major infrastructure initiative in the city of Atlanta is the Atlanta BeltLine, a 22-mile ring around the dense urban center of Atlanta that will convert a former rail corridor into a multimodal walk/bike/transit corridor. Full build-out is anticipated to include 33 miles of trails around the ring

and connecting to it. During the study site selection of NCHRP 08-102 in 2015, one 2.2-mile section of the ring trail (the Eastside trail) and two other connecting trails were already open. Two additional sections of the ring trail were expected to open during the timeline of NCHRP 08-102: a 1.25-mile Eastside trail extension and a 3-mile Westside trail, shown in Figure 1.

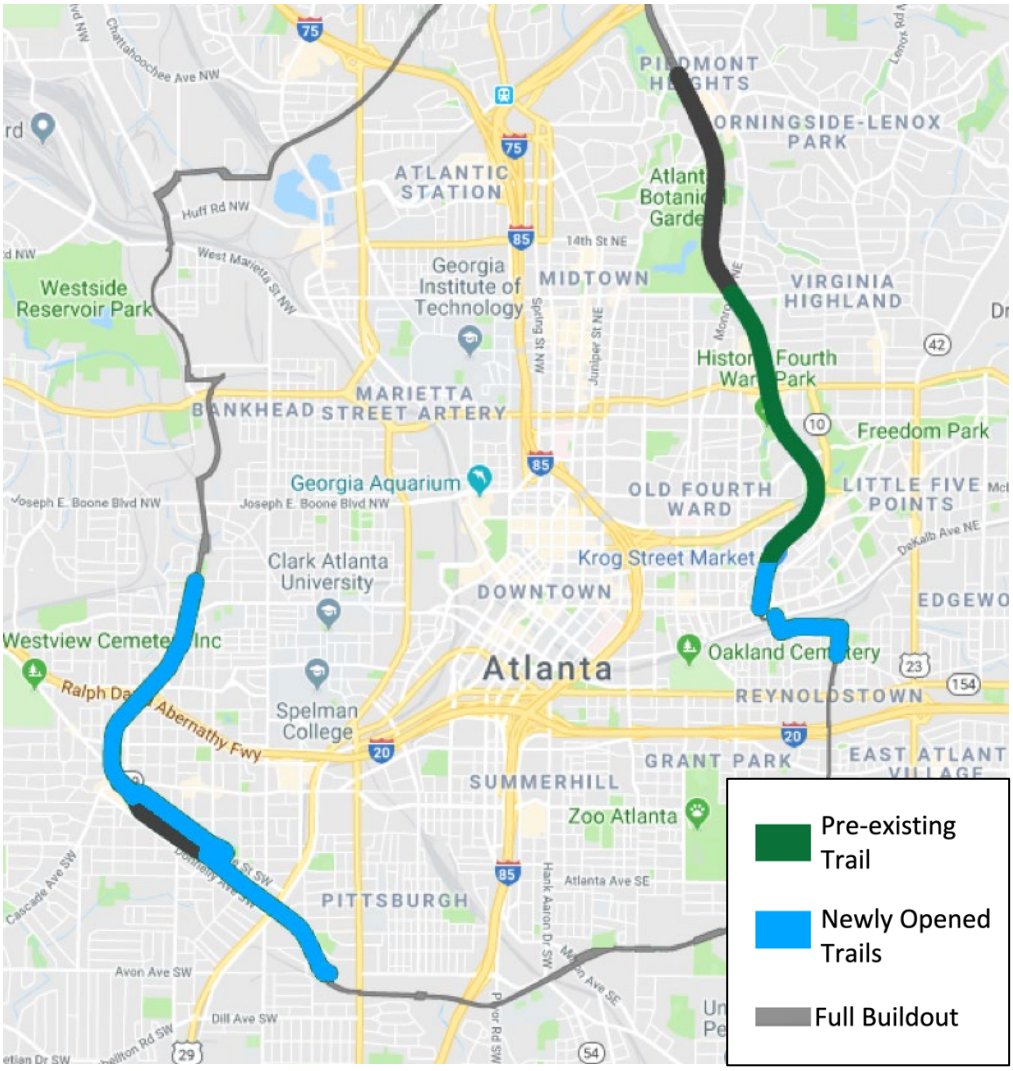

FIGURE 1

Map of BeltLine Current Segments

The NCHRP study began in August 2015, but in the process of identifying locations, the BeltLine project schedules had slipped and the two BeltLine projects no longer fit into the NCHRP project schedule. Therefore, three other study areas were chosen for the NCHRP study: Anniston, Alabama (sharrows and bike lanes), Opelika, Alabama (protected bike lanes) and Chattanooga, Tennessee (protected and buffered bike lanes). This project, therefore, is a supplement to the NCHRP project to allow the study team to deploy the NCHRP project survey in the BeltLine communities.

Research Approach

The research team's approach to understanding the relative preference for and relative effectiveness of various kinds of bicycle facilities among current and potential cyclists is cross-sectional and quasi-experimental. Specifically, this project investigates the revealed preferences of existing cyclists and stated preferences of potential cyclists through a panel dataset collected through two waves of an online and paper survey. The first-wave survey was distributed among a sample of current and potential users in the study areas to evaluate their personal attitudes, preferences, and behaviors before the opening of planned bicycle facilities. The second-wave survey included many of the same questions, with additional questions relating to perceptions of new infrastructure changes. To enable the researchers to measure changes rigorously, while avoiding biasing respondents toward exaggerating any changes, both surveys had a similar structure.

This approach provides a rigorous basis for estimating both induced demand as well as demand that results from mode and route shifts. *Key dependent variables* include the following:

- Preference for facility types
- Likelihood of cycling
- Revealed amounts of actual cycling

The study controls for a number of *explanatory variables* including the following:

- Individual sociodemographic characteristics
- Personal attitudes, personality traits, lifestyles, and preferences
- Household characteristics and living arrangements
- Work characteristics and schedule
- Current travel behavior patterns for both commuting and leisure trips
- Residential location and land use characteristics
- Community environment (e.g., extent of bicycle network, community support, population characteristics, geography)
- Features of bicycle facilities (e.g., on-road bike lanes, off-road bike trails, intersection control) for both existing facilities and future projects

The research is of a quasi-experimental or natural experiment design. The purpose of such a design in this case is to measure perceptions and behaviors in a "treatment" group before and after a treatment is implemented, which in this case is the opening of the Westside trail and the Eastside extension. The measurements at two separate points of time increases the robustness of the research by allowing for the analysis of a change associated with the treatment. The robustness of the analysis is further augmented by the inclusion of control groups that are similar in nature to the treatment groups with the only difference being the lack of the treatment. The combination of these characteristics allows for a difference-in-difference analysis, where the differences between first and second observations in the treatment group can be compared to the differences between the first and second observations in the control group. The design of this study enables the research team to disentangle background changes in attitudes and demographics that may be confounded with the influence of the new infrastructure. This before-and-after-with-control-group approach is considered to be a robust quasi-experimental design that protects against a number of common

threats to validity. It will provide strong evidence for the impacts of various infrastructure improvements on cycling behavior.

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First-Wave Survey Description

Survey Method

The initial sample of respondents invited to complete the first-wave survey was built with a *stratified random sampling* methodology. For the "treatment" neighborhoods, the researchers focused on the residents that live within a radius of 0.5 mile from the location of the coming BeltLine segment. For the "control" neighborhoods, the researchers identified adjacent, similar-sized areas comprising contiguous areas matched on key variables, including population and employment density, mean income, household size, race and ethnicity, and presence of student population. These comparisons were done using American Community Survey (ACS) 5-year data and were verified using demographic data purchased with the addresses from the targeted marketing company. The two control neighborhoods identified were in areas near Grant Park (control for the Eastside treatment) and South Atlanta (control for the Westside treatment) as shown in Figure 2.

FIGURE 2

Map of BeltLine Treatment and Control Neighborhoods

The intent of the survey was to: (1) identify the composition of the population of current and potential bicycle users, and their characteristics; (2) assess the size of the persuadable market of potential bicycle users; (3) assess preferences for "treatments," e.g., different types of bicycle infrastructure and facilities; and (4) investigate the relationships of several dimensions of interest, including users' personal attitudes and preferences, current lifestyles, land-use patterns, and sociodemographic traits, with current travel behavior and the propensity to engage in bicycle use. Questions were designed to address all of these issues.

Survey Design

The survey instrument was 12 pages and took approximately 30 minutes for the respondent to complete. This allowed a nice balance of a thorough dataset, but limited time commitment from participants. To reduce potential response biases, the content of the survey was purposefully

broader than just cycling to ensure that participants remained interested and did not quit the survey if they did not recognize themselves as the "biking type." To the extent practical, the researchers reused questions from previous surveys both to rely on previously tested and vetted questions and to maximize opportunities for cross-study comparisons of results. The resulting survey contained six sections, including:

A. Attitudes
B. Technology usage
C. Household location
D. Daily travel
E. Bicycling experience
F. Demographics

The complete survey instrument is found in Appendix A. Particular attention was given to attitudinal questions regarding car dependence, environmental concerns, exercise, land use, mode preferences, peer influence, time pressure, and multitasking for the survey. To assess bicycle preferences, the research team used Adobe Photoshop to modify an image of a generic low-rise downtown streetscape into 16 images, with all combinations of four bike infrastructure classes (i.e., sharrows, bike lanes, buffered bike lanes, and protected bike lanes); presence or absence of on-street parking; and two versus four traffic lanes. The background image was intended to be seen as a small-town downtown or central point in a lower-density area of an urban environment to allow it to be familiar to residents from a variety of urban settings. An additional image of a multi-use trail was also used, but due to the nature of this type of infrastructure it was impossible to use the common streetscape.

It was impractical to ask each respondent to rate all 17 images, so the researchers prepared four different versions of the survey, using a modified factorial design that gave each respondent six images to evaluate. Each respondent was presented with one image from each of the four types of

on-street infrastructure (i.e., sharrows, bike lanes, buffered bike lanes, and protected bike lanes) for the same roadway characteristics, and at least one additional image from among those four types that differed either in whether parking was present or not, or in whether the street was two-lane or four-lane. The sixth image was either another "double" from among the four infrastructure types, or portrayed a multi-use path as shown in Figure 3. These combinations ensured that across the entire sample, specific comparisons of interest could be made. All 17 images were tested in focus groups and some modifications were applied. Figure 4 displays the images used for the 16 on-street infrastructure configurations.

FIGURE 3

Image for Multi-use Paths Used in Survey

The survey was pretested with graduate students, the NCHRP panel, and members of the public. Both an online version and a paper version were prepared. All four versions of the final survey are attached to this report in Appendix A. The survey is intended to be generic enough for use across the country for future comparison of results in varying locations (beyond the scope of this project).

The survey was deployed in May 2017 and responses were collected throughout that summer. A printed version of the full survey (including a URL for an online version) was mailed to over 17,000 residents of the study area. The research team provided a 1-800 number and email address

to field questions or comments from respondents. Each paper survey was entered (coded) twice, and the two datasets were compared to ensure no coding errors were introduced during the data-entry process.

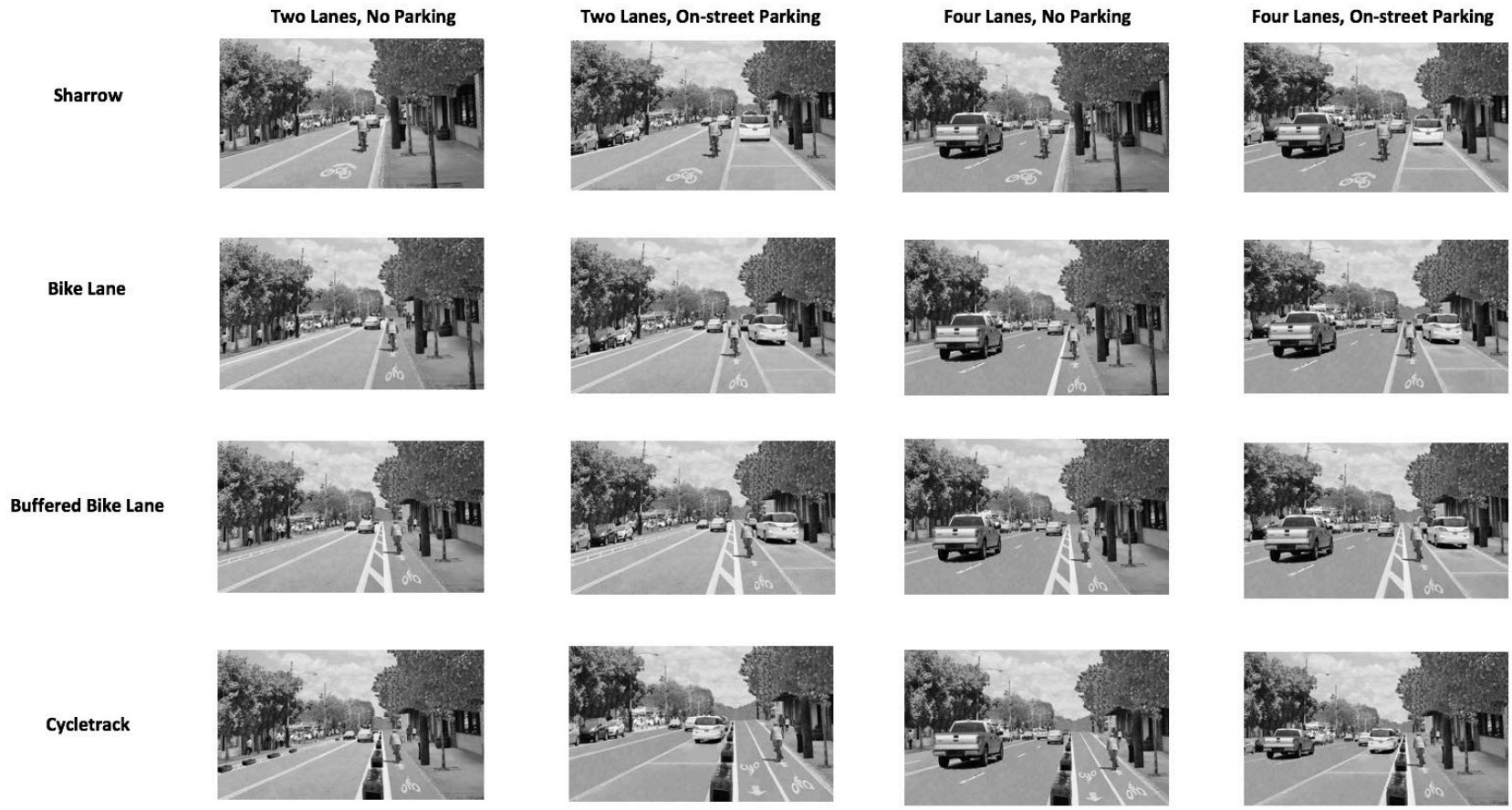


FIGURE 4

Images of Infrastructure Configurations for Different Roadway Layouts Used in Survey

Data Cleaning

A general screening process was utilized during the data collection process and a more in-depth review for missing data has followed in this phase. Unfinished surveys and those with a low portion of questions answered were removed entirely from the working database. An additional assessment was undertaken on a section-by-section basis, using commonly accepted methods to fill in small amounts of missing data, and excluding cases with an unacceptable amount of missing data. Cases were evaluated for inclusion or imputation on different completion criteria for each section, as follows:

- *Section A (Attitudes)*: Cases with more than five missing items were deleted; otherwise, missing items were imputed using expectation maximization.
- *Section B (Technology Use)*: Uncleaned.
- *Section C (Household Information)*: Uncleaned.
- *Section D (Daily Travel)*: Logical variables were introduced to account for any discrepancies between employment data and commute pattern data.
- *Section E (Bicycling Experience)*: For key dependent variables and segmentation variables, all missing responses were excluded from the respective models.
- *Section F (Sociodemographics)*: Where available, responses with small amounts of missing sociodemographic data were supplemented with information from the targeted marketing database.

After cleaning, there was data from 1,335 respondents. Each person responded to 6 different images, so there were up to 8,010 possible image responses for each of the 4 questions (i.e., comfort, safety, willingness to try, and frequency), though cases were excluded from their respective models due to item non-response.

Survey Response

In total, the researchers received 1,335 responses to the survey: 408 online and 927 on paper. Responses were distributed by site, as shown in Table 1.

TABLE 1
Survey Responses by Site

Area	Households Contacted	Responses	Response Rate	Treatment / Control
Eastside	4,509	433	9.6%	Treatment
Westside	5,035	235	4.7%	Treatment
Grant Park	4,411	477	10.8%	Control
South Atlanta	3,815	190	5.0%	Control
Total	17,770	1335	7.5%	

As discussed previously, four different survey versions were used to limit the number of images that any one respondent saw. The four versions were evenly divided among the six sites. As shown in Table 2, the responses were fairly evenly distributed, as well.

TABLE 2
Survey Responses by Version

Version Number	Responses	Percent of Total
1	332	24.9%
2	339	25.4%
3	363	27.2%
4	301	22.5%

First-Wave Survey Statistics

Summary Statistics Separated by Site

The final section of the survey included several demographics questions to illuminate the participant's personal and household characteristics and allow comparison to the populations to which the respondents belong. Note that in most cases the most appropriate comparison is 5-year 2014 ACS data at the block group level, but in others the targeted marketing data received from Direct Mail, from which the original addresses were obtained, was used for comparison to the respondents. To control for possible discrepancies between the sample and the population shown in the tables below, models will include sociodemographic variables.

Individual demographics questions were also asked, but the researchers are not able to compare to the populations to which the respondents belong as this data is not readily available at the population level.

A breakdown of household incomes by study site is presented in Table 3. As discussed earlier, individuals in higher income brackets were overrepresented in the combined study area, but the individual study areas show that most of this comes from the Eastside and Grant Park study areas. Each treatment area has a comparable distribution to its respective control area. Note that for the sake of brevity, the percentage of respondents reported in this section only includes those who answered the questions.

TABLE 3
Survey Respondents' and Study Area Population Household Incomes (Wave 1)

Household Income	Eastside (N=393)			Grant Park (N=426)		
	Responses*		Population	Responses*		Population
$15,000 or less	8	2.0%	15%	13	3.1%	16%
$15,001 – $30,000	15	3.8%	13%	17	4.0%	11%
$30,001 – $50,000	36	9.2%	19%	31	7.3%	12%
$50,001 – $75,000	56	14%	18%	63	15%	16%
$75,001 – $100,000	63	16%	14%	68	16%	13%
$100,001 – $125,000	59	15%	6.4%	64	15%	12%
More than $125,000	156	40%	16%	170	40%	20%
Prefer Not To Answer	33			38		

Household Income	Westside (N=199)			South Atlanta (N=163)		
	Responses*		Population	Responses*		Population
$15,000 or less	42	21%	31%	27	17%	35%
$15,001 – $30,000	36	18%	24%	33	20%	23%
$30,001 – $50,000	32	16%	22%	25	15%	14%
$50,001 – $75,000	31	16%	12%	26	16%	14%
$75,001 – $100,000	32	16%	8.1%	23	14%	5.4%
$100,001 – $125,000	10	5.0%	2.6%	8	4.9%	3.3%
More than $125,000	16	8.0%	1.8%	21	13%	5.1%
Prefer Not To Answer	22			34		

*Percentage of respondents electing to answer the question.

Household size by study area is presented in Table 4. Single households were generally underrepresented, with the exception of South Atlanta. Households of two were overrepresented, also with the exception of South Atlanta.

TABLE 4
Survey Respondents' and Study Area Population Household Sizes (Wave 1)

Household Size	Eastside (N=420)			Grant Park (N=459)		
	Responses*		Population	Responses*		Population
1	171	39%	58%	132	28%	39%
2	184	42%	30%	201	42%	36%
3	40	9.2%	7.4%	50	10%	13%
4	22	5.1%	4.7%	60	13%	9.0%
5+	3	0.7%	0.7%	16	3.4%	3.5%

Household Size	Westside (N=221)			South Atlanta (N=180)		
	Responses*		Population	Responses*		Population
1	72	31%	38%	83	44%	39%
2	85	36%	29%	50	26%	27%
3	31	13%	14%	27	14%	16%
4	14	6.0%	8.0%	8	4.2%	8.5%
5+	19	8.1%	11%	12	6.3%	9.2%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Table 5 shows the breakdown of residence types by study site compared to the targeted marketing (TM) data. Note that the TM data reported only "single-family" and "multi-family" dwellings, which correspond loosely to "Detached" and "Duplex," and "Apartment" and "Other," respectively. Other than Eastside, most of the study sites were represented by detached resident types. Respondents along the Eastside extension were much more likely to live in an apartment than respondents in other areas.

TABLE 5
Survey Respondents' Residence Types (Wave 1)

Residence Type	Eastside (N=432)			Grant Park (N=477)		
	Responses*		TM	Responses*		TM
Detached	179	41%	39%	352	74%	65%
Duplex	67	15%		74	16%	
Apartment	183	42%	61%	48	10%	35%
Other	3	0.7%		3	0.6%	

Residence Type	Westside (N=233)			South Atlanta (N=189)		
	Responses*		TM	Responses*		TM
Detached	183	78%	74%	125	66%	63%
Duplex	16	6.8%		9	4.7%	
Apartment	31	13%	26%	49	26%	37%
Other	3	1.3%		6	3.2%	

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Responses for gender were compared to the population (from the targeted marketing data) for each site as shown in Table 6. In each case, there were more female respondents than male respondents, but this trend was even more prevalent in the Westside.

TABLE 6
Survey Respondents' Genders (Wave 1)

Gender	Eastside (N=424)			Grant Park (N=470)		
	Responses		TM	Responses		TM
Female	237	55%	53%	263	55%	53%
Male	187	43%	47%	207	43%	47%

Gender	Westside (N=222)			South Atlanta (N=187)		
	Responses		TM	Responses		TM
Female	153	65%	56%	103	54%	55%
Male	69	29%	44%	84	44%	45%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Age distributions compared to populations of each site (from the ACS population data) are presented in Table 7. Respondents under 35 were severely underrepresented in each study area. Like the combined study area data, older respondents were overrepresented.

TABLE 7
Survey Respondents' Ages (Wave 1)

Age	Eastside (N=428)			Grant Park (N=471)		
	Responses*		Population	Responses*		Population
18–34	149	34%	49%	120	25%	42%
35–49	166	38%	28%	191	40%	33%
50–64	78	18%	16%	112	23%	18%
65+	35	8.1%	6.7%	48	10%	6.9%

Age	Westside (N=222)			South Atlanta (N=187)		
	Responses*		Population	Responses*		Population
18–34	45	19%	30%	33	17%	39%
35–49	51	22%	29%	55	29%	30%
50–64	72	31%	26%	59	31%	22%
65+	54	23%	16%	39	21%	9.2%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

The racial breakdown of respondents by site is presented in Table 8. The majority of respondents were White or African American, but there were vastly more White respondents in Eastside and Grant Park than in South Atlanta and Westside. Still, African Americans were underrepresented even in South Atlanta and Westside.

TABLE 8
Survey Respondents' Races (Wave 1)

Race	Eastside (N=425)			Grant Park (N=458)		
	Responses*		Population	Responses*		Population
White	340	79%	55%	371	78%	58%
African American	49	11%	37%	62	13%	36%
Hispanic	10	2.3%	3.9%	18	3.8%	5.7%
Asian	23	5.3%	NA	8	1.7%	NA
Native American	1	0.2%	NA	4	0.8%	NA
Other	9	2.1%	8.6%	8	1.7%	6.3%

Race	Westside (N=215)			South Atlanta (N=184)		
	Responses*		Population	Responses*		Population
White	54	23%	4.7%	59	31%	19%
African American	163	69%	93%	116	61%	71%
Hispanic	6	2.6%	1.7%	3	1.6%	11%
Asian	3	1.3%	NA	5	2.6%	NA
Native American	7	3.0%	NA	3	1.6%	NA
Other	5	2.1%	2.7%	7	3.7%	9.8%

*Percentage of entire sample size, note that due to non-responses and respondents possibly giving more than one answer percentages may not add up to 100%.

The employment status breakdown for each site is presented in Table 9. Eastside and Grant Park showed a larger percentage of respondents that work full-time, while South Atlanta and the Westside BeltLine had more sizable portions of respondents that do not work.

TABLE 9
Survey Respondents' Employment Status (Wave 1)

Employment Status	Eastside* (N=428)		Grant Park* (N=472)	
Full time	346	80%	354	74%
Part time	32	7.4%	44	9.2%
2+ jobs	18	4.2%	19	4.0%
Homemaker	11	2.5%	14	2.9%
Don't work	35	8.1%	59	12%

Employment Status	Westside* (N=223)		South Atlanta* (N=186)	
Full time	102	43%	100	53%
Part time	30	13%	27	14%
2+ jobs	23	9.8%	12	6.3%
Homemaker	11	4.7%	5	2.6%
Don't work	71	30%	53	28%

*Percentage of entire sample size, note that due to non-responses and respondents possibly giving more than one answer percentages may not add up to 100%.

Vehicle ownership data for each site is presented in Table 10. While South Atlanta and Westside show a sizable portion of respondents that do not own a vehicle, the majority of respondents had at least one car per household when considering all the study sites.

TABLE 10
Number of Vehicles Owned by Survey Respondents (Wave 1)

Vehicles per Household	Eastside* (N=428)		Grant Park* (N=471)		Westside* (N=223)		South Atlanta* (N=183)	
0	21	4.8%	26	5.5%	41	17%	37	19%
1	194	45%	149	31%	92	39%	65	34%
2	170	39%	229	48%	63	27%	62	33%
3	28	6.5%	49	10%	18	7.7%	15	7.9%
4	12	2.8%	11	2.3%	6	2.6%	3	1.6%
5+	3	0.7%	7	1.5%	3	1.3%	1	0.5%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Bicycle ownership for each site is represented in Table 11. As with vehicles, about 20% more of the respondents did not own any bicycles in South Atlanta and Westside compared to Eastside and Grant Park.

TABLE 11
Number of Bikes Owned by Survey Respondents (Wave 1)

Bikes per Household	Eastside* (N=428)		Grant Park* (N=472)		Westside* (N=220)		South Atlanta* (N=183)	
0	105	24%	112	23%	99	42%	99	52%
1	129	30%	95	20%	59	25%	38	20%
2	113	26%	140	29%	38	16%	25	13%
3	36	8.3%	48	10%	10	4.3%	13	6.8%
4	26	6.0%	35	7.3%	11	4.7%	4	2.1%
5+	19	4.4%	42	8.8%	3	1.3%	4	2.1%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

The bike confidence levels stated the respondents are tabulated in Table 12. There was a greater percentage of respondents who could not bike in South Atlanta and Westside than Eastside and Grant Park.

