

1 **Removing Barriers to Bicycle Use in Black and Hispanic Communities**

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1 ABSTRACT

2 Research on identifying barriers to bicycling has become popular over the past decade. However,
3 few studies have been conducted on barriers and solutions that are unique to bicycle use among
4 Blacks and Hispanics. The purpose of the study was to ascertain barriers to and identify solutions
5 to bicycle use among Black and Hispanic bicyclists and non-bicyclists. Primary data collection
6 methods were intercept surveys of pedestrians in thirty-four geographically and typographically
7 diverse municipalities in New Jersey and focus groups with exclusively Black and Hispanic
8 participants. The intercept survey method was selected to obtain a high response rate that was
9 representative of the selected municipalities. The focus groups obtained additional information
10 that can be difficult to gather from an intercept survey. A total of 1,660 surveys were collected, and
11 16 Blacks and 10 Hispanics participated in the focus groups. These data show that the three biggest
12 barriers to bicycling for all respondents are fear of a traffic collision, fear of robbery and assault,
13 and pavement condition. Other notable barriers include fear of being stranded with a broken
14 bicycle, and fear of being profiled by the police. Solutions for both bicyclists and non-bicyclists
15 include bicycle lanes and off-street bicycle paths between their respective origins and destinations,
16 and secure bicycle parking at their destinations. Key findings from the study are being discussed
17 with select agencies and organizations throughout NJ.

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Keywords: Bicycle, Barriers, Black, Hispanic, Police, Solutions

1 INTRODUCTION

2 The purpose of this study is to ascertain barriers to and identify solutions to bicycle use among
3 Black and Hispanic bicyclists and non-bicyclists. Research on identifying barriers to bicycling has
4 become popular over the past decade. However, few research studies have been conducted on
5 barriers and solutions that are unique to bicycle use among minorities, specifically Blacks and
6 Hispanics. Minorities are a rapidly growing population in the United States, and by 2010, the share
7 of the population identifying as a minority in the United States represented a majority in states
8 including California and Texas (1). Minority neighborhoods are especially prominent in urban
9 areas, where bicycling can be a feasible mode of transportation for business or recreation.
10 Minorities, in particular those with low-incomes, have higher rates of obesity and poorer health
11 outcomes than the general population, and bicycling as a health intervention can be part of the
12 solution (2). Taking this in mind, research focused specifically on these populations is highly
13 valuable.

14 This study has taken advantage of the fact that New Jersey is an incredibly diverse and
15 densely populated state. With only 58.9% of the population in the state being non-Hispanic White,
16 it serves as an ideal place to address the gaps in the literature (3). The state's size allowed
17 researchers to visit 34 municipalities, encompassing a wide range of geographic and development
18 typologies. This paper uses data obtained from an extensive intercept survey and two focus groups
19 with Blacks and Hispanics to parse out which barriers to bicycling are unique to these minority
20 communities, and which solutions can be implemented to encourage bicycling. The study
21 contributes to the existing literature by answering why Blacks and Hispanics choose not to bicycle,
22 what prevents current Black and Hispanic bicyclists from choosing to bicycle more, and what can
23 be done to encourage all Blacks and Hispanics to bicycle more often.

24 LITERATURE REVIEW

25 Bicycling provides benefits to individual users and the broader community. Often characterized as
26 a recreational activity, bicycling has recently attracted the attention of engineers and planners
27 looking for solutions to growing transportation problems, particularly as young people bicycle at
28 higher rates than previous generations (4). Numerous benefits have been attributed to bicycling,
29 including health-related (5), economic (6), environmental (7), and traffic congestion reduction.
30 Because of potential benefits, some policymakers and transportation professionals view bicycling
31 as a solution to various problems associated with the transportation system (8). Minorities, in
32 particular those with low-incomes, have higher rates of obesity and poorer health outcomes than
33 the general population, and health interventions have targeted these groups because of their
34 elevated risk (9). White males take a disproportionately high number of total bicycle trips, and are
35 high-profile users in major cities (10, 11). To make bicycling more accessible, research into
36 barriers to bicycling should focus particularly on minority groups. However, only sporadic efforts
37 have been undertaken, including a survey by a nonprofit organization in Portland, Oregon, which
38 studied limited groups of minority residents (12).

39 Safety is a primary concern for all bicyclists and continues to be a major barrier for all users,
40 especially in countries with high rates of automobile use. Studies show that separated bicycle paths,
41 which increase physical separation between bicyclists and automobiles, decrease the risk of injury,
42 and have increased bicycle ridership in various American cities (13, 14). A study of buffered bike
43 lanes found that both bicyclists and motorists preferred ample space separating the different modes
44 (15). However, bicycling infrastructure amenities often appear first in higher-income
45 neighborhoods of cities, and some residents view the presence of bicycle infrastructure as a sign of
46 gentrification (16). And yet a study of bicycle lanes in a mixed-income area in Brooklyn found that
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1 a large proportion of the bicyclists using the lanes were low-income, non-white, and reported
2 better health than non-bicyclists (17). The research also suggests that with improved infrastructure,
3 bicycling may attract a large user group other than Caucasian males. This indicates many different
4 bicyclists, especially non-White and low-income people, would benefit from the expansion of
5 bicycle infrastructure into diverse neighborhoods.

