

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Cycling to UBC Vancouver: Barriers for Individuals that live within 10km

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University of British Columbia

KIN 464

Themes: Transportation, Community, Wellbeing

Date: Apr 2, 2020

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University of British Columbia

KIN 464: Group 29

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EXECUTIVE SUMMARY

The purpose of this project is to identify cycling barriers to individuals who live less than ten kilometers away from the University of British Columbia (UBC) Point Grey campus and gather suggestions for improvements that can be implemented in the future. Despite the increase of numbers in cycling within Vancouver, British Columbia (Centre for Active Transportation, 2019), UBC cycling rates for students continue to decline (UBC Transportation Status Report, 2019).

Data was collected using quantitative and qualitative methods with a structured survey and open-ended questions. Participants were recruited to take part in the study through the promotion of social media posts as well as being directly contacted by members of the study. The study was completed by participants through the online program Qualtrics. Based on our findings, we have highlighted four main themes of barriers to cycling: Safety, weather, cycling infrastructure, and other (consisting of costs, timing and scheduling).

Although almost all participants are comfortable riding a bike, few actually feel safe while cycling to UBC. Poor road conditions, due to aspects like weather, and the lack of safe bike paths around UBC prevent participants from cycling to campus. Many mentioned a key factor that may encourage more people to cycle involves education and awareness surrounding cycling etiquettes and safety. The primary barrier to cycling for this population was weather. The majority of participants agreed that weather impacts their choice to cycle and harsh weather prevents them from cycling. Due to Vancouver's unpredictable weather, it seems to have a domino effect on other barriers such as safety and infrastructure. While we are unable to control the weather, there are other measures that can be taken into action to reduce weather being a major barrier to cycling. In terms of infrastructure, increased bicycle security and the need of safer bike lanes on and around campus was a recurrent necessity for cycling. The majority of participants agreed that they would feel nervous locking their bike up on campus. In addition, the lack of bike paths to and around campus make it difficult for cyclers to be safe while staying alert for pedestrians. Additional barriers to cycling based on participants' responses was due to class scheduling making it difficult to manage a bike in-between class. The lack of ease and lengthy duration of cycling to and around campus was also seen as a common barrier. A limited number of participants thought cycling was the more cost-effective choice of transportation thereby many participants were concerned with the maintenance and costs of a bike.

One of the main limitations to this study was the lack of sample diversity due to the recruitment process. The majority of participants were students due to promotion being limited to other members of the community. Further research should be done in order to get a greater perspective of participants who live less than 10km away, including more faculty and community residents.

INTRODUCTION

Cycling is a mode of active transportation (Province of British Columbia, n.d.) that has been increasingly trending in larger cities (Wuerzer & Mason, 2015). Active transportation describes all forms of human-powered motion to travel from one place to another (Government of Canada, 2014; Province of British Columbia, n.d.). In Vancouver, more than 100,000 cycling trips are made each day (Canadian Automobile Association, 2020). However, cycling rates remain lower than expected among college students and across Canada (Agarwal & North, 2012). The current University of British Columbia (UBC) Transportation Plan aims for more than two thirds of the trips traveling to and from the campus to be via walking, cycling or transit by 2040 (UBC Transportation Status Report, 2019). This plan considers the entire UBC population including students, staff, faculty and residential campus community members (UBC Transportation Status Report, 2019). However, in the past two decades, the use of cycling as a UBC student's mode of transportation has decreased from 3% to 1.4% (UBC Transportation Status Report, 2019). As cycling to and from campus remains low, it is critical to evaluate the barriers that prevent individuals who live less than 10km from the UBC Point Grey campus to cycle to campus.

LITERATURE REVIEW

Weather

Among various factors limiting rates of cycling, poor weather is the second most significant barrier that discourages Metro Vancouver cyclists from cycling more frequently (Tranklink, 2010). With regard to the university demographic, weather has also been identified

as a primary barrier that hinders students from cycling to campus (Agarwal & North, 2012; Swiers, Pritchard & Gee, 2017; Wuerzer & Mason, 2015). Swiers et al. (2017) found that 62% of students identified weather as the top barrier in their cross-sectional online survey from Liverpool John Moores University (LJMU). Since weather conditions differ due to location (Manaugh, Boisjoly & El-Geneidy, 2016; Swiers et al., 2017), it is difficult to translate weather barriers across various places. For instance, a cross-sectional survey that included students, faculty and staff at McGill University in Montreal, surprisingly did not include weather as a prevalent barrier to cycling (Manaugh et al., 2016). Conversely, the majority of students from Queen's University in Ontario took an online survey and agreed weather conditions such as cold weather, too much snow and the risk of slipping on ice had a significant impact on cycling to school (Agarwal & North, 2012). The Centre for Active Transportation (2019) states that although municipalities cannot change the weather or landscape in target areas, it is very possible that a combination of effective infrastructure and programming can significantly increase the desirability of cycling as a commute option even in limiting winter conditions. Respondents from the Agarwal and North (2012) study recommended interventions to encourage cycling including ways to counter weather conditions, such as clearing snow and ice from bicycle pathways as well as providing bicycle parking facilities that are protected from weather. Due to the different attitudes toward weather as a barrier to cycling, it is important to hone in on individuals who live less than 10km away from campus to examine if weather is in fact a main barrier to transporting to campus.

Cycling Infrastructure

Another barrier that cyclists face is inadequate bicycle infrastructure, such as paved off-street bicycle paths. Adequate bicycle infrastructure not only helps meet the needs of current

cyclists, but also motivates new cyclists (Dill & Carr, 2003). In the study by Swiers et al. (2017), respondents indicated that the implementation and development of bicycle lanes would significantly encourage the decision to cycle by making it a more comfortable, safer and easier method of transportation. Similarly, UBC invested in developing and improving bicycle lanes on popular commuter routes to UBC (UBC Vancouver Transportation Status Report, 2019). As a result of improvements in cycling infrastructure, cycling rates have gradually been on the rise since 2010 (UBC Vancouver Transportation Status Report, 2019). However, despite the slight increase in cycling to UBC in the previous decade, the rates of cycling as a method of commuting to UBC remain lower than before 1997 (UBC Vancouver Transportation Status Report, 2019).

There are multiple propositions for why the implementation of infrastructure in routes has not been a major success in drastically increasing bicycle rates to UBC. In a survey conducted by UBC Cycling in Cities Research (2009), it was suggested that the most commonly preferred routes for biking are paved-off street cycle paths for bikes only, which unfortunately are the routes that are the least available or convenient for cyclists in getting to their destination. The most widely used routes, and also the least preferred, tend to be major streets with parked cars and without cycling infrastructure (UBC Cycling in Cities Research, 2009). Furthermore, the survey also suggests favourable routes were those that were flat, scenic and away from traffic noise and pollution (UBC Cycling in Cities Research, 2009). These survey findings suggest that investing in the construction of lightly trafficked and designated cycling routes to UBC could encourage cycling.

Safety is another prominent concern for people using a bike to commute. The different aspects of limited safety surrounding cycling to school such as lack of parking facilities, bike lanes and theft has left various commuters to turn to other methods such as transit services or motorized vehicles (Agarwal & North, 2012; Manaugh et al., 2017). Students at LJMUC concluded that 39% of bikers believed safety was a significant barrier to their daily commute (Swiers et al., 2017). These aforementioned safety concerns primarily arose from the lack of separated bike lanes on major roads along with the lack of road maintenance during winter coupled with the absence of night lights on the streets (Agarwal & North, 2012). Consequently, the effects of this barrier were evident to winter cyclists and even non-cyclists as well as non-winter cyclists who attributed this lack to daily bike commuting to motor vehicle traffic (66%), unsafe road conditions (72%), and insufficient street lighting when cycling home at night (48.5%) (Agarwal & North, 2012). In a similar study conducted in Montreal, commuters reported the lack of bike lanes, safety, and secure parking facilities as their top barriers when considering switching over to biking as their method of daily commute (Manaugh et al., 2017). The concern for safety also seemed to have direct correlation with distance from destination (Wuerzer & Mason, 2015).

Streamlining related findings locally to Vancouver and specifically UBC, there seem to be similar patterns regarding public concerns and identification of barriers. In a recent survey, 47% of the respondents stated their possibility of biking would increase if there was more road space allocated for bikes (UBC Transportation Survey Report, 2017). Also, since about 35% of the population that commutes to UBC do not reside in Vancouver, their safety concerns (as previously mentioned) will increase along with other barriers such as distance, accessibility and more (UBC Transportation Survey Report, 2017). The safety concern also results in more people

using public transit which, while being a more expensive and a less healthy alternative to biking, tends to provide a safer and more efficient commute to the destination (UBC Transportation Status Report, 2019). This trend in using transit as a primary method of commuting seemed to only be further fueled by the introduction of the Universal Transit Pass (U-Pass) in 2003 at UBC (UBC Transportation Status Report Fall, 2019). The U-Pass is a British Columbian transportation card that “gives students access to bus, SeasBus and SkyTrain services within Metro Vancouver” (Translink, 2020). Although, TransLink (2010) reported that cyclists tend to use transit more than non-cyclists, therefore if the rate of cyclists increases, so will the number of transit commuters. Combining transit and cycling in a commute to UBC may potentially take the burden off of cycling on highly trafficked roads, allowing commuters to cycle where they feel more safe (TransLink, 2010). Therefore, there may be a need for improved bicycle and transit integration taking the form of increased education, increased services, etc. (TransLink, 2010).

In conclusion, the research has shown that although there are numerous barriers that may be preventing individuals from cycling to UBC much of the focus appears to be surrounding weather, poor or limited cycling routes and infrastructure, and safety (Agarwal & North, 2012; Centre for Active Transportation, 2019; Swiers et al., 2017; Wuerzer & Mason, 2015). The Centre for Active Transportation (2019) offers suggestions and examples of potential interventions such as: bike-to-work events and follow-up programming, institutional or city-wide standards to increase safety factors, installing higher quality cycling infrastructure and route options, maintaining cycling paths in winter months to increase safety, etc. However, with all potential executed interventions, adequate marketing campaigns and related programming are key to raising awareness about improving cycling commute conditions, and ultimately increasing the number of people choosing cycling as their preferred method of transportation (The Centre

for Active Transportation, 2019). The aims of our research is to determine if the barriers mentioned in previous literature correspond to the population of individuals who live less than 10km away from the UBC campus.

METHODS & RATIONALE

Participants

The target population for our research consisted of individuals who live less than 10km away from the UBC Point Grey campus. Due to the unexpected COVID-19 situation, we were unable to adhere to our previous methods consisting of any in-person contact to promote our survey such as placing posters around the UBC campus, as well as handing out a survey link to individuals around campus. Consequently, our recruitment process shifted to promoting our survey solely online via social media. The link to the survey was posted in a Facebook group called UBC Class of 2022/2021 that consists of 15,000 members. In addition, all five members of this research project contacted their UBC colleagues through direct private messaging. As an incentive to attract participants to take the survey, all respondents that answered the survey were qualified to be entered in a draw upon completion of the survey. Participants were provided with a link where they entered their name, contact information and group number. Participants were not obligated to fully complete the survey to be entered in the draw. The draw prize consists of two \$25 gift cards and 2 yoga mats that will take place on April 7th, 2020.

