UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

The Effects of Poster Tone Aggression on Waste Sorting Accuracy

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PSYC 321

Themes: Waste, Buildings

April 4, 2019

Executive Summary

The present study examined the relationship between waste distribution and camera surveillance. We hypothesized that notifying individuals of a presence of a surveillance camera will increase sorting accuracy. Additionally, we hypothesized that reminding participants of the presence of surveillance in a more threatening tone will have a higher effect on sorting accuracy than reminders which follow a more neutral tone. Disposal bins were monitored for 4 weeks with each week consisting of a different poster notifying individuals of a camera surveying the disposal bins. Our findings did not support our hypothesis as camera surveillance did not improve sorting accuracy and there was no significant difference in sorting accuracy based on the tone of the posters.

Introduction

The act of composting has become a widely accepted behaviour across North America and is known to be the biggest contributor to food disposal. However, in recent years, researchers have seen an increase in the amount plastic seen in compost waste bins (McIllfaterick, 2017). With this in mind, the present study aims to investigate ways to improve sorting accuracy to reduce the amount of contamination seen in compost.

To start, environmental cues are known to alter our everyday behaviours (Heine, 2016) and one study investigated if the structural design of buildings affect waste sorting accuracy. Wu, DiGiacomo, and Kingstone (2013) compared waste disposal accuracy between a building which was built with the intent of sustainability to one that was not. Researchers observed sorting accuracy in the Centre for Interactive Research on Sustainability (CIRS) and the Student Union Building (SUB) at the University of British Columbia. CIRS is a great model of a sustainable structure as it is one of the most regenerative buildings in North America (Cole, 2012). After several weeks of observation, results showed a significant difference in waste sorting behaviours between the two buildings. In CIRS, waste sorting accuracy had a rating of 86%, whereas SUB had a rating of 58%. These results imply how ones environmental surroundings has an effect on waste sorting behaviours.

Indeed, the structural aspect of buildings influences waste disposal; however, it is unrealistic to redesign every pre-existing structure into one that is more sustainable. With that, one approach which could be helpful is the presence of subtle environmental cues. Bateson, Nettle, and Roberts (2006) investigated if placing a picture of human eyes would increase spending in a university coffee shop. Researchers would place a picture of eyes for a one week period and replace them the following week with pictures of flowers to act as a control. The study lasted 10 weeks, with the two pictures replacing one another each week. Results illustrated how students tended to spend more for the weeks containing the picture of eyes compared to the picture of flowers. This suggests how subtle cues such as eyes, can have a strong influence on human behaviour.

Although the previous study has provided evidence in increased spending, it does not relate to the topic of waste disposal. With society aiming to be environmentally friendly, composting can be seen as a prosocial behaviour. A study done by Rompay, Vank, and Fransen (2009)

researched the relationship between camera surveillance and prosocial behaviour. Participants were assigned to two conditions. The first involved a scenario where a research assistant would ask the participant to follow them into a room and "accidentally" drop all paper documents they were holding on the floor. Before this however, the researcher would have notified the participant that the room was under 24 hour surveillance and that it is not a part of the study. The second condition consisted of the same scenario, with the absence of video surveillance. Researchers analyzed if the presence of video surveillance would have any effect on if the participant would help the researcher pick up the dropped documents. Results illustrated the behaviour of picking up the dropped items were significantly more frequent in the camera surveillance condition, compared to the control. These results suggest that knowing that one is under surveillance influences behaviour, specifically increasing prosocial behaviour. On the other hand, how reminders of surveillance are framed could be another factor towards prosocial behaviour. It is possible that the use of a more threatening tone could induce a higher response to that of a more subtle/neutral tone. A study done by Chang and Wu (2014), looked at if different styles of framing has an effect on ones intentions on pro-environmental behaviour. Researchers provided participants with two versions of text which motivate the purchase of organic food. The two pieces of text differed in how the message was framed with the first consisting of a positive tone and the second consisting of a threatening tone. Results illustrated how participants were much more likely to agree with buying organic food in the threatening condition than the positive condition. These results suggest that more threatening cues could elicit better environmental behaviours such as distributing waste in a proper way.

Current Study

The current study aims to examine ways to improve sorting accuracy among university students and staff. Based on research pertaining to camera surveillance and prosocial behaviour, we hypothesize that notifying individuals of a presence of a surveillance camera will increase sorting accuracy. Secondly, based on the evidence of tone influencing environmental behavioural intentions, we hypothesize that reminding participants of the presence of surveillance in a more threatening tone will have a higher effect on sorting accuracy than reminders which follow a more neutral tone.

Method

Participants

Participants consisted of all individuals who use the disposable bins in the UBC Orchard Commons cafeteria. There were no exclusion criteria for our participants. Our sample size, N, consisted of the average of bin contamination ratings from all group members. For example, 1 N would consist of the average contamination ratings from all group members of 2 bins, compost and paper bins, on a single day. Due to logistical errors in collecting the data, we reduced our N from 31 and obtained a final N of 29.

