# Drawing Flowers: How Interactive Visuals Impact Plant Empathy and Conservation

**Crystal Leung, Felicity Tang, Katie Edge, Sasha Astudillo, Vivian Wong**

**University of British Columbia**

**PSYC 321**

**May 29, 2017**

***Title*: Drawing Flowers: How Interactive Visuals Impact Plant Empathy and Conservation**

Sunflower SEEDS: Sasha Astudillo, Katie Edge, Crystal Leung, Felicity Tang, Vivian Wong

## Executive Summary

Previous research about plant blindness by Balding and Williams (2016), has shown that people are more likely to support plant conservation and to be more empathetic when the species have humanized characteristics, making them easier to relate to. Anthropomorphizing is the act of ascribing human attributes to a non-human object. The present research will expand on this study, by seeing if anthropomorphizing of a plant, through drawing, can lead to an increase of plant empathy, that can eventually lead to one's willingness to support the species' conservation. The researchers gave a photo of a flower to participants and asked them to either provide a literal sketch or and anthropomorphized sketch of the flower. They were then asked to do a survey that measured their plant empathy. The results did not support the hypothesis, however this could be due to lack of proper operationalization as will be discussed below.

## Detailed Report

***Research Question*.** Does interactively anthropomorphizing plants by drawing influence plant empathy and people's willingness to support the conservation of the plants?

***Hypothesis*.** We hypothesize that participants who anthropomorphize sketches of plants will have lower plant blindness, higher plant empathy, and willingness to support plant conservation than participants who do not anthropomorphize their sketches.

## Method

***Participants.*** Seventy-four students of the University of British Columbia (44 females, 28 males, 2 unspecified) from 17 to 54 years old (M=22.21 years, SD=5.76), in the AMS Nest were randomly assigned to draw a literal sketch (n=33) or an anthropomorphized sketch (n=41). Participants completed the study individually.

***Conditions***. This study used a between-subjects design. Participants completed one of two activities: a literal sketch in the control condition or an anthropomorphized sketch in the experimental condition. Participants in one condition were unaware of the alternate condition. Both conditions received the same survey that followed the sketching activity.

***Measures.*** In the study, the independent variable (IV) is anthropomorphizing of plants and the dependent variable (DV) is plant empathy. A self-report survey with 22 questions regarding plant empathy and demographics was then administered: ten questions measuring plant empathy, five distractor questions, one question indicating the condition, and six questions collecting demographics. We used some of the questions from the Empathy Quotient questionnaire developed by Simon Baron-Cohen and created a survey via Google Doc/Forms (Cohen, 2004). Our questions can be found in Appendix A. Participants indicated how much they agreed with statements using a 5-point Likert scale from 1, *strongly disagree*, to 5, *strongly agree*). While most answers on the questionnaire were answered on the scale; some required a written response. For example, willingness to support conservation of plants was measured by asking participants how much they would be willing to donate per month to plant conservation. Distractor questions, asking about education and animals for example, were included and mixed amongst the survey in hopes to reduce biases and keep participants blind from the study. The end of the survey collected demographic information.

***Procedure.*** All participants were approached randomly in the AMS Nest, and asked whether they would be willing to participate in our study. They were told that they would do a short survey after doing a sketch and participants that were interested first signed a consent form. The consent form briefly explained the study's purpose, procedures, potential risks, confidentiality, and contact information. Next, participants received a sheet of A5 paper, at the top of which was drawing instructions (Appendix B). They were then given a photo image of a flower shown on an iPad, and left to draw for 3 minutes, letting them know the researchers were in the area if they had any questions (Appendix C). Drawings were collected, if the participant agreed to it, and they were then asked to complete a short survey on an iPad (examples of drawings are found in Appendix D). Participants were given a choice to keep their drawings if they wished to reduce anxiety caused by potential judgement of drawing skills.

## Results

Since we had one IV and one DV, we performed anindependent samples T-Test, assuming unequal variances. We found no significant difference in the scores for the literal sketch ($M=3.47$, $SD=1.68$) and anthropomorphized sketch ($M=3.65$, $SD=1.34$) conditions; $t(73)=2.00$, $p=0.61$. As a result, we conclude that the null hypothesis was true: people did not show more plant empathy after having them anthropomorphize their sketches.