6 Studies have shown socioeconomic differences between those who bicycle for utilitarian
7 purposes and those who bicycle for recreation, or exercise (18). Unsurprisingly, people with
8 consistent access to an automobile are far more likely to engage in recreational bicycling than
9 bicycling for utilitarian purposes. However, automobile access is inversely correlated with both
10 recreation-only and utility-only bicycling (18). This suggests one method to increase bicycle
11 commuting: to decrease access to automobiles.

12 While few studies have identified specific barriers to bicycling for minorities in the United
13 States, others have examined the travel habits of immigrants, who represent a sizeable proportion
14 of the minority population. In particular, researchers have identified an “immigrant effect” that
15 distinguishes the travel behavior of immigrants’ from that of the U.S. population at large. The
16 effect also includes increased bicycle commuting among non-native born people living in the
17 United States, and bicycle researchers have posited that the “immigrant effect” may not arise
18 solely from the built environment. After controlling for factors including income and location,
19 regression analysis indicates that immigrants still bicycle at higher rates than those born in the
20 United States. This suggests that this “immigrant effect” may in fact be influenced by cultural
21 factors (19).

22 Gaps in the literature exist related to how minorities view bicycle maintenance costs,
23 awareness of bicycle-share programs, frequency of police encounters, safe bicycle storage, and
24 unidentified cultural barriers that may be unique to Black and Hispanic groups. One reason for the
25 gap may be the difficulty in surveying these populations. Providing all survey materials in Spanish
26 is essential for surveying Hispanic communities, but the high cost and extra logistical challenges
27 of doing so might prove restrictive. Researchers may also not have cost-effective access to
28 majority Black and majority Hispanic municipalities in their region. The following data address
29 these gaps.

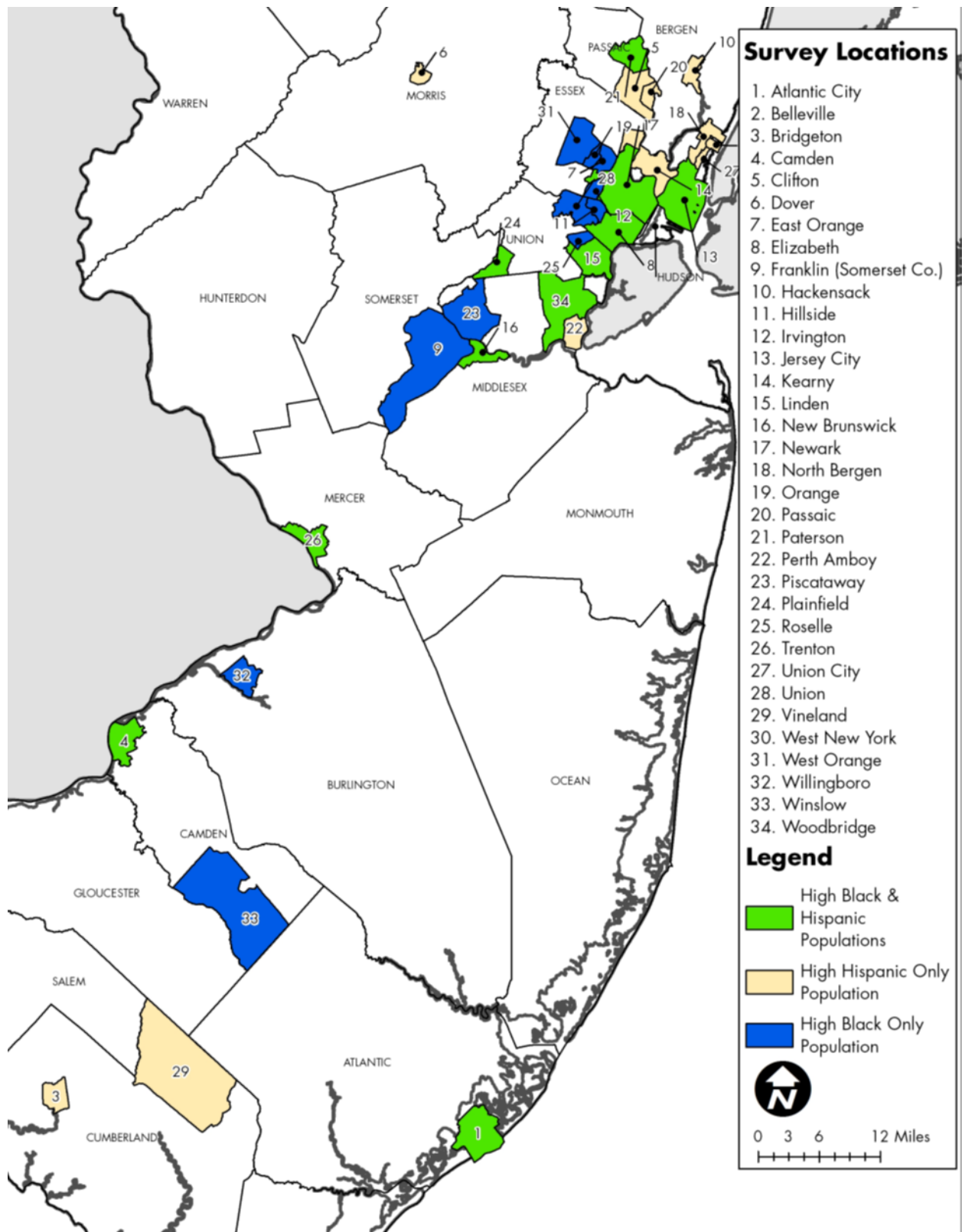
30 **DATA COLLECTION**

31 The primary data collection methods were intercept surveys of pedestrians and focus groups with
32 exclusively Black and Hispanic participants. The intercept survey method was selected to obtain a
33 high response rate that was representative of the selected municipalities. The focus groups
34 obtained additional information that can be difficult to gather from an intercept survey.

