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Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Student Well-Being and Physical Activity in Campus Green Spaces

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Student Well-Being and Physical Activity in Campus Green Spaces

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Executive Summary

This research study aims to analyze how physical activity – defined through movement – on campus green spaces (CGS) is associated with students' subjective well-being. We hypothesized that students engaging in more physical activity in CGS will show higher positive affect and lower negative affect and stress scores. 217 participants completed our online survey, self-reporting their positive and negative affect, perceived stress, and time spent on CGS. This data allowed for the exploration of different levels of interaction by each student in CGS and how it relates to affectivity and stress. Using Pearson's R correlation analysis, there was a positive correlation between positive affect and engagement in physical activity in CGS. There was a negative correlation between negative affect score, stress score, and time spent engaging in physical activity in CGS. However, the negative correlation was found as only marginally significant, indicating that a decreased amount of time spent in CGS may not directly contribute negatively to an individual's well-being. Through understanding the relationship between an individual's positive affect and time spent engaging in physical activity in CGS, we recommend that action is taken to have a greater diversity of engagement opportunities and increased awareness and accessibility to CGS.

Introduction

Literature Review

Campus green spaces (CGS) are instrumental in shaping a university's image and can have a diverse impact on students' experiences (Speake et al., 2013). In a previous study conducted by Speake et al. (2013), the researchers explored the relationship between students' perceptions of CGS and their subsequent use of CGS at Liverpool Hope University. They identify a need for a variety of CGS forms to meet a diverse array of student demands. Meanwhile, Houlden et al., (2018) associate several benefits with using greenspace, such as connecting with nature, engaging in social activities, and exercising. This research suggests the important function of urban green spaces to provide a healthy lifestyle for individuals and positively influence mental health and well-being. In conducting a meta-analysis of 12 articles, Barton & Rogerson (2018) highlight the importance of using green spaces for well-being. Moreover, they provide evidence that greenspace may have an instrumental effect on population-level mental health and recommend a more detailed understanding of its benefits.

While associations have been explored between cognition, reducing stress, and increasing happiness, it is not known how these processes may occur when exploring how physical activity in outdoor green spaces may modify students' positive affect, negative affect, and stress scores. Our study explores the knowledge gap between subjective well-being and the effects of engaging in physical activity (PA) on CGS.

Our research is novel as it uniquely applies to the University of British Columbia with a demographic directly targeting university students and is specific to campus green spaces. It also explores variables, such as stress, or other barriers listed by students, alongside student subjective well-being. Through understanding this relationship, we can identify potential steps universities should take in promoting the mental and physical wellness of their students through the green spaces that a campus setting features.

Driving and Restraining forces

Our primary driving force for this study was to examine a clear relationship between physical activity through movement amongst CGS and subjective well-being and stress scores of students. Through this association, we hope to provide suggestions and amendments to the promotion and prioritization of CGS by the university and among student groups. The restraining forces we found included how weather conditions, conflicts or limitations in one's schedule, geographical barriers, and perceived student stress may limit students' engagement in CGS. Our study aims to identify the relationship between the different forms of physical activity used by students and how increased access to these campus green spaces may have positive effects on students' subjective well-being.

Research Question and Hypothesis

Considering the knowledge gap identified we aim to explore how physical activity in campus green spaces is associated with students' subjective well-being. For the purposes of this study, we define physical activity through movement self-reported by participants. We hypothesize that students who engage in more physical activity in campus green spaces will show more positive affect, less negative affect, and less stress.

Methods

Participants

This study was intended to target students attending the University of British Columbia (UBC) living on the university campus or in surrounding Vancouver areas. In power analysis, assuming a minimum effect size of 0.25, an alpha of 0.05, power of 0.95, our study required a minimum of 202 participants. After collection, we obtained results from 217 participants. Amongst these participants, 92.27% of them were UBC students, 73.42% of them identified as female, the average age of participants was 21.42 years old, and 67.12% of the participants stated that they did not live on campus during the completion of the survey.

Conditions

Within our correlational study, we were focusing on continuous conditions, collecting data on the quantitative differences in the time spent in CGS by students and their scores of positive affect, negative affect, and stress from their respective scales. Our informal independent variable of time spent in CGS was operationalized by participants self-reporting their time spent engaging in physical activity on CGS.