Rationale

Choosing a population that lives less than 10km away reduces the chances of one of the primary barriers affecting the daily commute to campus i.e. distance (2017 Vancouver

Transportation Survey, 2017). The reduction of the impact of distance as a barrier allows for a closer investigation of other barriers that might be causing people not to use cycling as their primary mode of transportation. These barriers could include weather, safety and infrastructure around cycling such as parking facilities etc. The proposed research will also identify the makeup of the research population which includes students, faculty, staff and community members who work at UBC. The identification of these various groups within the population will provide us with the differences in barriers that might be specific to a certain group. An example of this is age as it may act as a barrier and a contributing factor that affects faculty instructors but may not be a prominent barrier to students. Another reason for low numbers in cycling commute would be the comfort factor, as around 8km seems to be the most comfortable distance for cyclists to travel regularly (Whalen, Páez, & Carrasco, 2013). This research will allow for these findings to be tested in the UBC setting and further the research in the lack of cycling commute by elaborating on when distance becomes a prominent barrier i.e. differences from commute being 0-5km versus it being between 5-10km.

Data Collection

All participants will read and sign a consent form (Appendix A) prior to their involvement in the study. The consent form is for participants to acknowledge they are participating in a research project led by undergraduate students for the purpose of their course. The consent form also informs participants of their right to withdraw from the study for any reason at any given time. Participants will then complete a series of survey questions (Appendix B). The survey will be conducted online via the program Qualtrics; the initial portion of the survey consists of questions that gather demographic information about the participants. Collecting this data will contribute to gaining a better understanding about the make-up of our

sample. The theoretical population of this study are individuals who live within 10km of campus. This population may include students, staff, faculty and other community members. Therefore, the exclusion criteria applies to those who live more than 10km away from campus as they do not fit the theoretical population. The latter portion of the survey will consist of questions for participants to share their experiences of cycling to campus. These questions range from inquiring about bike ownership to the cycling route taken to campus.

The mixed-method approach was used to investigate the barriers that prevent UBC students that live within 10km of school from cycling to campus. The mixed-method approach encompasses both quantitative and qualitative data from participants which provided validation and a foundation for drawing conclusions from the study (Shorten & Smith, 2017). The instrument that we used to conduct the research was through a structured survey which included likert scale questions, yes or no questions and open-ended questions. The surveys offered a quick method for data collection that fits into a student's and faculty busy schedules. The use of multi-faceted questions provided an in-depth understanding of the participant's personal barriers that prevent cycling to campus (Shorten & Smith, 2017). Through open-ended questions, we gained insight into the students' personal experiences, barriers and opinions towards cycling to UBC (Shorten & Smith, 2017). Whereas with close-ended questions we gathered information on the frequency of cycling to UBC. For an outline of the interview questions that will be included in the survey, please refer to Appendix B. The surveys will be open for students to fill out online from March 12th to March 21st, 2020.

Data Analysis

The Likert scale survey questions were analyzed using content analysis to identify measures of dispersion such as minimum, maximum and range, as well as measures of frequency

to identify the percentages and frequency of the Likert scale answers (Braun & Clarke, 2006). This will allow for a quantitative analysis of our initial qualitative data. For instance, for the Likert scale questions included in our survey, content analysis will allow us to quantify the frequency of all responses and transform the data set into statistical graphs (i.e. bar graphs, pie charts, etc.) indicating the prevalence of ascertained themes. The open-ended responses were analyzed using thematic analysis as well as qualitative description analysis. Thematic analysis involves reviewing collected data and noting recurrent themes and patterns (Braun & Clarke, 2006). This will allow us to examine and interpret our open-ended survey questions in more detail and provide a more comprehensive report of the resulting recurrent themes. The qualitative description analysis will aid in identifying the similarities and differences in the responses. Utilizing both of these methods will allow us to examine our mixed quantitative and qualitative data more effectively. We used a deductive approach given that the Likert scale survey was based on statements related to barriers we researched earlier in the literature review. Since our population is quite specific, we wanted to see if the barriers discussed in the literature review would be similar to the barriers identified in our study.

RESULTS

Participant Demographic

Although there were a total of 74 responses to our online survey, some responses were incomplete or did not fit our target demographic of people that live within 10km of the UBC campus. As such, these responses were discarded bringing our total number of participants to

forty-six. The majority (74%) of participants heard about our survey through our various Facebook posts while the other 17% of participants reported that they were recruited in-person and 9% did not specify. It is also important to note that about 93% of our participants identified as students, with only one participant identifying as faculty, one selecting that they are no longer part of the UBC community, and one not specified. Additionally, a large majority of our participants (78%) identified as female. The remaining reported gender identities were as follows: eight males, one non-binary, and one that preferred not to say. Figure 1 illustrates the primary methods of transportation reported by our 46 participants that live within 10km of UBC.

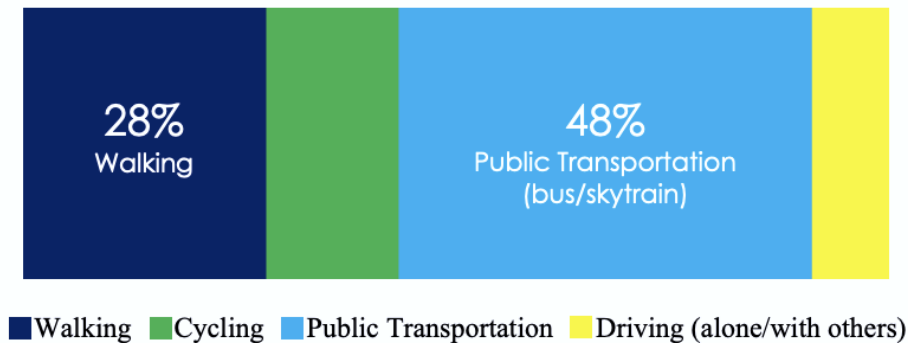


Figure 1. Reported primary methods of transportation.

Perceived Barriers to Cycling

The primary goals of our online survey were to investigate individuals' opinions, experiences, and perceived barriers surrounding cycling to/from UBC. As such, we used both content and thematic analysis to reveal recurrent patterns and themes across both the quantitative and qualitative data. As demonstrated in Figure 2, the four overarching themes are **Safety**, **Weather**, **Cycling Infrastructure**, and **Other**.

Theme	Characteristic	Percent of Strongly Agreed/Agreed Responses
Safety	Feeling safe while cycling in Vancouver traffic conditions	26%
	Feeling safe while cycling to UBC	44%
Weather	Having harsh weather prevent cycling to campus	80%
	Weather having an impact on the decision to cycle	87%
Infrastructure	Being more encouraged to bike if campus had better parking facilities	42%
	Feeling nervous about locking up a bike on campus	80%
	Being more encouraged to bike if campus had more changing facilities	17%
Other	Class schedules having an effect on the decision to cycle	59%
	The duration of cycling to campus is too time consuming	35%
	The maintenance/cost of a bike is too expensive	37%

Figure 2. Four themes of perceived barriers to cycling.

Safety

One of the primary barriers enlisted in the introduction for people who cycle was overall safety — a concern that was evident in this research as well. From the 46 participants who lived within 10km or less from the campus, 76% felt comfortable riding a bike, but only 44% felt safe riding it to UBC (Figure 3). This could be an extension of safety concerns while riding a bike in the City of Vancouver as only 26% participants reported feeling safe riding a bike in the city traffic conditions (Figure 3).

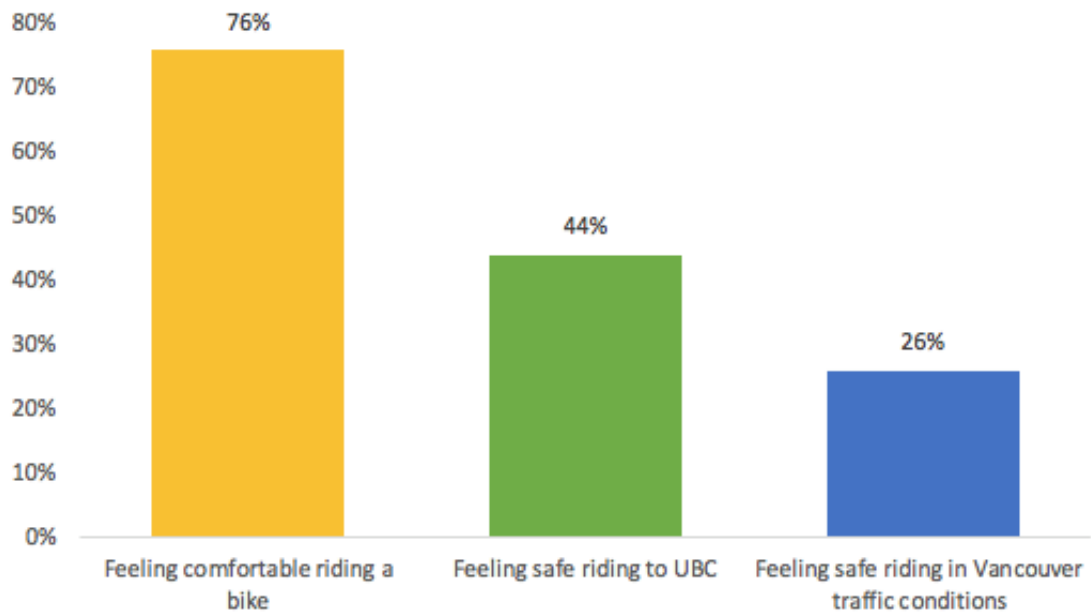


Figure 3. Comfort levels of cycling across various contexts.

Weather

With regards to the impact of weather on cycling, 87% of participants take weather into consideration when deciding to cycle to UBC. With that being said, 80% agreed or strongly agreed that harsh weather prevented them from biking to campus and 85% agreed that they would be more encouraged to bike if the weather was better. In addition, a majority of the open-ended responses we received about the relevant barriers to cycling was indeed weather. Out of the 12 open-ended response questions, 8 of them were related to weather, with participants often stating the rain and cold makes them nervous to bike and Vancouver's winter conditions are often reasons that prevent them from cycling in the winter months.

"Weather makes me nervous, if it's cold or raining I won't bike"

- Participant

Similarly, open-ended responses towards what would make it easier to cycle consisted of participants stating if only weather was nicer.

"It's just inconvenient with the constant fluctuations in the weather in Vancouver."