35 Trained investigators certified by the Rutgers University Institutional Review Board
36 distributed intercept surveys in thirty-four geographically and typographically diverse
37 municipalities in New Jersey between June and August of 2015 (Figure 1). Investigators were
38 instructed to focus on intersections or corridors where high volumes of pedestrians were
39 anticipated. These locations were near train stations, commercial corridors, and municipal
40 buildings within neighborhoods having high concentrations of Black and/or Hispanic residents. In
41 residential municipalities that lacked heavy pedestrian activity, surveying was done during the
42 weekend near parks or strip malls. Of the municipalities surveyed, twelve had high concentrations
43 of Hispanic residents, eleven had high concentrations of Black residents, and eleven had high
44 concentrations of both Black and Hispanic residents. Investigators were given English and Spanish
45 surveys and instructed to approach all pedestrians and not make assumptions about race or bicycle
46 use. Respondents were not given the option to respond online or to mail in a response. The surveys
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1 were designed to take no more than 5 minutes to complete. A chance to win one of three \$100 gift
2 cards was used as an incentive to generate interest in the survey. A total of 2,062 surveys were
3 collected; 1,660 were deemed appropriate for data analysis. The latter reflects those respondents
4 who exclusively self-identified as Black, Hispanic and Mixed Race—the target of study.

5 To gain additional insight into the responses received from the intercept survey, trained
6 Rutgers University investigators facilitated focus groups with Black and Hispanic participants in
7 December 2015. Focus groups were held on a weekday from 6pm to 8pm in the City of New
8 Brunswick, an urban municipality located in the central part of the state. The Black focus group
9 was conducted in English and held at Rutgers University, whereas the Hispanic focus group was
10 conducted in Spanish and held at the office of the Puerto Rican Action Board. Focus groups
11 participants were recruited through the intercept survey and with assistance from the City of New
12 Brunswick and New Brunswick Tomorrow, a local nonprofit dedicated to enriching the lives of
13 New Brunswick residents. Each focus group participant received \$50 cash.
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FIGURE 1 Locations of pedestrian survey municipalities, according to race and ethnicity.

1 **FOCUS GROUPS RESULTS**

2 **Black Focus Group**

3 Sixteen individuals participated in the focus group, evenly split between male and female
4 participants, ranging in age from 18 to 65. Participants' annual household incomes varied from
5 under \$25,000 to \$149,999. Participants' educational attainment ranged from a high school degree
6 to a graduate degree, and 15 of the 16 participants listed their marital status as single. All but one
7 participant knew how to ride a bicycle and every participant had access to a bicycle.

8 When asked to cite their primary reasons for bicycling, the participants cited exercise, fun,
9 and leisure as their top three choices. Many participants also spoke fondly of bicycling with their
10 families in parks or during events where the streets were free of cars. Only one participant bicycled
11 to work. The other participants' top three reasons for not bicycling to work included long distances
12 from home to work, lack of protection from vehicular traffic, hygiene, and being forced to ride on
13 unsafe routes, such as major roads and highways. Hygiene was a major concern for the members of
14 the Black focus group as well as the negative perceptions and stereotypes that come with bicycling.
15 For example, participants stated that it would be unacceptable to arrive to work or to a social event
16 sweaty from riding a bicycle, and that coworkers would assume that using a bicycle to commute
17 meant that "something was wrong with their car" or financial situation. Additional barriers
18 expressed by the group included bicycle theft, weather, trauma from a previous traffic collision,
19 and concerns over being stopped by a police officer when bicycling through non-Black
20 communities.

21 The primary suggestion from the group on how to encourage more bicycling was by
22 holding "open streets" events where bicyclists could ride without fear of motor vehicles. Another
23 suggestion from the group was to provide training to the community on how to best reach
24 destinations by bicycle. The group also expressed interest in bicycle infrastructure separated from
25 motor vehicles, with one participant stating that she would feel comfortable riding with her
26 granddaughter in a protected bicycle lane.

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28 **Hispanic Focus Group**

29 Ten individuals participated in the focus group; eight were female and two were male. Their ages
30 ranged from 21 to 54, and eight of the ten were single. Most participants had children or lived in
31 households with children. Participants' incomes ranged from \$25,000 to \$99,000. While all the
32 participants knew how to bicycle, six did not own one.

33 Participants' primary reasons for bicycling included bonding with family, fun, and fitness. One
34 female participant works as bicycle tour guide, but overall none of the participants bicycle to work.
35 Their reasons for not bicycling to work included the fear of traversing a high-crime neighborhood
36 to and from work, long distances between home and work, the need to have a car on hand for
37 family emergencies, and not having time to use a bicycle to reach a second job. Unlike the Black
38 focus group, concerns over hygiene were not as important. Participants did however agree that
39 coworkers would probably make negative assumptions if they were seen bicycling to work, such
40 as assuming their car had broken down or they had gotten a moving violation.

