University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Green Coverage and Willingness to Access Mental Health Services

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Prepared for: Student Health and Wellbeing

Course Code: PSYC 421

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Green Coverage and Willingness to Access Mental Health Services

Group 16 (Diet Coke)

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Course: PSYC 421

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Executive Summary

Our research focuses on the area of greenery on or around the buildings and the participants' evaluations of these buildings, especially looking into how the green space around a mental health service built on campus influences stressed students' willingness to walk in. The study conducted an online survey using a between-subjects design with 227 university students of all genders and ages as the target population. The survey presented participants with four different conditions: building designs with more than 5 trees, building designs with less than 5 trees, building designs with ivy, and building designs with no trees and no ivy. Participants were randomly assigned to one of the four conditions. The four conditions were chosen based on variations in the four different types of building designs and sizes. Participants were randomly assigned to one of the four conditions and asked to rate their likelihood of entering each of the four buildings. The obtained statistics found no significant effect of greenery coverage on students' willingness to access mental health services. Besides, the designs of the exterior facade of the mental health services are crucial to the effectiveness of the student's willingness to access.

Introduction

Recently, people have been increasing awareness of the importance of green coverage due to many studies proving that it can benefit the environment and society. Zhu and colleagues claimed that more vegetation greenness is related to more positive emotions and a reduction of negative ones (Zhu et al., 2021). Furthermore, this phenomenon is particularly obvious among females. Some researchers also find that higher exposure to greenness positively correlates with better academic performance among elementary school students, which is especially significant for English and Math (Wu et al., 2014). According to Luo et al.'s study, more greenness around schools can lead to lower rates of hypertension and blood pressure issues. This result is consistent and universal and can be detected at a very young age range. The study also explains why this result is more prevalent in the urban area. The city environment is associated with a worse stress-coping ability, while the presence of green space can improve this problem greatly. At the same time, the more stressed people are, the more benefits they will get from greenery.

Following the above context, one of the conclusions that can be drawn is that greenery will provide a degree of stress relief. While as stated by Alsaleem et al.'s research, a high-stress level can negatively affect the GPA and bring disadvantages to students' physical and psychological well-being, therefore leading to even worse performance. Hence, universities have investigated how to increase students' access to mental health resources. For example, a study among universities across New York discussed how students and staff could get what they want from mental health resources and increase their usage. It lists several measures that might be useful, such as covering a wider range of information availability, more accurate demand assessment, and even cooperation with off-campus related organizations (Harris et al., 2022). At the same time, a study from the University of Amsterdam also points out that compared to the standard design, students prefer places with greenery more, whether outdoors or indoors. And this preference and the idea that greenery brings restoration are quite pervasive (van den Bogerd et al., 2018).

As a result, previous research has shown us the usefulness of more green coverage. For instance, it is learned that excessive stress can lead to negative conditions and that greenery can somewhat relieve stress. Nowadays, students' issues while dealing with stress are a common status quo, especially in university life. Moreover, a previous study has confirmed that houses with ivy and some other types of vegetation coverage are preferred,

since people considered them more beautiful, restorative, and pleasing (White & Gatersleben, 2011). As none of the studies connect the effect of greenery and students' evaluation of a mental health resource, it creates a gap and raises consideration: can green coverage become a factor influencing resource usage? Thus, we recognize the necessity of implementing this study. For this reason, the research question of the present study is "How does the green space around a stress support center built on campus influence students' willingness to visit?" To enable a complete consideration of the factors associated with greenery, two hypotheses are being tested in this study. The first is that greater tree coverage surrounding the building will increase stressful students' likelihood of visiting the stress support center, and the second one is that the existence of Boston Ivy will increase stressful students' likelihood of visiting the stress support center.