TABLE 12
Respondents' Stated Bike Confidence Level (Wave 1)

Bike Confidence	Eastside* (N=430)		Grant Park* (N=473)		Westside* (N=222)		South Atlanta* (N=184)	
Can't Bike	13	3.0%	21	4.4%	38	16%	25	13%
Not Very Confident	66	15%	69	14%	44	19%	40	21%
Somewhat Confident	119	27%	137	29%	43	18%	38	20%
Very Confident	232	54%	246	52%	97	41%	81	43%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Summary Statistics Segmented by Rider Status

The same household characteristics were also computed based on segments of different rider status among the combined study group. The four rider statuses are potential rider, recreational,

utilitarian, and those that cannot bike. The criteria for inclusion in one of these categories comes from the responses to questions regarding bicycling confidence, cycling distances for recreation/utilitarian purpose, and cycling trip frequency for commute/other purposes. The four segments and their criteria are:

1. *Potential cyclist* (N=648)—those who report zero miles of cycling per month, but report being able to ride a bike, regardless of confidence level.
2. *Recreational cyclist* (N=329)—those who bike a non-zero distance per month, but do not bike more than once a month for utilitarian purposes.
3. *Utilitarian cyclist* (N=235)—those who bike more than once a month for utilitarian purposes and bike at least a mile a week, on average.
4. *Cannot bike* (N=97)—those who state that they cannot ride a bicycle.

The statistics presented do not have a comparison to the population, as there is no readily available population-level data for rider type segmentation. Note that those who did not answer the bike confidence question were not included in the segmentation. The distribution of respondents in these segments is shown in Table 13.

TABLE 13
Distribution of Rider Segments by Neighborhood (Wave 1)

Rider Status	Eastside* (N=430)		Grant Park* (N=473)		Westside* (N=222)		South Atlanta* (N=184)	
Potential	183	42%	222	47%	133	57%	110	58%
Recreational	120	28%	139	29%	33	14%	37	19%
Utilitarian	114	26%	91	19%	18	7.7%	12	6.3%
Can't Bike	13	3.0%	21	4.4%	38	16%	25	13%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Income for each of these segments is presented in Table 14. Those who stated they cannot bike were drastically overrepresented by those in the lowest income categories. Conversely, recreational and utilitarian cyclists were vastly overrepresented by those in the highest income categories.

TABLE 14
Survey Respondents' Household Income by Rider Type (Wave 1)

Household Income	Potential* (N=630)		Recreational* (N=320)		Utilitarian* (N=232)		Cannot Bike* (N=90)	
$15,000 or less	39	6.0%	9	2.7%	6	2.6%	27	28%
$15,001 – $30,000	69	11%	9	2.7%	7	3.0%	14	14%
$30,001 – $50,000	66	10%	24	7.3%	22	9.4%	11	11%
$50,001 – $75,000	94	15%	40	12%	31	13%	9	9.3%
$75,001 – $100,000	89	14%	52	16%	38	16%	6	6.2%
$100,001 – $125,000	60	9.3%	43	13%	36	15%	2	2.1%
More than $125,000	153	24%	122	37%	81	34%	5	5.2%
Prefer not to answer	60	9.3%	21	6.4%	11	4.7%	16	16%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Distributions for household sizes by rider type are presented in Table 15. Single-person households appeared to make up the largest portions of respondents who could not bike. Larger households made up the majority in the other segments.

TABLE 15
Survey Respondents' Household Sizes by Rider Type (Wave 1)

Household Size	Potential* (N=640)		Recreational* (N=326)		Utilitarian* (N=232)		Cannot Bike* (N=90)	
1	240	37%	96	29%	71	30%	45	46%
2	241	37%	138	42%	101	43%	31	32%
3	76	12%	44	13%	20	8.5%	6	6.2%
4	42	6.5%	27	8.2%	29	12%	5	5.2%
5+	27	4.2%	13	4.0%	6	2.6%	2	2.1%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Residence types for each rider type are presented in Table 16. The residence type was pretty consistent across rider type, but most residences were detached.

TABLE 16
Survey Respondents' Residence Types by Rider Type (Wave 1)

Residence Type	Potential* (N=646)		Recreational* (N=328)		Utilitarian* (N=235)		Cannot Bike* (N=96)	
Detached	410	63%	217	66%	137	58%	60	62%
Apt	81	13%	38	12%	37	16%	5	5.2%
Duplex	149	23%	71	22%	60	26%	28	29%
Other	6	0.9%	2	0.6%	1	0.4%	4	4.1%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Responses for gender are reported by rider type in Table 17. Females made up the majority of the cannot bike segment but also the potential and recreational segment. Male riders represented the vast majority of utilitarian riders.

TABLE 17
Survey Respondents' Gender by Rider Type (Wave 1)

Gender	Potential* (N=637)		Recreational* (N=324)		Utilitarian* (N=231)		Cannot Bike* (N=96)	
Female	402	62%	181	55%	88	37%	73	75%
Male	235	36%	143	43%	143	61%	23	24%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Respondents' ages for each rider type are presented in Table 18. Not surprisingly, a large part of those who cannot bike are those 65 years old or older. Utilitarian cyclists are likewise more likely to be under 44. The other two rider types were most likely to be 30–44.

TABLE 18
Survey Respondents' Age by Rider Type (Wave 1)

Age	Potential* (N=639)		Recreational* (N=328)		Utilitarian* (N=234)		Cannot Bike* (N=93)	
<30	158	24%	93	28%	93	40%	2	2.1%
30-44	206	32%	147	45%	95	40%	12	12%
45-64	177	27%	67	20%	39	17%	34	35%
65+	98	15%	20	6.1%	7	3.0%	45	46%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Respondents' race by rider type is presented in Table 19. Most of the respondents who cannot bike were African American, while the majority of all the other three rider statuses were White.

TABLE 19
Survey Respondents' Race by Rider Type (Wave 1)

Race	Potential* (N=623)		Recreational* (N=323)		Utilitarian* (N=227)		Cannot Bike* (N=96)	
White	369	57%	245	74%	182	77%	24	25%
African American	222	34%	63	19%	25	11%	71	73%
Hispanic	16	2.5%	49	2.7%	9	3.8%	0	0.0%
Native American	6	0.9%	3	0.9%	4	1.7%	1	1.0%
Asian	19	2.9%	10	3.0%	8	3.4%	1	1.0%
Other	15	2.3%	3	0.9%	9	3.0%	2	2.1%

*Percentage of entire sample size, note that due to non-responses and respondents possibly giving more than one answer percentages may not add up to 100%.

Table 20 shows the employment status breakdown for each rider type group. As expected with the overrepresentation of senior adults in the "cannot bike" category, a majority of those in that category do not work. Potential, recreational, and utilitarian cyclists were also much more likely to work full-time.

TABLE 20
Survey Respondents' Employment Status by Rider Type (Wave 1)

Employment Status	Potential* (N=640)		Recreational* (N=326)		Utilitarian* (N=235)		Cannot Bike* (N=94)	
Full time	425	66%	256	78%	192	82%	24	25%
Part time	73	11%	30	9.1%	20	8.5%	9	9.3%
2+ jobs	29	4.5%	20	6.1%	19	8.1%	2	2.1%
Homemaker	16	2.5%	15	4.6%	6	2.6%	3	3.1%
Don't work	116	18%	26	7.9%	13	5.5%	57	59%

*Percentage of entire sample size, note that due to non-responses and respondents possibly giving more than one answer percentages may not add up to 100%.

Vehicle and bike ownership broken down by rider types are presented in Table 21. Zero-vehicle households made up the majority in the group of respondents who cannot bike. Households with three or more vehicles made up the majority in the potential, recreational, and utilitarian rider groups, indicating that those who cannot bike are less likely to own more than one vehicle. Unsurprisingly, the majority of respondents who cannot bike do not own any bikes. Recreational and utilitarian cyclists were more likely to own more than one bike, but potential cyclists were still about as likely to have a bike as they were to not have one.

TABLE 21
Number of Vehicles and Bikes Owned by Survey Respondents by Rider Type (Wave 1)

Vehicles per Household	Potential* (N=636)		Recreational* (N=324)		Utilitarian* (N=232)		Cannot Bike* (N=91)	
0	55	8.5%	11	3.3%	14	6.0%	37	38%
1	262	40%	105	32%	92	39%	34	35%
2	260	40%	158	48%	88	37%	13	13%
3	38	5.9%	38	12%	28	12%	4	4.1%
4	13	2.0%	10	3.0%	6	2.6%	3	3.1%
5+	8	1.2%	2	0.6%	4	1.7%	0	0.0%

Bikes per Household	Potential* (N=633)		Recreational* (N=325)		Utilitarian* (N=232)		Cannot Bike* (N=90)	
0	304	47%	23	7.0%	3	1.3%	73	75%
1	161	25%	84	26%	64	27%	8	8.2%
2	114	18%	133	40%	62	26%	4	4.1%
3	28	4.3%	39	12%	37	16%	2	2.1%
4	22	3.4%	25	7.6%	23	9.8%	3	3.1%
5+	4	0.6%	21	6.4%	43	18%	0	0.0%

*Percentage of entire sample size, note that due to non-responses percentages may not add up to 100%.

Table 22 shows respondents' stated level of bike confidence, segmented by rider type. By definition, all those who stated they cannot bike are in the category of "cannot bike." Respondents of all confidence levels were present in the potential rider group. There are higher representations of more confident riders in both the recreational and utilitarian categories.

TABLE 22
Respondent's Stated Level of Confidence by Rider Type (Wave 1)

Confidence Level	Potential (N=648)		Recreational (N=329)		Utilitarian (N=235)		Cannot Bike (N=97)	
Can't Bike	0	0.0%	0	0.0%	0	0.0%	97	100%
Not Very Confident	200	31%	18	5.5%	1	0.4%	0	0.0%
Somewhat Confident	211	33%	98	30%	28	12%	0	0.0%
Very Confident	237	37%	213	65%	206	88%	0	0.0%

First-Wave User Preference Analysis

Infrastructure Images

The images presented to respondents were created in Adobe Photoshop. One common roadway setting was chosen as a base image to control for urban environment, weather, and other contextual variables. Variations were based on different types of bicycle infrastructure, the presence or absence of on-street parking, and the number of automobile lanes (one versus two in each direction). Each scenario exhibited a moderate amount of automobile traffic that would allow for near free-flow conditions with a reasonable amount of opportunity for auto-to-cyclist interactions. The images were designed such that the background scenery could be related to by urban dwellers as an in-town neighborhood and by rural dwellers as a small town.

Seventeen total images were prepared, as shown in Figure 5 and Figure 6. The infrastructure includes sharrows, bike lanes, buffered bike lanes, and barrier-protected bike lanes (also referred to as separated bike lanes). Two of the protected bike lanes were one-way, while the other two were two-way. An image for a multi-use path was also created, though due to the nature of this type of infrastructure a different road environment had to be used.

For each image, respondents were given the prompt: "*Bicycling on a road [trail] like this is…*", with the sentence being completed in each of three ways (perceptions): "*Comfortable*," "*Safe*," and "*Something I'd try*." For each perception, they were asked to choose the most appropriate response on a 5-point Likert-type scale (Strongly Disagree, Disagree, Neutral or No opinion, Agree, or Strongly Agree). Respondents were randomly assigned one of four versions of the survey, each of which had a different combination of infrastructure images. Each version had a base road configuration (e.g., two lanes with on-street parking, or four lanes with no parking) for which a sequence of all four on-street infrastructure types were shown. Two other images were also included, from among the other road configurations and/or multi-use trails, so that each respondent was presented with six infrastructure combinations, and several were repeated between surveys.

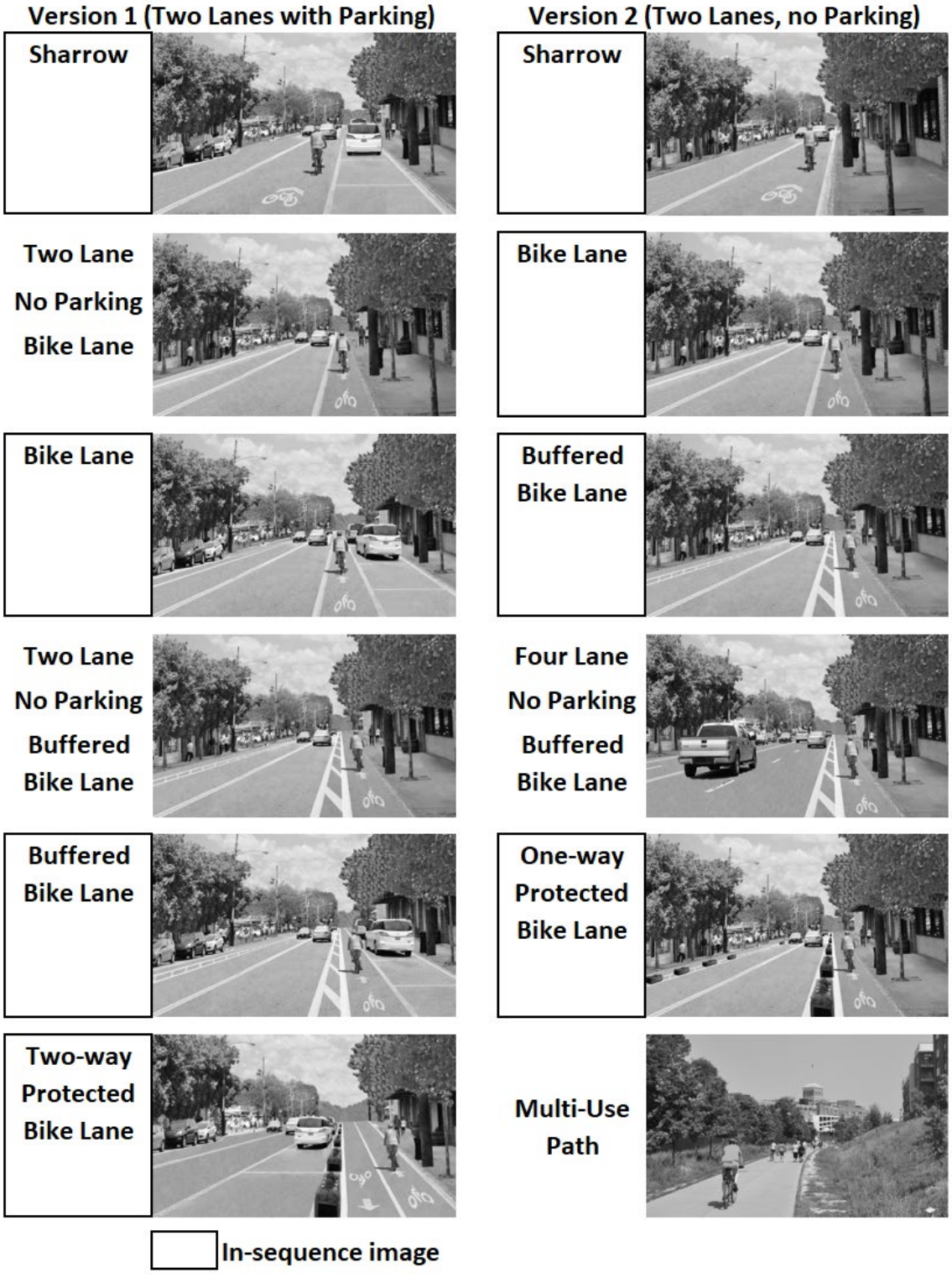


FIGURE 5

Combinations of Bicycle Infrastructure Used in Survey Versions 1 and 2

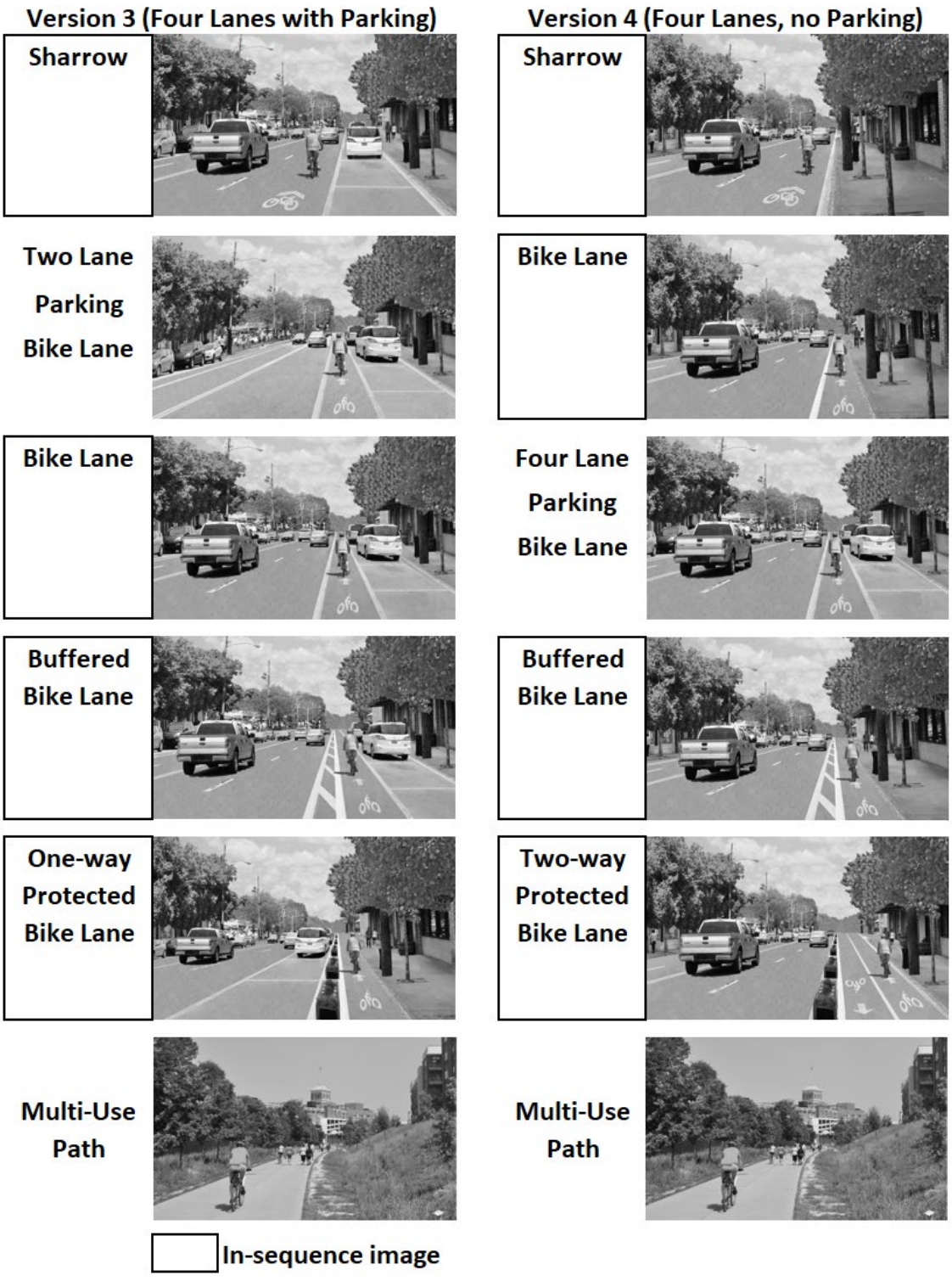
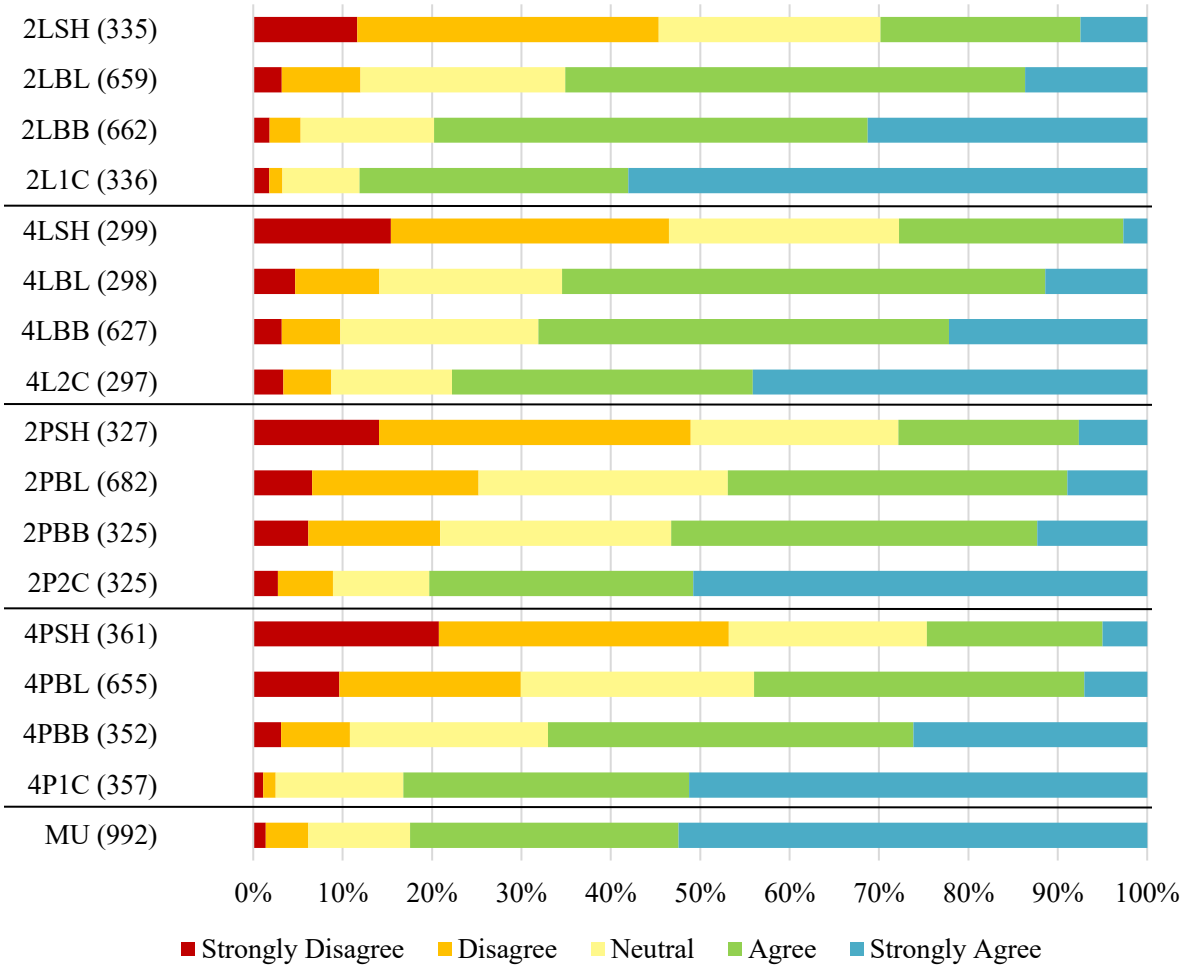


FIGURE 6

Combinations of Bicycle Infrastructure Used in Survey Versions 3 and 4

Image Response Results

Figure 7, Figure 8, and Figure 9 visually show the distribution of respondents' perceptions of comfort, safety, and willingness to try, respectively. These figures are grouped so that for each lane combination each row is progressively more separated from traffic. The agreement with each perception markedly increases with each degree of separation from traffic and decreases with the addition of on-street parking. The differences between scenarios varying only by the number of lanes are subtler. More rigorous analysis is necessary to delve into the underlying patterns.

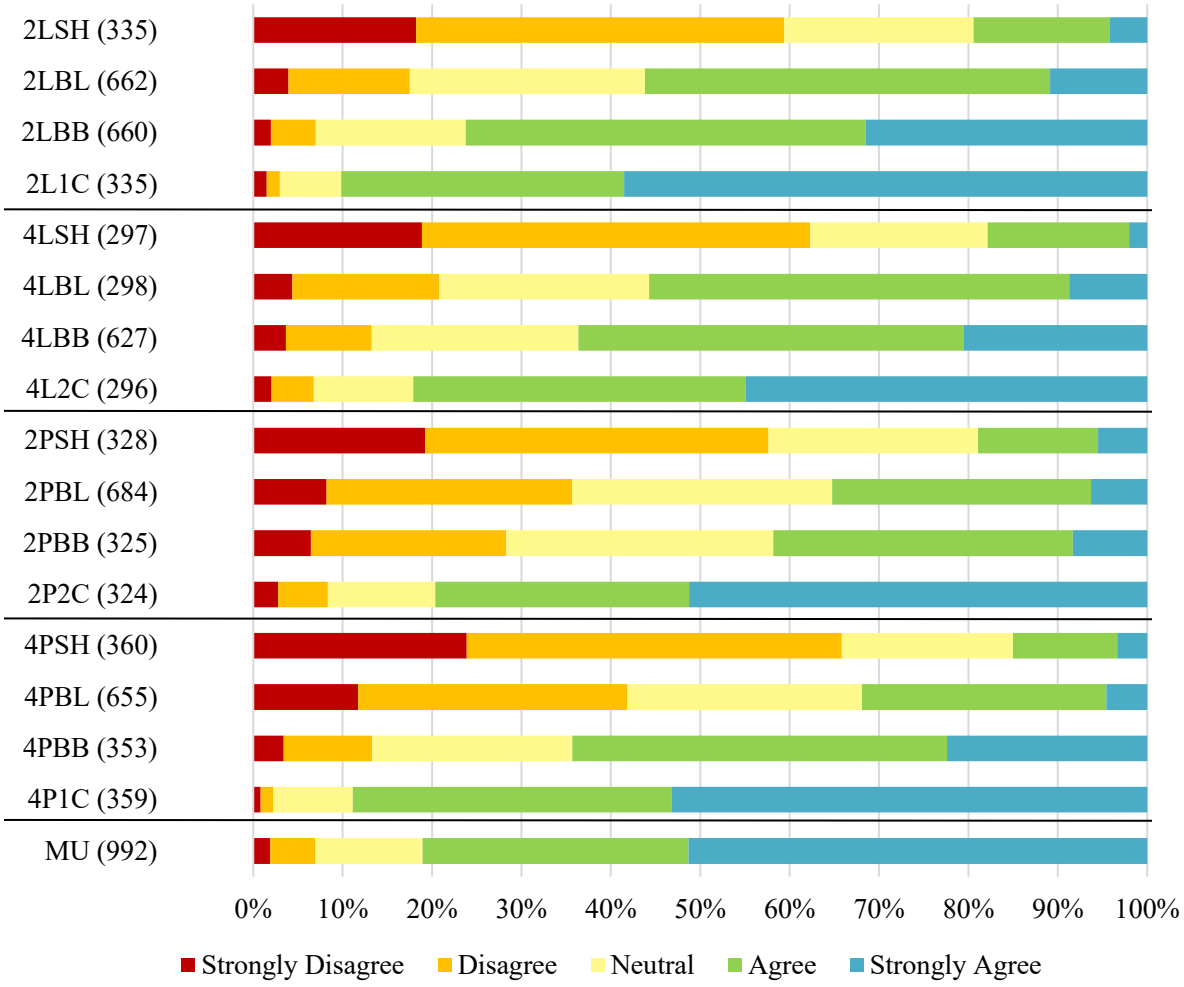


2L=two lanes, 4L=four lanes, 2P=two lanes with parking, 4P=four lanes with parking, SH=sharrow, BL=bike lane, BB=buffered bike lane, 1C=one-way protected cycletrack, 2C=two-way protected cycletrack, and MU=multi-use path.