- Participant

(Quotes shown in Appendix C)

Cycling Infrastructure

Cycle infrastructure also seems to be a significant concern for individuals when deciding on riding their bike to campus. In terms of cycling infrastructure, we first asked participants about the impact that location of change rooms at UBC has on their decision to cycle to UBC. From the 46 participants that live within 10km or less to campus, 28% of participants agreed or strongly agreed that a lack of change room locations impedes their ability to cycle to UBC. Although locations of change rooms seem to be a barrier for some participants, 43% of the participants strongly disagreed/disagreed that it was a factor that affected their ability to cycle to UBC. Lastly, 28% of participants felt indifferent about the locations of change rooms affecting their ability to get to school. Additional research should be conducted to fully determine whether change rooms are a barrier to cycling as our research shows conflicting results.

In addition, we asked participants whether they believe that there are adequate amounts of change rooms on campus when they arrive. Out of the 46 participants that answered this question, 17% of them thought that there are enough adequate change rooms on campus. However, 54% of participants felt indifferent about the number of adequate change rooms on campus. Lastly, 28% of participants thought that there were not enough adequate change rooms on campus, suggesting that this might be a slight barrier to cycling to UBC.

Furthermore, another concern regarding cycling infrastructure is that participants have the ability to lock up their bike somewhere that they felt safe. Out of the 46 participants, only 2% strongly disagreed and 15% disagreed that they did not feel nervous locking up their bike on campus. However, 20% strongly agreed and 48% agreed that they would feel nervous locking their bike up at campus suggesting that the lack of cycling ...

... infrastructure to keep bikes safe on campus is a barrier that may affect the decision to bike to school.

Security was another factor impacting the overall safety concerns with 67% of participants suggesting that they would feel nervous locking up their bike on campus. However, when the question was later repeated and reworded to survey whether participants would feel 'anxious' locking up their bike on campus, the number jumps up to 80% which suggests some participants might be doing it out of necessity. This also seemed to be a generalized concern that was not particularly an impact of UBC's infrastructure as only 18% participants suggested feeling secure when they lock up their bike regardless of the location.

When we asked participants to openly describe any relevant barriers that they felt prevented them from cycling to school there were multiple answers that pertained to infrastructure. A few participants thought that a lack of cycling infrastructure such as bike lanes was a significant factor that made them feel reluctant to bike to UBC. They felt that the lack of dedicated bike lanes and trails contributed to feeling unsafe cycling to UBC because they were close to cars and buses while on the road. A few participants mentioned that they thought it was challenging to cycle because there were pedestrians, which suggests that perhaps cyclists do not have designated bike lanes that are separate from pedestrians. A participant expressed that *"It's hard to bike around campus, [and that they] know that pedestrians have the right of way, but would be nice if some of the main paths had a section for bikes because it takes forever to get through campus on a bike because no one moves"* (Appendix C). Another participant expressed the need for *"more dedicated bike lanes, more change rooms and more bike lockers"* (Appendix C). The frustration of the limited availability of bike lockers was expressed by a number of participants as a relevant barrier for cycling to school.

Other

Additional factors that influenced the participants' decision to cycle to campus related to class schedule, cost of bikes as well as the ease and duration of cycling. In relation to class schedules, Figure 4 illustrates over 59% of participants agreed or strongly agreed that their class time plays a role in their decision to cycle to campus. Similarly, when the survey question was worded differently, more than 45% of participants disagreed with the statement that class schedules have no effect on their decision to cycle to campus. According to the open-ended response questions, when asked how cycling to campus can be made easier, two participants mentioned class time as a primary factor. One participant shared that a “*10-minute break seems awfully short to get out of class, unlock bike, ride [to the next destination], and lock bike*” again (Appendix C). Similarly, another participant shared that instead of having class times that overlapped with rush hour, the participant would be more comfortable to cycle if they “*had class times in the afternoon only*” (Appendix C).

As for the cost of owning, maintaining and cycling to campus, the majority of participants considered it as a barrier to cycle to campus. When asked if it is expensive to own and maintain a bicycle, 30% of participants reported they neither agree nor disagree, whereas another 30% agreed to the statement. In a different survey question, participants were asked whether the cost of a bike and cycling to UBC does not play a role in their decision to cycle to campus. The majority of participants (close to 37%) disagreed with the statement. According to some of the open-ended responses, participants mentioned cheaper bikes and cheaper bike share options would contribute to making cycling to campus an easier experience (Appendix C). Furthermore, when asked if cycling to campus is a more cost-effective choice, the majority of participants (42%) disagreed with the statement. Overall, there are some participants ...

... who do not consider the cost of bikes as a barrier to cycle to campus; however, the greater majority of participants expressed concerns over the costs of cycling and maintaining the bikes.

The participants also expressed the ease of cycling to campus and the duration of such cycling trips as relevant barriers. When asked about the ease of cycling to campus, over 34% of the participants agreed with the statement that riding a bike to campus is a hassle. The majority of participants also shared that the amount of time it takes to cycle to campus is another barrier. Over 34% of participants disagreed with the statement that the amount of time it takes to cycle to UBC does not play a role in the decision to cycle. At the same time, 30% of participants neither agree nor disagree with the statement that cycling to campus is too time consuming.

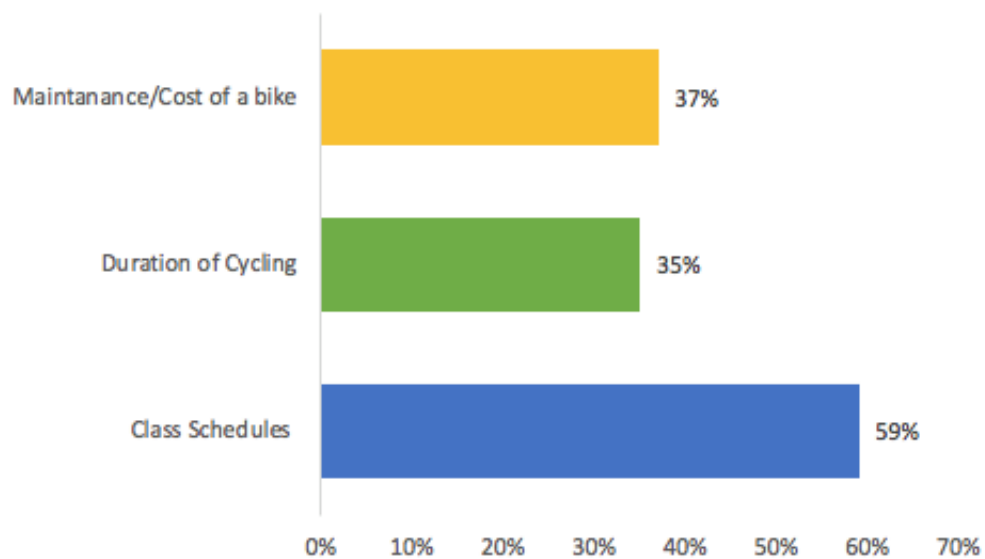


Figure 4. Primary other barriers.

DISCUSSION

The aim of this study was to identify the barriers to cycling for individuals who live less than 10km away from the UBC Vancouver campus. Out of the 74 participants who took our survey, 46 of them lived less than 10km away from campus. These 46 responses were used during the analysis of our study. The Likert scale type questions were analyzed using content analysis to identify measures of dispersion and frequency, while the open-ended responses were analyzed using thematic and qualitative description analysis. Based on our Likert scale survey and open-ended questions, we have highlighted four main themes of barriers to cycling: safety, weather, infrastructure and other, consisting of costs, timing and scheduling.

As predicted, safety seemed to be a major concern for individuals when it comes to riding a bike to campus, with two subcategories being fear of road/traffic conditions and fear of theft. While these fears were reported in context to the campus facilities, both also seem to be a general factor when it comes to cycling in the city of Vancouver. Although, the solution may seem as simple as having better parking facilities to solve the parking and the theft concern, it does not seem to encourage higher cycling rates with only 19 of the 46 participants suggesting it would make a difference in their choice suggesting the changes need to be more precise and address the theft concern more directly.

As for the road conditions, the fear seems to be generalized to overall traffic in the city and the commute to the campus seems to be no different than travelling anywhere else in Vancouver. Safety is a barrier that can be reduced highly to increase the rate of biker accessibility and regular ridership and in order to ensure this barrier has a limited impact on the bikers close to campus moving forward, a collaborative action is required on the part of UBC

and the local government. With a few alterations (see recommendations) and increased promotion, there is a high probability, more individuals will be willing to use bikes as a primary mode of transportation, especially those within a 10km distance to UBC.

In this study, weather seemed to be the primary barrier in preventing people from using a bike as their primary mode of transportation. Vancouver, being one of the cities with a high precipitation rate, does not yield the best weather conditions for individuals to rely on a bike for regular commuting throughout the year. In addition to the rain, the colder months also tend to bring in harsher conditions with additions of snow and negative temperatures, which are not particularly ideal for the average biker. The results also indicate that the weather tends to have a domino type effect on other barriers such as safety and even infrastructure. The cold weather and the rainy attribute of the winter seasons decrease the quality of road conditions, undermining the biker's safety. Also, in terms of infrastructure, even if a biker decides to commute during the rain, the changing facilities or the parking infrastructure on campus are not up to par for them for regular and uninterrupted access. One participant mentioned how having a setup where they could hang their clothes to dry in a place that would not get stolen would be helpful (Appendix B). While it's hard to control the weather conditions, there are some steps that are taken to ensure biker safety and access should they choose to continue using a bike as their primary mode of transportation during the colder months.

Based on our deductive approach, it was surprising that not as many participants agreed or strongly agreed that the amount and location of change rooms on campus impact their decision to cycle (28%). With participants being neutral and 28% participants unconcerned about the impact, it is evident that changing rooms are not a main concern for this population cycling to campus. However, when it came to asking if there are enough adequate changing rooms on

campus, only 17% of participants agreed. The discrepancy between the adequate amount of changing rooms and the true impact they have on cycling to campus, reveal that although there may not be enough changing rooms on campus, the majority would not utilize them to the extent where there would be a significant increase of individuals cycling to campus if more changing rooms were built.

One of the bigger concerns with cycling infrastructure includes the bike parking facilities on campus. A few participants expressed in the open-ended responses that they are hesitant to park their bike on campus because of bike theft being common. Similarly, 67% of participants agreed or strongly agreed that they would feel nervous locking their bike up on campus. When this question was repeated in our survey to prevent participants from rushing through their answers, the agreed or strongly agreed responses increased to 80%. In comparison to the UBC Transportation Survey Report (2017), there has been a significant increase of theft concerns over the past few years. In 2017, only 45% were concerned about theft (UBC Transportation Survey Report), consequently this substantial jump in numbers suggests helping ease the worries and concerns of individuals' is an apparent main concern the UBC campus must address immediately.