41 One barrier to bicycling that was unique to this group was that of gender norms. A female
42 participant was told by her mother that bicycling was for boys. The majority of the group also felt
43 that their surrounding area was not safe for girls to be out on a bicycle, but did not feel the same
44 concern about a boy riding a bicycle. None of the participants had been stopped by a police officer
45 for bicycling, but did express concerns over rampant bicycle theft in their community. The group
46 spent a lot of time discussing how crime in their community made them uncomfortable being out at
47 nighttime, and that being on a bicycle would make them vulnerable.

1 As with the Black focus group, most participants spoke fondly of open streets events as a
2 way to encourage bicycling. Participants were however more interested in the community aspect
3 of the event rather than the specific act of bicycling. The group was most comfortable bicycling in
4 places of leisure, such as parks or trails. When shown a picture of a protected bicycle lane, most
5 agreed that such infrastructure would encourage them to ride, or allow their children to do so,
6 although none of the participants had ever seen one before. One unique suggestion that arose in the
7 group was to encourage bicycling via reduced auto insurance premiums.

8 9 **SURVEY RESULTS**

10 Prior to receiving one of the two surveys designed for bicyclists and non-bicyclists, all
11 respondents were asked if they had bicycled within the past twelve months. If respondents stated
12 that they had not bicycled within the twelve months before receiving the survey, they were given
13 the non-bicyclist survey instrument and categorized and counted as “non-bicyclists.”; if the
14 respondents had bicycled, they were categorized and counted as “bicyclists”. Fifty-four percent
15 were categorized as non-bicyclists and 46% as bicyclists.

16 While both surveys included identical questions that allowed comparisons to be made
17 between bicyclists and non-bicyclists, the bicyclist survey instrument differed from the
18 non-bicyclist survey instrument in that it asked questions intended specifically for bicyclists.
19 Questions unique to the bicyclist survey instrument centered on bicycle frequency, purpose, and
20 behavior in the past twelve months. Therefore, since non-bicyclists reported not having ridden a
21 bicycle within twelve months of receiving the survey, these questions were excluded from their
22 survey instrument. The results below are predominantly derived from the questions common in
23 both surveys.

24 25 **Demographic Characteristics of All Survey Respondents**

26 The proportion of Black and Hispanic survey respondents are significantly higher than those of
27 New Jersey as a whole, and differ significantly from the places where the surveys were
28 administered (Table 1). Persons in age group 18-24 constitute the largest share of survey
29 respondents (21%). The educational attainment of the survey respondents is lower than both the
30 population of New Jersey as a whole and the population living within the study area (i.e., the 34
31 locations where surveys were administered). Respondents are poorer than the population within
32 the study area and the New Jersey population as a whole. The majority of survey respondents have
33 at least one bicycle in the household but have fewer motor vehicles available in the household than
34 the population within the study area and New Jersey’s population as a whole. While an
35 overwhelming majority (63%) spent the first twelve years of their lives in the United States of
36 America, a sizeable minority (37%) grew up in countries outside of the US.

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1 **TABLE 1 Demographics of All Survey Respondents**

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Variables	Share of All Respondents									
	New Jersey		Study Area		All Respondents		Bicyclists		Non-Bicyclists	
	Total	% of Total	Total	% of Total	Total	% of Total	Total	% of Total of All Respondents	Total	% of Total of All Respondents
ALL	8,874,374	100%	2,235,965	100%	1,660	100%	758	46%	902	54%
RACE AND ETHNICITY										
Black or African-American	1,133,259	12.8%	666,861	29.8%	777	47%	343	44%	434	56%
Hispanic or Latino	1,649,784	18.6%	847,588	37.9%	656	40%	308	47%	348	53%
Mixed Race	68,080	0.8%	40,444	1.8%	83	5%	46	55%	37	45%
AGE										
Under 18	2,036,084	22.9%	539,727	24.1%	116	7%	69	59%	47	41%
18 to 24	785,669	8.9%	241,888	10.8%	348	21%	174	50%	174	50%
25 to 34	1,132,991	12.8%	364,978	16.3%	339	20%	161	47%	178	53%
35 to 44	1,200,296	13.5%	318,684	14.3%	256	15%	116	45%	140	55%
45 to 54	1,363,844	15.4%	301,710	13.5%	260	16%	111	43%	149	57%
55 to 64	1,106,226	12.5%	230,759	10.3%	161	10%	64	40%	97	60%
65 or older	1,249,264	14.1%	238,219	10.7%	58	3%	11	19%	47	81%
SEX										
Male	4,363,391	49.2%	1,138,963	50.9%	898	54%	508	57%	390	43%
Female	4,574,784	51.6%	1,097,002	49.1%	636	38%	205	32%	431	68%
TOTAL ANNUAL HOUSEHOLD INCOME										
Less than \$14,999	294,218	9.2%	124,779	16.5%	340	20%	159	47%	181	53%
\$15,000 to \$24,999	258,445	8.0%	86,297	11.4%	244	15%	109	45%	135	55%
\$25,000 to \$49,999	584,815	18.2%	174,323	23.1%	331	20%	146	44%	185	56%
\$50,000 to \$74,999	509,599	15.9%	125,055	16.6%	185	11%	90	49%	95	51%
\$75,000 to \$99,999	406,137	12.6%	85,532	11.3%	85	5%	42	49%	43	51%
\$100,000 to \$149,999	546,533	17.0%	92,118	12.2%	60	4%	28	47%	32	53%
\$150,000 to \$249,999	276,523	8.6%	36,748	4.9%	41	2%	22	54%	19	46%
\$250,000 or more	312,228	9.7%	29,344	3.9%	17	1%	10	59%	7	41%
EDUCATION										
Less than high school graduate	801,764	11.7%	345,306	20.4%	221	13%	110	50%	111	50%
High school graduate or GED	1,970,815	28.8%	552,415	32.6%	510	31%	244	48%	266	52%
Some college or vocational/technical school	1,340,621	20%	349,084	20.6%	310	19%	130	42%	180	58%
Two-year college degree (AA, AS)	418,947	6.1%	87,478	5.2%	136	8%	53	39%	83	61%
Four-year college degree (BA, BS)	1,459,124	21.3%	239,356	14.1%	211	13%	98	46%	113	54%
Graduate degree (Masters, PhD, MD, Lawyer)	847,019	12.4%	122,599	7.2%	68	4%	31	46%	37	54%
BICYCLES IN HOUSEHOLD										
None					457	28%	75	16%	382	84%
One					443	27%	243	55%	200	45%
Two					411	25%	233	57%	178	43%
Three or More					300	18%	198	66%	102	34%
MOTOR VEHICLES IN HOUSEHOLD										
None	274,653	8.5%			409	25%	180	44%	229	56%
One	935,191	29.1%			472	28%	227	48%	245	52%
Two	1,680,137	52.3%			380	23%	177	47%	203	53%
Three or More	1,233,112	38.4%			229	14%	111	48%	118	52%
COUNTRY OF ORIGIN										
United States of America	6,969,969	78.5%	1,492,925	66.8%	1,054	63%	512	49%	542	51%
Outside United States of America	1,904,405	21.5%	743,040	33.2%	606	37%	246	41%	360	59%

