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Student Research Report

# Impact of Campfire and Fountain Lounge on Belonging and Connectedness

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**Impact of Campfire and Fountain Lounge on Belonging and Connectedness**

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### **Executive Summary**

This research investigates the effect of outdoor lounges with campfires and fountains on university campuses on students' belonging and social connection. We hypothesized that the outdoor lounge with a fire pit and water feature would increase students' belonging and social connection compared with a lounge without any special feature.

Through a between-subjects experimental design, we randomly assigned 159 university students to one of three conditions, where they were shown an image of an outdoor lounge and asked to complete a standardized survey measuring belonging and social connection. The results showed that the three conditions have similar scores on both PSSM and SCS scales. Therefore, no significant difference has been shown in students' levels of belonging and social connection among the three conditions. Our hypothesis was not supported.

Despite limitations such as small sample size and the use of images rather than in-person experience, our findings suggest that the type of outdoor lounge on a university campus may not significantly impact students' sense of belonging and social connection.

## Introduction

Previous literature studies have indicated that the presence of campfires and water features has been associated with various positive psychological outcomes for students. For instance, Lynn (2014) found that water features in campus lounge areas can promote feelings of relaxation and calmness among students, which can enhance their overall well-being. The study also revealed that the sound and sight of flowing water could reduce stress levels and enhance cognitive performance (Lynn, 2014). Additionally, Alves et al. (2022) conducted a study that found that a campfire in a communal outdoor space can promote a sense of community and social bonding among students. This can lead to a higher positive mood and well-being, which can positively impact students' academic performance and overall satisfaction with their college experience (Alves et al., 2022).

Furthermore, Tanner (2009) emphasized the importance of designing public spaces, such as campus lounge areas, focusing on inclusion and accessibility for all students. However, there needs to be more research investigating the impact of these design elements on social interaction among students in campus lounge areas, particularly considering students' connectedness and belonging. This knowledge gap motivates our research question, which aims to explore the effect of campfire and water feature design on social interaction and connectedness in campus lounge areas. Thus, the current study seeks to fill this gap by examining the effect of campfire and water feature design on students' connectedness and social interactions in outdoor lounges on campus. Based on previous research, campfire and water features can positively affect students. Therefore we predict in our hypothesis that the lounges with the campfire and water features will facilitate greater belonging and connections. This research is novel and important as it can inform the design of future campus lounge areas to facilitate social interaction better and promote a sense of community among students.

## Research Question and Hypothesis

Our research aims to investigate how campfires and fountain lounges influence students' social connection and belonging. We hypothesized that the outdoor lounge with a fire pit and water feature would increase students' belonging and social connection compared with a lounge without any special feature.

## Methods

### Participants

With power analysis (assuming a minimum effect size = 0.20, alpha = .05, power = .95), we needed a minimum of 390 participants for our study. Initially, we had 320 recorded responses, but 161 responses were excluded as they were not completed. After excluding them, we are left with sample  $N=159$ . Most of the participants were UBC undergraduate students. Among the 159 participants ( $M_{age}=20.79$ ,  $SD_{age}=2.14$ ), 8.39% were in the 1<sup>st</sup> year, 21.94% were in the 2<sup>nd</sup> year, 37.42% were in the 3<sup>rd</sup> year, and 32.26% were in the 4<sup>th</sup> year (see Appendix B Figure 2 & 3). Regarding gender, 72.78% were female, 20.25% were male, 3.16% were nonbinary, and 3.80% preferred not to say (see Appendix B Figure 1).

### Conditions

Our experiment used a between-subject design, randomly assigning participants to one of three conditions. Each participant was presented with a lounge image and asked to complete a standardized survey measuring their social connection and school belonging after seeing the image (Appendix A). The independent variable was the type of an outdoor lounge. Specifically, we focused on manipulating the center feature of the lounge, which is where people sit around.

