UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Amenities to Activity: Identifying the Influences on Active Transportation

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Executive Summary

With global warming becoming an increasingly prominent problem in the world, the value of reducing greenhouse gases has become crucial. It is thought that the CIRS building at the University of British Columbia (UBC) has the potential for encouraging pro-environmental behaviors as it is an environmentally sustainable building with “end of trip” facilities. The current study attempted to answer the following research question: “Are UBC students/staff found in the CIRS building more likely to utilize active transportation than a control building (Kenny) due to the additional available facilities supporting active transport?” Researchers gathered surveys from student and faculty member participants from both the CIRS building and the Kenny Building (control variable). Results were gathered from with surveys, including self-reports from students and UBC staff members. The results showed there were no significant correlations between the use of sustainability buildings and environmentally conscious behaviors or in the use of active transportation.

Introduction

There is recent research that investigates whether or not environmentally sustainable buildings could help spur environmentally conscious behaviors but there has been only some support to show that buildings that encourage more pro-environmental responses. The motivation for the current study came from an interest in extending the study done by Wu et al., (2013) and to find the most efficient method that would encourage students and faculty members alike to participate in reducing our carbon footprint. According to a study by DiGiacomo et al., (2018), there is some support to show that inconvenience is potentially a barrier to people sorting their recycling disposals. This is related to another study investigated by Shu et al., (2011) in which cognitive barriers that barr decision making relating to environmental issues are identified. They found that people fail to recognize the effect of their actions on future generations, fail to see the severity of environmental issues, and possess a “self-serving bias” that is linked to the belief that others will make the changes to solve environmental problems. The current study attempts to identify various psychological barriers related to the environment by analyzing students and UBC staff using active transportation to move around campus and whether or not end-of-trip facilities could be utilized as an additional convenience.

Research question and hypothesis

Research Question: Are UBC students/staff found in the CIRS building more likely to utilize active transportation than a control building (Kenny) due to the end-of-trip facilities supporting active transport?

Hypothesis: Participants surveyed in the CIRS building are more likely to utilize active transport than participants surveyed in the Kenny building.

Methods

The data gathered consisted of opinions and information on students' and UBC staffs' transportation habits and their perception of the environment. It was gathered using an online survey service (SurveyMonkey). The questions asked for self-reports about participants' most often used primary and secondary transportation methods, distance from campus, time it takes to commute to campus, whether participants considered themselves environmentally conscious and their likelihood of utilizing active transportation if they were given access to end-of-trip facilities (see Table 1 in the Appendix). All participants were gathered in-person at the Kenny building and CIRS during peak school hours: 9AM to 5PM.

Independent variables: Access to end-of-trip facilities
Dependent variable: Use of active transportation around or to campus.

Participants

The current study gathered data from a total of 62 participants; 56 students and 6 UBC staff members. The average age for the students and staff members were were 21 and 35 respectively. 23 participants self-reported that they spent the most time in the CIRS building, 15 participants self-reported that they spent most of their time in the Kenny building and 24 participants selected "Other" (meaning they only rarely visit either building).

It is important to note that our original study had intended to survey staff members of the Kenny and CIRS building in order to build a representative sample to compare individuals who have access to the facilities to those who do not. However, due to extenuating circumstances we were no longer able to obtain a staff-heavy sample and instead collected surveys in person from each building. This resulted in a student-heavy sample of participants.

Conditions

All participants were randomly selected from either the CIRS building or the Kenny building. For our control condition, we measured the rates of active transportation for participants in the Kenny building. For our experimental condition, we measured the rates of active transportation for participants in the CIRS building.

Measures

Researchers in the current study gathered all data and responses in-person, randomly sampling students and UBC staff members located at either the CIRS building or the Kenny building. They were asked to fill out a short 10 question online survey about their use of active transportation and end-of-trip facilities.

Self-reports of individuals in these buildings were measured by utilizing an online survey via SurveyMonkey. The average percentage of participants utilizing active transport vs. those utilizing passive transport on a weekly basis was the main measure to investigate the research question for the current study. Additional measures were taken to help contextualize our findings. These included comparisons based on commute time, distance from campus, and rates of other secondary types of active transportation (walk, bike, public transit) used.