3 **Results from Questions Unique to Bicyclists in the Bicyclist Survey**

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5 Respondents are fairly active with 35 percent bicycling more than twice a week, and the majority

6 (56%) doing so for health/exercise and fun/excitement. The largest proportion of respondents

7 bicycle most often for exercise or leisure (48%), for running errands (37%), or for visits to see

8 friends and family (34%). The largest proportion of bicyclists (22%) feels that they can safely

9 bicycle to parks or trails from their homes, followed by to work (14%), to shopping destinations

10 (14%), to social activities (13%), and to school, daycare or church (11%).

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1 **Results from Questions Unique to Non-Bicyclists in the Non-Bicyclist Survey**

2 Eighty-four percent of the respondents know how to bicycle. Of those that reported not knowing
3 how to bicycle, fifty-two percent stated that they are interested in learning. More than one-quarter
4 of non-bicyclists reported having had a negative bicycling experience. Of those, a sizable minority
5 reported that the negative bicycling experience limits how often they choose to bicycle. A larger
6 proportion of males reported having negative bicycling experiences than females, and the same is
7 true for Mixed-Race non-bicyclists versus Black and Hispanic non-bicyclists. While negative
8 bicycling experiences impacted males and females equally, it impacted Hispanic non-bicyclists
9 more so than Blacks and Mixed Race non-bicyclists. Non-bicyclists were asked to select from a
10 pre-determined list of eleven reasons that may prevent them from bicycling, their two main
11 reasons for not bicycling were not owning a bicycle (28%) and not having time to bicycle (15%),
12 followed by disabilities/physical limitations (11%), concerns for safety (11%), and disinterest
13 (11%).

15 **Results from Questions Identical in the Bicyclists and Non-Bicyclists Surveys**

16 *Bicycle Cost and Maintenance*

17 Black and Hispanic communities are less likely to have access to a car, and rely heavily on
18 non-motorized forms of transportation. Within this context, the cost and maintenance of a bicycle
19 can serve as a real barrier to mobility and access to opportunities. Respondents were given the
20 option of answering yes, no, or not sure as to whether they thought a bicycle was expensive to
21 purchase and maintain. Nearly one-quarter of all respondents (24%) responded affirmatively.
22 More bicyclists, males, and those earning less than \$14,000 annually feel that bicycles are
23 expensive to purchase and maintain than their counterparts. The differences in responses in regards
24 to user ($\chi^2 = 24.315$, $p = .000$), gender ($\chi^2 = 11.838$, $p = .019$), and income ($\chi^2 = 22.654$, $p = .012$)
25 are statistically significant.

27 *Awareness of Bicycle-Share Program*

28 The expansion and popularity of bike-share systems within the U.S. provide opportunities for
29 Black and Hispanic residents to increase physical activity, improve health outcomes, and commute
30 to and from work. Many of these systems however are located outside of minority communities.
31 To ascertain the awareness of local bicycle share systems, respondents were asked if they are
32 aware of CitiBike (NYC) or Indego (Philadelphia). The majority (57%) of all respondents
33 indicated that they have not heard of these systems even though all the respondents live within an
34 hour of either programs. Non-bicyclists, Blacks, females, and those earning less than \$14,000
35 annually were less aware of the program than their counterparts. There is a statistically significant
36 difference in response according to income ($\chi^2 = 46.289$, $p = .000$).

37 When asked if they would use a bicycle-share system if one was available in their
38 community, an overwhelming majority (85%) stated that they would. A higher proportion of
39 bicyclists, Hispanics, females, and those earning between \$25,000 and \$49,000 annually
40 responded affirmatively than their counterparts. The difference in responses between females,
41 males and others is statistically significant ($\chi^2 = 10.061$, $p = .039$), as well as the responses between
42 bicyclists and non-bicyclists ($\chi^2 = 7.209$, $p = .027$).

