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DEMOCRACY IN ACTION



Democracy in Action – Organics Recycling
Final Presentation Group, Spring 2023

Organics Recycling
2023

Coral M. Bruni, PH.D.
Lecturer, CSUSM
cbruni@csusm.edu

Samantha Byfield
Special Projects Manager
sbyfield@san-marcos.net

BACKGROUND

Democracy in Action

Democracy in Action emphasizes civic learning and democratic engagement. Through Democracy in Action, the university contracts with a local city entity in the capacity of consultant. Faculty and students partner with a regional city to conduct research, gathering qualitative and quantitative data to benefit city projects that are challenges and/or are backlogged. Democracy in Action is a program facilitated by the Office of Civic Learning within the Division for Community Engagement at California State University San Marcos (CSUSM).

COURSE DESCRIPTION

Psyc 338 – Environmental Psychology

Examines human behaviors associated with environmental problems, including global warming, ozone depletion, acid rain, destruction of rainforests, and depletion of natural resources. Covers such subjects as the commons dilemma, rational choice, values, and incentives. Examines interventions designed to change human behavior such as conservation, public transportation, recycling, and environmental education.

PROJECT OBJECTIVES AND SUMMARY

Organics Recycling Project

This semester, we partnered with the Democracy in Action department at CSUSM to conduct a research project with the City of San Marcos. The City of San Marcos is required to implement organics recycling at its facilities and public events. This research project's goal is to research and recommend solutions around the placement of receptacles, easy-to-understand signage for staff and event attendees, and other marketing materials that could be used to help educate the intended audiences on how to integrate this new practice into their daily habits.

Observations

For Groups 1 and 2, observations were used to examine placement of receptacles toward the promotion of recycling behavior. Each group gathered data by observing the recycling behavior of participants at various locations at CSUSM and the City of San Marcos and using coding sheets developed by Mozo-Reyes et al., (2016).

Observation-based data collection was used at multiple locations at each site (CSUSM and City of San Marcos). Locations at CSUSM included University Student Union, Campus Library, Markstein Hall, and Social and Behavioral Sciences Building. Locations at City of San Marcos included: City Hall, the Community Center, the Recreation Center, and the County Library. We observed interactions with waste receptable(s) in relation to its distance from an entryway. We measured distance (in feet and inches) of the receptacles with tape measures. We noted how participants used the receptacles (complete stop, quick stop, passed and went back, no stop), and how many people were by the bin on average during the observation period.

GROUP 1 – Placement of Receptacles

- Dominique Alvarez, Morgan Bartholomew, Aleah Magoun Rubio, Nathan Mannion, Collin Pugeda



INTRODUCTION TO GROUP PROJECT'S FOCUS

In partnership with the Democracy in Action group on campus at CSUSM, students enrolled in the Environmental Psychology course (Psyc 338) were assigned separate research topics to report on for San Marcos City Hall. As Group 1, we assigned to complete research on the “placement of receptacles” both on campus (CSUSM) and at City Hall. Past research suggests that a common barrier to recycling is convenience (Moussaoui et al., 2022). Our hypothesis was curated from the study “Will they recycle” conducted by Mozo Reyes et al (2016) on a university campus, wherein they examined “eco-feedback technology” and “environmental psychology” in a “semi-public space in multiple social environments. Though their focus was not on distance, they did pay attention to the placement of recycling receptacles in relation to other bin types.

HYPOTHESIS

After completing research on the topic of organics recycling and bin placement, our group decided to test whether lesser distance of receptacles from an entry/exit way was more likely to be used more than those further away.

METHODS

Participants

96 CSUSM students/visitors and 72 City Hall visitors

Materials

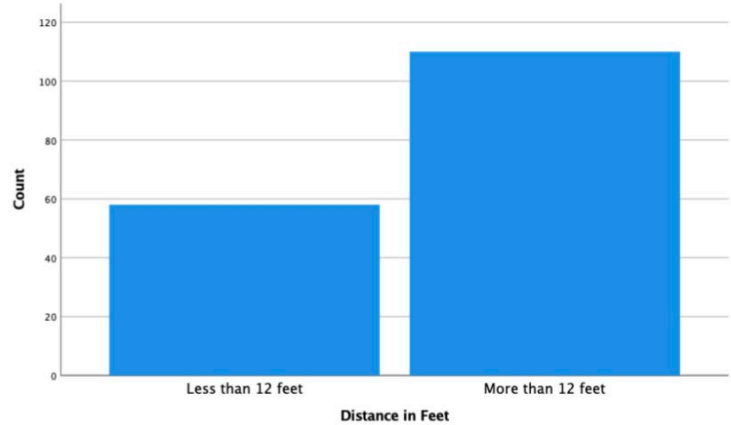
Observation-based data collection was used at multiple locations at each site (CSUSM and City of San Marcos). Locations at CSUSM included University Student Union, Campus Library, Markstein Hall, and Social and Behavioral Sciences Building. Locations at City of San Marcos included: City Hall, the Community Center, the Recreation Center, and the County Library. We observed interactions with waste receptacle(s) in relation to its distance from an entryway. We measured distance (in feet and inches) of the receptacles with tape measures. We noted how participants used the receptacles (complete stop, quick stop, passed and went back, no stop), and how many people were by the bin on average during the observation period.

Procedure

At each location, we measured the distance of the receptacle with tape measures and recorded the distance in feet and inches on our data table. Observations were then made for 4 hours over the course of two days and information for participants who used the receptacles were recorded on a data table.

RESULTS

To test the hypothesis that receptacles placed in closer proximity to entry ways and exits are used more often than receptacles that are further away, a chi-square test of goodness of fit. Distance was divided into less than 12 feet from entry/exit ways and more than 12 feet entry/exit ways. There was a significant difference in distance, $\chi^2(1) = 16.10, p < .001$. That is, more participants used the receptacles when they were more than 12 feet from the entry/exit ways ($N = 58$) compared to use of the receptacles when they were less than 12 feet from the entry/exit ways ($N = 110$). However, this result should be taken with caution as it is biased by more locations where the receptacles were more than 12 feet from the entry/exit ways (6 locations) compared to those that were less than 12 feet from the entry/exit ways (3 locations).