Procedure

We asked people in the CIRS and Kenny building to fill out our online survey. We analysed the research responses to the questions using rates of active transportation comparing means between the two buildings. When comparing the rates of active transportation with the distance participants lived from campus we categorized persons on a 0-3 scale of active transportation use; 0-no active primary or secondary; 1-primary non active but secondary active; 2-primary active but secondary non active; 3- both primary and secondary are active. We then did a comparison of this rating with the distance of their commute to campus. We also looked at the raw data of what respondents replied to a few different questions.

Results

Between the CIRS and Kenny building, there was a slight difference in the prevalence of active transportation. Of the participants from the CIRS building condition, 52.17% reported that they use active transportation as their primary mode of transportation, with 46.66% of participants from the Kenny Building using active transportation as their primary mode of transportation.

An analysis of the data of participants from Kenny and CIRS (*N= 35*) found that 60% of participants reported that they would be more likely to use active transportation if they had access to these facilities. However, we ran a chi-square analysis between the two buildings and found a chi-square statistic of 0.0211 with a *p*-value of .88. The result was *not* significant at $p < .05$. *(See Appendix: Table 4).* We did find that the most prevalent form of transportation from our student sample was Walking, (23 participants, 41.07%) followed by public transit (22 participants, 39.29%), Motor Vehicle (9 participants, 16.07%) and Biking (2 participants, 3.57%).

After our analysis of the data using inferential statistics, we compared the number of participants from each building who chose active transportation as their primary mode of transportation to the number of participants who chose non-active transportation as their primary mode of transportation. Our chi-square statistic for the Kenny building and active transport use was $X^2=0.03$ and for CIRS it was $X^2=0.02$. The total chi-square statistic for both buildings and variables at a significance level of $p < .05$ was $X^2=0.1101$ and was *not* significant at a *p*-value of $p=.74$. *(See Appendix: Table 3).*

Discussion

For the purpose of this study, responses from participants who selected either the CIRS or Kenny building was analyzed to answer the main research question. Responses from participants that selected “Other” for the buildings most often utilized was used as supplementary data, such as a comparison of whether or not participants would more likely to use active transportation around campus if they were given the opportunity to access end of trip facilities.

As shown in our results, 52.17% of CIRS participants reported that they use active transportation as their primary mode of transportation compared 46.66% from the Kenny Building. We predicted that the CIRS building would have higher rates of active transportation due to environmental nudges and covered bike racks. If students had access to these end of trip facilities, we would expect to see higher rates of active transportation and a larger difference between the two buildings. To support this we analyzed our participants from Kenny and CIRS (*N= 35*) and found that 60% of participants reported that they would be more likely to use active transportation if they had access to these facilities. However, after running a chi-square analysis between the two buildings we found that the result was *not* significant (*See Appendix: Table 4)*. This result could be due to the small sample size obtained from both buildings, as a small population can conclude in skewed data.

Overall, 70% of people considered that they were environmentally friendly while only 43% used active transportation the discrepancy between the two could be due to socially desirable responding. The study was surrounded by limitations including a ten question limit, self report measures, a limited sample, and a correlational design. The study could be improved by using an experimental method that gives access to end of trip facilities to the sample after and see how that impacts the actual rates of active transportation.

In the future, studies should be conducted after the end of trip facilities are fully installed in the life sciences building to build data regarding the use of these amenities. An experimental study could be conducted comparing those who have access to the facilities as an experimental group and those who do not have access as the control group. This would allow for a causal indication of how access to these amenities play a role in influencing people's use of active transport. Also, this would allow to determine the specific amenities that are highly used and to what extent. This would further educate the necessities required for UBC students and staff to utilize active transportation. Future studies should give access to end of trip facilities for a student sample and analyse any changes in the rates of active transportation before and after giving access to those facilities. Another survey that may be helpful is to ask students what they like or dislike about current facilities to help inform the building of new end of trip facilities with better accuracy to what is desired.

A possible confounding variable presented in the study was related to weather and climate. Perhaps if the participants were surveyed in the Spring or Summer months, they would be more likely to choose active transport as their primary form of transportation. This variable could have affected our data. Additionally, we had a relatively small sample size of 62 participants and a small non-significant effect size.

