

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

**Perceptions and Experiences of Women When Choosing to Cycle as the Mode of Transportation**

**Katherine Fong, Randall Kwan, Deegan Milne, Emily Wong, Caroline Wu**

**University of British Columbia**

**KIN 464**

**Themes: Transportation, Community, Wellbeing**

**Date: Apr 2, 2020**

*Disclaimer: "UBC SEEDS Sustainability Program provides students with the opportunity to share the findings of their studies, as well as their opinions, conclusions and recommendations with the UBC community. The reader should bear in mind that this is a student research project/report and is not an official document of UBC. Furthermore, readers should bear in mind that these reports may not reflect the current status of activities at UBC. We urge you to contact the research persons mentioned in a report or the SEEDS Sustainability Program representative about the current status of the subject matter of a project/report".*

Final Report: Perceptions and Experiences of Women When Choosing to Cycle as the Mode of  
Transportation

KIN 464: Health Promotion and Physical Activity (Dr. Andrea Bundon)

Katherine Fong, Randall Kwan, Deegan Milne, Emily Wong, Caroline Wu

Group 3

University of British Columbia, School of Kinesiology

April 2nd, 2020

# **TABLE OF CONTENTS**

<b>Executive Summary</b>	2
<b>Introduction</b>	3
Literature Review	3
Rationale	7
<b>Methods</b>	8
<b>Results</b>	11
<b>Discussion</b>	15
Location of UBC as a Barrier	15
Infrastructure of Vancouver and UBC as a Barrier	16
Lack of Knowledge and Community as a Barrier	17
Our Partners and What our Overall Findings Suggests	19
<b>Recommendations</b>	20
<b>Conclusion</b>	22
<b>References</b>	23
<b>Appendices</b>	29
<b>Appendix A: Draft of Survey Questions</b>	28
<b>Appendix B: Finalized Distributed Survey To Target Audience</b>	33
<b>Appendix C: Results Graphs</b>	45
<b>Appendix D: Survey Promotion Examples</b>	52
<b>Appendix E: Results (Quantitative)</b>	53
<b>Appendix F: Location of the University of British Columbia (UBC)</b>	64

### Executive Summary

Noted in previous studies and literature were barriers specific to women when it came to using a bike as a means of transportation. This paper attempted to identify what the most deterring barrier to cycling was for women at the University of British Columbia (UBC). Data was collected by using an online survey distributed to self-identified women who commuted to UBC Vancouver campus. All participants were required to give consent prior to the completion of the survey. The data was collected with the use of Qualtrics, a credible survey tool that stores data in a secure drive within Canada. The survey was promoted and distributed on social media sites such as Facebook and in-person to participants. Draw prizes were used as an incentive to recruit participants for the survey.

In total, 175 respondents were included in the final data collection and analysis. To meet our criteria and be included in the analysis, participants had to self-identify as a woman and be a current student, staff, or faculty member. Due to the recent COVID-19 pandemic, in-person recruitment of staff and faculty members was interrupted and cut-short. In total, 87% of participants were students, 11% were staff, and 2% were faculty members. Barriers and perceptions to cycling were identified by determining the most common response for each question.

The most notable barrier that deterred women from cycling to UBC was distance (43%). This barrier was also identified by previous studies. It is recognized that this barrier will not be one that can be easily solved. The second most observed barrier was safety. To increase the feeling of safety, we recommended that physical barriers be built along the designated bike routes for all major roads connecting UBC and the city of Vancouver as a means to separate cyclists from motor vehicles. Another notable finding was that 45% of participants do not have access to a bike. To this, we recommended implementations of bike rentals or collaborate with a company that can create bike share programs that span distances beyond campus. Amongst the women surveyed, 85% believed cycling was more prevalent among men. Also, we asked whether or not respondents knew of the bike storage facilities available on campus, to which 56% of respondents were able to identify at least one. To which recommendations were made for UBC to implement more cycling initiatives for women and to promote bike facilities available on campus. Further studies should be done to understand the effects and opinions of implementing physical barriers to designated bike routes, barriers and perceptions of cycling for women staff and faculty members, and the magnitude of distance being a barrier to using cycling as a means to travel to and from UBC.

## **Introduction**

Cycling is a popular mode of transportation for people around the world. However, cycling only makes up 1.4% of all trips to and from UBC (UBC, 2019). Studies have reported that primary reasons people choose biking as a mode of transportation are for: (1) health benefits, (2) enjoyment, and (3) to be environmentally-friendly (Heinen, van Wee, & Maat, 2010; Stinson & Bhat, 2004). Common barriers bikers face include road aggression, lack of designated bike lanes, and weather (Akar, Fischer, & Namgung, 2013; Dill & Voros, 2007; Heesch, Sahlqvist & Garrard, 2012). In a study by Bopp, Child, and Campbell (2014), they found that facility and institutional support was significantly related to cycling to work. The presence of physical support such as bike parking availability, showers and lockers present, and bike storage policies, were a significant influence on bike participation among women (Bopp et al., 2014). It is not yet known if the concern of bike theft constitutes a major barrier to commuting via bike, however there is evidence that women only make up 30% of all daily bikers in Canada (Pucher & Buhler, 2008). Furthermore, research needs to be conducted on the specific barriers women face when cycling in order to promote this mode of transportation so that they do not miss out on the potential health benefits.

## **Literature Review**

Numerous studies on cycling as a mode of transportation has revealed a variety of barriers and dangers bicyclists face whilst on the road (Akar et al., 2013; Bopp et al., 2014; Dill & Voros, 2007; Flottorp, 2019; Grudgings et al., 2018; Heesch et al., 2012; Lubitow, 2017; Pucher & Buehler, 2008; Stinson & Bhat, 2004). From concerns that relate to biker's safety on the road, to the image they must uphold when in a professional setting, or to the amount of time

needed to be allocated for cycling, people face numerous barriers and have an abundance of valid concerns when deciding whether to bike as their mode of transportation (Akar et al., 2013; Bopp et al., 2014; Dill & Voros, 2007; Flottorp, 2019; Grudgings et al., 2018; Heesch et al., 2012; Lubitow, 2017; Pucher & Buehler, 2008; Stinson & Bhat, 2004). For example, in a study by Stinson and Bhat (2004), primary deterrents to biking included: (1) unpleasant weather, (2) injuries and illnesses, and (3) errands during the commute. Additionally, in a study by Dill and Voros (2007) they identified 5 major barriers, including: (1) high traffic flow, (2) lack of bike lanes, (3) lack of safe places to bike, (4) large number of hills, and (5) distance. It could be believed that many bikers feel deterred from cycling to UBC because there exists diverse areas of barriers, concerns, and challenges people have in regards to using bikes as their main mode of transportation.

There is a lack of women in the cycling community and most feel that there are barriers that keep them from cycling to work or for leisure. In a study done by Lubitow (2017), she looked at understanding the barriers that kept women from cycling to work. The main barriers discussed were: safety, visibility and harassment, appearance, and parenting. Another study by Bopp et al. (2014), discussed the barriers women face were social and community support, appearance, work facility, and family life. The common theme between the studies was understanding the barriers women faced when they bike and the solutions that could be implemented (Bopp et al., 2014; Lubitow, 2017). A suggestion made to increase the feeling of safety was to brighten the lighting on the streets and have more protected bike lanes (Lubitow, 2017). When women are cycling they feel that they attract a lot of attention from people in cars, and this makes them vulnerable to cat calling or harassment (Bopp et al., 2014). A suggestion to improve this situation was having a “bike buddy” program, women group rides, or a program

within the workplace for women to bike together (Lubitow, 2017). Women were also hesitant to bike to work because they feel that compared to men and that they have to look a certain way when they arrive to work (Bopp et al., 2014). An intervention that could help was having workplaces that provided change rooms and showers that allow women to tidy up before work (Lubitow, 2017). For women who have a hard time balancing a healthy lifestyle and parenting there could be cycling events that support families (Lubitow, 2017). Although the rates of cycling are low in women, if they had more resources to feel safe, can keep up their appearance, and are able to take care of their families they would feel a sense of empowerment from participating in a physical activity (Bopp et al., 2014; Lubitow, 2017).

An example of a program that is advocating for better cycling in the community, providing leadership roles, and creating a community for women bikers is the Women & Bicycles program in Washington, D.C. (Jones, 2015). The two primary objectives of the Women & Bicycles program is to foster connections between women bikers in the region and community and to work towards getting more people, specifically women, to start cycling more (Jones, 2015). Indeed, there are many barriers that challenge the women and the program. Such as their perceptions of safety, logistics, social norms and expectations, as well as social support, but the program successfully offers services and opportunities that are responsive to the needs of the community (Jones, 2015). Women & Bicycles strives to create and facilitate mentorship, to work with a diverse coalition of groups who already work to empower women, and to ensure their outreach and marketing reaches a diverse audience (Jones, 2015).

A study by Grudgings et al. (2018), looking at census data from rural England and Wales, identified several conditions as to why females may not cycle to work within a 5 kilometre commute in comparison to males. The most impactful conditions found to deter cycling to work

for both men and women was whether their route contained hills and condense motor vehicle traffic (Grudgings et al., 2018). More specific and less impactful deterrents for females however, were rain, child care, and wealth which were less impactful to male cycling behaviour as females tend to take care of children more so than men (Grudgings et al., 2018). Of note by the researchers was that the existence of bike lanes in the area had no real effect in cycling behaviour and that only the lack of hills and car related traffic seemed to produce higher rates of bike use (Grudgings et al., 2018). In areas classified with poor cycling conditions, hills and high traffic, rates for male cycling would be 3% of the population while females would be 0.3% (Grudgings et al., 2018). However, in areas classified with good conditions the rates for male and female were as high as 14% and 10% respectively, well above the combined sex national average of about 7% (Grudgings et al., 2018). Although this study did well to identify factors that determined differences in reasons for cycling behaviour from a large population, the use of census data can not tell us everything and is an impersonal form of data that does not show individual differences in circumstance.