To make sure that this result was not biased by the locations that had 12 feet from the entry/exit ways had more locations (6 locations) than the locations that had receptacles less than 12 feet from the entry/exit ways (3 locations), one location from each of distance types groups by location (e.g., CSUSM, City) were randomly selected for analysis for a total of four locations (CSUSM: University Student Union and Campus Library; City: Recreation Center and County Library). There was not a significant difference between distance of the receptacle (more than 12 feet from the entry/exit ways and less than 12 feet from the entry/exit ways) when controlling for type of site, $\chi^2(1) = 0.76, p = .383$. This suggests that it does not matter how far away from entry/exit ways receptacles are placed.

CONCLUSIONS/GROUP TAKE AWAYS

Results reported that more bins at greater distance from entry/exit ways were used; however, we cannot conclude that bin placement plays a significant role in increased recycling behaviors. We propose that the City of San Marcos continue to look into location, as well as bin type and design (Mozo-Reyes et al., 2016). If the City of San Marco implements these changes, they might see an increase in receptacle usage over time.

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GROUP 2 – Placement of Receptacles

– Jaykob Lopez, Kainoa Mori, Trinity Roblero

INTRODUCTION TO GROUP PROJECT’S FOCUS

Our topic of research was recycling receptacle placement. More specifically how recycling behavior is impacted by recycling receptacle placement in proximity to trash receptacles. Past research has shown that when recycling containers are in close proximity to trash receptacles, there were more items recycled (Brothers et al., 1994). This is important to our study because it allows us to understand the thought process behind closer recycling bins. “Only 28.0% of paper was recycled in the central container condition, but when recycling containers were placed in close proximity to participants, 85.0% to 94.0% of all recyclable paper was recycled” (Brothers et al., 1994).

HYPOTHESIS

Our hypothesis was that the distance a recycling receptacle is placed from a trash receptacle affects how often the recycling receptacle is used. We believe that the closer a recycling receptacle is placed to a trash receptacle the more often the recycling receptacle will be used.

METHODS

Participants

We conducted an observational study, in which 86 participants (53 on CSUSM campus, 33 at San Marcos City Hall) were observed. Participants were chosen using a fixed sample, with every other person using recycling receptacles being observed and logged.

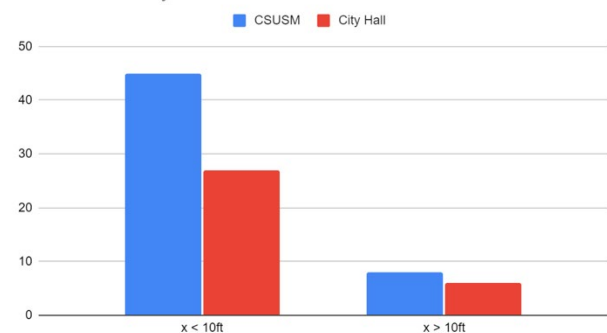
Procedure

One recycling receptacle was placed more than 10 feet away from the nearest trash receptacle, while another recycling receptacle was placed next to the trash receptacle. As participants recycled, the researchers logged their behavior.

RESULTS

The results from our observational study show that there was a significant difference in the use of recycling receptacles and distance, $\chi^2(1) = 39.64, p < .001$. More participants used recycling receptacles $X < 10ft$ away from trash bins ($N=72$) compared to those who recycled when recycling receptacles $X > 10ft$ away from a trash bin ($N=14$). This shows us that recycling receptacle placement had a significant impact on participants recycling behavior.

CSUSM and City Hall



CONCLUSIONS/GROUP TAKE AWAYS

This study supported the hypothesis that recycling receptacle placement would impact how often a trash receptacle is used. The difference in usage of recycling receptacles when placed next to a trash receptacle shows how important placement is. Our suggestion to City Hall is to place organics and recycling receptacles right next to the present trash receptacles on property.

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Survey Projects:

For Groups 3 through 10, a survey was used to gather information about psychological principles (e.g., social norms, attitudes, intentions, beliefs, connectedness with nature, etc.) and reported recycling and organics recycling behaviors. Each group gathered data for their group, but the survey contained all items across all the groups. Below you will find information on the methods for this data collection procedure, including basic demographics of the sample.

METHODS

Participants

The study took place at California State University San Marcos and various locations of City Hall in San Marcos. Our results are from 143 participants ranging in age from 18 to 79 ($M = 26.26$, $SD = 10.15$). Sixty percent of participants identified as female, with 34.3% identifying as male, 4.2% identifying as non-binary/third gender and 1.4% of participants preferred not to say. The majority of participants were Caucasian (36.4%), and Latino or Hispanic (35.0%), followed by Asian (13.3%), Other/Mixed (11.9%), and African American (3.5%). Note: due to the length of the survey, many participants did not complete the survey and were dropped from these analyses ($N = 113$).

Procedure

Participants were approached by a Psyc 338 students and asked if they would participate in a study on recycling. Upon agreeing to participate, participants were provided with a QR code that they could scan using their personal device to access the survey. The first page of the survey provided participants with an informed consent. Upon giving consent to participate in the study, participants completed a 10-minute survey on their attitudes, beliefs, intentions, social norm knowledge, environmental education of recycling, and connectedness with nature. Finally, participants were debriefed and thanked.

GROUP 3 – Verbiage for Signage: Value-Belief-Norm Theory, Social Norms, Social Normative Feedback

– Gabbie Becker, Alyssa Mandujano, Chloe Spears-Cahill, Sara Taghizadegan

INTRODUCTION TO GROUP PROJECT’S FOCUS

Our study explored the effect of social norms on individual recycling behaviors. Social norms are the perceived, unwritten rules that define appropriate and acceptable action within a group or community that guides human behavior. This study focused on two types of social norms: injunctive and subjective. Injunctive norms refer to socially acceptable behavior. They are what people think others are doing. Subjective norms refer to the perceptions of other people’s attitudes, typically people important to that individual, on whether or not they would approve of a particular behavior.

Graham-Rowe et al. (2015) examined subjective norms on intention to reduce household food waste. They found that subjective norms reflect perceived social pressures to engage in a particular behavior and subjective norms could predict intention to reduce household food waste.

HYPOTHESIS

We hypothesized that participants with stronger perceptions of injunctive and subjective norms will engage in more frequent recycling and less convenient forms of recycling than participants with weaker perceptions of injunctive and subjective norms.