In addition, many participants expressed their frustrations of the limited availability and accessibility to bike lockers and facilities in our open-ended responses. One response explained how they were able to cycle to campus because they rented a secure bicycle locker from the UBC Kitchen, however due to limited availability, they currently do not have a locker and are unable to cycle anymore (Appendix C). In contrast, when participants were asked if they would cycle more to campus if there were more locations to park their bike only 28% agreed or strongly agreed to this. The latter indicates that perhaps the majority do not take into consideration the

locations of parking facilities and the above open-ended question is not applicable to many participants. Moreover, 42% agreed or strongly agreed that they would be more encouraged to cycle if the campus had better parking facilities. Another common open-ended response was related to the need of safer bike lanes and main paths around campus to hinder the challenges of safety and pedestrians. 57% agreed or strongly agreed that traffic conditions prevent them from cycling (or choosing to cycle), which is comparable to the UBC Transportation Survey Report (2017) stating the participants would bike more often if there was more road space allocated for bikes (47%) and if there were less pedestrians (42%). Likewise to the concerns about theft, these numbers display that bike lane infrastructure and pedestrians continue to be a barrier to cycling. Thus, it is worth looking into cost effective ways to create more bike lanes and paths going to campus and on campus. Overall, the main concern with bicycle infrastructure is the lack of security to keep bikes safe.

Additional barriers to cycling such as class schedules, the ease and duration of cycling as well as the cost and maintenance of a bike were placed in the 'Other' theme. Class schedules appeared in the open-ended responses as a primary barrier for a couple of participants. One participant explained how difficult the process of riding a bike around campus is when you have back to back classes with only a 10-minute break in-between to unlock, ride, find a parking spot and lock up again (Appendix C). When participants were asked if class time affects their decision to cycle to campus, 59% agreed or strongly agreed with the statement. With over half of the participants agreeing that class schedules can be a barrier to cycling, along with the explanation of the open-ended responses, it is evident that this barrier links to the insufficient number and quality of bike parking facilities. Despite the low number of participants agreeing they would cycle to campus if there were more locations to park their bike (28%), the responses

regarding class schedules suggest otherwise. Thus, even though the previous question may not reflect a significant demand for more parking facilities, it may in turn solve the barrier of class schedules if there were more bike parking facilities located on campus allowing them to park closer to their scheduled classes. Additionally, it could help with the ease and duration of cycling to campus as 48% of participants think riding to campus is a hassle and 35% find it too time consuming.

Concerning the maintenance and costs of a bike, 37% of participants agreed or strongly agreed it is indeed expensive to own and maintain a bike and 41% agreed or strongly agreed that the cost does play a role in their decision to cycle to campus. With only 24% participants agreeing that cycling is a more cost-effective choice displays the issue of ultimately owning a bike. As a matter of fact, with 98% of participants knowing how to ride a bike, only a bit over half of participants (52%) actually own one. To mitigate the cost and maintenance of owning a bike, having cheaper bike share options was a common suggestion in the open-ended responses. These suggestions remain to align with the UBC Transportation Survey Report (2017) that reported the most important elements for a bike share system are affordability and coverage/availability.

Unexpectedly, bike etiquette and safety was a shared suggestion amongst the participants to make it easier to cycle to campus. One stated how knowing more about bike etiquette on the road would be helpful for preparing them to cycle. Another talked about how learning how to bike safely on roads where there is actual traffic would be beneficial. Some expressed their lack of knowledge of cycling in general and the rules to stay safe. Thus, it seems that a key factor that may encourage more people to cycle at UBC involves education and awareness surrounding cycling etiquette and safety.

There were several challenges and limitations throughout our study. We initially anticipated a lack of sample diversity and prepared to overcome it by recruiting participants both on-campus and online. In terms of on-campus, we planned to post flyers about our project across campus as well as recruiting participants in-person. However, the start of our recruitment process overlapped with the COVID-19 situation which led to UBC transitioning all of its classes to an online platform. The sudden change of events had a significant impact on our recruitment process. As a result, we resorted to solely recruiting participants online by sharing our research survey in a Facebook group (UBC Class of 2022/2021) and inviting our UBC friends to participate in the survey and/or share the survey to friends who match our target population of individuals who live less than 10km away from campus. Such recruitment methods worked well in terms of recruiting an appropriate number of participants from our target population. However, seeing as all five of our group members are undergraduate Kinesiology students, the people we reached out to were typically students as well. When recruiting participants online, it was challenging to recruit those other than students who also lived within 10km away from campus.

Since we were not able to implement in-person recruitment, this became a significant limitation to our sample diversity. Among our sample of 46 participants, we had 43 students, one faculty member, one individual who used to be a part of the UBC community, and one participant who self-categorized as 'other'. Since our sample primarily comprises students, our findings do not accurately reflect the diversity of the UBC community which also includes faculty members, staff and residents. Therefore, it may be difficult to apply the findings of our study for future related studies as the sample was not a strong representation of people who live

less than 10km away from campus.

Another challenge relates to the quality of our survey responses. We anticipated that participants may rush through our survey questions without answering each carefully and meaningfully. Therefore, we mitigated this challenge by repeating certain questions in the Likert scale portion of our survey and reworded the repeated questions slightly different each time. We found this approach useful when analyzing the survey responses and found the responses were fairly consistent across the reworded questions. Similarly, to ensure we receive quality responses from the participants, many of our survey questions were worded through a deductive approach. Through this approach, the survey questions asked about specific barriers to prompt participants in answering clearly and decisively about the relevant barrier.

RECOMMENDATIONS

Our research aimed to investigate the opinions, experiences, and perceived barriers regarding cycling to UBC for individuals that live within 10km. Ultimately, these findings may be used to inform and reveal significant areas that could be addressed in order to increase the amount of people in our demographic that choose cycling as their primary method of transportation. The social-ecological model of health promotion suggests that there are numerous levels of factors that must be addressed in order to influence a change in health-related behaviours. As such, when forming our recommendations based on our findings we aimed to address the numerous applicable levels of this model such as policy environment, built environment, social environment, and individual factors in changing transportation behaviours. Finally, we looked into the key strategies of health promotion, such as mediating and advocating

to help further inform our recommendations. Essentially, as cycling is arguably one of the healthiest choices of transportation, our recommendations aim to help make cycling to UBC the easiest choice as well.

1) Increase number of secure bicycle parking and lockers

As our findings indicated, an increase in the amount of secure bicycle parking on campus is one of the most frequently mentioned potential actions that could increase the probability of our demographic cycling to UBC. This action involves looking at the built environment level of the social-ecological model in order to influence a change in active transportation and cycling. Although there are 13 free parking cages around campus, and a significant amount of outdoor parking spaces and bike racks, there are only 200 individual bicycle lockers (UBC Campus & Community Planning, *Bicycle Parking*, n.d.). As the majority of our participants stated that they do not feel that their bicycles are secure when locked up on campus, and individual bicycle lockers are the most secure option on campus (The Bike Kitchen, n.d.), increasing the amount of available lockers should be a priority. The Bike Kitchen (n.d.) describes that if lockers are not available then individuals will be added to a waitlist, but many participants alluded to there being an overall lack of these secure parking lockers, and that an increase in lockers may encourage cycling. Lastly, additional secure parking spaces and lockers may address the previously mentioned barrier of time and scheduling as this would likely imply that spaces may be closer to individuals' classes and destinations, limiting their time spent walking.

2) Investigate potential partnerships for improving bicycle security

In addition to addressing the amount of secure bicycle parking at UBC, it is also important to enhance feelings of security and look into anti-theft initiatives. This relates to the individual factors and social environment levels of the social-ecological model as it addresses

attitudes and perceptions of security as well as crime. UBC has already partnered with a community-based anti-theft service, Project 529, that allows cyclists to upload key details and images of their bike that may aid in getting their bike returned if it is stolen (UBC Campus & Community Planning, *Anti-Bike Theft Registration with 529 Garage*, n.d.). The City of Vancouver Police state that the 30% drop in bike theft may be due to this program (UBC Campus & Community Planning, *Anti-Bike Theft Registration with 529 Garage*, n.d.). It may be beneficial to look into additional programs, services, and insurance providers for UBC to partner with to further reduce bike theft on campus. Additionally, in order to prevent an individual from having their bike stolen in the first place, it is crucial that an individual uses a high-quality lock. However, bike locks can be very expensive, and some are not as effective as others. As such, it may be beneficial to look into the existing research surrounding the most effective bike-locks and security systems and reach out to these businesses and develop potential partnerships. For example, if a business that manufactures or sells bike locks were to partner with UBC Campus and Community Planning and agree to offer small discounts to UBC students, this could provide them with advertising and a potential increase in sales while also giving UBC students the opportunity to purchase the best security equipment at a reduced cost.

3) Increase and improve bike-only lanes on and around campus

A common concern that was expressed by respondents' open-ended responses reveals the need for safer bike lanes and main paths around campus to decrease the interference with pedestrians and traffic. This is related to the built environment level of the socio-ecological model as it pertains to looking at strategies that can improve the current physical infrastructure that are currently available to cycle to UBC. As many of the participants expressed concern for their safety while biking alongside traffic and pedestrians, efforts should be in place to ensure

that cyclists feel a greater sense of safety. As suggested by Reynolds et al. (2009) there is evidence that purposely built bicycle-only facilities such as bike lanes/paths/routes help to reduce the risk of injury and crashes when compared to cycling on the road with traffic or off the road with pedestrians. Thus, findings from our research indicate that investing in increasing the designated bike-only paths along the main routes on campus so that cyclists can commute around campus without having to share the paths with pedestrians.

Additionally, a study of different kinds of cycling facilities in Vancouver and Toronto, found that the safest environment for biking was, by far, on-street bicycle lanes that are physically separated from motor vehicles by raised curbs (Pucher & Buehler, 2016). The study also found that roads that are protected from traffic and do not have parked cars were significantly safer for cyclists when compared to unprotected lanes with parked cars (Pucher & Buehler, 2016). This suggests that cyclists' safety may benefit from removing car parking and ensuring that major cycling streets are physically separated from cars by curbs or barricades.

4) Increase awareness & education surrounding cycling etiquette

A recurring barrier that was expressed by our survey respondents was their lack of awareness of bike etiquette when manoeuvring the streets along with other cars and people. This relates to the individual factor of the socio-ecological model as it involves teaching students specific rules and etiquette to increase their confidence in cycling. More specifically, respondents mentioned in the final open-ended question that they felt they lacked the basic understanding of bike etiquette to manoeuvre with traffic safely and this consequently made them reluctant to cycle to UBC. According to Winters, Weddell and Teschke (2013), education for cyclists can increase their competency, confidence and knowledge which has been correlated to increases in cycling rates. In countries, such as the Netherlands or Germany, where every child undergoes

comprehensive cycling programs as a part of their education curriculum, there are significantly more cyclists along with decreased safety risks (Winters, Weddell & Teschke, 2013). However, in Canada, there is no current cycling education system in place making it the cyclists' responsibility to learn etiquette and rules of the road independently (Winters, Weddell & Teschke, 2013). Ideally, cycling education should be implemented as a part of high school curriculum, however learning about cycling can be beneficial at any age (Winters, Weddell & Teschke, 2013). Therefore, efforts should be made to increase the educational resources for cyclists in UBC. Although UBC has incorporated cycling tips and resources as a part of their website that relays information about bike etiquette and safety (UBC Campus & Community Planning, *Cycling Tips and Resources*, n.d.), it seems as if none of our participants were aware of this resource. One strategy is to promote the information on the university website, on social media platforms or through educational videos where students may easily access and be aware of this information. Lastly, UBC could potentially organize and host events where they may relay this useful information.

