



# EXPANDING BICYCLING AMONG MINORITY WOMEN: A PROPOSED SURVEY AND FOCUS GROUP APPROACH

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**RUTGERS**

Edward J. Bloustein School  
of Planning and Public Policy



## About the Report

This technical memorandum was written by Siennah Yang and Susan G. Blickstein, AICP/PP, PhD, of Susan G. Blickstein, LLC under contract by the New Jersey Bicycle and Pedestrian Resource Center (BPRC) within the Alan M. Voorhees Transportation Center (VTC) at Rutgers, The State University of New Jersey. Materials referenced in the report were created by BPRC staff Samuel Rosenthal, James Sinclair, Aashna Jain, and Leigh Ann Von Hagen, PP, AICP.

The Alan M. Voorhees Transportation Center (VTC) is a national leader in the research and development of innovative transportation policy. Located within the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, VTC has the full array of resources from a major research university on transportation issues of regional and national significance.

The New Jersey Bicycle and Pedestrian Resource Center (BPRC) assists public officials, transportation and health professionals, and the public in creating a safer and more accessible walking and bicycling environment through primary research, education and dissemination of information about best practices in policy and design. The Center is supported by the New Jersey Department of Transportation through funds provided by the Federal Highway Administration.

Susan G. Blickstein, LLC is a planning, policy, and public engagement firm that specializes in sustainable land use and transportation planning in the State of New York and New Jersey. It provides urban planning and strategic planning services to municipal entities, MPOs, state agencies and the private sector. Susan G. Blickstein, LLC is a certified DBE (Disadvantaged Business Enterprise) in New York and New Jersey.

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# I. Overview

In 2021, the New Jersey Bicycle and Pedestrian Resource Center (BPRC) was tasked with undertaking a new research project: "Expanding And Encouraging Women in Environmental Justice Communities to Bicycle for Transportation and Recreation." The purpose of the project was to unpack the barriers that prevent women, especially women of color, from bicycling at rates comparable to men and to identify programs, policies and recommendations that address and overcome those barriers. This project builds on two previous BPRC studies, "Understanding Barriers to Bicycle Access and Use in Black and Hispanic Communities in New Jersey" (2016) and "Bicycling Among Black and Latino Women" (2016). As originally designed, this project includes the following elements:

- Literature Review
- New Jersey survey on attitudes and perceptions of bicycling and bicyclists
- National survey of female-identifying people who ride bikes
- Focus group discussions

Previous studies on women and bicycling were compiled, reviewed, and synthesized in the form of a literature review. Two surveys, one focused on New Jersey and one intended for a national audience, were developed. The New Jersey-focused survey seeks to understand the experiences and attitudes of New Jersey residents towards bicycling and is designed to capture a broad spectrum of attitudes and perceptions. The national survey has been designed to specifically target female-identifying bicyclists. Susan G. Blickstein, LLC (SGB) created promotional materials for the surveys in the form of social media graphics, blurbs, and QR codes. SGB also created an inventory of national bicycle advocacy groups and bicycle programs that can be used to seek out partners for survey promotion. BPRC applied for approval from Rutgers University IRB, which was granted on November 11, 2021.

Early on in the study development, focus groups or interviews were anticipated with female-identifying cyclists who have been involved in programs that have been successfully scaled up to extend the reach of bicycling among female-identifying non-white people. An initial draft of a focus group guide was developed as part of this effort. However, funding constraints were anticipated and concerns identified about adequately compensating participants and project emphasis shifted to the surveys.

The purpose of this memo is to document the status of various elements of this project.

## II. Literature Review

SGB drafted a literature review of prior research that has been conducted around women and their attitudes towards bicycling and the barriers that prevent higher rates of women and minority bicycle ridership. Topics discussed included built environment barriers that prevent women from riding a bicycle, such as lack of safe bicycle infrastructure. Societal barriers, such as fear of harassment, gender norms, and workplace presentation were found to be just as important, if not more so. Identity was also an important factor, as these barriers were compounded for women who were LGBTQ, low-income, or non-white. The literature proposed a variety of solutions: infrastructural in the form of more robust and more comfortable bicycling networks, financial in the form of free/cheap bicycles and bike maintenance classes, or communal in the form of greater representation for women and people of color in bicycle groups and training classes. The literature review was reviewed by BPRC staff and the current draft can be found in "Appendix A: Draft Literature Review" on page 5.

## III. Surveys

### New Jersey Survey

SGB and BPRC staff drafted a short survey to understand the experiences and barriers to bicycling faced by women in New Jersey. This short survey was designed to be included in the Eagleton Center's bi-annual Omnibus Survey, which is a statistically significant telephone survey of New Jersey residents. Three issues arose with the survey. The first is that the phone survey targets a 50% response rate of women, and an over-sample to receive 700 responses by women would cost more than BPRC had budgeted. The second is that the Eagleton Center asked BPRC to reduce the survey time from 4 minutes to 3 minutes, which would have resulted in less data than expected, at a cost of \$10,780. Finally, the original estimated launch of the survey was delayed from summer 2021 to November 2021.

The current draft of this survey is available in "Appendix B: New Jersey Survey" on page 18.

### National Survey

#### Survey Design

SGB drafted and programmed a survey with 33 questions that targets minority women/female-identified bicyclists within the US. The survey was edited and reviewed by BPRC staff. The survey touches on key issues identified in the literature review and in prior research efforts. It seeks to understand the specific challenges faced by minority women who ride bicycles for any purpose, with emphasis on how they perceive and experience safety. It also explores women's experiences with different bicycle events and programs, and their thoughts on representation in bicycling programs, policies and events, as well as exploring strategies to even the playing field for women who ride bicycles.

BPRC staff added a number of branches to the survey, to account for people who wanted to take the survey even though they were not bicyclists or were not women. BPRC staff translated the survey into Spanish.

The current draft of the survey is available in "Appendix C: National Survey" on page 20.

#### Survey Distribution

SGB prepared an inventory of over 1000 local, regional, and national bicycle programs and organizations in the United States that have worked to expand bicycling among women. The programs that were researched included bike share programs, youth bicycling organizations, bicycle advocacy organizations, social service organizations, bicycle shops, and bicycle clubs. The spreadsheet includes the jurisdiction, website link, and contact information of the programs/organizations. The inventory also includes potential media channels, which

can be used for future survey promotion. There is a blank tab that was reserved for researching organizations and programs that promote walking. The information in this spreadsheet is current as of May 2022.

SGB prepared social media graphics to promote the national survey. SGB drafted an email for BPRC staff to use in publicizing the survey to various organizations and leaders nationally. A social media blurb was also drafted so that other organizations can easily drag and drop the announcement into their social media channels. BPRC would also post the survey on Twitter and Facebook, and pay to have the posts boosted onto the feeds of individuals who have indicated they identify as a woman and are a bicyclist. BPRC staff translated the promotional materials into Spanish.

Materials prepared to support the survey on social media are available in "Appendix D: Social Media Content" on page 39.

## Focus Groups

SGB compiled a list of potential participants who could be invited for future focus groups or interviews. The participants are mostly minority women who are advocates/leaders in the bicycling and transportation world. The purpose of the focus groups is to explore the types of programs and initiatives that have been successful in encouraging more minority women to bicycle and what participants think is still needed to broaden the reach of bicycling.

SGB drafted a preliminary focus group guide that includes a project overview and twelve questions that can be used or referenced for future focus group discussions or interviews. The focus group guide is available in "Appendix E: Focus Group Guide" on page 42.

## IV. Next Steps and Recommendations

This project can be continued based on its original scope, or can be refocused based on current trends and needs in New Jersey.