METHODS

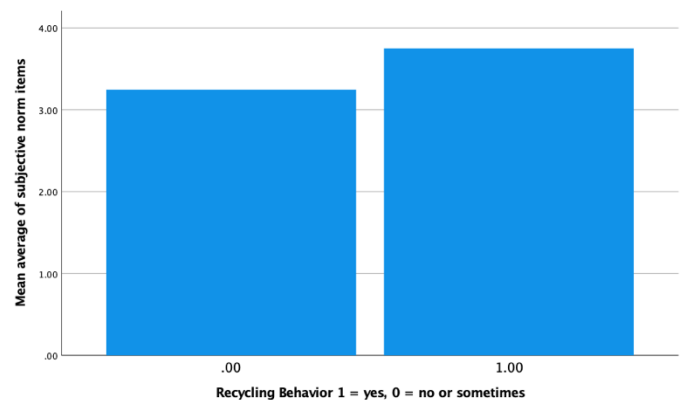
See above for procedure and participants information for this study.

Materials

For our portion of the study, subjective and injunctive norms in relation to individual recycling behaviors were examined. To create a measure of subjective norms, items, adapted from a survey by Liu et al. (2022), were measured on a 5-point Likert Scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A scale score was created for each variable by taking the average of the items within each measure.

Items used to create a measure of subjective norms regarding recycling included:

- Most people who are important to me think I should recycle.
- Most people who are important to me would approve of me recycling.
- My household/family members think I should recycle.
- My friends/colleagues think I ought to recycle.
- I feel morally obliged to recycle materials/products regardless of what other people do.
- I feel guilty when I do not recycle materials/products.
- I would consider myself a better person if I recycle materials/products.

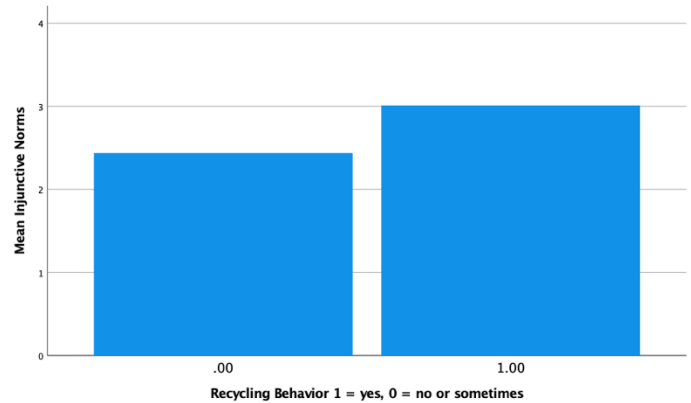
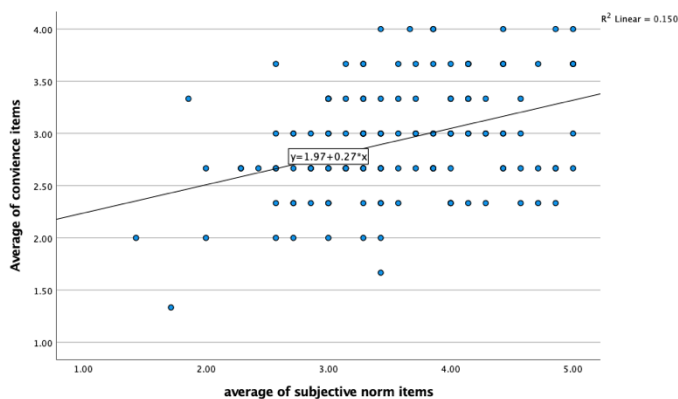


To measure injunctive norms, the item, adapted from Vallet et al. (2005), "On a scale from 1 (strongly disagree) to 5 (strongly agree), please rate the following statement: My friends expect me to recycle household waste" was used

RESULTS

There was a significant difference in subjective norms between participants who stated that they recycled ($M = 3.75, SD = 0.76, N = 97$) and those that did not recycle or sometimes ($M = 3.25, SD = 0.73, N = 40$), $t(135) = 3.57, p < .001$.

In addition, there was a significant difference in injunctive norms between participants who stated that they recycled ($M = 3.01, SD = 1.21, N = 97$) and those that did not recycle or sometimes ($M = 2.44, SD = 1.23, N = 41$), $t(136) = 2.52, p < .05$.

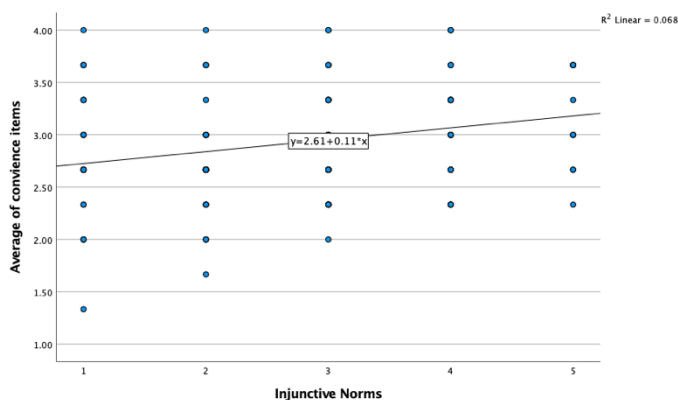


norms ($M = 2.84, SD = 1.24, N = 138$) and inconvenience of recycling ($M = 3.54, SD = 0.74, N = 143$), $r(136) = .28, p < .001$.

There was also a significant positive correlation between subjective norms ($M = 3.60, SD = 0.78, N = 137$) and inconvenience of recycling ($M = 3.54, SD = 0.74, N = 143$), $r(135) = .51, p < .001$. Finally, there was also a significant positive correlation between injunctive

CONCLUSIONS/GROUP TAKE AWAYS

Findings were consistent with the hypothesis. Perceived opinions of the community have strong effects on recycling behavior. People who believe that socially acceptable behavior within a group is to recycle, are more likely to recycle.



Signage for social change is the best course of action for what we are trying to accomplish for this project. We have seen that the 37% of people that were surveyed live in San Marcos have said that they do find recycling convenient. It was also shown that areas with conveniently placed receptacles made it easier to recycle as well. As stated previously, the use of injunctive signage and wording is incredibly effective when mixed with convenience. A suggestion for new signage would be "People around you recycle, you should too!" In order for this to happen, having signs that create a sense of community through these injunctive phrases can be effective.

that create a sense of community through these injunctive phrases can be effective.

