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USING THE THEORY OF PLANNED BEHAVIOR TO UNDERSTAND UNIVERSITY STUDENTS

RECYCLING BEHAVIOR

By:

Vanessa Sonnenfeld

AN UNDERGRADUATE THESIS

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Thesis Reader: Name: Cale Brodersen

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USING THE THEORY OF PLANNED BEHAVIOR TO UNDERSTAND UNIVERSITY STUDENTS RECYCLING BEHAVIOR

Vanessa Sonnenfeld, B.S.

University of Nebraska-Lincoln, 2018

Advisor: Dr. Prabhakar Shrestha

Improving recycling behavior is an important means to reducing the ever-increasing amount of waste sent to landfills. When discussing sustainable behaviors, such as recycling, the Theory of Planned Behavior (TPB) can be used to explain why people make the decisions they do. The Theory of Planned Behavior utilizes attitude, subjective norm and perceived behavioral control to be the predictors of behavioral intention. Once we can better explain why students decide to recycle or not to recycle we can utilize this data to increase recycling rates. The Theory of Planned Behavior was used as a basis for this study in order to uncover motivating factors related to on campus recycling. The results show that students have a positive attitude toward recycling on campus, they do not feel there is an established subjective norm to recycle on campus, and they feel in control of their ability to recycle on campus. The information provided from this research can be used to develop a more efficient recycling program and make revisions to current recycling strategies.

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1. Introduction

1.1 Problem Statement

“With the inevitability of growth, society must find sustainable ways to meet current needs that do not compromise the ability of future generations to meet their needs” (Becker, 2014).

Implementing and practicing sustainable behaviors is critical for the conservation of our environment for future generations. Steps can be taken to improve the overall quality and quantity of natural resources that our society today has become so dependent on. One of these steps include the efforts of recycling. The act of recycling reduces the emissions related to waste disposal, the need to harvest raw materials, and energy consumption related to the production of new materials (Largo-Wight, 2013). Recycling is an important means to reducing the ever-increasing amount of waste sent to landfills. Lifestyle consumerism is a driver for the problem of anthropogenic climate change. Recycling promotion is essential because it not only reduces consumption of natural resources, but it also conserves energy (Chan, 2013). According to the EPA, in 2014 the United States produced roughly 258 million tons of municipal solid waste and only 89 million tons of that municipal solid waste was recycled or composted. This equates to a 34.6 percent diversion rate. A greater understanding of recycling behaviors can be utilized to increase overall recycling rates. When discussing sustainable behaviors and recycling habits the Theory of Planned Behavior can be used to explain why people make the decisions they do.

Universities are a critical place to establish recycling participation as a social norm (Clay, 2005). Studying the behaviors of University students is the first step in increasing overall campus recycling efforts. This research will generate new knowledge of University students’ campus recycling behaviors and has the potential to be applied to future campus recycling campaigns to increase overall recycling rates.

This research used the Theory of Planned Behavior to better understand university students’ recycling behavior. This study has two main goals: to gain a better understanding of students’ recycling behaviors and to understand which intentions of the Theory of Planned Behavior are the strongest predictors in determining students’ recycling behaviors.

In his 2005 article on increasing university recycling efforts, Clay frames the importance of recycling well: “In recent years recycling has become increasingly imperative; waste generation has escalated, and resources are becoming scarce, making recycling not only sensible practice but essential” (Clay, 2005). The Theory of Planned Behavior can be utilized to create a better understanding of students recycling behaviors within a campus setting. Once we can better explain why students decide to recycle or not to recycle we can utilize this data to increase recycling rates.

1.2 Literature Review

Recycling

Practicing sustainable behaviors is at the core of improving our ability to safeguard the environment for future generations to come. “Environmental resources such as soil, water, air, and biodiversity provide the building blocks necessary for human health” (Largo-Wight, 2013). When these resources are not properly cared for, we are making our environment vulnerable to potential harm and degradation. As the world continues to see increasing resource consumption and consequences from climate change, there is a consensus that public action is necessary to protect the environmental resources necessary for human health (Largo-Wight, 2013). “The ‘waste problem’ demands a solution on a local, national and international level. Technological advances are one part of the equation. The other part is human behavior and decision-making related to recycling” (Botetzagias, 2015). Protecting these environmental resources is a difficult and complicated task but there are steps that can be implemented to help improve the quality of our environment such as recycling. A common behavior that contributes to a more sustainable earth is recycling (Poškus, 2015). “The term recycling is defined as the process through which materials already used are collected, processed, remanufactured and reused” (Clay, 2005). “Overall, recycling reduces the amount of waste sent to landfills and incinerators, conserves natural resources, and prevents pollution and greenhouse emissions caused by the manufacturing of new goods from virgin materials” (Becker, 2014). For example, according to Becker, manufacturing recycled materials uses only two-thirds the energy that is required to make goods from raw materials. “Americans recycled about 33% of total municipal solid waste in 2009, which is equivalent to saving almost 225 million barrels of oil.” (Largo-