****Number in parentheses is the number of responses for the associated configuration***

FIGURE 7

Distribution of Comfort Perceptions for Each Image (Wave 1)

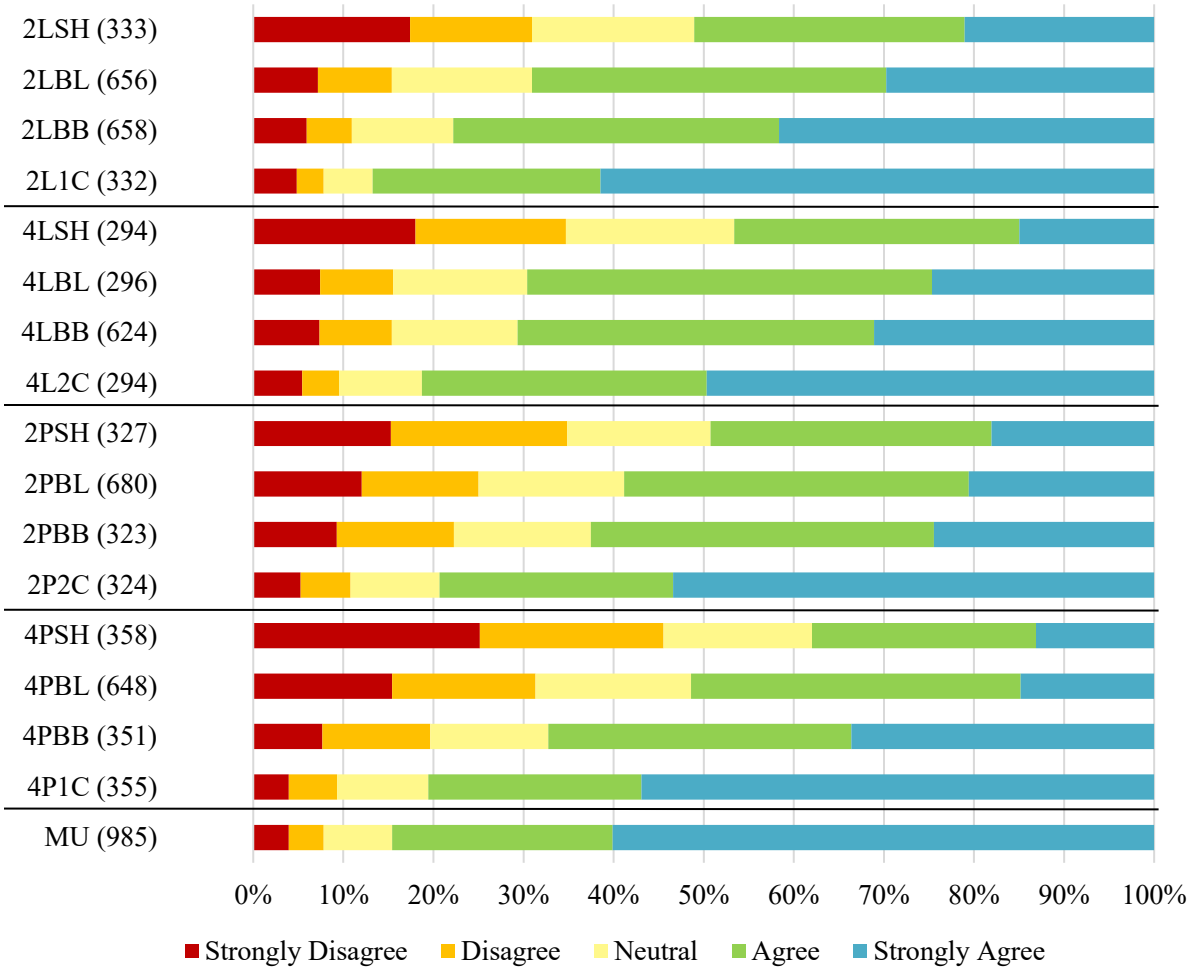


2L=two lanes, 4L=four lanes, 2P=two lanes with parking, 4P=four lanes with parking, SH=sharrow, BL=bike lane, BB=buffered bike lane, 1C=one-way protected cycletrack, 2C=two-way protected cycletrack, and MU=multi-use path.

****Number in parentheses is the number of responses for the associated configuration***

FIGURE 8

Distribution of Safety Perceptions for Each Image (Wave 1)



2L=two lanes, 4L=four lanes, 2P=two lanes with parking, 4P=four lanes with parking, SH=sharrow, BL=bike lane, BB=buffered bike lane, 1C=one-way protected cycletrack, 2C=two-way protected cycletrack, and MU=multi-use path.

****Number in parentheses is the number of responses for the associated configuration***

FIGURE 9

Distribution of Willingness to Try Perceptions for Each Image (Wave 1)

Frequency

Multi-use paths were the most frequently used of all infrastructure types. The breakdown of reported frequency of biking on such a path is presented in Table 23. Over half of respondents reported biking on something similar at least sometimes or often. This is likely a representation that members of the general population are more likely to have biked on a multi-use path rather than on

an on-street infrastructure, especially in areas anticipating BeltLine extensions. For example, many people will bike for a one-time recreational event, but never develop the habit. This type of ride is much more likely to take place on a multi-use path than on any other type of infrastructure.

TABLE 23
Self-Reported Frequency of Use for Multi-use Paths

	Multi-use Path
Responses	976
Never	29%
Sometimes	36%
Often	33%
Not Sure	1.8%

On-street facilities were biked less frequently. Table 24, Table 25, Table 26, and Table 27 display the reported frequencies for each infrastructure for two-lane roads without parking, two-lane roads with parking, four-lane roads without parking, and four-lane roads with parking, respectively. Roughly half of respondents report never having used bike lanes and roads with sharrows, though two-thirds to four-fifths (and higher) of the relevant samples report never using buffered or protected bike lanes.

TABLE 24
Self-Reported Frequency of Use for Each Infrastructure Type for Two-lane Roads without Parking

	Sharrow	Bike Lane	Buffered Bike Lane	One-way Cycletrack
Responses	332	655	654	327
Never	45%	38%	60%	74%
Sometimes	31%	36%	23%	14%
Often	20%	22%	7.6%	6.4%
Not Sure	3.6%	3.5%	8.6%	5.2%

TABLE 25
Self-Reported Frequency of Use for Each Infrastructure Type for Two-lane Roads with Parking

	Sharrow	Bike Lane	Buffered Bike Lane	Two-way Cycletrack
Responses	329	680	322	332
Never	51%	47%	70%	72%
Sometimes	27%	31%	13%	19%
Often	16%	18%	4.3%	5.4%
Not Sure	5.5%	4.4%	12%	3.9%

TABLE 26
Self-Reported Frequency of Use for Each Infrastructure Type for Four-lane Roads without Parking

	Sharrow	Bike Lane	Buffered Bike Lane	Two-way Cycletrack
Responses	290	288	607	289
Never	47%	36%	63%	70%
Sometimes	28%	40%	23%	21%
Often	21%	20%	6.3%	4.8%
Not Sure	3.4%	3.5%	8.6%	4.5%

TABLE 27
Self-Reported Frequency of Use for Each Infrastructure Type for Four-lane Roads with Parking

	Sharrow	Bike Lane	Buffered Bike Lane	One-way Cycletrack
Responses	355	641	341	350
Never	53%	53%	66%	74%
Sometimes	29%	31%	24%	18%
Often	16%	11%	4.7%	3.7%
Not Sure	2.0%	5.0%	5.3%	4.3%

User Preference Models

As previously described, survey respondents were presented with different configurations of roadway characteristics and infrastructure types, and asked to state their perceived levels of comfort, safety, and willingness to try the presented infrastructure. Responses were converted to numeric values, with Strongly Disagree equal to 1 and Strongly Agree equal to 5. The average ratings for comfort, safety, and willingness to try are presented in Figure 10, Figure 11, and Figure 12, respectively. Each version of the survey focused on the continuum of the four infrastructure types within the same traffic lane and parking lane combination, plus two additional images duplicated from the other survey versions. To avoid the potential framing effects introduced by the insertion of these additional images "out of sequence," only the responses for the four in-sequence images are included in the descriptive analysis presented here (sample sizes of between 266 and 308 responses for each mean); all responses are included in the regression analysis reported below.

The characteristics of the bicycle infrastructure portion of the roadways for the sharrow, bike lane, and buffered bike lane cases were consistent between roadway configurations. However, protected bike lanes had two variations, one-way and two-way, only one of which was presented for a given configuration in order to limit the number of images presented. The broken lines on the graphs show the point in the progression of bicycle infrastructure where barrier-protection is introduced, and two different protected bicycle infrastructure types are portrayed. The two-lane/no parking and four-lane with parking configurations had one-way protected bike lanes (indicated by the dotted line), while the four-lane/no parking and two-lane with parking arrangements had two-way protected bike lanes (indicated by the dash-dot lines). Given the close clustering of the four means for this infrastructure type, the figures indicate that the differences in ratings between protected bike lane scenarios may be unrelated to roadway characteristics.

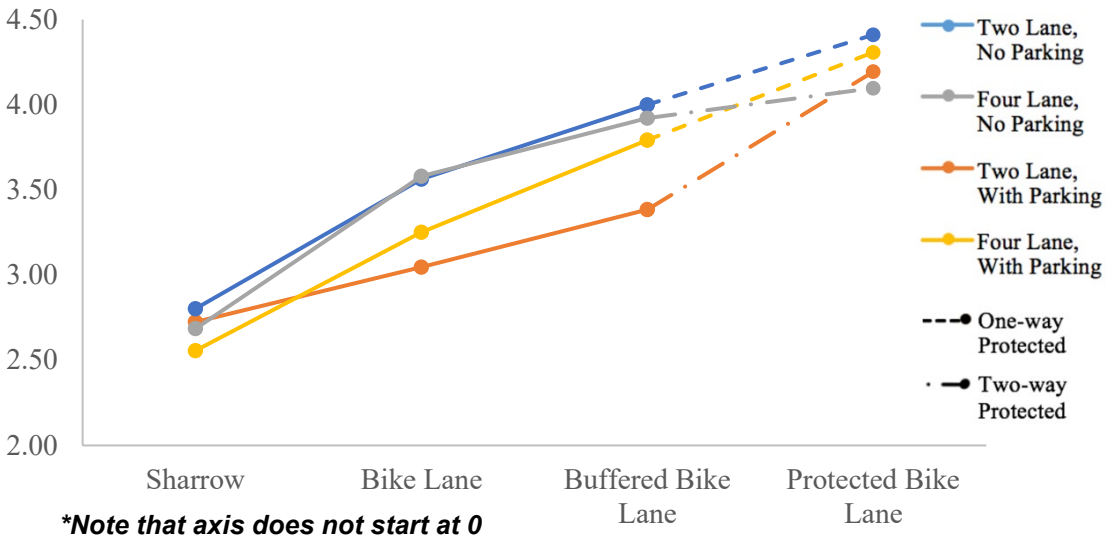


FIGURE 10

Average Expressed Comfort Levels for Each Lane/Parking Configuration by Bicycle Infrastructure Type

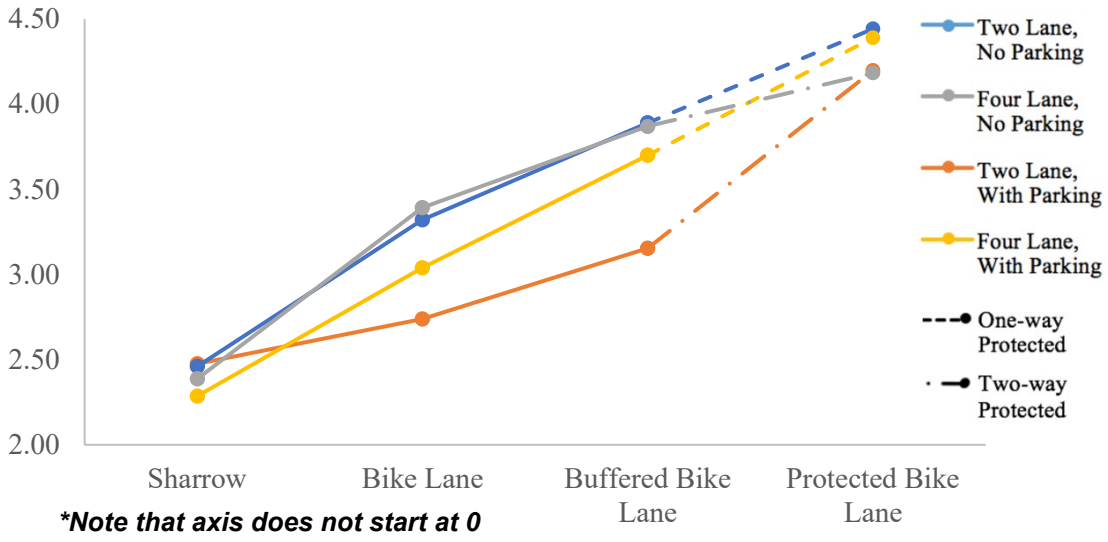


FIGURE 11

Average Expressed Safety Levels for Each Lane/Parking Configuration by Bicycle Infrastructure Type

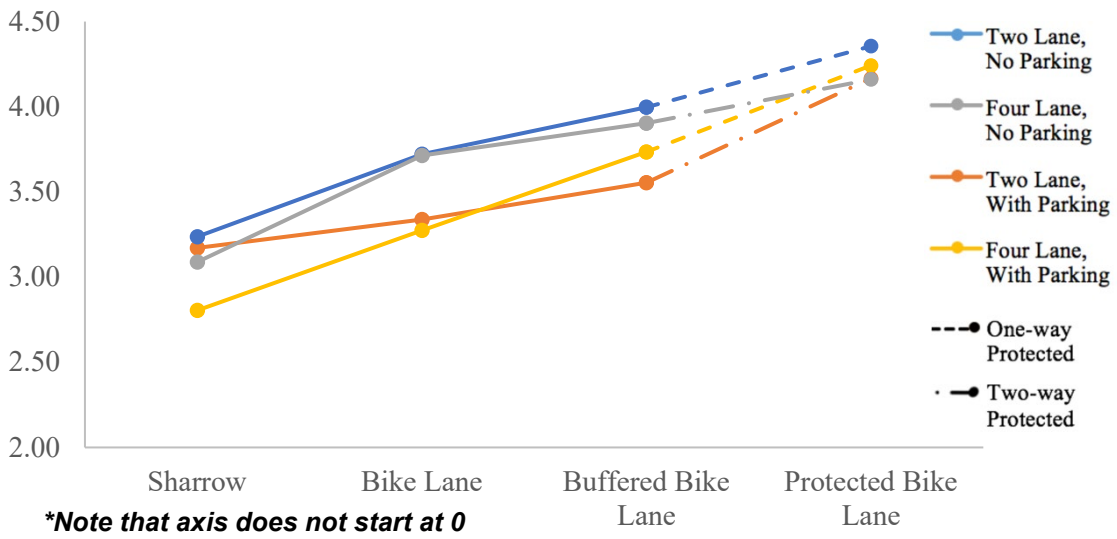


FIGURE 12

Average Expressed Level of Willingness to Try for Each Lane/Parking Configuration by Bicycle Infrastructure Type

Ratings for these three different measures tended to follow the same patterns. This indicates that respondents did not make much distinction between the different questions (comfort versus safety versus willingness to try) for each image, which may result, for example, from a lack of experience that would allow one to rate a given infrastructure as safe but not comfortable, or vice versa.

Each of the three measures improved for each increased degree of separation provided by the bicycling infrastructure, indicating a positive benefit associated with separation from moving and parked cars. Each version of the survey began the infrastructure image section with a sharrow configuration, which allows the sharrow infrastructure layouts to serve as a base measurement for each lane configuration. In each version, the sharrow configurations received the lowest ratings, and the existence of any sort of spatial separation was influential in increasing each perception measure. Average ratings for each traditional bike lane scenario were higher than those for sharrows on the same roadway configuration. The difference is more pronounced for bicycle lanes without

adjacent curb parking. Buffered bike lanes received higher average ratings than traditional bike lanes, and also saw the same disutility of parking lanes.

As previously mentioned, two different protected bike lane scenarios were tested in the survey. Table 28 shows the average ratings for each of the protected bike lane scenarios along with the multi-use path. The presence of the barrier was effective in overcoming the obstacles created by the inclusion of parking or extra traffic lanes. The differences between perceptions of protected facilities appeared to be more related to whether the facility was one-way or two-way than the configuration of the rest of the roadway. The multi-use path received ratings comparable to those of the one-way and two-way protected bike lanes.

TABLE 28
Average Ratings for Comfort, Safety, and Willingness to Try for Protected Bike Lanes and Multi-Use Paths

	One-way Protected		Two-way Protected		Multi-Use Path
	Two-Lane/ No Parking	Four-Lane with Parking	Two-Lane with Parking	Four-Lane/ No Parking	
Comfort	3.64	3.92	4.25	3.42	4.10
Safety	3.59	3.91	4.20	3.30	4.07
Willingness to Try	3.79	3.94	4.28	3.70	3.89

Note: (1=Strongly Disagree, 5=Strongly Agree)

Infrastructure and Roadway Trait Models

While the descriptive analysis of the preceding subsection is useful, it is also desirable to control for a number of covariates whose effects might otherwise be confounded with those of infrastructure type and roadway configuration. Linear regression models were built using the multiple responses by 1,335 respondents for each of the three dependent variables (comfort, safety, and willingness to try), as presented in Table 29. Dummy variables for each infrastructure type, along with the presence of on-street parking and additional lanes of traffic, were included in the

models. Although linear regression models have limitations for application to Likert-type data, they can serve as a reliable approximation with four or more ordinal response levels with "little worry."[1]

An issue resultant from the survey design was the emergence of a framing effect. Six of the seventeen images appeared on more than one version of the survey. One of those six images was the multi-use path, which had consistent scores in every version where it appeared. The other five saw more variance in responses between versions. Specifically, these images attracted different responses when they were out-of-sequence (e.g., the "two-lane/no parking bike lane" image in Version 1 of Figure 5) than when they were in-sequence (the same image in Version 2).

Dummy variables were included in the regression to capture the variation due to the framing effects of the preceding image—specifically, the interaction effects occurring when the bicycle infrastructure type changed at the same time as the removal of parking or extra lanes of traffic. Three such variables were created: Bike Lane (BL)-No Parking, Buffered Bike Lane (BBL)-No Parking, and BL-Two Lanes. The BL-No Parking variable was set to 1 for the second image in Version 1, which added a bike lane and removed parking compared to the preceding image; the BBL-No Parking variable was set to 1 for the two-lane buffered bike lane image in Version 1 along with the four-lane buffered bike lane in Version 4, both of which added a buffer to the bike lane and removed parking compared to the preceding image; and the BL-Two Lanes variable was set to 1 for the second image in Version 3, which introduced a bike lane and removed the additional lanes of traffic compared to the preceding image. A fourth dummy variable was also considered for the two-lane one-way protected bike lane without parking image in Version 2; however, this variable was eventually excluded because it undermined the stability of the model, perhaps due to empirical collinearity issues related to the infrequent appearance of one-way protected bike lanes.

[1] Bentler, P.M., and C.-P. Chou (1987). Practical issues in structural modeling. *Sociological Methods and Research* **16**, 78–117.

TABLE 29

Linear Regression for Expressed Comfort, Safety, and Willingness to Try, Including only Infrastructure Characteristics

Variable	Comfort			Safety			Willingness to Try		
	Coefficient		P-value	Coefficient		P-value	Coefficient		P-value
Constant	2.83	***	<0.001	2.54	***	<0.001	3.25	***	<0.001
Bicycle Infrastructure Types									
Bike Lane (BL)	0.61	***	<0.001	0.64	***	<0.001	0.39	***	<0.001
Buffered BL (BBL)	1.02	***	<0.001	1.16	***	<0.001	0.67	***	<0.001
One-way Protected	1.67	***	<0.001	2.01	***	<0.001	1.23	***	<0.001
Two-way Protected	1.46	***	<0.001	1.79	***	<0.001	1.09	***	<0.001
Multi-Use	1.44	***	<0.001	1.69	***	<0.001	1.08	***	<0.001
Roadway Characteristics									
Parking	−0.21	***	<0.001	−0.23	***	<0.001	−0.23	***	<0.001
Four Lanes	−0.06	*	0.022	−0.03		0.228	−0.13	***	<0.001
Framing Effects									
BL-No Parking	0.26	***	<0.001	0.42	***	<0.001	0.16	*	0.032
BBL-No Parking	0.19	***	<0.001	0.30	***	<0.001	0.12	*	0.040
BL-Two Lanes	0.18	**	0.004	0.25	***	<0.001	0.09		0.280
# of Responses	7889			7890			7838		
R^2	0.236			0.312			0.121		
Adjusted R^2	0.235			0.311			0.120		

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

As shown in Table 29, the dummy variables for each infrastructure type were significant. The coefficients for each of the on-street infrastructure variables (BL, BBL, and Protected Lanes) were also significantly different from each other, supporting the earlier finding that greater separation of cyclists from cars increases all three measures of effectiveness. The multi-use dummy coefficient was not substantially different from the protected bike lane coefficients; however, it was still included separately in the model because the multi-use images excluded the effects of roadway characteristic variables.

The framing effect terms were significant in each model. These variables show sensitivity to the comparative removal of a perceived negative aspect (i.e., parking or additional travel lane) that is not explained by the variables, indicating the absence of that aspect alone. For example, when an image without parking was presented after an image with parking, it tended to receive a higher rating than if it were preceded by an image that also had no parking.

While the framing variables picked up the influence of multiple simultaneous changes from image to image, the "Parking" and "Four Lanes" variables represented the overall effects of roadway characteristics. The parking variable was significant in all models, indicating that the overall effect of parking was still significant, even after accounting for the strong impact of the removal of parking in the few images affected by framing. Interestingly, the variable for the number of traffic lanes alone was not consistently significant between models. The coefficients are negative in each model, though with a lower magnitude than the parking coefficient, likewise leading to reduced levels of significance. The insignificance in the Safety model is accompanied by a highly significant framing variable, while the highly significant coefficient of Four Lanes in the Willingness to Try model is accompanied by an insignificant framing variable.

Additional Influence of Sociodemographic Traits

Sociodemographic data was also collected using the survey instrument. The influence of covariates such as demographic and other characteristics on the perceptions of interest is

additionally informative in its own right. The previous linear models were supplemented with sociodemographic data, as presented in Table 30. As explained previously regarding imputing data, for the few cases where this information was not reported, data obtained from targeted marketing data sources was used as an estimate. Each model was estimated step-wise, with insignificant sociodemographics being dropped from the model, while judgment was used for inclusion of borderline-significant variables that were significant in other models. The best of each model is presented in Table 30. In all three models, age, student-status, and gender were significant with similar signs between models. Older individuals rated scenarios lower in general, as did full-time students and women.

TABLE 30

Linear Regression for Expressed Comfort, Safety, and Willingness to Try by Infrastructure and Individual Characteristics

Variable	Comfort		Safety		Willingness to Try	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	3.40 ***	<0.001	2.84 ***	<0.001	4.54 ***	<0.001
Bicycle Infrastructure Types						
Bike Lane (BL)	0.62 ***	<0.001	0.65 ***	<0.001	0.39 ***	<0.001
Buffered BL (BBL)	1.03 ***	<0.001	1.18 ***	<0.001	0.66 ***	<0.001
One-way Protected	1.68 ***	<0.001	2.03 ***	<0.001	1.23 ***	<0.001
Two-way Protected	1.47 ***	<0.001	1.81 ***	<0.001	1.09 ***	<0.001
Multi-Use	1.46 ***	<0.001	1.73 ***	<0.001	1.11 ***	<0.001
Roadway Characteristics						
Parking	−0.21 ***	<0.001	−0.23 ***	<0.001	−0.22 ***	<0.001
Four Lanes	−0.04	0.110	−0.01	0.62	−0.07 *	0.017
Framing Effects						
BL-No Parking	0.26 ***	<0.001	0.42 ***	<0.001	0.16 *	0.019
BBL-No Parking	0.19 ***	<0.001	0.31 ***	<0.001	0.13 *	0.014
BL-Two Lanes	0.22 ***	<0.001	0.28 ***	<0.001	0.16 *	0.036
Sociodemographics						
Age	−0.01 ***	<0.001	−0.01 ***	<0.001	−0.02 ***	<0.001
Full-Time Student	−0.30 ***	<0.001	−0.19 **	0.004	−0.29 ***	<0.001
Driver's License			0.17 **	0.003		
Asian	−0.16 *	0.017	0.12	0.072	−0.28 ***	<0.001
African American					−0.36 ***	<0.001
Hispanic	0.17 **	0.004	0.11	0.098	0.22 **	0.001
Other					−0.26 *	0.010
Female	−0.16 ***	<0.001	−0.12 ***	<0.001	−0.36 ***	<0.001
Children in Home					0.08 **	0.008
# of Responses	7721		7703		7682	
R^2	0.263		0.333		0.237	
Adjusted R^2	0.261		0.331		0.236	

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

The only race/ethnicity variables that were significant in the comfort model were Asians and Hispanics. The negative coefficient for Asians indicates that this group generally views infrastructure as less comfortable, while Hispanics view infrastructure as more comfortable, all else equal.

The coefficient for holding a driver's license was significant only in the safety model. The positive coefficient for driver's license may indicate that those with a license feel more control over the safety of the roadway in general. The coefficients for Asians and Hispanics were borderline significant in this model.

In addition to the coefficients for Asians and Hispanics, the coefficients for African Americans and Other races were also significant in the model for willingness to try. The remaining two race/ethnicity options not represented are Native American (which had only 2 respondents) and White (which essentially acts as the base). In each sizable ethnic/racial group other than White the coefficient was negative, indicating a general lack of willingness to try cycling for other groups, apart from Hispanics.

Sociodemographic characteristics seemed to play a larger role in the willingness to try model than for the other two perceptions, as seen by the increase in the R^2 value from 0.121 (Table 29) to 0.237 (compared to increases of 0.027 and 0.021, respectively, for the other two models). This indicates that individual characteristics have a stronger relationship to potential users' decisions of whether to use a certain type of infrastructure than to their perceptions of whether it is safe or comfortable in general.

Segmented Models: Ridership Status

A segmented model was developed to investigate how the influence of the other explanatory variables differs by rider group. The sample was segmented using the previous criteria for rider statuses of potential rider, recreational, utilitarian, and those that cannot bike:

1. *Potential cyclist* (N=648)—those who report zero miles of cycling per month, but report being able to ride a bike, regardless of confidence level.
2. *Recreational cyclist* (N=330)—those who bike a non-zero distance per month, but do not bike more than once a month for utilitarian purposes.
3. *Utilitarian cyclist* (N=234)—those who bike more than once a month for utilitarian purposes and bike at least a mile a week, on average.
4. *Cannot bike* (N=97)—those who state that they cannot ride a bicycle.

The potential cyclist population was used as the base, and incremental-difference coefficients were reported for segments with significant differences from the base group. Not all segments were significantly different from the base in each model.

Each segmented model started from the previously reported ordinary least squares models for comfort, safety, and willingness to try, respectively. Dummy variables were introduced for the "recreation," "utilitarian," and "cannot bike" segments, using the "potential cyclists" as the base. The incremental effects for each segment were estimated using interaction terms between the main effect explanatory variables and the segment dummy variables, piecewise removing insignificant variables (constraining them to be 0). Insignificant variables were included in cases with borderline significance, where a main effect was insignificant but an associated interaction effect was significant, and/or in cases where the coefficient is necessary for interpretation of a similar variable, such as for different types of bicycle infrastructure.

