

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

The Reactions to the Blossoming Nature

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Themes: Climate, Biodiversity, Community

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Executive summary

Everything in nature is closely related, including us human beings and other animals, plants, and even inanimate - everything, all of which is given by it, nature. Our experiment attempts to determine the relationship between nature and UBC students' decisions. Specifically, does being physically present in nature influence students' responses when it comes to supporting UBC's environmental projects? The experiment consists of a total of 100 university students from University of British Columbia (UBC) all randomly selected. The students belong to either Group A or Group B. Participants in Group A were asked to complete a survey at Irving Learning Center and Group B were asked to do the same at the Forestry Garden. The responses were measured and calculated. Results suggest that there is a relationship between nature and decision-making. UBC students will have a greater probability to encourage on-campus project when they are in a natural setting. The experiment also has an underlying implication that students are more appreciative of nature when they are interacting with it.

Keywords: Willingness, nature environment, Decisions making, Actions, Students

Introduction

People perceive the natural environment as more beautiful than man-built surroundings (Van den et al., 2003). In addition, White and Gatersleben (2010) suggest that buildings with vegetation are more preferred by the public as it provides people a sense of peace and imposes a positive psychological effect. A few studies demonstrated that people physically being in nature (e.g outdoor walks) will increase the connectedness between nature and human-beings (Nisbet & Zelenski, 2011; Mayer, Frantz, Senecal & Dolliver, 2009). An increased connection with the environment positively impacts people's emotion, attention and cognitive abilities (Mayer et al., 2009). It can even nurture one's perceived mental well-being (Nisbet & Zelenski, 2011). Furthermore, Bogerd, Dijkstra, Seidell & Maas (2018) suggested the greenery in the university environment has an impact on students' connectedness of nature. Bogerd et al. conducted a study for indoor and outdoor conditions. For indoor condition, they provided different levels, which include no poster, color poster, nature poster, and green wall. For outdoor condition, there were also four different levels, which includes standard nature view, standard nature view with seating, stand nature view with artifacts and extensive greenery view with seating. They concluded that university students in outdoor condition, specifically for students who are in extensive greenery view level, undergo far more psychological restoration compared to those in other levels. The strong connection between actual nature view and people can evoke one's awareness of the environment (Mayer et al., 2009).

Our motivation for this study was influenced by the previous studies which demonstrated that the natural environment has a positive impact on people's mental well-being and raise their awareness of nature. We are interested to know whether the natural environment could encourage people to take action in supporting the environment. This study, therefore, accesses the difference between student's decisions in different environments.

Research question and hypothesis

Our primary research question: does being physically present in the natural environment influence UBC students' decisions on supporting on-campus environmental projects? In addition to that, we hypothesized that participants completing the survey in the Forestry Garden are more willing to donate for nature-related projects compared to those in Irving Learning Centre (IKB).

Methods

Participants

100 students from University of British Columbia (58 females, 42 males), the majority aged between 18-34 years old (Appendix figure. 1 and 2). Participants had backgrounds from domestic-within Canada, domestic-within BC, or international (Appendix figure. 3). All students were randomly selected from Irving Learning Center ($n=50$) or Forestry Garden ($n=50$). Participants at Irving Learning Center will be referred to as Group A and Forestry Garden will be Group B. The same online survey was provided for all participants to complete at their locations using an Ipad.

Conditions

There are two conditions involved in our study: indoor or outdoor. The indoor condition (Group A), we made sure there is no view of nature as the survey is completed. Thus, we stopped the first 50 students we saw to participate in the study in IKB learning center (Appendix Photo.1). For the outdoor condition (Group B), the first 50 students seen

were also asked to complete the survey at the Forestry Garden (Appendix Photo.2) which has a full view of nature.

Measures

A survey was created for the purpose of this study using a website called Survey Monkey. The survey includes a series of multiple choice, Yes or No, and Likert-type scales questions (Appendix questionnaire). Questions were created to identify basic information about participants' gender, age, faculty and students' current status at UBC (whether they are international students, domestic students). The Likert-type scales were used to assess participants' willingness to donate for an on-campus environmental project (specifically establishing an outdoor study facility at Forestry Garden). It indicated how willing they would like to donate a build a glass study room on the field outside the forestry building, using a 5-point Likert scale (from 1, *Strongly Disagree*, to 5, *Strongly Agree*). Our dependent variable, in this case, would be the difference in scales of the willingness for donation. For our independent variable: the environmental stimulation which is either Irving Learning Center or the Forestry Garden.