5) Advocate for the option of U-Pass exemption for UBC cyclists

The U-Pass is considered mandatory for all students who are enrolled in classes at UBC unless the student is strictly taking distance education classes (UBC Campus & Community Planning, 2020). Although the U-Pass program may be a convenient and environmentally friendly mode of transportation for long-distance commuters, it can be difficult to opt-out of the U-Pass for those who are wishing to use cycling as their main mode of transportation to campus. According to U-Pass, you can only apply for an exemption if you meet specific criteria such as holding another valid transit pass, unable to use transit due to a disability or live outside of Metro Vancouver (U-Pass, 2020). Following the first year of the implementation of the U-Pass

program, the number of bicycle trips to UBC decreased by 15% (UBC Urban systems, 2005). Furthermore, in the second year, the number of trips to UBC by bicycle saw a further decline to half the number before U-Pass was implemented (UBC Urban systems, 2005). As expected, many of the cyclists switched from cycling to transit (UBC Urban systems, 2005). Respondents of our survey mentioned in their open-ended responses that they felt obligated to use transit because they are already paying for the U-Pass included in their tuition so they may as well get their money's worth. In other words, our research shows that commuting by transit may currently be the easier and more cost-effective option for students to commute to campus even when they live within 10km. A suggestion to help mitigate this barrier is to advocate for change in the policies around U-Pass exemption to make it easier for students that wish to cycle to campus to opt-out. Perhaps, UBC could collaborate with U-Pass policy makers to allow cycling as a primary mode of transportation as another reason to opt-out of the U-Pass program. This way, students won't feel obligated to use transit due to mandatory payment, which consequently may motivate more students to cycle to school. Advocating for such a change aligns with the effective health promotion strategy of making the best and healthiest choice, in this case cycling, the easiest and most accessible choice for students.

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Appendix A

Consent Form for Participants

Consent Portion

KIN 464: Health Promotion and Physical Activity

Participant Consent Form for Class-based Projects

UBC SEEDS: Cycling Survey

Group 29

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 cycling to UBC Vancouver campus and what encourages and inhibits them from doing so.

Study Procedures:

With your permission, we are asking you to participate in an online 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>

Potential benefits of class project:

There are no explicit benefits to you by taking part in this class project. However, the interview will provide you with the opportunity to voice your opinion on your experiences with health promoting activities or initiatives in a broad sense and will provide the students with an opportunity to learn from your experiences.

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

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 . 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.

I consent: Begin the survey.

I do not consent: I do not wish to participate in the survey.

Appendix B
Online Qualtric Survey Questions

Demographic Portion

How did you hear about our survey?

- Social Media
- Flyer on campus
- In person
- Other

Are you currently a member of the UBC community? (If so, select most applicable category)

- Student
- Faculty
- Community resident
- Visitor
- I am not (or no longer) a part of the UBC community.
- Other/Prefer not to say

What is your primary method of transportation to UBC?

- Walking
- Cycling
- Public Transportation (bus/skytrain)
- Driving (alone/with others)

What gender do you identify as?

- Male
- Female
- Non-binary
- Other:
- Prefer not to disclose

Survey Portion

Rate your level of agreement with the following statements from: 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree).

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I feel comfortable riding a bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy riding a bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel (or would feel) safe riding a bike to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not care about the weather when deciding to cycle to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My class times affect my decision/ability to cycle to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The amount and locations of change rooms on campus affects my decision/ability to cycle to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel (or would feel) nervous locking up my bike on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling to campus is too time consuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
It is expensive to own and maintain my bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Harsh weather prevents me from biking to school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would bike more to campus if there were more locations to park my bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that there is adequate amounts of change rooms on campus for when I arrive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel (or would feel) anxious about locking up my bike on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel safe riding a bike with the traffic conditions in Vancouver	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My class schedule has no effect on my decision to bike (or not to bike) to campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cost of a bike and cycling to UBC does not play a role in my decision to cycle to campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think riding a bike to campus is a hassle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be more encouraged to bike to UBC if the weather was better	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would bike more to campus if there were more changing facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The amount of time it takes to cycle to UBC does not play a role in my decision to cycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The traffic conditions in Vancouver prevent me from cycling (or choosing to cycle) to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not feel comfortable/safe riding a bike to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling to campus is a more cost effective choice for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be more encouraged to bike if UBC had better parking facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not feel my bike is secure when locked up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What days of the week do you typically have to commute to campus? (Select all that apply)

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The amount of time it takes to cycle to UBC does not play a role in my decision to cycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The traffic conditions in Vancouver prevent me from cycling (or choosing to cycle) to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not feel comfortable/safe riding a bike to UBC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling to campus is a more cost effective choice for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be more encouraged to bike if UBC had better parking facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not feel my bike is secure when locked up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What days of the week do you typically have to commute to campus? (Select all that apply)

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

During what times are you typically commuting to/from campus? (Select all that apply)

- Morning (6:00am - 11:59am)
- Afternoon (12:00pm - 3:59pm)
- Evening (4:00pm - 6:59pm)
- Night (7:00pm - 11:59pm)

How far away from campus do you live?

- 0 - 10 kilometres away
- 11 - 20 kilometres away
- Over 20 kilometres away

Do you know how to ride a bike?

- Yes
- No
- Other:

Do you own a bike and/or have access to a bike? (YES or NO)

- Yes
- No
- Other:

How often do you cycle to UBC?

- Never

- Sometimes (1-3 times a week)
- About half the time (variable)
- Most of the time (4-7 times a week)
- Always

How long does it take you to cycle to UBC? (minutes and/or hours)

When cycling to UBC Vancouver campus, what route do you take? (In general/main roads)

What do you see as the relevant barrier to cycling (or choosing to cycle) to UBC Vancouver? (Please answer openly and truthfully)

What do you think would make it easier for you to cycle (or to choose to cycle) to UBC Vancouver? (Please answer openly and truthfully)

Appendix C

Default Report

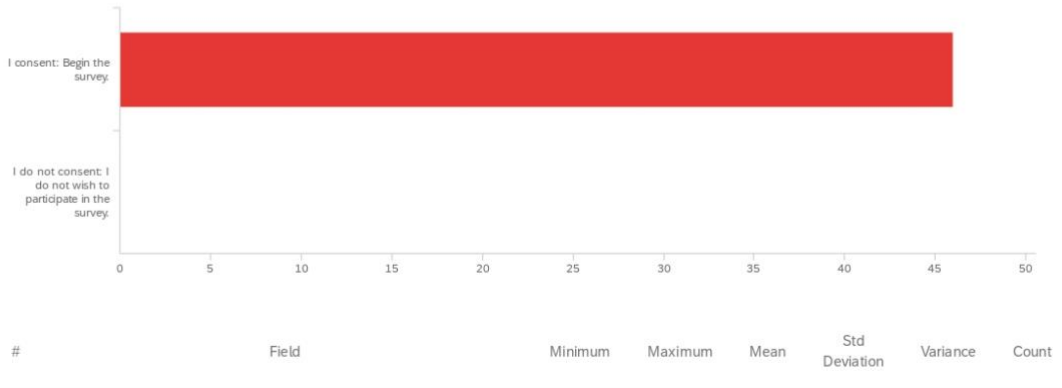
UBC SEEDS: Cycling Survey

March 23, 2020 7:42 PM MDT

C1 - KIN 464: Health Promotion and Physical Activity Participant Consent Form for
Class-based Projects UBC SEEDS: Cycling Survey Group 29 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 cycling to UBC Vancouver campus and what encourages and inhibits them from doing
so. Study Procedures: With your permission, we are asking you to participate in an online
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> Potential benefits of class project: There
are no explicit benefits to you by taking part in this class project. However, the interview

will provide you with the opportunity to voice your opinion on your experiences with health promoting activities or initiatives in a broad sense and will provide the students with an opportunity to learn from your experiences. 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 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 . 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.



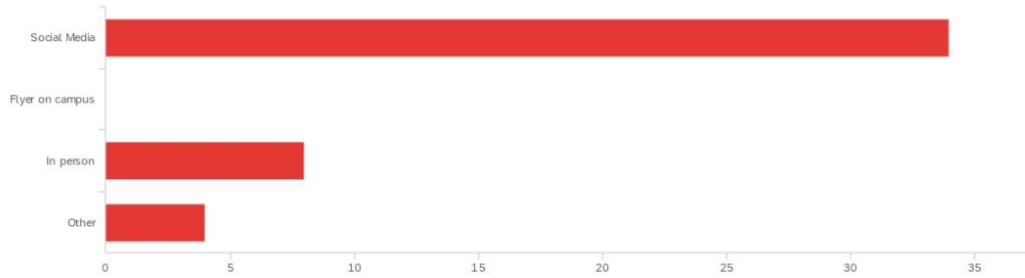
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	<p>KIN 464: Health Promotion and Physical Activity Participant Consent Form for Class-based Projects UBC SEEDS: Cycling SurveyGroup 29 Principal Investigator: Dr. Andrea Bundon (Assistant Professor, School of Kinesiology, Faculty of Education) The purpose of the class project:To gather knowledge and expertise from community members on cycling to UBC Vancouver campus and what encourages and inhibits them from doing so. Study Procedures:With your permission, we are asking you to participate in an online 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 Potential benefits of class project:There are no explicit benefits to you by taking part in this class project. However, the interview will provide you with the opportunity to voice your opinion on your experiences with health promoting activities or initiatives in a broad sense and will provide the students with an opportunity to learn from your experiences.</p> <p>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 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 . 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.</p>	1.00	1.00	1.00	0.00	0.00	46

#	Field	Choice Count
1	I consent: Begin the survey.	100.00% 46
2	I do not consent: I do not wish to participate in the survey.	0.00% 0

46

Showing rows 1 - 3 of 3

D1 - How did you hear about our survey?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How did you hear about our survey?	1.00	4.00	1.61	1.05	1.11	46

#	Field	Choice Count
1	Social Media	73.91% 34
2	Flyer on campus	0.00% 0
3	In person	17.39% 8
4	Other	8.70% 4

Showing rows 1 - 5 of 5

D2 - Are you currently a member of the UBC community? (If so, select most applicable category)