When trying to encourage behavior that the majority of the group does not do, highlight the behavior as socially desirable. This can be done with simple icons like a happy face or sad face. Highlighting the social desirability of a behavior, again weaponizes injunctive social norms to change the behavior of a group.

Based on our findings, we believe that signage that alters or highlights the socially acceptable or desirable behavior among a group will be effective in increasing recycling behaviors in San Marcos residents and students.

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GROUP 4 – Verbiage for Signage: Value-Belief-Norm Theory, Social Norms, Social Normative Feedback

– Alanna Howe, Mario Reyes-Morales, Isabella Tolbert

INTRODUCTION TO GROUP PROJECT’S FOCUS

Social norms are beliefs, values, attitudes that are shared by a group of people (Schultz, 1998). Subjective social norms are defined as an individual’s perceived social pressure to engage in a certain behavior (Liu et al., 2022). Social influence is known to play a significant role in recycling behaviors (Vining & Ebero, 1990). Past research has shown behavior can change in the direction of a social norm through social normative feedback (Mertens & Schultz, 2021). The purpose of this study is to identify the influence that social norms have on recycling behaviors.

HYPOTHESIS

Do social norms have an influence on recycling behaviors? We hypothesized that subjective social norms would be positively related to recycling behaviors.

METHODS

See above for procedure and participants information for this study.

Materials

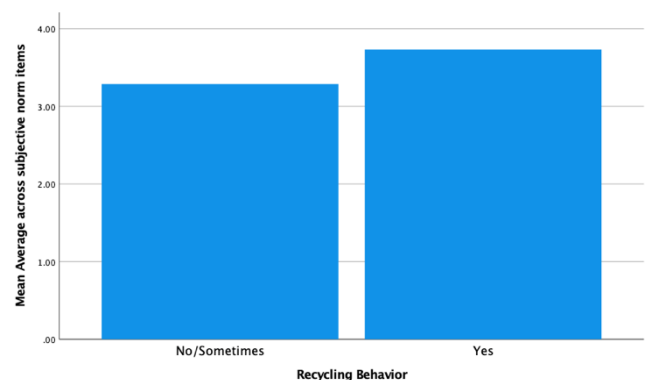
Our group analyzed survey items on subjective social norms, adapted from a survey by Liu et al. (2022) and compared them to if the participant had stated that they recycled or did not or only sometimes recycled. The measure of subjective norms used a 5-point Likert Scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A scale score was created for each variable by taking the average of the items within each measure.

Items used to create a measure of subjective norms regarding recycling included:

- Most people who are important to me think I should recycle.
- Most people who are important to me would approve of me recycling.
- My household/family members think I should recycle.
- My friends/colleagues think I ought to recycle.
- I feel morally obliged to recycle materials/products regardless of what other people do.
- I feel guilty when I do not recycle materials/products.
- I would consider myself a better person if I recycle materials/products.

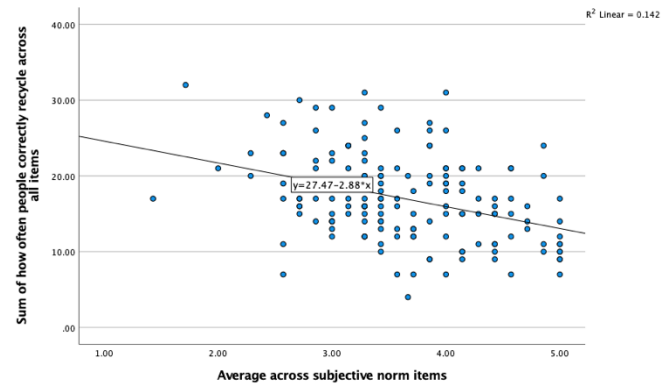
RESULTS

An independent sample *t* test was conducted to examine the hypothesis social norms will be positively related to recycling behavior. There was a significant difference in social norms between those who stated that they recycled ($M = 3.75, SD = 0.76, N = 97$) compared to those who stated that they did not recycle or only recycled sometimes ($M = 3.24, SD = 0.73, N = 40$), $t(135) = 3.58, p < .001$. On average, those who stated that they recycled scored, on average, half a point higher on their



subjective norm items, than participants who stated that they did not recycle or only sometimes recycled ($M_{Diff} = 0.50$).

In addition, a correlation was conducted between subjective norms ($M = 3.60, SD = 0.78, N = 137$) and the how often people correctly recycle across a variety of items ($M = 17.12, SD = 5.82, N = 139$), $r(131) = -.39, p < .001$. That is, as recycling behavior increases so does subjective social norm influence. The correlation between how often individuals correctly identified items by bin type and subjective norms were also examined. There was a significant positive correlation between placing items correctly ($M = 2.66, SD = 1.48, N = 143$) in bins and subjective norms ($M = 3.60, SD = .78, N = 137$), $r(135) = .34, p < .001$.



CONCLUSIONS/GROUP TAKE AWAYS

Our hypothesis was supported. The results demonstrated that subjective social norms did have an influence on whether participants engaged in recycling. This means that when the subjective social norm is that recycling is an approved of behavior, than individuals are more likely to do it. Our finding is consistent with previous research. Vining and Ebreo (1990) found that social norms play a significant role in an individual's decision to recycle. In addition, Mertens and Schultz (2021) found behavior can change in the direction of social norm.

The results from our study have important implications for the City of San Marcos due to the finding that when the subjective social norm is that engagement in recycling is approved by others, than the individual is more likely to engage in pro-recycling behaviors. We recommend that the verbiage on marketing posters should include positive words that indicate pro-recycling behaviors. Additionally, verbiage should indicate that the community approves of recycling. This type of verbiage is important because it demonstrates the subjective social norm that the surrounding community approves of recycling, which influences an individual to engage in recycling. Overall, it is important to identify and understand the influence of social norms because it is a powerful tool that can be utilized when trying to achieve a desired behavior, which in this case is organics recycling.