44 *Access to Political Power*

45 Using a five-point scale, respondents were asked to state the perceived likelihood their
46 government would build bicycles lanes or paths in their communities if they requested them. The
47 majority of all respondents (54%) believe that it is unlikely to very unlikely that the government
48 would do so. A higher proportion of Blacks and Hispanics, males, bicyclists, and those earning

1 between \$75,000 and \$99,000 were more optimistic than their counterparts. There are statistically
 2 significant differences in the responses to the question in regards to user ($\chi^2 = 16.726$, $p = .002$),
 3 gender ($\chi^2 = 17.386$, $p = .026$), and income ($\chi^2 = 32.796$, $p = .036$).

4 *Government Support of and Investment in Bicycling*

5 Respondents were asked to state whether they felt their government supports and invests in bicycle
 6 infrastructure and facilities. An overwhelming majority of all respondents (64%) disagreed. A
 7 higher proportion of men (19%) than women (14%) believe their government supports and invests
 8 in bicycle infrastructure and facilities. The difference in the responses are statistically significant
 9 ($\chi^2 = 19.48$, $p = .001$). There is also a statistically significant difference in the responses of
 10 non-bicyclists and bicyclists ($\chi^2 = 45.315$, $p = .000$). Nearly a quarter of bicyclists (24%)
 11 responded affirmatively versus 12 percent non-bicyclists. Black respondents and those earning
 12 between \$50,000 and \$74,000 annually also responded affirmatively at a higher rate than their
 13 counterparts.

14 *Perceived Police Harassment*

15
 16 When asked if they had been unfairly stopped by a police officer while riding a bicycle, nearly 15
 17 percent of all respondents answered affirmatively. Table 3 shows that there are statistically
 18 differences shown in the responses according to user ($\chi^2 = 44.593$, $p = .000$), race and ethnicity (χ^2
 19 $= 17.130$, $p = .000$), and gender ($\chi^2 = 86.635$, $p = .000$). Males reported being stopped at a rate
 20 seven times than that of females and Mixed Race and Black respondents were stopped more
 21 frequently than Hispanic respondents.

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 24 **TABLE 2 Respondents Perceptions Regarding Police Harassment**

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Variables	Yes	No	Total Number	Chi-square
User				44.593 ^a
Bicyclist	19.9%	80.1%	694	
Non-Bicyclist	7.9%	92.1%	762	
Race/Ethnicity				17.13 ^a
Black	16.2%	83.8%	714	
Hispanic	9.1%	90.9%	592	
Mixed Race	19.8%	80.2%	81	
Gender				86.635 ^a
Male	20.8%	79.2%	843	
Female	3.4%	96.6%	561	
Other	0.0%	100.0%	6	
Income				5.289
Less than \$14k	11.6%	88.4%	311	
\$15k - \$24k	15.9%	84.1%	226	
\$25k - \$49k	15.4%	84.6%	298	
\$50k - \$74k	16.9%	83.1%	178	
\$75k - \$99k	14.8%	85.2%	81	
\$100k and above	9.7%	90.3%	93	

26 a. Significant at 1%

1 *Bicycle Theft*

2 The fear and reality of bicycle theft in Black and Hispanic communities serves as a barrier to
3 bicycle access and usage. To gauge the degree to which respondents had been victims of bicycle
4 theft, respondents were asked if they had ever had their bicycles stolen. One-third of all
5 respondents responded affirmatively, with a higher proportion of Mixed Race (39.5%) and Black
6 respondents (34.5%) reporting being victims than Hispanics respondents (31%). There are
7 statistically significant differences in responses in regards to gender ($\chi^2 = 90.514$, $p = .000$) and
8 user ($\chi^2 = 50.23$, $p = .000$). Males reported being victimized more than twice as much as females
9 (43.2% versus 18.9%), and bicyclists (41.8%) were victimized disproportionately more so than
10 non-bicyclists (24.5%).

11 12 *Safe Bicycle Storage*

13 While nearly nine out of ten bicyclists have a safe place to store their bicycles, nearly one out of
14 every four non-bicyclists do not. There is a statistically significant different in response to the
15 question in regards to race and ethnicity ($\chi^2 = 7.32$, $p = .026$). A higher proportion of Hispanics
16 (19.3%) do not have a safe place to store their bicycles than Black (14 %) and Mixed Race
17 respondents (13.6%). There are also statistically significant differences in responses to the
18 question in regards to income ($\chi^2 = 15.266$, $p = .009$), and users ($\chi^2 = 56.967$, $p = .000$). A
19 disproportionate amount of non-bicyclists do not have safe bicycle storage as opposed to bicyclists
20 (23% versus 9%). A higher proportion of males have access to safe bicycle storage than females
21 and “others” (15% versus 17.9% and 33%), and those earning between \$15,000 and \$24,000
22 (21%) have less access than their counterparts.

23 24 *Rate Facilities*

25 Numerous studies have shown that high quality bicycle infrastructure is an effective tool in
26 persuading people to use a bicycle. Using a three-point scale, respondents were asked to rate the
27 bicycle facilities and infrastructure in their communities. The options were bicycle path/trail, lanes,
28 racks, lockers, pavement and signage. In every category, a higher proportion of non-bicyclists
29 assigned unfavorable ratings than bicyclists and all respondents as a whole. Bicycle paths and
30 trails received the highest rating by all respondents (28%), whereas roadway pavement received
31 the lowest rating by all respondents (19%).