A segmented model for expressed comfort is presented in Table 31. Those unable to bike had negative coefficients for each infrastructure type, indicating a neutralizing effect on the positive main effects. This presents a problem for models that include those unable to bike, as they serve as a dampening effect on measurements of perceptions of target cyclists. Utilitarian cyclists also had slightly negative coefficients for one-way protected bike lanes and multi-use paths, indicating that recreational and potential cyclists are the segments driving positive perceptions of comfort for these more protected infrastructure types. The negative coefficient of the four lanes variable for

recreational cyclists is indicative that this segment may be a driving force for the sometimes significantly negative effect of extra lanes of traffic.

A segmented model for expressed safety is presented in Table 32. Like the previous model, those unable to bike had compensatory negative coefficients for bicycle infrastructure variables. Utilitarian cyclists and recreational cyclists had positive coefficients for two-way protected bike lanes, with recreational cyclists also having a positive coefficient for multi-use path. In addition to recreational cyclists having a negative coefficient for the number of vehicular lanes, utilitarian cyclists also had a similar coefficient in this model. This discrepancy may indicate a difference in perceptions of comfort and safety for utilitarian cyclists in terms of riding with more lanes of traffic.

A segmented model for expressed willingness to try is presented in Table 33. Notably, the only roadway characteristics to be significant in any segmentation were the parking and four lanes variables for those unable to bike. Both were positive, with higher magnitudes than the negative base coefficients, implying that those who cannot bike express a greater willingness to try in the presence of parking and additional traffic lanes, and are even more likely to express it than other groups. The change in sign for these coefficients was unexpected; however, based on the rather large magnitude of the negative constant term for that group, it is important to note that this group is still substantially less willing to try in comparison to the other groups. The coefficients for age are all significant and have similar magnitudes, with only the base being negative. This indicates that age is a deterrent for those in the potential cyclist group, but does not have a significant effect among the recreational, utilitarian, and unable groups.

TABLE 31
Linear Regression for Expressed Comfort by Infrastructure and Individual Characteristics, Segmented by Rider Type

Variable	Main Effects	P-value		Incremental Effects								
				Recreation	P-value		Utilitarian	P-value		Unable	P-value	
Constant	3.06	<0.001	***	0.19	<0.001	***	0.47	0.012	*	0.20	0.111	
Bicycle Infrastructure Types												
Bike Lane	0.63	<0.001	***							−0.20	0.185	
Buffered Bike Lane	1.05	<0.001	***							−0.28	0.077	
One-way Protected	1.75	<0.001	***				−0.20	0.010	**	−0.48	0.009	**
Two-way Protected	1.49	<0.001	***	0.18	0.033	*				−0.69	0.004	**
Multi-use	1.54	<0.001	***				−0.20	0.008	**	−0.54	0.003	**
Roadway Characteristics												
Parking	−0.21	<0.001	***									
Four Lanes	−0.002	0.438		−0.14	0.011	*						
Framing Effects												
BL-No Parking	0.26	<0.001	***									
BBL-No Parking	0.20	<0.001	***									
BL-Two Lanes	0.23	<0.001	**									
Sociodemographics												
Age	−0.007	<0.001	***									
Asian	−0.17	0.011	*							0.95	<0.001	***
Hispanic	0.22	0.003	***				−0.31	0.011	*			
Student (full-time)	−0.20	0.002	**									

Note: 7,659 Responses *Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001; R^2=0.212; Adj R^2=0.210

TABLE 32
Linear Regression for Expressed Safety by Infrastructure and Individual Characteristics, Segmented by Rider Type

Variable	Main Effects	P-value		Incremental Effects								
				Recreation	P-value		Utilitarian	P-value		Unable	P-value	
Constant	2.53	<0.001	***	0.10	0.010	*	0.35	<0.001	***	0.16	0.212	
Bicycle Infrastructure Types												
Bike Lane (BL)	0.66	<0.001	***							−0.16	0.305	
Buffered BL (BBL)	1.20	<0.001	***							−0.26	0.095	
One-way Protected	2.08	<0.001	***							−0.65	<0.001	***
Two-way Protected	1.76	<0.001	***	0.29	0.001	**	0.18	0.055		−0.59	0.013	*
Multi-use	1.73	<0.001	***	0.16	0.040	*				−0.55	0.003	**
Roadway Characteristics												
Parking	−0.23	<0.001	***									
Four Lanes	0.05	0.099		−0.13	0.021	*	−0.13	0.026	*			
Framing Effects												
BL-No Parking	0.43	<0.001	***									
BBL-No Parking	0.31	<0.001	***									
BL-Two Lanes	0.28	<0.001	***									
Sociodemographics												
Age	−0.007	<0.001	***									
Female	−0.72	0.002	**									
Driver's License	0.24	<0.001	***									
Student (full-time)	−0.07	0.275					−0.40	0.042	*			
Hispanic	0.16	0.034	*				−0.32	0.040	*			
Asian	−0.13	0.065								0.63	0.002	**

Note: 7,639 Responses *Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001; R^2=0.3478; Adj R^2=0.3451

TABLE 33
Linear Regression for Expressed Willingness to Try by Infrastructure and Individual Characteristics, Segmented by Rider Type

Variable	Main Effects	P-value		Incremental Effects								
				Recreation	P-value		Utilitarian	P-value		Unable	P-value	
Constant	3.74	<0.001	***	−0.65	0.004	**	−0.20	0.428		−1.89	<0.001	***
Bicycle Infrastructure Types												
Bike Lane (BL)	0.32	<0.001	***									
Buffered BL (BBL)	0.59	<0.001	***									
One-way Protected	1.15	<0.001	***									
Two-way Protected	1.02	<0.001	***									
Multi-use	1.19	<0.001	***									
Roadway Characteristics												
Parking	−0.21	<0.001	***							0.37	<0.001	***
Four Lanes	−0.05	0.152								0.24	0.014	*
Framing Effects												
BL-No Parking	0.44	<0.001	***									
BBL-No Parking	0.25	<0.001	***									
BL-Two Lanes	0.18	0.043	*									
Sociodemographics												
Age	−0.009	<0.001	***	0.008	0.009	**	0.009	0.032	*	0.009	0.015	*
Female	−0.19	<0.001	***									
African American	−0.16	<0.001	***							0.62	<0.001	***
Education	0.03	0.012	*	0.15	<0.001	***						
Vehicles per Driver	−0.48	<0.001	***				0.50	0.016	*	0.40	0.026	*

Note: 7,619 Responses *Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001; R^2=0.327; Adj R^2=0.323

First-Wave Survey Conclusions

Results from the first-wave survey suggest similar trends between perceived comfort, safety, and willingness to try infrastructure. Respondents responded more positively to images containing bicycle facilities providing a higher degree of separation from drivers, with protected bike lanes and multi-use paths being the best. Parking was a clear deterrent for all measures of perception/preference, while an increase in the number of automobile lanes did not appear to negatively affect perceptions. Protected bike lanes seemed effective in reducing the negative effects of parking and traffic lanes.

Linear regression models were used to predict stated preferences for perceived comfort, safety, and willingness to try bicycle infrastructure. The estimated coefficients for the bicycle infrastructure variables were significantly positive and significantly different from each other in each model, implying a significant difference between each type of infrastructure type on perceptions. For the pooled sample, the variable for parking was significantly negative, though the variable for the number of lanes of traffic was not significant. Framing effects were also accounted for in the regression models, where images that removed parking or an extra lane of travel (compared to the previous image shown) were given a dummy variable to capture the relative changes in perception from image to image associated with the order in which the images were presented. Each of these variables was significant.

User characteristics were significant in explaining variations in comfort, safety, and willingness to try. The addition of sociodemographic information was more influential in improving explanatory power for the willingness to try model than for the other two dependent variables. Age, gender, and student status were significant in all models, with older individuals, females, and full-time students having a decreased perception of comfort, safety, and willingness to try cycling, all else equal. Other characteristics were only significant in some models.

Perceptions were also modeled using segmentations based on rider types, including potential cyclists, recreational cyclists, utilitarian cyclists, and those unable to bike. These models also saw a comparatively larger impact on the willingness to try model than on the other two perceptions. Those who are unable to bike had a number of coefficients that consistently differed from the rest of the sample, indicating the need to exercise caution in including the perceptions of members of this group with the rest of the population. Age was positive and statistically significant in the willingness to try model for all segments except the base, essentially cancelling out the influence of the main effects of age, indicating that the overall effects of age are not substantial for those that either bike currently or are unable to bike anyway.

Second-Wave Survey Description

The intent of the second survey was to repeat observations from the first-wave survey and to assess perceptions and recognitions of any changes that may have occurred. Key questions from the first-wave survey were repeated verbatim, with other questions being removed in favor of brevity. The survey was pretested with graduate students and members of the public. Both an online version and a paper version were prepared. The resulting survey (which can be found in Appendix B) was 9 pages, taking approximately 20 minutes to complete, and contained four sections, including:

A. Attitudes

B. Daily travel

C. Bicycling experience

D. Demographics

With the ever-changing nature of some transportation systems, the researchers wanted to gauge the general perceptions of changes in transportation in each neighborhood, including for automobiles, transit, walking, and biking. This also helped the research team avoid leading respondents about specific changes, and provide a reasonable basis for comparing perceptions of bicycle infrastructure. A general question on perceptions was included to fulfill this purpose, as presented below:

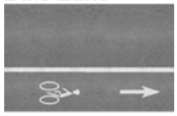
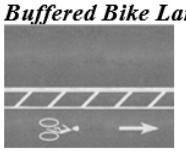
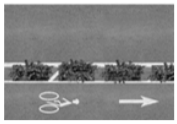
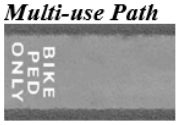
11. We would like to know whether transportation in your community has changed since Spring 2017, either for better or worse. Please give your opinion for each category below.

	Much worse	*Somewhat worse*	*Neutral/ No change*	*Somewhat better*	*Much better*
Traffic congestion	☐	☐	☐	☐	☐
Parking availability	☐	☐	☐	☐	☐
Public transit route coverage (can reach more/fewer places)	☐	☐	☐	☐	☐
Public transit frequency (comes more/less often)	☐	☐	☐	☐	☐
Sidewalk availability (more/fewer of them)	☐	☐	☐	☐	☐
Sidewalk quality	☐	☐	☐	☐	☐
Bicycle safety	☐	☐	☐	☐	☐
Availability of bicycle lanes and trails	☐	☐	☐	☐	☐
Quality of bicycle lanes and trails	☐	☐	☐	☐	☐
Availability of taxi/ Uber/ Lyft	☐	☐	☐	☐	☐
Other (please specify): _____	☐	☐	☐	☐	☐

In addition to general perceptions, the research team also wanted to measure recognition of changes in bicycle facilities. The goal was to measure recognition of the addition of any bicycling facility as well as properly identify what facility was added. Recognition in treatment sites would be compared to those of the respective control sites (which have not received bicycling facilities during the study period). From this data, models would be estimated to explain differences in recognition.

Parallel to the questions of recognition, the researchers also asked respondents whether they have used the new bike facilities and if they like them. These responses would also be compared between treatment and control pairs and models would be developed to predict usage of and sentiments toward new facilities. These questions are reproduced below:

3. Since Spring 2017, some communities in the US have added new bicycle infrastructure. Have you noticed the *addition* of any of the following features in your community?

	Have you seen this added in your community?			***If you've seen it…***					
				…have you used it?			***…do you like it?***		
	No	*Not sure*	*Yes*	*No*	*Not sure*	*Yes*	*No*	*Neutral*	*Yes*
Sharrow 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Buffered Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Protected Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Multi-use Path 	☐	☐	☐	☐	☐	☐	☐	☐	☐

The survey was deployed in May 2018 and responses were collected throughout the summer. The invitation list for the second-wave survey was composed of all respondents from the first wave. Printed versions of the survey were mailed to all on the list. Additionally, email invitations with a URL to take the survey online were sent to all subjects who had provided an email address. The research team provided a 1-800 number and email address to field questions or comments from respondents. Each paper survey was entered (coded) twice and the two datasets were compared to ensure no coding errors were introduced in the data-entry process.

As is typical for panel surveys, the response rate for the second-wave survey was much higher than the first wave. This is generally the case due to the weeding out effect of the first-wave survey. The total number of responses for each neighborhood (after removing severely incomplete responses) for both waves is presented in Table 34.

TABLE 34
Survey Responses for Waves 1 and 2 for each Neighborhood

Area	Households Invited	Initial Responses	Initial Rate	Follow-up Responses	Follow-up Rate
Eastside*	4,509	433	9.6%	231	53%
Grant Park	4,411	477	10.8%	265	56%
Westside*	5,035	235	4.7%	108	46%
South Atlanta	3,815	190	5.0%	109	57%
Total	17,770	1335	7.5%	713	53%

*Indicates treatment location

Multi-wave Demographic Statistics

Summary Statistics for Matched Respondents

This section contains a summary of the demographics for those individuals who responded to both waves of the survey. Although second-wave invitations were sent only to those who responded to the first wave, there was no way the researchers could force the same individual or member of the household to respond to each wave. To determine whether a second-wave respondent matched with a first-wave respondent, the research team checked for consistency of gender, age (accounting for the passage of time), and race/ethnicity. Only those that matched on all three criteria were identified as a matched respondent. Out of the 713 responses, 612 were from matched respondents. The summaries reported in this section are for only matched respondents, with summaries from 2017 and 2018, where applicable. For complete summaries, see Appendix C.

Distributions for gender are presented in Table 35. Each site was slightly overrepresented by females, as is typical for mail-out/mail-back surveys.

TABLE 35
Genders of Respondents of both Wave 1 and Wave 2

Gender	Eastside (211)	Grant Park (225)	Westside (82)	South Atlanta (94)
Female	54%	58%	61%	52%
Male	46%	42%	39%	48%

The ages (in 2018) of respondents are presented in Table 36. Eastside had a somewhat larger portion of younger respondents than Grant Park, while South Atlanta was younger than Westside.

TABLE 36
Ages of Respondents of both Wave 1 and Wave 2

Age	Eastside (211)	Grant Park (224)	Westside (81)	South Atlanta (93)
18–34	30%	22%	10%	18%
35–49	43%	38%	28%	30%
50–64	18%	25%	28%	32%
65+	9.0%	14%	33%	19%

The race and/or ethnicity of respondents is presented in Table 37. Note that respondents were instructed to select all options that apply, so percentages may exceed 100%.

TABLE 37
Races of Respondents of both Wave 1 and Wave 2

Race/Ethnicity	Eastside (206)	Grant Park (222)	Westside (78)	South Atlanta (93)
White	81%	83%	22%	38%
African American	13%	13%	72%	59%
Hispanic	3.4%	2.3%	5.1%	1.1%
Asian	6.3%	1.4%	0.0%	2.2%
Native American	0.0%	1.8%	0.0%	1.1%
Other	1.0%	1.8%	3.8%	3.2%

For the remainder of the demographic statistics presented in this section, values are reported for both 2017 and 2018 responses to show how these characteristics may have changed. Values in parentheses are the number of responses, which may vary due to item non-response in one but not both of the survey years. Household incomes are presented in Table 38. There are minor fluctuations between income groups for each site, but the overall distributions are rather consistent.

TABLE 38
Household Incomes of Respondents of both Wave 1 and Wave 2

Household Income	Eastside		Grant Park		Westside		South Atlanta	
	2017 (192)	2018 (196)	2017 (205)	2018 (200)	2017 (78)	2018 (70)	2017 (82)	2018 (76)
$15,000 or less	3.6%	2.0%	2.4%	2.5%	21%	14%	13%	13%
$15,001 – $30,000	4.2%	2.6%	4.9%	4.0%	22%	19%	20%	13%
$30,001 – $50,000	6.3%	7.1%	11%	10%	13%	24%	13%	12%
$50,001 – $75,000	16%	14%	16%	14%	12%	11%	15%	20%
$75,001 – $100,000	18%	15%	14%	15%	21%	13%	18%	17%
$100,001 – $125,000	15%	18%	15%	16%	5.1%	13%	3.7%	5.3%
More than $125,000	38%	41%	37%	39%	7.7%	5.7%	17%	20%

Household sizes reported for each wave are presented in Table 39. There are also minor fluctuations here, but again, the overall distributions are consistent between years.

TABLE 39
Household Sizes of Respondents of both Wave 1 and Wave 2

Household Size	Eastside		Grant Park		Westside		South Atlanta	
	2017 (205)	2018 (205)	2017 (220)	2018 (221)	2017 (78)	2018 (75)	2017 (89)	2018 (85)
1	40%	43%	32%	34%	41%	39%	45%	44%
2	41%	41%	42%	41%	37%	39%	33%	30%
3	11%	10%	13%	12%	5.3%	8.9%	13%	15%
4	4.9%	4.9%	11%	10%	11%	5.1%	4.7%	4.5%
5+	2.0%	1.0%	1.8%	2.3%	5.3%	7.6%	4.7%	6.7%

Residence type for each wave is reported in Table 40. Very few discrepancies exist between years, indicating that the overwhelming majority of respondents did not move between survey waves, or if they did, they at least moved to a similar residence type as before.

TABLE 40
Residence Types of Respondents of both Wave 1 and Wave 2

Residence Type	Eastside		Grant Park		Westside		South Atlanta	
	2017 (211)	2018 (211)	2017 (225)	2018 (225)	2017 (81)	2018 (82)	2017 (93)	2018 (94)
Detached	45%	40%	75%	72%	76%	77%	70%	72%
Duplex	16%	18%	12%	16%	6.1%	8.6%	7.4%	6.5%
Apt	38%	42%	12%	12%	16%	14%	17%	19%
Other	0.5%	0.9%	0.4%	0.0%	1.2%	1.2%	3.2%	2.2%

Employment status in 2017 and 2018 is presented in Table 41. The share of respondents who don't work decreased between waves, indicating that more people gained employment than lost employment or retired. Note that respondents were instructed to select all that apply, so percentages may exceed 100%.

TABLE 41
Employment Status of Respondents of both Wave 1 and Wave 2

Employment Status	Eastside		Grant Park		Westside		South Atlanta	
	2017 (211)	2018 (211)	2017 (225)	2018 (225)	2017 (82)	2018 (82)	2017 (94)	2018 (94)
Full time	81%	81%	66%	70%	37%	35%	51%	57%
Part time	4.3%	7.1%	12%	12%	9.8%	16%	13%	12%
2+ jobs	4.7%	3.8%	5.3%	4.4%	8.5%	9.8%	4.3%	7.4%
Homemaker	3.3%	2.4%	6.2%	2.2%	2.4%	1.2%	3.2%	3.2%
Don't work	10%	7.1%	20%	15%	51%	43%	28%	27%

The number of vehicles per household is presented in Table 42. Vehicle ownership appears to be relatively stable on the aggregate between the two survey waves.

TABLE 42
Number of Vehicles Owned per Household of Respondents of both Wave 1 and Wave 2

Number of Vehicles	Eastside		Grant Park		Westside		South Atlanta	
	2017 (209)	2018 (208)	2017 (225)	2018 (224)	2017 (81)	2018 (77)	2017 (91)	2018 (87)
0	5.8%	6.7%	5.8%	5.8%	18%	16%	18%	18%
1	41%	45%	33%	33%	39%	44%	36%	35%
2	46%	39%	49%	49%	30%	26%	38%	34%
3	5.3%	6.7%	9.4%	8.4%	9.1%	8.6%	3.4%	8.8%
4	1.4%	1.4%	1.8%	1.3%	2.6%	3.7%	3.4%	3.3%
5+	0.5%	1.0%	0.9%	1.3%	1.3%	1.2%	1.1%	1.1%

The number of bikes per household is presented in Table 43. The consistency of bike ownership between waves indicates that the impact of the year between surveys and the treatment itself do not have a measurable impact on bike ownership, which helps remove access to a bike as a potential causal channel of any changes in perceptions or behavior.

TABLE 43
Number of Bikes Owned per Household of Respondents of both Wave 1 and Wave 2

Number of Bikes	Eastside		Grant Park		Westside		South Atlanta	
	2017 (209)	2018 (207)	2017 (225)	2018 (224)	2017 (76)	2018 (80)	2017 (91)	2018 (86)
0	27%	28%	25%	24%	49%	45%	50%	53%
1	28%	29%	19%	19%	26%	28%	24%	25%
2	25%	26%	29%	31%	17%	16%	17%	13%
3	10%	7.7%	10%	11%	3.9%	7.5%	5.8%	5.5%
4	4.8%	3.8%	6.3%	5.8%	1.3%	2.5%	2.3%	2.2%
5+	5.3%	4.8%	10%	9.3%	2.6%	1.3%	0.0%	1.1%

The distributions of bike confidence levels are presented in Table 44. Although there is some fluctuation between the confidence levels, the share of respondents who cannot bike is rather consistent between waves.

TABLE 44
Stated Bike Confidence Level of Respondents of both Wave 1 and Wave 2

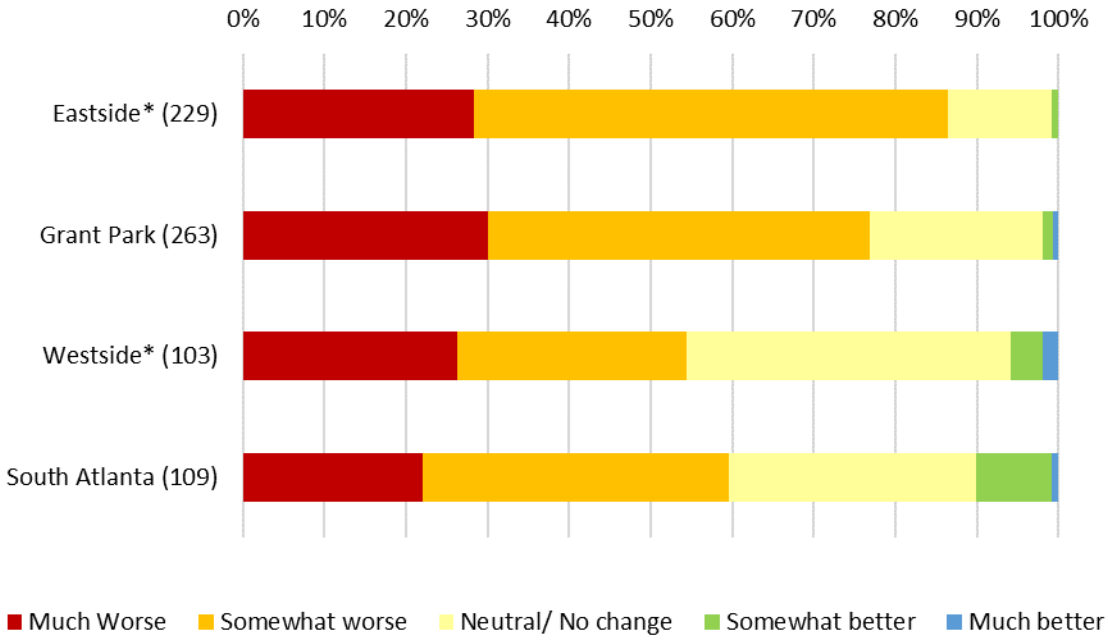
Bike Confidence	Eastside		Grant Park		Westside		South Atlanta	
	2017 (211)	2018 (211)	2017 (225)	2018 (224)	2017 (80)	2018 (75)	2017 (91)	2018 (93)
Can't Bike	1.9%	3.3%	3.6%	4.0%	13%	14%	10%	10%
Not Very Confident	14%	14%	15%	15%	18%	21%	17%	29%
Somewhat Confident	33%	26%	33%	33%	26%	24%	24%	16%
Very Confident	51%	57%	48%	48%	43%	41%	49%	45%

Second-Wave Survey Analysis

General Perceptions of Changes in Transportation

The two new questions that were introduced in the second-wave survey relied on recollection of recent trends, so the responses to these questions were analyzed for all second-wave respondents regardless of whether they were matched respondents. The first new question included perceptions about general transportation trends. This question was written in a general sense to capture a holistic perspective of how transportation has changed in the previous year. Although the bike-infrastructure items are the variables of greatest interest, results from the other items are included here for completeness. Note that the sample sizes (before adjusting for item non-response) of each site are Eastside=231, Grant Park=265, Westside=108, and South Atlanta=109.

The two automobile-related items, congestion and parking, are reported in Figure 13 and Figure 14, respectively. The share of respondents expressing changes for the worse for congestion are in the majority, especially in the denser neighborhoods of Eastside and Grant Park. Parking availability in Eastside and Grant Park was also perceived as worsening, while there were many more respondents expressing no change in Westside and South Atlanta.



Indicates treatment location, consistent throughout the rest of this section

FIGURE 13

Distribution of Responses for Perceived Changes in Traffic Congestion

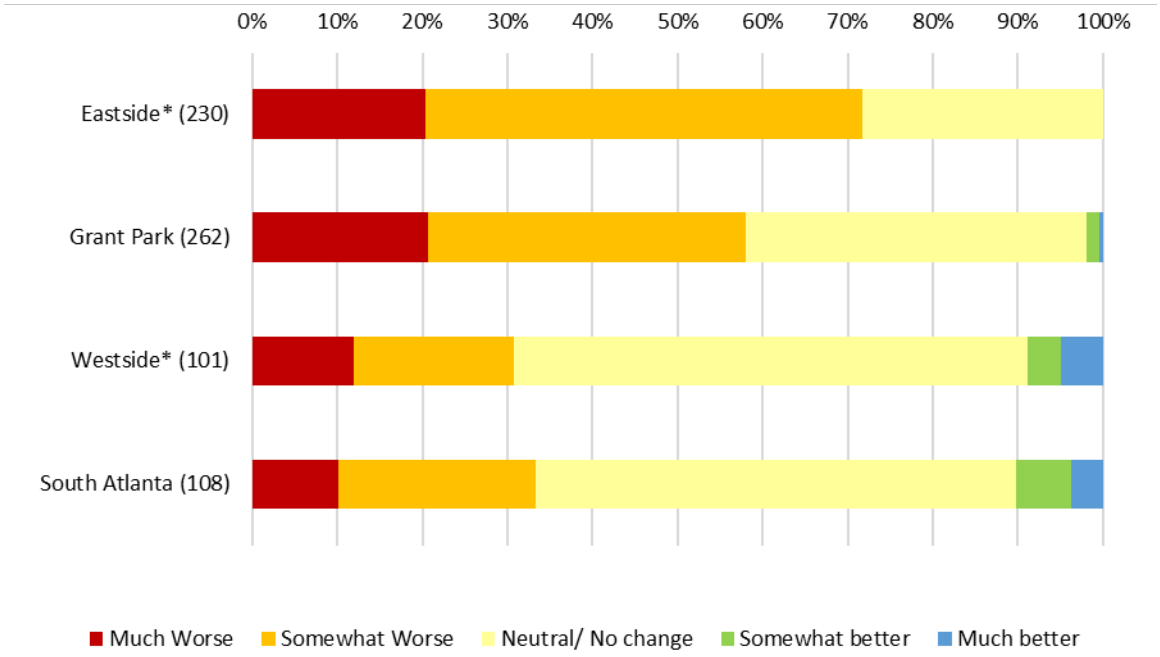


FIGURE 14

Distribution of Responses for Perceived Changes in Parking Availability

An item for the availability of ride-hailing options was also presented and is summarized in Figure 15. The share of respondents in each site expressing positive changes outweighed those expressing negative changes. The directionality of responses for this item is the reverse from the automobile-focused items, which indicates a lack of "yea-saying," or the tendency of respondents to over-agree on some items.

