

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

**Arousal and Willingness to Contribute to Sustainable Efforts**

**Guan-Ji Pu, Jivin Jawanda, Manmeet Sital, Tamara Kryschuk, Vanessa Liang**

**University of British Columbia**

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### **Executive summary**

Arousal is experienced frequently throughout the day and can influence attitudes and emotions. This experiment was mostly conducted on University students and examines whether arousal will influence people's willingness to contribute to a sustainable cause. This study had an experimental condition in which participants watched an arousing video and a control condition, in which participants watched a non-arousing video. After viewing the video, participants were asked to complete a questionnaire which measured their level of concern for the environmental issue, willingness to sign an environmental petition, and willingness to make a monetary donation. The results demonstrate a significant difference in the levels of arousal between the two conditions, which reveals that our manipulation worked. Arousal was found to significantly increase concern for the environmental issue at hand and willingness to sign an environmental petition. However, these effects were not found for willingness to donate. Our results may be explained by Schachter and Singer's (1962) study which found that people could misattribute their arousal depending on context. Our findings can be used to raise concern for environmental efforts by pairing an arousing stimulus with information about an environmental effort.

*Keywords:* arousal, willingness, environment, petition, misattribution

## Introduction

Arousal is a natural occurrence in everyday life; it is experienced at the gym, social interactions or even while watching a horror movie. Arousal can be interpreted as fear, excitement, anxiety, anger, and many other emotions. Importantly, arousal has implications for our intentions, attitudes, and actions. There are several studies that highlight these effects.

For instance, Dutton and Aron (1974) investigated whether arousal would influence men's attraction to a woman. Their research was conducted on one of two bridges: an arousing suspension bridge or a non-arousing bridge. After the male participants walked across one of the two bridges, an attractive female researcher distributed a questionnaire containing the Thematic Apperception Test (TAT). She then gave them her phone number to call if they had any questions. Results indicated that the males who crossed the arousing bridge interpreted the TAT images as more sexual and were more likely to contact the attractive researcher after the study, compared to those who crossed the non-arousing bridge. An explanation for these results according to Reis and Sprecher (2009) is called the misattribution of arousal. This occurs when people misattribute the cause of their arousal from one situation to another. In Dutton and Aron's (1974) study, the men misattributed their physiological arousal from the arousing bridge condition as attraction to the women.

Amato (1986) considered whether emotional arousal would influence helping behaviors. Shortly after a major bushfire in Melbourne, Australia, Amato (1986) distributed a questionnaire asking participants to report their emotional reactions to the fire. Participants were asked whether they had donated to any of the bushfire relief funds and if so, how much money? Results indicated that those who experienced a higher level of emotional arousal (e.g. terror, horror, or shock) were significantly more likely to donate to the relief funds and report wanting to help the victims of the fire. Hartmann, Apaolaza, D'Souza, Barrutia & Echebarria (2014) tested whether fear arousal would increase people's pro-environmental intentions. The researchers showed participants images of damage related to climate change (e.g. drought, floods, wildfires) and measured their fear arousal responses. Results indicated that exposure to a threat such as climate change increased participants fear arousal. In turn, this influences pro-environmental intentions, specifically, to purchase green electricity and support implementation of a carbon tax. Essentially, fear arousal, as a result of exposure to extreme environmental threats, can influence individual's willingness to engage in pro-environmental behaviors.

Our motivation for the current study was influenced by the previous studies that indicate arousal can influence helping behaviors and intentions. We aimed to expand the research by finding additional ways to gain support for an environmental issue by evoking arousal. Our current research was also motivated by the current political climate regarding environmental issues. Because there is not a wide consensus in the existence of global warming (Gallup & Newport, 2010), raising awareness is critical as attention to improving and maintaining a healthy environment is important now more than ever. If arousal is a way to get others to engage in sustainable behavior or even the intention to do so, then this would have important implications for the environment and those who live within it. If arousal could influence the misattribution of attraction to another person, what other influences could arousal have? In this current study, we question whether arousal can influence individual's

willingness to contribute to an environmental cause? We hypothesized that arousal would increase concern for an environmental cause, willingness to sign an environmental petition, and willingness to donate to the environmental cause.

## Methods

### Participants

A pilot study was conducted which had 51 participants (23 females and 28 males; 20.41 years and 21.91 years for the control and the experimental conditions respectively) (Appendix Figure 7 and 8). It was found that many participants did not understand what was meant by “arousal” in our questionnaire. As a result, we included the definition of “arousal” with the question.

Our formal study included 95 participants (66 females and 27 males; mean age = 21.1 years; 20.23 years and 21.96 years for the control and the experimental conditions respectively) (Appendix Figure 1 and 2). There were 48 participants in the control condition and 47 in the experimental condition. The demographics of the participants ranged in age, major, and gender. Most of the participants are majoring in Psychology, Biology and Economics among other majors. A total of 146 participants were involved in our experiment including the pilot study.