Given the increased adoption of shared mobility and micromobility use in New Jersey, the team recommends that any future advancement of this project focus on the experiences of minority women using shared micromobility and barriers to the use of shared micromobility systems. Research has shown that women and lower-income populations are more supportive of shared micromobility services than other populations (Aman, Smith-Colin, Zhang, 2021; Clewlow, 2019). However, e-scooters are still a male-dominant mode of transportation (Aman, Smith-Colin, Zhang, 2021; Howe, 2021; Wray 2021). Other research has also shown that micromobility services are not equitably distributed, and minorities and low-income populations show lower micromobility usage (Aman, Smith-Collin, and Zakhem, 2021; Baiocchi and Younes, 2022). In addition to the disproportionate usage of shared micromobility, the use of e-scooters has resulted in an estimated 70,000 emergency department visits and at least 41 fatalities between 2014 and 2019 in the United States (Aman, Smith-Colin, Zhang, 2021). Refocusing this project on micromobility usage among female-identified people would require revisions to the literature review, surveys, focus group/interview guide, and promotional strategy.

Sources:

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# Appendix A: Draft Literature Review

## OVERVIEW

Over the last few decades, bicycle ridership in the U.S. has increased substantially. In particular, the surge of bicycle purchases alongside rapid efforts to build bicycle infrastructure and implement traffic calming measures during COVID-19 shows rising interest in bicycling as a viable transportation mode and an important activity for physical and mental well-being (Adriazola-Steil, Harms, Li, and Schwedhelm, 2020). However, findings show that a low share of women bicycle for either recreation or transportation; for instance, women account for only a quarter of transportation-related bicycling trips in the United States (U.S. Census 2010). The gender gap in bicycling rates between women and men in the United States grew from 2001 to 2009. Whereas the share of trips taken by men by bicycle rose from 1.2 to 1.7% during that time, the share of trips taken by bicycle by women stayed at about 0.5% (Pucher et al, 2011).

The gender gap in bicycling also varies spatially. Overall, the gender gap is smallest where the bicycling mode share is highest, and vice versa (Pucher and Buehler, 2011; Transportation Research Board, 2005; Pucher and Buehler, 2008; Ravensbergen-Hodgins, 2020). For instance, women consistently bicycle less than men in countries like the United States and Canada that have high car dependence and a small bicycle mode share; whereas more women bicycle in countries like the Netherlands that have a large bicycle mode share (U.S. Census 2010; Sersli, Gislason, Scott, and Winters, 2020). This pattern also is true for places within the U.S.; the percentage of female bicyclists is much higher in areas with higher overall bicycling rates, including some college towns and cities such as Boston and Philadelphia, where women account for 39% and 42% of the total number of bicycle commuters, respectively (U.S. Census 2010).

Experts posit that this pattern partly results from safer bicycling environments. Studies in many disciplines – including psychology, economics, geography, and sociology – have shown that women have greater concerns about safety in public spaces (Baker, 2009; Loukaitou-Sideris and Eck, 2007; Brown and Blickstein, 2016; Brown, Cintron, Deka, and Sinclair, 2017; PeopleforBikes, 2021). For this reason, safer bicycling environments are more conducive to women bicycling. In fact, countries with a higher percentage of female bicyclists have lower bicycle fatality and non-fatal injury rates than countries with a lower percentage of female riders. From 2002 to 2005, the average rate of fatalities per 100 million kilometers bicycled was close to five times greater in the U.S. than that of the Netherlands (Pucher and Buehler, 2008). Non-fatal injuries for American bicyclists were about 30 times higher than in the Netherlands or Denmark (Broache, 2012).

Fostering safe bicycling environments is especially important for people of color due to the disproportionate danger that they face while bicycling. In New York City, out of the 26 bicycle fatalities that happened in 2020, most of them were low-income essential workers (Cuba, 2021). Of the 210 bicycle or pedestrian fatalities that happened between 2018 and 2020 in Massachusetts, a quarter of them happened in neighborhoods with a majority Black population, even though the Black population only accounts for 8% of the total population in Massachusetts (MilNeil, 2021). And when looking at the country as a whole, biking deaths per 100,000 people are greater for Hispanics (0.28) and Blacks (0.23) compared with Whites (0.18) (PeopleforBikes and Alliance for Biking and Walking, 2015).

Although there has been an increasing body of literature that examines the disparity that exists between female and male bicyclists, less attention has been given to the ways in which other aspects of identity, such as race, ethnicity, and class, complicate and add nuance to the gendered differences in bicycling. Through an intersectional approach – based on the idea that discrimination and oppression do not happen solely on a “single-axis” and instead are enmeshed and mutually reinforcing (Crenshaw, 1989; May, 2015) – this literature review examines existing research to shed light on how the intersections of identities play a part in the various



barriers that minority women face when bicycling, and how bicycling also shapes the identities of minority women. It builds on two previous studies conducted by VTC, “Understanding Barriers to Bicycle Access and Use in Black and Hispanic Communities in New Jersey” (2016) and “Bicycling Among Black and Latino Women” (2016) to address recent trends and issues that impact bicycling. This literature review also expands the scope from the two previous studies to examine other types of minority women.

This literature review also gives specific focus to the ways that barriers, on individual, structural, and representational levels, can be overcome to empower more women to bicycle. Given that the framework of intersectionality is rooted in black feminism, it provides tools to contest the status quo, both at the micro level of everyday lived experiences and at the macro level of social structures and norms (May, 2015). In considering various solutions and recommendations to improve bicycling for minority women, this literature review also takes note of the growing body of literature and academic focus regarding equity, which has been more robustly conceptualized and implemented in recent years. By looking at the multiple barriers to bicycling and ways to overcome them, this literature review seeks to illuminate larger systemic issues and impacts of systemic discrimination and injustice that affect the diverse lives of minority women.

## **BARRIERS AND POTENTIAL SOLUTIONS**

### **Safety and the Built Environment (Infrastructure)**

#### **Top Safety Concern: Motorized Traffic**

A substantial body of literature examines how motorized traffic impacts willingness to bicycle and to what extent bicycle infrastructure could encourage more frequent bicycling. Many studies show that women are more influenced than men by the perception of how safely drivers behave around bicyclists and are less comfortable bicycling in traffic (Emond et al, 2009; Sersli, Gislason, Scott, and Winters, 2020). A non-representative study done with 365 women bicyclists in Seattle, WA found that the top safety barriers, such as distracted driving, vehicles turning in front of them, parked cars opening doors, speed of cars, and trucks and buses, all had to do with motorized traffic; in particular, bicycle safety with motorized traffic was the largest concern for female bicyclists (Broache, 2012). Disconnected bicycle routes and a lack of bicycle infrastructure are also major concerns for female bicyclists (Cascade Bicycle Club, 2009; Broache, 2012; Ravensbergen-Hodgins, 2020).

Designated and physically separated bicycle facilities would encourage more women to ride bicycles (Brown and Blickstein, 2016; PeopleforBikes, 2021). For Seattle women who did not ride their bicycles every day, 70% said that completely separated off-road cycle paths would motivate them to start or increase bicycling, and 60% indicated that more bike lanes would motivate them to start or increase bicycling (Broache, 2012). In a study conducted in San Francisco, where three quarters of focus group participants were female, the majority of respondents commented that they would bicycle more if lanes were physically separated (Bhamidi, Deakin, Fukami, Golani, and McCarthy, 2018). Comparable results were found in the national analysis of the Women Cycling Survey, which found that safety and infrastructure that enhanced safety were major concerns for all women in the U.S. sample (Sibley, 2010).

