The Effects of Biophilic Art on Affective Well-Being

Prepared by: Aimee Lutrin, Varnika Gupta, Prabhangad Kahlon, Trisha Naik, Krysten Spencer, Bita Jokar

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The Effects of Biophilic Art on Affective Well-Being

Aimee Lutrin, Varnika Gupta, Prabhangad Kahlon, Trisha Naik, Krysten Spencer, Bita Jokar

Group Name: The Green Knights

The University of British Columbia

PSYC 421 001: Environmental Psychology

Dr. Jiaying Zhao

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Executive Summary

Current research indicates the positive benefits of biophilia as well as art on affective well-being. However, there is a knowledge gap surrounding the effects of biophilic art on affective well-being, specifically when integrated into design. This study examines the effects of biophilic art compared to actual biophilia on affective well-being in the context of biophilic design elements. We hypothesise that actual biophilia and biophilic art have similar effects on affective well-being. We conducted an independent-samples T-test between the two conditions on 10 measures: Motivated, Calm, Tired, Bored, Gloomy, Active, At ease, Anxious, Annoyed, and Happy. Our preliminary findings reveal there is no significant difference found between the two conditions on any measure, indicating that biophilic art may be an appropriate substitute for actual biophilia in interior design.

Key Words: Biophilia, Biophilic Art, Student Well-Being, Greenery, Green Spaces, Positive and Negative Affect, Mental Well-Being, Interior Design

Project Title: The Effects of Biophilic Art on Affective Well-Being

Introduction

Since the emergence of COVID-19 in 2020, British Columbians and other global citizens have been subject to numerous restrictive measures to control the outbreak. These measures, especially "stay-at-home orders" and quarantine, have been observed to have detrimental effects on mental health, particularly well-being (Samji et al., 2021). Given the indefinite nature of "well-being", we have chosen to define the term as positive and negative psychological states better captured by the term "affective well-being". A significant contributor to the negative effects on affective well-being is how these measures enforce and encourage staying indoors. Long-term compliance with these social distancing measures, as well as increased "perceived mental health" (Gilmour & Ramage-Morin, 2016) is leaving many frustrated, irritated, and wanting to leave their quarantine space and bring back feelings of normalcy. In fact, the impacts of these measures are so dire that researchers predict an incoming new "wave" of the pandemic consisting of mental health issues (Bhatia & Goyal, 2020).

Given this prediction, the question of how to circumvent this new "wave" is raised. One solution that we generated has to do with "biophilia", which is defined by Fromm (1963) as the love of life that explains two fundamental tendencies of living organisms: sustaining life from death threats and the positive integration with each other. Furthermore, Wilson (1984) has proposed the "Biophilia Hypothesis", which emphasizes the inherent and biologically-based human need to connect with life and lifelike processes. Using these as foundations for our study, we explore biophilia in the context of design, which includes the utilization of nature in architecture. Yin et al. (2018) found that participants exposed to an indoor biophilic environment reflected better well-being than patients exposed to a non-biophilic indoor environment. The reports incorporate cognitive measures with the participants showing a decrease in negative emotions and an increase in positive emotions when exposed to the biophilic setting.

Despite its benefits, there are barriers to implementing biophilia in interior design. Söderlund (2019) identifies the universality of these barriers across cities, the most prominent being financial barriers such as higher initial costs and ongoing maintenance and labour. Additionally, these barriers include relying on novice technologies needed to implement and maintain biophilia, high water use, and lack of understanding and precedent.

Given these drawbacks, we consider an alternative to integrating biophilia and interior design: biophilic art. In line with various studies concluding that aesthetic experiences, such as art, can improve health and well-being, we believe biophilic art may be an appropriate substitute for real biophilia in indoor settings. Mastandrea et al. (2019) find a neuroaesthetic explanation for the aforementioned phenomenon and propounds the interaction between emotional processing in reward pathways from the brain and an individual's top-down processing. Consequently, this self-rewarding nature of aesthetic experiences could influence an individual's affective state and thus, potentially improve affective well-being.