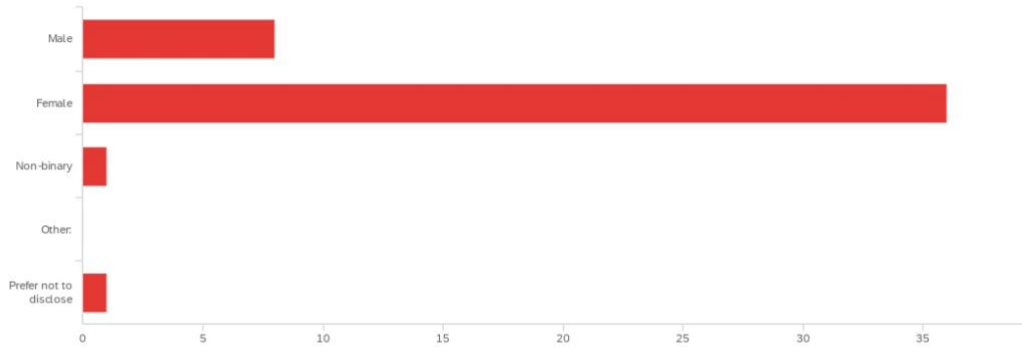
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Are you currently a member of the UBC community? (If so, select most applicable category)	1.00	6.00	1.22	0.93	0.87	46


#	Field	Choice Count
1	Student	93.48% 43
2	Faculty	2.17% 1
3	Community resident	0.00% 0
4	Visitor	0.00% 0
5	I am not (or no longer) a part of the UBC community.	2.17% 1
6	Other/Prefer not to say	2.17% 1

46

Showing rows 1 - 7 of 7

D4 - What gender do you identify as?



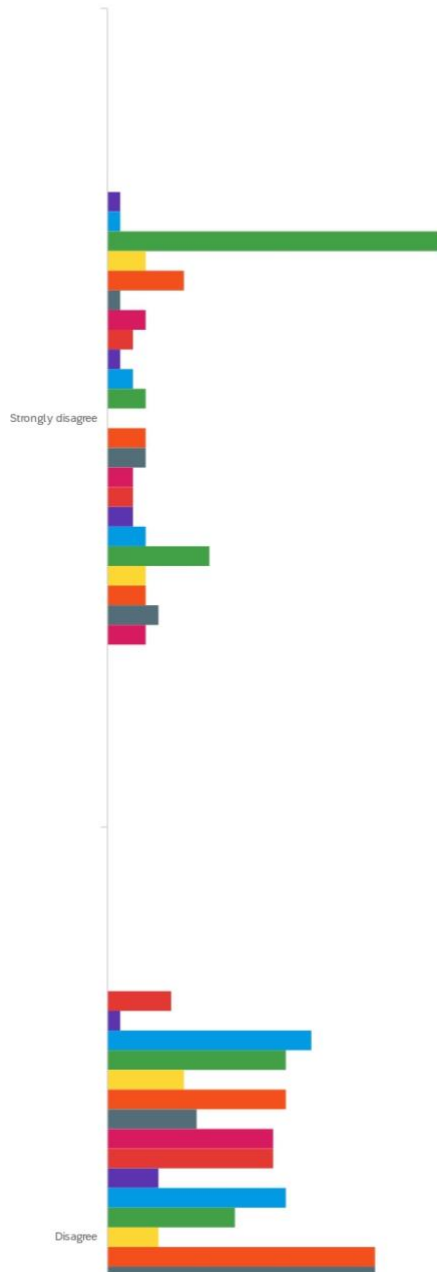

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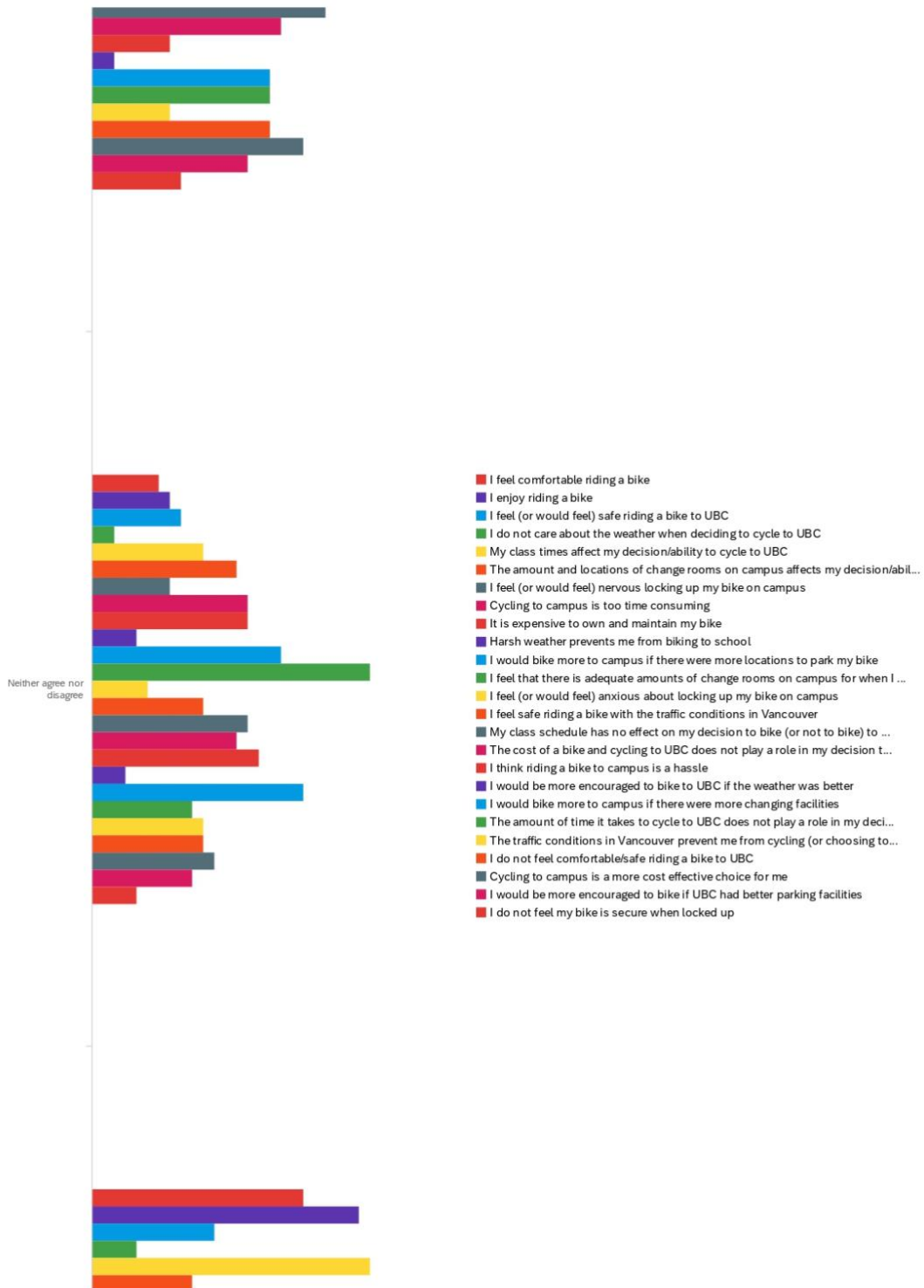

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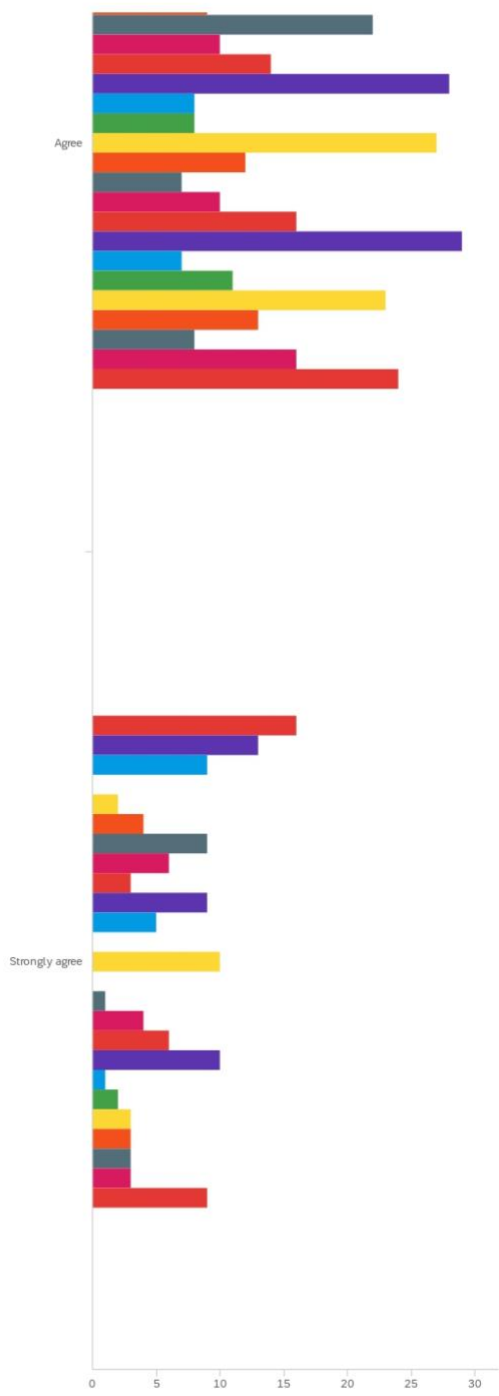
D4_4_TEXT - Other:

Other:

Q1 - Rate your level of agreement with the following statements from: 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (strongly agree).