32 33 *Child Safety*

34 Respondents were asked whether they felt children were safe bicycling in their community. Nearly
35 sixty percent of all respondents (56%) do not feel that children are safe from traffic when bicycling
36 in their neighborhoods. There are statistical significant differences in responses in regards to user
37 ($\chi^2 = 38.48$, $p = .000$), race and ethnicity ($\chi^2 = 13.84$, $p = .008$), gender ($\chi^2 = 11.10$, $p = .025$), and
38 income ($\chi^2 = 17.36$, $p = .067$). Collectively, those earning less than the 2015 median household
39 income in New Jersey (i.e., \$71,919) are less optimistic about the safety of children than those
40 earning more. Non-bicyclists and females are also less optimistic about the safety of their children
41 than their respective counterparts.

42 43 *Learning to Ride a Bicycle*

44 Respondents were asked whether or not they had received professional bicycle training. Nine out
45 of every ten respondents reported that they had not. Bicyclists reported receiving formal bicycle
46 education at a higher percentage than non-bicyclists (13% versus 7%). Mixed-Race respondents
47 (12.3%) more so than Blacks (9%) and Hispanics (9.6%), and a higher proportion of males than
48 females (11% versus 8%). There is a statistically significant difference between the responses of

bicyclists and non-bicyclists ($\chi^2 = 10.912$, $p = .001$), with a higher proportion of the bicyclist reporting having received training than non-bicyclists (12.5% versus 7.4%).

Barriers to Bicycling

All respondents were asked to identify those things that would prevent them from bicycling or bicycling more by selecting one or more variables from a predetermined list. Their responses are shown in Table 4. The three significant barriers identified are fear of traffic collision, fear of robbery/assault, and poor pavement condition. Non-bicyclists were more concerned than bicyclists with being involved in a traffic collision, verbal harassment, and being stranded with a broken bicycle, whereas bicyclists were more concerned with being robbed or assaulted and being profiled by police. A higher proportion of Blacks reported being more concerned than Hispanics and Mixed Race respondents in six of the nine available options to select from. That list includes the fear of being robbed or assaulted, fear of being profiled by the police, fear of verbal harassment, fear of being stranded with a broken bicycle, pavement condition, and other reasons. On the other hand, Hispanic and Mixed Race respondents are more concerned with pregnancy/small children and cost of bicycle maintenance than Black respondents.

TABLE 4 Ranking of Variables that are Perceived Barriers to Bicycling for Bicyclists and Non-bicyclists

Variables	All Respondents		Bicyclists		Non-Bicyclists	
	%	Ranking	%	Ranking	%	Ranking
Fear of traffic collision	31%	1	27%	1	34%	1
Fear of robbery/assault	16%	2	17%	2	15%	2
Fear of being profiled by the police	8%	5	9%	5	6%	5
Fear of verbal harassment	5%	7	5%	7	6%	5
Fear of being stranded with broken bicycle	11%	4	10%	4	11%	4
Cost of bicycle maintenance	6%	6	5%	7	6%	5
Pavement Condition	14%	3	14%	3	14%	3
Pregnancy/small children	5%	7	4%	8	5%	6
Other	5%	7	8%	6	3%	7
Total	100%		100%		100%	

Comparatively, females are more concerned with being involved in a traffic collision, verbal harassment, being stranded with a broken bicycle, cost of bicycle maintenance, and pregnancy/small children than males, who were more concerned with being robbed or assaulted and being profiled by police officers. Both males and females were equally concerned about poor pavement condition. Of note, a higher proportion of those earning less than \$15,000 annually than those in other income groups were also more concerned with being robbed or assaulted, being profiled by the police, being verbally harassed and being stranded with a broken bicycle.

Potential Solutions to Encourage Bicycling

All respondents were given an option to choose those things that would encourage them to bicycle more frequently by selecting one or more variables from a predetermined list. Their responses are shown in Table 5. The number one improvement that would encourage all respondents to bicycle more frequently is bicycle lanes between them and their destinations, followed by off-street bicycle paths between them and their destinations, and secure bicycle parking at their destination. Not having children, living in close proximity to transit, and bicycle events are least likely to encourage more bicycling among survey respondents.

TABLE 5 Rankings of Variables that would Encourage Respondents to Bicycle More, for Bicyclists and Non-bicyclists

Variables	All Respondents		Bicyclists		Non-Bicyclists	
	Number	Ranking	Number	Ranking	Number	Ranking
Bicycle lane between you and your destination	1071	1	517	1	554	1
Off-street bicycle path between you and your destination	1031	2	515	2	516	2
Secure bicycle parking at your destination	995	3	486	3	509	3
Better weather	970	4	480	4	490	5
If you did not have a car	963	5	459	6	504	4
If your destination was closer	949	6	440	7	509	3
Bicycle Events	871	7	460	5	411	6
If the bus/train was closer	730	8	367	8	363	7
If you did not have small children	652	9	337	9	315	8
Total	8232		4061		4171	

The top three things that would encourage more bicycling among Blacks, Hispanic and Mixed Race respondents varied. For instance, the number one thing to encourage more bicycling among Blacks is secure bicycle parking at their destinations, whereas lack of car ownership ranked first for Hispanics and having a bicycle lane between them and their destinations ranked first for Mixed Race respondents. Consistent with all respondents, “not having small children” ranks last out of ways to encourage more bicycling.