Measures

For the purposes of our study, we analyzed the positive affect and negative affect using the Positive and Negative Affect Schedule (PANAS) short version (Thompson, 2007). This scale was validated by Thompson (2007) using both an exploratory quantitative study (N = 407) as well as a qualitative study (N = 18) with a diverse demographic, identifying the PANAS items suitable to remove. In our study, participants rated their positive and negative affect using a 5-point Likert scale for different affects one would feel in their daily lives (1 = never, 5 = always).In a similar method, using a 4-point Likert scale (0 = did not apply to me, 3 = applied to me very much), perceived stress of students was measured using the stress subscale from the Depression, Anxiety and Stress Scale (DASS) (Lovibond & Lovibond, 1995). In both scales, a sixth point “prefer not to say” was provided to participants, however, such responses were not included in our analysis. Henry and Crawford (2005) validated the DASS in a cross-sectional correlational and confirmatory factor analysis (N = 1794), identifying the scale's ability to be used to validly measure depression, anxiety, and stress independently. However, its utility can be increased with larger sample size. The survey then included questions regarding time spent (in minutes) in outdoor CGS per week and per day for the purpose of establishing our independent variable. Lastly, we collected responses concerning barriers students may face regarding their ability to engage in physical activity in CGS as well as demographic questions in order to better understand our demographic and any additional factors that may influence participants’ affectivity (see Appendix for the survey).

Procedure

The finalized Qualtrics survey was distributed through our social media platforms (i.e., Facebook, Instagram, Discord) from March 10 to March 24, 2022. The survey began with a UBC student validation question followed by the PANAS short version questionnaire to collect data on the participants’ positive and negative affect scores. Following was the stress subscale for DASS where participants were asked to indicate how closely each statement applied to them in the past week at the time of completion. Participants self-reported their minutes spent engaging in physical activity in CGS and were to complete unique composed questions requested by our client. One major challenge we encountered close to the end of our data collection was that a portion of our responses failed to record on our survey software. Close to 50 responses taken over the span of

three days malfunctioned and failed to record responses past the first question of the survey. More detail is to be provided in the discussion portion of this paper.

Results

Variable		Positive Affect Score	Negative Affect Score	Stress Affect Score
How many minutes in a week do you currently spend on physical activities in outdoor campus green spaces?	Pearson's R	.155	- .121	- .118
	p-value	.023	.076	.084

Table 1: Inferential statistics and correlations of variables (N = 217)

A Pearson's R correlation analysis and inferential statistics (see Table 1) was conducted to verify whether an individual's time spent engaging in physical activity in outdoor campus green spaces is correlated with their positive affect score, negative affect score and stress score. Table 1 shows the results of Pearson's R correlation analysis and inferential statistics of variables.

There was a positive correlation found between time spent engaging in physical activity in campus green spaces and positive affect score (r = .155, p = .023). The correlation is a weak positive correlation that would indicate that while both variables tend to go up in response to one another, the relationship is not very strong. Table 1 also indicates that there is a weak negative correlation between minutes spent engaging in physical activities in outdoor campus green spaces and negative affect score (r = -.121, p = .076) and stress score (r = -.118, p = .084). This can be articulated in that individuals who reported spending more time engaging in physical activities at outdoor campus green spaces showed a high positive affectivity score, indicating positive feelings that lead to being proactive and enthusiastic. Additionally, it also displayed lower negative affect and stress scores, highlighting lower negative emotions that lead to states of distress or disengagement.

The p-value describes how likely we are to have found a particular set of observations if the null hypothesis, time spent engaging in physical activity at campus green spaces has no effect on positive affect, negative affect, or stress scores, were true. The relationship between our independent variable, time spent engaging in physical activity at CGS, and the dependent variable, a positive score is statistically significant at 5% significance level since the p-value (.023) is below 0.05. On the other hand, the negative affect score and stress score are marginally significant at 10% significance level, since their p-values (.076, .084) are above $p > 0.05$ and below $p < 0.1$. This could exemplify that spending time in these outdoor spaces does in fact augment positive affect scores. However, if low, may not have a significant impact on worsening an individual's wellbeing. It can also give insight that negative affect might not be a significant barrier in students' appraisal of physical activity in campus green spaces.