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GROUP 5 – Verbiage for Signage: Attitudes, Beliefs, Values

– Gabriel Benitez, Julie Djanbatian, Daria Pourbafrani, Dejanique Seras-Gilbertson

INTRODUCTION TO GROUP PROJECT'S FOCUS

The purpose of our research was to find out new ways to improve recycling in San Marcos. The topic for our research was to promote organic recycling. We chose to promote this by researching attitudes, beliefs, and values. Liu et al. (2021) used the theory of planned behavior, environmental concerns, and recycling knowledge to investigate recycling intentions. After conducting their survey in New York, they found that intentions are correlated with attitudes, subjective norms, and perceived behavior control. In another study those who had past behaviors to recycle had more intentions to recycle versus those that did not have past behaviors of recycling (Knussen et al. 2004). The attitude-intention relationships were stronger if they had recycled in the past. Finally, Vinning et al. (1990) found that people who were aware of recycling knew more about it compared to non-recyclers. They also discovered that recyclers that already had the knowledge and intentions to recycle based of environmental reasons, while non recyclers would be motivated to recycle based off of financial reasons. The focus of our research was to uncover the recycling habits of people at CSUSM and the City of San Marcos. This will help the city understand what people believe or think about recycling, so that changes can be made accordingly.

HYPOTHESIS

Individuals who hold higher attitudes towards recycling will be more likely to follow through with their intentions to recycle compared to individuals who hold lower attitudes.

METHODS

See above for procedure and participants information for this study.

Materials

Items used to measure attitudes toward recycling and intentions to recycle adapted from a survey by Liu et al. (2022). The measure of subjective norms used a 5-point Likert Scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A scale score was created for each variable by taking the average of the items within each measure.

Items included for the Attitudes Toward recycling included:

- Recycling helps conserve natural resources.
- Recycling helps reduce litter.
- Recycling helps save energy.
- Recycling helps reduce use of landfills/dumps.
- Recycling creates jobs.
- What I recycle will be made into new products.
- Recycling won't make much difference in the quality of the environment (reversed).

Items included n the Recycling Intention Measure included:

- I intend to recycle better in the next three months.
- I will try to recycle better in the next three months

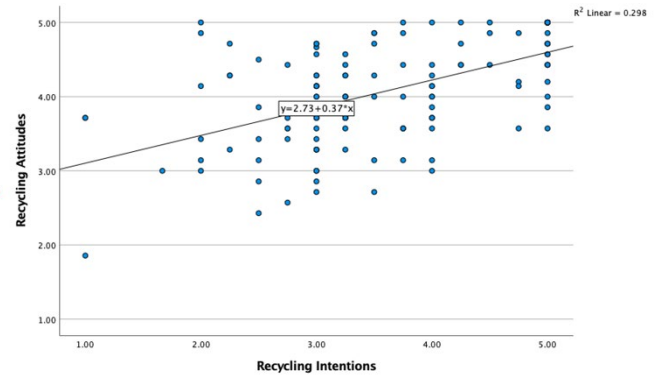
- I plan to recycle better in the next three months.
- How likely are you to recycle better in the next three months?

RESULTS

We conducted a Pearson correlation analysis to assess the relationship between recycling attitudes and intentions. There was a significant positive correlation between recycling attitudes ($M = 4.07$, $SD = 0.69$, $N = 139$) and recycling intentions ($M = 3.58$, $SD = 1.01$, $N = 136$), $r(132) = .55$, $p < .001$.

CONCLUSIONS/GROUP TAKE AWAYS

Our results supported our hypothesis, by confirming that those who have a more positive attitude towards recycling, are more likely to follow through with their intentions to recycle. Past research support this finding as well. Knussen et al. (2004) also found that attitudes and perceived behavioral control contributed to the level of intention to recycle. In another study, prompting and encouragement has additionally suggested a higher likelihood in exhibiting recycling behaviors (Hopper et al, 1991). This further implies that encouraging positive attitudes towards recycling can result in higher rates of recycling behavior. This implies that future research should be interested in investigating the factors that contribute in enhancing attitudes in order to increase recycling behaviors.



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GROUP 6 – Verbiage for Signage: Attitudes, Beliefs, Values

– Erika Bautista Gutterez, Kimi Herrera, Dailah Wilson

INTRODUCTION TO GROUP PROJECT'S FOCUS

Our group decided to test whether individuals will properly recycle and discard their waste if they have a pro-environmental attitude. The purpose of our study is to test whether individuals will choose to properly recycle and discard of their wastes if they have a pro-environmental attitude.

HYPOTHESIS

We hypothesized that individuals would be more likely to direct their attention to organics recycling signage if the message is portrayed in a pro-environmental/eco-friendly way.

METHODS

See above for procedure and participants information for this study.

Materials

Our portion of the survey consisted of seven questions measuring attitudes, beliefs, and values on recycling, adapted from Valle et al. (2005) that were measured on a scale from 1 (strongly disagree) to 5 (strongly agree). A scale score was created by taking the average of the seven items. These items included:

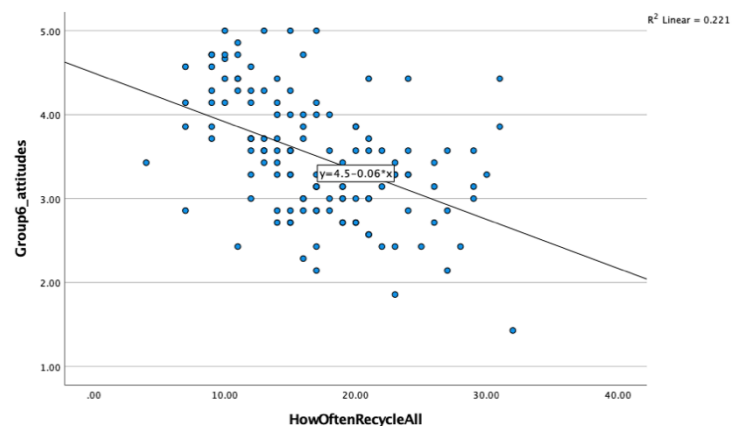
- Recycling household waste is not up to me
- For me, recycling household waste is a very difficult task
- I feel a strong personal obligation to recycle a large portion of my household
- I would feel guilty if I did not recycle regularly my household's recyclables
- I am willing to go blocks out of my way to recycle household materials on a regular basis
- My friends expect me to recycle household waste
- Satisfaction in promoting actions able to help change the world