The conclusions from prior research, such as Yin et al. (2018) and Mastandrea et al. (2019), prompted the question of what entails the consolidation of biophilic architecture and art on an individual's affective well-being. Presently, there is a sparse amount of research that explores this consolidation and creates a knowledge gap. Our research project aims to delve deeper

into this knowledge gap and answer the question through a study within the demographic of students, particularly those of the University of British Columbia. This particular study focuses on biophilic art, which is artistic renditions depicting greenery, and actual biophilia, which is real greenery in interior design presented in photographic form, as its conditions.

As the COVID-19 pandemic persists, unprecedented impacts on well-being have been observed as individuals are constrained to indoor spaces more frequently. Therefore, it is crucial that more focus on the implications of these restrictive measures on emotions, and so, well-being, is done to cope with the outbreak and facilitate an easier return to normalcy.

Research Question and Hypothesis

Our project's research question is: "What impact does biophilic art have on student affective well-being compared to actual biophilia?" Given the positive impact of biophilia on affect and well-being (Yin et al., 2018), as well as the positive influence of artwork on affect (Mastandrea et al., 2019), we hypothesise that actual biophilia and biophilic art have similar effects on affective well-being.

Methods

Participants: Our study's target sample was 260 participants, according to our power analysis; however, we collected data from 147 participants in the allotted collection period. We aimed to collect data from students, faculty, and staff affiliated with The University of British Columbia (UBC) and have them complete our survey via Qualtrics. At the end of our data collection, we excluded 4 participants' data due to Qualtrics errors, and 37 participants' data due to the incompleteness of the study. 106 valid final responses were recorded, of which 78 are current UBC students. The majority of our participant pool consisted of individuals between the ages of 16-25 years old ($N = 100$), and women ($N = 82$). Three of our participants had tested positive for COVID-19 in the previous 30 days and six individuals had to quarantine over the previous 30 days.

Conditions: This study's dependent variable is affective well-being and our independent variables include exposure to photographs of actual biophilia versus biophilic art. Our study included a between-subjects design where participants were either assigned to a Real Biophilia condition or a Biophilic Art condition. In the Real Biophilia condition, participants were exposed to images of real biophilia incorporated into interior design elements (See Appendix A). For instance, these images include wall murals and fixtures that incorporate greenery. In the Biophilic Art condition, participants are shown images of artwork that incorporate biophilic elements (See Appendix A).

Measures: To accurately measure the impact of our independent variables on participants' affective well-being, we had our participants answer questions concerning their background (See Appendix A) so as to eliminate any confounding variables. Doing so assures that the impact of one's affective well-being is solely the result of our manipulation. The Daniel's Five-Factor measure (D-FAW) was used to measure our dependent variable, which is affective well-being. It is a short-form measure consisting of 10 items that are rated from 1 being "not at all" to 6 being "very much." We chose to implement this measure as it asks participants to rate their current affect in the present moment as seen in the following question, "In this section below, please indicate how you feel **right now**, that is, at the present moment." Daniels and Russel's (2018) identify that the factor structure of the short-form D-FAW is robust when used as a standalone measure and when participants'

instructions focus on now or today, then affect is best represented by five discrete emotion factors.

Procedure: Our study was developed using the Qualtrics platform, and was distributed to participants within our community via social media channels (e.g., Instagram, Facebook, WhatsApp, and text message) to ensure maximum exposure. Our data collection period lasted between March 3rd and March 22nd, 2022. Initially, participants were provided with a consent form, which included a brief study description. Next, participants completed a series of background demographic questions pertaining to their affiliation with UBC, as well as their age, gender identity, SES, and more. Afterwards, participants were separated according to their condition and were prompted to view ten images of either actual biophilia or biophilic art. After viewing the images one at a time, participants completed the D-FAW measure and answered a series of follow-up questions pertaining to their frequency of exposure to art and nature, as well as how connected they feel to art and nature (See Appendix A).

