

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

The Effects of Using Memes to Reduce Contamination in Compost

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PSYC 321

Themes: Waste, Community, Food

April 4, 2019

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Executive Summary

Contaminated compost bins are a huge obstacle in the goal when striving for a greener environment. For our research question, we asked “How can informative, eye-catching posters influence the number of contaminants in compost bins?” We hypothesized that residents are significantly more likely to compost without contaminants (i.e plastic bags) when composting in a building with posters promoting correct composting behaviours compared to a building without posters. Our study was conducted on the residents of the Ponderosa Cedar and Oak House residences. To test our hypothesis, we posted a number of posters that promote proper composting techniques and raised awareness of plastic contamination in the compost bins in the compost room of the Cedar House while leaving the Oak House compost room free of intervention. Over the course of two weeks, we collected data from the Ponderosa Cedar and Oak House residences and found that our intervention had no statistically significant effect on the proper composting rates.

Keywords: composting, contaminants, behaviour, environment

Introduction

Improper composting practices are a hindrance for the goal of creating a more sustainable environment. There have been numerous attempts in the past that were made to combat some issues that were found in previous studies.

In their article “A room with a viewpoint: Using social norms to motivate environmental conservation in hotels”, Goldstein (2008) conducted an experiment where two signs were designed, the first sign reflecting the industry standard approach and focusing on the important of environment protection, and the second sign informing guests that the majority of other guests also participate in the towel reuse program. They found that the descriptive norm condition (sign saying that “majority of guests reuse their towels”) yielded a significantly higher towel reuse rate. Goldstein (2008) suggests that from these results, the more important a social category is to person’s social identity, the more they will follow the norms of that category. Taking these findings, we hypothesized that with the use of meme posters, those posters would help to promote the usage of less plastic bags for composting.

In Schultz’s (2007) article, “The Constructive, Destructive, and Reconstructive Power of Social Norms,” they hypothesized that descriptive normative information would decrease energy consumption in households consuming more energy than those around them. To test their theory, they delivered either descriptive norm feedback or a descriptive injunctive message to the participants. In the descriptive norm condition, participants were told of their average energy consumption compared to the average energy usage of the households around them. The descriptive injunction message was a message that either approved or disapproved of their energy consumption by drawing either a happy face for consuming less energy than the average surrounding households or a frowning face depending if they were above the other households. Confirming their hypothesis, it was found that a message containing both a descriptive normative message and a descriptive injunctive message that indicated some sort of social approval or normalized behaviour increased desirable energy savings and also eliminated the boomerang effect.

DiGiacomo (2018) found that by shortening the distance of recycling stations to resident suites, recycling increased by over 100%. In the most convenient condition, they placed the recycling station by the elevator on each floor. In a convenient location, there were compost bins on the ground floor and the garbage room, while in the inconvenient condition, the compost bin was only located in the garbage room. This intervention managed to divert 14-23 kilograms of recyclable items from the landfill per person per year. In other words, an increase of physical convenience (i.e. decreasing distance of bin to suite) without any other external prompts can significantly increase proper composting and recycling behaviours.

Our motivation for this study stems from the previous studies conducted regarding what external prompts influences individuals to recycle and compost correctly. Our study aims to discover whether attempting to spread a message using unconventional means will have a positive impact on rates of proper composting.

Methods

Participants

The participants in our study are approximately 500 current upper year level university students living in Ponderosa Oak and Cedar Houses at the University of British Columbia (UBC) Point Grey campus. Since obtaining residency is a lottery system, the demographic of international and local students living in both buildings are unknown to us. The female to male ratio who used the compost during the time of our study is also unknown to us.

Conditions

For our project, we had two conditions. The first condition was a control condition. There were no posters or any other prompts to promote better composting methods in the Oak House compost room. The second condition was an experimental condition where we posted up multiple posters (Appendix Figure 1 to 5) of memes right above and beside the compost bin in the Cedar House. The independent variable was the presence of the posters. The dependent variable was participant's decision to compost without any contaminants after seeing the posters.