The first condition ( $n = 50$ ) was lounge chairs surrounding a table, the second condition ( $n = 53$ ) was the same lounge chairs but around a fountain, and the third condition ( $n = 56$ ) was around a fire pit (see Appendix A, Figure 1, 2, & 3). Consistency in the background and lounge chairs was maintained across the three conditions to avoid confounds. Image descriptions for each given lounge were included to better immerse participants in that context. All images were taken from Google, and the fountain, the campfire, and the students were photoshopped onto the existing lounge images via MeiTu app.

### Measure

Our dependent variable was students' level of belonging and social connection. A self-report survey asked participants to rate their feelings toward the photographs they had seen. In our survey, the effect of different outside lounges on students' level of connectedness was measured with a 6-point Likert Social Connectedness Scale ranging from "strongly disagree" to "strongly agree" (Lee & Robbins, 1998) and the student's level of belonging was measured with a 5-point Likert Psychological Sense of School Membership Scale ranging from "Not at all true" to "completely true" (Goodenow, 1993). Those two scales helped us to test whether different outside lounges on university campuses increased students' attachment, involvement and identification with the school, as well as their perceived social support and acceptance from peers and teachers. Using two Likert scales, SCS and PSSM, participants were asked to rate their agreement with social connectedness and belonging statements. We examined how campfire and fountain lounges affected students' social connectedness and belonging by comparing participants' intervention scores under different conditions.

### Procedure

Our research survey was designed through Qualtrics to collect data while increasing exposure and engagement in various ways, for example, by posting links and QR codes on social media (WeChat, Instagram, WhatsApp, etc.); sending individual surveys to individuals we encountered on campus; and posting links and QR codes to the course discussion board with the instructors' and professors' permission. Our data was collected in 29 days, from March 7, 2023, to April 4, 2023. One challenge in surveying was that most of the respondents dropped out midway due to our survey's long length, which made it impossible for us to get a sufficient number of respondents. On the front page, a consent form was made available for participants to read, which included a brief introduction to the study and confirmation of participation. After consenting, participants were randomly assigned to either Condition 1, Condition 2, or Condition 3 to complete an approximately 10-minute online survey; each condition included a detailed description of the outside lounge in various photographs, which provided participants with a way to imagine themselves underneath it (See Appendix A, Figure 1, 2 & 3). After being asked to answer the scale with the lounge in mind, participants assessed questions about their sense of belonging and social connectedness by completing the SCS and PSSM scales. Near the end of the survey, participants were asked to answer demographic questions about their age, gender, and current year level. This helped us accurately identify our dependent variables and eliminate any

confounding variables while ensuring anonymity. Our survey was designed to explore whether an outdoor lounge with fire pit tables and a water feature similarly increased students' sense of belonging and social connection with others.

## Results

Participants ( $N = 159$ ) were randomly assigned evenly among three conditions, in which they were shown a picture of an outdoor lounge with a table surrounded by chairs ( $n = 50$ ) or a picture of an outdoor lounge with a water fountain surrounded by chairs ( $n = 53$ ) or a picture of an outdoor lounge with a fire pit surrounded by chairs ( $n = 56$ ) (see Appendix C, Table 1).

Since the PSSM and SCS scales we used in our survey contain both positively and negatively worded statements, we first conducted an inverse transformation of negatively worded statements to get the corresponding scores. We then took the average scores of all statements in each scale to get the overall PSSM and SCS scores separately for all participants.

To compare the means of three groups, we used a one-way between-groups ANOVA with an alpha level of  $= .05$ . In terms of PSSM, the mean scores of students belonging to the school in table condition ( $M = 3.36$ ,  $SD = 0.57$ ), water fountain condition ( $M = 3.30$ ,  $SD = 0.58$ ), and fire pit condition ( $M = 3.46$ ,  $SD = 0.70$ ) were similar (see Appendix C, Table 2). The standard error is shown by the error bar in the bar graph (see Appendix C, Figure 1). A one-way between-groups ANOVA revealed a small-sized insignificant mean effect of the picture students viewed on their psychological sense of school membership scores,  $F(2, 156) = 0.90$ ,  $p = .41$ ,  $\eta^2_p = .01$  (see Appendix C, Table 3).

