

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

# Exploring the Effects of UBC Green Spaces on Undergraduate Students' Stress Levels

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Prepared for:

Course Code: PSYC 421

University of British Columbia

Date: 14 April 2022

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## Final Report

The Mighty Ogres

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### Executive Summary:

For this project, our research question was “How does the duration of time spent in outdoor green spaces affect students’ level of stress while studying?” Our hypothesis is that students who study with the presence of green space would be less stressed than those who study without the presence of green space. In order to test our claim, we performed a correlational study. We had a total of 135 participants respond via a self-report survey. The independent variable was the duration of time spent studying outdoors and the dependent variable was the level of stress after studying. The participants’ stress levels were measured using the *Depression Anxiety Stress Scale*. Based on the data that was collected, we found no correlation between the duration of time spent studying in outdoor green spaces and the individual’s level of stress. At the same time, we observed that participants were more likely to study in outdoor green spaces if they had more information on the location and its availability.

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#### **Introduction:**

Existing research conducted by Kondo et al.<sup>2</sup> indicated that spending time in green spaces can reduce stress. In addition, Van den Berg and Beute<sup>3</sup> suggested that natural environments can provide relief from burnout and stress, which improves an individual's mental health. Last but not least, Van Herzele and de Vries<sup>4</sup> found that neighbourhood satisfaction positively corresponded with the availability of nearby green spaces. As a result, the present studies all demonstrate a positive correlation between green space and reducing stress or improving mental health. At the same time, present studies have not accounted for the impact of green spaces in a university environment.

Post-secondary education involves a far more extensive list of stressors, as a student must balance academic work with the likely unfamiliarity of living alone. For this study, we define green spaces as an area partially or entirely covered with grass, trees, shrubs, or other vegetation. Additionally, our samples will be limited to UBC students. While this narrows the scope of our research, it also enables us to provide conclusions that are targeted toward this specific demographic.

The potential driving force of a student's engagement with green spaces is that they may feel more relaxed in this environment. Additionally, some students may find that the natural background noises (such as birds chirping, the wind blowing, et cetera) aid them in concentrating. On the other hand, some restraining forces include a lack of knowledge about the availability of green spaces on campus. Furthermore, students may be forced to study indoors more often than they would otherwise prefer due to seasonal weather.

#### **Hypothesis:**

The point of the research is to find out how we can improve students' on-campus experience. Literature has shown a positive correlation between the presence of green space and mental health<sup>3</sup>. The present study wants to explore whether we can generalize previous studies' results. Hence, we hypothesized that students who study more time outdoors would experience lower stress, anxiety, and depression than students who study less time outdoors.

#### **Research Question:**

How does the duration of time spent in outdoor green spaces affect students' level of stress while studying?

#### **Methods:**

Power analysis indicates that our study needs a minimum of 144 participants (assuming  $\alpha=0.05$ ,  $\text{power}=0.95$ ).

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## Participants

We recruited a total of 135 participants. Within this sample, 40 identified as Male, 89 as Female, 6 as non-binary/third gender, and 1 preferred not to disclose. Most participants were recruited on the UBC Point Grey campus.

## Conditions & Measures

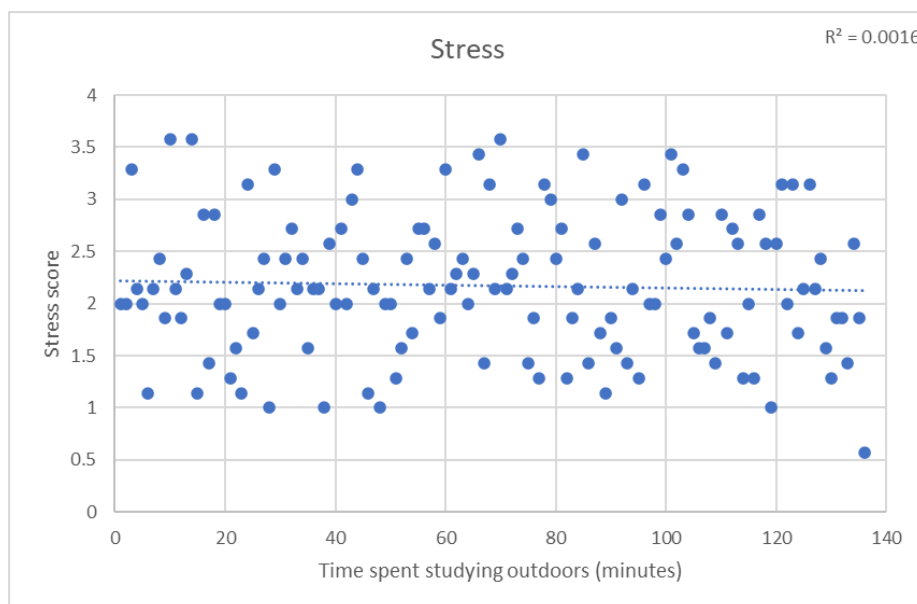
The study aimed to examine the correlation between time studied at an outdoor green space and the individual's level of stress afterwards. Therefore, the independent variable is the duration of time the participant spent in outdoor green space and the dependent variable is their level of stress, as measured by the *Depression Anxiety Stress Scale* (DASS). Our independent variable was operationalized by adding our definition of green space in the survey. The DASS is widely regarded to have high reliability and validity scores<sup>1</sup>.