Measures

To obtain the measures, we weighed the contaminants with a scale provided by the Social Ecological Economic Development Studies (SEEDS) located at the Centre for Interactive Research on Sustainability. The weight of the contaminants was measured by subtracting the bin weight from the total weight. For example, the weight of an empty bin weighs in at 11.95 kilograms; with this unit it allowed us to calculate the actual weight of the contaminants itself by subtracting the total weight of the bin (including the contaminant) from 11.95 kilograms. We used an independent samples t-test to determine whether there were any statistically significant differences between the Cedar House and Oak House composts. Over the course of two weeks, we were able to collect our data nine times. During this period, we measured the weight of the contaminants and the number of contaminants at a randomized time to maximize the probability of collecting data from different residents. For example, if we collected data each morning at 10am, there would be a high likelihood that we would only collect data from the same student(s).

Procedure

The study was conducted in Oak House and Cedar House of the Ponderosa buildings. Posters and memes that prompted correct composting behaviours were posted right above and on both sides of the compost bin in the Cedar House compost room. On the other hand, the Oak House compost room was left untouched and did not have any posters and memes displayed. The data was collected by weighing the compost bin that was filled with the compost as well as taking out and counting the number of contaminants (i.e plastic bags) inside the bin.

Results

The overall results are shown in Appendix Table 1. A two-tailed independent samples t-test was used to compare the means of two independent groups. This allowed us to determine whether there was statistical evidence that the associated population means were significantly different. An alpha of 0.05 was used as the cutoff for the significance. Since we used a two-tailed independent samples t-test with a significance level of 0.05, this means that

0.025 is in each tail of the distribution of the test statistic. With a p-value of 0.219, it exceeds the alpha of 0.05 which makes it statistically insignificant. We cannot conclude that a significant difference exists in our findings. This ultimately means we cannot conclude that the implementation of our posters and memes had impact on the resident's composting behaviors. The residents of Cedar House that saw the posters and memes and the residents of Oak House that did not see any posters and memes both showed no signs of change in their composting behaviors.

In Appendix Table 2, it is seen that the control condition ($M = 6.452$, $SD = 8.466$) and the experimental condition ($M = 10.939$, $SD = 6.248$) had means and standard deviations that appear to go against our hypothesis. Evidently, the mean weight of the contaminants in the control condition appears to be lower than the mean weight of the contaminants in the experimental condition. With informative posters and memes displayed in the experimental condition, we expected the numbers to be lower than the control condition. Perhaps the reason for this is because of the difference in the number of residents living in Cedar House compared to Oak House.

Limitations

There were several limitations to our study. Due to a communication error with the building manager and the general building staff at Ponderosa Cedar and Oak, we were not able to get access to the building until a much later date than anticipated. This lack of access to the compost rooms caused several issues, the first being is our lack of baseline. Since there was no baseline, our statistical analysis may have been incorrect. The lack of access also gave our group members difficulties in collecting measures as the building staff refused to give us access several times. Furthermore, Ponderosa Cedar and Oak did not have a set schedule for emptying the compost bins. This caused several measures to have barely any waste to measure, thus creating outliers in our measurements.

The memes could have also proven to be a factor for affecting compost rates. Internet memes are a form of cultural communication that typically appeals to the younger population, yet it is not fully understood whether these memes were affecting those of other age groups or those who do not understand the meaning behind the memes. Most internet memes have a template and are used to convey a message within a specific circumstance, but it's meaning may be different in another culture. We assumed that most of our population would have had a fair understanding of the meaning behind our memes. However, we did not take into account whether the message would be interpreted the way we wanted them to be towards those who didn't fully understand them.

Another limitation that stems from the memes would be the possibility of a crowding effect. Although the main purpose of the memes was to catch the attention of the residents and to direct them toward the educational poster. By doing so, we might have indirectly caused a crowding effect when we place the memes above and around the compost bin. By having four memes displayed around the one informative poster, it might have lessened the impact that the poster could have potentially garnered.