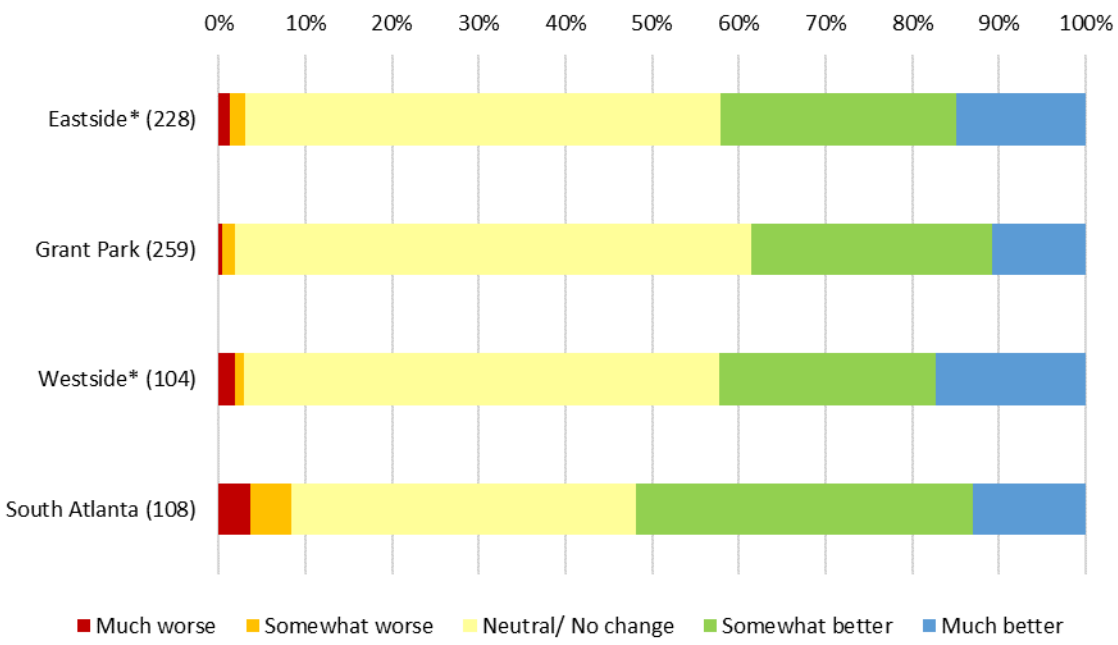


FIGURE 15

Distribution of Responses for Perceived Changes in Availability of Taxi/ Uber/ Lyft

The two transit items, route coverage and frequency, are reported in Figure 16 and Figure 17, respectively. For both of these items, the overwhelming majority of respondents perceived no changes, which may be an indication of consistency between transit operations or a lack of attention paid to transit.

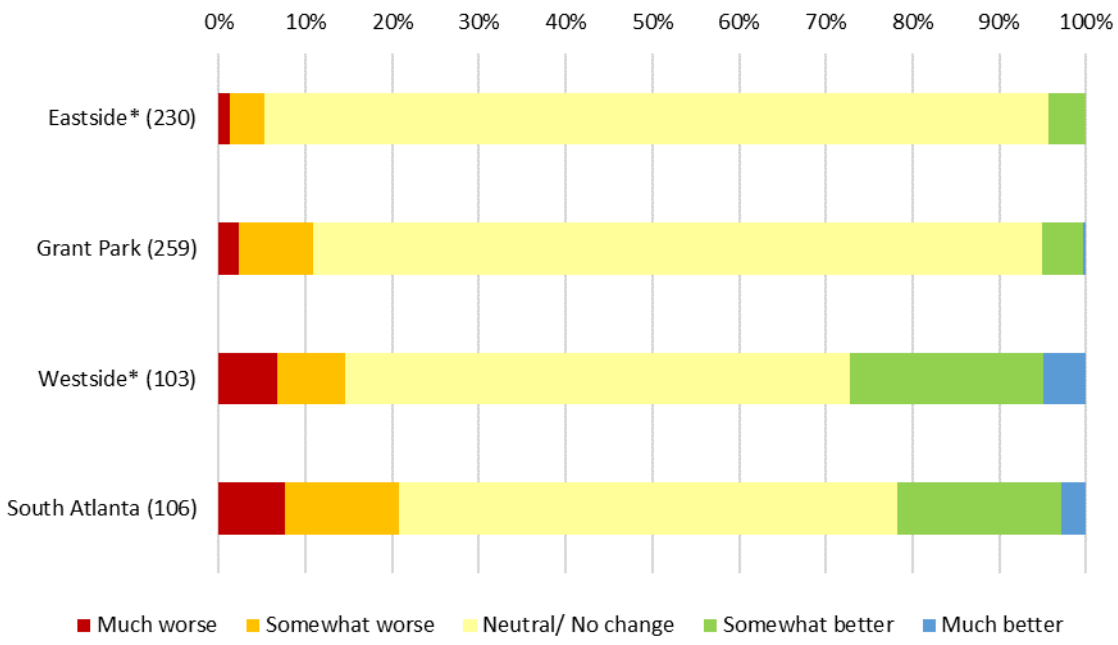


FIGURE 16

Distribution of Responses for Perceived Changes in Public Transit Route Coverage

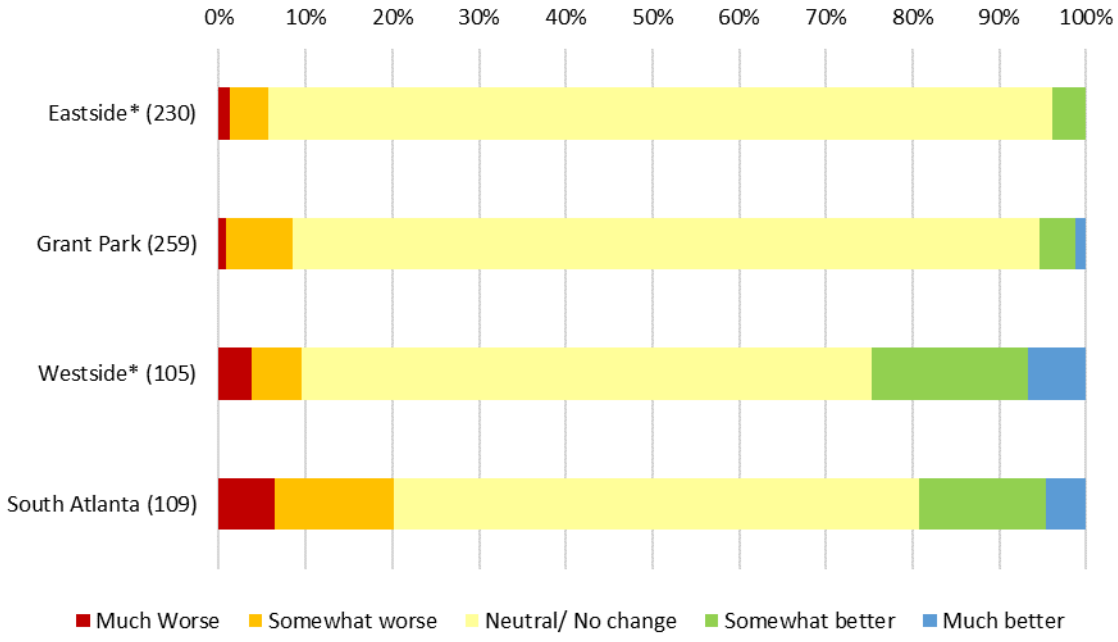


FIGURE 17

Distribution of Responses for Perceived Changes in Public Transit Frequency

The two pedestrian-related items, sidewalk availability and sidewalk quality, are presented in Figure 18 and Figure 19, respectively. There appears to be a consistent pattern of respondents in the treatment sites perceiving greater improvements in pedestrian infrastructure. Although the purpose of this research project is to investigate the impact of the BeltLine on bike trips, a side benefit is the quantification of the perceived pedestrian improvements linked to the BeltLine.

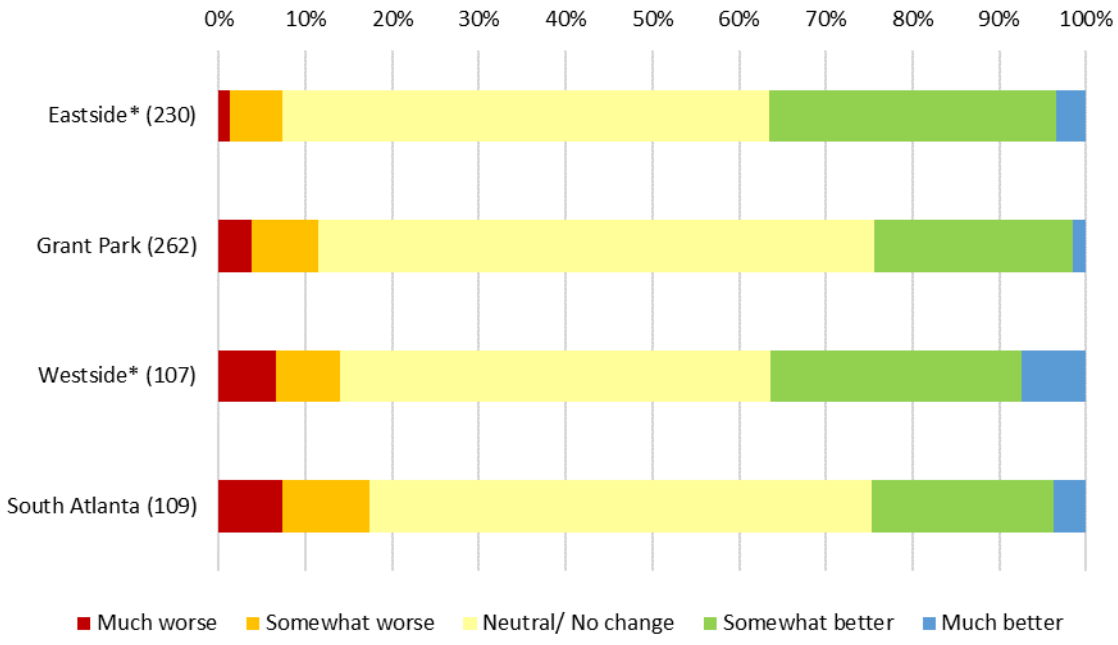


FIGURE 18

Distribution of Responses for Perceived Changes in Sidewalk Availability

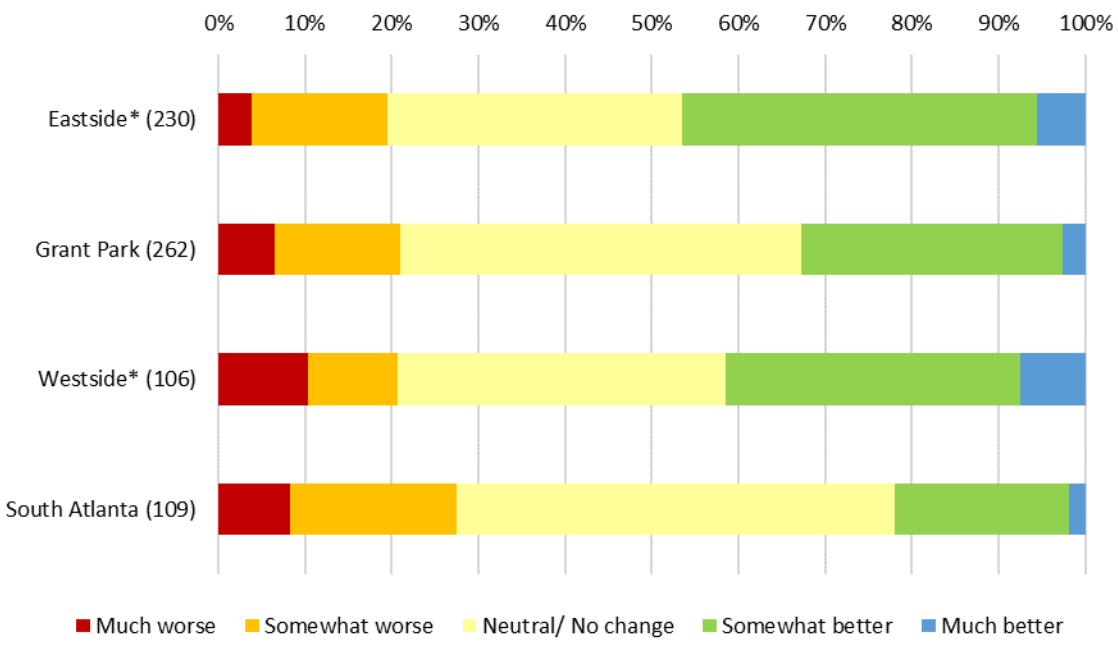


FIGURE 19

Distribution of Responses for Perceived Changes in Sidewalk Quality

The three bike-related items—safety, bike lane/trail availability, and bike lane/trail quality—are presented in Figure 20, Figure 21, and Figure 22, respectively. For each of these measures there appears to be little difference in perceptions between Eastside and Grant Park. On the other hand, the differences between Westside and South Atlanta are much more pronounced, especially for perceived improvements in availability and quality of bike lanes/trails. Despite differences among each site, there is a consistent trend of positivity in each site.

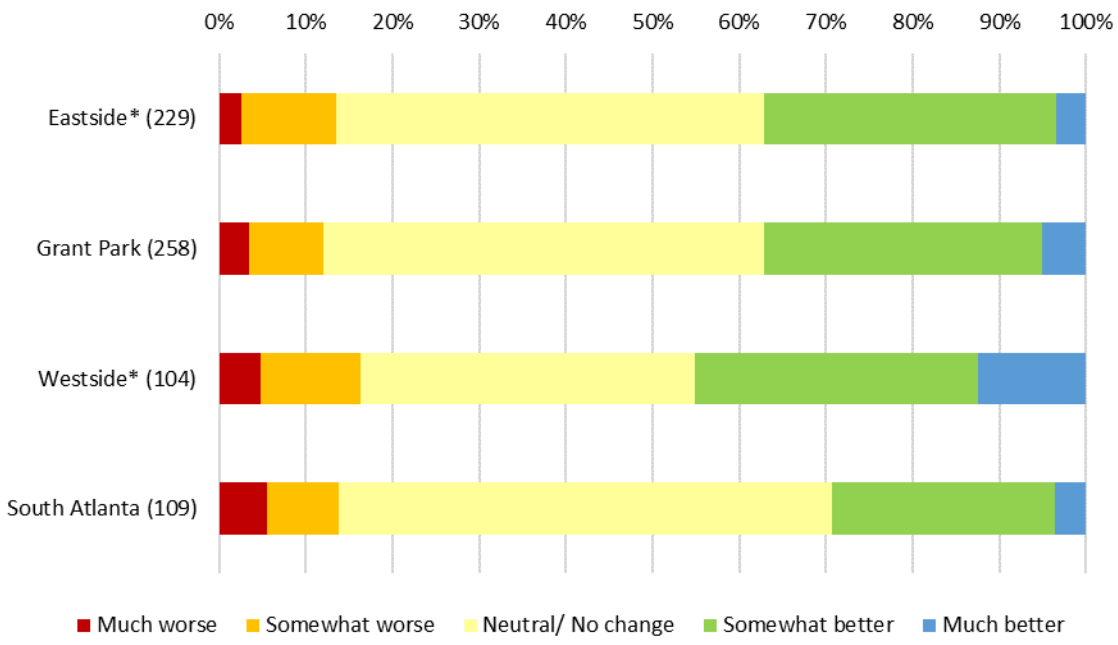


FIGURE 20

Distribution of Responses for Perceived Changes in Bicycle Safety

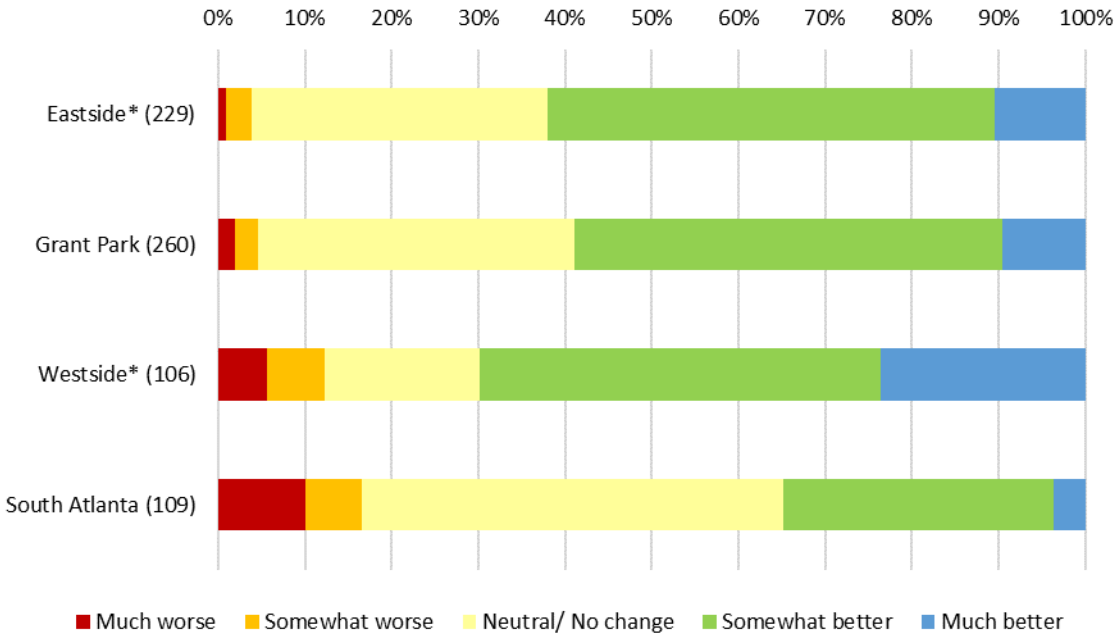


FIGURE 21

Distribution of Responses for Perceived Changes in Availability of Bicycle Lanes and Trails

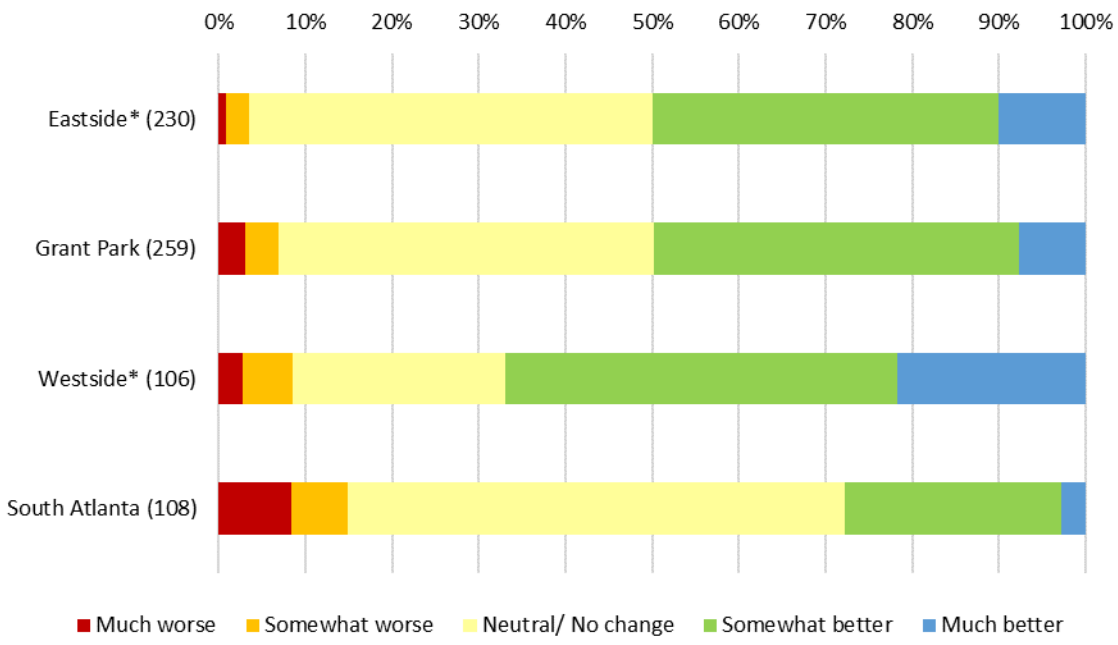


FIGURE 22

Distribution of Responses for Perceived Changes in Quality of Bicycle Lanes and Trails

Although the distributions of responses are similar between Eastside and Grant Park, the positivity in both cases is informative. This may be an indication that the two neighboring sites are interconnected enough by bike that the impacts of the BeltLine permeate through both neighborhoods. The smaller share of positive responses than those in Westside may also be an indication that while things have improved, the extension of an existing trail is not as monumental as an entirely new trail.

The inclination of respondents to express perceived improvements in bicycle infrastructure may be a representation of general changes that have occurred for cycling throughout Atlanta over this time period. It may also be a representation of the impact of the visibility of the BeltLine that extends beyond the half-mile buffer used to define neighborhoods in this study.

Although the distributions of responses are important for understanding the general spread of responses, it is also valuable to investigate the mean responses. Responses were coded to numeric values (Much Worse=1 and Much Better =5), and mean values were calculated for each item for

each neighborhood. Figure 23 shows a graph of the mean responses for the pedestrian- and bike-related items for each neighborhood.

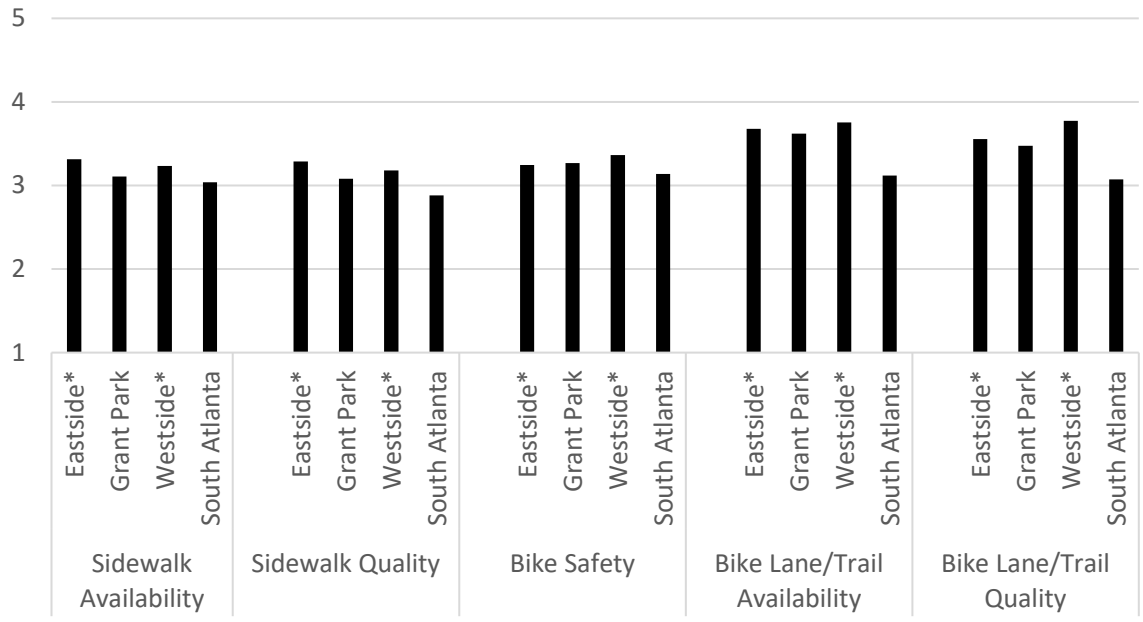


FIGURE 23

Chart of Mean Responses for Pedestrian- and Bicycle-related Questions

Analysis of variance (ANOVA) tests were performed on the mean responses to test for statistical significance of the differences in means between groups. The sample was subdivided between treatment (Eastside and Westside) vs control (Grant Park and South Atlanta) and Westside with control (Westside and South Atlanta) vs Eastside with control (Eastside and Grant Park). An interaction term for the two dummies was also included to test for the difference in the effects of the two treatments.

The ANOVA results for sidewalk availability are presented in Table 45. The significance of the treatment confirms that treatment areas perceived a significantly better change in sidewalk availability.

TABLE 45
ANOVA Results for Mean Responses for Sidewalk Availability

	Degrees of Freedom	Sum of Squares	Mean Square	P-value	
Treatment	1	7.2	7.18	0.001	***
Westside/South ATL	1	0.8	0.84	0.237	
Treatment (Westside)	1	0.0	0.003	0.942	
Residuals	704	420	0.60		

ANOVA results for sidewalk quality are presented in Table 46. The treatment is also significant for this measure, as is the Westside and South Atlanta, indicating a perceived improvement associated with the treatment, as well as somewhat better improvements overall that were reported in both Eastside and Grant Park.

TABLE 46
ANOVA Results for Mean Responses for Sidewalk Quality

	Degrees of Freedom	Sum of Squares	Mean Square	P-value	
Treatment	1	9.4	9.44	0.001	**
Westside/South ATL	1	3.6	3.59	0.043	*
Treatment (Westside)	1	0.3	0.31	0.549	
Residuals	703	615	0.88		

Results of the ANOVA for bike safety are presented in Table 47. Although there appears to be greater improvement in Westside, the ANOVA results are borderline significant at best, indicating that the data does not strongly point toward a significant difference by site.

TABLE 47
ANOVA Results for Mean Responses for Bike Safety

	Degrees of Freedom	Sum of Squares	Mean Square	P-value	
Treatment	1	0.5	0.50	0.404	
Westside/South ATL	1	0.0	0.01	0.899	
Treatment (Westside)	1	2.3	2.32	0.072	.
Residuals	696	498	0.72		

Table 48 contains the ANOVA results for bike lane/trail availability. The dummy for each group is significant. The impact of both treatments on average has a significant association with better improvements. Additionally, the general pattern of perceiving improvements is higher on average in Eastside and Grant Park, though the improvements associated with the Westside treatment are even higher.

TABLE 48
ANOVA Results for Mean Responses for Bike Lane/Trail Availability

	Degrees of Freedom	Sum of Squares	Mean Square	P-value	
Treatment	1	9.3	9.28	<0.001	***
Westside/South ATL	1	7.2	7.19	0.002	**
Treatment (Westside)	1	12.4	12.45	<0.001	***
Residuals	700	499	0.71		

ANOVA results for bike lanes/trail quality are presented in Table 49. The treatment is significant for this item as well, further confirming the positive impact associated with the BeltLine. Although the Westside and South Atlanta neighborhoods are not significantly different from the Eastside and Grant Park neighborhoods for this measure, the impact of the Westside treatment is significantly different from that of the Eastside treatment.