In addition to physically separated bicycle facilities, women also prefer to bicycle in low-traffic environments. A study found that women were more likely to use “bike boulevards,” i.e. quiet residential streets with traffic-calming structures, and less likely than men to use bike lanes on streets with motorized traffic (Baker, 2009). In Denmark, women were more likely to choose routes with cycle paths and safer intersections compared to men who more often chose the fastest route (Bernhoft and Carstensen, 2008). Other studies found that women are willing to take a longer route, in terms of time or distance, if that route allows them to bicycle on quieter streets (Pucher et al., 2010; Emond et al., 2009; Transportation Research Board, 2005). Additionally, women tend to care more about well-lit paths and paved shoulders than men do (Transportation Research Board, 2005).

## **Benefits (and challenges) of improved bicycle infrastructure for low-income people of color**

Other research examines the spatial disparity of bicycle infrastructure, where communities with lower-income and minority populations have less access to safe bicycle infrastructure than wealthier communities. (Golub, Hoffmann, Lugo, and Sandoval, 2016; Law and Karnilowicz, 2015; Osborne and Grant-Smith, 2017). This disparity holds true even within the same cities, as wealthier and whiter neighborhoods receive better bicycle facilities than their fellow city residents in poorer minority neighborhoods (Lusk, Anastasio, Shaffer, Wu, and Li, 2017). Bicycling advocates note that while many people of color cycle for recreation and exercise, fewer commute to work on a bicycle and are therefore undercounted by the U.S. Census, which exclusively tracks commuting trips. This undercounting likely contributes to the construction of fewer bicycle facilities in these communities. Bike share usage and access is another instance of disparities between white and minority communities. Surveys of users of Washington, D.C. Capital Bikeshare found that riders were whiter and better educated than the city as a whole (Buck, Buehler, Happ, Rawls, Chung, and Borecki, 2013). In terms of bike share stations, low-income areas were underserved, with one study finding that only four of the large U.S. bike share systems had 40% of their stations in communities experiencing economic hardship (Smith, Oh, and Lei 2015). Ursaki and Aultman-Hall found significant differences in bike share station placement based on racial and economic factors (Ursaki and Aultman-Hall, 2016).

Despite this gap in funding, there is evidence that investing in bicycle infrastructure in low-income and/or minority neighborhoods could increase bicycling rates. In a 2014 national survey commissioned by PeopleForBikes, 54% of black respondents and 57% of Hispanic respondents expressed the wish to ride a bicycle more often, compared with 52% of white respondents. In the same survey, 48% of black respondents, 53% of Hispanic respondents, and 44% of white respondents stated that they would be more likely to ride a bicycle if bikwa were physically separated by a barrier from motorized vehicles (PeopleforBikes et al, 2015). Another survey showed that 60% of people of color and 59% of those earning less than \$30,000 per year stated that more bike trails and bike lanes would encourage them to bicycle more (Princeton Survey Research Associates, 2012; The League of American Bicyclists et al., 2013). Furthermore, 56% of people of color supported more federal funding for walking and bicycling infrastructure, compared to 44% of white respondents who supported such funding (Princeton Survey Research Associates, 2012; The League of American Bicyclists et al., 2013). In a research effort conducted by PeopleforBikes, over half to almost all participants across ten focus groups (most focus groups had high share of participants in lower income ranges and half of the focus groups had a higher share of minority participants compared to their respective cities) were supportive or had positive views of bicycle infrastructure investment (PeopleforBikes, 2021).

The need for secure bicycle parking was also a barrier to increasing rates of bicycling, with 47% of people of color agreeing compared to 32% of white respondents (The League of American Bicyclists et al., 2013). A pedestrian intercept survey – conducted in 34 municipalities in New Jersey that have large Black and Hispanic populations – shows that secure bicycle parking is the number one factor to encourage more bicycling among Blacks (Brown, Harvey, and Sinclair, 2016). The same survey also illuminates the importance of secure bicycle parking, given that 42 percent of all respondents who are bicyclists have been the victims of theft (Brown, Harvey, and Sinclair, 2016). In another survey, 57% of Hispanic respondents identified the lack of secure bicycle parking as a barrier to bicycling (Community Cycling Center, 2012; The League of American Bicyclists et al., 2013). In addition to the desire for more bicycle facilities from people of color in their communities, cases already exist in which these types of investments are successful. For example, the installation of a new bike lane in one New Orleans neighborhood increased the number of female bicyclists and African American bicyclists by 115% and 51%, respectively.

While greater investment in bicycle infrastructure does contribute to greater safety and is desired by a large percentage of various minority and low-income communities, this investment is not divorced from greater urban changes that often disenfranchise those communities. Hoffmann (2016), in her book, *Bike Lanes are White Lanes: Bicycle Advocacy and Urban Planning*, explains that bicycle infrastructure often becomes amenities to attract real estate development and the creative class. The creative class, a concept coined by urban theorist Richard Florida, are a group of younger, well-educated adults who contribute to the now-dominant creative economy and are attracted to cities for their lifestyle amenities. This preference for lifestyle over specific career opportunities accelerates the process of gentrification as members of the creative class move into downtown areas that were previously disinvested. Hoffmann points out that the creative class is “the group destined to ride bicycles in urban spaces,” and in advocating for safer conditions for bicyclists, they are also advocating for conditions that appeal to the specific sensibilities of the creative class rather than the sensibilities of the communities that already live there. In this way, bike lanes serve as a sign of the gentrification of minority neighborhoods rather than the community benefit that they could and should be.

### Safety and the Perceived Environment (Personal Safety/Fear of Harassment)

For women, safety concerns include not only issues around bicycling with motorized traffic but also a woman’s personal safety in what she may perceive as an unsafe neighborhood or public space. The fear of violence has been demonstrated to greatly influence the travel patterns and mobility of women (Wekerle, 2005; Hanson, 2010; Brown, Cintron, Deka, and Sinclair, 2017; Lubitow, 2017; Deka, Brown, Cintron, and Sinclair, 2017). Women are more likely than men to avoid public spaces due to safety issues (Loukaitou-Sideris and Eck, 2007; Brown, Cintron, Deka, and Sinclair, 2017). Studies have shown that women tend to take extra precautions and feel more anxious when riding a bike at night. For instance, some women avoid engaging in any physical activity at night and in dim areas (Lubitow, 2017; Doyle-Baker, Lasehwicz, McCormack, and Salvo, 2018). Being a woman on a bike might draw additional attention from men, potentially leading her to experience catcalls and other forms of harassment in public spaces (Lubitow, 2017; Ravensbergen-Hodgins, 2020). According to a 2014 survey conducted in the U.S., 65% of all women have experienced street harassment (Alliance for Biking & Walking, 2016). In a UK survey, women reported personal safety concerns as the reason for choosing to drive to work rather than bicycle (Dickinson et al, 2003). Yet, other studies also show that women felt safer on a bicycle than on transit or walking because they could more quickly get away from a hostile situation (Bhamidi, Deakin, Fukami, Golani, and McCarthy, 2018). Interestingly, some research points out the discrepancy between perception of fear and the actual risk of danger (Brown, Cintron, Deka, and Sinclair, 2017). For example, older women typically have the highest levels of fear, but they experience a lower risk of danger than many others in public spaces (Ravensbergen-Hodgins, 2020).

Personal safety concerns are further heightened for women of color, who are more likely than white women to report that they do not exercise in public spaces due to safety concerns (Broache, 2012; Brown, Cintron, Deka, and Sinclair, 2017; PeopleforBikes, 2021). Studies have revealed that minority women experience aggressive behavior and other microaggressions in public spaces that are specifically racially-motivated. Women of color on bicycles felt that white drivers and bicyclists treated them differently than they treat white cyclists, for instance (Lubitow, 2017). Fear of police violence, harassment, and racial profiling also significantly impact minority women’s decisions about bicycling (Lubitow, 2017) and engaging in other forms of physical activity (Gothe and Kendall, 2016; Doyle-Baker, Lashewicz, McCormack, and Salvo, 2018). Transgender women’s participation in physical activity declined after disclosing their gender, likely due to fear of discrimination and victimization (López-Cañada et al., 2020).