Procedure

We randomly selected participants from two locations at UBC (IKB learning center and Forestry Garden) and asked them to complete an online survey using an Ipad. The indoor condition (IKB), participants had no sight of any natural view while completing the survey. As for the outdoor condition, we made sure that participants were doing the survey with full view of nature. The experimenters at both locations approach the first 50 students seen on site to complete the survey with Ipad. While participants are completing the survey, researchers intentionally backed away to avoid pressuring students. This was done to allow the maximum experience of the environment and reduce the number of third variables taking place.

The survey consisted of questions on the basic background of participants. The Likert-type scales allowed the measurement of participants' willingness to donate for on-campus environmental projects. Specifically, establishing an outdoor study space at the Forestry Garden. To be more detailed, the question asks about whether students are willing to raise tuition support UBC nature projects. At the end of the questionnaire, we specifically asked about whether the participants had completed the survey in the indoor or outdoor environment.

Results

A total of 100 surveys were counted in two different conditions, each condition had 50 surveys (participants in IKB and Forestry Garden), and the data collection period was 2 days from 12 pm to 2 pm. An unpaired-sample t-statistic method has been used to compare participants' willingness to increase their tuition to build a library in nature from IKB group and Forestry Garden group. The results indicated that there was a significant difference between forestry garden group ($M=7.07$, $SD=2.18$) and IKB group ($M=3.50$, $SD=3.04$); $\alpha=0.05$ (appendix table.1). In conclusion, the result showed that the participants are more willing to increase their tuition for school nature projects in the nature condition

We also determined the association between the environment and the willingness of donation by using Pearson's Chi-Square test. We questioned whether physically being in a natural environment (Forestry Garden condition) or not (IKB condition) influence UBC students' answers relating to donation questions. We predicted that participants in Forestry Garden are more willing to donate for this project compare to those in IKB. As indicated in Table 1, Participants who completed the survey in Forestry Garden condition are more likely to choose "yes" for "would you like to increase tuition to build a glass study room" question

than those who in IKB ($X^2=32.667$, and $p=.000$; Appendix table. 2). Therefore, we suggest that there is a relationship between the natural environment and decision-making. UBC students have a greater probability to donate on suitability project when they in a natural environment.

Discussion

The original hypothesis stated that participants completing the survey in the Forestry Garden are more willing to donate for on-campus environmental projects compared to those in Irving Learning Centre. From the data collection and analysis, the participants clearly rated higher willingness to donate in the natural condition. Thus, this experiment confirms our hypothesis to be mostly correct that being physically present in a natural environment can put influence on students' decisions. Students are more likely to donate to environmental projects when being surrounded by nature; however, the result shows more significance of the two conditions, the power of surrounding environment had larger effects than we expected as the t-score equals to 4.81 which is much bigger than the rejection region ($=2.009$). Below are several key interpretations, implications, and suggestions that can be drawn from this research.

The experimental goal of this study was to examine the natural environment influence the UBC students' decision making on environmental projects in order to identify the relationship between nature and people. The result of this study has a very high validity percentage because after the T-test calculation the curve has a 98% confidence interval. The result showed there was a significant difference between two groups of participants. The nature group's rate of wiliness to donate is much higher than the indoor group which would conform to our hypothesis. However, reliability and transferability are lacking due to the participant limitation. Also, there are some limitations which will be introduced in the next paragraph.

There are several reasons why our independent variables had significant effects on willingness to donate to an environmental project other than being in the surrounding itself. One reason this may have occurred is that the participants were not asked about their income status. Most of our participants were university students in their early twenties that are not economically free to distribute money the way they want, and thus would be less willing to donate money. In addition, 52% of our participant demographics has a status as "international student", which means their tuition fee is about five times higher of the domestic students, which may lead to decrease in the willingness to pay. A second reason this might have happened is due to how willingness to donate was measured by the questionnaire, to tackle the problem with different definition of "willingness to donate", we used a Likert scale instead of asking the exact amount they want to donate (e.g. \$5, \$10...), but this may also raise a problem because, for example, person A and B both rated their "willingness to donate" as 80/100, but because of their different financial backgrounds, they have different perceptions of values, so A would only donate \$5 but B would donate up to \$100. Therefore, our project lacks quantitative measure and validity on exactly how much money individuals are willing to donate and need future research to address this problem.