### Conditions

The participants were randomly assigned to either the experimental condition or the control condition. Participants in the experimental condition were shown an arousing video of a roller coaster. Participants in the control condition were shown a neutral, non-arousing video of a train travelling down a straight path. Both the videos were 20 seconds long (Appendix Videos) and both conditions were given identical questionnaires. The independent variable was arousal, which was manipulated by the videos shown. The dependent variable was participants’ concern for the environmental issue and willingness to sign a petition and donate to the environmental issue.

### Measures

A questionnaire was created for the purpose of this study using Google Forms, including a mixture of multiple choice, yes-no questions, and Likert-type scales (Appendix Questionnaire). Arousal was operationalized in the questionnaire as “the state of being physiologically alert, awake, and attentive”. Level of arousal was self-reported by the respondent on a scale from 1-10, with 1 being *not at all arousing* and 10 being *extremely arousing*. The valence of participant’s arousal was measured using a multiple choice question of either positive, neutral, or negative arousal. However, valence was filtered out due to the lack of negative interpretation. Consequently, the effects of the participants’ level of arousal was then examined. These effects include level of concern for the environmental cause in question, which was saving the Great Barrier Reef, measured on a 5-point Likert scale, with 1 being *not very concerned* and 5 being *very concerned*. The participants self-reported willingness to sign an environmental petition, as well as willingness to donate to the environmental cause were also measured. Willingness to donate was measured using a

multiple choice question, with donation amounts ranging from \$0 to \$50. An “other” option was included for participants who wished to fill out personalized responses. Demographics were collected in the last portion of the questionnaire to determine participants’ gender, age, and major.

### Procedure

The research was conducted in the Irving K. Barber Learning Centre by approaching students over the course of the semester. The researchers’ personal laptops were used and handed to students who agreed to participate in the study. Data was simultaneously collected online after posting the survey link on various university student groups.

The survey consisted of three main sections. After reading the consent form, participants agreed to take part in the study by clicking the “next” button. The first portion consisted of a muted 20-second video of a first-person view of a roller coaster for the experimental condition or a train riding through Dubai, for the control conditions. Next, participants read a short paragraph detailing the deteriorating condition of the Great Barrier Reef before continuing to the questionnaire. Lastly, participants answered some demographic questions about themselves. An optional section for participants to submit their email addresses was included at the end of the survey, to be entered into a draw to win a \$25 Food Services gift card. Optional debriefing was available in person and through email to those who inquired.

### Results

The overall results are shown in Appendix Table 1. One-tailed independent-sample *t*-tests were used to compare arousal level, concern for the cause, and the amount of money participants were willing to donate between the experimental and control conditions. The difference in arousal level was significant between the experimental ( $M = 7.19$ ,  $SD = 1.80$ ) and control conditions ( $M = 3.00$ ,  $SD = 1.91$ );  $t(92.86) = 11.00$ ,  $p < .01$  (Appendix Figure 3). This result suggests that the arousal level of participants is higher in the experimental condition, which is a manipulation check of the current research. Moreover, the difference of concern was significant between the experimental ( $M = 3.79$ ,  $SD = 0.95$ ) and control conditions ( $M = 3.31$ ,  $SD = 1.22$ );  $t(88.60) = 2.11$ ,  $p = .02$  (Appendix Figure 4). However, the difference of the amount of money willing to be donated was not significant between the experimental ( $M = 12.66$ ,  $SD = 10.42$ ) and control conditions ( $M = 12.29$ ,  $SD = 16.01$ );  $t(80.97) = 0.13$ ,  $p = .45$  (Appendix Figure 5). A  $\chi^2$  test of independence was also performed to compare the frequency of willingness to sign the petition between conditions. A significant interaction was found ( $\chi^2(1) = 5.58$ ,  $p = .02$ ). Willingness to sign was higher in the experimental condition ( $M = .91$ ) than in the control condition ( $M = .73$ ) (Appendix Figure 6).

Pearson correlations were calculated to examine the relationship between arousal level with the following: concern for the cause, the amount of money participants were willing to donate, and willingness to sign in both conditions. Results indicated that there was only a significant positive association between arousal level and concern in the experimental condition ( $r(45) = .29$ ,  $p = .05$ ) (Appendix Table 2).

The same analyses were performed on the pilot data (Appendix Table 1, Table 2, and Figure 9~12).

### Discussion

The purpose of this study was to determine if arousal would increase concern and compliance towards a sustainability effort. The results of the experiment demonstrate that the hypothesis is mostly correct. Arousal appears to increase concern for an environmental issue and willingness to sign an environmental petition, however arousal did not seem to have an effect on willingness to donate to an environmental cause. There are several important interpretations, implications, and suggestions that can be drawn from the conducted research.