Roger Geller, the bicycle coordinator for the Portland Office of Transportation in Oregon, claims that cities that have increased the number of bicyclists have done so because they have “substantially removed the element of fear associated with bicycling in an urban environment” (Broache, 2012). For women, and particularly minority

women, then, the literature suggests that in order to adequately address this “element of fear,” steps must be taken to address both issues around the safety of the built environment for bicyclists as well as issues around personal safety that women experience in public spaces.

Educational and outreach programs can help address “attitudinal variables” that may discourage women from bicycling. Susan Handy posits that variables such as “comfort” and “needing a car” were factors that were more important to women’s transportation choices than to men’s. She recommended that outreach programs could focus on demonstrating that women can “jump on a bike the way they jump in a car” (Baker, 2009). Bike buddy programs are one such outreach program that can support and encourage women to bicycle more frequently and reduce the heightened visibility of minorities in public spaces (Lubitow, 2017). Bystander intervention training can also help reduce sexual and street harassment that women face (Lubitow, 2017). In addition, efforts to reduce institutional racism and address issues related to over-policing by reforming police practices and policies are also vital to enhance the sense of safety for minorities to bicycle (Lubitow, 2017).

## Gender Norms (Household responsibilities and expectations of womanhood)

### Childcare and household responsibilities of motherhood

Gender norms and responsibilities also play an important role in creating barriers to bicycling for women. Women who have children in heterosexual relationships often spend more time on household and child rearing responsibilities compared to their partners. For instance, women tend to make more trips in a day, often engaging in “trip-chaining,” a term used to describe a sequence of connected trips often between the “anchors” of work and home (Transportation Research Board, 2005; Hanson, 2010; Levy, 2013). Because women are more likely to be transporting children and/or goods, bicycling becomes less feasible (Emond et al, 2009; Steinbach et al, 2011; Osborne and Grant-Smith, 2017; Lubitow, 2017). The disproportionate share of household responsibilities that women have remains true in double income households (Sersli, Gislason, Scott, and Winters, 2020). From 1995-2001, women in double income households were twice as likely as men to transport children to and from school on the way to work (Transportation Research Board, 2005). A 2014 study found that women made 1.5 times as many child-centered trips and 1.4 times as many grocery trips as their male partners, even in situations where the women worked more hours, received more pay, and were better educated than their male partners (Alliance for Biking & Walking, 2016). In fact, studies suggest that these gender differences in travel patterns persist when variables such as education, household income, and marital status are held constant (Hanson, 2010). As such, women often report a lack of time to bicycle while balancing work and household responsibilities (Lubitow, 2017).

While women across different backgrounds tend to take on a greater share of household and childcare responsibilities, this is especially true for minority women. A study shows that African American women have a great “ethic of care” – they take care of the majority of care responsibilities within their families as well as in kinship and community networks (Affuso, Answorth, Joseph, and Keller, 2017). Focus groups held in New Jersey also found that many minority women serve not only as caretakers, but also as informal taxis for family and extended family (Brown and Blickstein, 2016). Many African American women also view physical activity as “selfish” or “self-indulgent,” as they might believe that the time spent engaging in a physical activity is valuable time that they can spend with family or friends (Affuso, Answorth, Joseph, and Keller, 2017).

Even though household and care responsibilities often limit women from bicycling more frequently, some studies have examined women’s experiences completing household-serving trips via bicycling and bicycling with children. While it is difficult to bicycle with younger children or to do grocery shopping in bulk, one study shows that shopping for small items and trip-chaining without children are possible (Ravensbergen-Hodgins, 2020). Women’s preferences for using a bicycle for errands can change due to different contexts. A study conducted in San Francisco found that women are more likely to make trips for errands and to escort children

and are somewhat less likely to make work trips by bike as they do not want to trip-chain during rush hour (Bhamidi, Deakin, Fukami, Golani, and McCarthy, 2018). Furthermore, especially for women who do not have access to cars, it is easier and faster to commute to work or trip-chain on a bike than by walking or taking transit. Female participants who are immigrants do so because they have previous experiences bicycling with their children while doing errands in their countries of origin (Ravensbergen, 2020; Sersli, Gislason, Scott, and Winters, 2020). As with the gender gap in cycling as a whole, the gender gap in cycling due to the unequal and gendered division of household and childcare responsibilities is reduced in places with higher cycling rates (Osborne and Grant-Smith, 2017; Ravensbergen-Hodgins, 2020).

Regarding bicycling with children, Sersli, Gislason, Scott, and Winters (2020)'s study found that women were supportive of bicycling and saw bicycling as an enjoyable and healthy activity to do with their kids. The study looked at women in Canada with children who had learned to ride a bicycle as a child. Participants commented that teaching life skills and how to navigate streets, setting a good example, modelling values of independence, and showing that bicycling is a viable transportation alternative are among the many benefits of bicycling with children. For some of the women, bicycling regularly helped them develop the competency to start bicycling in other contexts. Others commented that bicycling with children requires additional competence and routes that are fine riding alone are often not suitable for children. Due to the lack of protected bicycle infrastructure, women with younger children are often limited to leisurely riding in traffic-free areas, such as parks, and do not complete utilitarian trips with their children (Sersli, Gislason, Scott, and Winters, 2020; Ravensbergen-Hodgins, 2020). Women with teenage and older children found it easier to commute via bicycle when children became independently mobile.

Safe Routes to School programs and other bicycle educational programs in schools are one way to improve the safety of bicycling with children. Cities that have offered such programs, such as in Portland, OR, have seen encouraging results. Portland offered a Safe Routes to School (SRTS) program in 25 schools in 2006 and increased that to 81 schools by 2010. During that time period, the percent of trips to and from schools that involved bicycling and walking increased from 31% to 39%, while the car-based school trips decreased from 42% to 36% (Pucher et al., 2011). Studies have shown that SRTS programs in other cities, such as San Francisco, also have the potential to increase bicycling in communities (Orenstein et al., 2007; Pucher et al., 2011). Offering other training and support to address the specific needs of parents, enhancing bicycle infrastructure to accommodate parents cycling with trailers or cargo bikes, and organizing family-friendly bicycle events are other ways to encourage parents to bicycle with children (Lubitow, 2017). In addition, having access to equipment, such as child seats, baskets, and trailers helped broaden the types of bicycle trips that could be taken (Sersli, Gislason, Scott, and Winters, 2020; Ravensbergen-Hodgins, 2020).

### **Norms of femininity and physical activity levels**

Cultural and gender norms play a role in women's willingness to bicycle. One study identified factors such as lack of physical fitness explaining the differences in bicycling rates between women and men (Dill et al., 2014). Although lack of physical activity is not unique to women, Broache (2012) draws on the work of public health researchers to point out that women are less likely than men to exercise. In particular, research has shown that African American women are one of the least active demographic groups in the US, with only 36% of African American women achieving the national physical activity guidelines (Gothe and Kendall, 2016; Affuso, Answorth, Joseph, and Keller, 2017). Segregation, discrimination, and cultural/gender norms all play a role in the lack of physical activity for African American women. Another study shows that older African American women had fewer opportunities to engage in physical activity than White counterparts (Affuso, Answorth, Joseph, and Keller, 2017). The study argues that cultural and gender norms from the time when older African American women were children discouraged physical activity because it was not "ladylike" and was viewed as an activity for only white women (Affuso, Answorth, Joseph, and Keller, 2017). Previous research also points

out that socio-economic variables also influence the availability and resources to support regular exercise; for instance, minority women who have physically demanding jobs or more than one job find it difficult to bicycle regularly as an exercise (Brown and Blickstein, 2016).