In conclusion, our hypothesis that students who engage in more physical activity in these campus green spaces will show more positive affect, less negative affect, and less stress, is partially supported by our results. There is a significant link between the time spent in outdoor campus green spaces and positive affect score however the associations between negative affect and stress score are less supported by evidence.

Discussion

The results of our study show that there is a significant link between the time spent in outdoor spaces and positive affect scores but only a marginally significant association between negative affect and stress scores in relation to time spent in these outdoor spaces. These results suggest that UBC should continue to provide resources in CGS to increase students' time engaging in these spaces and resulting in increased subjective well-being. During our study we did encounter some limitations that could extend into further research, specifically, we are unable to draw causal conclusions due to the fact there exists innumerable confounding variables. For example, differences in the definition of physical activity and green spaces, since this study is conducted online, we are unable to provide any clarification or answer questions immediately which could have created some possible confusion on what is regarded as physical activity or what parts of campus are labeled as CGS. In addition, we are unable to control for the factor of variability in well-being day to day, student's moods and perceptions of their well-being can be extremely sensitive given the stressful circumstances of UBC being a competitive academic space.

Furthermore, as this research project was conducted as a form of evaluation for the PSYC 421 course we were limited to the duration of the 4-month term to create, conduct and analyze our study and therefore limited on how much data we could obtain. Due to this time limitation, we are unable to measure the long-term implications of engaging in physical activity on CGS and we were only able to obtain information regarding students' well-being at the moment they were completing the study. However, we are unaware of how CGS (specifically at UBC) and well-being coincide long-term (ie., a term, school year or even the entire duration of a degree), which can be considered for future research.

Recommendations

Based on our research, we found that the top three physical activities students engaged in were walking, visiting a park or beach, and exercising. Therefore, we recommend that our clients should implement and/or provide additional access to spaces that encourage the continuation of these activities. A predominant part of our sample (137 participants) listed 'lack of time' as the greatest barrier to using campus green spaces for physical activity; in addition, we recommend future research utilizing an experimental design to examine a potential time-conscious green space physical activity intervention. As requested by our client, our survey asked students to rate their likelihood of utilizing interactional plaques and signage in campus green spaces. As reported, 115 participants declared that they would feel 'the same', whereas 83 participants stated that they would feel 'better' on an outdoor path with an informational plaque. Further research could explore whether the potential addition of informational plaques within CGS would affect students' subjective well-being. Playground pieces, such as swings, were the most popular interactive element identified in participant responses. Consequently, this indicates the importance of implementing interactive elements on CGS that encourage play and movement, as to potentially increase students' use of campus green spaces.

In conclusion, we suggest:

i. the creation of more trails around the UBC campus and raising greater awareness of the pre-existing available trails so that students may know what is accessible to them.

ii. greater diversity in CGS forms on the UBC campus (Speake et al., 2013). This could include introducing a green space with both informational plaques and playground pieces, which were the two most popular interactive elements chosen in our survey.

References

Barton, J., & Rogerson, M. (2017). The importance of greenspace for Mental Health. BJPsych. International, 14(4), 79–81. https://doi.org/10.1192/s2056474000002051

Henry, J. D. & Crawford, J. R. (2005). The short-form version of the depression anxiety stress scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 44*, 227-239. https://doi.org/10.1348/014466505X29657

Houlden, V., Weich, S., Porto de Albuquerque, J., Jarvis, S., & Rees, K. (2018). The relationship
between greenspace and the mental wellbeing of adults: A systematic review. PLOS ONE, 13(9). https://doi.org/10.1371/journal.pone.0203000