Methods

Participants

Participants of all genders were invited to participate, and the inclusion criteria were that they were current university students. Based on our power analysis we required a total of 280 participants for a significant effect(effect size = 0.2, alpha = 0.05, power = 0.8, number of groups = 4). However, a total of 227 participants completed the survey, which was split into 4 separate conditions. The sample comprised mostly female participants with 72.4% of participants identified as female, 20.8% identified as male, 5% opting out, and less than 1% identified as non-binary/third gender. The age of the participants was not collected. While we did collect information on their status at UBC, only 3 participants identified as not a student from UBC.

Conditions

The independent variable in the study was the outdoor green space coverage, which was operationalized by presenting participants with four different conditions: building designs with more than 5 trees, building designs with less than 5 trees, building designs with ivy, and building designs with no trees and no ivy (see Appendix A2). Four different building designs were selected and edited using Photoshop to meet the requirements of the four conditions. Participants were randomly assigned to one of the four conditions using Qualtrics' randomization feature and were designed to ensure equal distribution of participants across the conditions.

Measures

The dependent variable was the likelihood of participants entering a stress center building, which was measured using a 7-point Likert scale, (1 = very unlikely, 4 = neutral, and 7 = very likely). Participants were asked to rate four different building designs with the same green coverage density based on their assigned condition on how likely they would be to walk into one of these buildings and ask for help to manage their stress(see Appendix A1). The survey questions were developed specifically for this study. The survey questions were designed to specifically measure the likelihood of participants entering the building based on the condition design and were made to ensure clarity, making them appropriate for our study.

Procedure

Participants have been recruited from the University of British Columbia (UBC) student population through various means including social media, word of mouth between friends, and announcements from psychology professors to their classes. The study was conducted using Qualtrics, an online survey platform. Participants were first given

information on our research projects through a consent form. Once they have given consent to participate, they were then presented with a proposition statement that asked them to suppose that the UBC building department wants suggestions for a new "stress center."(see Appendix A3) After reading the statement, participants were randomly assigned to one of the four conditions(see Appendix A4). They were then presented with the four building pictures and asked to rate their likelihood of entering each of the four buildings to manage their stress. Finally, participants completed two demographic questions about their status at UBC and their gender. The survey took approximately 3-5 minutes to complete, and no incentives were offered to participants for completing the survey. Data were collected from March-April 2023. One particular challenge that we faced was a problematic survey mechanic. During the first part of data collection, our survey had a debriefing question that asked students whether or not they consented to have their data collected. This was redundant as they had already given consent at the beginning of the survey. Due to this mishap, we lost around 30 participants' data as they chose not to have their data included in our study. Later on, we realized this redundancy and removed this option. Participants who did not want to include their data would be able to directly choose the "No, I do not give consent to participate in this study" option at the beginning of the study.

Result

In this study, we recruited 227 participants in total, which is slightly lower than the sample size suggested based on the power analysis($N = 280$). As pre-planned, an one-way analysis of variance(ANOVA) has been implemented to investigate the difference in the mean willingness to access across the conditions. The descriptive statistics for each condition have been attached to the appendix(see Appendix B1) along with the visualization(see Appendix B2). Based on the alpha level($\alpha = 0.05$), the analysis did not reveal a significant difference in the mean willingness to access among the four conditions($F(3, 904) = 0.80$, $p = 0.496$)(see Appendix B3). Suggesting that the obtained differences in the mean willingness to access among the four conditions are likely due to random chance alone, thus, the obtained statistics are not in favor of the two hypotheses of this study.

Beyond the scope of the two hypotheses, an investigation of the differences in the mean willingness to access between the four conditions and buildings using a two-way analysis of variance(ANOVA) has also been implemented. The descriptive statistics for each building have also been attached to the appendix(see Appendix B4). Based on the result of the analysis, no significant difference was presented across the four conditions($F(3, 901) = 0.86$, $p = 0.46$)(see Appendix B5). However, a significant difference has been found across the buildings($F(3, 901) = 26.36$, $p < 0.001$)(see Appendix B5), suggesting that in at least one of the buildings, the mean willingness to access is significantly different than the others. The building has been coded to help with interpretation(see Appendix B6). Follow-up post hoc Tukey's test result revealed several significant differences(see Appendix B7). Based on the result from Tukey's test, the third building tends to have a significantly lower mean willingness to access than the first(Mean difference = -0.48, $p = 0.02$), second(Mean difference = -1.24, $p < 0.001$), and fourth(Mean difference = -1.26, $p < 0.001$) building. Additionally, the first building tends to have a significantly lower mean willingness to access than the fourth(Mean difference = -0.78, $p < 0.001$) and second building(Mean difference = -0.76, $p < 0.001$). No significant difference has been revealed between the fourth and second buildings. Additional visualization has been provided to interpret this result. (see Appendix B8)