Some studies examine the ways that gender norms in immigrant women’s home countries impact their comfort in bicycling. Studies that engage with immigrant women show that cycling was considered an inappropriate and immodest activity that might threaten their respectability and social standing (Osborne and Grant-Smith, 2017). Women of Arab African origin do not cycle in public in order to avoid transgressing cultural and religious expectations (Law and Karnilowicz, 2015). The younger generation of Arab African women who bicycle in public risk marginalization within their communities, as bicycling is interpreted as disobedience towards cultural rules (Law and Karnilowicz, 2015).

## Appearance

In addition to the impact of historic gender norms on the confidence, desire, and experiences of engaging in physical activity, norms about physical appearance also impact bicycling. For some women, bicycling is not a viable option for commuting for due to concerns about self-presentation and looking sweaty when arriving at work, as it is more socially permissible for men to sweat or smell in public (Lubitow, 2017; Osborne and Grant-Smith, 2017, Bhamidi, Deakin, Fukami, Golani, and McCarthy, 2018; Ravensbergen-Hodgins, 2020). For African American women, not wanting to “sweat out” or “mess up” their hair styles from wearing a helmet can prevent them from riding a bicycle (Affuso, Answorth, Joseph, and Keller, 2017; Lubitow, 2017). Osborne and Grant-Smith (2017) further indicates that minorities do not have a privileged identity to protect their status in public spaces; sweatiness and smelliness often stigmatize and marginalize them as “other” in public spaces and workplaces. To address this problem, one study showed that increasing the availability of lockers and showers or changing rooms in workplaces could encourage more employees to bike to work (Lubitow, 2017).

## Lack of Bicycle Access

Another significant obstacle women and minorities face may be quite simply that they do not have access to a functional bicycle or have bicycle repair skills. The U.S. Bicycling Participation Benchmarking Study Report found that almost half of adults lack access to a bicycle. Research shows that cost is a major barrier to bicycling. Buying, maintaining, and storing a bicycle are significant expenses for lower income families, especially in places where cars are seen as a necessity for transportation (Lubitow, 2017). Another study points out that purchasing a bicycle is difficult for immigrants due to their precarious employment status (Ravensbergen-Hodgins, 2020).

One way to overcome the lack of bicycle access is to provide bicycles for free or at a low-cost. For instance, it has been found that bicycle share programs could benefit women, adults with low incomes, and people of color the most (Khan et al., 2014). Another approach is the establishment of community bicycle workshops, also called bicycle kitchens, which offer tools and assistance for bicycle repair, in addition to recycling old bicycle parts and selling refurbished bicycles at a reduced price (Teppner, 2020).

## Representation and Perception of Typical Cyclists

A significant body of research also suggests that an individual’s choice to bicycle, in addition to being impacted by the difficulty of bicycle ownership, is affected by the perception of what a bicyclist “looks like” in their community (Gordon and Handy, 2012; Sherwin et al., 2014). The typical U.S. bicyclist is often described as white, male, 18-44 years old, with a relatively high income, sometimes characterized as MAMIL — middle-aged man in lycra (Krzek et al, 2009; Bhamidi, Deakin, Fukami, Golani, and McCarthy, 2018; Osborne and Grant-Smith, 2017; PeopleforBikes, 2021). Studies show that most women and BIPOC populations do not see themselves represented in mainstream print or social media focused on bicycles or bicycling (Brown

and Blickstein, 2016; PeopleforBikes, 2021). Many studies point out that the whiteness of bicycling culture in the U.S. and the invisibility of minority bicyclists act as a barrier for other minorities to start bicycling. The masculine, competitive image of cycling, one that often emphasizes speed, athleticism, and the need for specialized equipment and gear, alienates women and other minorities' bicycle experiences (Golub, Hoffmann, Lugo, and Sandoval, 2016; Osborne and Grant-Smith, 2017; PeopleforBikes, 2021). Other studies point out that associations of white cyclists as environmentally conscious or “hippy” reinforce the perception that bicycling is an exclusive or elitist activity, deterring minorities from wanting to bicycle (Osborne and Grant-Smith, 2017; PeopleforBikes, 2021)

Surveys suggest that women are more likely to see bicycling as something that young men do rather than something they could do themselves (Gatersleben and Appleton, 2007). The dominant representation of MAMIL neglects the experiences of “invisible cyclists” – those who cycle out of necessity – and skews bicycle infrastructure to privileged communities (Golub, Hoffmann, Lugo, and Sandoval, 2016). Other studies show that minorities are concerned that peers would perceive them as trying to act white if they start bicycling (Lubitow, 2017). In another study, a majority of non-white participants indicated that their family and friends would have a negative reaction if they start bicycling because they associate bicycling with whiteness and would be concerned for their safety; some participants would not share with family and friends that they are bicycling for utilitarian purposes (PeopleforBikes, 2021). The whiteness of bicycling culture in the U.S. extends to bicycle shops, which are often perceived as inaccessible and unwelcoming to minorities and women (Lubitow, 2017; Ravensbergen-Hodgins, 2020).

Diversifying how bicycling is portrayed in programming, signage, advertising is crucial to foster a more inclusive bicycle culture. One study found that 38% of African Americans agreed that their perception of bicyclists would improve with a broader representation of bicyclists that included women and people of color (Princeton Survey Research Associates, 2012; The League of American Bicyclists et al., 2013). In addition, recognizing the intersectional identities of those who bicycle and having diverse representation in bicycle advocacy and urban planning work are crucial to foster equitable bicycling spaces (Lugo, 2016; Lubitow, 2017, Osborne and Grant-Smith, 2017). In recent years, there has been a growing emphasis on equity and inclusion, and an increased presence of non-white bicycle advocates and representation in bicycle-related media. While diversifying representation is important, minority leaders and advocates often experience tokenism – the practice of doing something to create the appearance of equity and fairness – that places a toll on minority leaders (Lugo, 2016). Diverse representation, while very important, is only one step in enhancing equity in bicycling. A multi-faceted approach is needed to address the complex barriers that minority women face in an equitable manner.

A UK study asserted that social structures have a large effect on bicycling choice and that changes must be made to encourage “anyone” to bicycle rather than just those who identify as bicyclists (Steinbach et al, 2011). Non-white respondents in a national survey conducted by Princeton Survey Research Associates International were significantly more likely than white respondents to cite social factors – having people to bike with, learning about bicycling safely, or being part of an organization – as increasing their bicycling (Princeton Survey Research Associates, 2012; The League of American Bicyclists et al., 2013). Programs, including individualized marketing, culturally relevant bicycle programming, public events run for and by people of color that get people bicycling in fun and comfortable environments, can support and empower other minorities to bicycle (Dill et al., 2014; Affuso, Answorth, Joseph, and Keller, 2017; Lubitow, 2017). In addition, research in African American communities shows the important role of faith-based organizations to encourage and support physical activity (Affuso, Answorth, Joseph, and Keller, 2017).

Many communities have begun programs to promote and nurture this type of social support. City officials in Portland, OR operate a “Women on Bikes” program that is credited with encouraging more women to bicycle (Haughney, 2011; Portland Bureau of Transportation, 2012; Broache, 2012). The New Jersey chapter of the Major Taylor Bicycling Club seeks to nurture a diverse community of bicyclists. This club, organized in 2009, springs from the L&M Tourers, a cycling group founded by three sisters in Brooklyn in the early 1970s, which created a safe haven for African American bicyclists. The National Women’s Bicycling Forum and National Brotherhood of Cyclists, which connects African-American bicyclists, are two organizations that have significantly grown in recent years (Alliance for Biking & Walking, 2016). Black Girls Do Bike is a group for African-American bicyclists that has grown to more than 8600 members (Alliance for Biking & Walking, 2016). Open street events such as CicLAvia in Los Angeles and Ciclovía in New Brunswick, NJ offer car-free streets for walking and bicycling and attract participants that closely reflect the diverse demographics of the surrounding community. Nearly 92% of the participants in New Jersey said that Ciclovía inspired them to “consider walking or bicycling more” (Alliance for Biking & Walking, 2016). The New Majority: Pedaling Towards Equity, a report presented by the League of American Bicyclists and the Sierra Club, lists a host of other organizations such as: Red, Bike and Green chapters in Atlanta that use bicycling as a way to address disparities that affect the black community; Multicultural Communities for Mobility, which works with the immigrant population in Los Angeles; and the Girls Bike Club that encourages young women of color in Chicago to see bicycling as part of their personal and social lives (The League of American Bicyclists et al., 2013).