#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	I feel comfortable riding a bike	2.00	5.00	4.00	0.96	0.91	46
2	I enjoy riding a bike	1.00	5.00	4.02	0.85	0.72	46
3	I feel (or would feel) safe riding a bike to UBC	1.00	5.00	3.24	1.20	1.43	45
4	I do not care about the weather when deciding to cycle to UBC	1.00	4.00	1.65	0.91	0.84	46
5	My class times affect my decision/ability to cycle to UBC	1.00	5.00	3.37	0.99	0.97	46
6	The amount and locations of change rooms on campus affects my decision/ability to cycle to UBC	1.00	5.00	2.80	1.15	1.33	46
7	I feel (or would feel) nervous locking up my bike on campus	1.00	5.00	3.67	1.02	1.05	46
8	Cycling to campus is too time consuming	1.00	5.00	3.07	1.13	1.28	46
9	It is expensive to own and maintain my bike	1.00	5.00	3.07	1.01	1.02	46
10	Harsh weather prevents me from biking to school	1.00	5.00	3.87	0.90	0.81	46
11	I would bike more to campus if there were more locations to park my bike	1.00	5.00	3.00	1.04	1.09	46
12	I feel that there is adequate amounts of change rooms on campus for when I arrive	1.00	4.00	2.83	0.79	0.62	46
13	I feel (or would feel) anxious about locking up my bike on campus	2.00	5.00	3.93	0.82	0.67	46
14	I feel safe riding a bike with the traffic conditions in Vancouver	1.00	4.00	2.67	0.93	0.87	46
15	My class schedule has no effect on my decision to bike (or not to bike) to campus	1.00	5.00	2.61	0.90	0.80	46
16	The cost of a bike and cycling to UBC does not play a role in my decision to cycle to campus	1.00	5.00	2.93	1.05	1.10	46
17	I think riding a bike to campus is a hassle	1.00	5.00	3.37	1.03	1.06	46
18	I would be more encouraged to bike to UBC if the weather was better	1.00	5.00	3.93	0.92	0.84	46
19	I would bike more to campus if there were more changing facilities	1.00	5.00	2.72	0.88	0.77	46
20	The amount of time it takes to cycle to UBC does not play a role in my decision to cycle	1.00	5.00	2.63	1.15	1.32	46

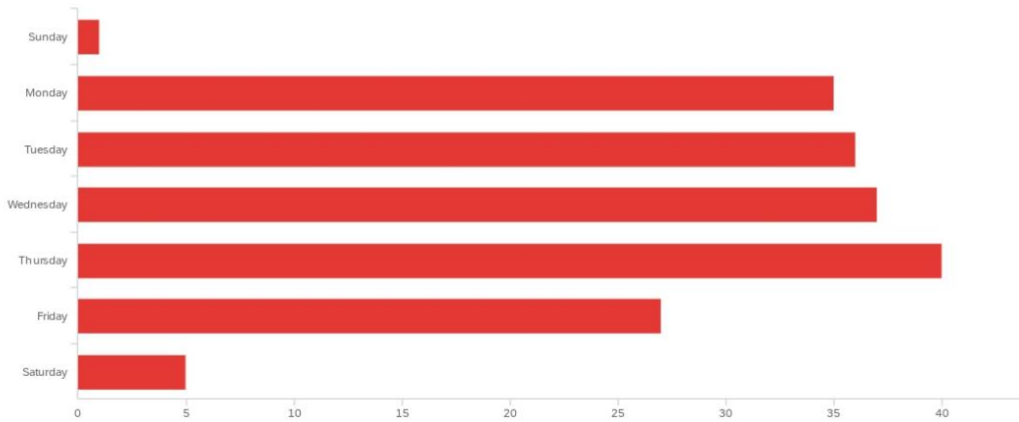
21	The traffic conditions in Vancouver prevent me from cycling (or choosing to cycle) to UBC	1.00	5.00	3.35	1.03	1.05	46
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
22	I do not feel comfortable/safe riding a bike to UBC	1.00	5.00	2.93	1.08	1.17	45
23	Cycling to campus is a more cost effective choice for me	1.00	5.00	2.71	1.07	1.14	45
24	I would be more encouraged to bike if UBC had better parking facilities	1.00	5.00	3.04	1.09	1.20	45
25	I do not feel my bike is secure when locked up	2.00	5.00	3.76	0.97	0.94	45

#	Field	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Total
1	I feel comfortable riding a bike	0.00% 0	10.87% 5	13.04% 6	41.30% 19	34.78% 16	46
2	I enjoy riding a bike	2.17% 1	2.17% 1	15.22% 7	52.17% 24	28.26% 13	46
3	I feel (or would feel) safe riding a bike to UBC	2.22% 1	35.56% 16	17.78% 8	24.44% 11	20.00% 9	45
4	I do not care about the weather when deciding to cycle to UBC	56.52% 26	30.43% 14	4.35% 2	8.70% 4	0.00% 0	46
5	My class times affect my decision/ability to cycle to UBC	6.52% 3	13.04% 6	21.74% 10	54.35% 25	4.35% 2	46
	The amount and locations of change rooms on campus affects my decision/ability to cycle to UBC	13.04% 6	30.43% 14	28.26% 13	19.57% 9	8.70% 4	46
	I feel (or would feel) nervous locking up my bike on campus	2.17% 1	15.22% 7	15.22% 7	47.83% 22	19.57% 9	46
	Cycling to campus is too time consuming	6.52% 3	28.26% 13	30.43% 14	21.74% 10	13.04% 6	46
	It is expensive to own and maintain my bike	4.35% 2	28.26% 13	30.43% 14	30.43% 14	6.52% 3	46
	Harsh weather prevents me from biking to school	2.17% 1	8.70% 4	8.70% 4	60.87% 28	19.57% 9	46
	I would bike more to campus if there were more locations to park my bike	4.35% 2	30.43% 14	36.96% 17	17.39% 8	10.87% 5	46
	I feel that there is adequate amounts of change rooms on campus for when I arrive	6.52% 3	21.74% 10	54.35% 25	17.39% 8	0.00% 0	46
	I feel (or would feel) anxious about locking up my bike on campus	0.00% 0	8.70% 4	10.87% 5	58.70% 27	21.74% 10	46
	I feel safe riding a bike with the traffic conditions in Vancouver	6.52% 3	45.65% 21	21.74% 10	26.09% 12	0.00% 0	46
	My class schedule has no effect on my decision to bike (or not to bike) to campus	6.52% 3	45.65% 21	30.43% 14	15.22% 7	2.17% 1	46

#	Field	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Total
	The cost of a bike and cycling to UBC does not play a role in my decision to cycle to campus	4.35% 2	36.96% 17	28.26% 13	21.74% 10	8.70% 4	46
	I think riding a bike to campus is a hassle	4.35% 2	15.22% 7	32.61% 15	34.78% 16	13.04% 6	46
	I would be more encouraged to bike to UBC if the weather was better	4.35% 2	4.35% 2	6.52% 3	63.04% 29	21.74% 10	46
	I would bike more to campus if there were more changing facilities	6.52% 3	34.78% 16	41.30% 19	15.22% 7	2.17% 1	46
	The amount of time it takes to cycle to UBC does not play a role in my decision to cycle	17.39% 8	34.78% 16	19.57% 9	23.91% 11	4.35% 2	46
	The traffic conditions in Vancouver prevent me from cycling (or choosing to cycle) to UBC	6.52% 3	15.22% 7	21.74% 10	50.00% 23	6.52% 3	46
	I do not feel comfortable/safe riding a bike to UBC	6.67% 3	35.56% 16	22.22% 10	28.89% 13	6.67% 3	45
	Cycling to campus is a more cost effective choice for me	8.89% 4	42.22% 19	24.44% 11	17.78% 8	6.67% 3	45
	I would be more encouraged to bike if UBC had better parking facilities	6.67% 3	31.11% 14	20.00% 9	35.56% 16	6.67% 3	45
	I do not feel my bike is secure when locked up	0.00% 0	17.78% 8	8.89% 4	53.33% 24	20.00% 9	45

Showing rows 1 - 25 of 25

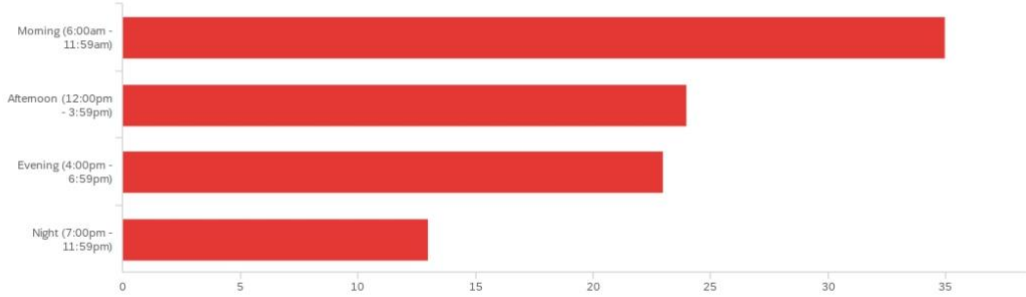
Q2 - What days of the week do you typically have to commute to campus? (Select all that apply)



#	Field	Choice Count
1	Sunday	0.55% 1
2	Monday	19.34% 35
3	Tuesday	19.89% 36
4	Wednesday	20.44% 37
5	Thursday	22.10% 40
6	Friday	14.92% 27
7	Saturday	2.76% 5
		181

Showing rows 1 - 8 of 8

Q3 - During what times are you typically commuting to/from campus? (Select all that apply)

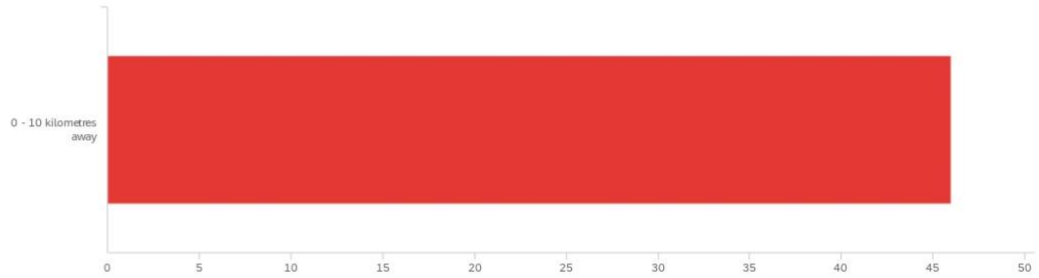


#	Field	Choice Count
1	Morning (6:00am - 11:59am)	36.84% 35
2	Afternoon (12:00pm - 3:59pm)	25.26% 24
3	Evening (4:00pm - 6:59pm)	24.21% 23
4	Night (7:00pm - 11:59pm)	13.68% 13

95

Showing rows 1 - 5 of 5

Q4 - How far away from campus do you live?

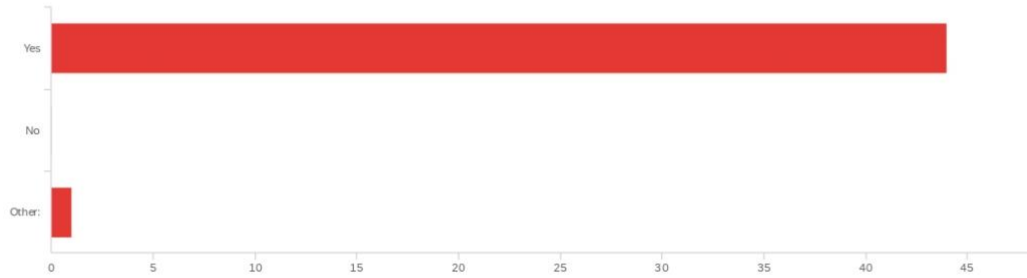


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How far away from campus do you live?	1.00	1.00	1.00	0.00	0.00	46

#	Field	Choice Count
1	0 - 10 kilometres away	100.00% 46

Showing rows 1 - 1 of 1

Q5 - Do you know how to ride a bike?