A Pearson correlation coefficient was computed to explore the relationship between plant empathy and age. We found a weak but significant positive correlation between the two variables, $r=0.460^{**}$, $n=33$, $p=0.008$ in the control but an insignificant negative correlation the experimental condition, $r=-0.072$, $n=41$, $p=0.661$. These results are summarized in scatterplots in (Appendix E). However, our results were skewed due to two outliers, aged 50 and 54, so we decided to run the correlation without the outliers. The age range without the two outliers was 17 to 29 years old. We no longer found a significant relationship in either control condition, $r=-0.280$, $n=33$, $p=0.126$, nor experimental condition, $r=-0.089$, $n=41$, $p=0.595$, summarized in Appendix F.

A second Pearson correlation coefficient was computed to assess the relationship between plant empathy and intended donation to plant conservation. There was a positive correlation between the variables in the control group, $r=0.918^{***}$, $n=33$, $p<0.001$, and the experimental group, $r=0.936^{***}$, $n=41$, $p<0.001$. These results are summarized in scatterplots in Appendix G. Even after removing the outliers, we were able to find significant positive correlation between the two variables in both the control group, $r=0.888^{***}$, $n=33$, $p<0.001$, and the experimental group, $r=0.937^{***}$, $n=41$, $p<0.001$, summarized in Appendix H. These results show that there is a strong positive correlation between plant empathy and willingness to support plant conservation. Higher plant empathy was correlated with larger hypothetical donations to plant conservation.

## Discussion

In our study, we were able to find a positive correlation between plant empathy and willingness to donate, which potentially indicates that the more individuals empathize with plants, the more they are willing to support plant conservation. As this was only correlational we are unable to make any causal inferences. There were no significant differences between the control and experimental condition. As a result, we cannot suggest that simply anthropomorphizing a species through drawing for three minutes will ultimately lead to an impact on plant empathy and plant blindness. Additionally, outliers skewed our results from the

first statistical analysis. Once these outliers were removed in a second statistical analysis, there were changes to the correlations, especially regarding plant empathy and age. While the first statistical analysis showed a weak significant positive correlation, there was an insignificant negative correlation once the outliers were removed. Thus, we conclude that the outliers did indeed skew our results, and age does not have an impact on plant empathy within our age range.

While the three minutes to engage with the plants was likely to not have been enough time to change the participant's behaviour and attitude towards plants, the study faced several challenges and limitations that may have led to the insignificant results. As a result, many improvements can be made to the study to see whether anthropomorphizing plants affect plant empathy and willingness to support plant conservation.

Firstly, one of the main limitations for the research was time, since the study was designed and conducted within three months and data was collected for only two weeks, flaws in our measurements resulted. Thus, only a limited number of questions could have been asked, which led to low internal validity. Furthermore, since there is no existing standardized measure of plant empathy, we created our own survey which may not have properly operationalized the variable. Another flaw found in the design of the survey was that there were too many distractor questions regarding the limited appropriate number of items. Designed to see if participants were paying attention, the survey also contained flipped questions in which 5, *strongly agree* would be a response showing low empathy rather than high empathy. The results indicated that participants were either not fully paying attention, or there was a misunderstanding due to the flipped questions not aligning with their previous answers.

Next, some sketches also indicated that not enough attention was given to the instructions while sketching, or that there may have been a misinterpretation of the term anthropomorphizing, even when the definition of the term was provided. Furthermore, data collection could have been improved upon. Participants were approached if they seemed unoccupied and friendly, which may have resulted in a biased sample of participants who are already empathetic/sympathetic. Some participants may have also been distracted because the research was conducted nearby their friends, hence influencing each other's behaviour.

We have included some potential improvements to our study's design for future research. First, to increase the internal validity, time spent on collecting data should be increased to reduce confounds. Furthermore, we can improve our counter questions by providing more sets of counter questions or creating more grammatically standardized versions of the questions. The study could also be conducted in a standardized setting such as a lab, so that the environment is more controlled and will have less confounding variables. Furthermore, a third control group in which participants will not be asked to draw anything could be included. This can show how by not actively engaging with the plant species, participants can exhibit even less plant empathy. The manipulation of anthropomorphizing could be changed, where instead of simply sketching the plant, participants can be asked to read a narrative, watch an animation, or be provided with more information about the plant. For example, letting the participant know that the plant they are anthropomorphizing is actually endangered may elicit more empathy. Other plants can be introduced where some might be familiar and unfamiliar to see if there is a difference. Overall, key improvements should be made on data collection and operationalization of variables.