Results

We used the open-source statistical analysis software JASP for our data analyses. We conducted an independent-samples T-test between the two conditions on 10 measures: Motivated, Calm, Tired, Bored, Gloomy, Active, At ease, Anxious, Annoyed, and Happy. While 9 of the 10 measures yielded results with no statistical significance, all 10 measures produced similar findings between conditions indicating that biophilic art may be an appropriate substitute for actual biophilia in interior design. Comparing the Biophilic Art and Real Biophilia conditions within the measures, our independent-samples T-test produced a value of $T = 1.224$ (p = 0.224) for the Motivated measure; $T = -0.083$ ($P = 0.934$) for the Calm measure; $T = -0.064$ ($P = 0.949$) for the Tired measure; $T = 1.099$ ($P = 0.274$) for the Bored measure, $T = 0.831$($P = 0.408$) for the Gloomy measure, $T = 2.141$ ($P = 0.035$*) for the Active measure, $T = -0.623$ ($P = 0.535$) for the At Ease measure, $T = 0.655$ ($P = 0.514$) for the Anxious measure, $T = -0.056$ ($P = 0.956$) for the Annoyed measure, and $T = 0.057$ ($P = 0.954$) for the Happy measure. Each condition's mean scores for each measure are reflected in the graphs presented in Appendix C.

Participants were asked about their familiarity with the images that they were exposed to and the majority were **not at all** familiar with the images presented (38.6%) or **slightly familiar** (35.8%). When asked how frequently they are exposed to art (43.3%) and nature (46%), the majority of participants chose **daily**. In terms of their general feelings of connection towards art and nature, the majority of participants chose **somewhat connected** to art (40.5%), whereas the majority of participants chose **deeply connected** to nature (48.1%).

Discussion

Our results suggest that biophilic art may be used in lieu of actual biophilia due to the lack of difference in student affective well-being between the two conditions. This is supported by the similar T-test values we found across the ten measures used in both conditions of our study. While a larger sample size is needed to determine a definite conclusion, we can infer from the similar T-test values across conditions that biophilic art may provide similar effects on affective well-being as real biophilia.

Implementing biophilic art may be more environmentally sustainable due to a direct cut in the required natural and financial resources, as well as the required labour forces. Additionally,

this would be a less demanding alternative that takes into account a significant public issue in today's environment, COVID-impacted work behaviours, and provides the same well-being effect as natural biophilia.

This paper proposes the all-inclusive nature of art in the sense that it can be more readily employed in a larger number of locations that constitute different age groups and cultures as opposed to actual biophilia because of its convenience and undemanding installation and maintenance. Overall, this would make implementing biophilic art advantageous as it provides the benefits of actual biophilia on well-being while being a more environmentally and financially sustainable option.

Limitations

It is important to note the limitations of our study as guidance for future research. First, our study did not reach its participant goal as determined by our power analysis leading to no concluding statistical significance and high p-values. Second, having a control group, in addition to our two experimental groups, who would have not been exposed to any pictures at all, would have helped clarify the meaning of our results. Additionally, it would have been interesting to see how our study would be framed if a null hypothesis was not used. Since our study was an online study, the effects may be different compared to an in-person study where there are real, tangible influences of art compared to real biophilia. Last, future research may consider changing the wording in a few of our survey questions. For example, the question regarding political stances (Question 7) would benefit from more multiple-choice options. Additionally, the wording of student status questions (Questions 1 and 2) were limited to UBC students, as many participants who filled out our survey were from other universities who had no way of specifying they were of another similar status.

Recommendations

Although a larger sample is needed to determine a conclusion, the preliminary findings of the present study suggest that artwork incorporating biophilia may be used as a substitute for real biophilia in interior design at The University of British Columbia. Hence, we suggest the implementation of biophilic artwork derived from local artists, including UBC Visual Art (BFA) students. More specifically, we suggest hanging artwork in areas that are heavily populated with students at UBC, to ensure maximal exposure. These spaces could include the plethora of libraries on campus (e.g., IKR, Koerner's library, etc.), casual study spaces (e.g., forestry building, CIRS), and other frequented areas (e.g., Nest, Life building, etc.).

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Appendix A: Study Questionnaire

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Consent Form

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Class Research Projects in PSYC 421 - Environmental Psychology

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Principal Investigator: Dr. Jiaying Zhao

                                Course Instructor

                                Department of Psychology

                                Institute for Resources, Environment and Sustainability

                                Email: jiayingz@psych.ubc.ca

Introduction and Purpose

Students in the PSYC 421 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, analyze data, present their findings in class, and submit a final report. Their projects can include surveys, observations, and simple experiments on waste sorting on campus, student health and wellbeing, food consumption and diet, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.