The results from this experiment may be explained by the misattribution of arousal. First of all, arousal can be ambiguous (Schachter & Singer, 1962) this means that the physiological symptoms for all states of arousal are quite similar. For instance, anxiety and excitement both have similar symptoms (e.g. increased heart rate), but it is the contextual interpretation of the symptoms that determines their emotion. In Schachter and Singer's (1962) experiment the participants were put in a high state of arousal with an injection of epinephrine. They found that participants would report different emotions (e.g. anger or euphoria) based on the situation they were presented with. This same philosophy can be applied to the experiment conducted for this paper. In the experiment, participants in the experimental group were exposed to an arousing video. According to Schachter and Singer (1962), participants should then interpret their arousal as concern for the environmental issue presented, and consequently increase willingness to sign an environmental petition. However, this is all speculative, as it is impossible to know if the participants' concern or their arousal is increasing their willingness to sign.

Although arousal increases concern and willingness to sign an environmental petition, the same results not seen for willingness to donate to an environmental cause. There are several reasons why arousal did have a significant effect on willingness to donate to an environmental cause. One reason this may have occurred is because the participants were not asked about their income. A large majority of our participants were university students in their early twenties. According to Statistics Canada (2015), people in this age demographic tend to have lower income, and thus would be less willing to donate money. A second reason this might have happened is due to how willingness to donate was measured by the questionnaire. The question asked "How much money would you be willing to donate to this cause?". There were 7 possible responses: \$0, \$10, \$20, \$30, \$40, \$50, or other. Perhaps the price bracket for donations was too high for our target demographic. Future studies should attempt to control for socioeconomic status.

For other implications, it seems that arousal is easily manipulated and that the source of arousal is not important. In the conducted research, the two videos used were only about 20 seconds long. They also had nothing to do with the environmental issue discussed in the questionnaire. However, the results show there were significant differences in levels of arousal between the experimental and control groups (Appendix Figure 3). This is important as any arousing imagery, setting, or stimuli can be associated with and can raise concern for an environmental issue, as arousal is easily induced and context does not seem to matter.

This study has several limitations which should be considered for future research. One limitation is that the majority of the participants were university students around 20 years old. Since the participants are from a small convenience sample and a similar demographic it makes generalizing the results to a larger population difficult. Future studies should look to collect a larger sample and gather results from a variety of areas. Another issue is that this experiment may have low ecological validity. For instance, people may not be given videos to watch and then asked how willing they are to sign a petition on a regular basis. Our experiment only measured intended behaviour, as the questionnaire asked how willing people would be to sign an environmental petition or donate. Future research can improve on these issues by conducting research in areas where people are naturally in higher states of arousal and asking them to sign a real environmental petition or actually donate, thereby measuring actual behaviour. Another limitation was that we did not consider valence in our results. Measuring valence could be important for future studies. Previous research suggests that people with Western backgrounds prefer high arousal positive (HAP) affect while Eastern backgrounds value low arousal positive (LAP) affect (e.g., Gobster, 2002; Sims, Koopmann-Holm, Young, Jiang, Fung, & Tsai, 2017). Perhaps the results of our research are culture specific. The results may be explained by most participants being from Western backgrounds and viewing the arousing video as HAP, therefore catering to their ideal state of happiness. If this is true, then mood would be playing a large factor in the results. Similar research needs to be done with other cultures with LAP, HAP, low arousal negative, and high arousal negative conditions.

### **Recommendations for UBC Client**

There are a variety of ways University of British Columbia (UBC) and the client can apply our findings. UBC has many campus initiatives (<https://sustain.ubc.ca/campus-initiatives>) which they would like to raise awareness for. Perhaps coupling the information with an arousing stimuli will raise concern for their initiatives, as our research found arousal to be easily manipulated and it raises concern for environmental efforts. Posters presenting information about these campus initiatives could be placed in areas where students will be in a high state of arousal: gyms, exam halls, or the Aquatic Centre. If the client and UBC students are trying to gather support for an environmental petition, they can also collect signatures in places where people are naturally in a higher state of arousal. UBC has a variety of clubs which strive to help the community and the environment, such as the UBC Rotaract Club, Botany Enthusiasts Club and the UBC Emerging Green Builders. Clubs like these could invite potential members to a hike, and afterwards ask participants to commit to the club. Specifically, the client could fill volunteer positions for the botanical garden by asking students doing the canopy walk, the bird tour, and grow green guide tour in the botanical garden. Further, the client could ensure that the community returns for future activities by having sign-up sheets available at the end of the event, as a majority of their events could possibly lead to a higher state of arousal. Overall there are a variety of ways that our findings could be applied to creating a sustainable future for UBC.