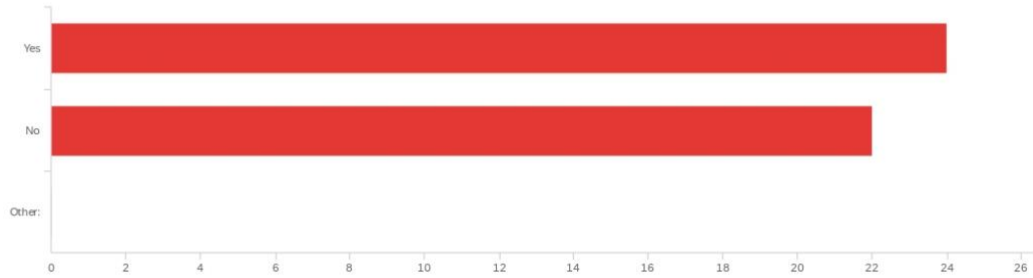
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you know how to ride a bike? - Selected Choice	1.00	3.00	1.04	0.29	0.09	45

#	Field	Choice Count
1	Yes	97.78% 44
2	No	0.00% 0
3	Other:	2.22% 1
		45

Showing rows 1 - 4 of 4

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Q6 - Do you own a bike and/or have access to a bike? (YES or NO)



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you own a bike and/or have access to a bike? (YES or NO) - Selected Choice	1.00	2.00	1.48	0.50	0.25	46

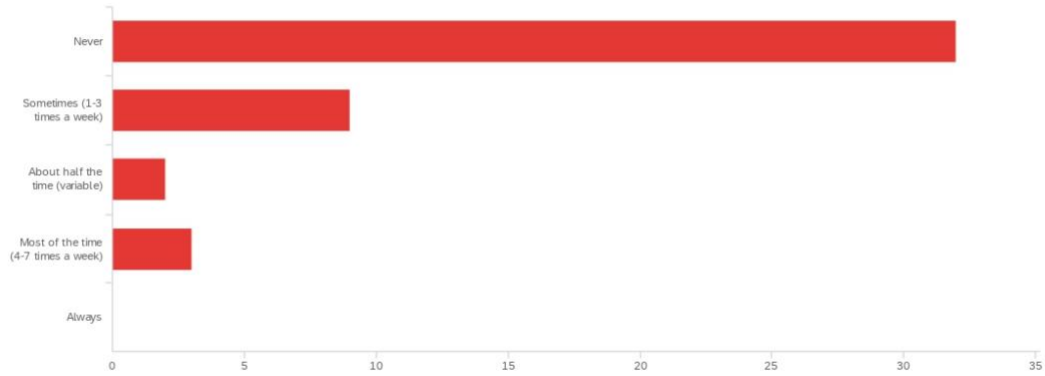
#	Field	Choice Count
1	Yes	52.17% 24
2	No	47.83% 22
3	Other:	0.00% 0
		46

Showing rows 1 - 4 of 4

Q6_3_TEXT - Other:

Other:

Q7 - How often do you cycle to UBC?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How often do you cycle to UBC?	1.00	4.00	1.48	0.85	0.73	46

#	Field	Choice Count
1	Never	69.57% 32
2	Sometimes (1-3 times a week)	19.57% 9
3	About half the time (variable)	4.35% 2
4	Most of the time (4-7 times a week)	6.52% 3
5	Always	0.00% 0
		46

Showing rows 1 - 6 of 6

Q8 - How long does it take you to cycle to UBC? (minutes and/or hours)

How long does it take you to cycle to UBC? (minutes and/or hours)

20-25 min

15

about 10 minutes

20 min

15 minutes

15

25 minutes

30 minutes

5

15min

15-25 min

30mins

25-30 minutes

10min

Q9 - When cycling to UBC Vancouver campus, what route do you take? (In general/main roads)

When cycling to UBC Vancouver campus, what route do you take? (In general/m...

Past WPGA along 10th(?)

16th

I live on Blanca, so I go up Blanca and then along 10th ave to campus.

W16th ave

Either 10th to university boulevard or 16th to marine drive just depending on what I feel like/to mix it up.

Wesbrook mall, 16th

The bike route on west 7th to Alma then up through the endowment lands

Through Pacific Spirit Park

I live on campus

W16

West Broadway-> University Boulevard

W 49th Ave -> SW Marine Dr -> SW Marine Dr Highway -> Stadium Rd -> West Mall -> Agronomy Rd -> Main Mall Coming back I take E Mall to W 16th Ave and then SW Marine Dr Highway.

Main Mall/East Mall

Q10 - What do you see as the relevant barrier to cycling (or choosing to cycle) to UBC

Vancouver? (Please answer openly and truthfully)

What do you see as the relevant barrier to cycling (or choosing to cycle) t...

Weather

bike theft

I'm lucky that I live so close to campus and am above the big hill, because I think that makes it unaccessible for some people. For me, the big barrier is the weather because I'm a lot less likely to bike if it's super rainy. For me, it's usually faster and easier than the bus and also then I get to be outside, so I really like to bike when I can.

Locking it at ubc

Rain if it's really really hard but otherwise I just bike.

Weather

Weather makes me nervous, if it's cold or raining I won't bike

For me the rain is the only barrier - I mostly bike in sept and oct, and march and april, but not through winter

Safety of roads (cars and busses could kill me) Lack of dedicated bike lanes Pedestrian Weather

Weather Conditions and biking during peak hours where buses make regular stops.

The largest barriers for me cycling to UBC is bike theft. For my first 2 years at UBC I rented a secure bicycle locker from the UBC Bike Kitchen to lock my bike. This allowed me to cycle to UBC 1-5 times a week without worrying about my bicycle (or bicycle parts) getting stolen. Due to limited availability I currently do not have a locker and because of this I don't currently cycle to UBC. My second barrier was the weather. While I enjoyed cycling in the rain, I never found a good way to dry out my cycling clothes while attending classes.

Pedestrians and Squirrels

Q11 - What do you think would make it easier for you to cycle (or to choose to cycle) to

UBC Vancouver? (Please answer openly and truthfully)

What do you think would make it easier for you to cycle (or to choose to cy...

A bike

Cheaper bike share options

Weather How far I live But personally I think it's not safe to cycle to school, and it takes so much effort. I would prefer to take public transportation.

Better weather and no hills.

N/a, beyond weather I find cycling accessible

free individual lockers

It's hard to bike around campus. I know that pedestrians have the right of way, but would be nice if some of the main paths had a section for bikes because it takes forever to get through campus on a bike because no one moves.

If I lived closer to UBC and the weather was not so rainy.

The weather is usually not great during the school year, so if weather was better I would be more likely to bike. However, another important factor is that we can't easily opt out of the upass. I already spend a decent amount of money on it each term so I don't see why I should ride a bike rather than transit when I'm already paying for transit. If I bought a good bike for daily use, I would have to spend quite a bit of money and then if I used the bike instead of transit, I would be paying those upass fees for no reason. Basically the biggest thing is why would I pay for two modes of transportation especially when one of them I am essentially required to pay for?

Better security

I currently live on campus so a bike isn't necessary, if I lived a bit further I would consider it, although biking in the rain is not ideal. I think I only would bike on sunny days that I was sure it wasn't going to rain.

It's just inconvenient with the constant fluctuations in the weather in Vancouver.

The UBC campus is well equipped for bikers. The only reason I don't bike to school is because it would take me a long time to get there from where I live and I would have to bike up a bike hill which I am not in shape to do. Busing is easier and faster for me.

If there was more secure bike parking and if there was enough time to get to school before class. I also don't like being tied down, so having a bike that I need to keep track of doesn't really fit with my style of education. I also wouldn't feel safe riding at night and that would limit the amount of time I could spend on campus. Also, embarrassingly, I don't know how to put a bike onto the front-of-the-bus racks.

If there was more theft deterrence on campus.

More trails and Accessible bikes?

Better bike paths and safer areas to lock up bikes

What do you think would make it easier for you to cycle (or to choose to cy...

knowing more about bike etiquette on the road

Better weather

More bike lanes, more change rooms, more bike lockers

better weather, safer road conditions

The weather was nicer and more predictable. I lived closer to campus and had more time/energy to bike every day. I could lock my bike in a secure location so I don't have to worry about it being stolen.

UBC campus itself is not bike friendly and it's challenging to navigate pedestrian areas on a bike

Learning how to bike safely in the road while there are cars

Stricter/more secure bike locking availability

Making bike lock ups safe

Dedicated bike lanes

Making sure all bikes would be safe when in class

If bicyclists and pedestrians were safer on campus as the drivers on campus do not respect people on foot.

If I knew the traffic rules and if I know that I'm going to get a parking spot at UBC

Less slope (I have knee pain biking uphill can hurt

Safe bike paths (These are probably in existence but I just don't know about them) Less people on campus hahhaa (When it's really crowded between classes, I feel like it would be difficult to manoeuvre) More time between classes (10 min break seems awfully short to get out of class, unlock bike, ride, and lock bike)

If I had a bike

Better Weather but that can't really be controlled.

Easy weather and less cars

Cheaper bike and a bike trail in UBC

Additional secure, single-person bicycle storage options. If the bicycle kitchen had more of their lockers I would cycle more. Some sort of setup where I could leave my clothes (without them getting stolen) hanging to dry would also be great.

Cheaper bikes, easier maintenance

Having more secure parking spots

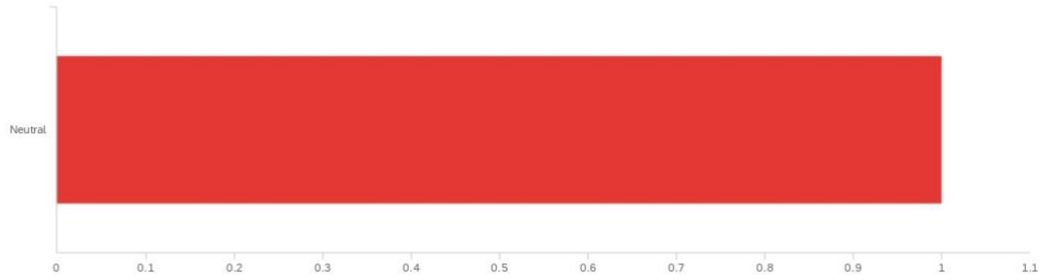
More bike parking spaces, also there are lots of rumors about bikes getting stolen which makes makes me not want to park my bike on campus.

What do you think would make it easier for you to cycle (or to choose to cy...

Secure lock system that operates with ubc student id; secured small space for one bike only

If I had class times in the afternoon only (as opposed to during rush hour) that would help me feel more comfortable. Also, if the weather was better.

Q5_3_TEXT - Sentiment



#	Field	Choice Count
Neutral	Neutral	100.00% 1

Showing rows 1 - 1 of 1