In a study by Akar et al. (2013), researchers studied the lack of female bikers in the faculty, staff, and student body at Ohio State University. From the research, the top reasons that prevented women from cycling included: (1) Need to carry things and a change of clothes, (2) lack of bike lanes, trails, and paths, (3) vehicular traffic, and (4) weather conditions (Akar et al., 2013). These reasons significantly differed from the top issues men cited that prevented them from cycling (Akar et al., 2013). Furthermore, in an article written by Flottorp (2019) for We Love Cycling, similar barriers to Bopp et al. (2014) were discussed. This included: the fear of learning a new skill, formal cycling rules of the road, access to proper equipment, increased vulnerability to others, lack of a female cycling community, and guilt of not being at home



(Flottorp, 2019). Indeed, the study from Akar et al. (2013) and the article from Flottorp (2019) further supported claims from other researchers that women were more concerned about issues revolving safety when compared to men (Blais & Weber, 2001; Flottorp, 2019; Pucher & Buehler, 2008). To be able to feel comfortable and safe before, during, and after the ride is a crucial and critical barrier to women bicyclists and is a concern that should be addressed. The primary goal of this Social Ecological Economic Development Studies (SEEDS) project, “What Stops People From Cycling to UBC?”, will be to identify the major barriers for women and commuters of the UBC campus in order to increase the popularity of cycling as their main choice of transportation.

### **Rationale**

The population selected for this SEEDS project--“What Stops People from Cycling to UBC?”, are self-identified women that are students, staff and faculty members of UBC. The primary objective of our project was to investigate and identify the perceived barriers to cycling for women at UBC. Women were chosen as the target population because research indicates cycling in urban areas are often predominantly made-up by male cyclists (Dill & Voros, 2007; Pucher & Buehler, 2008). With just 30% of total daily cyclists made up by women, it would be important to identify and address the barriers women may face when choosing to bike as a mode of transportation (Pucher & Buehler, 2008). With the collected data, we looked to provide feasible and implementable solutions to overcome and/or minimize the perceived barriers women face when cycling to and from UBC.

As a form of transportation, cycling is a great alternative to taking a taxi, driving and busing as it is more environmentally sustainable, healthy, and inexpensive (Jones, 2015;

Woodcock et al., 2009). Therefore, other factors or barriers that should be identified and addressed are the present knowledge of available bike facilities at UBC, the perception of women cyclists, and the potential deterrents and/or barriers current women face when cycling to campus. It is important to identify the present knowledge of available bike facilities (e.g., bike cages, bike lockers, Bike Kitchen, etc.) on campus as a lack of knowledge could be a major deterrent for potential cyclists. Moreover, it would be insightful to know what women's perceptions of other women cyclists on campus are. By identifying these perceptions, it may reveal issues, stigma such as expectations to look appealing at work, and social barriers women face when deciding what mode of transportation to use. Furthermore, it is crucial to identify potential deterrents and barriers women cyclists currently face that could serve as potential role models for women who are hesitant about picking up biking as a mode of transportation, as well as hold insights and perspectives that may be more pragmatic and significant to the cycling community.

### **Methods**

The data was collected using an online survey to reach our target population. An online survey was chosen because it allowed participants to complete it at a time that was most convenient to them and can reach a broad part of the UBC population. Questions were in the form of multiple choice and open ended answers. Along with the survey was the consent form that discussed the intentions of our survey, such as why the data is being collected, and where any questions or concerns can be directed to. Questions varied and included current modes of transportation, potential benefits to cycling, potential barriers to cycling, knowledge about cycling facilities, perceptions of cyclists on campus, and suggestions to improvements for cycling to campus (see Appendix A and B for survey questions). Data was collected with the

purpose of identifying why women were not choosing cycling as their mode of transportation to and from UBC.

Using the UBC Survey Tool, Qualtrics, an online survey was distributed to our target population and used to collect data for this project. Qualtrics is an online survey platform that is certified by UBC to collect data (UBC, 2020b). Offering a wide range of features, Qualtrics is an easy-to-use, top-tier survey tool platform that allows multiple members of a group to collaborate and share surveys (UBC, 2020b). Qualtrics also complies with the BC Freedom of Information and Protection of Privacy Act as the data is kept secure, stored and backed up in Canada (UBC, 2020b). Most importantly, Qualtrics conforms to the ethics board which is a big contributing factor to why we are able to conduct this study.

Through its online format, Qualtrics provided easy access to a large number of possible students, staff, and faculty member participants at UBC. This survey was posted on social media sites such as Facebook pages associated with UBC asking for self-identified women who commute to campus to participate. By emphasizing women and commuting, we ensured that our participants are women who travel to UBC by driving, busing, cycling, or any other modes of transportation.

Data collection was done during the month of March 2020 and was primarily promoted through social media platforms to reach a variety of students, staff, and faculty members. Furthermore, group members personally approached students, staff and faculty to provide them with the link to the survey as a way that ensured a variety of students, staff, and faculty members were included in the data. This was done before the need to completely transition to online recruitment due to Coronavirus disease (COVID-19). Not to mention, as an incentive to

participate, participants could enter into a draw for several prizes with a separate link provided with the survey.

The data was collected and analyzed through Qualtrics. We took this further by exporting the data into a Microsoft Office Excel Spreadsheet. One of the first things done was removing the people who met our exclusion criteria which was identifying as a man or non-binary, and not commuting to UBC. Then the incomplete responses were removed from our data. The next step was to highlight the partially completed surveys to differentiate it from our completed and qualified answers. The responses were also analyzed altogether as a whole, but also divided into student, staff, and faculty responses. This allowed us to determine qualitative descriptives that occurred in the results to identify similarities and differences in the participant's responses as well as in the mentioned groups. For example, in a study by Akar, Fischer, and Namgung (2013), staff and faculty members identified the need to change and carry items as a major deterrent to cycling whereas students identified extreme weather conditions as a major barrier.

The analysis of the open ended questions was done with Qualtrics Word Cloud, which allowed us to view the most repeated words found in our results from the questions (Qualtrics, 2020). The Word Cloud displays a cluster of words with the size of the word, the biggest being the most popular, indicating how often the word appears in the responses (Qualtrics, 2020). After having gathered all the data from Qualtrics, it was exported to a Microsoft Office Excel Spreadsheet. In the excel program we were able to plot visuals for the descriptive statistics of the data, such as the average response to a question, in the forms of bar graphs, pie charts, and tables which identified the main barriers that prevent women from cycling to UBC.

## Results

Initially, there were a lot of responses from participants who were genuinely interested. Each group member used convenience sampling to get the survey started with responses by contacting female peers they knew who would qualify for our study to participate in our survey. We got to about 150 participants before it plateaued. By the end of the results, there were a lot of incomplete surveys, as well as some fake participants.

Upon closing the survey on March 20th, after two weeks of collecting surveys--going live on March 6th, we had a total of 297 responses. Four responses where two identified as either male or non-binary. Unfortunately, we had one participant switch from identifying as male, to identifying as a woman with the exact same name. We assume this was done for the sole purpose of qualifying for the participation incentive. Out of the 297 responses, 24 of them were partially complete, and 28 responses were incomplete (link clicked, name and consent provided, but responses were empty). Therefore, a total of 175 responses were thoroughly completed and met our inclusion criteria.

Out of the 175 participants, 4 were faculty members, 19 were staff, and the remaining 152 participants were students. The biggest limitation that affected our data was the lack of staff and faculty members due to the Coronavirus disease (COVID-19) which changed our original promotion plans of posting our posters, handing out links with our survey to be completed at a later convenient time, and approaching potential participants in-person as originally proposed. From the beginning, our group understood that there would be a challenge recruiting staff and faculty members, however, due to the fast adapting policies to contain COVID-19, many of our proposed plans of reaching this target population had to change. Recommended by UBC to

practice social distancing, the other best alternative our group decided was to send emails to staff and faculty members (see Appendix D). Though this was not the most reliable way to guarantee participating respondents, our group tried to work with what was made available. However, because respondents were not found in-person, our results resulted in a much smaller sample of staff and faculty members.

Once March 20th passed, we closed the survey and exported the data onto an Excel Spreadsheet. We made duplicates of the responses just in case anything were to fail in the data analysis process. The data was imported to JASP where descriptive statistics were created and allowed us to further analyze the results (see Appendix E). As we expected, there was an over representation of students with the 151 participants falling in the 18-25 years old category. It is also worthwhile to note that 2 respondents did not answer which age category they belong to. There were 152 participants who classified as students, therefore, showing there was one participant who was older than the norm.

Of all respondents, the majority of participants chose the bus as their mode of transportation (Appendix C, Figure C3). The second most frequent answer was walking (n=44) followed by use of a car (n=25) as methods to commute to UBC (Appendix E, Table E3). There were 9 participants who chose to bike to UBC, which was a fairly low number indicating only 5% of respondents bike (Appendix C, Figure C3).

Of all respondents, the majority reported they have a bike but chose not to commute to UBC this way while the rest do not own bikes (Appendix C, Figure C4). The main reason reported that deters people from biking is that they live too far from campus, with 76 participants having a mutual opinion about this. There were 30 participants who thought biking to UBC is

unsafe; 27 participants have an alternative reason that prevents them from biking to UBC; 24 participants choose not to because they are too lazy or unfit; 17 participants did not have a bike so that eliminates the possibility for biking to be mode of transportation for them (Appendix E, Table E5). Similarly enough, about the same amount of participants who have a bike and do not have a bike, are aware of biking facilities offered on campus with 97 participants were aware of biking facilities or services offered at UBC and 76 participants who were unaware (Appendix E, Table E6). The main service that most respondents knew about was the Bike Kitchen as 53 participants mentioned this facility offered at UBC (Appendix E, Table E7). Other facilities mentioned included bike rentals mentioned by 18 participants and 15 were aware of bike cages around campus. When asked if biking was more male or female dominant, the majority (85%) believed it was more male dominant (Appendix C, Figure C9). It is worthwhile to mention that there were 6 missing responses to this question and some believing there is no dominance between the two genders.