TABLE 49
ANOVA Results for Mean Responses for Bike Lane/Trail Quality

	Degrees of Freedom	Sum of Squares	Mean Square	P-value	
Treatment	1	12.6	12.60	<0.001	***
Westside/South ATL	1	1.5	1.47	0.142	
Treatment (Westside)	1	14.2	14.19	<0.001	***
Residuals	699	475	0.68		

The perceptions of general transportation trends analyzed in this section shed light on some common themes. Automobile measures were perceived as worse, while transit measures were mostly noncommittal. Pedestrian infrastructure was perceived as improving significantly more in the BeltLine treatment locations than in their controls. Bike infrastructure was generally perceived as improving in each site. The improvements associated with the BeltLine treatment areas are significantly greater than those perceived in their controls. However, the impacts of the two treatments were significantly different from each other, indicating that the newly constructed Westside trail may be more influential in triggering perceptions of improvements than the extension of the Eastside trail.

Recognition and Use of New Bicycle Facilities

The second-wave survey also included another new question designed to assess the extent of recognition of new bicycle facilities that had been implemented since the first-wave survey. Each respondent was presented images of each of five bike facility types (sharrows, bike lanes, buffered bike lanes, protected bike lanes, and multi-use paths), though unlike the previous infrastructure images, these were presented without any other roadway characteristics. Respondents were asked if they have seen that type of facility implemented in their community since May 2017, and if they have seen it, if they have used it and if they like it. The response distributions for the Seen question are presented in Figure 24.

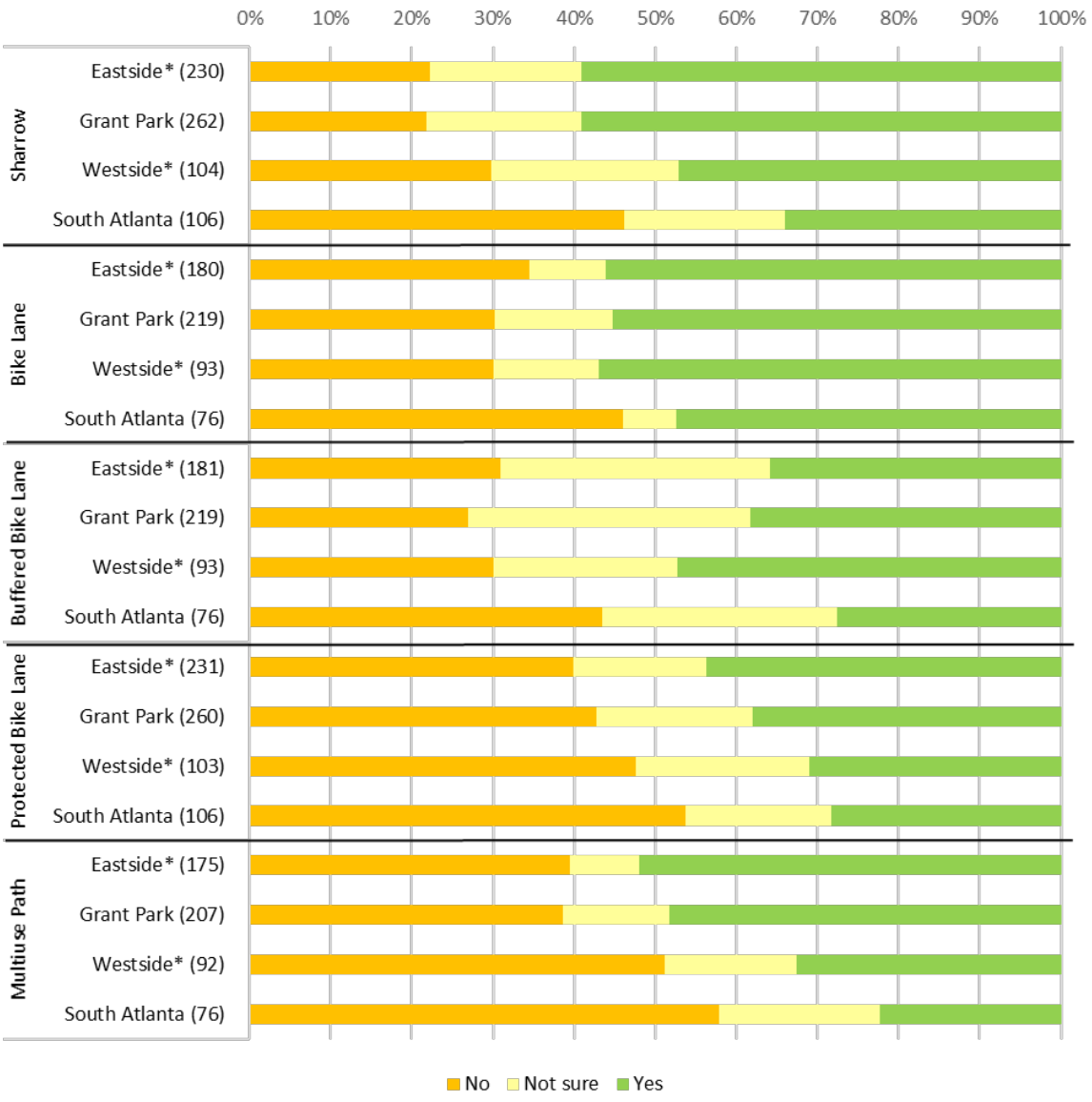


FIGURE 24

Distribution of Responses for the Question, "Have you seen this added in your community?" for Each Infrastructure Type and for Each Neighborhood

A sizeable portion of respondents in each site stated that they had seen each facility type in their community. Additions of sharrows, bike lanes, buffered bike lanes, and protected bike lanes may vary between locations. As the purpose of this report is to outline impacts of the BeltLine, the discussion herein focuses only on multi-use paths, with the other facility types serving as a primer to help respondents understand that some facilities they may have seen are different types.

Recognition of the path was highest in Eastside, followed by Grant Park, then Westside and South Atlanta. This seems to be counterintuitive based on the findings reported in the previous section, as the Westside treatment area was viewed as having improved more than the Eastside treatment. This seeming disagreement may be an indication that the treatment improved perceptions of cycling, but respondents in the Westside area were not able to properly identify the BeltLine as a multi-use path. Recognition was only marginally higher in Eastside than Grant Park, further strengthening the idea that the two neighborhoods are well-connected, while the differences between Westside and South Atlanta appear to be greater.

The distributions of responses of those who have used each facility type (if they have seen it) are presented in Figure 25. Those in Eastside were most likely to have used a multi-use path, followed by Grant Park, then Westside and South Atlanta. Both treatment areas had higher shares of respondents that have used a multi-use path than their respective controls areas, though the Eastside and Grant Park areas were substantially higher. This may be evidence that the connection of the Eastside extension to the original trail, while not as influential in improving perceptions, is more useful as it connects into a more well-established network. The Westside trail, on the other hand, is a fairly novel facility, so while it may have been successful in improving perceptions, it simply has not had time for a network of use or compatible development to accompany it.

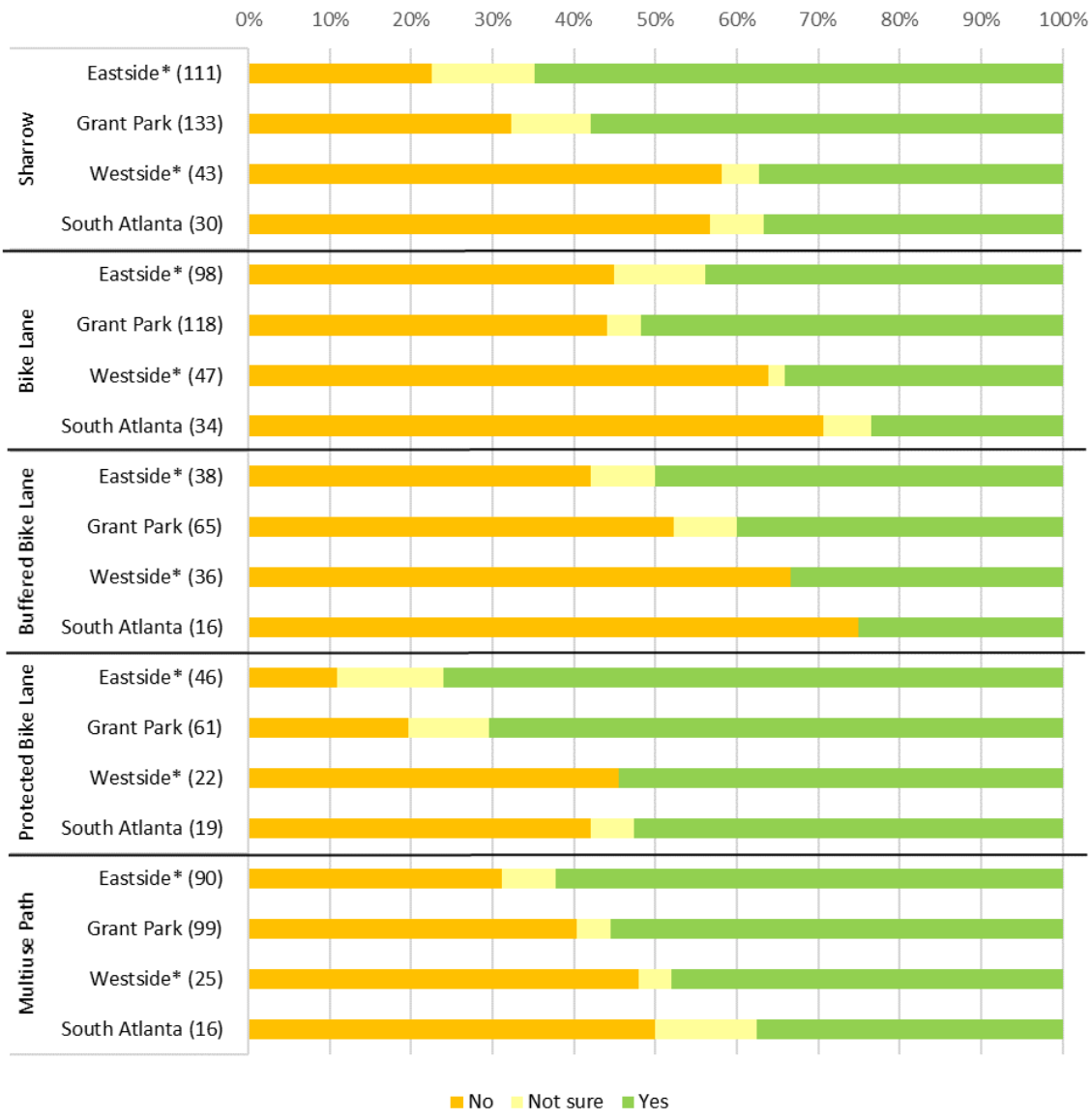


FIGURE 25

Distribution of Responses for the Question, "Have you used it?" for Each Infrastructure Type (for those who have seen it) and for Each Neighborhood

The distributions of responses of those who like each facility type (only for those who have seen it) are presented in Figure 26. While the patterns of usage by site is explainable by treatment, the percent of those who like it is not as apparent. In Eastside and Grant Park the percentages of those who like protected bike lanes is higher than that of multi-use paths, which may be a reflection of the business of the Eastside trail and extension. In Westside and South Atlanta, multi-use paths

were more liked than protected bike lanes, which may reflect a slight preference for multi-use paths among those who have not seen as much bike infrastructure.

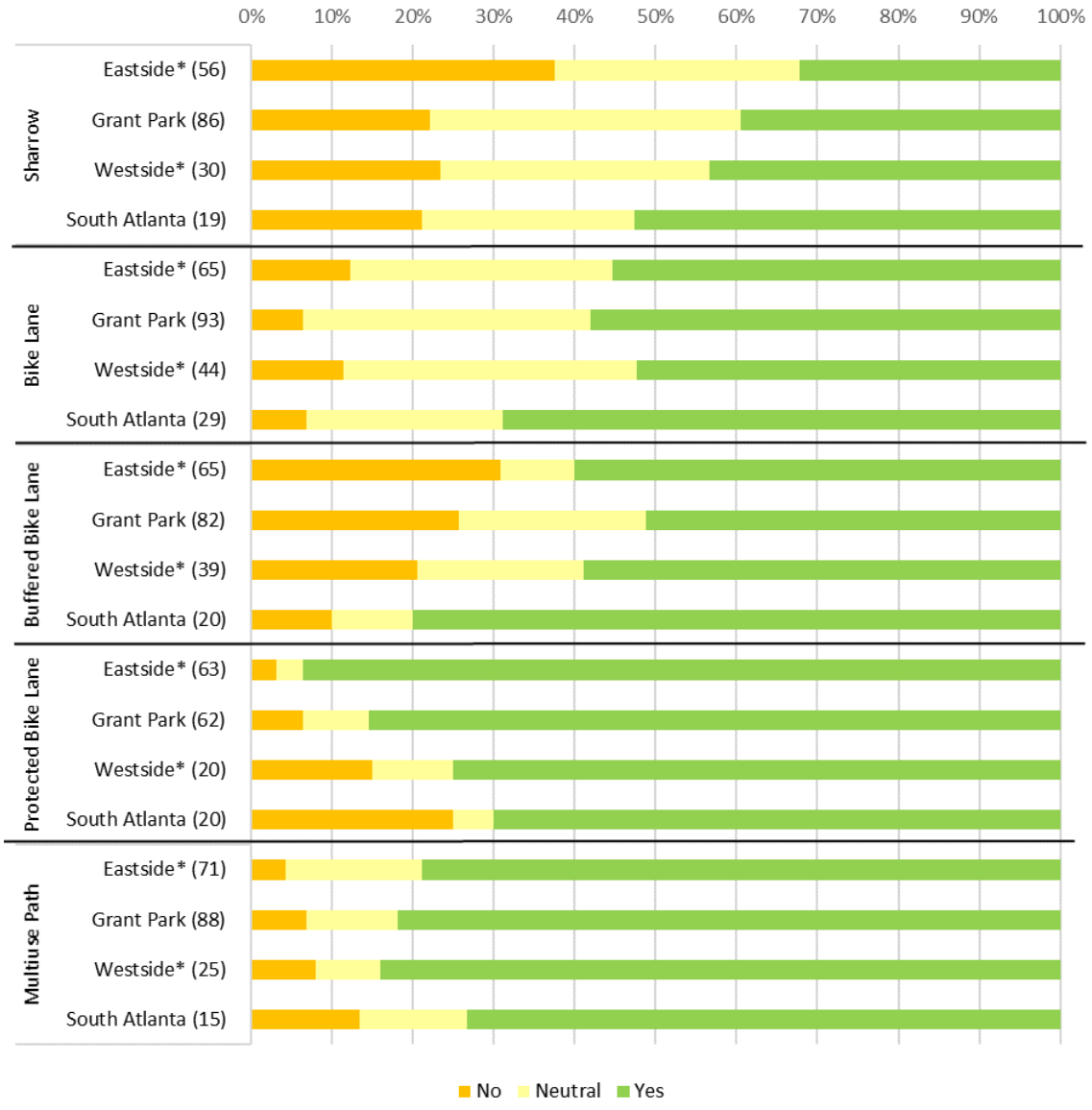


FIGURE 26

Distribution of Responses for the Question, "Do you like it?" for Each Infrastructure Type (for those who have seen it) and for Each Neighborhood

Second-Wave User Preference Analysis

The series of six photoshopped images from the first-wave survey were repeated in the second wave, with each respondent being assigned the same version for each wave. Models of similar form as the first-wave models were estimated on the second-wave data. Table 50 includes a summary of the linear regressions for comfort, safety, and willingness to try by infrastructure characteristics. These models generally reflect those that were estimated on the first-wave sample (Table 29), though the coefficient for the number of automobile lanes went from significantly negative in the willingness to try model in the first wave to not significant in the second wave. The R^2 in each model is also higher in the second wave.

TABLE 50
Linear Regression for Expressed Comfort, Safety, and Willingness to Try, Including Only Infrastructure Characteristics

Variable	Comfort			Safety			Willingness to Try		
	Coefficient		P-value	Coefficient		P-value	Coefficient		P-value
Constant	2.72	***	<0.001	2.57	***	<0.001	3.06	***	<0.001
Bicycle Infrastructure Types									
Bike Lane (BL)	0.68	***	<0.001	0.64	***	<0.001	0.47	***	<0.001
Buffered BL (BBL)	1.11	***	<0.001	1.12	***	<0.001	0.72	***	<0.001
One-way Protected	1.89	***	<0.001	1.99	***	<0.001	1.39	***	<0.001
Two-way Protected	1.78	***	<0.001	1.94	***	<0.001	1.31	***	<0.001
Multi-Use	1.62	***	<0.001	1.68	***	<0.001	1.28	***	<0.001
Roadway Characteristics									
Parking	−0.24	***	<0.001	−0.28	***	<0.001	−0.13	**	0.007
Four Lanes	−0.02		0.576	0.02		0.580	−0.03		0.478
Framing Effects									
BL-No Parking	0.29	***	<0.001	0.33	***	<0.001	0.30	**	0.004
BBL-No Parking	0.30	***	<0.001	0.34	***	<0.001	0.29	***	0.001
BL-Two Lanes	0.25	**	0.009	0.33	***	<0.001	0.21	.	0.054
# of Responses	3633			3624			3610		
R^2	0.301			0.336			0.149		
Adjusted R^2	0.299			0.334			0.147		

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

Sociodemographic data was added to the previous models, and the resulting models are presented in Table 51. The significance of much of the sociodemographics did not drastically change for the second-wave models, though the smaller sample size makes it less likely to have as many significant variables in each second-wave model. The coefficients for age, females, and African Americans were consistent in the willingness to try models between waves.

TABLE 51

Linear Regression for Expressed Comfort, Safety, and Willingness to Try by Infrastructure and Individual Characteristics

Variable	Comfort		Safety		Willingness to Try	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	2.66 ***	<0.001	2.16 ***	<0.001	3.41 ***	<0.001
Bicycle Infrastructure Types						
Bike Lane (BL)	0.67 ***	<0.001	0.63 ***	<0.001	0.45 ***	<0.001
Buffered BL (BBL)	1.13 ***	<0.001	1.13 ***	<0.001	0.71 ***	<0.001
One-way Protected	1.89 ***	<0.001	1.99 ***	<0.001	1.41 ***	<0.001
Two-way Protected	1.81 ***	<0.001	1.98 ***	<0.001	1.31 ***	<0.001
Multi-Use	1.58 ***	<0.001	1.65 ***	<0.001	1.29 ***	<0.001
Roadway Characteristics						
Parking	−0.23 ***	<0.001	−0.28 ***	<0.001	−0.15 **	0.001
Four Lanes	−0.03	0.378	0.01	0.747	0.05	0.281
Framing Effects						
BL-No Parking	0.28 **	0.002	0.33 ***	<0.001	0.29 **	0.006
BBL-No Parking	0.29 ***	<0.001	0.35 ***	<0.001	0.27 **	0.001
BL-Two Lanes	0.27 **	0.007	0.34 ***	<0.001	0.33 **	0.002
Sociodemographics						
Income Group	0.052 ***	<0.001	0.036 ***	<0.001	0.068 ***	<0.001
Education Level	−0.038 *	0.020				
Driver's License			0.23 *	0.030	0.22 .	0.061
Age					−0.014 ***	<0.001
Female					−0.30 ***	<0.001
African American					−0.36 ***	<0.001
# of Responses	3229		3196		3181	
R^2	0.311		0.345		0.245	
Adjusted R^2	0.308		0.343		0.241	

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

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Before-and-After Analysis

The purpose of maintaining consistency in much of the survey between wave 1 and wave 2 was to allow for comparisons between the two waves and to quantify change. This section includes an analysis of changes in both perceptions and behavior among matched respondents.

Changes in User Preference Analysis

User preference models were estimated, with the wave 2 responses as the dependent variable and the wave 1 responses and a dummy variable for treatment neighborhoods included as explanatory variables, as shown in Table 52. These models differ from the previously presented regression models as the wave 1 response is expected to explain a large amount of variation in wave 2 responses. For example, a model with a coefficient of 1 for wave 1 response and no other significant variables would indicate that wave 2 responses are equal to wave 1 responses. The relatively low values on the wave 1 responses in the models presented here indicates that even after using similarly constructed measures of preferences as predictors, there is still a large amount of variation built into these constructs. The dummy treatment variable is intended to capture the portion of that variation that is associated with respondents in one of the treatment areas. The lack of significance for the treatment coefficient in the comfort model indicates that there is not enough evidence from the data of any association of residing near a treatment and having a general increase in comfort toward biking. The significantly negative coefficient for the treatment variable in the safety models indicates that those who are near treatments are more likely to rate hypothetical cycling scenarios as less safe, which may be an indication that these respondents have become conditioned to seeing higher quality bike infrastructure and are thus less likely (albeit slightly) to rate other facilities as safe. Conversely, the treatment coefficient for willingness to try is borderline significant, indicating a slight association with those near the BeltLine treatments being more willing to try other facilities in general.

The models were re-estimated including sociodemographic cheristics and are shown in Table 53. The addition of sociodemographics in these models was enough to push the treatment coefficient for the willingness to try model from marginally significant (p=0.056) to significant (p=0.021), strengthening the association that, after controlling for demographics, the treatment locations are associated with a slightly higher willingness to try.

TABLE 52

Linear Regression for Expressed Comfort, Safety, and Willingness to Try, Including Only Infrastructure Characteristics

Variable	Comfort			Safety			Willingness to Try		
	Coefficient		P-value	Coefficient		P-value	Coefficient		P-value
Constant	1.55	***	<0.001	1.53	***	<0.001	1.25	***	<0.001
Wave 1 Response	0.42	***	<0.001	0.42	***	<0.001	0.55	***	<0.001
Treatment	−0.04		0.199	−0.08	**	0.008	0.06	.	0.056
Bicycle Infrastructure Types									
Bike Lane (BL)	0.42	***	<0.001	0.36	***	<0.001	0.27	***	<0.001
Buffered BL (BBL)	0.71	***	<0.001	0.63	***	<0.001	0.39	***	<0.001
One-way Protected	1.18	***	<0.001	1.11	***	<0.001	0.74	***	<0.001
Two-way Protected	1.16	***	<0.001	1.16	***	<0.001	0.72	***	<0.001
Multi-Use	1.00	***	<0.001	0.95	***	<0.001	0.66	***	<0.001
Roadway Characteristics									
Parking	−0.15	***	<0.001	−0.17	***	<0.001	−0.03		0.526
Four Lanes	0.003		0.926	0.04		0.216	0.01		0.791
Framing Effects									
BL-No Parking	0.20	*	0.015	0.16	.	0.050	0.24	**	0.005
BBL-No Parking	0.20	***	0.001	0.22	***	<0.001	0.20	**	0.004
BL-Two Lanes	0.19	*	0.038	0.22		0.011	0.14		0.134
# of Responses	3602			3599			3564		
R^2	0.429			0.464			0.423		
Adjusted R^2	0.427			0.462			0.421		

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

TABLE 53

Linear Regression for Expressed Comfort, Safety, and Willingness to Try by Infrastructure and Individual Characteristics

Variable	Comfort		Safety		Willingness to Try	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	1.19 ***	<0.001	1.21 ***	<0.001	1.56 ***	<0.001
Wave 1 Response	0.43 ***	<0.001	0.43 ***	<0.001	0.50 ***	<0.001
Treatment	−0.05	0.135	-0.07 *	0.025	0.08 *	0.021
Bicycle Infrastructure Types						
Bike Lane (BL)	0.38 ***	<0.001	0.34 ***	<0.001	0.25 ***	<0.001
Buffered BL (BBL)	0.69 ***	<0.001	0.62 ***	<0.001	0.39 ***	<0.001
One-way Protected	1.13 ***	<0.001	1.10 ***	<0.001	0.79 ***	<0.001
Two-way Protected	1.13 ***	<0.001	1.16 ***	<0.001	0.75 ***	<0.001
Multi-Use	0.94 ***	<0.001	0.92 ***	<0.001	0.71 ***	<0.001
Roadway Characteristics						
Parking	−0.14 ***	<0.001	-0.17 ***	<0.001	−0.05	0.225
Four Lanes	−0.01	0.830	0.04	0.234	0.06	0.145
Framing Effects						
BL-No Parking	0.18 *	0.036	0.15 .	0.084	0.22 *	0.015
BBL-No Parking	0.19 **	0.002	0.22 ***	0.001	0.20 **	0.006
BL-Two Lanes	0.21 *	0.021	0.25 **	0.006	0.23 *	0.017
Age	0.003 *	0.016	0.003 **	0.006	−0.005 ***	<0.001
Income Group	0.041 ***	<0.001	0.035 ***	<0.001	−0.14 ***	<0.001
Female					−0.14 ***	<0.001
African American					0.045 ***	<0.001
# of Responses	3206		3214		3177	
R^2	0.442		0.470		0.447	
Adjusted R^2	0.440		0.468		0.444	

*Significant at P = 0.050 or better; **Significant at P = 0.010 or better; ***Significant at P < 0.001

Changes in Cycling Frequency

In each wave of the survey, respondents were asked to report their frequency of making trips using certain modes, both for commute purposes and other purposes. Respondents were divided into groups based on their bike trip frequency in wave 1. Table 54 and Table 55 show cross-tabulations for each group within each neighborhood and the number of those in each group who decreased, increased, or did not change in frequency for commute trips and other trips, respectively.

TABLE 54
Changes in Bike Commuting Frequency from First to Second Wave

First Wave Frequency	Eastside			Grant Park		
	Decreased	No change	Increased	Decreased	No change	Increased
Never	0	94	12	0	106	10
<1 day a month	4	1	0	2	3	4
1–3 days a month	5	1	1	1	4	1
1–2 days a week	5	3	0	1	4	1
3–4 days a week	7	3	0	4	2	2
≥5 days a week	0	4	0	0	3	0
Total	21	106	13	8	122	18

First Wave Frequency	Westside			South Atlanta		
	Decreased	No change	Increased	Decreased	No change	Increased
Never	0	20	2	0	42	1
<1 day a month	2	2	0	3	0	0
1–3 days a month	1	1	1	1	1	0
1–2 days a week	0	0	0	0	0	0
3–4 days a week	0	0	1	0	0	0
≥5 days a week	1	0	0	0	0	0
Total	4	23	4	4	43	1

TABLE 55
Changes in Frequency of Other Trips by Bike from First to Second Wave

First Wave Frequency	Eastside			Grant Park		
	Decreased	No change	Increased	Decreased	No change	Increased
Never	0	71	17	0	87	22
<1 day a month	7	16	10	13	15	9
1–3 days a month	10	15	12	13	10	5
1–2 days a week	16	10	2	7	12	2
3–4 days a week	2	4	0	5	2	2
≥5 days a week	4	3	0	4	0	0
Total	39	119	41	42	126	40

First Wave Frequency	Westside			South Atlanta		
	Decreased	No change	Increased	Decreased	No change	Increased
Never	0	47	9	0	60	10
<1 day a month	1	3	1	5	2	1
1–3 days a month	2	3	1	3	1	1
1–2 days a week	1	1	0	0	0	1
3–4 days a week	1	0	1	2	0	0
≥5 days a week	0	0	0	0	0	0
Total	5	54	12	10	63	13

As shown in the tables, the vast majority of respondents are not commuting or making other trips by bike in both waves. There is some movement of respondents to begin making commute or other trips by bike, but similar numbers of respondents increased as decreased overall. Standout results are that more respondents increased commute trips in Grant Park than in the Eastside, perhaps indicating that the extension of the BeltLine opened up other neighborhoods than those along the trail. For other trips, the Westside has a noticeable increase and limited decrease in bike trips, while the comparable control (South Atlanta) had a similar increase and decrease.