In terms of SCS, we can get the same conclusion as PSSM. The data indicate that the mean scores of students' social connectedness with others in table condition ( $M = 4.00$ ,  $SD = 0.80$ ), water fountain condition ( $M = 3.83$ ,  $SD = 0.61$ ), and fire pit condition ( $M = 4.06$ ,  $SD = 0.76$ ) were similar (see Appendix C, Table 4). The standard error is shown by the error bar in the bar graph (see Appendix C, Figure 2). A one-way between-groups ANOVA revealed a small-sized insignificant mean effect of the picture students viewed on their social connectedness scores,  $F(2, 156) = 1.49$ ,  $p = .23$ ,  $\eta^2_p = .02$  (see Appendix C, Table 5).

From the results above, the pictures of different outdoor lounges did not cause statistically significant differences among the three conditions for both scales, so the post hoc test was unnecessary. Therefore, our hypothesis was not supported, and we could not conclude that the outside lounge with a fire pit table and water feature would lead to an increase in students' belonging and social connection with others compared with a lounge without any special feature.

## Discussion

Our study showed that the participant's responses on belonging and connectedness were not significantly impacted by the varying lounge conditions. There might have been a flaw in our research question, and other factors at play should have also been considered. For instance, one limitation includes the lack of UBC features in the background of the survey picture. Since our participants are mostly UBC students, the picture could include more well-known UBC features, such as showing an AMS student nest or the rose garden as the image's background to make the participants feel more resonated. Additionally, because of our small sample size, this may limit the generalizability of our results. Redoing this study with a larger sample may yield a different outcome.

There might be a third variable problem in our research, including consideration of season and lack of real-world in-person experience. For instance, the fire pit might induce less preference from participants in summer because of the high temperature. Furthermore, because we exhibited the outside lounge as manipulated images, participants were unable to link the experience to the natural environment (smell of fire, the sound of flowing water, and fresh air) and were also unable to directly resonate with our setting.

From our results, we can infer that the lounge design might not be enough or unimportant to promote the social connection between students. Although fire and water features were proven to be associated with psychological well-being in previous research, the lounge features did not substantially impact bonding people together in our experimental results. Thus, one implication is that other potential factors like people's activity in the outside lounge might be key to increasing social connection. Activities like ping-pong or other physical games that people do in the lounge might be better in bringing people together compared to the lounge design itself. Future studies can investigate table games placed in lounges and their impact on students' belonging and connectedness.

### **Recommendations for our UBC Client**

Since the study did not find significant differences between conditions, investing in fire pits or fountains for student tables may not be worthwhile. Therefore, when redesigning or renovating outdoor spaces on the UBC campus, those environmental features surrounding a lounge may be less important than the lounge itself in improving social connectedness. Instead, UBC should investigate what students need in their social lounges, considering their preferences and requirements. Based on our research, we recommend that UBC can conduct further research on the current water fountain at UBC to better understand its impact on students. This could be achieved through surveys or focus groups to gather students' feedback. Specifically, future research can focus on how the size of the fountain affects students and the seating arrangement around the fountain. This could be done by conducting surveys or observations to gather data on how often students sit near the fountain and how it impacts their social interactions. We suggest that UBC consider adding a smaller fountain at student residences to test the hypothesis that water features can bring students closer together. This could be a cost-effective way to enhance the sense of community among students living on campus. UBC could consider partnering with student groups or residence advisors to gather feedback and insights on the impact of the new fountain.

Additionally, we recommend that UBC further investigate the impact of the campus design on students' sense of belonging and connectedness, with a specific focus on the existing campfire lounge design at SFU. This investigation can provide insights into the effectiveness of the design in promoting social interaction and connectedness among students. For instance, in SFU's existing campfire table lounge, they included activities like making S'mores with the campfire to foster social connection between students. A specific recommendation we have for UBC is that we can see whether it is the campfire or the activity of making S'mores that leads to an increase in social connection. Because from our result, we see that lounge design like the fire does not help bring people together, maybe the key is the activity students do together. Based on this information, UBC can conduct future research to examine the relationship between campfire and activity (S'mores) impact on students' connection to see which factor contributes the most. Overall, our research highlights the importance of creating inviting and inclusive outdoor spaces on campus to enhance student well-being and connectedness. We hope our findings and

recommendations can help UBC prioritize and invest in initiatives promoting a positive campus environment for all students.