Efforts were made to increase internal validity in this experiment in order to establish a warranted causal conclusion. We designed 3 filler questions in the questionnaire to avoid participants from knowing the purpose of this experiment hence performing demand characteristics. Other than that, we also disregarded 3 participants' data due to incompleteness and ambiguous marking on the survey paper. We consider these as confound variables and might slightly change the willingness to donate.

However, there are limitations in this experiment that should be considered for future research on this topic. Since we took three separate days for completing surveys and

collecting data, we experienced different weathers and temperature. It was cloudy with a bit of rain on one day and sunny on the other two days. According to Vrie's research on effects of weather on pro-social behaviours, we believe that lower temperature and rainy day will affect the participant's emotional threshold and make them less sensitive and caring about others. (Vrie, 2016) With this concept in mind, a few of the participants, we believe, did not attribute their full efforts to genuinely answer the survey at the forestry garden on a rainy day.

Recommendation

Based on the result of our studies, we would suggest our client to set up donation booths regarding environmental project at more naturally experienced locations instead of indoor surroundings (e.g. Student Union Building) From our experiment, people exposed in a natural environment are more connected to nature and more sensitive about their surroundings than people indoor. Perhaps natural and outdoor environment will raise concern for environmental efforts. Information session and donation booth about environmental projects on campus could be placed in areas where students will be fully exposed to natural environment like Rose Garden, Nitobe Garden, pacific spirit park, etc..Since most of the posters and donation booth are indoor, we also suggest our client and UBC to set up bulletin board outdoor at a noticeable place on campus.

References

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Appendix

Tables

Two Sample T-test

| | | Indoor | Outdoor |
|------------------|-----------|------------|------------|
| N (Participants) | | 50 | 50 |
| Mean | | 3.50612245 | 7.06530612 |
| SD | | 3.0354644 | 2.18001601 |
| t | -6.6742 | | |
| df | 98 | | |
| P-value | 1.496e-09 | | |

Table.1 The table of the number of samples, the means, standard deviations of participants' willingness to donate for the on-campus project, and the t statistic results

| | Would you like to donate? | | |
|-----------------|---------------------------|------------------------|-----|
| | YES | NO | |
| IKB | 16 30.00 (6.53) | 34 20.00 (9.80) | 50 |
| Forestry Garden | 44 30.00 (6.53) | 6 20.00 (9.80) | 50 |
| | 60 | 40 | 100 |

$$\chi^2 = 32.667, \quad df = 1, \quad \chi^2/df = 32.67, \quad P(\chi^2 > 32.667) = 0.0000$$

Table 2. The Chi-square test of association between environment and decision-making