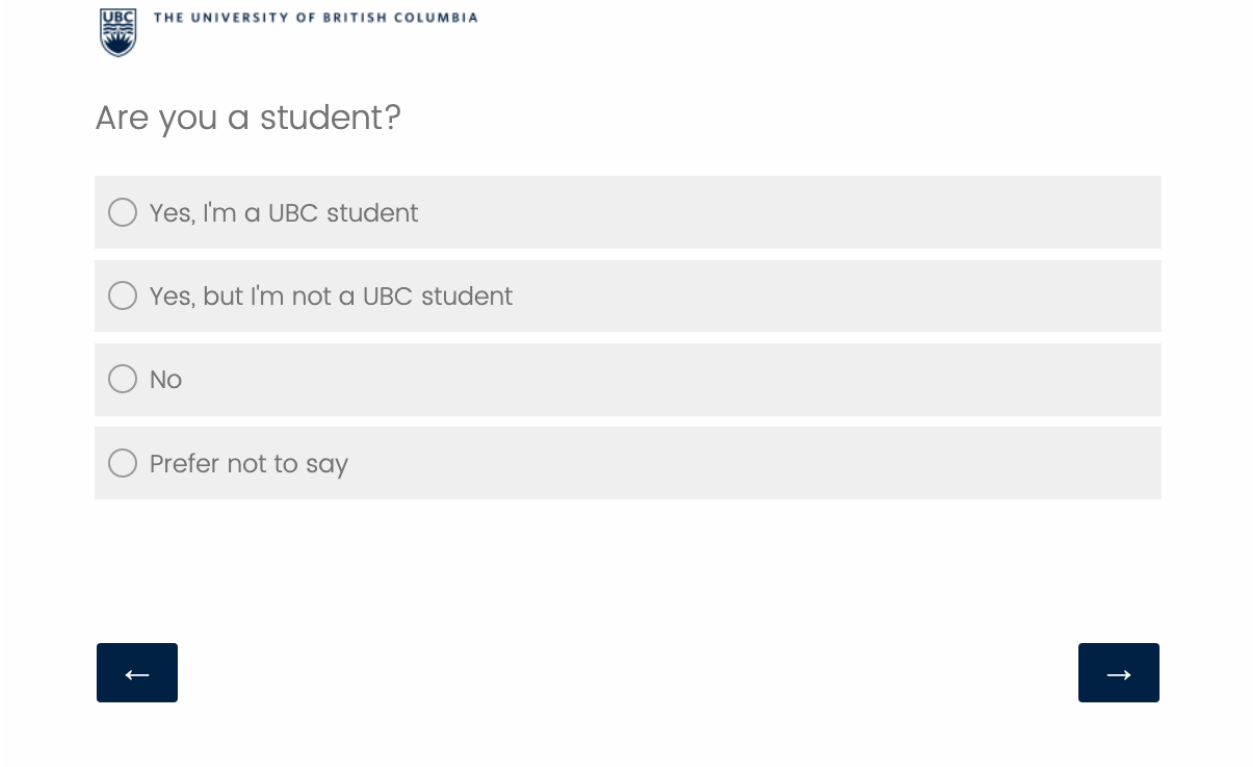
Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety & Stress Scales. (2nd Ed.) Sydney: Psychology Foundation.