### References

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### Appendix A: Study Questionnaire

**Link:** [https://ubc.ca/qualtrics.com/jfe/form/SV\\_9BobuCUjvClcmH4](https://ubc.ca/qualtrics.com/jfe/form/SV_9BobuCUjvClcmH4)

After agreeing on the consent form, randomly assigning participants to the different conditions to rate their level of belongingness and connectedness.

*Figure 1: Condition 1* (outside lounge chairs around a table)



Take a deep breath and take a moment to clear your thoughts. Now, focus on the above picture, imagine you are now taking a break in this outdoor lounge on campus (not raining, snowing, or storming). You are sitting on one of the chairs. In front of you, there is a table in the middle. You might be surrounded by other people. If you want, you can close your eyes to fully immerse yourself in this environment for a while. Please keep this feeling or thought in mind, now please answer the questions below.

*Figure 2: Condition 2*(outside lounge chairs around a water fountain)



Take a deep breath and take a moment to clear your thoughts. Now, focus on the above picture, imagine you are now taking a break in this outdoor lounge on campus (not raining, snowing, or storming). You are sitting on one of the chairs. In front of you, there is a fountain. You might be surrounded by other people. You can hear the sound of the water. In the center of the basin, you can see thin streams of water sprouting out. If you want, you can close your eyes to fully immerse yourself in this environment for a while. Please keep this feeling or thought in mind, now please answer the questions below.

*Figure 3: Condition 3* (outside lounge chairs around a fire pit)



Take a deep breath and take a moment to clear your thoughts. Now, focus on the above picture, imagine you are now taking a break in this outdoor lounge on campus (not raining, snowing, or storming). You are sitting on one of the chairs. In front of you, there is a fire pit table. You might be surrounded by other people. Feeling the warmth, and hearing the crackling sound of the orange flame. The fire pit table is safe. If you want, you can close your eyes to fully immerse yourself in this environment for a while. Please keep this feeling or thought in mind, now please answer the questions below.

### General Survey Questions:

How likely are you going to sit and rest in this outdoor lounge situated on campus?

- Very unlikely
- Somewhat unlikely
- Somewhat likely
- Very likely

How much would you like this outdoor lounge to be built on campus?

- Not at all
- A little
- Moderate
- Very
- Extremely

**Survey Questions: Psychological Sense of School Membership Scale (PSSM) 5-point Likert Scale**

Imagine this outdoor lounge is going to be built on campus, how would you feel about your sense of belonging to the school? Choose the answer for each statement that is most true for you with the scale ranges from 1 (Not at all true) to 5 (Completely true). (If you need, you can go back to the previous page and remember the picture and feelings in your mind.)

	Not at all true 1	2	3	4	Completely true 5
I feel like a part of my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People at my school notice when I am good at something.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is hard for people like me to be accepted at my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other students in my school take my opinions seriously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most teachers at my school are interested in me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I feel as if I don't belong in my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is at least one teacher or adult I can talk to in my school if I have a problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People at my school are friendly to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers here are not interested in people like me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am included in lots of activities at my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am treated with as much respect as other students in my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel very different from most other students at my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can really be myself at my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers at my school respect me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People at my school know that I can do good work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I were in a different school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel proud to belong to my school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other students at my school like me the way that I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Demographic Questions:**

We also would like to know a little bit about your background information. This is totally anonymous, and it will be helpful for us to gain some insight into our data.

1. What is your gender?
  - a. Male
  - b. Female
  - c. Non-binary/third gender
  - d. Prefer not to say
  
2. What is your age (type in numbers)?

3. What is the year level you are currently in university?
  - a. 1st year
  - b. 2nd year
  - c. 3rd year
  - d. 4th year or upper

**End of the survey:**

Any feedback or comments about our experiment?

### Appendix B: Demographics Graphs

Figure 1. Gender of participants in percentages.