Conclusions

The research presented in this report investigated preferences for bicycle infrastructure and the impact of the BeltLine on travel behavior. Surveys were deployed in two waves in the neighborhoods of the two BeltLine treatments of interest (Eastside Extension and Westside Trail) and their similar control neighborhoods (Grant Park and South Atlanta, respectively). The first wave of the survey was sent out in May 2017, roughly 6 months before the completion of both projects, while the second wave of the survey was sent out in May 2018, roughly 6 months after the opening of both facilities.

Results from the first wave were used to analyze preferences for and perceptions of a variety of bicycle facilities. Images were created in photoshop to identify specific roadway characteristics—namely on-street parking, the number of automobile lanes, and the type of bicycle facility—and presented to respondents. The resulting models indicate a clear preference and positivity toward bicycle facilities that are more separated from vehicles. Parking was also identified as a consistent negative, though protected infrastructure was enough to overcome those negatives. Models segmented by rider type (based on cycling frequency and purpose) indicate that different rider types have different tastes for certain infrastructure characteristic, such as a preference of recreational cyclists for multi-use paths.

Results from the second wave were used to assess perceptions of how transportation in the communities has changed over the previous year. Results indicate that there is a perception in all study areas that private automobile conditions have worsened, while ride-hailing availability has improved and transit conditions have remained roughly the same. There is a perception within the treatment locations that pedestrian infrastructure has improved to a greater extent than within control locations, though the trend was positive in both cases. Perceptions of bicycle facility availability and quality were positive in all locations, with Eastside and Grant Park expressing

similar amounts of improvement while Westside expressed a significantly greater amount of perceived improvements than South Atlanta. Perceptions of both pedestrian and bike improvements in each site can be attributable to the BeltLine. The differences between these perceptions between the two neighborhood pairs may be an indication that while the impact of both BeltLine treatments appears to be comparable for pedestrian perceptions, the Eastside area has either already seen the bulk of the improvements that came with the original Eastside BeltLine segment or that the improvements associated with the extension have already begun to spill into Grant Park.

Comparisons in responses were also conducted for those who responded to both waves. Preferences and perceptions (as measured by the hypothetical images) were similar on average between the two waves, though there was a lot of individual variability. Despite this variability, a slight but significant difference was identified in treatment locations of a decrease in perceived safety and an increase in willingness to try, indicating that those near the BeltLine treatments were more likely in general to express a lower level of perceived safety for roadway configurations but a higher level of willingness to try biking on them.

Implementation Recommendations

One of the primary purposes of GDOT research is to inform future planning, design, operations, and maintenance practices at the agency. There are several key policy takeaways from the research presented in this report that should be carried forward for implementation of the research.

First and foremost, throughout both waves of the survey, respondents showed a clear preference and positivity toward bicycle facilities that are more separated from vehicles. Parking was also identified as a consistent negative, though protected infrastructure was enough to overcome those negatives. GDOT should focus on implementing protected bicycle infrastructure and multi-use trails to encourage bicycle trip-making behavior.

Second, the implementation of multi-use trails such as the BeltLine have positive impacts on the impression of sidewalk quality and availability as well as bicycle facility quality and availability. Facilities such as the BeltLine are noticed and appreciated by residents. This gives further evidence that multi-use trails should be encouraged and funded.

Finally, through this study, a ready-made survey to assess future sections of the BeltLine and other bicycle infrastructure has been developed. As policy, GDOT should ensure that as infrastructure is constructed, before-and-after surveys such as this one are conducted to better understand preferences and impacts over time.

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Appendix A: First-Wave Survey

Community Transportation Study

Thanks for taking our survey! Remember, we are interested in your answer to **each** question, even those dealing with topics that might be less familiar to you. If you have any questions, please feel free to contact my study team at survey@ce.gatech.edu, or me at kari.watkins@ce.gatech.edu, or call toll-free *1-855-444-2930*.

Alternatively, you may take the survey online at http://bit.ly/GTtranspo, with access code: **{code}**

To make sure we count your opinions, please complete the survey by ***May 12, 2017*** and send it back to us in the postage-paid envelope provided. If you are unable to fill out the survey by then, we would still welcome it as soon as you can. After completion of the survey, we'll send you a $2 bill as a token of gratitude. Thanks again!

Part A: Your Views on Various Topics

To begin, we'd like to learn more about your opinions on various issues related to travel and lifestyles. This will help us understand your answers to later questions. We want your true opinion on each statement, or your best guess for topics you are not very familiar with. Remember, **there are no "right" or "wrong" answers!**

1. For each of the following statements, please choose the response that most closely fits your reaction.

	Strongly disagree	*Disagree*	*Neutral or No opinion*	*Agree*	*Strongly agree*
I like the idea of living in a neighborhood where I can walk to the grocery store.	☐	☐	☐	☐	☐
The importance of exercise is overrated.	☐	☐	☐	☐	☐
Owning a car is an important sign of my freedom.	☐	☐	☐	☐	☐
Most drivers don't seem to notice bicyclists.	☐	☐	☐	☐	☐
Taking risks fits my personality.	☐	☐	☐	☐	☐
I'm often in a hurry to be somewhere else.	☐	☐	☐	☐	☐
This country has gone too far in its efforts to protect the environment.	☐	☐	☐	☐	☐
I generally enjoy the act of traveling itself.	☐	☐	☐	☐	☐
Around here, adults who bicycle for transportation are viewed as odd.	☐	☐	☐	☐	☐
The functionality of a car is more important to me than its brand.	☐	☐	☐	☐	☐
I can usually find good ways to use the time I spend traveling each day.	☐	☐	☐	☐	☐
I like to be among the first people to have the latest technology.	☐	☐	☐	☐	☐
I am trying to have an environmentally-friendly lifestyle.	☐	☐	☐	☐	☐
Most bicyclists look like they spend a lot of money on their bikes.	☐	☐	☐	☐	☐
I like trying things that are new and different.	☐	☐	☐	☐	☐

	Strongly disagree	*Disagree*	*Neutral or No opinion*	*Agree*	*Strongly agree*
I am usually very cautious with strangers.	☐	☐	☐	☐	☐
I like traveling by car.	☐	☐	☐	☐	☐
It's pretty hard for my friends to get me to change my mind.	☐	☐	☐	☐	☐
Kids often ride bicycles around my neighborhood for fun.	☐	☐	☐	☐	☐
My time spent in everyday travel is generally wasted time.	☐	☐	☐	☐	☐
I'm too busy to do many things I'd like to do.	☐	☐	☐	☐	☐
I like the idea of sometimes walking or biking instead of taking the car.	☐	☐	☐	☐	☐
I feel like I need to make the most of every single minute.	☐	☐	☐	☐	☐
Many bicyclists appear to have little regard for their personal safety.	☐	☐	☐	☐	☐
I am fine with not owning a car, as long as I can use/rent one any time I need it.	☐	☐	☐	☐	☐
Improving sidewalks should be a priority for my town.	☐	☐	☐	☐	☐
The only good thing about traveling is arriving at your destination.	☐	☐	☐	☐	☐
Most bicyclists look like they are too poor to own a car.	☐	☐	☐	☐	☐
I like using public transit when it provides good service.	☐	☐	☐	☐	☐
Getting regular exercise is very important to me.	☐	☐	☐	☐	☐
My dream is to live in a large house with a big yard.	☐	☐	☐	☐	☐
I would bicycle more if my friends / family came with me.	☐	☐	☐	☐	☐
I avoid doing things that I know my friends would dislike.	☐	☐	☐	☐	☐
I prefer to minimize the material goods I possess.	☐	☐	☐	☐	☐
Our first concern for transportation should be helping cars get around better.	☐	☐	☐	☐	☐
My phone is so important to me, it's almost a part of my body.	☐	☐	☐	☐	☐
I like bicycling.	☐	☐	☐	☐	☐
I am generally satisfied with my life.	☐	☐	☐	☐	☐

Part B: Technology in Your Life

In this short section, we are interested in learning about your online preferences and habits, and understanding how they relate to your lifestyles and travel choices.

1. Do you **regularly use** any of the following devices (for work or personal purposes)? Please respond to each.

	Yes	*No*
Smartphone	☐	☐
Basic (non-smartphone) cell phone	☐	☐
Laptop	☐	☐
Desktop computer	☐	☐
Tablet (e.g., iPad, Galaxy Tab)	☐	☐
Wearable technology (e.g., Apple Watch, Fitbit)	☐	☐

2. How often do you use a **computer** or **smartphone app** to do each of the following things?

	Seldom or never	*Several times a year*	*At least once a month*	*At least once a week*	*(Almost) every day*
Check traffic to plan my route or departure time	☐	☐	☐	☐	☐
Check bus / train arrivals	☐	☐	☐	☐	☐
Decide which means of transportation to use for a trip	☐	☐	☐	☐	☐
Identify possible destinations (e.g., restaurant, store)	☐	☐	☐	☐	☐
Learn how to get to a new place	☐	☐	☐	☐	☐
Navigate in real time (e.g., using Garmin, Waze)	☐	☐	☐	☐	☐
Check the weather	☐	☐	☐	☐	☐

Part C: The Place You Call Home

Learning more about your home will help us understand how these factors affect the way you organize your daily activities and the way you travel.

1. What best describes the type of residence you currently live in? Please check one.

☐ Detached (free-standing) home
☐ Attached home / duplex / townhouse
☐ Apartment /condo building
☐ Dormitory
☐ Other (please specify): _____

2. In what year (YYYY) did you move to your current address?

Year: _____
☐ I have lived here my entire life

3. Knowing more about your general neighborhood will help us put your transportation choices and opinions in context. Please give your address or, if you prefer, an intersection (two streets that cross) near your home.

_____ (and _____)

City: _____ Zip code: _____

4. Who lives with you? Please check all that apply:

- ☐ My partner / husband / wife
- ☐ My child(ren) or grandchild(ren)
- ☐ My parent(s) or grandparent(s)
- ☐ One or more of my siblings
- ☐ Some other relative(s)
- ☐ One or more roommates / housemates
- ☐ I live alone
- ☐ Other (please specify): _____

Part D: Your Daily Travel

Please think about your everyday travel: where you go to work or school, shop, and relax. We're interested in learning about your typical transportation choices.

1. On average, how many days per week do you do each of the following? By **telecommuting**, we mean **working / studying** from home or a nearby location (not counting overtime work at home).

Travel to **work:** ____ days/wk	Travel to **school:**____ days/wk	**Telecommute:** ____ days/wk
☐ Not applicable	☐ Not applicable	☐ Not applicable

For the following block of questions, please consider the regular trip to your main **work / school** location. If you travel to **more than one location** on a regular basis, consider the location to which you travel most often.

→ If you don't travel to **work or school**, please go to **question 7 of Part D, page 5**

2. How far do you live from your main **work / school** destination? _____ miles

3. How long does it usually take you to get from home to **work / school** (one-way trip)? _____ minutes

4. Knowing more about where you **work / study** will help us better understand the transportation options that are available to you. Please give the address or, if you prefer, an intersection (two streets that cross) that is close to your **main work / school location**.

_____ (and _____)

City: _____ Zip code: _____

5. In terms of its **value to you**, how would you rate the time you typically spend on your **work / school** trip? Place a mark (×) at the most appropriate place on the scale below:

Mostly wasted time |———|———|———|———|———| *Mostly useful time*

6. Considering your **trips to work / school**, please indicate **how often** you use each of the following means of transportation for such trips:

	Never	*Less than once a **month***	*1-3 days a **month***	*1-2 days a **week***	*3-4 days a **week***	*5 or more days a **week***
Alone in personal car, truck, van, or motorcycle	☐	☐	☐	☐	☐	☐
With others in car, van...	☐	☐	☐	☐	☐	☐
Public transit	☐	☐	☐	☐	☐	☐
Taxi	☐	☐	☐	☐	☐	☐
Uber, Lyft, etc.	☐	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐	☐
Walk	☐	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐	☐

7. Consider your **trips for other** (non-work / school) **purposes** (e.g., for grocery or clothes shopping, going to a restaurant/bar or ball game, attending church, visiting others, running errands, or for hobbies). Please indicate **how often** you typically make such trips, using each of the following means of transportation:

	Never	*Less than once a **month***	*1-3 days a **month***	*1-2 days a **week***	*3-4 days a **week***	*5 or more days a **week***
Alone in personal car, truck, van, or motorcycle	☐	☐	☐	☐	☐	☐
With others in car, van...	☐	☐	☐	☐	☐	☐
Public transit	☐	☐	☐	☐	☐	☐
Taxi	☐	☐	☐	☐	☐	☐
Uber, Lyft, etc.	☐	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐	☐
Walk	☐	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐	☐

8. Thinking about all your travel, would you **like** to travel **more** or **less** by the following **means of transportation,** and for the following **purposes**? Please respond for **each means** and **each purpose**.

I'd like to travel:	*Less*	*About the same*	*More*
By car/truck/van /motorcycle	☐	☐	☐
By public transit	☐	☐	☐
By bicycle	☐	☐	☐
By walking	☐	☐	☐
By other: _____	☐	☐	☐

I'd like to travel:	*Less*	*About the same*	*More*
For work / school	☐	☐	☐
For shopping	☐	☐	☐
For social	☐	☐	☐
For entertainment	☐	☐	☐
For eating out	☐	☐	☐
For other:_____	☐	☐	☐

With respect to **how well they meet your current needs**, please rate the four most common means of travel on each of the following attributes. We are interested in your views on **each,** even **if you seldom** or **never use** some of these means.

Personal vehicle (e.g., car, truck, van, motorcycle)	*Very bad*	*Bad*	*Neutral or No opinion*	*Good*	*Very good*
Overall rating as a means of travel for me	☐	☐	☐	☐	☐
Comfort	☐	☐	☐	☐	☐
Ability to get where I need or want to go	☐	☐	☐	☐	☐
Reliability	☐	☐	☐	☐	☐
Safety / security	☐	☐	☐	☐	☐
Effect on the environment	☐	☐	☐	☐	☐
Cost	☐	☐	☐	☐	☐
Availability when needed / wanted	☐	☐	☐	☐	☐
Traveling in poor weather conditions	☐	☐	☐	☐	☐
Ability to stop at additional places on the same trip	☐	☐	☐	☐	☐
Avoiding congestion	☐	☐	☐	☐	☐
Privacy	☐	☐	☐	☐	☐
Ability to carry things with me	☐	☐	☐	☐	☐
Ability to spend travel time in useful ways	☐	☐	☐	☐	☐
Ability to relax / have fun while traveling	☐	☐	☐	☐	☐

Public transportation (e.g., local bus)	*Very bad*	*Bad*	*Neutral or No opinion*	*Good*	*Very good*
Overall rating as a means of travel for me	☐	☐	☐	☐	☐
Comfort	☐	☐	☐	☐	☐
Ability to get where I need or want to go	☐	☐	☐	☐	☐
Reliability	☐	☐	☐	☐	☐
Safety / security	☐	☐	☐	☐	☐
Effect on the environment	☐	☐	☐	☐	☐
Cost	☐	☐	☐	☐	☐
Availability when needed/ wanted	☐	☐	☐	☐	☐
Traveling in poor weather conditions	☐	☐	☐	☐	☐
Ability to stop at additional places on the same trip	☐	☐	☐	☐	☐
Avoiding congestion	☐	☐	☐	☐	☐
Privacy	☐	☐	☐	☐	☐
Ability to carry things with me	☐	☐	☐	☐	☐
Ability to spend travel time in useful ways	☐	☐	☐	☐	☐
Ability to relax / have fun while traveling	☐	☐	☐	☐	☐

Remember, we want your considered opinions on each means of travel, **even if you never use** some of them.

Bicycling	*Very bad*	*Bad*	*Neutral or No opinion*	*Good*	*Very good*
Overall rating as a means of travel for me	☐	☐	☐	☐	☐
Comfort	☐	☐	☐	☐	☐
Ability to get where I need or want to go	☐	☐	☐	☐	☐
Reliability	☐	☐	☐	☐	☐
Safety / security	☐	☐	☐	☐	☐
Effect on the environment	☐	☐	☐	☐	☐
Cost	☐	☐	☐	☐	☐
Availability when needed/ wanted	☐	☐	☐	☐	☐
Traveling in poor weather conditions	☐	☐	☐	☐	☐
Ability to stop at additional places on the same trip	☐	☐	☐	☐	☐
Avoiding congestion	☐	☐	☐	☐	☐
Privacy	☐	☐	☐	☐	☐
Ability to carry things with me	☐	☐	☐	☐	☐
Ability to spend travel time in useful ways	☐	☐	☐	☐	☐
Ability to relax / have fun while traveling	☐	☐	☐	☐	☐

Walking	*Very bad*	*Bad*	*Neutral or No opinion*	*Good*	*Very good*
Overall rating as a means of travel for me	☐	☐	☐	☐	☐
Comfort	☐	☐	☐	☐	☐
Ability to get where I need or want to go	☐	☐	☐	☐	☐
Reliability	☐	☐	☐	☐	☐
Safety / security	☐	☐	☐	☐	☐
Effect on the environment	☐	☐	☐	☐	☐
Cost	☐	☐	☐	☐	☐
Availability when needed/ wanted	☐	☐	☐	☐	☐
Traveling in poor weather conditions	☐	☐	☐	☐	☐
Ability to stop at additional places on the same trip	☐	☐	☐	☐	☐
Avoiding congestion	☐	☐	☐	☐	☐
Privacy	☐	☐	☐	☐	☐
Ability to carry things with me	☐	☐	☐	☐	☐
Ability to spend travel time in useful ways	☐	☐	☐	☐	☐
Ability to relax / have fun while traveling	☐	☐	☐	☐	☐

On the next two pages, we portray six different kinds of bikeways in use today. Please look at the images carefully and answer a few questions for each one.

Sharrows on 2-lane road

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 2-lane road

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on 2-lane road

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on 4-lane road

Compared to the previous image, this bikeway is placed next to a 4-lane road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Protected bike lane on 2-lane road

A protected bike lane is an exclusive bike lane that physically separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on road with parking

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road without parking

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 2>

Buffered bike lane on road without parking

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the buffered bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Two-way protected bike lanes on road with parking

Two-way protected bike lanes physically separate bicyclists (coming from both directions) from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on 4-lane road

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 2-lane road

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 4-lane road

Compared to the previous image, this bikeway is placed next to a 4-lane road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 3>

Buffered bike lane on 4-lane road

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Protected bike lane on 4-lane road

A protected bike lane is an exclusive bike lane that physically separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on road without parking

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road without parking

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 4>

Buffered bike lane on road without parking

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Two-way protected bike lanes on road without parking

Two-way protected bike lanes physically separate bicyclists (coming from both directions) from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Part E: Your Bicycling Experience

Bicycling is one activity that is gaining more attention, and new bikeways are being installed in many cities. Whether you love it, hate it, or don't care – we're interested in your opinions about bicycling.

1. How would you rate your ability to ride a bicycle? Please indicate your confidence level, regardless of whether it is practical or desirable for you to ride a bicycle nowadays.

   ☐ I cannot ride a bike at all → Please go to **question 4 below**.
   ☐ I can ride a bike, but I am not very confident doing so
   ☐ I am somewhat confident riding a bike
   ☐ I am very confident riding a bike

2. On average, how many miles do you ride a bicycle… ☐ I don't ride a bicycle much / ever

   … for completely **recreational** purposes? _____ miles per **week** ***OR*** _____ miles per **month**

   … for **practical** purposes
   (e.g., to go to work / school, to the store)? _____ miles per **week** ***OR*** _____ miles per **month**

3. Regardless of how you *currently* get there, which of the following factors make it more difficult for you to travel to **work / school** by bicycling? Place a mark (×) at the appropriate place on the scale for each statement below:

	Does not limit ⟺ *Absolutely prevents*	*Does not apply*
The location is too far to be reached by bicycle	|——|——|——|——|	☐
Weather (e.g., rain, heat, cold)	|——|——|——|——|	☐
It is too slow	|——|——|——|——|	☐
It takes too much physical effort	|——|——|——|——|	☐
Safety / security concerns (e.g., traffic, accidents)	|——|——|——|——|	☐
Need to make multiple trips	|——|——|——|——|	☐
Negative effect on appearance (e.g., sweat, hair)	|——|——|——|——|	☐
Difficult to carry bags/heavy packages with me	|——|——|——|——|	☐
Difficult to travel with children	|——|——|——|——|	☐
Other (please specify): _____	|——|——|——|——|	☐

4. When it comes to bicycling, what are your experiences and future choices with respect to these activities? Please check the **single most appropriate answer** for **each** of the five activities below:

	I ***do*** *it now*		*I've* ***done*** *it*		*I've* ***never done*** *it*	
	& might continue	***& won't continue***	***& might do*** *it again*	***& won't do*** *it again*	***& might do*** *it*	***& won't do*** *it*
Bicycling to work / school	☐	☐	☐	☐	☐	☐
Bicycling to go other places	☐	☐	☐	☐	☐	☐
Bicycling for fun / exercise	☐	☐	☐	☐	☐	☐
Bicycling in bad weather	☐	☐	☐	☐	☐	☐
Using bikeshare services	☐	☐	☐	☐	☐	☐

Part F: Some Background about Yourself

This is the last section of the survey. We're almost done! To help us know you a little bit better, we'd like to ask you a few background questions.

1. How old were you on January 1, 2016? _____ years old

2. Where did you grow up? Please indicate the single US state or territory, or foreign country, where you lived for the longest period of time as a child / teenager. _____

3. Overall, how would you describe the area where you were raised?

   ☐ Small town/ rural
   ☐ Suburban
   ☐ Core of a small urban area (e.g., population less than 1 million)
   ☐ Core of a large urban area (e.g., population over 1 million)

4. What is your gender identity?

   ☐ Female
   ☐ Male
   ☐ Prefer not to answer
   ☐ Other (please specify):_____

5. Would you describe yourself as… (please check all that apply)

   ☐ American Indian/Native American
   ☐ Asian/Pacific Islander
   ☐ Black/African American
   ☐ Hispanic/Latino
   ☐ White/Caucasian
   ☐ Prefer not to answer
   ☐ Other (please specify): _____

6. Do you have a driver's license? ☐ Yes ☐ No

7. Are you a current student? ☐ Yes, full-time ☐ Yes, part-time ☐ No

8. What is your educational background? Please check the **highest level attained**.

   ☐ Some grade / some high school
   ☐ High school / GED
   ☐ Some college / technical school
   ☐ Associate's degree
   ☐ Bachelor's degree
   ☐ Graduate degree (e.g., MS, PhD, MBA)
   ☐ Professional degree (e.g., JD, MD, DDS)
   ☐ Prefer not to answer

9. Which statements describe your current employment situation? Please check all that apply:

   ☐ I work full-time
   ☐ I work part-time
   ☐ I have two or more jobs
   ☐ I am a homemaker/ unpaid caregiver
   ☐ I do not work
   → Please go to the **next page**.

10. Which option best describes your main occupation?

    ☐ Professional/technical
    ☐ Manager/administrator
    ☐ Sales/marketing
    ☐ Production/construction
    ☐ Service/repair
    ☐ Clerical/administrative support
    ☐ Other (please specify): _____

11. On average, **how many hours** in a week do you work **for pay**? _____ hours per week

For the following questions, please remember that by **"household"** we mean, "people who live together and share at least some financial resources" (ordinary housemates/ roommates are usually **not** considered members of the same household).

12. **Including yourself**, how many people live in your household? _____ people

13. **Including yourself**, how many people in your household fall into **each** of the age groups listed below? If there is no one in a particular age group, please respond with zero ("0") for that age group.

    _____ persons under 6 years old
    _____ persons 6-12
    _____ persons 13-17
    _____ persons 18-26
    _____ persons 27-34
    _____ persons 35-50
    _____ persons 51-65
    _____ persons 66-75
    _____ persons over the age of 75
    ☐ Prefer not to answer

14. **Including yourself**, how many people in your household hold a driver's license? _____ people

15. How many motorized vehicles (e.g., cars, vans, motorcycles) does your household have? _____ vehicles

16. How many bicycles does your household have? If none, please write "0". _____ bicycles

17. Please check the category that contains your approximate annual **household income** before taxes:

    ☐ $15,000 or less
    ☐ $15,001 to $30,000
    ☐ $30,001 to $50,000
    ☐ $50,001 to $75,000
    ☐ $75,001 to $100,000
    ☐ $100,001 to $125,000
    ☐ More than $125,000
    ☐ Prefer not to answer

18. In 2016 and 2017 your community may experience changes in transportation, and it is important for us to know your opinions on these changes. To help us reach you for the **follow-up survey next year**, it would be useful to have your email address if you have one. In addition, if you are willing to be contacted in case we have any questions about your survey, we would appreciate having your phone number. All of this information is kept completely confidential, and will never be used for any other purpose.

    Email: _____ Phone: (_____) _____–_____
    area code

Thank you for your time!

We welcome any additional comments you may have regarding transportation in your community. Please write them in the space below, and on additional sheets of paper if needed.

Appendix B: Second-Wave Survey

Georgia Institute of Technology

School of Civil and Environmental Engineering

April 30, 2018

Dear <Resident> or current resident:

Georgia Tech is leading a study of transportation in your community. You or a member of your household completed a previous survey for this study in Spring 2017, and we are now following up regarding how your travel may have changed since then. We are interested in your daily travel and the things that can cause it to change over time, which is why we are asking you to participate in this shorter survey even though you may have completed the previous one. The findings of this study will inform transportation planning throughout the Southeast and across the nation.

Your participation in this study is voluntary, but your responses are ***extremely*** important to us. The questionnaire will take about 20 minutes to complete, and we think you'll find the content interesting. We ask that the survey be filled out by the same adult (19 years old or older) as before. However, if that person is unable to participate, another adult in the household may do so. Please limit your response to one survey per household.

Study records will be kept confidential to the extent allowed by law, and all identifying information will be kept in a secure location at Georgia Tech. The risks involved in participating are no greater than those involved in daily activities. You do not waive any of your legal rights by agreeing to be in the study.

After completion of the survey, we'll send you a $2 bill as a token of our gratitude. You won't receive any other personal benefits for participating, aside from the satisfaction of contributing to better transportation planning.

To ensure the timely inclusion of your responses in the study, we kindly ask you to complete the survey by ***May 25, 2018.*** If you are unable to fill out the questionnaire by then, we would still welcome it as soon as you can. You may complete the printed copy included and return it back to us in the postage-paid envelope provided, or, alternatively, we encourage you to take the survey online at the following website:

http://bit.ly/transpo2018

To access the online survey, please enter your invitation five-letter code:

{codes}

If you have questions about the study, please email my study team at survey<VersionNumber>@ce.gatech.edu or me personally at kari.watkins@ce.gatech.edu, or call toll-free *1-855-444-2930*. If you have any questions about your rights as a research subject, you may contact Ms. Melanie Clark, Georgia Institute of Technology at (404) 894-6942. Thank you in advance for your time and for sharing your thoughts and opinions with us.