### References

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## Appendix

### Tables

Table 1

*The table of number of samples, the means, standard deviations of participant's age, arousal level, concern, willingness to donate what amount of money, and willingness to sign the environmental petition, and the statistics results.*

	n	Age	Arousal	Concern	Donation	Sign
Control (SD)	48	20.23 (1.55)	3.00 (1.91)	3.31 (1.22)	12.29 (16.01)	0.73
Experimental (SD)	47	21.96 (5.07)	7.19 (1.80)	3.79 (0.95)	12.66 (10.42)	0.91
t			11.00***	2.11**	0.13	
$\chi^2$						5.58**
p			<0.01	0.02	0.45	0.02
df			92.86	88.6	80.97	1

Table 2

*The table of Pearson correlations and p-values between arousal level and concern, willingness to donate what amount of money, and willingness to sign the environmental petition in each group.*

	Concern	Donation	Sign
r (Control)	0.17	0.15	0.17
p	0.24	0.3	0.24
r (Experimental)	0.29*	-0.02	0.16
p	0.05	0.88	0.28

Table 3

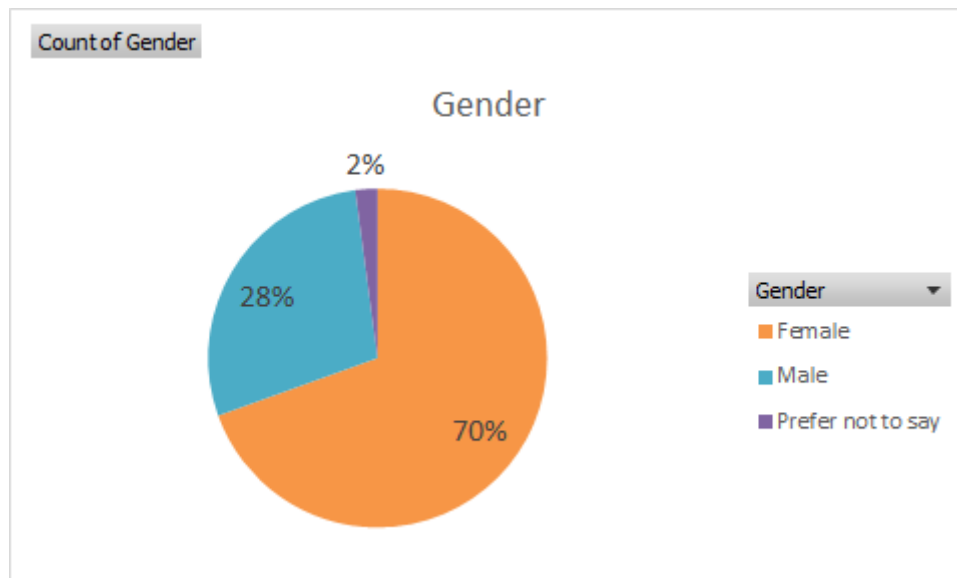
*The table of number of samples, the means, standard deviations of participant's age, arousal level, concern, willingness to donate what amount of money, and willingness to sign the environmental petition, and the statistics results from the pilot data.*

	n	Age	Arousal	Concern	Donation	Sign
Control (SD)	17	20.41 (2.32)	3.65 (1.9)	3.71 (0.92)	14.41 (13.91)	0.82
Experimental (SD)	34	21.91 (6.01)	4.88 (2.48)	3.71 (0.94)	16.18 (18.59)	0.85
t			1.97**	0	0.38	
$\chi^2$						0.07
p			0.03	0.5	0.35	0.79
df			40.6	32.7	41.36	1

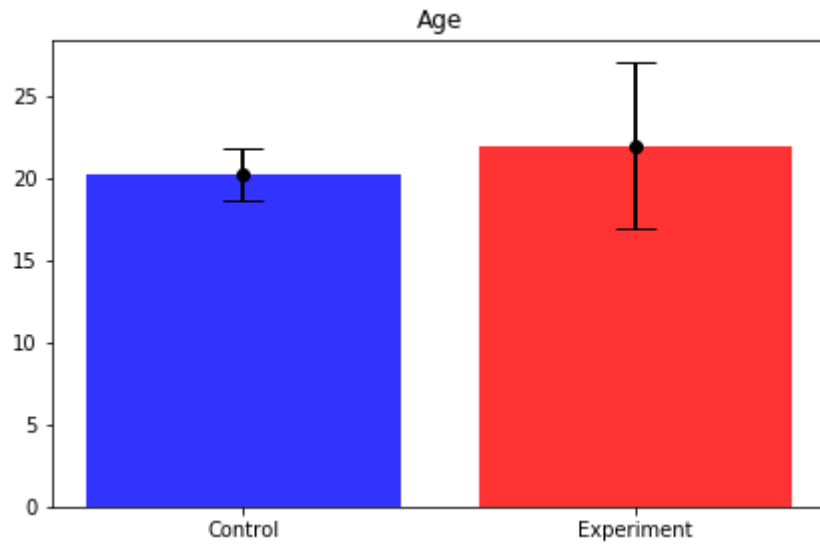
Table 4

*The table of Pearson correlations and p-values between arousal level and concern, willingness to donate what amount of money, and willingness to sign the environmental petition in each group from the pilot data.*