Discussion

The main purpose of this study was to determine whether there would be an effect in the residents' composting behaviors when eye-catching posters and memes were displayed. The results of the experiment showed that there was no effect in the use of memes to reduce contamination in compost bins. However, the results of this experiment may have been different if we were not hindered by the logistical difficulties as mentioned in our limitations. Perhaps a greater number of measures would have changed the outcome of the results. Additionally, a possible crowding effect could've been introduced with the density of the posters around the compost bin. By having too many posters within a small area, they may have created an undesired effect instead. Although the posters that we posted contained relatively passive statements, the sheer number of posters may have had a reactance effect on the residents. By seeing so many statements that nudge them to one particular action, they may feel that their choice of composting methods is being limited and create an opposite, undesired effect of practicing improper composting techniques. For future studies, we believe that posting fewer posters may help to reduce possible crowding effects that may have been created due to the high density of posters. Furthermore, future studies may benefit from a baseline taken prior to an intervention period. The implementation of a baseline would be able to provide future studies with a more accurate statistical analysis. External validation of the comprehension of our meme posters may also be beneficial for future studies. If we were to create a sample meme poster that was similar to the ones that were posted and surveyed the general population, we could hope to attain a more detailed understanding of the effectiveness on different age groups, sexes, and cultures. Aside from creating a survey to assess the effectiveness of our intervention means, we could also create post-experiment surveys. We could survey the residents of Cedar to determine if they noticed the posters, what they perceived to be the meaning behind the memes, whether they were offended by the memes in some way, whether the density created a crowding effect and ask them for their opinion to see if there could be something that could be improved upon.

Recommendation for UBC Client

After weeks of conducting this experiment, there are a few helpful methods that the University of British Columbia and our client can apply themselves. The knowledge of proper composting techniques may be acknowledged by the people who compost; however, it does not mitigate the convenience factor. For many, it is a lot simpler and less costly to use a plastic bag. Plastic bags are often more readily available and convenient for people to store their compost. Since the majority of the compost observed was dry waste, we suggest that the building should provide paper bags to the residents and have the cost be included into the residence fees. By doing so, it will completely eliminate the inconvenience factor for the residence to go out and purchase their own compostable paper bags. Another possible method that our client can choose to apply would be the installation of compost bins on each floor. As the findings from DiGiacomo et al. (2018) shows, the installation of compost bins on each floor vastly improves composting behaviours.

References

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Appendix

Figures



Figure 1. An informative poster that instructs the correct way to compost.