Discussion

As students' mental health has been an increasing concern, universities have put great efforts into developing and improving on-campus mental health services. Much work has been done on making information about mental health services more widespread and enhancing services' efficiency by improving demand assessment (Harris et al., 2022). However, few of them directly target the mental health service buildings themselves on the students' willingness to access them. Our experiment continues the exploration of the student's mental health services on campus but focuses on the effect of the green coverage around the mental health services buildings. Unfortunately, no significant effects were found regarding the effect of green coverage on students' willingness to access mental health services.

Accompanying the previous studies' findings the exposure to green areas can relieve students' stress levels and improve study outcomes (Luo et al., 2022), our study shows that although green areas benefit students, increasing green coverage around a mental health services building does not necessarily make students more willing to enter.

Furthermore, our study examined the potentially different effects of different kinds of plants. Specifically, we tested ivy and trees condition separately. However, none of them significantly improved participants' willingness to access compared to no plants conditions, and no significant differences were found between trees and ivy conditions. This finding aligns with the precious study by White and Gatersleben, which study the effect of different plants on the preference and perceptual beauty of buildings (White & Gatersleben, 2011). Their study found that participants rated buildings covered by ivy with the highest preference and perceptual beauty compared to other conditions, such as turf and no plants. There are two potential possibilities for this contradiction. The first one would be that our experiment was not a strict replicate study, so the differences in population may be a potential reason for the different results. The second potential reason is that people's perceived beauty may not necessarily increase their willingness to access it.

Except for the effect of green coverage, we find significant differences between different buildings on students' willingness to access. Specifically, participants showed a clear preference for some buildings compared to others, regardless of the density of green coverage surrounding them. These findings show that the designs of the exterior façade of the mental health services are essential in its effectiveness in increasing students' willingness to access. However, we did not manipulate the element in the facade designs of the buildings we selected for our study. We could not tell which specific factor in the design led to this preference. Although few studies have examined this issue in mental health services buildings, one study of stores' exterior façade and customer attraction showed similar results. They proved that changing the elements of the exterior facade of a retail store can significantly influence customers' attraction and the store's business value (Majid, 2022). Future studies should base on these findings to examine which specific element in the exterior façade design can influence students' willingness to access mental health services when in need.

Limitations

Some limitations may influence the result of our study. First, the power analysis suggested 280 participants, but we only recruited 227. Secondly, the services of a mental health support center mainly target students with mental health issues. In this experiment, we asked participants to imagine they are in an exam period and experiencing stress. However, this method does not necessarily represent the actual need of the population experiencing stress symptoms. A better design for a future replicative study should also test participants'

stress levels in advance and see the actual effect on participants with higher stress levels. Other than that, our studies' participants were not balanced in gender. Over 70% of participants were female. This imbalanced gender of our participants may challenge the representativeness of our sample in the student population. These problems were mainly because female members from our groups send the survey on their own social media, while male members send the survey to large social media groups and to other professors to post the link in their classes. A future replicated study should be aware of these issues and equally share the participant's generation from different sources with both female and male group members.