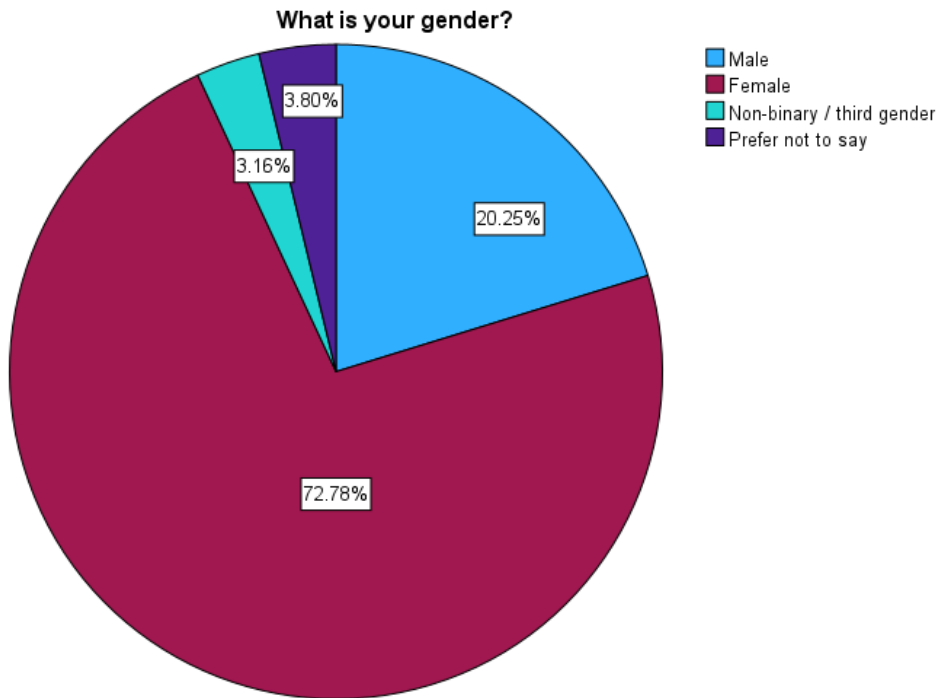


Figure 2. Year level of participants in percentages.