Conditions

Our study was a naturalistic observation experimental type design consisting of 4 conditions in total: a baseline condition with no poster and 3 conditions with posters including a piece of

text explaining how the disposable bins are monitored through an AI camera (see appendix A). Each condition contained a different poster for the participants to see and these posters were changed every Monday morning of the assigned weeks. The first poster explained the presence of the camera in a familiar tone: "*Smile! You're on Camera!*" the second in a neutral tone: "*This Waste Sorting Area is Monitored by Video Cameras*", and the third in an aggressive tone: "*Waste Sorting Accuracy is Monitored and Evaluated in this Area*" (see Appendix A).

Measures

Contamination ratings were scored on a researcher subjective scale of 0 (*no contamination*) to 5 (*completely contaminated*) with contamination being defined as anything that did not belong in the prescribed compost or paper bin**.**

Procedure

The posters were replaced once a week, every Monday, by a UBC staff member, cycling from the baseline condition of no intervention posters, to the familiar condition of a familiar tone poster, to the neutral condition of a neutral tone poster, to the aggressive condition of an aggressive tone poster. We observed the level of contamination Monday through Friday from March 4 to March 29 at 2:00pm. Each day, a team of researchers would take a picture of the compost and paper bins at UBC's Orchard Commons cafeteria (see Appendix B). Following data collection, pictures were randomized and emailed to each group member to provide a blind contamination rating. The average of the blind contamination ratings from all group member for 2 pictures, the compost and paper bins, on a single day were treated as 1 N. Each N was assigned to 1 of 4 conditions: baseline, familiar, neutral, or aggressive, depending on the presence and tone of posters. All data analyses were run using the software R (version 3.01; RStudio team, 2016).

Results

Descriptive Analysis

Means of Conditions. The mean bin contamination ratings for each condition were calculated on a scale of 0 (no contamination) to 5 (completely contaminated). The mean of all contamination ratings for the baseline condition was 2.04. The mean of all contamination ratings for the familiar condition was 1.46. The mean of all contamination ratings for the neutral condition was 1.14. And the mean of all contamination ratings for the aggressive condition was 1.28.

Main Analysis

1-Way Analysis of Variance. A 1-way ANOVA test on the contamination ratings of the 4 conditions yielded a p-value of 0.243, indicating that there were no statistically significant differences between the means of the 4 contamination rating conditions (see Figure 1).

Discussion and Limitations

The aim of the present study was to investigate if the disposal of compost and recyclables are affected under camera surveillance. We hypothesized that the use of posters reminding subjects of the presence of a monitoring camera would improve sorting accuracy. Further, we also hypothesized that sorting accuracy would improve based on the tone of the posters. Our findings did not support our hypothesis as there was no significant difference in sorting accuracy based on our 3 posters.

There are a few notable limitations for our study. The first being that our data does not hold significant statistical power. Our researchers were tasked to take photographs of the surface of the disposal bins and base a contamination rating from that picture. However, is it entirely possible that the surface of the waste does not accurately reflect the amount of contamination present underneath. Having a contamination estimate based solely on the surface holds very little reliability and future studies should aim to analyze the disposal bins as a whole or implement a technology which monitors sorting accuracy before the items are placed inside the bins. Secondly, another limitation is that our study has no way of knowing if participants noticed or even comprehended the posters placed above the disposal bins. Distributing waste is not a behaviour which takes much cognitive effort, so it is possible that participants simply disposed their waste without taking the time to analyze their surroundings. Future studies should aim in implementing a manipulation check to ensure individuals are aware of the posters.

Taken together, our research is one of the first to provide results on the relationship between waste sorting behaviours and camera surveillance. We hope the present research can provide a step towards better sorting behaviours and further help turn around the environmental crisis we see around the world today.

Recommendations for UBC Client

As discussed in the limitations, recommendations for the client would be to analyze the disposal bins as a whole or implement a technology which monitors sorting accuracy before the items are placed inside the bins. Also, the use of color (like red) and increasing the physical size of the signs to attract more attention could aid in seeing an effect. As mentioned before, further studies could also have survey questions that are asked to those who use the bins, immediately after use, if they saw the signs or not and to what degree would they think that it influenced their behavior in sorting. These strategies would provide a more accurate and reliable data set to investigate if reminders of camera surveillance would improve sorting accuracy.