Study Procedures

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

Confidentiality

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

Remuneration

There is no remuneration for your participation.

Contact for information about the study

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

Contact for concerns about the rights of research subjects

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Implications

We do not foresee any potential harms to the participant, outside of those experienced in day-to-day life. Potential benefits may include gaining experience in psychological research. Implications of this study include bettering learning environments for students at UBC.

Consent

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. You also may postpone your decision to participate for 24 hours. You have the right to choose to not answer some or any of the questions. By clicking the "continue" button, you are indicating your consent to participate; hence, your signature is not required. The researchers encourage you to keep this information sheet for your records. Please feel free to ask the investigator any additional questions that you have about the study.

We do not foresee any potential harms to the participant, outside of those experienced in day-to-day life. Potential benefits may include gaining experience in psychological research. Implications of this study include bettering learning environments for students at UBC.

Background Questions

1. Which of the following groups at UBC are you affiliated with:
    a. Student
    b. Faculty
    c. Staff
    d. Other _____

2. If you're a UBC student, what year of your program are you in?
    a. 1st year
    b. 2nd year
    c. 3rd year
    d. 4th year

  e. 5th year +

  f. Graduate Student

  g. N/A

3. Do you currently live on UBC campus?

  a. Yes

  b. No

  c. Other _____

4. What is your age?

  a. 16-25

  b. 26-35

  c. 35-45

  d. 45+

  e. I prefer not to respond.

5. What is your total yearly household income?

  a. <10,000

  b. 10,000-29,000

  c. 30,000-59,000

  d. 60,000-99,000

  e. 100,000+

  f. I prefer not to respond.

6. Which of the following gender identities do you associate with?

  a. Female

  b. Male

  c. Non-binary

  d. Two-Spirit

  e. Other _____

  f. I prefer not to respond.

7. What is your political orientation?

  a. Somewhat liberal

  b. Mostly liberal

  c. Mostly conservative

  d. Somewhat conservative

  e. I prefer not to respond.

8. Which of the following ethnic identities do you identify most with?

  a. White (e.g., German, Irish, English, Italian, Polish, French, etc.)

  b. Hispanic, Latino or Spanish origin (e.g., Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Colombian, etc.)

  c. Black or African American (e.g., African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, etc.)

  d. Asian (e.g., Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)

e. American Indian or Alaska Native (e.g., Navajo nation, Blackfeet tribe, Mayan, Aztec, Native Village or Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.)
f. Middle Eastern or North African (e.g., Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian, etc)
g. Native Hawaiian or Other Pacific Islander (e.g., Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, etc.)
h. Some other race, ethnicity or origin _____
i. I prefer not to respond.

9. Do you practice a religion?
a. Yes
b. No
c. I Prefer not to respond.

What religion do you practice? _____

10. Do you consider yourself to be a spiritual person?
a. Yes
b. No
c. Somewhat
d. I prefer not to respond.

11. Have you tested positive for Covid-19 in the last 30 days?
a. Yes
b. No

12. Have you been required to quarantine in the last 30 days?
a. Yes
b. No

For how long were you quarantining? _____

Section 2 (Version 1 - Biophilic Art Condition):

Please spend some time looking at the following images. Continue clicking through the survey in order to see the next image.
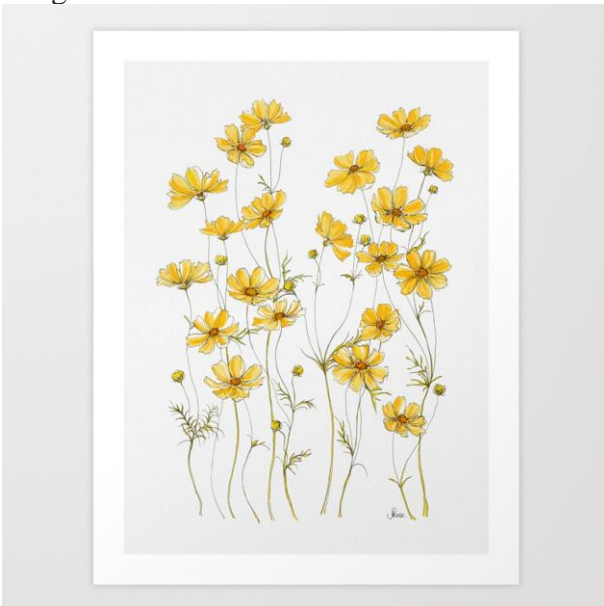
Image 1:

Image 2:

Image 3:

Image 4:

Image 5:

Image 6:

Image 7:

Image 8:

Image 9:

Image 10:

Section 2 (Version 2 - Actual Biophilia Condition):

Image 1:

Image 2:

Image 3:

Image 4:

Image 5:

Image 6:

Image 7:

Image 8:

Image 9:

Image 10:

Section 3: Questionnaire and Final Questions

In this section below, please indicate how you feel right now, that is, at the present moment. Please circle the most appropriate number on the 6 point scale, where 1 = not at all, to 6 = very much.

Happy	1	2	3	4	5	6
At Ease	1	2	3	4	5	6
Anxious	1	2	3	4	5	6
Annoyed	1	2	3	4	5	6
Motivated	1	2	3	4	5	6
Calm	1	2	3	4	5	6
Tired	1	2	3	4	5	6
Bored	1	2	3	4	5	6
Gloomy	1	2	3	4	5	6
Active	1	2	3	4	5	6

How familiar are you with the images you just saw?
   a. Not familiar at all
   b. Slightly familiar
   c. Moderately familiar
   d. Very familiar
   e. Extremely familiar

How often are you exposed to art (e.g., paintings, photographs, illustrations, etc.)?

a. Daily
b. Weekly
c. Monthly
d. Yearly
e. Not at all

How often are you exposed to nature (e.g., gardens, bodies of water, forests, etc.)?
a. Daily
b. Weekly
c. Monthly
d. Yearly
e. Not at all

How connected do you feel to art (e.g., paintings, photographs, illustrations, etc.)?
a. Deeply connected
b. Somewhat connected
c. Neutral
d. Somewhat unconnected
e. Not connected at all

How connected do you feel to nature (e.g., gardens, bodies of water, forests, etc.)?
a. Deeply connected
b. Somewhat connected
c. Neutral
d. Somewhat unconnected
e. Not connected at all

Generally speaking, how stressed are you regarding climate change?
a. No stress at all
b. A negligible amount of stress
c. A small amount of stress
d. A noticeable but tolerable amount of stress
e. A just manageable amount of stress
f. A slightly stressful amount of stress
g. A noticeable amount of stress
h. A considerable amount of stress
i. An overwhelming amount of stress

Why do you think you were shown these images? What do you think this study is about?

_____

Do you have any final questions, comments, or concerns? (optional)

_____

Section 4: Debrief form and End of Survey

Page 1:

Biophilia is the love of life that explains two fundamental tendencies of living organisms: sustaining life from death threats and the positive integration with each other (Fromm, 1963). The definition has extended to include greenery in interior design, including the use of greenery and natural materials in architecture. Current research shows the benefits of biophilia (Yin et al., 2018), as well as the positive influence of art, on affect (Mastandrea et al., 2019). Conversely, literature raises concerns of incorporating and maintaining biophilic design elements, including high initial and maintenance costs (Söderlund, 2019).

There exists a knowledge gap surrounding the effects of biophilic art in particular, and the similarities or differences between photographs of actual greenery and biophilic art. The current study investigates how biophilic art can influence affect, as compared to photographs of biophilia. This study includes a Biophilic Art condition and a Real Biophilia condition, the results of which will be compared in order to analyze differences in affective well-being.

We expect that ratings of affective well-being after being exposed to biophilic art will be similar to rankings of affective well-being after being exposed to actual biophilia. Potential implications could include more incorporation of biophilic art into buildings and spaces at UBC, which is less costly than implementing actual biophilia in spaces around UBC. Potential challenges may be the presence of confounding items in the selected images, previous exposure to the images, and response biases.

If you have any questions, comments, or concerns, please contact jiayingz@psych.ubc.ca.