Overall, most participants (95 somewhat agree; 21 strongly agree) think Vancouver is a safe city to bike in (Appendix E, Table E9). Only 26 participants think that Vancouver is not a safe city to bike in while 30 participants neither agree nor disagree. Additionally, when asked about the idea of adding more bike lanes along the commute to UBC the majority of participants voted yes (Appendix C, Figure C11).

Of the 23 staff and faculty participants, the most popular modes of transportation were car and public transit (Appendix E, Table E13). A few participants (n=4) chose walking as their mode and 3 participants biked to UBC. The main barrier that prevented staff and faculty specifically from biking to UBC were other reasons not mentioned in our study; 5 participants felt that it was unsafe for them to commute to UBC via bike; another 5 participants think UBC is

too far to transport by bike; 4 participants think they are too lazy/unfit to bike to UBC; and 1 staff or faculty did not own a bike (Appendix E, Table E14). Although few staff and faculty bike to campus, they are well aware of the health and fitness benefits from biking to work. Other benefits that were included as options were; environmental, financial, time saving, not having to pay for gas/insurance, and other benefits not mentioned in our survey.

The common themes we found were that a majority of respondents were students who were aged 18-25 years old (Appendix C, Figure C1). Their preferred method of transportation to commute to UBC was by bus. The primary reason is because the Universal Transit Pass (U-Pass) is already included in their tuition fees (Appendix E, Table E10). For those who chose to walk, it is because they live close, and those who chose to drive, is because they live far or are carrying stuff that they don't want to carry on public transit. More than half of the participants own a bike but choose not to commute to school via cycling. Additionally, of those who do not own a bike, 34 participants reported they would like to own a bike, 18 participants declared they would not like to own a bike, and 25 respondents said they might want to own a bike. The major benefit perceived by our participants derived from biking to UBC would be health and fitness benefits. The second and third benefit would be environmental, then financial benefit. The main barrier that prevents participants from biking to UBC is that they live too far. The next barrier would be that they think it is unsafe to do so, and the third reason was that they are too lazy or unfit. The most commonly mentioned facility known was the bike kitchen. The gender that participants think dominates the activity are males. A great majority of participants like the idea of bike lanes and that there should be more implemented to and from UBC.



## Discussion

### Location of UBC as a Barrier

After analyzing the collected data, results indicated that the main barrier and deterrent for women when choosing to cycle as their mode of transportation was distance (43%) (Appendix C, Figure C5). This barrier was only mentioned briefly in one of the articles reviewed, however this barrier did not come as a surprise to our group as UBC is known to be quite isolated and remote from the rest of Vancouver (Appendix F, Figure F1; Dill & Voros, 2007). With a minimum cycling distance of 3 km to travel off campus, cycling may not be an appealing mode of transportation for most even if participants lived just outside of campus (Appendix F, Figure F1). As mentioned previously, it is interesting to note that a search of the literature yielded very little mention of distance as a major deterrent to people cycling. However, it should be noted especially because researchers and authors have reported time needing to be allocated for cycling as a barrier, which can be closely related to distance needed to travel (Pucher & Buehler, 2008; Jones, 2015).

Additionally, some studies have also indicated that the presence of hills along the commute path impacted cycling behaviours (Dill & Voros, 2007; Grudgings et al., 2018). As the main commute paths to UBC involve a gradual incline, hills may contribute as a barrier to cycling as those who are new to biking may find the path intimidating, too physically exhausting, and/or time consuming (Appendix F, Figure F2). This is noteworthy because when asked to select which barriers respondents would experience if they cycled to campus, the third most given response was 'Too lazy/unfit' (14%). This barrier, which could be made-up of multiple factors (e.g., hills, elevation, and distance), and could impede and/or deter respondents who were

interested in cycling to UBC (Appendix C, Figure C5). Being unfit could be a reason for not wanting to bike up a hill as it could also be time consuming from requiring breaks to conquer the hill, as previous research has shown that fitness level and the need to maintain a presentable appearance affects biking behaviour (Bopp et al., 2014; Heesch et al., 2012; Stinson & Bhat, 2004).

Seeing and understanding UBC's topographics and geographical location provides us insight as to what may be the actual barrier to people cycling to UBC. As touched upon earlier, UBC is located in an elevated location that is quite far for many commuters of UBC. Even if people had the financial means to own a bike and facilities were in place for cyclists, the bike and facilities would not be used due to other existing factors that may deter people from choosing to cycle (e.g., distance, appearances, fitness, and health implications).

### **Infrastructure of Vancouver and UBC as a Barrier**

In regards to the cycling infrastructure in Vancouver and UBC, a great majority of respondents liked the idea of having more bike lanes (83%) when cycling to UBC (Appendix C, Figure C11). Additionally, when we analyzed the data given by the respondents, results indicated that feeling unsafe (17%) was the second most prevalent barrier when choosing to cycle (Appendix C, Figure C5). For students, staff, and faculty members who live off campus, commuting to UBC, involves taking one of the four long stretches of road that lead to campus (i.e., SW Marine, W 16th, Chancellor Blvd, and University Blvd) regardless of their mode of transportation. Of these four routes, there exists bike lanes but lack physical barriers separating the biker from vehicular traffic. From previous literature, it is known that the presence of vehicular traffic and potential aggression from motorists has been a major deterrent to

commuters from cycling (Akar et al., 2013; Heesch et al., 2012; Lubitow et al., 2019; Grudgings et al., 2018). With a large number of motor vehicles driving on the same routes as the pre-existing bike lanes, this presents a major safety hazard when choosing to cycle. This is especially true when cyclists have to share the road with motorists that are often exceeding the posted speed limits (UBC, 2019). Although roads with bike lanes are present and offer a designated space for cyclists on the road, it does not mean it provides feelings of security and safety for cyclists whilst on the road. Though there is currently little credible and substantial data on the number of men and women currently cycling to UBC, the lack of security when cycling could be a reason as to why there are such low numbers of cyclists when compared to motorists (UBC, 2019).

The lack of security could also explain why there are more men who cycle when compared to women as previous research has indicated that women are more cautious and concerned about issues relating to safety, whereas males are more encouraged to and willing to engage in risk-taking behaviours (Blais & Weber, 2001; Flottorp, 2019; Pucher & Buehler, 2008). However, it is interesting to note that a majority of respondents (54%) thought Vancouver was a considerably safe place to cycle (Appendix C; Figure C10). Therefore, this could explain why the greatest barrier for our respondents was distance when considering cycling as their mode of transportation.

### **Lack of Knowledge and Community as a Barrier**

Results indicated that just over half of our respondents (56%) knew about at least one cycling facility offered by UBC (Appendix C, Figure C7). Among the 56% of respondents, the facility that was mentioned most was the Bike Kitchen (49%) (Appendix C, Figure C8). The Bike Kitchen is UBC's on-campus community bike shop that provides students with resources

and opportunities to learn more about bikes, share knowledge, and receive tune-ups and repairs (The Bike Kitchen, 2020). Furthermore, the Bike Kitchen functions as a non-profit and provides a community for students to work together to create, advocate, and promote cycling as a safe and sustainable mode of transportation (The Bike Kitchen, 2020). The second most mentioned facility was the bike rentals available on campus, followed by the bike cages (Appendix C, Figure C8).

Analyzing and understanding our target population's knowledge and awareness of cycling facilities on campus is crucial to understanding the experiences and barriers of our target population. The lack of knowledge about facilities offered could be the barrier causing them to not cycle. For example, of the 56% of respondents who were aware of any cycling facilities on campus (Appendix C, Figure C7), only 49% of those respondents were aware of the Bike Kitchen (Appendix C, Figure C8). This indicates that among all our respondents, just 27% were aware of a facility that is included in UBC's annual student fees, the Bike Kitchen (UBC, 2020a). Therefore, perhaps one of the barriers that could be contributing to the low number of cyclists on campus is the lack of knowledge, awareness, and/or promotion about cycling initiatives currently offered on campus.

Additionally, when asked whether respondents thought cycling as a mode of transportation was more prevalent amongst men or women, an overwhelming number of our respondents (85%) believed cycling was more prevalent amongst men (Appendix C, Figure C9). This could be contributing to the lack of women cyclists, as previous literature by Flottorp (2019) suggests that a lack of inclusivity, community, and accessibility to proper cycling gear were major deterrents to women cycling. However, it is important to note that 3% of our respondents missed or skipped this question with a few stating that they believed neither men or

women were more prevalent (Appendix C, Figure C9). Though the proportion of respondents who represent this are little, this is noteworthy because amongst the literature reviewed, a large number of researchers and authors acknowledge that there does exist a gender-gap wherein women make-up a much smaller fraction of the cycling community compared to men (Dill & Voros, 2007; Flottorp, 2019; Grudgings et al., 2018; Jones, 2015, Pucher & Buehler, 2008). Therefore, perhaps one of the barriers women experience when choosing to cycle is the perceived notion that cycling is a much more prevalent mode of transportation for men.

### **Our Partners and What our Overall Findings Suggests**

Partnered with SEEDS, the goal for this project was to aid UBC Campus + Community Planning (C+CP) make the most influential and impactful decisions to encourage women commuters to cycle to UBC. Therefore, our goal for this project was to learn more about the experiences and perceptions of women when they choose their mode of transportation. Specifically, we wanted to learn more about the barriers women experienced and/or perceived when commuting or choosing to commute to UBC via cycling.

Our overall findings suggest that the barriers experienced and perceived by women are often complex, diverse, and unique to each individual. However, upon further analysis, there are common concerns and deterrents that stop women from choosing to cycle to and from UBC: (1) distance, (2) safety, and (3) fitness. Similar to previous studies from Blais and Weber (2001), Flottorp (2019) and Stinson and Bhat (2004), our results also indicated that safety was one of the more significant barriers when women decide whether to cycle. However, unlike most studies before, the most significant barrier that deterred women from cycling to UBC was distance, a factor only mentioned specifically by one other study by Dill and Voros (2007).