Recommendations

The University of British Columbia has put great efforts into protecting students' mental health. There are many in-person mental health services available on campus. Our study aims to provide recommendations on improving students' willingness to access mental health services by changing the green coverage density around the building. The results show no significant results. Therefore, for existing or future new buildings, programs aiming to improve mental health services building attraction should not waste resources on planting or cutting trees and ivy. Furthermore, our findings on the significant effect of different building designs on students' willingness to access suggest that schools should put more emphasis and resources on the exterior façade designs. The school should also support a potential future study to examine which specific element of exterior façade can most effectively influence the willingness to access mental health services buildings for students in need.

Reference

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Majid, Z. K. (2022). Exterior façade design and its impact on boosting business and attracting customers in retail sectors. *Journal of Design, Business & Society*, *8*(1), 69–86. https://doi.org/10.1386/dbs_00033_1

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Appendix A

Survey

A1. Survey Questions (each participant will receive one condition)

UNIVERSITY OF BRITISH COLUMBIA

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Fax: 604.822.6923

Consent Form

Class Research Projects in PSYC 421 - Environmental Psychology

Principal Investigator: Dr. Jiaying Zhao
Course Instructor
Department of Psychology
Institute for Resources, Environment and Sustainability
Email: jiayingz@psych.ubc.ca

Introduction and Purpose

Students in the PSYC 421 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, collect and analyze data, present their findings in class, and submit a final report. Their final reports will be published on the SEEDS online library (https://sustain.ubc.ca/teaching-applied-learning/seeds-sustainability-program). Their projects include online surveys and experiments on a variety of sustainability topics, such as waste sorting on campus, student health and wellbeing, food consumption and diet, transportation, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.

Study Procedures

If you agree to participate, the study will take about 10 minutes of your time. You will answer a few questions in the study. The data will be strictly anonymous. Your participation is entirely voluntary, and you can withdraw at any point without any penalty. Your data in the study will be recorded (e.g., any answer you give) for data analysis purposes. If you are not sure about any instructions, please do not hesitate to ask. Your data will only be used for student projects in the class. There are no risks associated with participating in this experiment.

Confidentiality

Your identity will be kept strictly confidential. All documents will be identified only by code number and kept in a locked filing cabinet. You will not be identified by name in any reports of the completed study. Data that will be kept on a computer hard disk will also be identified only by code number and will be encrypted and password protected so that only the principal investigator and course instructor, Dr. Jiaying Zhao and the teaching assistants will have access to it. Following the completion of the study, the data will be transferred to an encrypted and password protected hard drive and stored in a locked filing cabinet. Please note that the results of this study will be used to write a report which is published on the SEEDS library.

Remuneration

There is no remuneration for your participation.

UNIVERSITY OF BRITISH COLUMBIA

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Vancouver, BC, V6T 1Z4
Phone: 604.822.2755
Fax: 604.822.6923

Contact for information about the study

This study is being conducted by Dr. Jiaying Zhao, the principal investigator. Please contact her if you have any questions about this study. Dr. Zhao may be reached at (604) 827-2203 or jiayingz@psych.ubc.ca.

Contact for concerns about the rights of research subjects

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 if long distance 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. You also may postpone your decision to participate for 24 hours. You have the right to choose to not answer some or any of the questions. By clicking the "continue" button, you are indicating your consent to participate; hence, your signature is not required. The researchers encourage you to keep this information sheet for your records. Please feel free to ask the investigators any additional questions that you have about the study.

Ethics ID: H17-02929

○ Yes, I give consent to participate in this study

○ No, I do not give consent

Info

For the next part of our study UBC proposes building a brand new Stress Center next year.
The following survey aims to collect suggestions for the proposed designs.

Imagine you are in an exam period and you've experienced stress-related symptoms. Now you see a new building, as shown in the questions, on campus with the sign 'stress center', rate the likelihood, from 1 to 7, that you will walk in and ask for help?"

Less than 5 (A)

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Over 5 trees (B)

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

No vines (C)

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Only Vine (D)

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Please answer on the following scale how likely you would walk into this building and ask for help to manage your stress. (7 being very likely, and 1 being very unlikely)

1- Very Unlikely	2	3	4- Neutral	5	6	7- Very Likely
○	○	○	○	○	○	○

Demographic

What is your status at UBC? (i.e student etc.)