**Recommendations for your UBC client**

Since our results show that anthropomorphizing plants through sketches does not increase plant empathy, we do not currently recommend implementing this as a strategy to increase plant

empathy, conservation, and awareness. However, other strategies could be used, such as presenting cartoon-anthropomorphic versions of plants or personification of descriptions of plants.

Although the results were not significant, the study can be used to address how there can be a lack of interest or awareness of the vegetation on campus, or gardens at UBC, since majority of respondents disagreed or remained neutral when viewing the vegetation on campus. According to our results, students on campus are hypothetically willing to donate, on average, $9 a month to support plant conservation. This shows that there is to some extent a willingness to support plant conservation on campus. UBC can enact upon this by creating more activities to engage people into caring more about plants. Our study was able to support the notion that as people's plant empathy increases, so will one's willingness to conserve plants. Thus, it is important to seek and implement methods to increase plant empathy.

UBC offers garden tours in the botanical gardens to provide information about plants. This provides a strategy about raising awareness to the different plants species, but previous research by McKenzie-Mohr et al. (2012) has shown that simply acquiring more information about conservation does not result to the person enacting upon it. In order to increase plant empathy, individuals must be able to relate to nature more, as was demonstrated in Balding and William's (2016) research. There are currently no set programs for guests in the garden to fully interact with the species of plants. More engaging activities are needed to stimulate plant empathy in the botanical gardens, that can eventually lead to more conservation. UBC shows promise in that they are currently in development of an Education Pod Curricula at the gardens, where visitors can interact with indigenous plants through a sensory experience. The plans are still in the process, so we recommend that the program should be able to relate to visitors by showing how humans can take an active role in forming a relationship with plants, and that people are needed to conserve species of plants.

**Appendix A - Survey Questions**

Answered on a Likert scale from 1, *strongly disagree,* to 5, *strongly agree*.

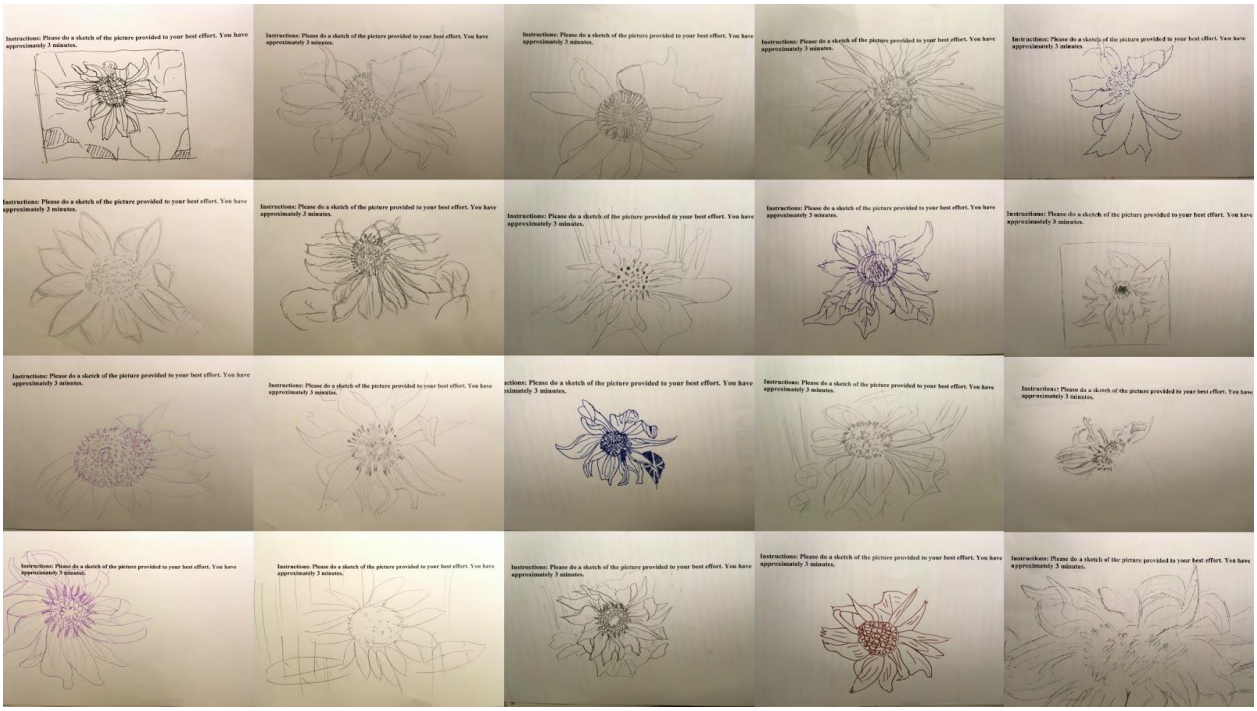
1. I would get upset if I saw forests cut down/burnt.
2. When I watch someone pluck a flower and throw it back on the ground, I feel bad.