For women who may perceive themselves to be less physically fit, they may be discouraged from trying to cycle to campus. This is especially true for commuters who may live further, as they would be less likely to consider or even attempt to cycle to UBC. Furthermore, the concern about one's safety and security may also contribute as a major deterrent to women choosing to cycle. This feeling of security could be strengthened with designated bike lanes during the entire commute path with enhanced safety features in areas with high traffic flow. The combination of concerns regarding one's own fitness abilities, safety, and security during the commute may reinforce one's choice of choosing a more convenient, less risky, and time efficient mode of transportation (e.g., transit and/or drive).

In regards to the general population in Vancouver, our results indicate that many women do feel relatively safe when cycling in the city, however, choosing to cycle will depend greatly on the distance and infrastructure (e.g., bike lanes, traffic speeds, etc.) of the commute. Although it may be difficult to accomplish, decisions and initiatives will need to be made to promote cycling as a means to improve fitness and enhance the feeling of safety when cycling.

### **Recommendations**

Based on our survey results, we established the following recommendations to break down the barriers that were identified. Our first recommendation is that physical barriers be constructed on the bike lanes that lead into campus. This recommendation comes from our finding that safety was the second most impactful deterrent to women cycling to campus, and the one that can be best influenced by intervention. A feeling of safety can be created when a cyclist is separated from car traffic by a physical barrier as highlighted by work of Lubitow (2017). We

recognize that not all lanes are a part of the campus and will require cooperation with the city of Vancouver to accomplish the construction of these barriers.

Another important finding of note was the lack of ownership of bikes from respondents. While it may not be practical to sell bikes on campus, it is possible to increase availability of rentable bikes for use to commute to and from campus. This could be implemented by UBC itself by renting out bikes each term for students, faculty, and staff to use, or by partnering with other companies that already offer this service. We note that HOPR already operates on campus, but this service is restricted to only being able to access and use a bike on campus. Meanwhile, the city of Vancouver has a partnership with Shaw and their Mobi by Shaw Go program, but this service is limited to having bike share stations around the downtown core area, which ranges far from the UBC campus. Potential partnerships with either of these services may be possible to extend their ranges away from and toward UBC respectively, but the availability of them alone may not be enough to increase women ridership to and from campus.

Based on our question of the dominance of cycling between men and women, we found that over 80% of women see it as a more male dominant activity. Perhaps future studies can dig deep into why this activity is thought to be more male dominant at UBC to help rectify the lower proportion of women that choose not to cycle to campus. Also, we recommend that promoting cycling to women may also help with this issue, but the identification as to the why will help more to support a more targeted promotion intervention.

Lastly, the knowledge of the UBC Bike Kitchen, bike rentals, and bike lockers/cages were known by more than half of participants, with over 50% of respondents mentioning they knew at least one of these options. Although it may not seem to relate to commuting to campus,

increased knowledge of these services could be beneficial for those individuals that have a bike but do not use it to commute to campus as they do not know where to store it during their time on campus. Also of note is that we did not ask whether any of those that did commute to campus used these facilities, future studies into their prevalence of use may be of interest.

### **Conclusion**

Biking is known to be an environmentally and financially sustainable form of transportation (Jones, 2015; Woodcock et al., 2009). Regarded as a form of active transportation, cycling can be beneficial to one's physical and cognitive health (Stinson & Bhat, 2004; Woodcock et al., 2009). However, of more than 155,000 trips to and from UBC each weekday, cycling makes up just 1.4% of all trips (UBC, 2020a). Therefore, in order to encourage more people to cycle to UBC, our group was tasked with looking at the perceptions and experiences of women when choosing to cycle as their mode of transportation.

Previous studies have indicated that major barriers deterring women from cycling involved complex issues involving concerns about safety (e.g., lack of bike lanes, aggression from motorists), infrastructure (e.g., an abundance of hills, distance), and convenience (e.g., running errands, weather). Upon analyzing the data collected from our online survey, results indicated that a majority of our participants believed distance was the greatest barrier whilst improving one's health was the greatest benefit to cycling. From our results, we identified 3 main themes that deterred women from cycling as their main mode of transportation: (1) the location of UBC, (2) the topographics and infrastructure of Vancouver and UBC, and (3) a lack of knowledge about available cycle facilities.



To our partners, SEEDS and UBC C+CP, we provided 4 feasible recommendations to make cycling more accessible and inclusive: (1) to install physical lane barriers to enhance the feeling of safety for cyclists, (2) to provide rentals and collaborate with bike share programs off-campus to improve accessibility of bikes and to encourage more people to cycle, (3) to create new initiatives and programs involving cycling to encourage inclusivity and enhance accessibility for women, and (4) to advertise and promote any available on-campus services and facilities for cyclists (e.g., the Bike Kitchen, bike cages, and bike lockers).

For future research, further studies should be conducted on the implications of having physical barriers on the effects of commuting via cycling, barriers and deterrents that staff and faculty members face when choosing to cycle, and the significance of distance as a barrier by asking where the respondents commute from. By addressing and discussing these questions, the barriers could be further addressed by UBC and cycling can be encouraged and promoted as the main mode of transportation for all students, staff, and faculty members.

### References

- Akar, G., Fischer, N., & Namgung M. (2013). Bicycling choice and gender case study: The Ohio State university. *International Journal of Sustainable Transportation*, 7(5), 347-365. DOI: 10.1080/15568318.2012.673694

Blais, A., & Weber, E. (2001). Domain-specificity and gender differences in decision making.

*Risk, Decision and Policy*, 6(1), 47-69. doi:10.1017/S1357530901000254

Bopp, M., Child, S., & Campbell, M. (2014). Factors associated with active commuting to work among women. *Women & health*, 54(3), 212-231. DOI: 10.1080/03630242.2014.883663

City Maps. (2015). *Street map Vancouver*. Retrieved from <http://worldcitymaps.blogspot.com/2015/09/street-map-vancouver.html>

Dill, J. & Voros, K. (2007). Factors affecting bicycling demand: Initial survey findings from the Portland, Oregon, region. *Transportation Research Record: Journal of the Transportation Research Board*, 2031(1), 9-17. <https://doi.org/10.3141/2031-02>

Flottorp, M. (2019). *What are the barriers that keep women from cycling?* Retrieved from <https://www.welovecycling.com/wide/2019/10/08/what-are-the-barriers-that-keep-women-from-cycling/>

Grudgings, N., Hagen-Zanker, A., Hughes, S., Gatersleben, B., Woodall, M., & Bryans, W. (2018). Why don't more women cycle? An analysis of female and male commuter cycling mode-share in England and Wales. *Journal of Transport & Health*, 10, 272-283. <https://doi.org/10.1016/j.jth.2018.07.004>

Heesch, K. C., Sahlqvist, S., & Garrard, J. (2012). Gender differences in recreational and transport cycling: A cross-sectional mixed-methods comparison of cycling patterns,

motivators and constraints. *The International Journal of Behavioural Nutrition and Physical Activity*, 9(1), 106. doi:10.1186/1479-5868-9-106

Heinen, E., van Wee, B., & Maat, K. (2010). Commuting by bicycle: An overview of the literature. *Transport Reviews*, 30(1), 59-96. DOI: 10.1080/01441640903187001

Jones, L. C. (2015). *Engaging more women in bicycling*. Retrieved from [http://bikeleague.org/sites/default/files/Womens\\_Outreach\\_Report\\_WABA\\_web.pdf](http://bikeleague.org/sites/default/files/Womens_Outreach_Report_WABA_web.pdf)

Lubitow, A. (2017). Narratives of marginalized cyclists: Understanding obstacles to utilitarian cycling among women and minorities in Portland, OR.

Pucher, J. & Buehler, R. (2008). Making cycling irresistible: lessons from the Netherlands, Denmark and Germany. *Transport Reviews*, 28(4), 495-528. DOI: 10.1080/01441640701806612

Stinson, M. A., & Bhat, C. R. (2004). Frequency of bicycle commuting: Internet-based survey analysis. *Transportation Research Record: Journal of the Transportation Research Board*, 1878(1), 122-130. <https://doi.org/10.3141/1878-15>

The Bike Kitchen. (2020). *About us*. Retrieved from <https://www.thebikekitchen.ca/about>

Topographic-map. (2020). *Vancouver*. Retrieved from <https://en-ca.topographic-map.com/maps/feb8/Vancouver/>

Qualtrics. (2020). *Word cloud*. Retrieved from <https://www.qualtrics.com/support/survey->

platform/reports-module/results-section/visualizations/word-cloud/

University of British Columbia. (2020a). *Student fees*. Retrieved from

<http://www.calendar.ubc.ca/vancouver/?tree=14,267,784,0>

University of British Columbia. (2020b). *Survey tool*. Retrieved from

<https://it.ubc.ca/services/teaching-learning-tools/survey-tool>

University of British Columbia. (2019). *Transportation status report*. Retrieved from

[https://planning.ubc.ca/vancouver/transportation-planning/research-and-reports/  
transportation-status-reports](https://planning.ubc.ca/vancouver/transportation-planning/research-and-reports/transportation-status-reports)

Woodcock, J., Edwards, P., Tonne, C., Armstrong, B., Ashiru, O., Banister, D., ... Roberts, I.


(2009). Public health benefits of strategies to reduce greenhouse-gas emissions: Urban land transport. *The Lancet*, 374(9705), 1930-1943. [https://doi.org/10.1016/](https://doi.org/10.1016/S0140-6736(09)61714-1)

S0140-6736(09)61714-1



## Appendix A: Draft of Survey Questions

---



 THE UNIVERSITY OF BRITISH COLUMBIA

What gender do you identify as?


Woman

Man

Non-binary

---

 THE UNIVERSITY OF BRITISH COLUMBIA

Which of the following are you?

Student

Staff

Faculty

What age category do you fall into?

18-25

25-32

32-39

40+

How do you commute to UBC?