What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

Debrief

Debrief

DEBRIEFING INFORMATION

Thank you for participating in our study. The purpose of the study is to focus on the problems associate student's accessibilities to clinic facilities. Specifically, we are focusing on the association between the amounts of coverage of green space around a certain building and student's likelihood to accessing it. We hypothesis that, a greater amount of green space around a building is associated with a greater likelihood of entering. Lastly, it is important for you to know that UBC will not be implementing the stress relief center as mentioned in the survey. The purpose of telling you this piece of misinformation is to make sure that the main purpose of the study is kept away from you and that it will not work as a clue for your responses.

In this study, one of the four potential conditions—"greater than five trees," "less than five trees," "without trees and ivy," and "without trees but with ivy"—has been randomly assigned to you. These photos retain their identity under each condition, while having entirely distinct buildings in each. For instance, there are more than five trees in each of the buildings in the photographs for the "more than five trees" condition, but other than this, there are no other commonalities between the structures. On a scale of 1 to 5, you were asked to assess how likely you were to enter each building. The data were collected as the dependent variable for our study.

Based on our hypothesis, we expect the likelihood of entering buildings in conditions "more than five trees" and "without trees but with ivy" on average, should be higher than the conditions "less than five trees" and " without trees and ivy ", since the first two conditions have a relatively greater amount of green space.

We respect your privacy as a participant in our study and appreciate your cooperation. The information you provide will be kept strictly confidential. It's also important to note that your participation in this study is entirely optional. If you withdraw from the study now, your data will not be gathered for the further stages of our research. If you wish to continue, please click "yes" on the next page; otherwise, click "no."

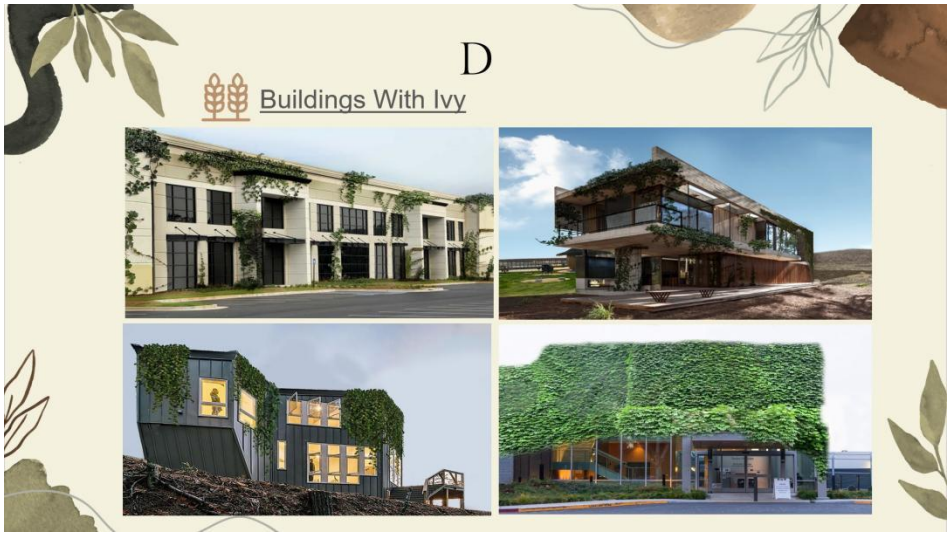
Once again, thank you for your participation!

A2. Qualtrics Survey Pictures Provided in Each Condition.