**Appendix B - Drawing Instructions**

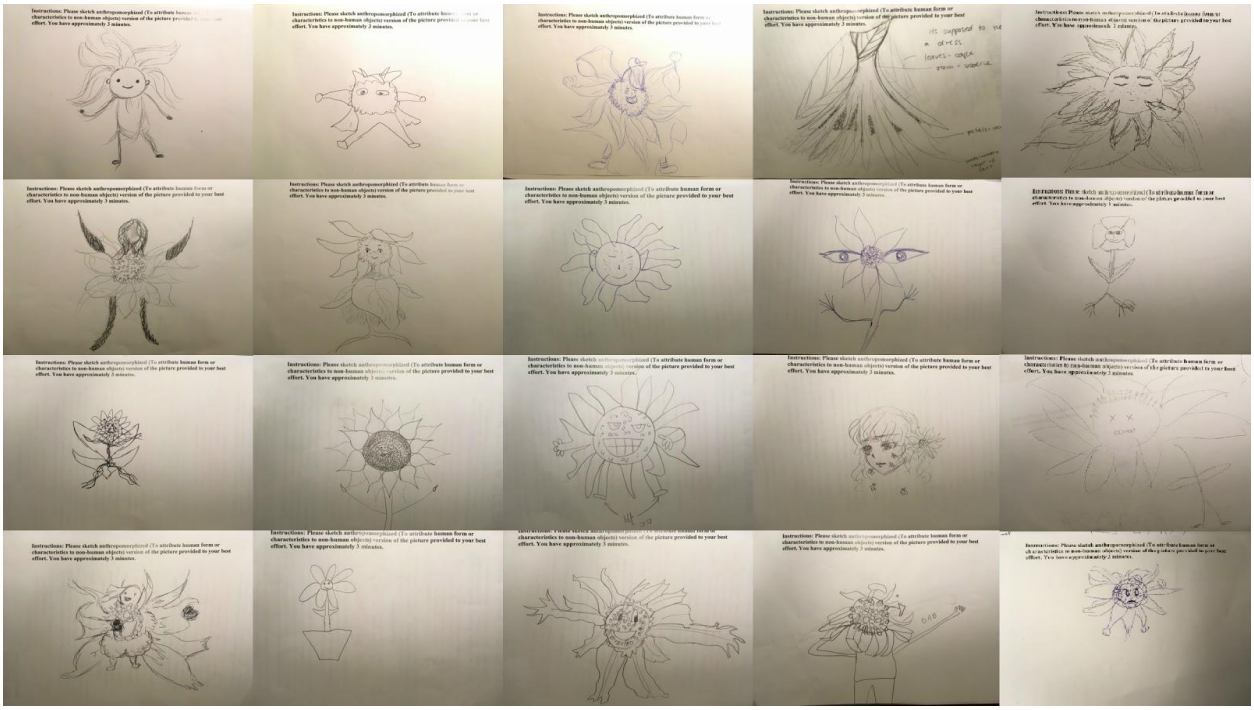
A photo image of a flower was provided on an iPad for participants to copy from and use as a guide. The same image was used for all participants.
Control Condition - *Instructions: please draw a sketch of the picture provided to your best effort. You have approximately 3 minutes.*
Experimental Condition - *Instructions: please sketch an anthropomorphized (to draw attribute human form or characteristics to non-human objects) version of the picture provided to your best effort. You have approximately 3 minutes.*'