References

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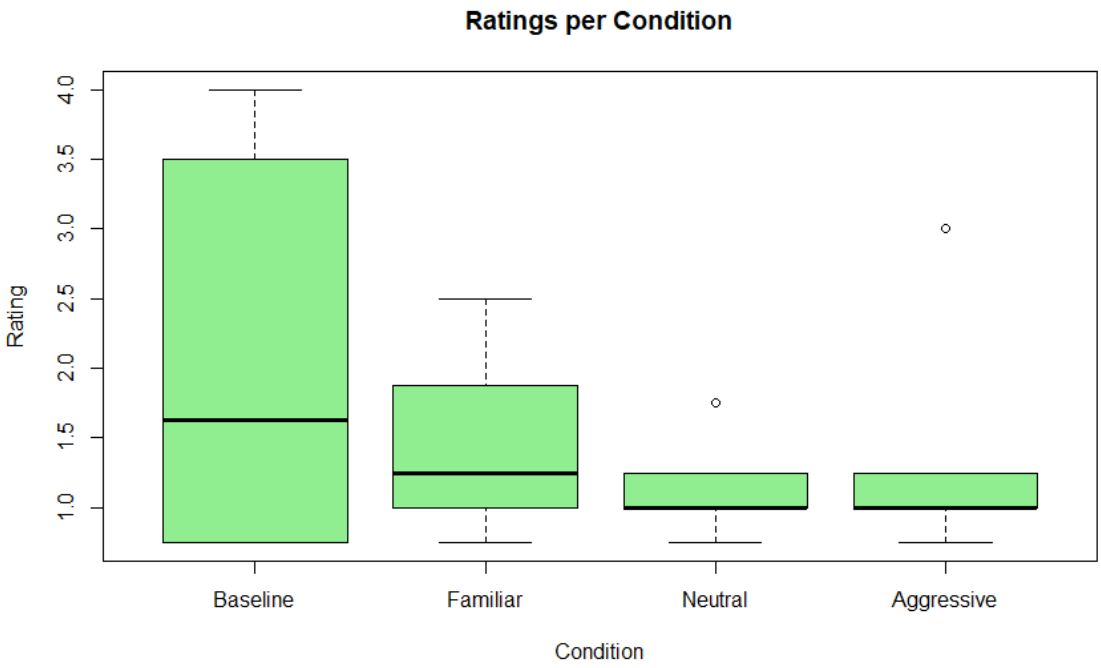

Ratings per Condition
Rating
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Baseline
Familiar
Neutral
Aggressive
Condition

Appendix A

Friendly Condition

Neutral Condition

Aggressive Condition

ATTENTION:
Waste sorting Accuracy is MONITORED and EVALUATED in this area

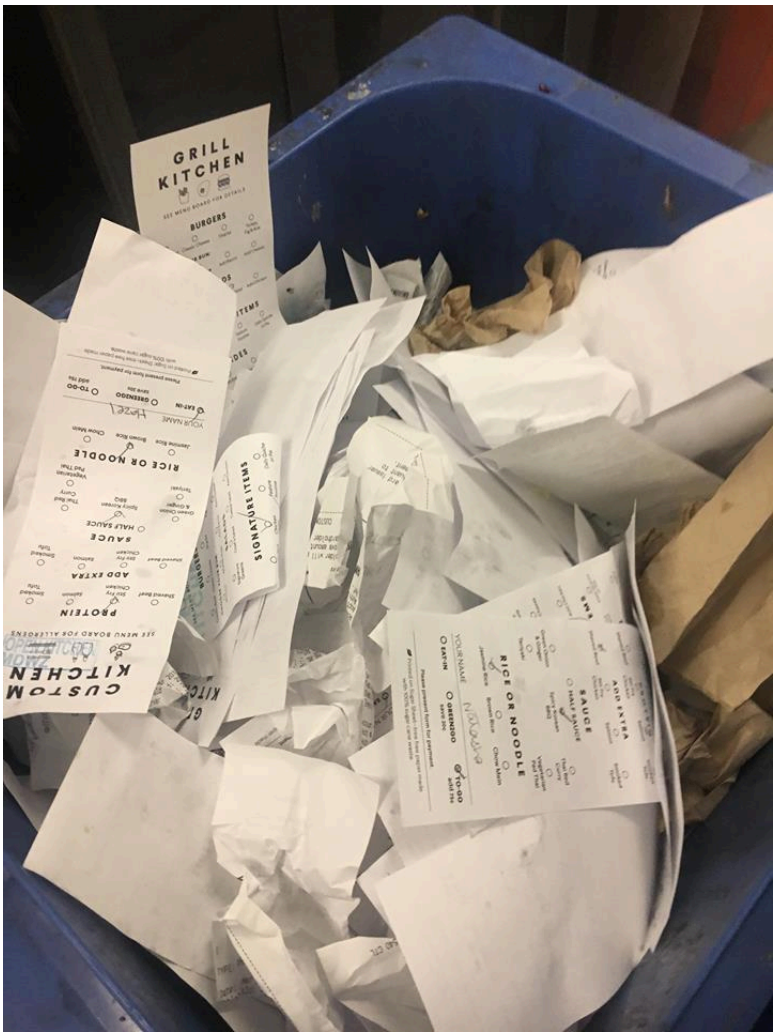
This is part of a SEEDS student research project.
For more information visit sustain.ubc.ca/moscar

Appendix B

Waste Bin Stimuli

Compost Bin Photograph

Paper Bin Photograph


GRILL
KITCHEN
BURGERS
RICE OR NOODLE
SAUCE
ADD EXTRA
PROTEIN
SIGNATURE ITEMS