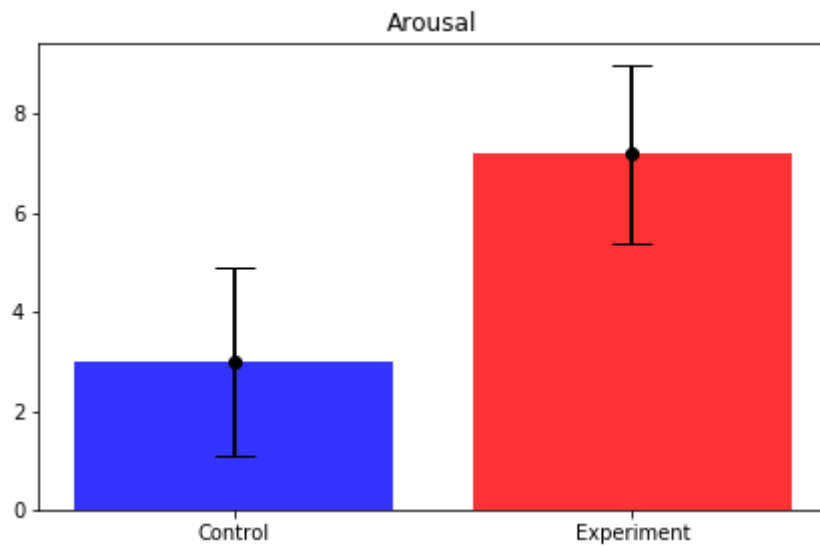
	Concern	Donation	Sign
r (Control)	0.33	0.24	0.41
p	0.2	0.35	0.1
r (Experimental)	-0.16	0.21	0.05
p	0.37	0.23	0.79

**Figures**

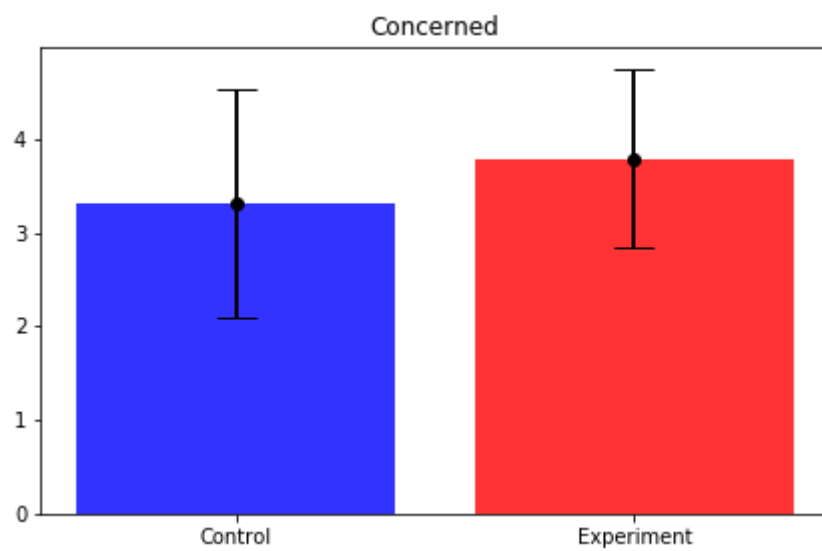
*Figure 1.* A pie graph of participants' gender.



*Figure 2.* A bar graph of participants' age. The error bar shows the standard deviation of each group.

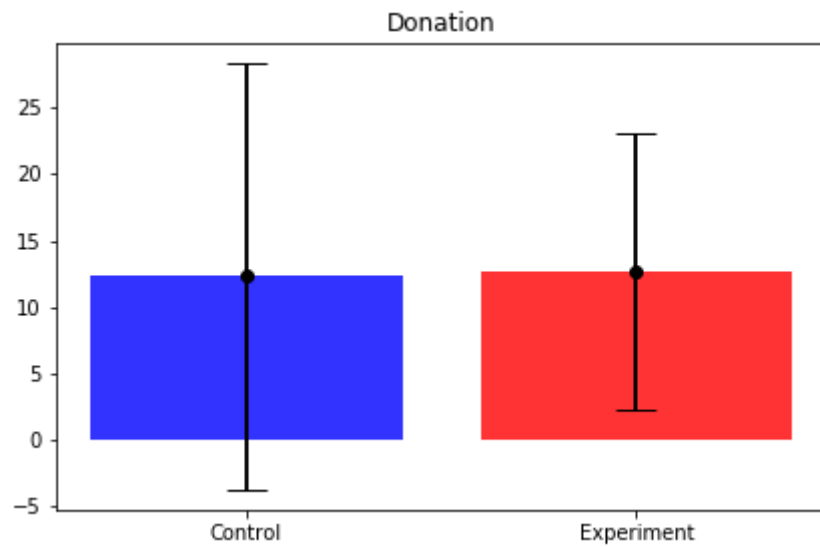


*Figure 3.* A bar graph of participants' arousal level. The error bar shows the standard deviation of each group. There is a significant difference between groups;  $t(92.86) = 11.00$ ,  $p < .01$ .