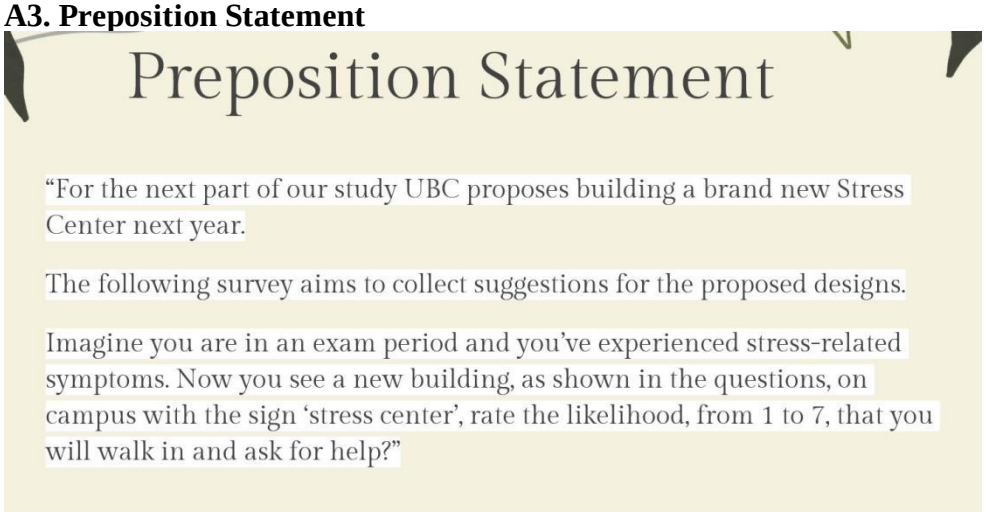

A
Buildings with LESS than 5 trees


B
Buildings with MORE than 5 trees

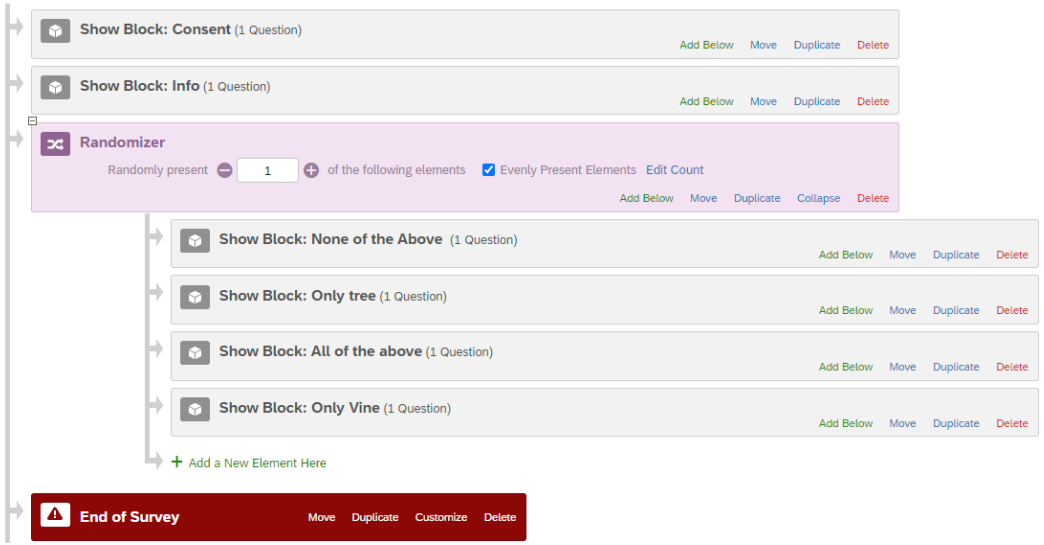

C
Buildings WITHOUT Trees or ivys



A3. Preposition Statement



A4. Survey Flow



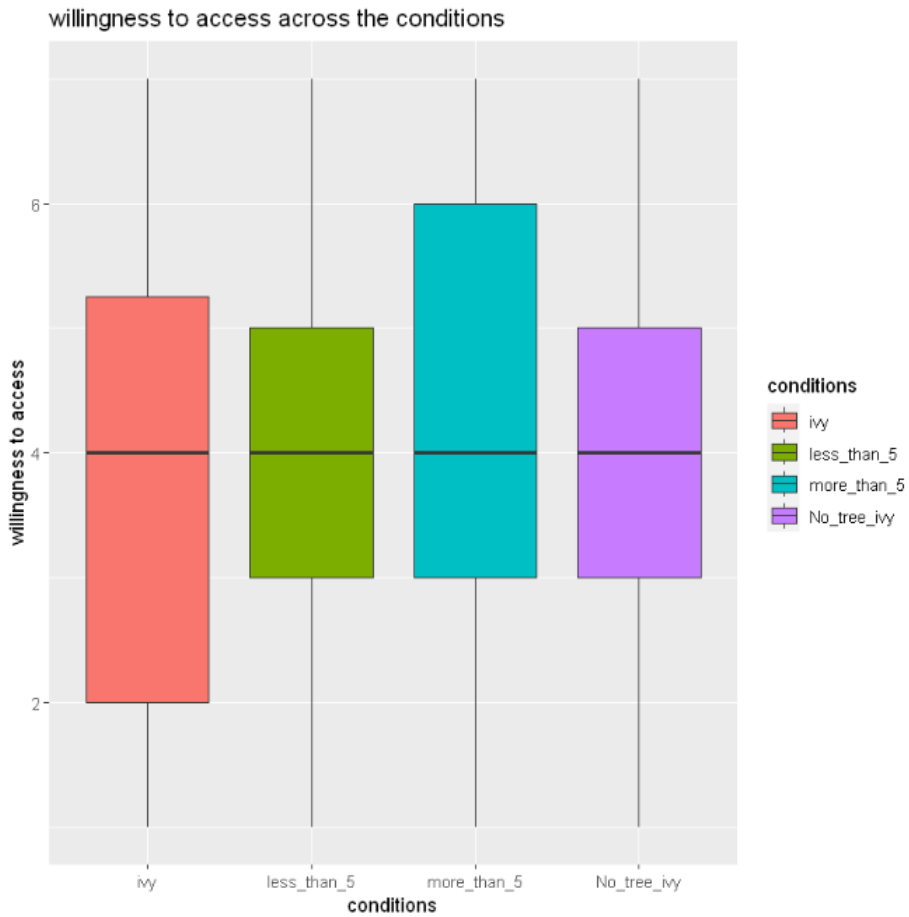
Appendix B

Results

B1. Descriptives Statistics - Conditions

condition	mean	sd	n
<chr>	<chr>	<chr>	<chr>
less_than_5	4.05	1.85	53
more_than_5	4.25	1.85	58
no_tree_ivy	4.06	1.83	59
Ivy	4	1.99	57

B2. Visualization - Willingness to Access Across the Conditions



B3. Hypothesis - Between Conditions One-way ANOVA

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
conditions	3	8	2.818	0.796	0.496
Residuals	904	3201	3.540		

B4. Descriptives statistics - Buildings

building	mean	sd	n
<chr>	<chr>	<chr>	<chr>
first_building	3.83	1.65	227
second_building	4.59	1.84	227
third_building	3.35	1.85	227
fourth_building	4.61	1.87	227