Thank you,

Kari E. Watkins

Dr. Kari Edison Watkins, PhD, PE
Associate Professor

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Atlanta, GA 30332-0355 U.S.A.
Phone 404-894-2201

Part A: Your Views on Various Topics

To begin, we ask for your opinions on some travel and lifestyle topics. Even if you responded to similar items in the previous survey, we'd like to know your current thoughts on each item, including your best guesses on topics that are less familiar to you. Remember, **there are no "right" or "wrong" answers!**

1. For each of the following statements, please choose the response that most closely fits your reaction.

	Strongly disagree	*Disagree*	*Neutral or No opinion*	*Agree*	*Strongly agree*
I like the idea of living in a neighborhood where I can walk to the grocery store.	☐	☐	☐	☐	☐
The importance of exercise is overrated.	☐	☐	☐	☐	☐
Owning a car is an important sign of my freedom.	☐	☐	☐	☐	☐
Most drivers don't seem to notice bicyclists.	☐	☐	☐	☐	☐
The functionality of a car is more important to me than its brand.	☐	☐	☐	☐	☐
I'm often in a hurry to be somewhere else.	☐	☐	☐	☐	☐
This country has gone too far in its efforts to protect the environment.	☐	☐	☐	☐	☐
I generally enjoy the act of traveling itself.	☐	☐	☐	☐	☐
Around here, adults who bicycle for transportation are viewed as odd.	☐	☐	☐	☐	☐
Taking risks fits my personality.	☐	☐	☐	☐	☐
I can usually find good ways to use the time I spend traveling each day.	☐	☐	☐	☐	☐
I like to be among the first people to have the latest technology.	☐	☐	☐	☐	☐
I am trying to have an environmentally-friendly lifestyle.	☐	☐	☐	☐	☐
Most bicyclists look like they spend a lot of money on their bikes.	☐	☐	☐	☐	☐
I like trying things that are new and different.	☐	☐	☐	☐	☐
It's pretty hard for my friends to get me to change my mind.	☐	☐	☐	☐	☐
I like traveling by car.	☐	☐	☐	☐	☐
Kids often ride bicycles around my neighborhood for fun.	☐	☐	☐	☐	☐
I am usually very cautious with strangers.	☐	☐	☐	☐	☐
My time spent in everyday travel is generally wasted time.	☐	☐	☐	☐	☐
I'm too busy to do many things I'd like to do.	☐	☐	☐	☐	☐
I like the idea of sometimes walking or biking instead of taking the car.	☐	☐	☐	☐	☐

	Strongly disagree	*Disagree*	*Neutral or No opinion*	*Agree*	*Strongly agree*
I feel like I need to make the most of every single minute.	☐	☐	☐	☐	☐
Many bicyclists appear to have little regard for their personal safety.	☐	☐	☐	☐	☐
I am fine with not owning a car, as long as I can use/rent one any time I need it.	☐	☐	☐	☐	☐
Improving sidewalks should be a priority for my town.	☐	☐	☐	☐	☐
The only good thing about traveling is arriving at your destination.	☐	☐	☐	☐	☐
Most bicyclists look like they are too poor to own a car.	☐	☐	☐	☐	☐
I like using public transit when it provides good service.	☐	☐	☐	☐	☐
Getting regular exercise is very important to me.	☐	☐	☐	☐	☐
My dream is to live in a large house with a big yard.	☐	☐	☐	☐	☐
I would bicycle more if my friends / family came with me.	☐	☐	☐	☐	☐
I avoid doing things that I know my friends would dislike.	☐	☐	☐	☐	☐
I prefer to minimize the material goods I possess.	☐	☐	☐	☐	☐
I like bicycling.	☐	☐	☐	☐	☐
My phone is so important to me, it's almost a part of my body.	☐	☐	☐	☐	☐
Our first concern for transportation should be helping cars get around better.	☐	☐	☐	☐	☐
I am generally satisfied with my life.	☐	☐	☐	☐	☐

Part B: Your Daily Travel

Please think about your everyday travel: where you go to work or school, shop, and relax. We're interested in learning about your typical transportation choices.

1. Are you a current student? ☐ Yes, full-time ☐ Yes, part-time ☐ No

2. Which statements describe your current employment situation? Please check all that apply:

   ☐ I work full-time
   ☐ I work part-time
   ☐ I have two or more jobs
   ☐ I am a homemaker/ unpaid caregiver
   ☐ I do not work/ I am retired

If you do NOT **work or attend school** at all, please go to **question 10 of Part B, page 5** →

If you **work OR attend school,** please respond to the following questions about your work or school experience and commute.

3. On average, **how many hours** in a week do you work **for pay**? _____ hours per week

4. On average, how many days per week do you do each of the following? By **telecommuting**, we mean **working / studying** from home or a nearby location (not counting overtime work at home).

   Travel to **work:** ____ days/wk ☐ Not applicable
   Travel to **school:** ____ days/wk ☐ Not applicable
   Telecommute: ____ days/wk ☐ Not applicable

5. How far do you live from your main **work / school** destination? _____ miles

6. How long does it usually take you to get from home to **work / school** (one-way trip)? _____ minutes

7. Knowing more about where you **work / study** will help us understand the transportation options available. Please give the address or, if you prefer, an intersection (two streets that cross) close to your **main work / school location**. If you travel to **more than one location** on a regular basis, consider the location to which you travel most often.

   _____ (and _____)

   City: _____ Zip code: _____

8. In terms of its **value to you**, how would you rate the time you typically spend on your **work / school** trip? Place a mark (×) at the most appropriate place on the scale below:

   Mostly wasted time |————|————|————|————|————| *Mostly useful time*

9. Considering your **trips to work / school**, please indicate **how often** you use each of the following means of transportation for such trips:

	Never	*Less than once a **month***	*1-3 days a **month***	*1-2 days a **week***	*3-4 days a **week***	*5 or more days a **week***
Alone in personal car, truck, van, or motorcycle	☐	☐	☐	☐	☐	☐
With others in car, van...	☐	☐	☐	☐	☐	☐
Public transit	☐	☐	☐	☐	☐	☐
Taxi	☐	☐	☐	☐	☐	☐
Uber, Lyft, etc.	☐	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐	☐
Walk	☐	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐	☐

10. Consider your **trips for other** (non-work / school) **purposes** (e.g., for grocery or clothes shopping, going to a restaurant/bar or ball game, attending church, visiting others, running errands, or for hobbies). Please indicate **how often** you use each of the following means of transportation for such trips:

	Never	*Less than once a **month***	*1-3 days a **month***	*1-2 days a **week***	*3-4 days a **week***	*5 or more days a **week***
Alone in personal car, truck, van, or motorcycle	☐	☐	☐	☐	☐	☐
With others in car, van...	☐	☐	☐	☐	☐	☐
Public transit	☐	☐	☐	☐	☐	☐
Taxi	☐	☐	☐	☐	☐	☐
Uber, Lyft, etc.	☐	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐	☐
Walk	☐	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐	☐

11. We would like to know whether transportation in your community has changed since Spring 2017, either for better or worse. Please give your opinion for each category below.

	Much worse	*Somewhat worse*	*Neutral/ No change*	*Somewhat better*	*Much better*
Traffic congestion	☐	☐	☐	☐	☐
Parking availability	☐	☐	☐	☐	☐
Public transit route coverage (can reach more/fewer places)	☐	☐	☐	☐	☐
Public transit frequency (comes more/less often)	☐	☐	☐	☐	☐
Sidewalk availability (more/fewer of them)	☐	☐	☐	☐	☐
Sidewalk quality	☐	☐	☐	☐	☐
Bicycle safety	☐	☐	☐	☐	☐
Availability of bicycle lanes and trails	☐	☐	☐	☐	☐
Quality of bicycle lanes and trails	☐	☐	☐	☐	☐
Availability of taxi/ Uber/ Lyft	☐	☐	☐	☐	☐
Other (please specify): _____	☐	☐	☐	☐	☐

On the next two pages, we portray six different kinds of bikeways in use today. Please look at the images carefully and answer a few questions for each one, even if you are not very interested in bicycling.

Sharrows on 2-lane road

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 2-lane road

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on 2-lane road

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on 4-lane road

Compared to the previous image, this bikeway is placed next to a 4-lane road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Protected bike lane on 2-lane road

A protected bike lane is an exclusive bike lane that physically separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on road with parking

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road without parking

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 2>

Buffered bike lane on road without parking

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Buffered bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the buffered bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Two-way protected bike lanes on road with parking

Two-way protected bike lanes physically separate bicyclists (coming from both directions) from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on 4-lane road

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 2-lane road

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on 4-lane road

Compared to the previous image, this bikeway is placed next to a 4-lane road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 3>

Buffered bike lane on 4-lane road

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Protected bike lane on 4-lane road

A protected bike lane is an exclusive bike lane that physically separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Sharrows on road without parking

Sharrows ("share arrows") show that motorists and bicyclists will be sharing the road. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road without parking

A bike lane is a dedicated lane for bicycling, separated with pavement markings only. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Bike lane on road with parking

Compared to the previous image, this bikeway has parked cars on the right side of the bike lane. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

<VERSION 4>

Buffered bike lane on road without parking

A buffered bike lane is a bike lane with buffer space that separates bicyclists from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Two-way protected bike lanes on road without parking

Two-way protected bike lanes physically separate bicyclists (coming from both directions) from motorists. Please mark your reaction to **each** statement below:

Bicycling on a road like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a road like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Multi-use trail

A multi-use trail is a dedicated path for bicyclists and pedestrians that is completely separate from the road. Please mark your reaction to **each** statement below:

Bicycling on a trail like this is …	*Completely disagree*	*Disagree*	*Neutral*	*Agree*	*Completely agree*
Comfortable	☐	☐	☐	☐	☐
Safe	☐	☐	☐	☐	☐
Something I'd try	☐	☐	☐	☐	☐

How often have you bicycled on a trail like this? ☐ Never ☐ Sometimes ☐ Often ☐ Not sure

Part C: Your Bicycling Experience

Bicycling is one activity that is gaining more attention. Whether you love it, hate it, or don't care – we're interested in your opinions about bicycling.

1. How would you rate your ability to ride a bicycle? Please indicate your confidence level, regardless of whether it is practical or desirable for you to ride a bicycle nowadays.

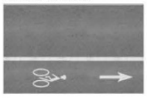
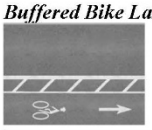
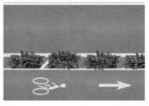
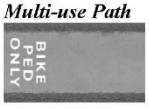
   ☐ I cannot ride a bike at all → Please go to **question 3 below**.
   ☐ I can ride a bike, but I am not very confident doing so
   ☐ I am somewhat confident riding a bike
   ☐ I am very confident riding a bike

2. On average, how many miles do you ride a bicycle… ☐ I (almost) never ride a bicycle

   For completely **recreational** purposes? _____ miles per **week** *OR* _____ miles per **month**

   For **practical** purposes (e.g., to go to work / school, to the store)? _____ miles per **week** *OR* _____ miles per **month**

3. Since Spring 2017, some communities in the US have added new bicycle infrastructure. Have you noticed the *addition* of any of the following features in your community?

	Have you seen this added in your community?			***If you've seen it…***					
				…have you used it?			***…do you like it?***		
	No	*Not sure*	*Yes*	*No*	*Not sure*	*Yes*	*No*	*Neutral*	*Yes*
Sharrow 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Buffered Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Protected Bike Lane 	☐	☐	☐	☐	☐	☐	☐	☐	☐
Multi-use Path 	☐	☐	☐	☐	☐	☐	☐	☐	☐

Part D: Some Background about Yourself

To help us know you a little bit better, we'd like to ask you a few background questions. Again, even if you answered these questions on the previous survey, we need to know if anything has changed.

1. How old were you on January 1, 2018? _____ years old

2. What is your gender identity?
   - ☐ Female
   - ☐ Male
   - ☐ Prefer not to answer
   - ☐ Other (please specify):_____

3. Would you describe yourself as… (please check all that apply)
   - ☐ American Indian/Native American
   - ☐ Asian/Pacific Islander
   - ☐ Black/African American
   - ☐ Hispanic/Latino
   - ☐ White/Caucasian
   - ☐ Prefer not to answer
   - ☐ Other (please specify): _____

4. Do you have a driver's license? ☐ Yes ☐ No

5. What is your educational background? Please check the **highest level attained**.
   - ☐ Some grade school / some high school
   - ☐ High school / GED
   - ☐ Some college / technical school
   - ☐ Associate's degree
   - ☐ Bachelor's degree
   - ☐ Graduate degree (e.g., MS, PhD, MBA)
   - ☐ Professional degree (e.g., JD, MD, DDS)
   - ☐ Prefer not to answer

6. What best describes the type of residence you currently live in? Please check one.
   - ☐ Detached (free-standing) home
   - ☐ Attached home / duplex / townhouse
   - ☐ Apartment /condo building
   - ☐ Dormitory
   - ☐ Other (please specify): _____

7. Knowing more about your general neighborhood will help us put your transportation choices and opinions in context. Please give your address or, if you prefer, an intersection (two streets that cross) near your home.

   _____ (and _____)

   City: _____ Zip code: _____

8. In what year (YYYY) did you move to your current address?

   Year: _____

9. Who lives with you? Please check all that apply:
   - ☐ My partner / husband / wife
   - ☐ My child(ren) or grandchild(ren)
   - ☐ My parent(s) or grandparent(s)
   - ☐ One or more of my siblings
   - ☐ Some other relative(s)
   - ☐ One or more roommates / housemates
   - ☐ I live alone
   - ☐ Other (please specify): _____

For the following questions, we will ask you about your household; by **"household"** we mean, "people who live together and share at least some financial resources" (ordinary housemates/ roommates are **not** considered members of the same household).

10. **Including yourself**, how many people live in your household? _____ people

11. **Including yourself**, how many people in your household fall into **each** of the age groups listed below? If there is no one in a particular age group, please respond with zero ("0") for that age group.

    _____ persons under 6 years old
    _____ persons 6-12
    _____ persons 13-17
    _____ persons 18-26
    _____ persons 27-34
    _____ persons 35-50
    _____ persons 51-65
    _____ persons 66-75
    _____ persons over the age of 75
    ☐ Prefer not to answer

12. **Including yourself**, how many people in your household hold a driver's license? _____ people

13. How many motorized vehicles (e.g., cars, vans, motorcycles) does your household have? _____ vehicles

14. How many bicycles does your household have? If none, please write "0". _____ bicycles

15. Please check the category that contains your approximate annual **household income** before taxes:

    ☐ $15,000 or less
    ☐ $15,001 to $30,000
    ☐ $30,001 to $50,000
    ☐ $50,001 to $75,000
    ☐ $75,001 to $100,000
    ☐ $100,001 to $125,000
    ☐ More than $125,000
    ☐ Prefer not to answer

16. In the coming months and years, your community may experience further changes in transportation, and we may want to ask for your opinions about these changes. To help us reach you for occasional **follow-up surveys in the future**, it would be useful to have your email address if you have one. In addition, if you are willing to be contacted in case we have any questions about your survey, we would appreciate having your phone number. All of this information is kept completely confidential, and will never be used for any other purpose.

    Email: _____ Phone: (_____)_____–_____
    area code

Thank you for your time!

We welcome any additional comments you may have regarding transportation in your community. Please write them in the space below, and on the next page if needed.

Appendix C: Complete Demographics

TABLE C - 1
Wave 1 & 2 Survey Respondents by Gender

Gender	Eastside			Grant Park		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (429)	Wave 2 (230)	(211)	Wave 1 (473)	Wave 2 (261)	(225)
Female	55%	55%	54%	55%	56%	58%
Male	43%	45%	46%	43%	44%	42%

Gender	Westside			Southside		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (226)	Wave 2 (102)	(82)	Wave 1 (188)	Wave 2 (107)	(94)
Female	65%	61%	61%	54%	53%	52%
Male	29%	39%	39%	44%	47%	48%

TABLE C - 2
Wave 1 & 2 Survey Respondents by Age

Age Group	Eastside			Grant Park		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (428)	Wave 2 (230)	(211)	Wave 1 (471)	Wave 2 (261)	(224)
18-34	34%	30%	30%	25%	23%	22%
35-49	38%	44%	43%	40%	36%	38%
50-64	18%	17%	18%	23%	26%	25%
65+	8.1%	10%	9.0%	10%	15%	14%

Age Group	Westside			Southside		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (222)	Wave 2 (100)	(81)	Wave 1 (186)	Wave 2 (105)	(93)
18-34	19%	9%	10%	17%	19%	18%
35-49	22%	28%	28%	29%	27%	30%
50-64	31%	30%	28%	31%	32%	32%
65+	23%	33%	33%	21%	22%	19%

TABLE C - 3
Wave 1 & 2 Survey Respondents by Race

Race	Eastside			Grant Park		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (414)	Wave 2 (226)	(206)	Wave 1 (452)	Wave 2 (258)	(222)
White	77%	79%	81%	76%	83%	83%
African American	11%	12%	13%	12%	13%	13%
Hispanic	0.9%	2.2%	3.4%	2.9%	2.7%	2.3%
Asian	4.6%	7.5%	6.3%	1.3%	1.2%	1.4%
Native American	0.0%	0.0%	0.0%	0.2%	1.9%	1.8%
Other	1.8%	1.3%	1.0%	2.7%	1.9%	1.8%

Race	Westside			Southside		
	Unmatched		Matched	Unmatched		Matched
	Wave 1 (210)	Wave 2 (101)	(78)	Wave 1 (176)	Wave 2 (106)	(93)
White	19%	19%	22%	30%	37%	38%
African American	63%	68%	72%	59%	57%	59%
Hispanic	5.1%	6.9%	5.1%	2.1%	2.8%	1.1%
Asian	0.9%	0.0%	0.0%	1.1%	2.8%	2.2%
Native American	0.4%	2.0%	0.0%	0.0%	1.9%	1.1%
Other	0.9%	4.0%	3.8%	1.1%	2.8%	3.2%

TABLE C - 4
Wave 1 & 2 Survey Respondents by Household Income

Household Income	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (393)	Wave 2 (209)	2017 (192)	2018 (196)	Wave 1 (426)	Wave 2 (233)	2017 (205)	2018 (200)
$15,000 or less	2.0%	1.9%	3.6%	2.0%	3.1%	3.0%	2.4%	2.5%
$15,001 - $30,000	3.8%	2.9%	4.2%	2.6%	4.0%	3.9%	4.9%	4.0%
$30,001 - $50,000	9.2%	6.7%	6.3%	7.1%	7.3%	9.0%	11%	10%
$50,001 - $75,000	14%	12.9%	16%	14%	15%	12.9%	16%	14%
$75,001 - $100,000	16%	14.8%	18%	15%	16%	15.5%	14%	15%
$100,001 - $125,000	15%	18.2%	15%	18%	15%	15.5%	15%	16%
More than $125,000	40%	42.6%	38%	41%	40%	40.3%	37%	39%

Household Income	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (199)	Wave 2 (87)	2017 (78)	2018 (70)	Wave 1 (163)	Wave 2 (89)	2017 (82)	2018 (76)
$15,000 or less	21%	13.8%	21%	14%	17%	14.6%	13%	13%
$15,001 - $30,000	18%	19.5%	22%	19%	20%	14.6%	20%	13%
$30,001 - $50,000	16%	23.0%	13%	24%	15%	11.2%	13%	12%
$50,001 - $75,000	16%	12.6%	12%	11%	16%	18.0%	15%	20%
$75,001 - $100,000	16%	14.9%	21%	13%	14%	19.1%	18%	17%
$100,001 - $125,000	5.0%	11.5%	5.1%	13%	4.9%	5.6%	3.7%	5.3%
More than $125,000	8.0%	4.6%	7.7%	5.7%	13%	16.9%	17%	20%

TABLE C - 5
Wave 1 & 2 Survey Respondents by Household Size

Household Size	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (420)	Wave 2 (222)	2017 (205)	2018 (205)	Wave 1 (459)	Wave 2 (258)	2017 (220)	2018 (221)
1	39%	38%	40%	43%	28%	31%	32%	34%
2	42%	44%	41%	41%	42%	42%	42%	41%
3	9.2%	11.3%	11%	10%	10%	15.1%	13%	12%
4	5.1%	5.4%	4.9%	4.9%	13%	10.5%	11%	10%
5+	0.7%	1.8%	2.0%	1.0%	3.4%	1.6%	1.8%	2.3%

Household Size	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (221)	Wave 2 (95)	2017 (78)	2018 (75)	Wave 1 (180)	Wave 2 (98)	2017 (89)	2018 (85)
1	31%	40%	41%	39%	44%	45%	45%	44%
2	36%	38%	37%	39%	26%	33%	33%	30%
3	13%	5.3%	5.3%	8.9%	14%	12.2%	13%	15%
4	6.0%	11.6%	11%	5.1%	4.2%	5.1%	4.7%	4.5%
5+	8.1%	5.3%	5.3%	7.6%	6.3%	5.1%	4.7%	6.7%

TABLE C - 6
Wave 1 & 2 Survey Respondents by Residence Type

Residence Type	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (432)	Wave 2 (230)	2017 (211)	2018 (211)	Wave 1 (477)	Wave 2 (263)	2017 (225)	2018 (225)
Detached	41%	45%	45%	40%	74%	45%	75%	72%
Duplex	15%	16%	16%	18%	16%	16%	12%	16%
Apt	42%	38%	38%	42%	10%	38%	12%	12%
Other	0.7%	0.9%	0.5%	0.9%	0.6%	0.9%	0.4%	0.0%

Residence Type	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (233)	Wave 2 (103)	2017 (81)	2018 (82)	Wave 1 (189)	Wave 2 (105)	2017 (93)	2018 (94)
Detached	78%	78%	76%	77%	66%	68%	70%	72%
Duplex	6.8%	5%	6.1%	8.6%	4.7%	9%	7.4%	6.5%
Apt	13%	16%	16%	14%	26%	19%	17%	19%
Other	1.3%	1.9%	1.2%	1.2%	3.2%	4.8%	3.2%	2.2%

TABLE C - 7
Wave 1 & 2 Survey Respondents by Employment Status

Employment Status	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (428)	Wave 2 (231)	2017 (211)	2018 (211)	Wave 1 (455)	Wave 2 (265)	2017 (225)	2018 (225)
Full time	78%	79%	81%	81%	72%	68%	66%	70%
Part time	6.5%	5.2%	4.3%	7.1%	7.5%	10.9%	12%	12%
2+ jobs	1.4%	4.8%	4.7%	3.8%	1.5%	5.3%	5.3%	4.4%
Homemaker	2.3%	3.5%	3.3%	2.4%	1.7%	6.4%	6.2%	2.2%
Don't work	8.1%	12%	10%	7.1%	12%	19%	20%	15%

Employment Status	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (211)	Wave 2 (108)	2017 (82)	2018 (82)	Wave 1 (177)	Wave 2 (109)	2017 (94)	2018 (94)
Full time	40%	36%	37%	35%	48%	50%	51%	57%
Part time	10%	8.3%	9.8%	16%	12%	15.6%	13%	12%
2+ jobs	5.1%	7.4%	8.5%	9.8%	3.2%	4.6%	4.3%	7.4%
Homemaker	3.8%	2.8%	2.4%	1.2%	1.6%	2.8%	3.2%	3.2%
Don't work	30%	51%	51%	43%	28%	28%	28%	27%

TABLE C - 8
Wave 1 & 2 Survey Respondents by Number of Vehicles

Number of Vehicles	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (428)	Wave 2 (227)	2017 (209)	2018 (208)	Wave 1 (471)	Wave 2 (261)	2017 (225)	2018 (224)
0	4.8%	5.7%	5.8%	6.7%	5.5%	6.1%	5.8%	5.8%
1	45%	40.1%	41%	45%	31%	32.6%	33%	33%
2	39%	47.6%	46%	39%	48%	49.4%	49%	49%
3	6.5%	4.8%	5.3%	6.7%	10%	9.2%	9.4%	8.4%
4	2.8%	1.3%	1.4%	1.4%	2.3%	1.9%	1.8%	1.3%
5+	0.7%	0.4%	0.5%	1.0%	1.5%	0.8%	0.9%	1.3%

Number of Vehicles	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (223)	Wave 2 (99)	2017 (81)	2018 (77)	Wave 1 (183)	Wave 2 (100)	2017 (91)	2018 (87)
0	17%	19.2%	18%	16%	19%	19.0%	18%	18%
1	39%	40.4%	39%	44%	34%	35.0%	36%	35%
2	27%	27.3%	30%	26%	33%	38.0%	38%	34%
3	7.7%	10.1%	9.1%	8.6%	7.9%	4.0%	3.4%	8.8%
4	2.6%	2.0%	2.6%	3.7%	1.6%	3.0%	3.4%	3.3%
5+	1.3%	1.0%	1.3%	1.2%	0.5%	1.0%	1.1%	1.1%

TABLE C - 9
Wave 1 & 2 Survey Respondents by Number of Bikes

Number of Bikes	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (428)	Wave 2 (227)	2017 (209)	2018 (207)	Wave 1 (472)	Wave 2 (261)	2017 (225)	2018 (224)
0	24%	25.6%	27%	28%	23%	25.3%	25%	24%
1	30%	29.5%	28%	29%	20%	21.5%	19%	19%
2	26%	23.3%	25%	26%	29%	29.1%	29%	31%
3	8.3%	10.1%	10%	7.7%	10%	9.2%	10%	11%
4	6.0%	6.2%	4.8%	3.8%	7.3%	6.5%	6.3%	5.8%
5+	4.4%	5.3%	5.3%	4.8%	8.8%	8.4%	10%	9.3%

Number of Bikes	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (220)	Wave 2 (99)	2017 (76)	2018 (80)	Wave 1 (183)	Wave 2 (99)	2017 (91)	2018 (86)
0	42%	50.5%	49%	45%	52%	50.5%	50%	53%
1	25%	25.3%	26%	28%	20%	23.2%	24%	25%
2	16%	17.2%	17%	16%	13%	18.2%	17%	13%
3	4.3%	3.0%	3.9%	7.5%	6.8%	5.1%	5.8%	5.5%
4	4.7%	2.0%	1.3%	2.5%	2.1%	2.0%	2.3%	2.2%
5+	1.3%	2.0%	2.6%	1.3%	2.1%	1.0%	0.0%	1.1%

TABLE C - 10
Wave 1 & 2 Survey Respondents by Cycling Confidence Level

Confidence Level	Eastside				Grant Park			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (430)	Wave 2 (231)	2017 (211)	2018 (211)	Wave 1 (473)	Wave 2 (262)	2017 (225)	2018 (224)
Can't Bike	3.0%	2.2%	1.9%	3.3%	4.4%	3.8%	3.6%	4.0%
Not Very Confident	15%	13.0%	14%	14%	14%	14.9%	15%	15%
Somewhat Confident	27%	33.3%	33%	26%	29%	31.3%	33%	33%
Very Confident	54%	51.5%	51%	57%	52%	50.0%	48%	48%

Confidence Level	Westside				Southside			
	Unmatched		Matched		Unmatched		Matched	
	Wave 1 (222)	Wave 2 (100)	2017 (80)	2018 (75)	Wave 1 (184)	Wave 2 (105)	2017 (91)	2018 (93)
Can't Bike	16%	14.0%	13%	14%	13%	10.5%	10%	10%
Not Very Confident	19%	20.0%	18%	21%	21%	18.1%	17%	29%
Somewhat Confident	18%	26.0%	26%	24%	20%	23.8%	24%	16%
Very Confident	41%	40.0%	43%	41%	43%	47.6%	49%	45%