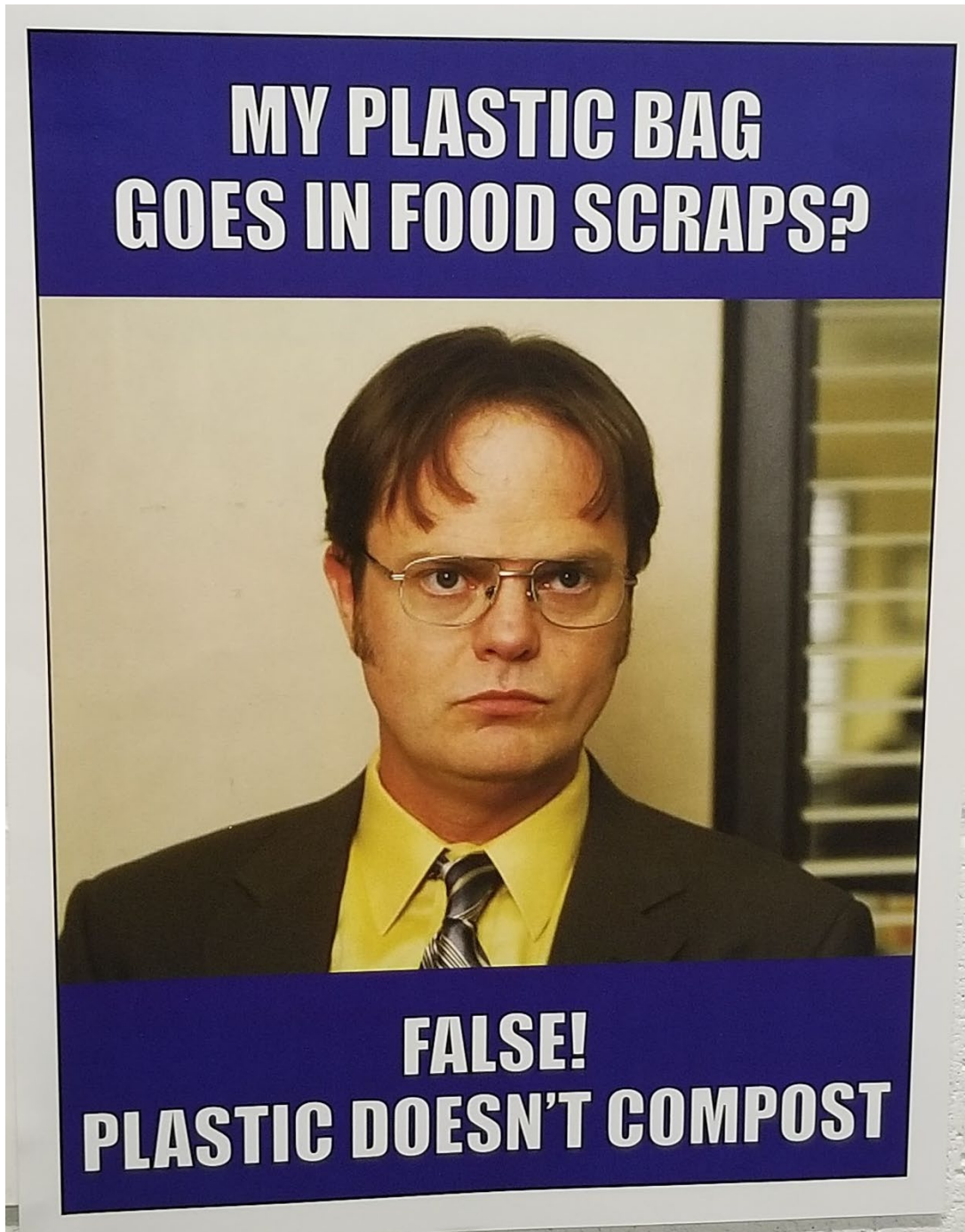


Figure 2.