DISCUSSION

These data show that Black and Hispanic bicyclists most often cycle for exercise or leisure, followed by running errands or visiting friends or family. All focus group participants spoke of many reasons why using a bicycle to commute to work would be impractical, such as a long distance, concerns about hygiene, and the need for trip-chaining, especially families with children. It is imperative to shift the focus from planning and policies that is mostly concerned with promoting and encouraging bicycle use for utilitarian purposes in Black and Hispanic communities to discussions surrounding recreational infrastructure improvements and incentives

1 for leisure or elective trips.

2 Many of the initiatives taken to increase bicycling in New Jersey have been done in the
3 context of commuting, such as by promoting “Bike to Work Day” or focusing on bicycle
4 infrastructure that links residents to jobs or commuter train stations. This is mainly due to concerns
5 about peak-hour traffic congestion. However, while fear of traffic was the most cited barrier to
6 bicycling by all respondents, perfect bicycle infrastructure cannot overcome the challenge created
7 by poor land-use planning, which has resulted in long distances between residents and their
8 work-places. This problem of distance in turn creates the challenge of hygiene, obstructs
9 trip-chaining, and increases exposure to crime.

10 To increase bicycling among minorities, focusing on infrastructure (such as protected
11 bicycle lanes) which connects residents to existing parks and trails, or on expanding those facilities
12 may be more successful. Respondents stated that they felt most comfortable bicycling in parks or
13 on trails, but only 22% stated that they could safely access these facilities on their bicycle.
14 Additionally, bicycling with family emerged as a theme within both the intercept survey and the
15 focus groups. Seventy-two percent of respondents were taught how to ride a bicycle by a family
16 members, and only 4% stated that their family members discouraged bicycling. During the focus
17 groups, participants stated that they enjoyed bicycling with their children or extended family as a
18 bonding experience. It follows that increasing access to these scenic, low-stress environments
19 would result in more frequent bicycling.

20 The primary reason cited by non-bicyclists on why they do not bicycle was not owning
21 one (28%). Additionally, one-third of respondents stated that they had been victims of bicycle theft,
22 and more than one quarter of respondents cited bicycles as being expensive to purchase or
23 maintain. One method to address this barrier is to support advocacy groups and organizations who
24 make quality bicycles available to minority communities at affordable prices, such as a “Bicycle
25 Exchange” or “Bicycle Library.” An additional solution to this issue can be expanding access to
26 bike-share systems in minority communities. These systems not only address concerns about
27 bicycle availability, maintenance, and theft, but also addresses the issue of lacking a safe space to
28 store a bicycle (cited by nearly a quarter of non-bicyclists). While the majority of the respondents
29 had not heard of bicycle share, more than 8 out of 10 stated that they would use the system if it was
30 available to them.

31 Tensions between police departments and minority communities has emerged as a major
32 issue this year, and strengthening connections between police departments and minority
33 communities could address multiple barriers identified in this research. Nearly 15% of all
34 respondents stated that they had been unfairly stopped by a police officer while on a bicycle, with
35 23% of Black bicyclists affirming this experience. Additionally members of the Black focus group
36 specifically cited harassment by police officers in certain municipalities as a reason to not bicycle.
37 However, respondents identified fear of robbery and assault as a larger barrier to bicycling, and a
38 stronger relationship between minorities and police departments could shift perceptions on
39 neighborhood safety. A stronger relationship could also help address the concern about bicycle
40 theft. Focus group respondents felt that police did not care about bicycle theft, however, if one
41 were to depend on their bicycle as their only mode of travel to their job, theft could be catastrophic.

42 Additional actions that could be taken to address identified barriers include advertising
43 and outreach to shift the perception that utilitarian bicycling is only done if something is wrong.
44 Concerns about poor pavement conditions can be addressed with dedicated bicycle infrastructure,
45 and the concern that bicycling is not safe for children should fade once the previous
46 recommendations are implemented, and adults are confident in their ability to bicycle safely.

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48

1 **CONCLUSIONS AND IMPLEMENTATION OF FINDINGS**

2 The primary objectives of this study were to ascertain barriers to and identify solutions to bicycle
3 use among Black and Hispanic bicyclists and non-bicyclists. These data show that the three
4 biggest barriers to bicycling for all respondents are fear of a traffic collision, fear of robbery and
5 assault, and pavement condition. Other notable barriers include fear of being stranded with a
6 broken bicycle, and fear of being profiled by the police. Solutions for both bicyclists and
7 non-bicyclists include bicycle lanes and off-street bicycle paths between their respective origins
8 and destinations, and secure bicycle parking at their destinations.

9 Key findings from this study have been shared with the New Jersey Department of
10 Transportation, New Jersey Bicycle and Pedestrian Resource Center, New Jersey Safe Routes to
11 School Resource Center, New Jersey Division of Highway Traffic Safety, and New Jersey Bike
12 and Walk Coalition. The discussions with these agencies has led the authors to conduct a study on
13 minority women bicycle access and use in New Jersey. The authors are working with other state,
14 regional, and local governments, as well as for-profit and non-profit organizations to discuss
15 strategic ways to address the research findings. Once a strategic approach is agreed upon, the
16 authors will distribute these recommendations through a series of webinars, trainings, and
17 informational workshops.

18
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