Page 2:

Thank you so much for completing this study. Your participation will help make UBC more environmentally sustainable!

Appendix B: Contributions of Team Members

Aimee Lutrin
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Helped with proof-reading the Qualtrics survey
- Collected participants for the study
- Ran the data analyses on JASP
- Collaborated with team members on developing the presentation
- Collaboratively worked on the final report

Krysten Spencer
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Gathered photos used in the survey
- Helped with proof-reading the Qualtrics survey
- Collected participants for the study
- Collaborated with team members on developing the presentation
- Collaboratively worked on the final report

Bita Jokar
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Gathered photos for the survey
- Developed the Qualtrics survey
- Collected participants for the study
- Collaborated with team members on developing the presentation
- Helped with data analyses
- Collaboratively worked on the final report

Prabhangad Kahlon
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Gathered photos for the survey
- Helped with proof-reading the Qualtrics survey
- Collected participants for the study
- Helped with data analyses
- Collaborated with team members on developing the presentation
- Collaboratively worked on the final report

Varnika Gupta
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Helped with proof-reading the Qualtrics survey
- Collected participants for the study
- Helped with data analyses and created all study graphs
- Collaborated with team members on developing the presentation
- Collaboratively worked on the final report

Trisha Naik
- Attended all team meetings
- Collaboratively worked on the proposal assignment
- Helped with proof-reading the Qualtrics survey
- Collected participants for the study
- Collaborated with team members on developing the presentation
- Collaboratively worked on the final report
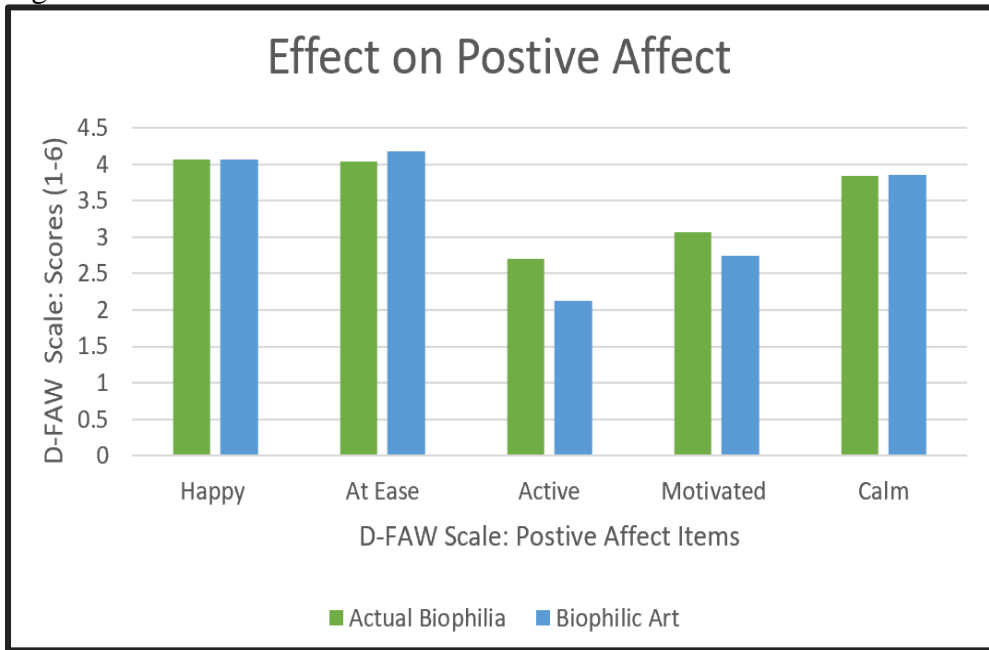
Appendix C: Descriptive Statistics

Figure 1:

Figure 2:
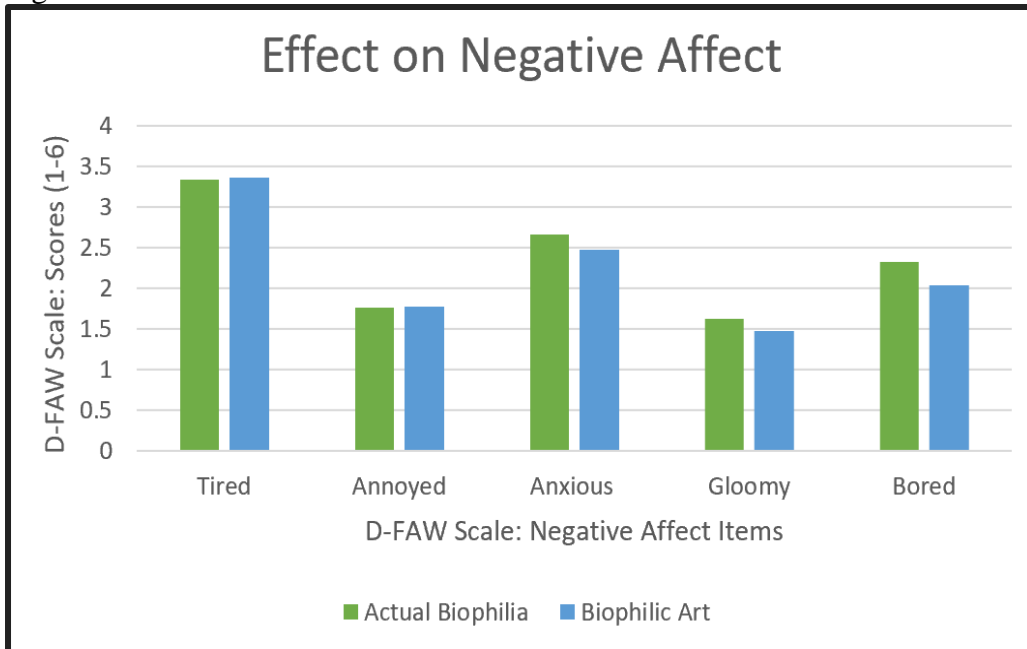
Appendix D: Inferential Statistics

Independent Samples T–Test

Independent Samples T–Test

	t	df	p
Annoyed	−0.056	104	0.956

Note. Student's t–test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Annoyed	ActualBiophiliaCondition	56	1.768	0.914	0.122
	BiophilicArtCondition	50	1.780	1.314	0.186

Independent Samples T–Test

Independent Samples T–Test

	t	df	p
Anxious	0.655	104	0.514

Note. Student's t–test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Anxious	ActualBiophiliaCondition	56	2.661	1.325	0.177
	BiophilicArtCondition	50	2.480	1.515	0.214

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
At Ease	−0.623	104	0.535

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
At Ease	ActualBiophiliaCondition	56	4.036	1.235	0.165
	BiophilicArtCondition	50	4.180	1.137	0.161

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Active	2.141	104	0.035[a]

Note. Student's t-test.

[a] Levene's test is significant (p < .05), suggesting a violation of the equal variance assumption

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Active	ActualBiophiliaCondition	56	2.696	1.513	0.202
	BiophilicArtCondition	50	2.120	1.223	0.173

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Gloomy	0.831	104	0.408

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Gloomy	ActualBiophiliaCondition	56	1.625	0.822	0.110
	BiophilicArtCondition	50	1.480	0.974	0.138

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Bored	1.099	104	0.274

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Bored	ActualBiophiliaCondition	56	2.321	1.266	0.169
	BiophilicArtCondition	50	2.040	1.370	0.194

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Tired	−0.064	104	0.949

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Tired	ActualBiophiliaCondition	56	3.339	1.676	0.224
	BiophilicArtCondition	50	3.360	1.626	0.230

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Motivated	1.224	104	0.224

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Motivated	ActualBiophiliaCondition	56	3.071	1.425	0.190
	BiophilicArtCondition	50	2.740	1.352	0.191

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Calm	−0.083	104	0.934

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Calm	ActualBiophiliaCondition	56	3.839	1.203	0.161
	BiophilicArtCondition	50	3.860	1.370	0.194

Independent Samples T-Test

Independent Samples T-Test

	t	df	p
Happy	0.057	104	0.954

Note. Student's t-test.

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE
Happy	ActualBiophiliaCondition	56	4.071	0.988	0.132
	BiophilicArtCondition	50	4.060	1.058	0.150