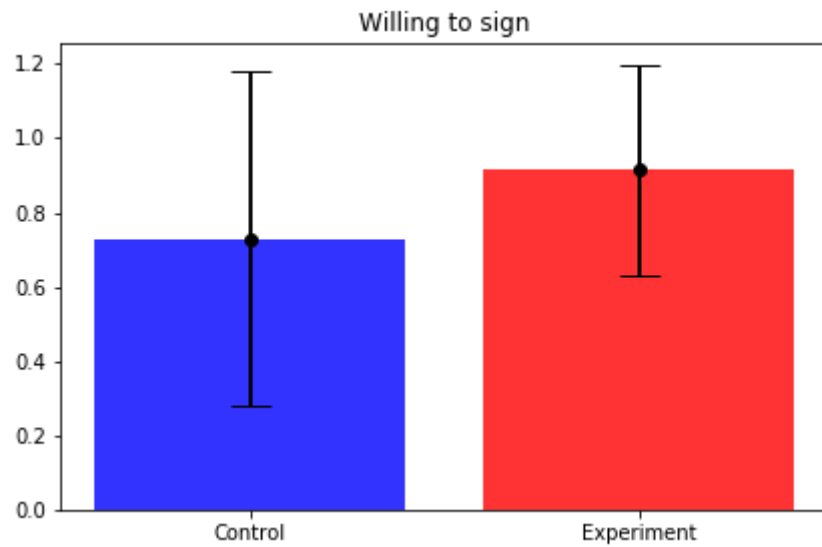


*Figure 4.* A bar graph of participants' concern to the environmental cause. The error bar shows the standard deviation of each group. There is a significant difference between groups;  $t(88.60) = 2.11, p = .02$ .





*Figure 5.* A bar graph of the amount of money the participants are willing to donate. The error bar shows the standard deviation of each group. There is no significant difference between groups;  $t(80.97) = 0.13$ ,  $p = .45$ .



*Figure 6.* A bar graph of participants' willingness to sign the environmental petition. The error bar shows the standard deviation of each group. There is a significant difference between groups;  $\chi^2(1) = 5.58, p = .02$ .