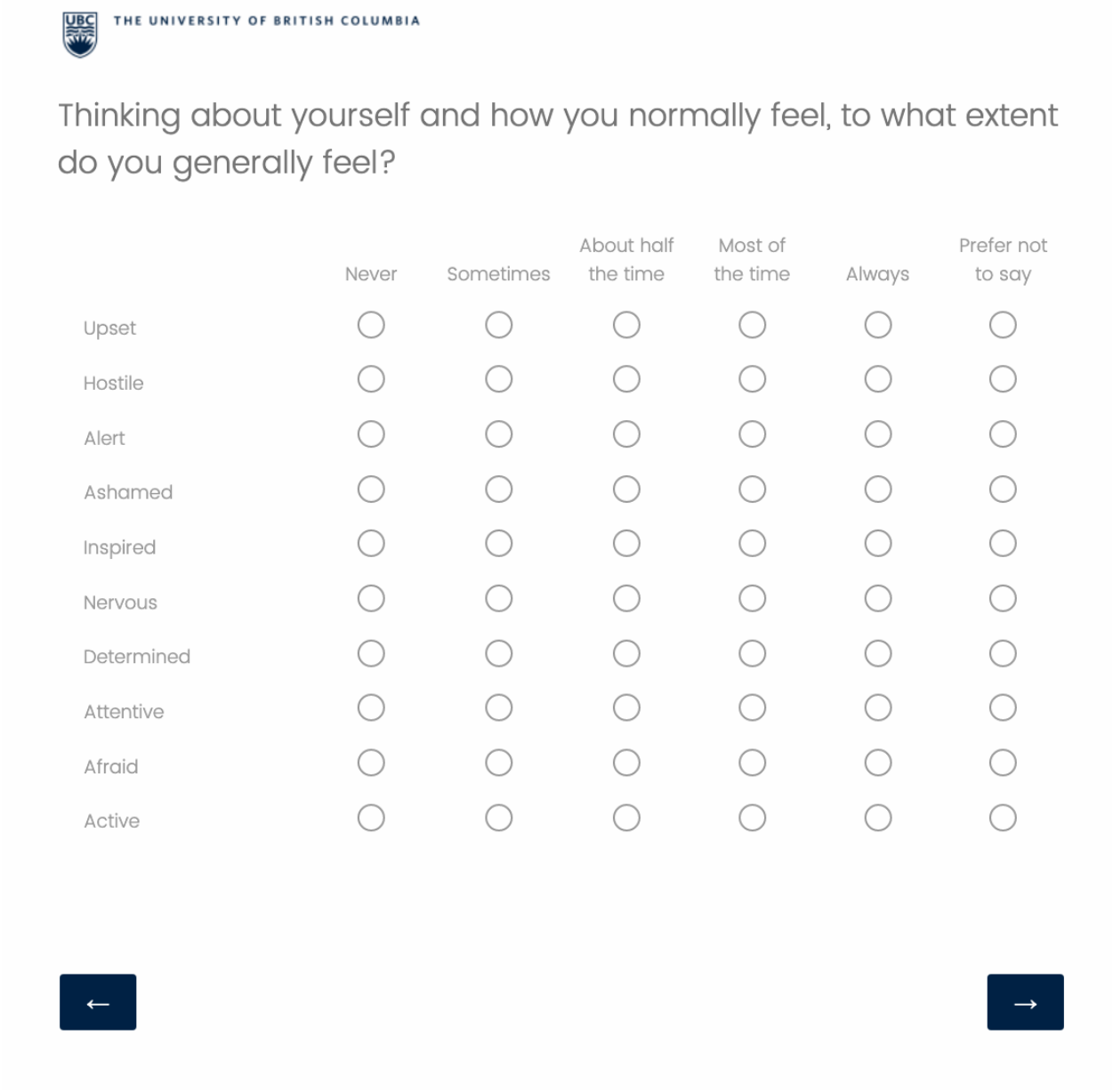
Speake, J., Edmondson, S., & Nawaz, H. (2013). Everyday encounters with nature: Students' perceptions and use of university campus green spaces. HUMAN GEOGRAPHIES – Journal of Studies and Research in Human Geography, 7(1), 21–31. https://doi.org/10.5719/hgeo.2013.71.21

Thompson, E, R. (2007). Development and Validation of an International Reliable Short-Form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology, 38*(2), 227-242. https://doi.org/10.1177/0022022106297301

Appendix

Survey Questions




THE UNIVERSITY OF BRITISH COLUMBIA
Thinking about yourself and how you normally feel, to what extent do you generally feel?
Never
Sometimes
About half the time
Most of the time
Always
Prefer not to say
Upset
Hostile
Alert
Ashamed
Inspired
Nervous
Determined
Attentive
Afraid
Active
←
→

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

	0 - Did not apply to me at all	1 - Applied to me to some degree, or some of the time	2 - Applied to me to a considerable degree or a good part of time	3 - Applied to me very much or most of the time	Prefer not to say
I find it hard to wind down	○	○	○	○	○
I tended to overreact to situations	○	○	○	○	○
I felt I was using a lot of nervous energy	○	○	○	○	○
I found myself getting agitated	○	○	○	○	○
I found it difficult to relax	○	○	○	○	○
I was intolerant of anything that kept me from getting on with what I was doing	○	○	○	○	○
I felt that I was rather touchy	○	○	○	○	○