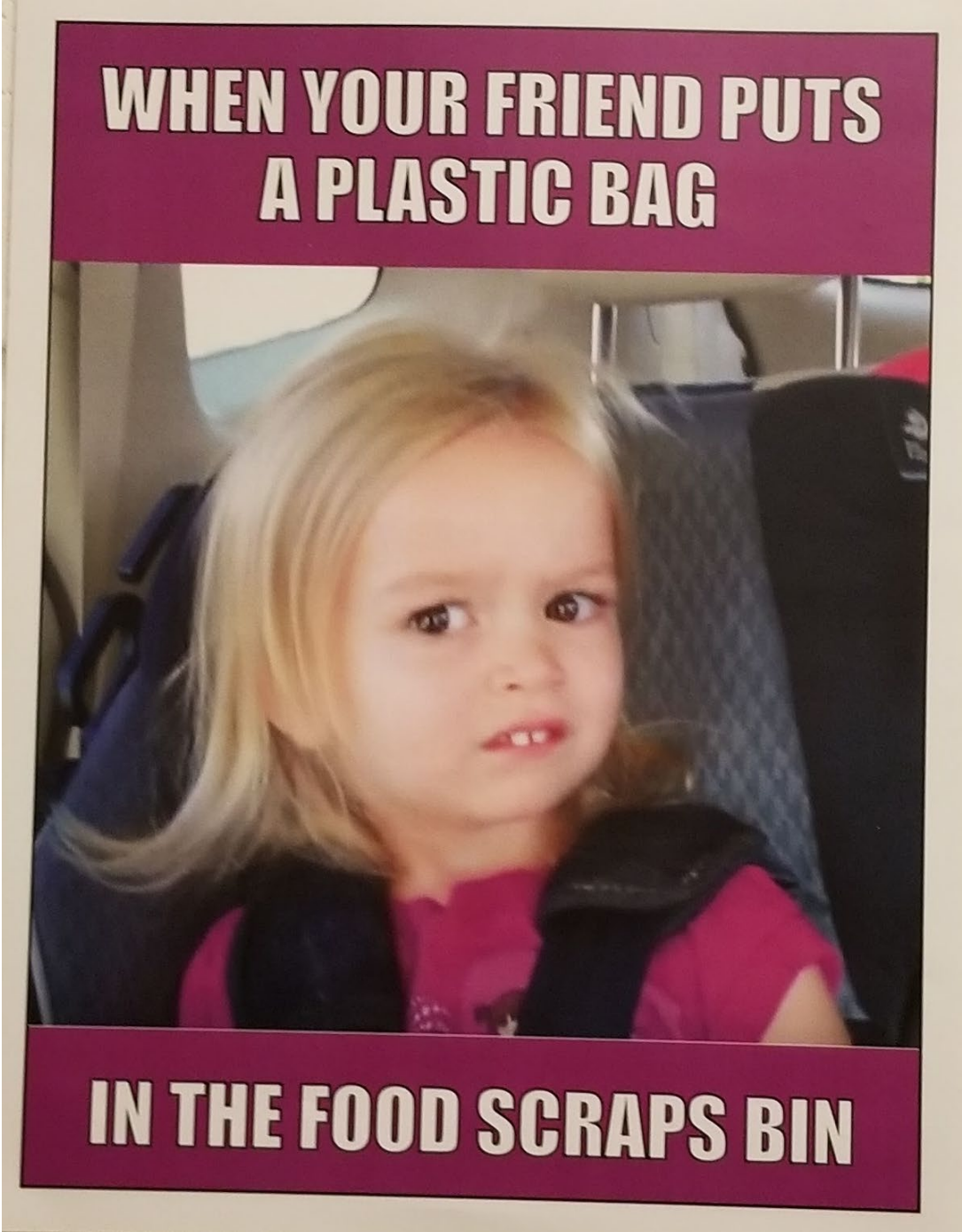
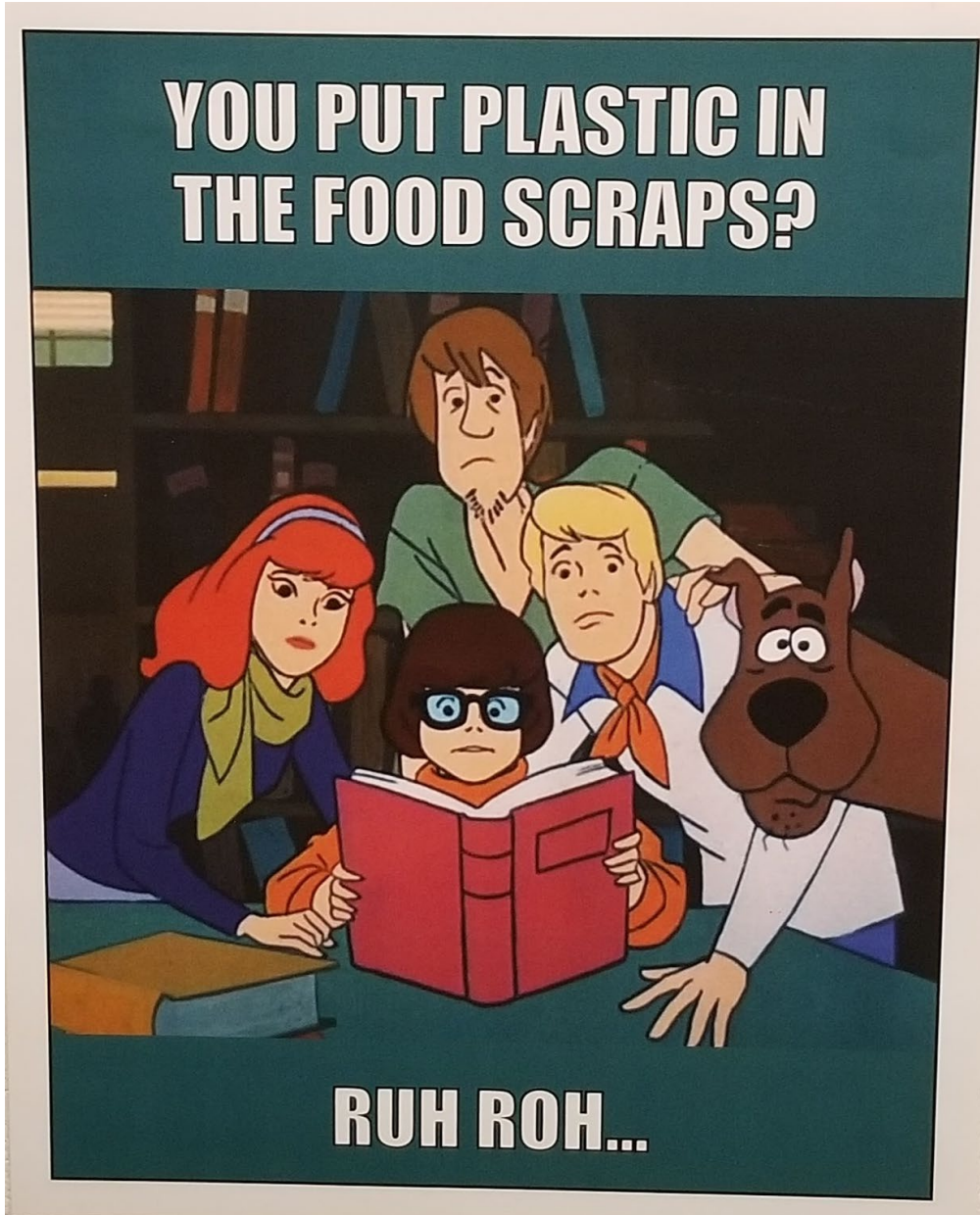