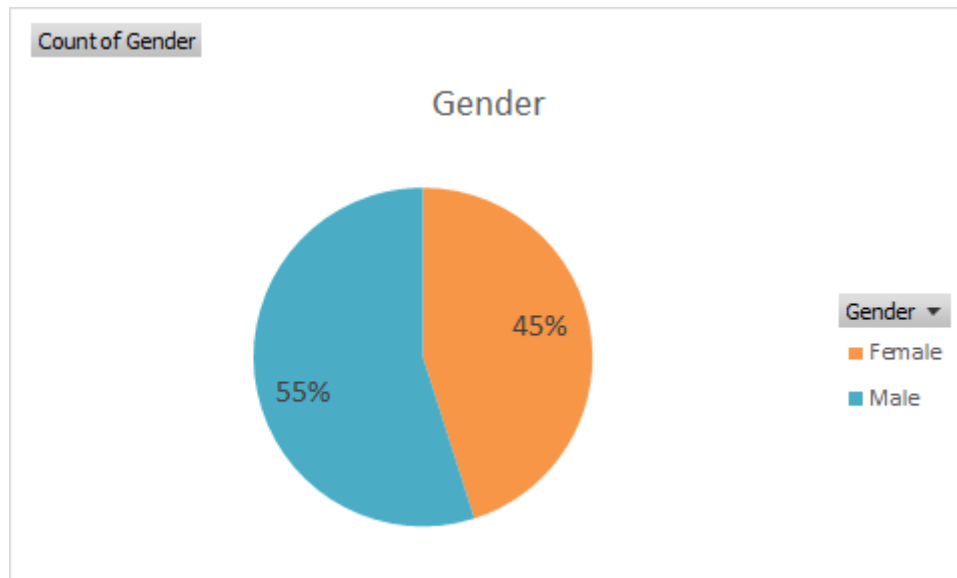
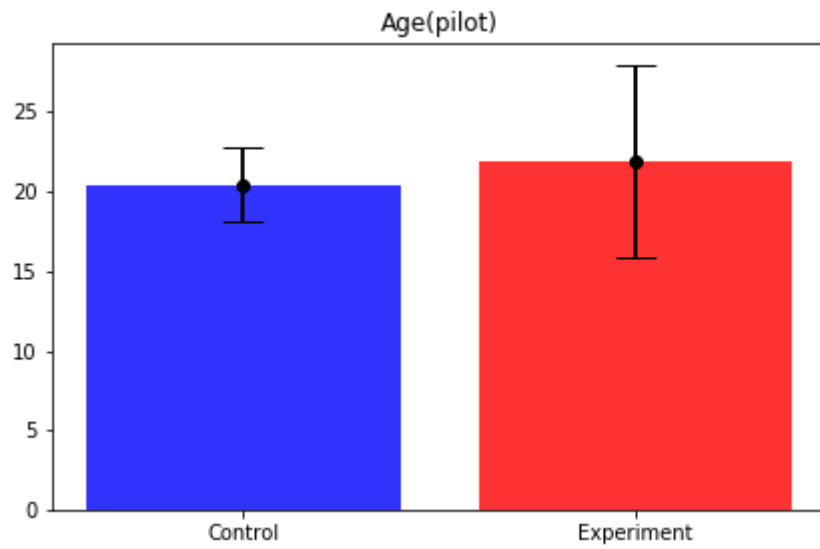
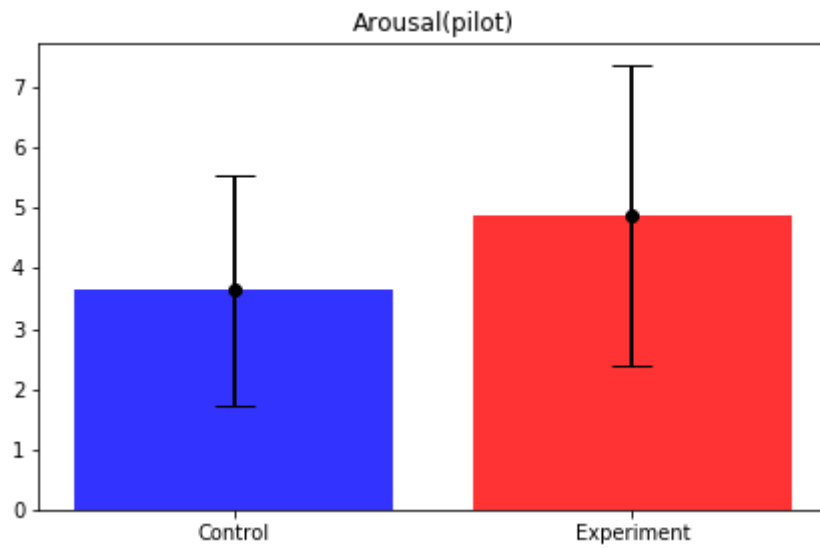


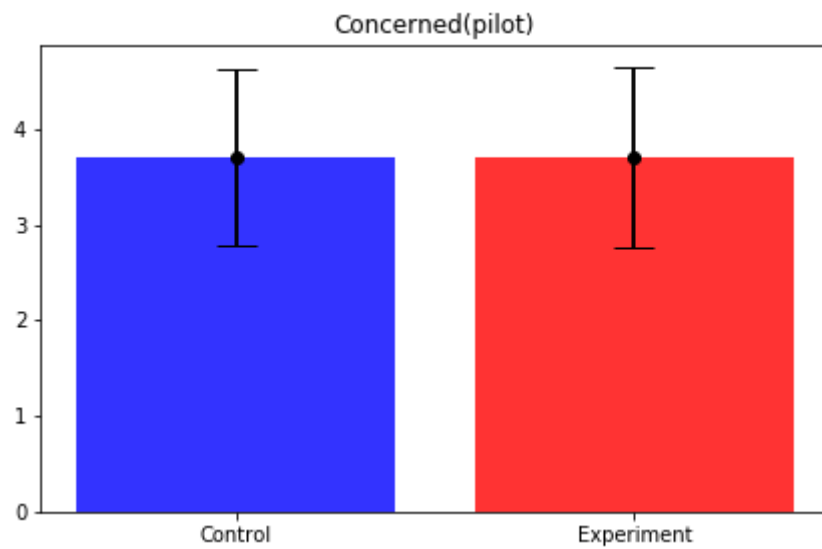
Figure 7. A pie graph of participants' gender in pilot data.