Bus

Car

Bike

Walk

Other



Do you want to own a bike?

- Yes
- No
- Maybe

What BENEFITS would you get out of biking from school?

- Health and fitness benefits
- Environmental benefits
- Financial benefits
- Community benefits
- Other

What BARRIERS would/do you experience if you biked to school?

- Too far
- No bike
- Too lazy/unfit
- Unsafe
- Other

Why do you commute to UBC the way you do?

- Bus - because it is apart of my tuition
- Car - I live far
- Bike - For health/environmental reasons
- Walk - I live close
- Other, please explain (and also please use the formatting above i.e. 'bus - \_\_\_\_\_');

Do you own a bike?

- Yes
- No





Do you think we should have more bike lanes in Vancouver?

Yes, please explain:

No, please explain:



Protected by reCAPTCHA. Privacy & Terms

Powered by Qualtrics

What BARRIERS would/do you experience if you biked to school?

Too far

No bike

Too lazy/unfit

Unsafe

Other

Do you think biking is more male or female dominant?

Male

Female

Do you like the idea of bikes lanes?

Yes

No



Protected by reCAPTCHA. Privacy & Terms

Powered by Qualtrics





What would you require first in order to get you to start biking to school (if it was feasible for you to)

- Designated lockers
- Bike storage
- Biker friends
- Modified infrastructure

Do you think Vancouver is a safe city to bike in?

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree





## Appendix B: Finalized Distributed Survey To Target Audience



THE UNIVERSITY OF BRITISH COLUMBIA

Greetings respondent! Thank you for taking the time out of your day to participate in our survey. We are 5 Kinesiology students conducting a health promotion project for our KIN 464 class regarding cycling to the University of British Columbia (UBC). By completing the survey provided, the answers could potentially help us identify some of the barriers women may face when cycling to and from UBC. All answers are confidential and will be specifically used for the project. We would like to request 5-7 minutes of your time to ask you some questions and opinions regarding cycling to school. We appreciate and thank you for your participation.



Protected by reCAPTCHA: [Privacy](#) & [Terms](#)

Powered by Qualtrics



THE UNIVERSITY OF BRITISH COLUMBIA

### Participant REQUIREMENTS to take part in our survey:

- Identify as a woman
- Currently a UBC student, staff, or faculty member





KIN 464: Health Promotion and Physical Activity.  
Participant Consent Form for Class-based Projects

## **What are the Experiences Women Face When Cycling to UBC?**

Group 3

Principal Investigator: Dr. Andrea Bundon (Assistant Professor, School of Kinesiology, Faculty of Education)

### **The purpose of the class project:**

To gather knowledge and expertise from community members on commuters of UBC, specifically **women** and the barriers they may face when cycling to UBC?

### **Study Procedures:**

With your permission, we are asking you to participate in a survey. With the information gathered, students will critically examine how different individuals understand or engage in health promoting activities or health promotion initiatives.

### **Project outcomes:**

The information gathered will be part of a written report for the class project. The written report will be shared with campus partners involved with the project. Summaries of findings will also be posted on the following websites. No personal information/information that could identify participants will be included in these reports or shared with campus partners.

**UBC SEEDS Program Library:**

<https://sustain.ubc.ca/courses-degrees/alternative-credit-options/seeds-sustainability-program/seeds-sustainability-library>



Protected by reCAPTCHA: [Privacy](#) & [Terms](#)

Powered by Qualtrics



THE UNIVERSITY OF BRITISH COLUMBIA

**Confidentiality:**

Maintaining the confidentiality of the participants involved in the research is paramount, and no names of participants will be collected.

At the completion of the course, all data (i.e. notes) and signed consent forms will be kept in a locked filing cabinet in Dr. Andrea Bundon's research lab (1924 West Mall) at the University of British Columbia. All data and consent forms will be destroyed 1 year after completion of the course.

**Risks:**

The risks associated with participating in this research are minimal. There are no known physical, economic, or social risks associated with participation in this study. You should know that your participation is completely voluntary and you are free to withdraw from the study and there will not be negative impacts related to your withdrawal. If you withdraw from the study, all of the information you have shared up until that point will be destroyed.

**Contact for information about the study:**

If you have any questions about this class project, you can contact Andrea Bundon by phone at 604-822-9168 or by email at [andrea.bundon@ubc.ca](mailto:andrea.bundon@ubc.ca)

**Research ethics complaints:**

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or e-mail [RSIL@ors.ubc.ca](mailto:RSIL@ors.ubc.ca), or call toll free 1-877-822-8598.

**Consent:**

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. If you do consent to participating in this survey, please type your **name** below along with the **date** you completed this survey.



I consent to participating in this study

Yes

No



As a participant of the study, you have a choice of being entered into a draw for prizes for the completion of our research survey. There are draws for 4 prizes (a \$25 UBC Bookstore gift card and a \$25 UBC Food Services gift card and two Lululemon yoga mats).

In order to enter the draw, you must enter: our group # (i.e., Group #3), your name and your contact email OR phone number in order to enter the draw.

If you are interested in being entered into the draw, please go to the link provided here:

[https://ubc.ca1.qualtrics.com/jfe/form/SV\\_6PTtoAHxBCyf4rkh](https://ubc.ca1.qualtrics.com/jfe/form/SV_6PTtoAHxBCyf4rkh)

The **deadline to enter is April 2nd, 2020**. Winners will be contacted through email or phone number provided!

Thank you for your participation! Now let's begin with the survey!



Protected by reCAPTCHA: [Privacy](#) & [Terms](#)

Powered by Qualtrics



What gender do you identify as?

Woman

Man

Non-binary







THE UNIVERSITY OF BRITISH COLUMBIA

Which of the following are you?

Student

Staff

Faculty

What age category do you fall into?

18-25

25-32

32-39

40+

How do you commute to UBC?

Bus

Car

Bike

Walk

Other

Why do you commute to UBC the way you do?

- Bus - because it is a part of my tuition
- Car - I live far
- Bike - For health/environmental reasons
- Walk - I live close
- Other, please explain (and also please use the formatting above i.e. "bus - \_\_\_\_\_"):

Do you own a bike?

- Yes
- No



Protected by reCAPTCHA: [Privacy](#) & [Terms](#)

Powered by Qualtrics [↗](#)



THE UNIVERSITY OF BRITISH COLUMBIA

Would you want to own a bike?

- Yes
- No
- Maybe

What BENEFITS would/do you get from biking to UBC?

Health and fitness benefits

Environmental benefits

Financial benefits

Community benefits

Other (you may specify if you would like)

What BARRIERS would/do you experience if/when you biked to UBC?

Too far

No bike

Too lazy/unfit

Unsafe

Other

Are you aware of any biking facilities or services offered at UBC?

Yes, please specify:

No

In your opinion, do you think biking is more male or female dominant?

Male

Female

Do you like the idea of bikes lanes?

Yes

No





Do you think we should have more bike lanes on the way to UBC?

Yes, please explain:

No, please explain:



Protected by reCAPTCHA: [Privacy](#) & [Terms](#)

Powered by Qualtrics



What would you require first in order to get you to start biking to UBC? (If it was a feasible option for you.)

Designated lockers

Bike storage

Friends who bike

Modified infrastructure

Other (please specify)

Do you think Vancouver is a safe city to bike in?

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree



Protected by reCAPTCHA: Privacy [↗](#) & Terms [↗](#)

Powered by Qualtrics [↗](#)



THE UNIVERSITY OF BRITISH COLUMBIA

Once again, if you are interested in being entered into the draw, please go to the link provided here:

**[https://ubc.ca1.qualtrics.com/jfe/form/SV\\_6PToAHxBCyf4rkt](https://ubc.ca1.qualtrics.com/jfe/form/SV_6PToAHxBCyf4rkt)**

The **deadline to enter is April 2nd, 2020**. Winners will be contacted through email or phone number provided.

Don't forget we are **Group number 3**! Thank you for your participation!



Protected by reCAPTCHA: Privacy [↗](#) & Terms [↗](#)

Powered by Qualtrics [↗](#)