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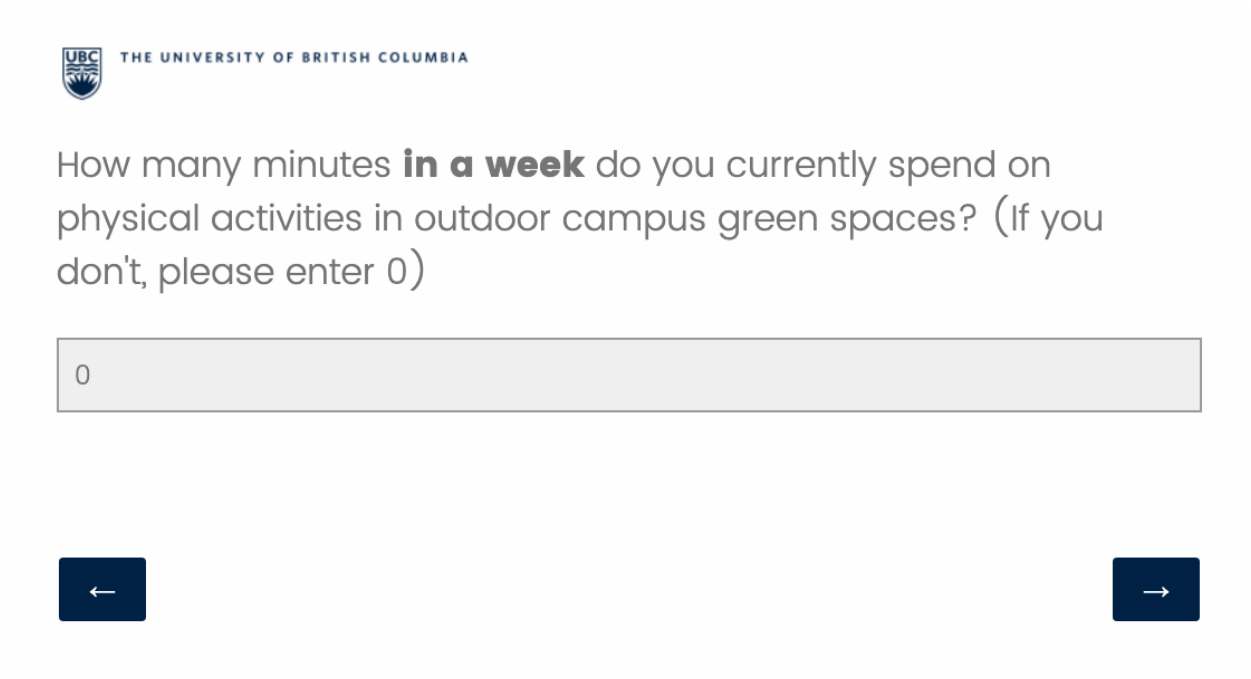
THE UNIVERSITY OF BRITISH COLUMBIA
How many minutes in a week do you currently spend on physical activities in outdoor campus green spaces? (If you don't, please enter 0)
0
←
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THE UNIVERSITY OF BRITISH COLUMBIA

How often do you participate in the following activities on outdoor campus green spaces?

	Not at all	Rarely	Occasionally	Frequently	Always	Prefer not to say
Walking	○	○	○	○	○	○
Jogging, running, rollerblading	○	○	○	○	○	○
Bicycling	○	○	○	○	○	○
Exercise	○	○	○	○	○	○
Go to the park/beach	○	○	○	○	○	○
Playing a recreational activity (frisbee, spikeball)	○	○	○	○	○	○
Playing outdoor sports	○	○	○	○	○	○
Other (please describe)	○	○	○	○	○	○