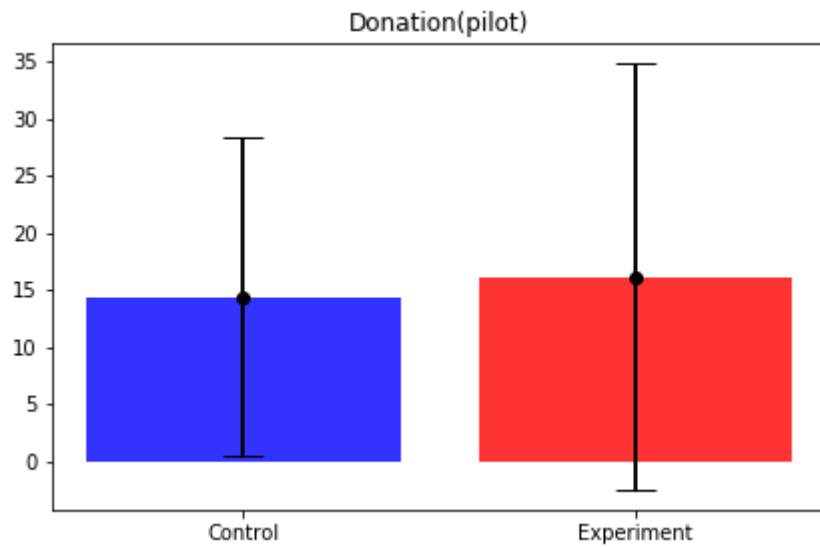
*Figure 8.* A bar graph of participants' age in pilot data. The error bar shows the standard deviation of each group.



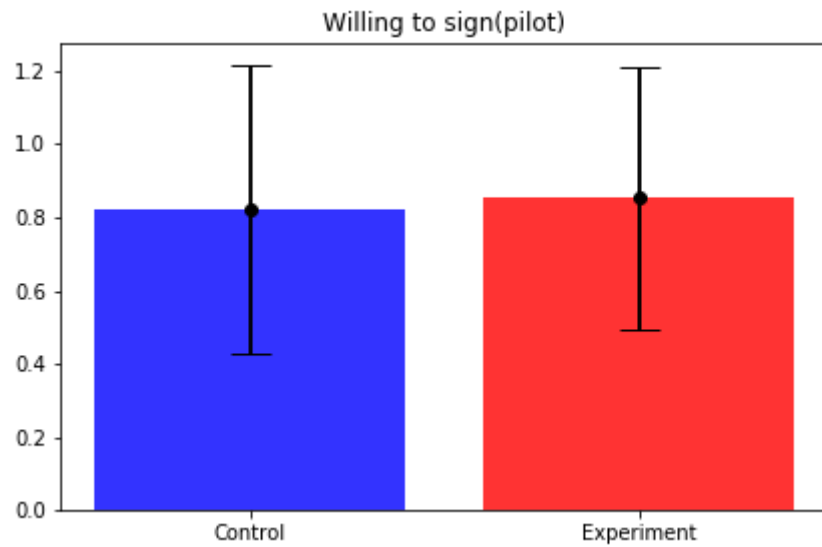
*Figure 9.* A bar graph of participants' arousal level in pilot data. The error bar shows the standard deviation of each group.



*Figure 10.* A bar graph of participants' concern to the environmental cause in pilot data. The error bar shows the standard deviation of each group.



*Figure 11.* A bar graph of the amount of money the participants are willing to donate in pilot data. The error bar shows the standard deviation of each group.



*Figure 12.* A bar graph of participants' willingness to sign the environmental petition in pilot data. The error bar shows the standard deviation of each group.



**Questionnaire**

# Thoughts about the video

Description (optional)

How arousing did you find the video? \*

Arousal is the state of being physiologically alert, awake, and attentive.

	1	2	3	4	5	6	7	8	9	10	
Not at all arousing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely arousing

Do you find the video to be positive, neutral, or negative? \*

- Positive
- Neutral
- Negative

## The Great Barrier Reef

"The Great Barrier Reef is a natural wonder of the world. It's an icon that is home to 1,500 species of fish and 400 species of coral.

But now, it's at risk.

Marine projects that involve dredging large portions of seabed in one location and then dumping them in another location, causing disastrous impacts to the Great Barrier Reef." (Change.org)

Image title



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How concerned are you with saving the Great Barrier Reef? \*

	1	2	3	4	5	
Not very concerned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very concerned

How much money would you be willing to donate to this cause? \*

- \$0
- \$10
- \$20
- \$30
- \$40
- \$50
- Other...

Are you willing to sign a petition to save the Great Barrier Reef? \*

- Yes
- No

**Gender Identity \***

- Female
- Male
- Prefer not to say
- Other...

**Age? \***

Short answer text  
.....

**Major (or Intended Major)**

Short answer text  
.....

**Email Address**

Please enter your email address if you are interested in entering the draw for a \$25 UBC Food Services gift card.

Short answer text  
.....

**Videos**

Experimental video: <https://www.youtube.com/watch?v=56H9466cGOE>

Control video: <https://www.youtube.com/watch?v=NsoGmMh-ucA>