B3. Beyond Hypothesis - Between Conditions and Buildings Two-way ANOVA

```
             Df Sum Sq Mean Sq F value  Pr(>F)
conditions    3    8.5    2.82   0.863    0.46
buildings     3  258.2   86.08  26.358 2.4e-16 ***
Residuals   901 2942.4    3.27
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

B6. Building Codes

First building

Second building

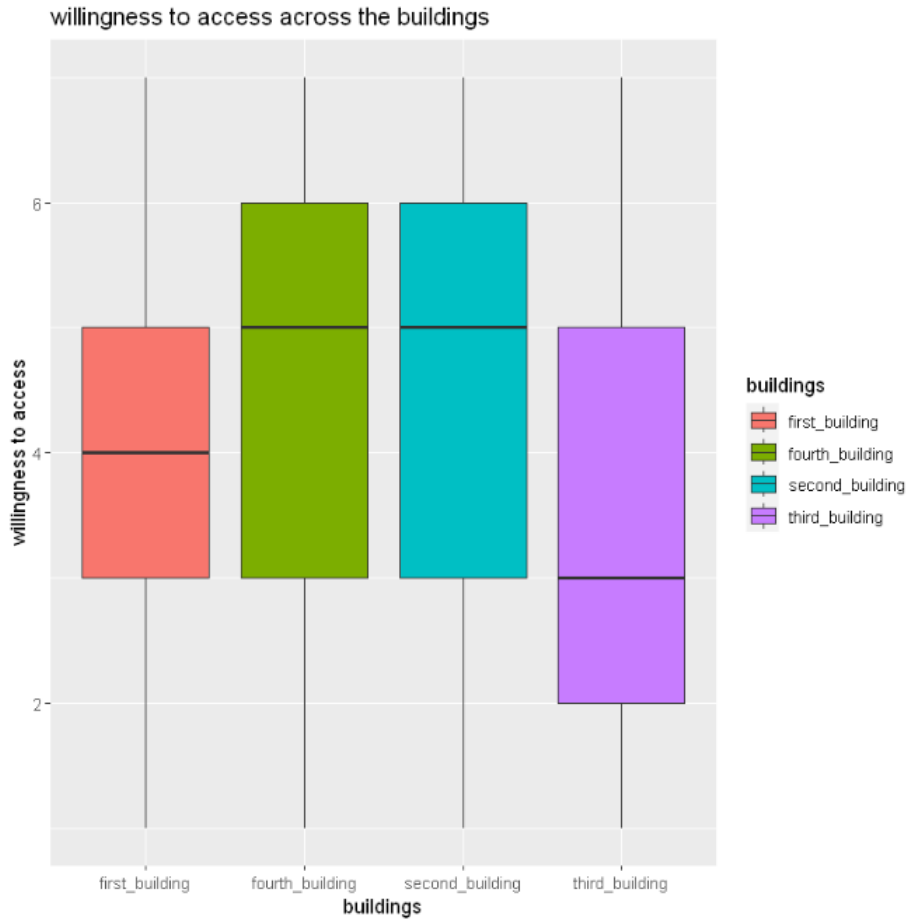
Third building

Fourth building

B7. Tukey - Differences Between Buildings

```
$buildings
                                        diff        lwr         upr     p adj
fourth_building-first_building    0.77973568  0.3431519  1.21631947 0.0000290
second_building-first_building    0.76211454  0.3255308  1.19869832 0.0000469
third_building-first_building    -0.48017621 -0.9167600 -0.04359242 0.0244748
second_building-fourth_building -0.01762115 -0.4542049  0.41896264 0.9995986
third_building-fourth_building  -1.25991189 -1.6964957 -0.82332811 0.0000000
third_building-second_building  -1.24229075 -1.6788745 -0.80570696 0.0000000
```

B8. Visualization - Willingness to Access Across the Buildings



Appendix C

Contributions of Group Member

Proposal	All group members participated in generating research questions. Yuechi Jin conducted the literature review. Alisa Lei, Hank Zhao, & Yuanhui Wei wrote the methods and anticipated outcomes. Zelong Liu created the survey. Yiwen Zhang did the final review and typography design.
Data collection	All group members participated in collecting data by posting the survey link on different social media platforms.

Data analysis	Hank Zhao analyzed the data.
Presentation	Yuechi Jin & Yiwen Zhang were responsible for designing and making the PPT slides. Alisa Lei (Introduction), Zelong Liu (Survey&Conditions), Yuanhui Wei (Results, Discussion, & Suggestions), and Hank Zhao (Power analysis&Results) presented in the class.
Final report	Yuechi Jin wrote the executive summary. Alisa Lei wrote the introduction section. Zelong Liu wrote the method section. Hank Zhao wrote the results. Yuanhui Wei wrote the discussion, limitations, & recommendations. Yiwen Zhang complied with the appendices & typography design. All group members revised the final report together.