Figures

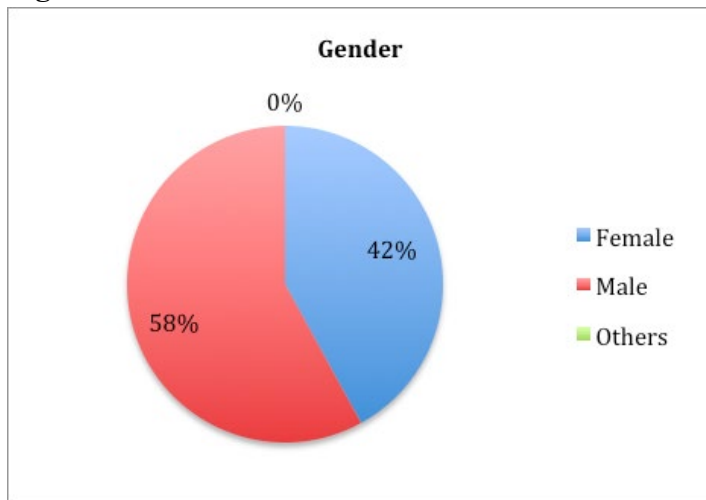


Figure 1. A pie graph of participants' gender

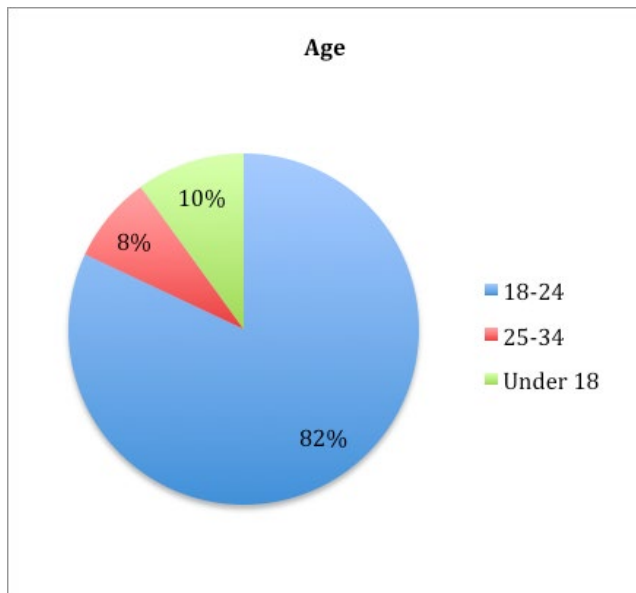


Figure 2. A pie graph of participants' age

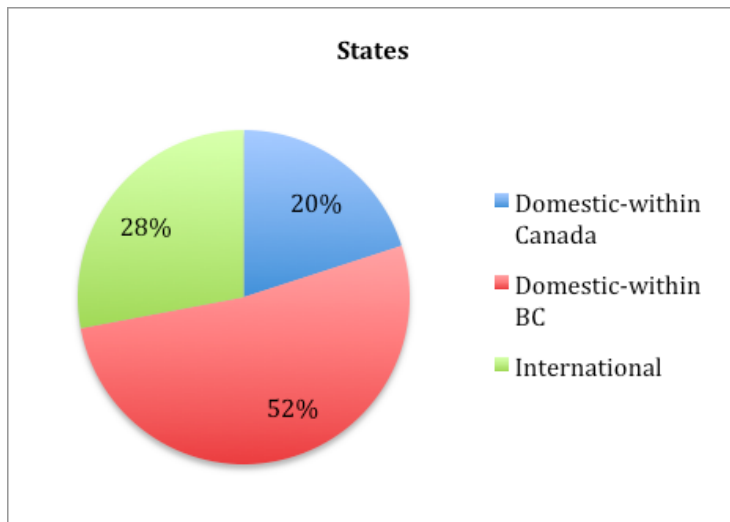


Figure 3. A pie graph of participants' states

Photos



Photo.1 A photo of indoor condition



Photo.2 A photo of outdoor condition

Questionnaire

Questionnaire: Examining the Relationship Between Natural Environment and Decision Making

Section 1- Please answer the following questions

1. What's your gender? _____
2. What is your age? _____
3. What's your current major? _____
4. What year are you in UBC? _____
5. What is your current student status
 - A. International
 - B. Domestic within BC
 - C. Domestic within Canada

Section 2- Please choose the best answer on the scale for the following questions:

5. I enjoy outdoor sport activities. (e.g. football, hiking, snowboarding, etc.)

○-----○-----○-----○-----○

Strongly Disagree Disagree Neutral Agree Strongly Agree
6. When I study, I need a quiet environment to focus.

○-----○-----○-----○-----○

Strongly Disagree Disagree Neutral Agree Strongly Agree
7. I love being surrounded by nature.

○-----○-----○-----○-----○

Strongly Disagree Disagree Neutral Agree Strongly Agree
8. I'd rather stay indoor than going outside on a sunny day.

○-----○-----○-----○-----○

Strongly Disagree Disagree Neutral Agree Strongly Agree
9. I use UBC facilities to study (study rooms, classrooms. etc)

○-----○-----○-----○-----○

Strongly Agree

Strongly Disagree Disagree Neutral Agree

10. I think UBC should build more facilities

Strongly Disagree Disagree Neutral Agree Strongly Agree

11. UBC should increase the amount of restaurants

Strongly Disagree Disagree Neutral Agree Strongly Agree

12. It is hard to find an available room fore studying at UBC

Strongly Disagree Disagree Neutral Agree Strongly Agree

12. I would like to donate to build a glass study room on the field outside the Forestry building

A. Yes
B.No

13. I am willing to donate to build a glass study room on the field outside the Forestry building

Strongly Disagree Disagree Neutral Agree Strongly Agree

14. Where are you taking this survey?

A. Indoor
B. Ourdoor

Thank you for your participation!