Recommendations for UBC client

The results of the study showed that a total of 61.82% of 55 student respondents (47% from Kenny, 66.67% from CIRS; one student did not respond to this question) would be more likely to use active transportation if they were permitted to use end-of-trip facilities around campus. This could indicate that more than half of respondents would perform more

environmentally conscious behaviors, if they were allowed to use these amenities. As our sample size was limited, following up with a future study that specifically looks into whether students would be more likely to use active transportation if they were given permission to use the end-of-trip facilities. We recommend allowing students to make use of these facilities if they're shown to utilize pro-environmental transportation methods and compare with a control group that does not have access to these facilities. We also recommend better advertisement of facilities in place for students as we believe better knowledge of these facilities could increase their use.

Appendix

Table 1: SurveyMonkey Survey Questions and Response Options

1. *Which building do you spend the most time in?*
    a. *CIRS building*
    b. *Kenny building*
    c. *Other*
2. *How far away from campus do you live (estimated km)?*
    a. *On or near UBC campus*
    b. *1-5 km*
    c. *5-10 km*
    d. *10-20 km*
    e. *20-30 km*
    f. *30+ km*
3. *What mode of transportation do you primarily use on the average week to get to campus?*
    a. *Walk*
    b. *Bike*
    c. *Public transit*
    d. *Motor vehicle*
    e. *Transit to campus and then bike (and visa versa)*
4. *What mode of transportation do you use the second most?*
    a. *Walk*
    b. *Bike*
    c. *Public transit*
    d. *Motor vehicle*
5. *How many days a week do you use your primary choice of transportation?*
    a. *7 days*
    b. *6 days*
    c. *5 days*
    d. *4 days*
    e. *3 days (or less)*
6. *Approximately, how long does it take you to commute to campus?*
    a. *Less than 5 minutes*
    b. *5-20 minutes*
    c. *20-30 minutes*
    d. *45-60 minutes*
    e. *60+ minutes*
7. *Do you consider yourself an environmentally friendly person?*
    a. *Yes*
    b. *No*
    c. *Prefer not to answer*
8. *How old are you?*
    a. *Under 18*
    b. *18-24*
    c. *25-30*
    d. *30s*
    e. *40s*
    f. *60+*
9. *Are you a student or UBC staff?*
    a. *Student*
    b. *UBC staff*
10. *If you had access to end-of-trip facilities (e.g., showers, secure bike storage, lockers, and/or changing room), would*

you be more likely to utilize active transportation (biking, walking, etc.) on a daily basis to get to campus?

a. *Not very likely*
b. *Likely*
c. *Very likely*
d. *Definitely likely*
e. *Not sure*

Table 2: Calculation Summary

Sum of X = 495
Sum of Y = 82
Mean X = 7.9839
Mean Y = 1.3226
Sum of squares (SS_X) = 5272.9839
Sum of products (SP) = -317.1774

Regression Equation = $\hat{y} = bX + a$

$b = SP/SS_X$ = -317.18/5272.98 = -0.06015

$a = M_Y - bM_X$ = 1.32 - (-0.06*7.98) = 1.80282

$\hat{y}$ = -0.06015X + 1.80282

X=distance from campus
Y=active transport use rated from 0-3

Table 3: Active Transportation vs Non-Active Transportation from the Kenny and CIRS Building

	Kenny	**CIRS**	**Row Totals**
Active	7 (7.50) [0.03]	12 (11.50) [0.02]	19
Non-Active	8 (7.50) [0.03]	11 (11.50) [0.02]	19
Column Totals	15	23	38 (Grand Total)

Table 3: Chi-Square Inferential Statistics Contingency Table shows cells totals, expected cell totals and the chi-squared statistic for each cell. Results show that the chi-square statistic is 0.1101. The *p*-value is .739979. The result is *not significant* at $p < .05$.

Table 4: Likelihood of Utilizing Active Transportation If Given Access to End-Of-Trip Facilities.