## Procedure

The data was collected via a self-report survey through Qualtrics. We analyzed the data through a linear regression. The goal of doing so is to try and identify the relationship between our independent and dependent variables.

The anticipated outcome of the data is that there will be a negative correlation between duration spent studying in outdoor green spaces and levels of stress. In other words, an individual should feel less stressed after studying in outdoor green spaces. If the results demonstrate statistical significance, then future projects can be focused on creating accessible green study spaces for students as it can benefit their mental wellbeing.

## Results



The statistical analysis performed on our data was linear regression as we wanted to find a correlation. The graph above visualizes the data, and the R2 suggests

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that the data does not demonstrate any correlation between time spent studying in outdoor green spaces and the participants' levels of stress. At the same time, a significant portion of the response was from individuals who do not study outdoors. Only 18 (13%) of participants indicated that they have ever studied outdoors. Furthermore, while our sample size was close to the intended target of 144 participants, it still did not quite reach that number. In addition, the number of Male to Females was also unequal. It is not easy to generalize the findings to the more significant population.

At the same time, the survey also indicates that participants are more likely to study in outdoor green areas if they are more readily available and have information on the location of the space. Some participants also suggested that weather played a factor in deciding where they were going to study. Last but not least, the results also highlighted the library garden as a top choice (40% of responses) for a study area.

### **Discussion**

Our results show no correlations, suggesting that we have many limitations, such as a small sample size. Multiple factors may have contributed to our small sample size. The surveys were distributed during winter, and many students may not be studying outdoors due to the weather. COVID-19 may also be a factor as some students may choose not to go to campus if their courses are online, limiting the chances of studying outside.

A challenge that we faced was finding participants that spent time studying outdoors. If we re-run this study, we might be more successful if the surveys were distributed during the spring or summer semesters. If our sample size had been larger, our outcome might have differed, and we may have correlated. Therefore, our hypothesis may have been supported. We could have applied our findings to a larger population if our hypothesis was supported by promoting outdoor studying.

### **Recommendations**

An overwhelming portion of students (68%) responded that they would study in outdoor green spaces should they be given information on where to find them. As a result, it may be worthwhile to look into methods of promoting existing green spaces. The result can help future landscape architects and planners to provide suggestions for campus design to meet students' needs and mental health to reduce stress levels. It would also be valuable to study whether or not natural background noise (birds chirping, wind blowing, et cetera) influences a student's ability to focus. This can influence the decision of what study spaces to make available. Participants also stated that the weather plays a significant role in deciding whether to study in outdoor green spaces or not. Due to large amounts of rain on the UBC Point Grey campus, we suggest constructing outdoor study spaces with an overhead cover to allow students to study outdoors regardless of the weather. Overhead covers could also benefit studying in spring and summer as they can provide shade from the sun.

## References

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## Appendix

### Survey Questions

1. Green Spaces includes an area that is partially or completely covered with grass, trees, shrubs, or other vegetation. Common green space can include parks, community gardens, etc. Some green spaces on UBC includes Rose Garden, Main Mall, Library Garden (the area outside IKB and beside the Clock Tower)
2. How many minutes do you study in Green Spaces per day? (0 if you don't study in Green Spaces)
3. If you studied in outdoor green spaces at UBC, please tell us where it is!
4. Please read each statement and circle a number 0, 1, 2 or 3 to indicate 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.
5. The rating scale is as follows:
  - ( 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

	0	1	2	3
I found it hard to Wind Down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was aware of dryness of my mouth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I couldn't seem to experience any positive feeling at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found it difficult to work up the initiative to do things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tended to over-react to situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I experienced trembling (e.g. in the hands)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that I was using a lot of nervous energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was worried about situations in which I might panic and make a fool of myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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I felt that I had nothing to look forward to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found myself getting agitated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found it difficult to relax	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt down-hearted and blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was intolerant of anything that kept me from getting on with what I was doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I was close to panic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was unable to become enthusiastic about anything	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I wasn't worth much as a person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that I was rather touchy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt scared without any good reason	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that life was meaningless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. What gender do you identify as?
7. If we provide information on where to find outdoor green spaces, would you choose to study in outdoor green spaces

### Contributions

The final proposal was a collaborative effort by the whole group, Jessica and Alice oversaw and delegated tasks for the proposal. The data collection was mostly run by Shawn and Anderson, the whole group also contributed. Data analysis was completed by Ishgun, Jessica, and Alice. James made the final group presentation, with help from all the members. The final report was drafted by Anderson and completed by all the group members.

### Additional Graphs

The following graphs depict Depression vs Time spent studying outdoors and Anxiety vs Time spent studying outdoors. Both graphs show no correlation between the variables. We conclude that this may be due to the small sample size and the season (Winter) that the surveys were distributed in.

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