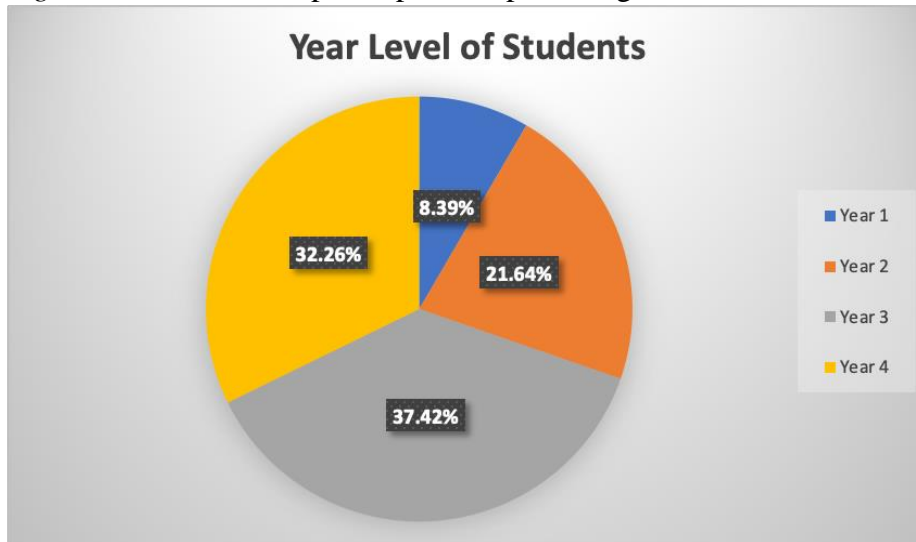
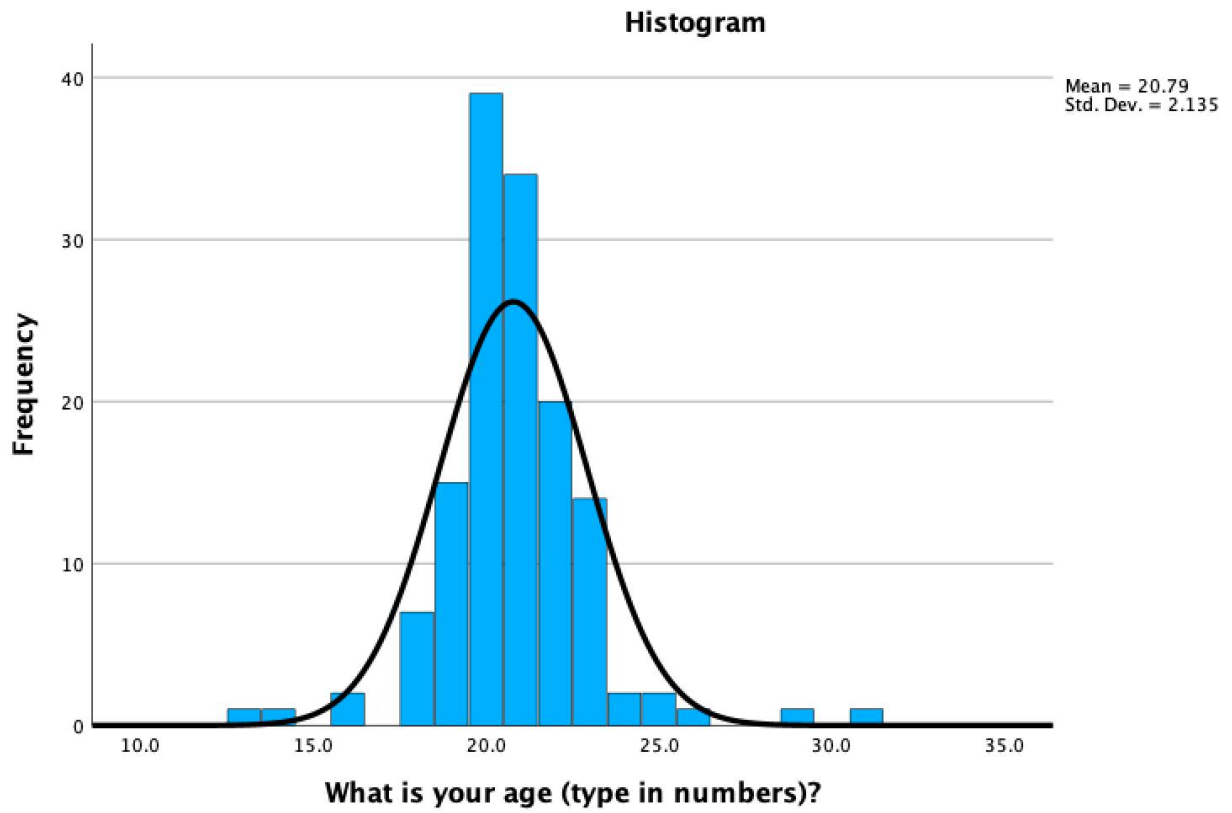


Figure 3. Mean and standard deviation of participant's age ( $M= 20.79$ ,  $SD= 2.14$ ).





**Appendix C: Survey Results (Descriptive Statistics and Inferential Statistics)**

*Table 1.* Sample size in each condition

		Value Label	N
Picture	1	table	50
	2	water	53
	3	fire	56

*Table 2.* Mean and standard deviation of PSSM between three conditions

<b>Descriptive Statistics</b>			
Dependent Variable PSSM			
Picture	Mean	Std. Deviation	N
table	3.3622	.57201	50
water	3.3019	.58119	53
fire	3.4603	.69854	56
Total	3.3767	.62203	159

*Table 3.* One-way ANOVA of PSSM

<b>Tests of Between-Subjects Effects</b>						
Dependent Variable: PSSM						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.699 <sup>a</sup>	2	.349	.902	.408	.011
Intercept	1807.032	1	1807.032	4664.469	<.001	.968
Picture	.699	2	.349	.902	.408	.011
Error	60.435	156	.387			
Total	1874.025	159				
Corrected Total	61.134	158				

a. R Squared = .011 (Adjusted R Squared = -.001)