**Appendix C: Results Graphs**

Figure C1

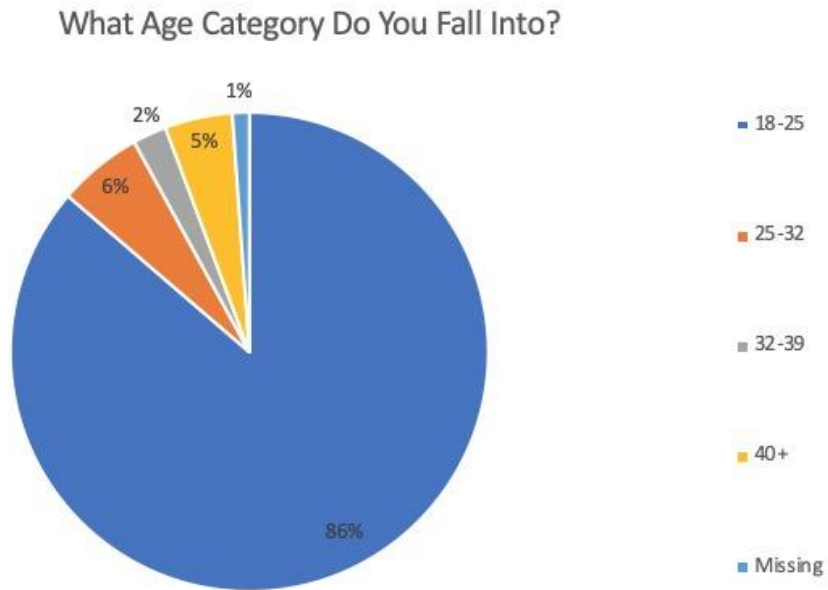


Figure C2

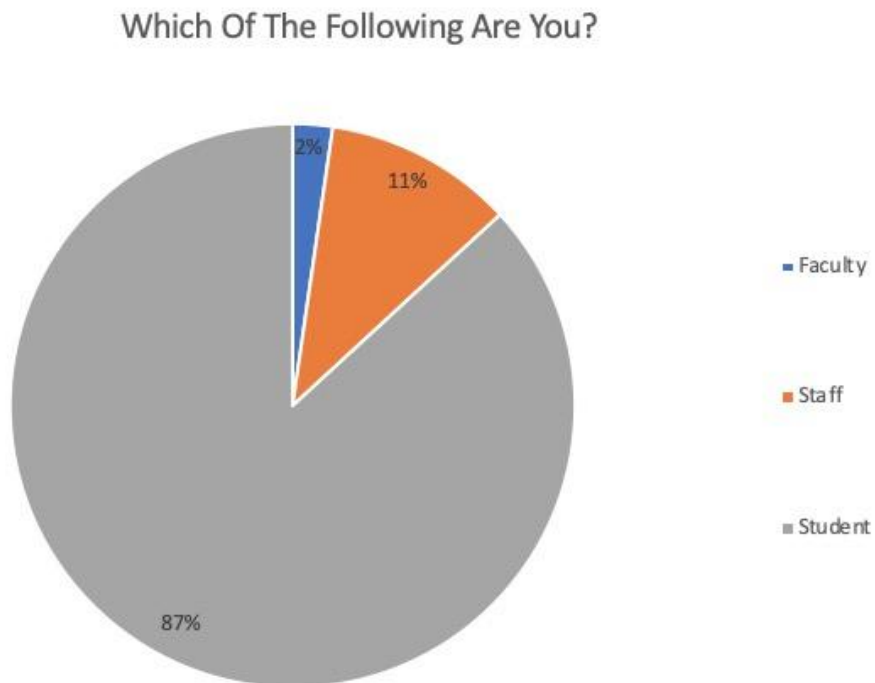


Figure C3

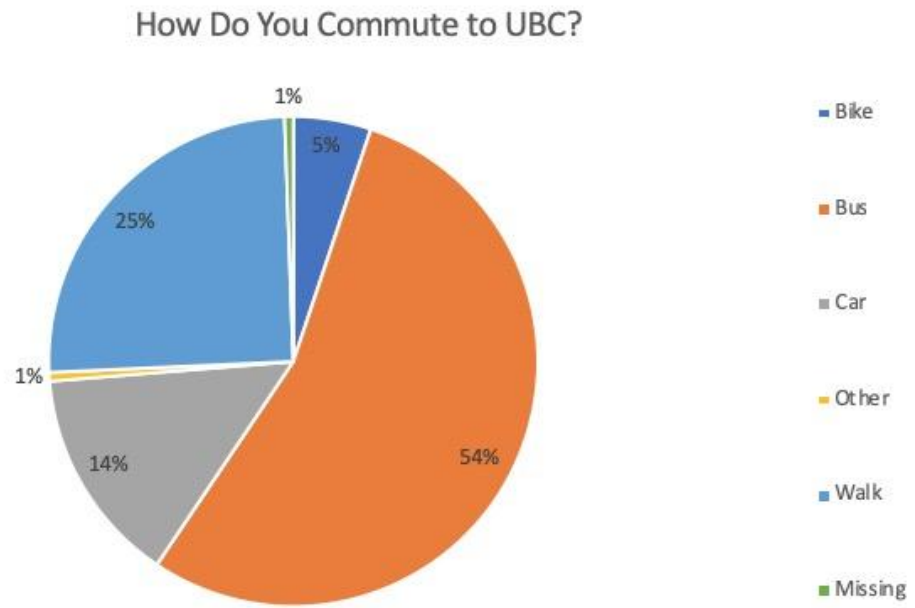


Figure C4

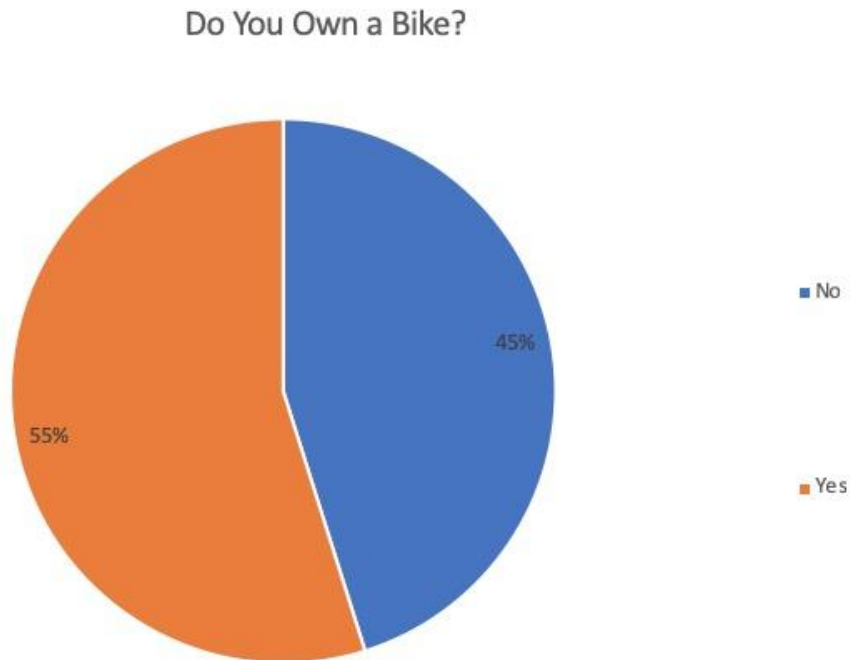




Figure C5

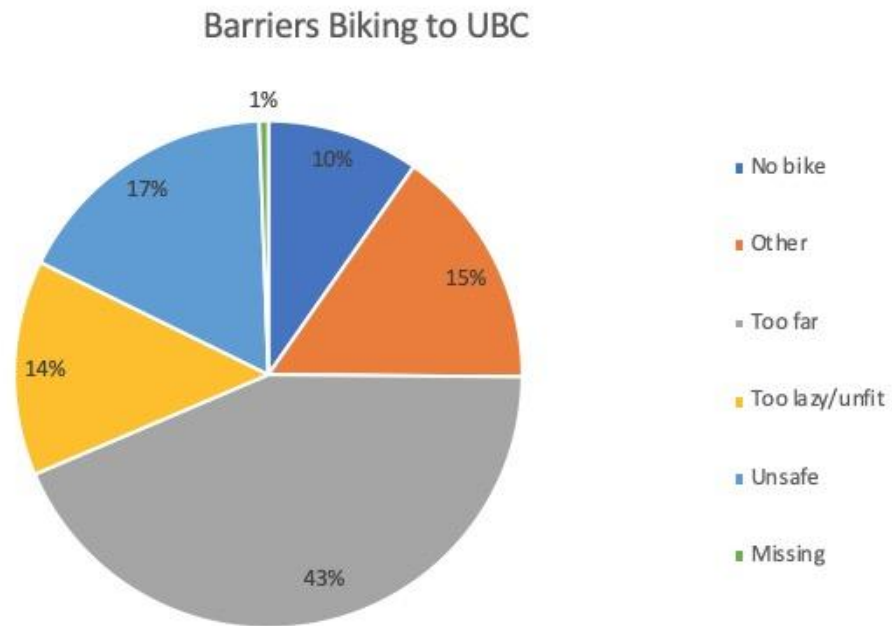


Figure C6

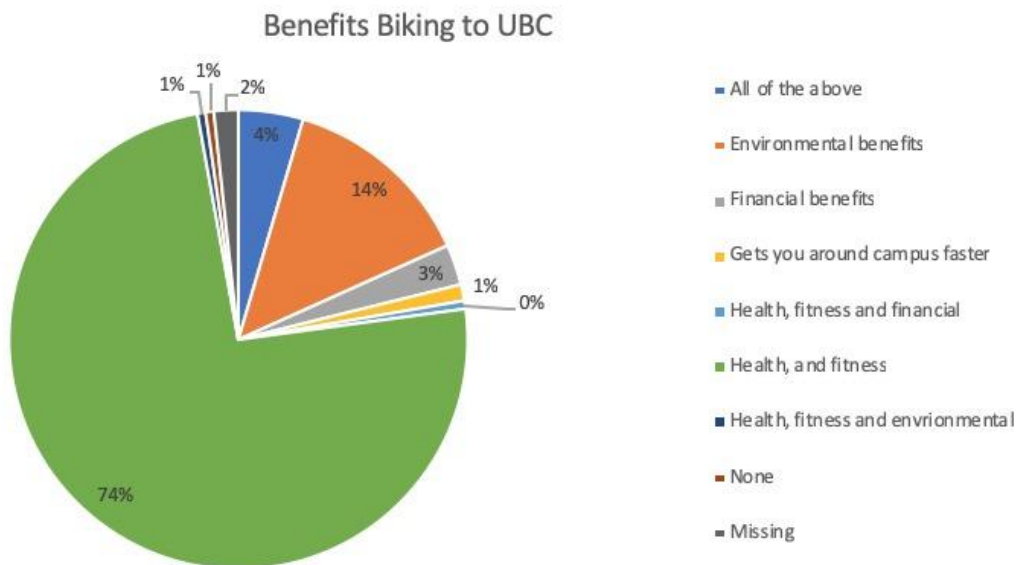


Figure C7

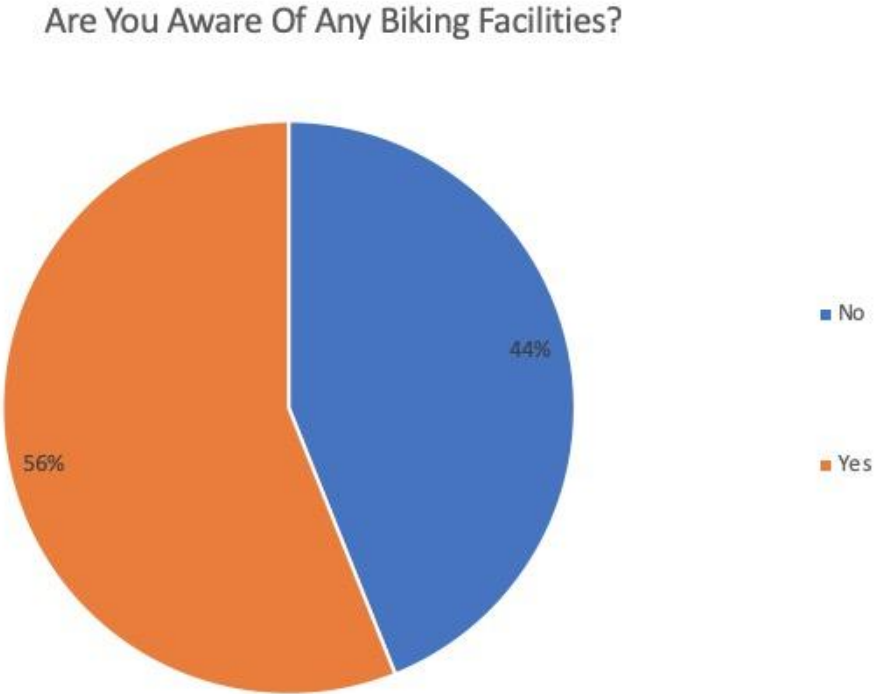


Figure C8

F

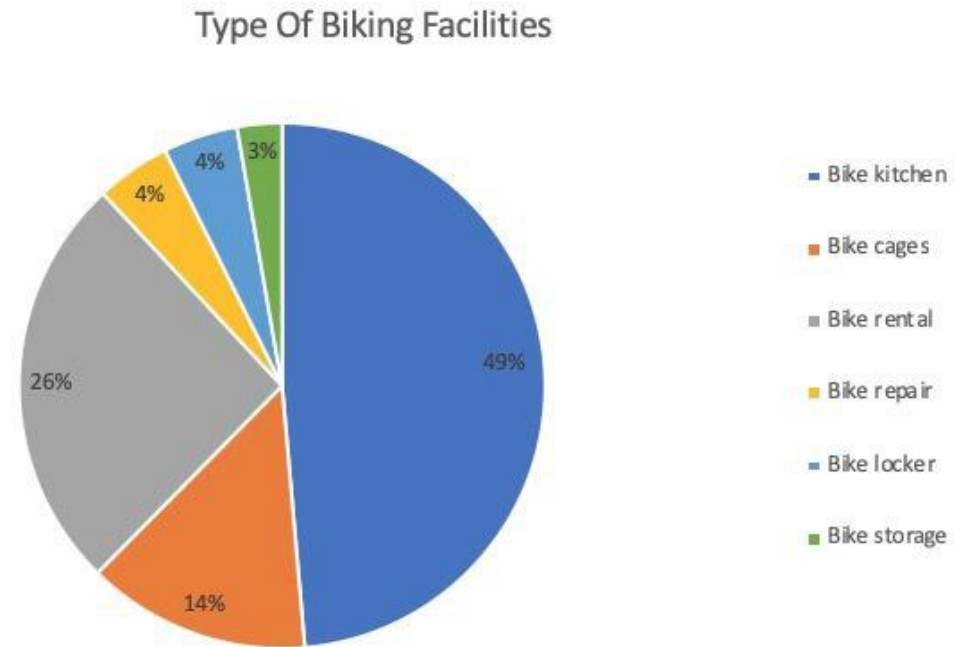


Figure C9

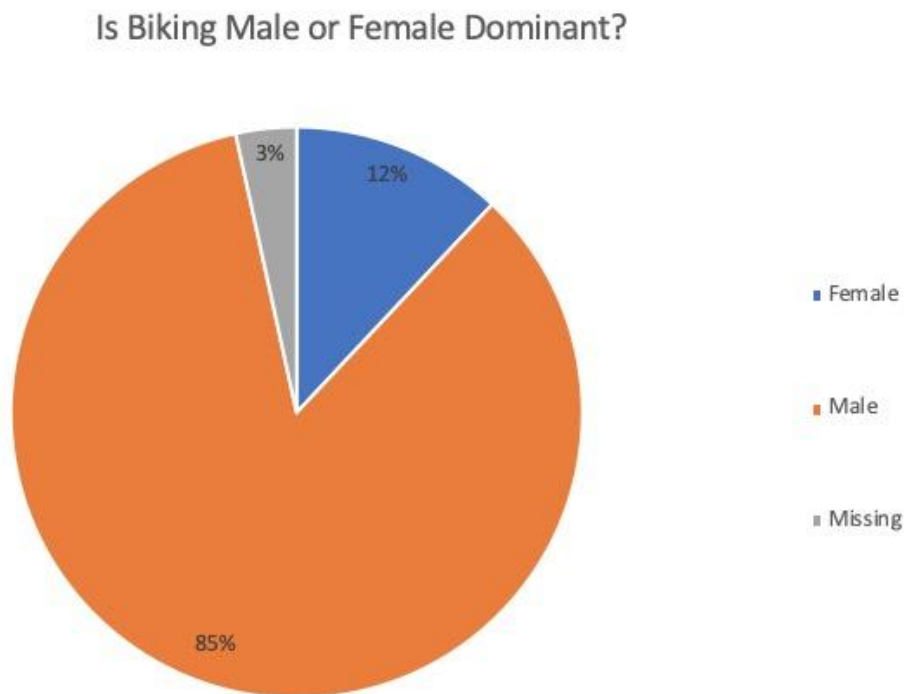
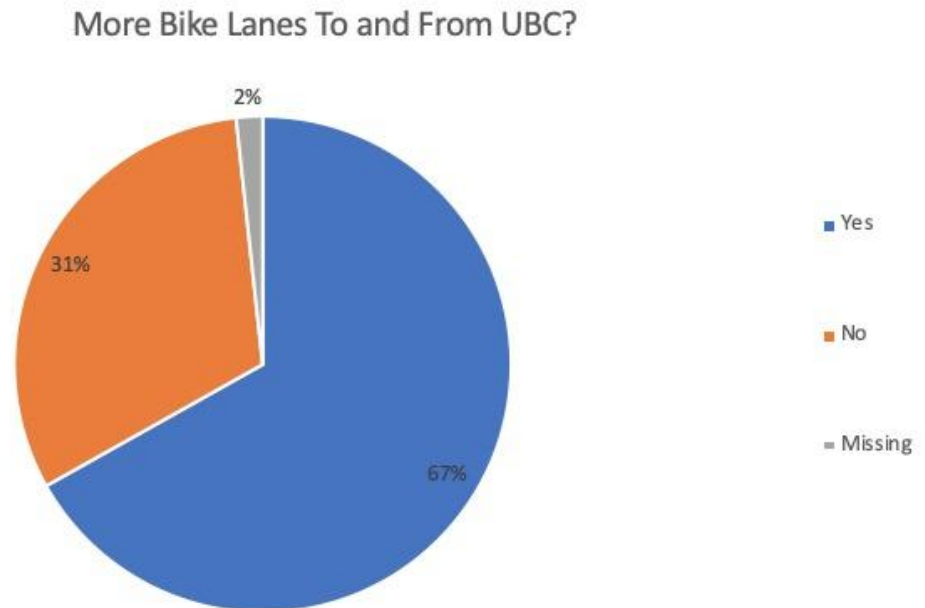


Figure C10



Figure C11





### Appendix D: Survey Promotion Examples

Randall Kwan

Wed 3/18, 10:36 PM

Reply all



Hi everyone,

My name is Randall and I am a Kinesiology student in the class KIN 464 Health Promotion and Physical Activity. Myself and four other students, have partnered with UBC SEEDS to conduct a study that looks to understand the barriers women face in regards to using biking as a model of transportation. If you can participate in our [survey](#), that would be greatly appreciated. All information is confidential and will be strictly used to understand and explore our topic further. As an incentive for participating, there is a chance to win one of two \$25 UBC gift cards (food services or book store) OR one of 2 Lululemon yoga mats.