RESULTS

Using a Pearson's correlation, there were significant negative correlations between recycling attitudes ($M = 3.46$, $SD = 0.73$, $N = 140$) and how often participants recycled each of the following items:

Paper ($M = 1.90$, $SD = 1.037$, $N = 139$), $r(134) = -.33$, $p < .001$; Organics ($M = 2.87$, $SD = 1.23$, $N = 139$), $r(134) = -.26$, $p < .01$; Plastic ($M = 1.91$, $SD = 0.97$, $N = 138$), $r(133) = -.23$, $p < .01$; Glass ($M = 2.07$, $SD = 1.19$, $N = 138$), $r(133) = -.36$, $p < .001$; Metal ($M = 2.41$, $SD = 1.34$, $N = 137$), $r(132) = -.30$, $p < .001$; Textiles ($M = 2.98$, $SD = 1.38$, $N = 138$), $r(133) = -.34$, $p < .001$; and Electrical ($M = 3.09$, $SD = 1.36$, $N = 138$), $r(133) = -.42$, $p < .001$.

NOTE: This is in the intended direction (how often was measured on a scale of 1 (always) to 5 (never)). This means that as recycling attitudes increased so did the amount of recycling participant did for these items. There was also a significant correlation between recycling attitudes and how often participants



recycled across all these items by adding up how often they recycled these items ($M = 17.12$, $SD = 5.82$, $N = 139$), $r(134) = -.47$, $p < .001$.

CONCLUSIONS/GROUP TAKE AWAYS

We found that our results supported the hypothesis that individuals choosing to properly recycle and discard their waste have a pro-environmental attitude toward recycling. The results of the analysis are significant to this field of study since they will predict what is most beneficial to add to the development of the project. This study has implications for recycling signage for receptacles. Signage should increase pro-environmental attitudes toward recycling to promote recycling.

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GROUP 7 – Verbiage for Signage: Environmental Education

– Hamza Hamoudeh, Taylor Mapes, Kaila Rayburn

INTRODUCTION TO GROUP PROJECT'S FOCUS

Environmental education has been linked to positive changes in recycling behaviors (Jones & Green, 2019). Previous research has shown that environmental education programs can increase participants' knowledge and awareness of recycling practices (Smith et al., 2017). Studies have found that environmental education interventions can lead to improved recycling behaviors and increased participation in recycling initiatives (Johnson et al., 2020). The aim of this research project was to explore the effects of environmental education on individuals' knowledge, attitudes, and behaviors towards organics recycling. The findings of this research project will hopefully provide valuable insights for educators & policymakers in designing and implementing effective environmental education initiatives.

HYPOTHESIS

It was hypothesized that If individuals are knowledgeable on environmental education and about the proper way to recycle organic materials, then it will have a positive impact on their recycling behaviors.

METHODS

See above for procedure and participants information for this study.

Materials

Measures of knowledge of proper recycling was measured by asking participants, "For each of the following items, please say whether each of the objects below should be placed in the trash bin, the blue recycling bin for regular recycling, the green recycling bin for organics, or at a recycling center. If you don't know, please choose "don't know"" for the following items:

- Newspaper
- CD/DVD
- Bubble gum
- Plastic grocery bag
- Magazines
- Glass bottles
- Batteries
- Shoes
- Junk mail
- Tree branches
- Bags or purses
- Banana peel
- Plastic water bottle
- Electronics
- Drinking glasses
- Yard/Grass/Lawn Clipping
- Soiled paper food packaging (e.g., used fast food containers)
- Brochures

- Soda cans
- Tissue paper
- Glass beer/wine bottles
- Stryofoam
- Clothes
- Candy bar wrappers and chip bags
- Plastic toys
- Clean aluminum foil
- Ceramics (e.g., plates, bowls, and flower pots)
- Leftover steak
- Milk jugs

Participants are then given a “correct” or “incorrect” rating based on which bin they choose to place these items. The number of correct disposals across all items was calculated by adding up the number of correct disposals across these items.

To measure where knowledge of what can and cannot be recycled came from the following item was used: “Where would you say the majority of your knowledge of what can and can’t be recycled comes from?

Choose all that apply.” Choices included:

- Friends/family/neighbors
- City provided information
- Social media
- Product packaging
- From what it says on the recycling bin
- Trial and error – put it in and see if the refuse collectors leave it behind

This item was adapted from a recycling survey - <https://www.surveymonkey.co.uk/r/KNGC6ZS>.

RESULTS

To test the hypothesis that environmental knowledge and knowledge of proper recycling of organics material will have an impact on recycling behaviors, independent samples *t* test were conducted. Participants were asked to correctly identify which bins different items were supposed to be placed in. There was not a significant difference between if participants recycled and correctly identified bin locations overall (Yes: $M = 14.43$, $SD = 6.85$, $N = 101$; No: $M = 13.45$, $SD = 7.16$, $N = 42$), $t(141) = 0.76$, $p = .45$; for trash bins (Yes: $M = 0.84$, $SD = 0.40$, $N = 101$; No: $M = 0.86$, $SD = 0.57$, $N = 42$), $t(141) = -0.14$, $p = .86$; for blue bins (Yes: $M = 7.90$, $SD = 4.00$, $N = 101$; No: $M = 7.81$, $SD = 4.40$, $N = 42$), $t(141) = 0.12$, $p = .90$; or green bins (Yes: $M = 1.68$, $SD = 1.03$, $N = 101$; No: $M = 1.74$, $SD = 1.06$, $N = 42$), $t(141) = -0.29$, $p = .77$. There was, however, as a significant difference between if participants recycled and correctly identified bin locations for recycling centers (Yes: $M = 3.22$, $SD = 2.42$, $N = 101$; No: $M = 2.31$, $SD = 2.33$, $N = 42$), $t(141) = 2.07$, $p < .05$. This suggests that knowing where to correctly place items does not determine if participants will recycle or not.