←

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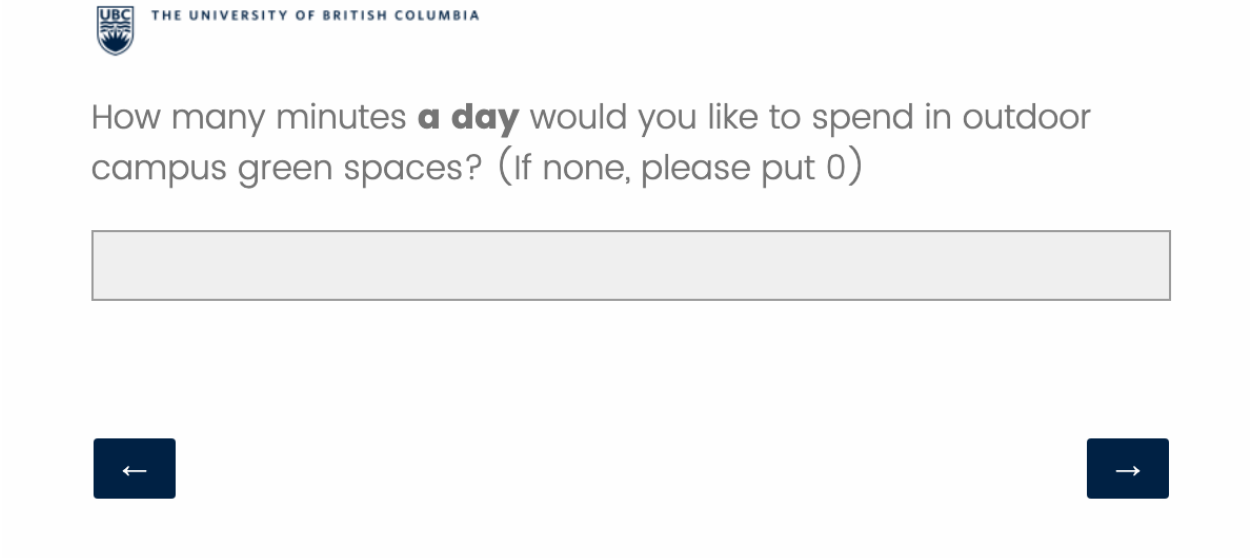
THE UNIVERSITY OF BRITISH COLUMBIA
How many minutes a day would you like to spend in outdoor campus green spaces? (If none, please put 0)
←
→

THE UNIVERSITY OF BRITISH COLUMBIA

How likely are you to spend time in the following outdoor campus spaces?

	Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Prefer not to say
An informational plaque on a walking path 	○	○	○	○	○	○
An interactive art piece *location not confirmed* 	○	○	○	○	○	○
An outdoor exercise park *location not confirmed* 	○	○	○	○	○	○
Playground pieces on greenspace *location not confirmed* 	○	○	○	○	○	○

How would spending time in these outdoor campus green spaces make you feel in comparison to current campus green spaces?

	Better	Worse	The same	Not sure	Prefer not to say
An informational plaque on a walking path 	○	○	○	○	○
An interactive art piece *location not confirmed* 	○	○	○	○	○
An outdoor exercise park *location not confirmed* 	○	○	○	○	○
Playground pieces on greenspace *location not confirmed* 	○	○	○	○	○

What is the biggest barrier to using campus green spaces for you?

- ◯ Stress
- ◯ Lack of time
- ◯ Lack of knowledge
- ◯ Lack of access
- ◯ Other
- ◯ Prefer not to say

← →


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How do you describe yourself?
Male
Female
Non-binary / third gender
Transgender
Two spririted
Prefer not to say/Other
How old are you?
0 10 20 30 40 50 60 70 80 90 100
Age

What is your race/ethnicity? (select all that apply)

- [ ] Indigenous
- [ ] White
- [ ] East Asian
- [ ] South Asian
- [ ] Southeast Asian
- [ ] Middle Eastern
- [ ] Black
- [ ] Latino
- [ ] Other

Do you live on campus?

- ◯ Yes
- ◯ No
- ◯ Prefer not to say

← →

Contribution Breakdown

Mahak

As a part of the group, my responsibilities changed over the course of the group project. We started off by all inputting our ideas for our main topic which was physical activity in campus green spaces and how that can influence a student's subjective well-being. I helped research previous work done in this area for our literature review. After that, my responsibilities included working on the anticipated outcomes part of our research proposal. Subsequently, I gave input to what statistical analysis worked the best along with my other group mates and how we could extrapolate that to align with our hypothesis. Thereafter when our survey was finally designed, I shared our survey across my social media platforms to recruit participants as well as asked my close UBC peers for their time. Lastly, since the presentation I have been working on the results part of the paper and presentation. This included researching how to interpret our data, what inferential statistics to utilize and additionally communicating with Professor Zhao to make the needed feedback from the presentation into our final research paper. Overall, it was great working with this team, and I learned an immense amount about research over the course of the term!