**Appendix C - Photo image of flower.**
We used a photo of *Balsamorhiza deltoidea*, this flower is native to British Columbia

**Appendix D - Examples of sketches completed by participants.**

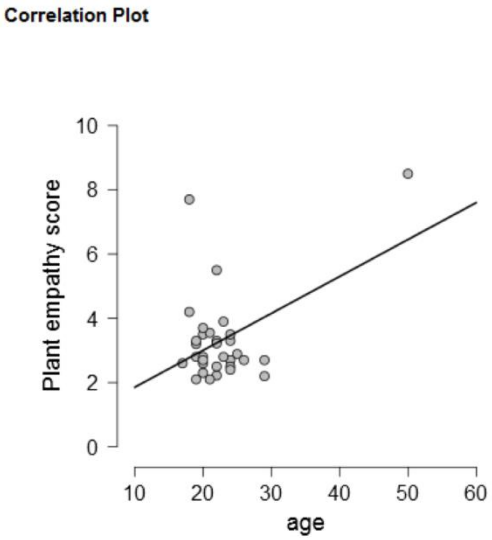


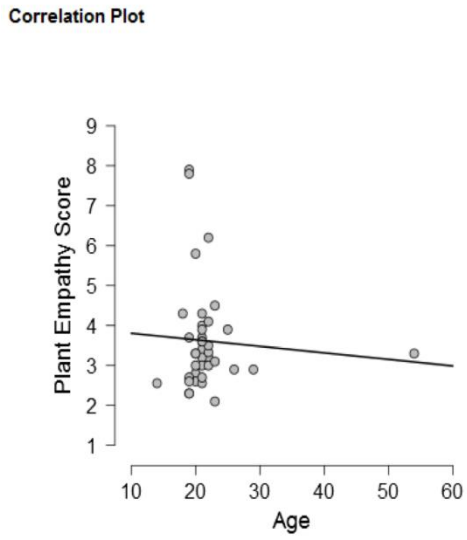
Above are literal sketches from the control condition.



Above are anthropomorphized sketches from the experimental condition.

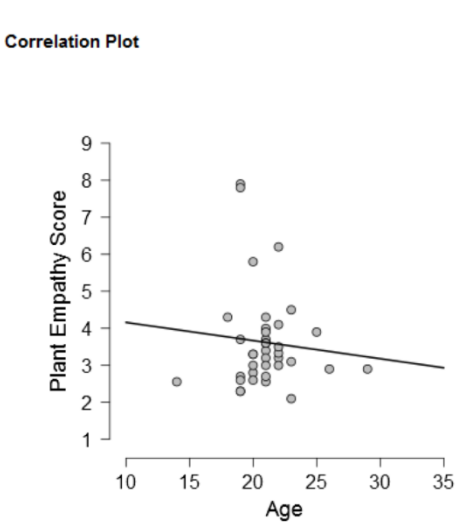
**Appendix E - Scatter plots: plant empathy and age**

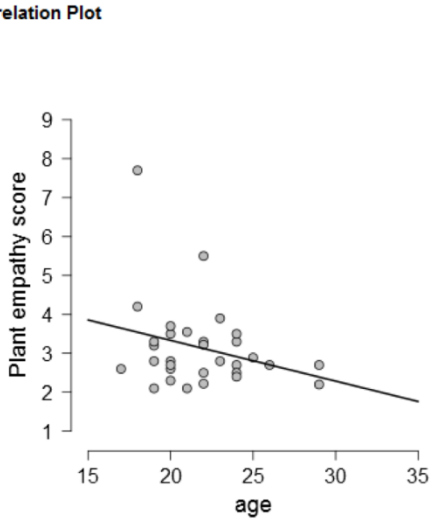



Control Condition Experimental Condition

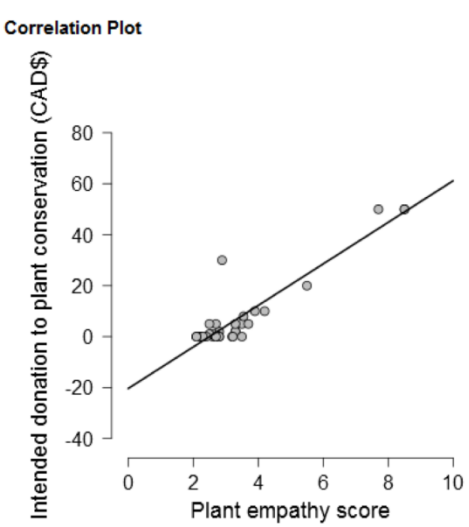
**Appendix F - Scatter plots: plant empathy and age (outliers removed)**