If you are interested, please click on the [link](#) to fill out our survey, it'll take 5-10 minutes. More information is in the Qualtrics survey link. Thanks again everyone!

Regards,  
Randall Kwan

📶 🔊 🔌 🔋 53% 10:13 PM

✕ Posts

**Deegan Cardoso** ▸ Buy and Sell - UBC textbooks  
Mar 10 at 12:49 PM · 📷

ATTENTION UBC STUDENTS!

Interested in chance to win one of 2 \$25 UBC gift cards (food services or book store) OR one of 2 Lululemon yoga mats ?

My kin 464 group has partnered with UBC SEEDS to conduct a study that looks to understand the barriers women face in regards to using biking as a model of transportation.

If you are interested, please click on this link and fill out our survey, it'll take 5-10 minutes.

[https://ubc.ca1.qualtrics.com/jfe/form/SV\\_56La2DEQsWtqHuR?fbclid=IwAR2PoyRe40PxxzGMsOKqASGfPBZ6B-teVSaCBlotlx5HMnmf7vcrkGi2Q](https://ubc.ca1.qualtrics.com/jfe/form/SV_56La2DEQsWtqHuR?fbclid=IwAR2PoyRe40PxxzGMsOKqASGfPBZ6B-teVSaCBlotlx5HMnmf7vcrkGi2Q)

Thank you in advance !

UBC.CA1.QUALTRICS.COM  
**Online Survey Software | Qualtrics Survey Solutions**

Write a comment...