Community bicycle workshops also encourage and facilitate getting people to ride a bicycle, but in doing so, they build an explicitly inclusive community environment that shows bicycling can be for anyone and everyone. In Austrian bicycle kitchens, no sort of discrimination, violence, or harassment is tolerated. Furthermore, acknowledging that bicycling is largely a male-dominated space, a bicycle kitchen in Vienna, Austria, created a parallel workshop, operating at the same times and with the same resources, open accessible to cisgender women, lesbians, as well as all transgender, intersex, and non-binary people (Teppner, 2020).

## CONCLUSION

The literature clearly establishes that both the built environment and social-cultural structures contribute to the lower rates of bicycling among women, with particular implications for overcoming the barriers to cycling for minority communities, especially minority women. Various solutions are proposed, including more robust and more comfortable bicycle infrastructure, greater accessibility for bicycles and instructional classes on bicycle maintenance, and greater woman and minority-based representation in bicycle groups. It is also important to point out that this intersectional approach to women in bicycling is still a new and growing area of academic interest, and although this literature review attempts to address many different dynamics, not all of them were addressed. More research is needed, especially with respect to the LGBTQ experiences.



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## Appendix B: New Jersey Survey

Q1. How frequently do you ride a bicycle?

- 1 Almost daily
- 2 A few times a week
- 3 Monthly
- 4 Rarely
- 5 Never

Q2. People ride a bicycle for various reasons. Please tell me whether or not each of the following is a reason why you ride a bicycle.

[RANDOMIZE ORDER A-E]

[Yes/No]

- A I do not bicycle
- B Exercise/recreation
- C Social time with family/friends
- D Commuting to work or school
- E Running errands

Q3. Thinking about your childhood, how common was it to see adult women bicycling in the community where you grew up?

- 1 Very common
- 2 Somewhat common
- 3 Not very common
- 4 Very uncommon

Q4. Please tell me whether or not each of the following has prevented you from riding a bicycle or from riding a bicycle more frequently?

*If respondent answered "I do not bicycle," in Q2, change wording to "has prevented you from riding a bicycle at all."*

[RANDOMIZE ORDER]

[Yes/No]

- A I'm concerned about being hit by a car
- B I'm concerned about being a victim of crime or assault
- C I'm concerned about being profiled by law enforcement
- D I'm constrained by family and/or work commitments
- E I feel unsafe due to a lack of bicycle lanes or paths
- F I'm concerned about looking presentable after a ride
- G I don't feel physically able
- H I don't have access to a bicycle

Q5. Please tell me whether any of the following would encourage you to bicycle more frequently?

[RANDOMIZE ORDER]

[Yes/No]

- A Nearby non-competitive group rides or community bicycling events
- B Classes that teach bicycle handling skills and how to safely ride with traffic
- C Free or reduced cost access to bicycles
- D Access to basic bicycle repair education
- E More bicycle lanes
- F Places to bicycle away from traffic
- G Other

Q6 How has your bicycling behavior changed during COVID-19?

- 1 I bicycle more often
- 2 I bicycle less often
- 3 Nothing has changed

Q7 How satisfied are you with on-road conditions for bicycling in your community?

- 1 Very satisfied
- 2 Moderately satisfied
- 3 Neither satisfied nor unsatisfied
- 4 Moderately unsatisfied
- 5 Very unsatisfied

# Appendix C: National Survey

## CONSENT TO TAKE PART IN A RESEARCH STUDY

**TITLE OF STUDY:** Survey of Bicycle Riders and Experiences

**Principal Investigator:** Leigh Ann Von Hagen, AICP/PP

This online consent form is part of an informed consent process for a research study. It is your choice to take part in this study or not. If you decide to take part, instructions at the end of document will tell you what to do next. If you do not wish to take part in the research, close this web page.

### **Who is conducting this research study and what is it about?**

You are being asked to take part in research conducted by Leigh Ann Von Hagen who is managing director of active transportation programs at the Alan M. Voorhees Transportation Center at Rutgers University. The purpose of this study is to identify and assess strategies that encourage women to bicycle more.

### **What will I be asked to do if I take part?**

If you take part in the research, you will be asked to answer a series of questions related to your experiences with bicycling, barriers to bicycling, and bicycling safety. Your time in the study will take approximately 10 minutes.

### **What are the risks and/or discomforts I might experience if I take part?**

Breach of confidentiality is a risk of harm but a data security plan is in place to minimize such a risk. Also, some questions may make you feel uncomfortable. If that happens, you can skip those questions or withdraw from the study altogether.

### **Are there any benefits to me if I choose to take part in this study?**

There are no direct benefits to you for taking part in this research, but by taking a few minutes to complete this survey you will be providing valuable insight into strategies that encourage women to bicycle more.

### **Will I be paid to take part in this study?**

You will not be paid to take part in this study. However, at the end of the survey, you will have the option to submit your name to be entered in a raffle for one of three \$100 gift cards. Note that your name will not be linked with any of your responses.

### **How will information about me be kept private or confidential?**

All efforts will be made to keep your responses confidential, but total confidentiality cannot be guaranteed. We will know your IP address when you respond to the online survey, but your IP address will not be stored with your responses. Instead, your responses will be assigned a subject # which will be stored separately from your responses so others will not know which responses are yours. Once data collection is complete, your identifiable information will be destroyed so no link will exist between your identity and your responses.

No information that can identify you will appear in any professional presentation or publication.

### **What will happen to information I provide in the research after the study is over?**

The information collected about you for this research will not be used by or distributed to investigators for other research.

**What will happen if I do not want to take part or decide later not to stay in the study?**

Your participation is voluntary. If you choose to take part now, you may change your mind and withdraw later. In addition, you can choose to skip questions that you do not wish to answer. You may also withdraw your consent for use of data you submit, but you must do this in writing to the PI, Leigh Ann Von Hagen.

**Who can I call if I have questions?**

If you have questions about taking part in this study, you can contact the Principal Investigator: Leigh Ann Von Hagen by phone at 848-932-2854 or by email at lavh@ejb.rutgers.edu.

If you have questions, concerns, problems, information or input about the research or would like to know your rights as a research subject, you can contact the Rutgers IRB or the Rutgers Human Subjects Protection Program via phone at (973) 972-3608 or (732) 235-2866 or (732) 235-9806 OR via email irboffice@research.rutgers.edu, or you can write to 335 George Street, Liberty Plaza Suite 3200, New Brunswick, NJ 08901.

Please print out this consent form if you would like a copy of it for your files.

If you do not wish to take part in the research, close this webpage.

**By beginning this research, I acknowledge that I am 18 years of age or older and have read and understand the information. I agree to take part in the research, with the knowledge that I am free to withdraw my participation in the research without penalty.**

**Click on the button below to begin the survey.**



# National Electronic Survey

## Survey Flow

Standard: Consent (1 Question)  
Block: Default Question Block (1 Question)  
Standard: Block 1 (1 Question)  
Standard: Block 2 (4 Questions)  
Standard: Block 3 (1 Question)

### Branch: New Branch

If

If When did you learn to ride a bicycle? Never learned Is Selected

Block: Block 8 (6 Questions)  
Block: Block 9 (1 Question)  
Block: Block 10 (1 Question)

**EndSurvey:**

Standard: Block 4 (4 Questions)  
Standard: Block 6 (4 Questions)  
Standard: Block 7 (13 Questions)  
Standard: Block 8 (6 Questions)  
Standard: Block 9 (1 Question)  
Standard: Block 10 (1 Question)

Page Break

---

Start of Block: Default Question Block

Q1 Do you currently live in the United States?