	Kenny	**CIRS**	**Row Totals**
Likely to Use Active	9 (9.20) [0.00]	14 (13.80) [0.00]	23
Unlikely to Use Active	5 (4.80) [0.01]	7 (7.20) [0.01]	12
Column Totals	14	21	35 (Grand Total)

Table 3: Chi-Square Inferential Statistics Contingency Table shows cells totals, expected cell totals and the chi-squared statistic for each cell. Results show that the chi-square statistic is 0.0211. The *p*-value is .884411. The result is *not significant* at $p < .05$.

Figure 1: Percentage of Participants Primarily Use Active Transportation

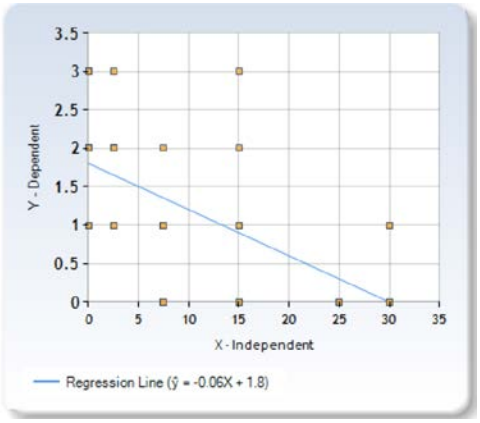


Figure 1: Graph of the distance from campus vs. active transportation use on a scale of 0-3 from least amount of use to most use. Results show that there is a slight correlation, with the r value of -0.06.

Figure 2: Percentage of Participants from CIRS vs. Kenny building that Utilize Active Transport as the Primary Form of Transportation (%)

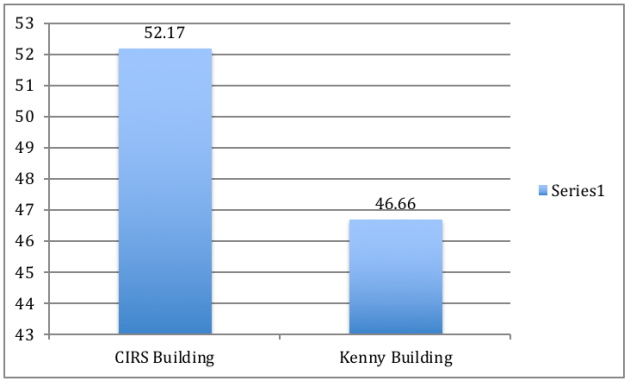


Figure 3: Percentage of Participants Who Rate How Likely They Would be to Utilize Active Transportation if They Had Access to End-of-Trip Facilities (%)

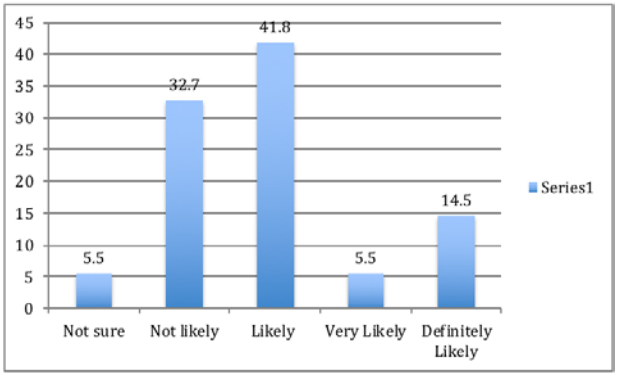
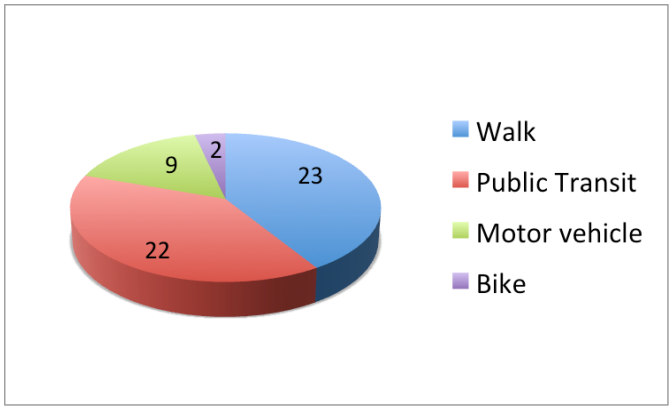


Figure 4: Environmentally Conscious Participants' Primary Mode of Transportation



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