Table 4. Mean and standard deviation of SCS between three conditions

**Descriptive Statistics**

Dependent Variable: SCS

Picture	Mean	Std. Deviation	N
table	3.9960	.80324	50
water	3.8255	.61462	53
fire	4.0598	.75723	56
Total	3.9616	.73077	159

Table 5. One-way ANOVA of SCS

**Tests of Between-Subjects Effects**

Dependent Variable: SCS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.582 <sup>a</sup>	2	.791	1.490	.229	.019
Intercept	2488.585	1	2488.585	4688.954	<.001	.968
Picture	1.582	2	.791	1.490	.229	.019
Error	82.794	156	.531			
Total	2579.810	159				
Corrected Total	84.376	158				

a. R Squared = .019 (Adjusted R Squared = .006)

Figure 1. Mean of PSSM bar graph with error bar (standard error)

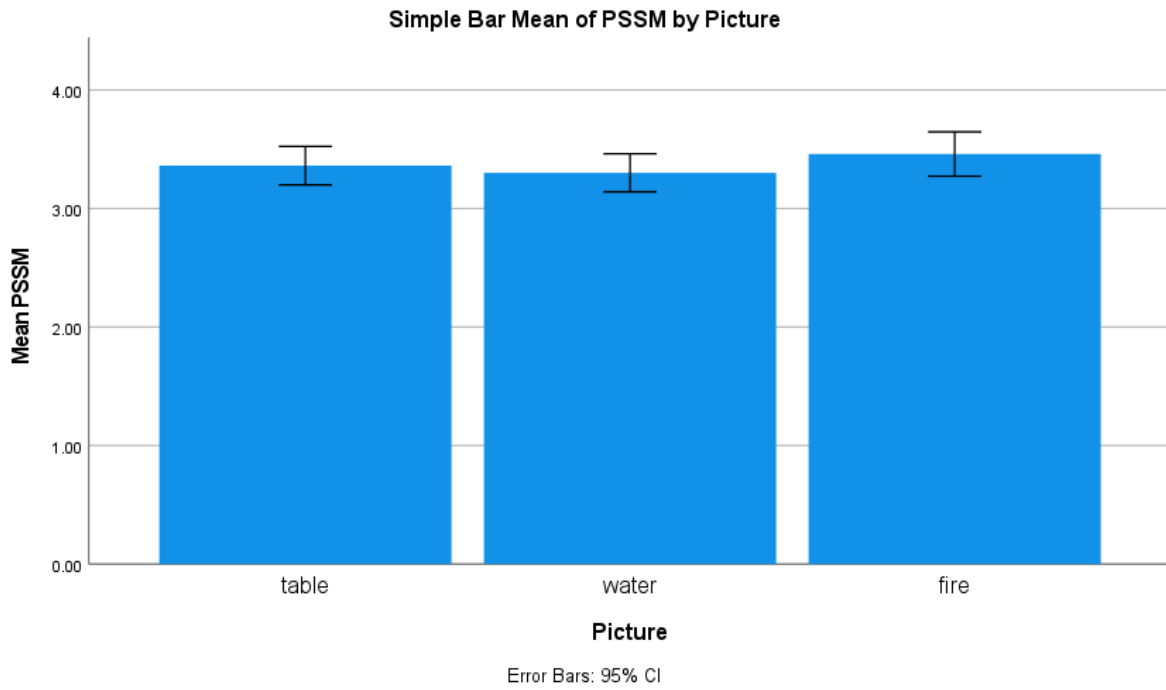
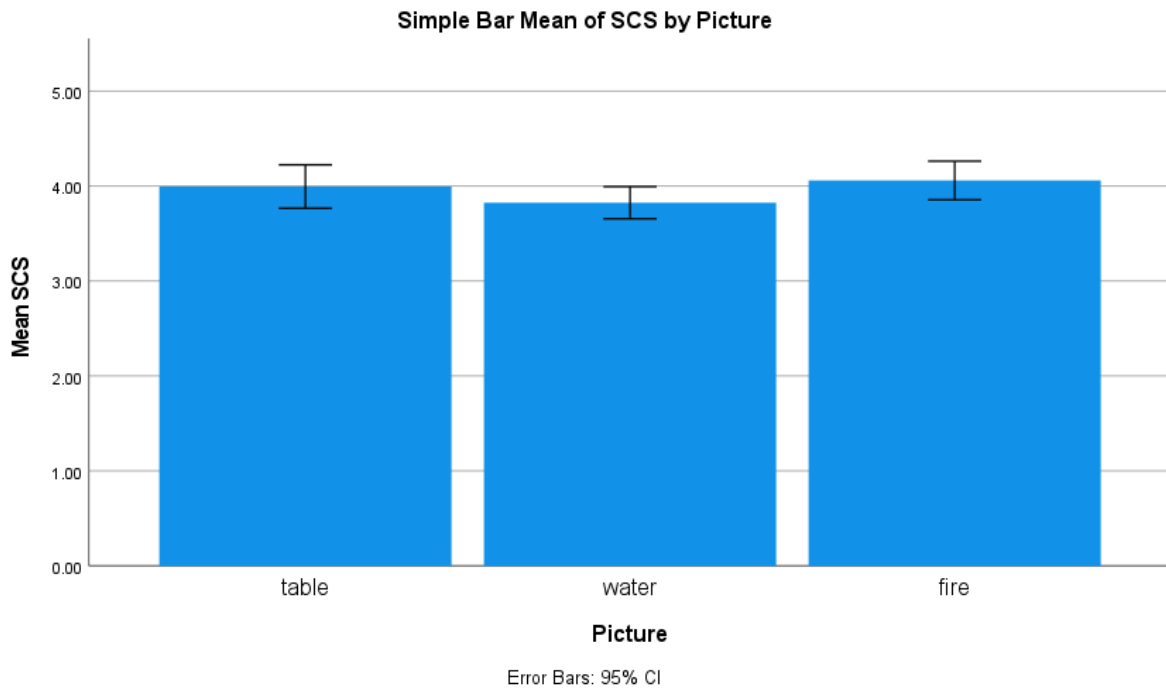