Next, to examine where knowledge of what can and can’t be recycled comes from, a chi-square test of independence was conducted between recycling behavior (yes or no) and where knowledge of recycling comes from (yes or no) for various places (e.g., family and friends, packaging, etc.). Where knowledge about recycling comes from is not significant related to recycling behavior (friends/family/neighbors, $\chi^2(1) = 1.23$, $p = .268$; the city, $\chi^2(1) = 0.04$, $p = .841$; social media, $\chi^2(1) = 0.00$, $p = .986$; product packaging, $\chi^2(1) = 3.74$, $p = .053$ (this one is marginally significant); a recycling box/bag/sticker on the bin, $\chi^2(1) = 0.69$, $p = .405$; or trial and error, $\chi^2(1) = 3.06$, $p = .080$ (this one is also marginally significant). This suggests that where the

knowledge about recycling comes from does not matter in terms of if participants recycle or do not/only sometimes recycle.

CONCLUSIONS/GROUP TAKE AWAYS

Overall, these findings suggest that the source of knowledge about recycling does not appear to have a significant impact on participants' recycling behavior. The relationship between recycling behavior and the ability to correctly identify bin locations was not significant, indicating that knowing where to place items for recycling does not guarantee participants' recycling behavior. Similarly, the source of environmental education paired with knowledge about recycling was not significantly related to recycling behavior, except for a marginal association with knowledge from product packaging and trial and error, which requires further investigation. Based on the provided information, the City of San Marcos could consider the following actions:



- Collaborate with manufacturers and suppliers to improve recycling information on packaging
- Encourage clearer labeling, use of standardized recycling symbols, and information about proper disposal or recycling methods to help residents make informed decisions
- Reinforce the message that correct sorting and recycling are essential for environmental conservation

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GROUP 8 – Verbiage for Signage: Environmental Education

– Malissa Camacho, Charles Golden, Alex Herrera, Cameron Maresh

PLEASE



RECYCLABLE



WASTE ONLY

INTRODUCTION TO GROUP PROJECT'S FOCUS

The present study demonstrates how environmental education influences people's behavior towards recycling and organics. Past research suggests that environmental education improves recycling comprehension and aims to motivate and expose public to recycling knowledge (Kristina, Christiani, & Jobiliong, 2018). There are, however, inconveniences in recycling (Vining & Ebreo, 1990; Fritz et al, 2017). Making recycling convenient and easy to access through structured and institutional recycling programs may be an effective strategy for promoting organics recycling (Derksen & Gartrell, 1993). Finally, proper signage can increase usage so placing instructional signage close to waste bins may be effective (Austin et al., 1993; Ludwig et al, 1998)

HYPOTHESIS

It was hypothesized that individuals with more environmental knowledge were more likely to have correct recycling habits as compared to those with minimal or no environmental knowledge.

METHODS

See above for procedure and participants information for this study.

Materials

To measure environmental education knowledge and environmental behavior (recycling habits), items were adapted from Moussaoui et al. (2022). For each item, participants were asked "Using a scale from 0 (never) to 10 (very often), rate the extent to which you do the following behaviors." For each measure, the average across the items was taken to create the respective measures.

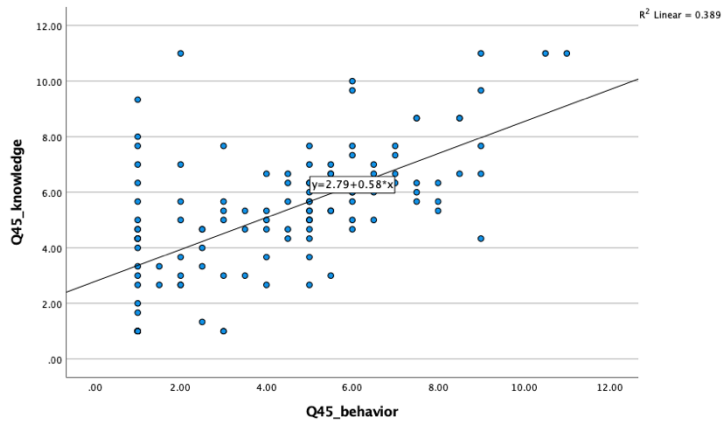
Two items were used to measure environmental behavior:

- How often do you find you can't put your organic waste in the green waste bin because it is too full?
- How often do you put organic waste in the trash because you are not sure if it can be put in the green waste bin?

- Three items were used to measure Environmental Education Knowledge:
 - How often do you not know in which container to put your organic waste because the indications were unclear?
 - How often do you put organics waste in the green bin without being sure that it is correct?
 - How often do you put organic waste in the trash because your green waste bin was already full?

RESULTS

To test the hypothesis that correct recycling habits are more likely to be displayed by people who have had more exposure to environmental education as opposed to people without or with very little environmental knowledge, a correlation was conducted. There was a significant positive correlation between recycling behavior ($M = 4.26, SD = 2.59, N = 129$) and recycling knowledge ($M = 5.23, SD = 2.39, N = 128$), $r(126) = .62, p < .001$. This suggests that as recycling knowledge goes up, so does proper recycling behaviors.



CONCLUSIONS/GROUP TAKE AWAYS

Data showed that more environmental education leads to correct recycling habits. Past research also supports our hypothesis (Vining & Ebreo, 1990). In this research recycling knowledge also had a direct effect of recycling behaviors.

After collecting our data and finding that our results had a positive correlation between recycling behavior and recycling knowledge, we were able to come up with solutions to spread recycling knowledge. When finding out that the City of San Marcos has a newsletter, we thought that an effective approach to this issue would be to have a segment in the newsletter talking about recycling and providing knowledge and information. Another idea we had was for city hall to provide a program in which people could attend to learn more about environmental education and heighten their knowledge of recycling. Lastly, we think that providing proper signage consistently on receptacles in the area will help people learn what can be recycled and what can't.

In conclusion, more knowledge = better recycling habits and proper and consistent signage improves recycling knowledge.

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GROUP 9 – Verbiage for Signage: Environmental Concern & Connectedness with Nature

– Isabella Cipriani, Celeste Groner, Kendra Lam

INTRODUCTION TO GROUP PROJECT’S FOCUS

What is Connectedness with Nature? Connectedness with nature is an individual’s bond to nature and knowing that actions impact the natural environment (Dutcher et al., 2007). Connectedness with nature has three components: cognitive (connection), affective (caring, concern), and behavioral (commitment). Past Research has found a relationship between environmental identity and pro environmental behavior (Brügger et al. 2011). However, connectedness with nature does not guarantee pro-environmental behavior (Van der Werferr et al., 2013). The purpose of this study is to examine the analyze the relationship between connectedness with nature and recycling.