Figure 3.



Figure 4.



Figure

5.

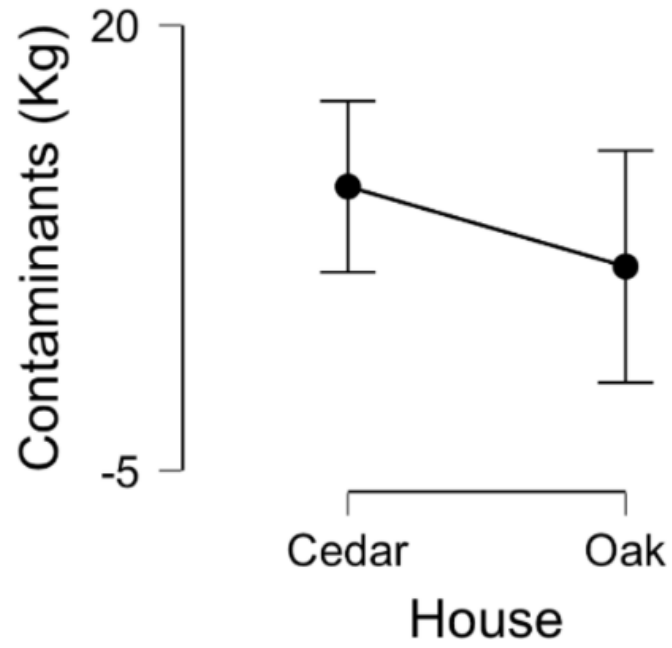


Figure 6. A graph of the weight of the contaminants in kilograms from Cedar House and Oak House with error bars.

Tables**Group Descriptives**

	Group	N	Mean	SD	SE
Contaminants (Kg)	Cedar	9	10.939	6.248	2.083
	Oak	9	6.452	8.466	2.822

Table 1. The table of the number of trials, the means, and the standard deviations of contaminants from Cedar House and Oak House.

Independent Samples T-Test ▼

	t	df	p	Cohen's d
Contaminants (Kg)	1.279	16.00	0.219	0.603

Note. Student's t-test.

Table 2. The table of the t-value, degrees of freedom, p-value, and Cohen's d of the contaminants from both Cedar House and Oak House.