**Appendix E: Results (Quantitative)**

Overall statistics (students, faculty, and staff)

**Table E1****Frequencies for Q1, What age category do you fall into?**

<b>Q1, What age category do you fall into?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
18-25	151	86.286	87.283	87.283
25-32	10	5.714	5.780	93.064
32-39	4	2.286	2.312	95.376
40+	8	4.571	4.624	100.000
Missing	2	1.143		
Total	175	100.000		

**Table E2****Frequencies for Q21, Which of the following are you?**

<b>Q21, Which of the following are you?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Faculty	4	2.286	2.286	2.286
Staff	19	10.857	10.857	13.143
Student	152	86.857	86.857	100.000
Missing	0	0.000		

Total	175	100.00 0
-------	-----	-------------

**Table E3****Frequencies for Q3, How do you commute to UBC?**

<b>Q3, How do you commute to UBC?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Bike	9	5.143	5.172	5.172
Bus	95	54.286	54.598	59.770
Car	25	14.286	14.368	74.138
Other	1	0.571	0.575	74.713
Walk	44	25.143	25.287	100.000
Missing	1	0.571		
Total	175	100.00 0		

**Table E4****Frequencies for Q5, Do you own a bike?**

<b>Q5, Do you own a bike?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
No	79	45.143	45.143	45.143



Yes	96	54.857	54.857	100.000
Missing	0	0.000		
Total	175	100.00	0	

**Table E5**

Frequencies for Q9, What BARRIERS would/do you experience if/when you biked to UBC?

Q9, What BARRIERS would/do you experience if/when you biked to UBC?	Frequency	Percent	Valid Percent	Cumulative Percent
No bike	17	9.714	9.770	9.770
Other	27	15.429	15.517	25.287
Too far	76	43.429	43.678	68.966
Too lazy/unfit	24	13.714	13.793	82.759
Unsafe	30	17.143	17.241	100.000
Missing	1	0.571		
Total	175	100.00	0	

**Table E6**

**Frequencies for Q30, Are you aware of any biking facilities or services offered at UBC? - Selected Choice**

<b>Q30, Are you aware of any biking facilities or services offered at UBC? - Selected Choice</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
No	76	43.429	43.931	43.931
Yes, please specify:	97	55.429	56.069	100.000
Missing	2	1.143		
Total	175	100.00	0	

**Table E7**

**Frequencies for Q30, Are you aware of any biking facilities or services offered at UBC?**

<b>Q30, Are you aware of any biking facilities or services offered at UBC? - Selected Choice</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Bike Kitchen	4	2.286	2.299	2.299
Bike Kitchen and bike cages	11	6.286	6.322	8.621
Bike Kitchen and rental	4	2.286	2.299	10.920
Bike Kitchen, rental and fixing stations	1	0.571	0.575	11.494
Bike Kitchen, rental and lockers	1	0.571	0.575	12.069

Bike Locker	2	1.143	1.149	13.218
Bike Storage	3	1.714	1.724	14.943
Bike cages	4	2.286	2.299	17.241
Bike kitchen	32	18.286	18.391	35.632
Bike rental	19	10.857	10.920	46.552
Bike rental and repair	1	0.571	0.575	47.126
No	81	46.286	46.552	93.678
Rental bikes	2	1.143	1.149	94.828
Yes, please specify:	4	2.286	2.299	97.126
bike locker	2	1.143	1.149	98.276
bike locker and repair	1	0.571	0.575	98.851
bike repair	2	1.143	1.149	100.000
Missing	1	0.571		
Total	175	100.00		0

**Table E8**

**Frequencies for Q13, In your opinion, do you think biking is more male or female dominant?**

<b>Q13, In your opinion, do you think biking is more male or female dominant?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
---	------------------	----------------	----------------------	---------------------------

Female	21	12.000	12.426	12.426
Male	148	84.571	87.574	100.000
Missing	6	3.429		
Total	175	100.000		

**Table E9**

**Frequencies for Q19, Do you think Vancouver is a safe city to bike in?**

<b>Q19, Do you think Vancouver is a safe city to bike in?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Neither agree nor disagree	30	17.143	17.442	17.442
Somewhat agree	95	54.286	55.233	72.674
Somewhat disagree	22	12.571	12.791	85.465
Strongly agree	21	12.000	12.209	97.674
Strongly disagree	4	2.286	2.326	100.000
Missing	3	1.714		
Total	175	100.000		

**Table E10**

**Frequencies for Q4, Why do you commute to UBC the way you do? - Selected Choice**

<b>Q4, Why do you commute to UBC the way you do? - Selected Choice</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Bike - For health/environmental reasons	6	3.429	3.429	3.429
Bike - Pleasure	3	1.714	1.714	5.143
Bus - I live far	10	5.714	5.714	10.857
Bus - because I have no other means of transportation to getting to school	1	0.571	0.571	11.429
Bus - because it is a part of my tuition	73	41.714	41.714	53.143
Bus - parking is expensive	1	0.571	0.571	53.714
Bus - quick and convenient	11	6.286	6.286	60.000
Bus- I don't own a car	1	0.571	0.571	60.571
Car - I have one to use	1	0.571	0.571	61.143
Car - I have to rush to work after	1	0.571	0.571	61.714
Car - I live far	20	11.429	11.429	73.143
Car- I bring my dog to work	1	0.571	0.571	73.714
Car- Lots of stuff to carry	1	0.571	0.571	74.286
Walk - I live close	44	25.142	25.142	99.429

Walk- Health reasons	1	0.571	0.571	100.00
Missing	0	0.000		
Total	175	100.00		
		0		

**Table E11**

**Frequencies for Q9, What BARRIERS would/do you experience if/when you biked to UBC?**

<b>Q9, What BARRIERS would/do you experience if/when you biked to UBC?</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
No bike	17	9.714	9.770	9.770
Other	27	15.429	15.517	25.287
Too far	76	43.429	43.678	68.966
Too lazy/unfit	24	13.714	13.793	82.759
Unsafe	30	17.143	17.241	100.000
Missing	1	0.571		
Total	175	100.00		
		0		

**Table E12**

**Frequencies for Q14, Do you think we should have more bike lanes on the way to UBC?**

<b>Q14, Do you think we should have more bike lanes on the way to UBC? - Selected Choice</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
--	------------------	----------------	----------------------	---------------------------

No, please explain:	55	31.429	31.97 7	31.977
Yes, please explain:	117	66.857	68.02 3	100.000
Missing	3	1.714		
Total	175	100.00	0	

Staff and faculty statistics

**Table E13**

**Frequencies for Q3, How do you commute to UBC?**

<b>Q3</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Bike	3	13.043	13.043	13.043
Bus	8	34.783	34.783	47.826
Car	8	34.783	34.783	82.609
Walk	4	17.391	17.391	100.000
Missing	0	0.000		
Total	23	100.000		

**Table E14**

**Frequencies for Q9, What BARRIERS would/do you experience if/when you biked to UBC?**

<b>Q9</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
No bike	1	4.348	4.348	4.348
Other	8	34.783	34.783	39.130
Too far	5	21.739	21.739	60.870
Too lazy/unfit	4	17.391	17.391	78.261
Unsafe	5	21.739	21.739	100.000
Missing	0	0.000		
Total	23	100.000		

**Table E15**

**Frequencies for Q8, What BENEFITS would/do you experience if/when you biked to UBC?**

<b>Q8</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
All of the above	5	21.739	21.739	21.739
Environmental benefits	2	8.696	8.696	30.435
Financial benefits	1	4.348	4.348	34.783
Health and fitness benefits	12	52.174	52.174	86.957



Health and fitness benefits, not having to pay gas or insurance	1	4.348	4.348	91.304
Other (you may specify if you would like)	1	4.348	4.348	95.652
Saves time	1	4.348	4.348	100.000
Missing	0	0.000		
Total	23	100.00		
		0		

### Appendix F: Location of the University of British Columbia (UBC)

Figure F1

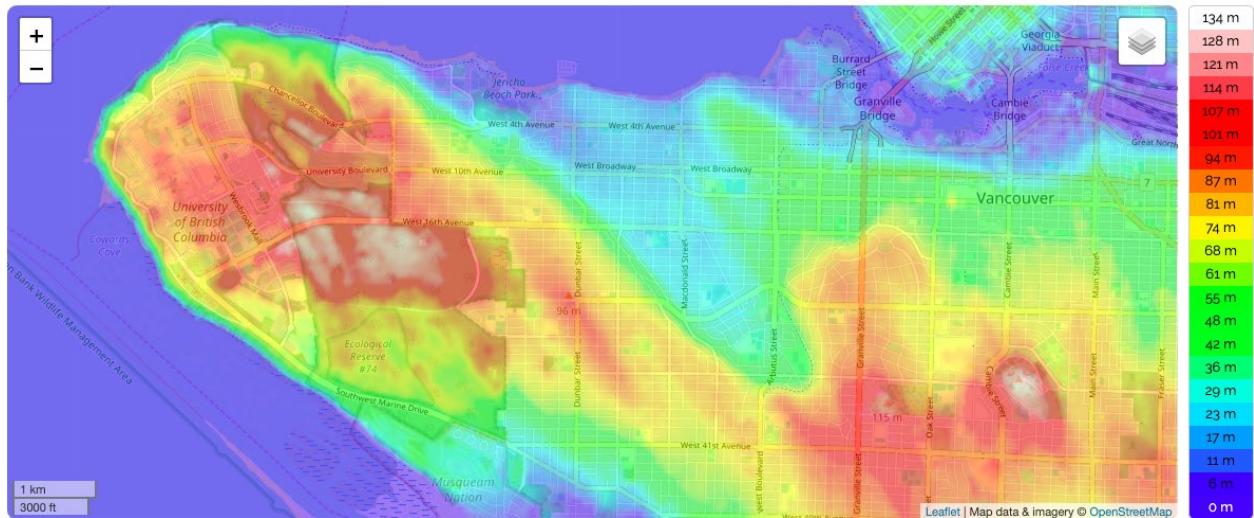
Location of the University of British Columbia in Vancouver, B.C., Canada



*Note.* Location of UBC's Vancouver campus in relation to the rest of the city of Vancouver. City Maps. (2015). *Street map Vancouver*. Retrieved from <http://worldcitymaps.blogspot.com/2015/09/street-map-vancouver.html>

**Figure F2**

Elevation map of the University of British Columbia and surrounding areas



*Note.* Topographic image of all commute paths to UBC. Topographic-map. (2020). *Vancouver*. Retrieved from <https://en-ca.topographic-map.com/maps/feb8/Vancouver/>