- Yes
- No

*Skip To: End of Survey If Q1 = No*

End of Block: Default Question Block

---

Start of Block: Block 1

Q2 How do you describe yourself?

- Woman
- Man
- Non-binary
- Not Listed \_\_\_\_\_
- Prefer Not to Answer

End of Block: Block 1

---

Start of Block: Block 2

Q3 How frequently do you travel by bicycle on average?

- Almost daily
- A few times a week
- Monthly
- Rarely
- Never

---

Q4 How supportive would friends and/or family be if you were to start riding a bicycle or bicycle more often?

- Very supportive
- Somewhat supportive
- Neutral
- Somewhat unsupportive
- Very unsupportive



Q5 Identify the **top 3** barriers that prevent you from bicycling or bicycling more?

- Physical ability
- I'm concerned about looking presentable after a ride

*Display This Choice:*  
*If Q2 = Woman*

- Not many women in my community ride a bicycle
- I'm afraid of getting hit by a vehicle
- I worry about being a victim of crime
- I worry about being harassed or catcalled
- I need to transport other people and/or goods
- I don't have the time to bicycle because of other responsibilities
- I'm afraid of encounters with the police
- A lack of safe bicycle infrastructure, such as secure bicycle parking, separated bicycle lanes, trails, etc.
- Poor lighting on streets and bicycle trails
- The places I go to are too far away
- I'm not interested in riding a bicycle
- I don't have access to a bicycle I can use
- I never learned to ride
- Other \_\_\_\_\_

---

Q41 Since the start of the pandemic (March 2020), have you noticed a change in how other roadway users interact with bicyclists in your community?

- Yes, for the better
- Yes, for the worse
- No change

End of Block: Block 2

---

Start of Block: Block 3

Q6 When did you learn to ride a bicycle?

- Younger than 10 years old
- 10-17 years old
- 18-25 years old
- 26-40 years old
- 41-64 years old
- 65 years old and up
- Never learned

End of Block: Block 3

---

Start of Block: Block 8

Q28 Which of the following best describes you? (Select all that apply)

- American Indian or Alaskan Native
- Asian or Asian American
- Black or African American
- Hispanic or Latin American
- Native Hawaiian or Other Pacific Islander
- White or Caucasian
- Other \_\_\_\_\_

*Skip To: Q30 If Q28 = White or Caucasian*

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Q29 Have you/how have you experienced racism in relationship to bicycling (while riding, in bike shops, in interaction with others, etc?)?

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Q30 What is your zip code?

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Q31 What is your age?

- 18-24 years old
  - 25-34 years old
  - 35-44 years old
  - 45-54 years old
  - 55-64 years old
  - 65-74 years old
  - 75 or older
- 

Q32 What is your total annual household income?

- Under \$25,000
  - \$25,000 - \$34,999
  - \$35,000 - \$49,999
  - \$50,000 - \$74,999
  - \$75,000 - \$99,999
  - \$100,000 - \$199,999
  - \$200,000 - \$500,000
  - Over \$500,000
- 

Q33 Please share any other comments you have about encouraging women and minorities to bicycle more.

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End of Block: Block 8

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Start of Block: Block 9

Q36 If you want to participate in a raffle to win one of three \$100 gift cards to Walmart, please enter your contact information below.

- Name \_\_\_\_\_
- Email \_\_\_\_\_
- Phone \_\_\_\_\_

End of Block: Block 9

---

Start of Block: Block 10

Q40 If you are interested in participating in a Zoom-based focus group to discuss strategies to encourage women—particularly women of color—to bicycle more often, please enter your contact information below. Members of the project team will follow up with interested parties.

- Name \_\_\_\_\_
- Email \_\_\_\_\_
- Phone \_\_\_\_\_

End of Block: Block 10

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Start of Block: Block 4



Q7 Who primarily taught you to ride a bicycle?

- Self-taught
- Older family member (Parent, aunt or uncle, grandparent, or guardian)
- Sibling or cousin
- Friend
- Bicycle training class or program
- Other (please specify) \_\_\_\_\_

---

*Display This Question:*

*If Q3 != Never*

Q8 Why do you ride a bicycle? (**Select all that apply**)

- Affordable
  - I don't have a car
  - Convenient/Faster to bicycle to destination
  - Good for health
  - Recreational/social activity
  - Good for the environment
  - Other (please specify)
-

Q10 What kinds of group bicycle rides or events have you participated in? (**Select all that apply**)

- Informal rides with friends or family
  - Formal bicycle education/skills training rides
  - Bicycle club rides
  - Community bicycle rides such as Pedal to Porch
  - Bicycle tours
  - Closed streets events, such as Ciclovía, Summer Streets, etc
  - Fundraising rides
  - Organized races
  - Advocacy events
  - None
  - Other (please specify)
-

*Display This Question:*

*If Q10 = Informal rides with friends or family*

*Or Q10 = Formal bicycle education/skills training rides*

*Or Q10 = Bicycle club rides*

*Or Q10 = Community bicycle rides such as Pedal to Porch*

*Or Q10 = Bicycle tours*

*Or Q10 = Closed streets events, such as Ciclovía, Summer Streets, etc*

*Or Q10 = Fundraising rides*

*Or Q10 = Organized races*

*Or Q10 = Advocacy events*

*Or Q10 = Other (please specify)*

Q9 How frequently do you participate in an organized group bicycle ride or event?

A few times a week

Monthly

A few times a year

Rarely

End of Block: Block 4

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Start of Block: Block 6

Q11 Have you ever participated in a bicycle or transportation advocacy group?

Yes

No

I don't know

*Skip To: Q14 If Q11 = I don't know*

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*Display This Question:*

*If Q11 = Yes*

Q12 If yes, what is the name of the group?

---

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*Display This Question:*

*If Q11 = Yes*

Q13 How did you get involved and what do you like about the group?

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Q14 How frequently do you use a public bike share system? (Such as BCycle, Citi Bike, Divvy, LimeBike, etc.)

- Almost daily
- A few times a week
- Monthly
- Rarely
- Never

**End of Block: Block 6**

---

**Start of Block: Block 7**

*Display This Question:*

*If Q3 != Never*

Q15 What type(s) of bicycling do you typically do over the course of a year? (Select all that apply)

- Outdoor riding on a non-motorized bicycle
- Outdoor riding on an electric bicycle
- Indoor bicycling

*Skip To: Q18 If Q15 != Indoor bicycling*

*Display This Question:  
If Q3 = Never*

Q42 Do you ever bicycle indoors?

- Yes
- No

*Skip To: Q18 If Q42 = No*

Q16 How frequently do you ride a bicycle indoors?

- Almost daily
- A few times a week
- Monthly
- Rarely



Q17 What are the main reasons that you bicycle indoors? (Select **up to 3**)

- Easy to fit into my schedule
  - I don't need to worry about the weather
  - I don't need to worry about traffic safety and flat tires
  - I don't need to worry about being a victim of crime or assault
  - I don't need to worry about my appearance
  - It's a good way to recover from an injury
  - I like the social aspect
  - I can control conditions like speed and slope
  - Other (please specify)
- 

Q18 For most of the year, how frequently do you see women bicycling in your community outdoors?