Stella

As a group member, my responsibilities included handling most of the communication between Dr. Zhao, Jason and Lydia, and other group members. Part of this responsibility included scheduling meetings, choosing the presentation time, and ensuring group members had completed their assigned sections on time. Additionally, I took on the role of helping group members who had larger divided sections to ensure all weight was equally distributed. Secondly, while much of our project was a cooperative project, I was often responsible for methods, conditions, research question and hypothesis, and statistical analysis written portions. Lastly, my contribution extended to include the introduction portion in the final write-up, as well as recommendations. Each group member contributed equally to participant recruitment, survey question creation, and presentation contribution, however, my role additionally included sufficient follow-up for additional questions and clarification. Finally, I often took on the role of note-taker for meetings, formal and informal, to help my group stay organized and efficient. I couldn't have asked for a better team to work with!

Rhea

My contributions to the group project started off with helping organize our initial group meeting and being one of the people responsible for sending Zoom links for our meetings throughout the semester. This responsibility was shared amongst a few of us. Additionally, I attended and contributed to every group meeting. During group meetings and meetings with Dr. Zhao and our client, I would occasionally take notes of things said for future reference (the main notetaker being Stella). I contributed to our research proposal by completing the research hypothesis, research question, and participants section of our proposal. Along with the rest of my group members, I shared our survey across my social media platforms to recruit participants as well as asked my classmates in person for their time. I contributed to our statistical analysis by providing initial stats information for us to understand which kind of analysis we were to carry out. When it came time to run the analysis, I was able to use JASP to get a preliminary understanding of the software. For our presentation I was in charge of the measures section where I made my own slide (as we all did) and came up with my script. I aided in proof reading through everyone's parts and providing feedback where necessary. I presented our slide show during our presentation. For my final contributions to this assignment, I was in charge of the executive

summary, half of the methods (measures and procedure) and I will be handing the final formatting and submission of the assignment. Overall, it was a pleasure working with every one of my group members! I am very grateful to have had them this semester.

Francesca

As a team member my responsibilities primarily revolved around the literature review (in the proposal), introduction (in the final report), and recommendation (in the presentation and in the final report) sections. At the beginning of the term, I created a means of communication between members so that we could coordinate outside of lecture time (via messenger group chat). I was also a part of the group that either sent zoom links for meetings or emailed our TA or professor. Each group member was expected to find articles to conduct our literature review; once these articles were selected, I read each one and identified the connection between each article and our research question and hypothesis. I also found an additional article related directly to campus green space and mental health. I presented the proposal to the professor by sharing my screen. After the literature review, I did the recommendation section based on the research we had already identified. I proposed recommendations that were in line with the results of our survey. I shared our survey across my social media platforms to recruit participants as well as asked members of my club to fill it out. I also made suggestions to other group members on their sections and helped answer any questions or concerns that came up. As did my other group members, I helped proofread all our material and was an active participant in and outside of meeting times. I enjoyed working with each member and learned a lot over the course of the semester!

Isha

My responsibilities throughout the term varied. Initially, I was assigned to find articles that can help us brainstorm our research project. After this, when we had finally settled on a topic, I was assigned to discuss our driving and restraining forces in our research proposal and also handed in the assignment on the group's behalf. Additionally, I also created a rough draft of our study's survey in Qualtrics for the research proposal, which included creating/photoshopping the interactive pieces that are seen within the survey. After meeting with Dr. Zhao and receiving feedback, I spent an immense amount of time perfecting the survey for distribution. Once completed, I advised all group members to share the survey and would periodically check in with group members on how distribution was going and continuously check the Qualtrics to make sure our data entries were going in correctly. When we came across some technical issues with Qualtrics, I communicated with Dr. Zhao on troubleshooting methods and reached out via social media platforms to recruit additional participants on top of the recruitment I was already conducting. I contributed to our statistical analysis by meeting with Dr. Zhao and Stella on how to use excel to create our data set that would then be used for analysis in JASP. For our presentation, I created the outline and designed the slides for the group as well as completed the participants section of our presentation. I aided in proof reading through everyone's parts and providing feedback where necessary. My final contributions in the final report were to complete half of the methods section (participants and conditions) and the discussion portion of the report. This team was filled with hard-working, passionate students and I enjoyed learning more about research throughout the term