HYPOTHESIS

We hypothesized that individuals who display more connectedness with nature will exhibit higher rates of pro-environmental behaviors (recycling).

METHODS

See above for procedure and participants information for this study.

Materials

Using a measure of connectivity adapted from Dutcher et al. (2007), participants were asked “using a scale from 1 (completely disagree) to 5 (completely agree, please rate the extent to which you do the following behaviors:

- I see myself as part of a larger whole in which everything is connected in a common essence.
- I feel a sense of oneness with nature.
- The world is not merely around us but with us
- I never feel a personal bond with things in my natural surroundings, like trees, a stream, wildlife, or a view of the horizon (reverse).

These items were then averaged together to create a measure of connectivity for nature.

Participants were also asked how often they recycled across a variety of items, using a scale from 1 (Always) to 5 (Never). Items included:

- Paper & Cardboard (e.g., books, newspapers, magazines, greeting cards, boxes)
- Organics (e.g., food scrapes, grass, clippings)
- Plastic (e.g., grocery store bags, water bottles, yogurt containers)
- Glass (e.g., glass bottles, jars)
- Metal (e.g., cans, foil)
- Textiles (e.g., clothes, shoes)
- Electrical (e.g., batteries, mobile phones, computers)

These items were then summed across all items to create a measure of how often the participant recycles.

RESULTS

To test the hypothesis, individuals who display more connectivity for nature will display higher levels of engaging in recycling/organics recycling behavior, a correlation was conducted between connectivity with nature and how often participants recycled items overall. There was not a significant relationship between connectivity with nature ($M = 3.03$, $SD = 0.43$, $N = 143$) and how often participants recycled overall ($M = 17.12$, $SD = 5.82$, $N = 139$), $r(137) = .02$, $p = .85$.

CONCLUSIONS/GROUP TAKE AWAYS

Our hypothesis was not supported. However, this is in line with past research that suggests that environmental identity has a significant relationship to pro-environmental behaviors but connectedness with nature may not (Brügger et al., 2011). Possible explanations as to why there was no correlation between connectedness with nature and recycling, could be due to limitations. Participants may have not felt connectivity with nature in the environment where they took the survey. It's possible that while participants filled out the survey, they experienced boredom, mental fatigue, or distractions that could have affected their answers or resulted in incomplete surveys. Furthermore, response bias is possible. It's also possible that participants did not understand what connectedness with nature truly implied. Lastly, another limitation could be the limited scales used from the study by Dutcher et al., (2007).

The implication of the study is to influence positive and more consistent recycling behavior. An important takeaway from this study is that people's recycling habits do not rely solely on their connectivity to nature. A recommendation for the City of San Marcos on how to implement organic recycling within the city is to incorporate connectedness with nature with other methods. Additionally, it would be beneficial to research other implications that may promote recycling behavior, such as incentives. Future research about connectivity with nature and pro-environmental behaviors should involve a shorter survey, more participants, and more types of scales to measure connectedness with nature such as a scale for behavior and a scale for concern for the environment.

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GROUP 10 – Verbiage for Signage: Environmental Concern & Connectedness with Nature

– Lauren Lichtenberger, Valeria Navarro, Mariah Torres, Andrew Wadlington

INTRODUCTION TO GROUP PROJECT’S FOCUS

Our goal of this study was to examine individual's connectedness with nature to understand whether it would have an impact on their recycling behaviors. Previous research studies have shown that those who have an ecocentric environmental concern, have more favorable attitudes towards recycling (Vining & Ebreo, 1992, as cited by Bloomfield, A., et al, 2022). We define connected with nature as previous research done by Schultz, 2002, 'The extent to which an individual includes nature within his/her cognitive representation of self' (Mayer & Frantz, 2004). It is known that most people who are more likely to participate in recycling are individuals with exceptional knowledge of recycling as well as other environmental factors, those who are older, have a higher income, and/or greater perceived skills (Andrews et al, 2013). It has been said in a previous study done by Mayer and Frantz (2004), that if one holds a stronger relationship between nature and oneself, empathy and willingness to help will increase and thus by measuring one's connectedness with nature, this is vital for progress to be made with environmental issues... such issues as recycling in which we are examining.

HYPOTHESIS

We hypothesized that there is a positive relationship between environmental connectedness and participation in organics recycling.

METHODS

See above for procedure and participants information for this study.

Materials

Using a measure of connectivity adapted from Dutcher et al. (2007), participants were asked “using a scale from 1 (completely disagree) to 5 (completely agree, please rate the extent to which you do the following behaviors:

- I see myself as part of a larger whole in which everything is connected in a common essence.
- I feel a sense of oneness with nature.
- The world is not merely around us but with us
- I never feel a personal bond with things in my natural surroundings, like trees, a stream, wildlife, or a view of the horizon (reverse).

These items were then averaged together to create a measure of connectivity for nature.

Organics recycling behavior was measured by asking participants to “Using a scale from 0 (never) to 10 (very often), please rate the extent to which you do the following behaviors”. Behaviors included:

- How often do you find you can't put your organic waste in the green waste bin because it is too full?
- How often do you not know in which container to put your organic waste because the indications were unclear?
- How often do you put organics waste in the green bin without being sure that it is correct?
- How often do you put organic waste in the trash because your green waste bin was already full?
- How often do you put organic waste in the trash because you are not sure if it can be put in the green waste bin?

The average across these items was used to create a scale measure of organics recycling behavior.

RESULTS

To test the hypothesis, individuals willing to engage in sustainable behaviors are correlated to how connected an individual is to nature itself, a correlation was conducted. There was not a significant correlation between connectivity with nature ($M = 3.03$, $SD = 0.43$, $N = 143$) and organics recycling behavior ($M = 4.84$, $SD = 2.22$, $N = 129$), $r(127) = .12$, $p = .19$.

CONCLUSIONS/GROUP TAKE AWAYS

Our hypothesis was not supported. Due to a relatively small sample size as well as a varying number in participants who completed the survey questions in which we were trying to find correlation, this caused some limitations. We can now recommend that the City of San Marcos should not design organic recycling signs based upon one's connectedness with nature. To conclude, while one's connectedness with nature does hold a high value in many ways; specifically for an increase in organics recycling, this subject cannot be claimed as impactful for organics recycling.

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