Figure 2. Mean of SCS bar graph with error bar (standard error)



**Appendix D: Contribution of Team Members**

<p>Proposal</p>	<p>All team members formed the research question, the hypothesis, and the anticipated results.</p> <p>Background Literature: Alime Guo                  Sample size: Alime Guo                  Conditions: Jojo Chen                  Measures: Yixuan Wu                  Survey: Yutong Xin                  Statistical analyses: Qi Qi, Katrina Cui</p>
<p>Data Collection</p>	<p>All group members with their contributions, like sharing links and QR codes on social media; sending individual surveys to people we met on campus; and posting links and QR codes to the course discussion board with permission from the professors.</p>
<p>Data Analysis</p>	<p>All members conducted data analysis by running SPSS.</p>
<p>Presentation</p>	<p>All members participated in creating the slide deck and attending the presentation.</p> <p>Introduction, Research Question &amp; Hypothesis: Yutong Xin                  Participants &amp; Demographic Info: Alime Guo                  Conditions: Jojo Chen                  Measures: Yixuan Wu                  Results &amp; Implication: Katrina Cui                  PowerPoint: Qi Qi, Yixuan Wu, Alime Guo, Yutong Xin, Katrina Cui, Jojo Chen</p>
<p>Final Report</p>	<p>All group members contributed to writing the final report.</p> <p>Executive Summary: Yutong Xin                  Introduction: Alime Guo                  Research Question &amp; Hypothesis: Yutong Xin                  Participants &amp; Conditions: Jojo Chen                  Measures &amp; Procedure: Yixuan Wu                  Results: Qi Qi, Katrina Cui                  Discussion: Katrina Cui                  Recommendations: Alime Guo                  Appendix: Yixuan Wu</p>