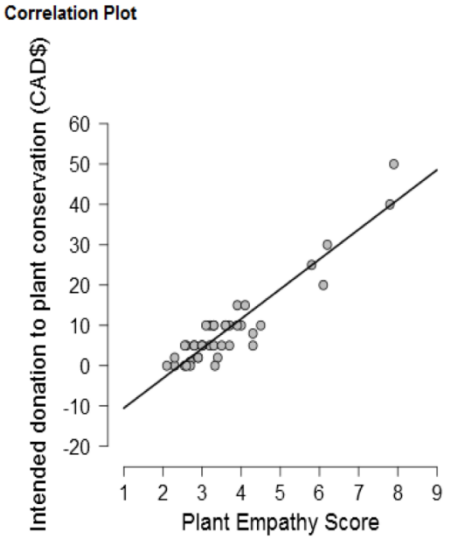




Control Condition Experimental Condition

**Appendix G - Scatter plots: plant empathy and willingness to support plant conservation**

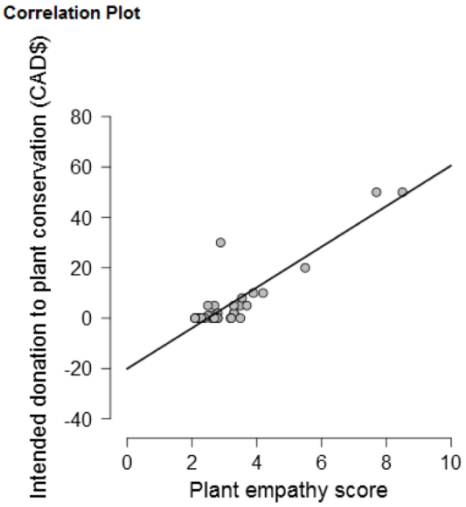



Control Condition

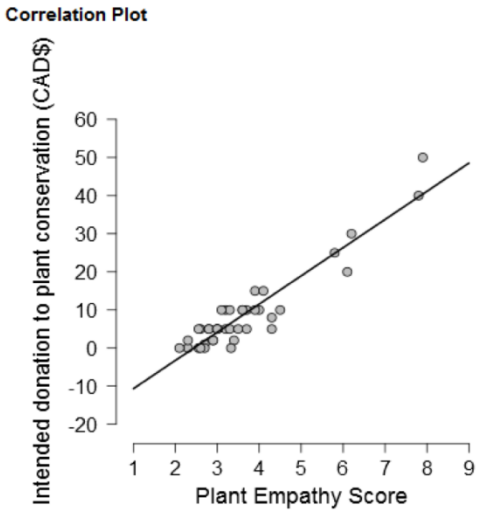



Experimental Condition

**Appendix H - Scatter plots: plant empathy and willingness to support plant conservation (outliers removed)**




Control Condition




Experimental Condition

## References

Balding, M., & Williams, K. J. H. (2016). Plant blindness and the implications for plant conservation. Conservation Biology, 30(6), 1192-1199. doi:10.1111/cobi.12738

Cohen, S. B., & Wheelwright, S. (2004). The Empathy Quotient: An Investigation of Adults with Asperger Syndrome or High Functioning Autism, and Normal Sex Differences. *Journal of Autism and Developmental Disorders,34*, 1-13. Retrieved April 2, 2017.

McKenzie-Mohr D, Lee N, Schultz PW, & Kotler P. (2012). Social Marketing to Protect the Environment: What Works. Sage, Thousand Oaks, California.

Wandersee, J. H., & Schussler, E. E. (1999). Preventing Plant Blindness. *The American Biology Teacher, 61*(2), 82-86. doi:10.2307/4450624