- Almost daily
  - A few times a week
  - Monthly
  - Rarely
  - Never
-

Q19 Thinking about your childhood, how common was it to see adult women bicycling where you grew up?

Very Uncommon                      Very Common  
1            2            3            4            5

Click or drag 

Q36 Thinking about your childhood, how common was it to see teen girls bicycling where you grew up?

Very Uncommon                      Very Common  
1            2            3            4            5

Click or drag 

Q37 How satisfied are you with how your local community is designed for safe bicycle riding?

Not Satisfied At All                      Very Satisfied  
1            2            3            4            5

Click or drag 

Q38 When riding a bicycle **during the day**, how concerned are you for your personal safety (fear of assault, crime, or encountering the police)?

Not Concerned At All                      Very Concerned  
1            2            3            4            5

Click or drag 

---

Q39 When riding a bicycle **during the evening**, how concerned are you for your personal safety (fear of assault, crime, or encountering the police)?

Not Concerned At All      Very Concerned

1      2      3      4      5

Click or drag



Q24 Which of the following would encourage you to bicycle more frequently? (Select all that apply)

- Secure, convenient bicycle parking at my destinations
  - Seeing more women and/or non-white people bicycling in my community
  - A local group that supports those new to bicycling
  - Free or reduced cost access to bicycles
  - Access to basic bicycle maintenance class
  - More bicycle lanes
  - More off-road bicycle trails
  - Other (please specify)
-



Q25 In your experience, what has been effective in encouraging more women to ride a bicycle in your community?

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Q27 There has been an effort to address diversity and inclusion in bicycling media, racing, and programming over the past two years.

Please **select all** that are important to you.

- Expansion of images or media coverage of women and/or non-white people who look like me on bicycles
  - Increased visibility of women and/or non-white community leaders and transportation advocates
  - Increased visibility of women and/or non-white people in professional bicycle racing
  - Expansion of bicycle programming for youth
  - Growth of local circuit races in cities across the US
  - Other (please specify)
- 

End of Block: Block 7

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## Appendix D: Social Media Content

### EMAIL to Partner Orgs

Dear \_\_\_\_,

The Alan M. Voorhees Transportation Center (VTC) at Rutgers University is conducting a national survey that examines the challenges and barriers to bicycling faced by those who identify as women, with emphasis on the experiences of BIPOC (Black, Indigenous, and People of Color). This research, funded by the New Jersey Department of Transportation, is part of ongoing efforts to advance safety for all roadway users and to implement equity initiatives as part of New Jersey's Strategic Highway Safety Plan. The research seeks to understand the factors that contribute to lower rates of bicycling among women and to identify those educational programs and design practices that can best address this gap.

We would greatly appreciate if you could help us share the survey link and graphic below to your networks! We would love to get as many responses as possible across the US and to hear from women who do any form of bicycling, from everyday commuting to the occasional ride in the park.

[Survey link]

[Facebook/Twitter/Instagram link to share]

Survey participants can enter a raffle to win a \$100 gift card.

If you have any questions, please email: \_\_\_\_\_.

### Facebook Posts/Ads

#### Ad 1 (positive)

Above image:

Do you bicycle for transportation or for fun? What can be done to make your trips better? Rutgers would love to hear from you!



Below image:

Survey of Bicycle Riders and Experiences

Complete the survey for a chance to win a \$100 gift card to Walmart!

## Ad 2 (negative)

Above image:

Do you think bicycling is dangerous? Is there anything that can be done to make it safer? Rutgers would love to hear from you!



Below image:

Survey of Bicycle Riders and Experiences

Complete the survey for a chance to win a \$100 gift card to Walmart!

## Ad 3 (women only)

Above image:

We want to hear from women who do any form of bicycling, from everyday commuting to occasional rides in parks in the U.S.!



Below Image:

Survey of Bicycle Riders and Experiences

Complete the survey for a chance to win a \$100 gift card to Walmart!

## **Twitter Posts / Promoted Tweets**

### **Post 1**

We want to hear from women who ride bicycles in their communities! Please take this survey to contribute to an equity and safety research project underway at the Voorhees Transportation Center.

### **Post 2**

We need your help to understand how community-based educational programs, local policy, and street design can address barriers faced by those who identify as women and bicycle.

### **Post 3:**

Is bicycling dangerous? Is there anything that can be done to make it safer? Complete our survey for a chance to win a \$100 gift card to Walmart!

Twitter Hashtags: #bike #bicycle #women #cycling

# Appendix E: Focus Group Guide

## AGENDA

1. Welcome and Introduction (Moderator with Participants)
2. Discussion Overview (Moderator)
3. Discussion: Question & Answers (Moderator with Participants)
4. Wrap up (Moderator)

## WELCOME & INTRODUCTION

The Voorhees Transportation Center, with funding from the New Jersey Department of Transportation, has conducted several research projects and surveys on bicycling and walking in communities in New Jersey. In the past, we have conducted research and surveys on attitudes towards bicycling in black and Hispanic/Latin communities, on travel behaviors, and on how experiences with/perceptions of crime affect walking behavior. The current research effort builds on previous studies conducted by VTC: “Understanding Barriers to Bicycle Access and Use in Black and Hispanic Communities in New Jersey” (2016) and “Bicycling Among Black and Latino Women” (2016). We want to examine how the intersections of identities play a part in the various barriers that minority women face when bicycling, and how bicycling also shapes the identities of minority women.

We will first discuss your experiences with bicycling as well as the barriers and challenges that women, especially minority women, face with bicycling in your community. We will then discuss the types of work that you have done and your experiences as bicycle leaders and advocates. Finally, our discussion will explore the types of programs that have been successful in encouraging more minority women to bicycle and what you think is still needed to broaden the reach of bicycling.

One advantage of a group discussion such as this is that everyone can contribute. The key, however, is respect. Please be mindful of each other’s experiences and opinions, but you are welcome to disagree or offer alternate viewpoints on any topic of conversation. Also keep in mind that I am the referee. If one person is dominating the discussion, I may step in to keep the conversation moving along since we have a limited time period.

*VTC to address signing of IRB consent form as a condition of participation.*

A couple of reminders before we start our discussion: please use the chat box to park any comments you would like us to follow up on during the discussion. Also, please mute yourself if you are not the one talking so that your background noise doesn’t disrupt the call. When asked to contribute, please unmute yourself before speaking. The unmute/mute button is at the bottom of the screen.

## DISCUSSION OVERVIEW

To begin, let’s just go around the room and briefly introduce ourselves. Please share your first name, pronouns, and tell us how you found out about this focus group.

## DISCUSSION QUESTIONS

1. What kind of community do you live in? Is it urban, suburban, or rural?
2. Has COVID-19 changed your travel and recreational patterns and bicycling habits? Or, how do you think COVID-19 has changed attitudes and perceptions towards bicycling in your community?
3. What are your main purposes of bicycling? (ex. recreation, transportation, racing)? What kinds of bicycling do you engage in most often/enjoy the most?

4. What types of barriers have you faced or continued to face with bicycling?
5. How have you overcome those barriers?
6. What do you think are the main challenges and barriers that minority women in your community experience with bicycling? Or, how have you seen bicycling played a positive influence in the lives of minority women in your community?
7. What are your roles as bicycle leaders or advocates in your community? Can you describe the types of work you have done?
8. What do you love most about bicycling and what motivated/continues to motivate or inspire you to be an advocate for bicycling?
9. Can you share some of the highlights and/or challenges of your work?
10. What types of educational or encouragement programs have been successful in expanding bicycle access for transportation and recreation for minority women? Or, what types of programs or initiatives have been successful in reaching and serving the needs of minority women to encourage them to bicycle more? What do you wish to see more?
11. What do you think is needed to broaden the reach of bicycling?
12. Any other comments?

## **WRAP UP**

Thank you for your participation in this group discussion.