Wight, 2013) Recycling behaviors can offer hope for sustainable growth by alleviating waste issues generated by economic activities (Becker, 2014). Increasing personal recycling rates is a great step toward a more sustainable world and a healthier environment. There are many benefits that can be connected to recycling. These includes healthier land, air, and water. Despite these benefits, recycling behavior still need public attention (Largo-Wight, 2013). “Although there are many programs in the U.S. designed to encourage and facilitate recycling behavior, a gap still exists between implementation of these initiatives and optimal amounts of recycling behaviors” (Becker, 2014). The United States alone has a lot of room for improving recycling rates across the country. According to Largo-Wight, approximately 90% of the waste generated in the U.S. could be recycled, but Americans are recycling only about 30% of their waste. Improving recycling rates can have a large impact on the number of recyclables that are taken to the landfill as well as the number of recyclables that end up in our environment as pollution. When recycling rates increase, there is also a decrease in the amount of raw materials harvested, which helps protect the Earth’s natural resources. When recycling is implemented, it also helps the economy by creating jobs and maintaining the environment for future generations. (Becker, 2014) “Schools and college campuses represent a recycling intervention priority worldwide because of the potential for colleges and universities to contribute to a community’s waste stream and impact environmental-related human health” (Largo-Wight, 2013). University students are an important group for research since they are the world’s future consumers and intellectual leaders (Izagirre-Olaizola, 2014). “Previous studies concluded that campus recycling rates are similar to the national household and municipal recycling statistics in the U.S.; only about one-third of recyclable waste is diverted from the landfills and recovered for recycling” (Largo-Wight, 2013). “Educational Institutions such as universities face the challenge of developing and nurturing sustainable, environmentally friendly mindsets in the students and educators who study there” (Clay, 2005).

Theory of Planned Behavior

Psychologists can investigate pro-environmental behavior by utilizing social psychological theories such as the theory of planned behavior (TPB) (Greaves, 2013). The Theory of Planned Behavior is a theoretical framework for investigating the factors that influence behavioral choices. (Mahmud, 2010). A common way to predict and explain recycling and sustainable behavior in general can be explained using the Theory of Planned

Behavior (Poškus, 2015). When discussing sustainable behavior and recycling habits we can use the Theory of Planned Behavior to explain why people make the decisions they do. “The theory assumes that people behave rationally when they consider the implications of their actions. “TPB (Theory of Planned Behavior) hypothesizes that the immediate determinant is the individual’s intention to perform or not to perform that behavior” (Mahmud, 2010). According to the Theory of Planned Behavior, behavior can be predicted by intentions to behave or act in a certain way (Poškus, 2015); most human behaviors are goal-directed behaviors, thus a person would behave pro-environmentally because they have the “intention” to do so. This “intention” is influenced by the person’s “attitude”, “subjective norms” and “perceived behavioral control” (Botetzagias, 2015). “Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intentions to engage in a behavior, the more likely should be its performance” (Ajzen, 1991). The Theory of Planned Behavior utilizes three conceptually independent determinants of intentions (Ajzen, 1991). “To predict whether a person intends to do something, we need to know, whether the person is in favor of doing it (‘attitude’), how much the person feels social pressure to do it (‘subjective norm’) and whether the person feels in control of the action in question (‘perceived behavioral control’)” (Francis, 2004). The Theory of Planned Behavior assumes that the behavioral intention is the strongest predictor of behavior. Perceived behavioral control, attitude towards behavior, and subjective norm are the aspects that construct the behavioral intention (Largo-Wight, 2013). “By changing the three ‘predictors’, we can increase the chance that the person will intend to do a desired action and thus increase the chance of the person actually doing it” (Francis, 2004). General findings support the predicative power of the three constructs in predicting intentions using the TPB (Cheung, 1999). The Theory of Planned Behavior has become one of the most frequently used models for predicting human behavior due to its universality (Poškus, 2015). According to Poškus, it is apparent that the Theory of Planned Behavior is a powerful framework for sustainable behavior research and can be applied to most behaviors.

Attitude

Attitude can be defined as a psychological tendency that is expressed by evaluating a particular behavior with some degree of favor or disfavor (Francis, 2004). The attitude reflects the evaluation of the behavior and its outcome (Knussen, 2008).

Subjective norm

The subjective norm is defined as the perceived social pressure to perform a behavior (Francis, 2004). The subjective norm reflects the extent to which people important to the individual are perceived to support the behavior and the extent to which the individual is motivated to comply (Knussen, 2008).

Perceived Behavioral Control

Perceived behavioral control (PBC) is defined as the perceptions of how easy or difficult it is to perform the behavior (Francis, 2004). The Perceived Behavioral Control reflects the extent to which the individual feels able to perform the behavior (Knussen, 2008). Perceived behavioral control assesses the perception of how well one can control factors that may facilitate and/or constrain the actions needed to deal with a specific situation (Han, 2010). “Cross-sectional findings suggest that one of TPB’s constructs, perceived behavioral control, was a particularly strong predictor of recycling behavior. In fact, perceived behavioral control was the single strongest predictor of recycling intention across several studies. Based on TPB’s assumptions, perceived behavioral control is comprised of “self-efficacy” and “external factors” that influence the adoption of a health behavior (Largo-Wight).

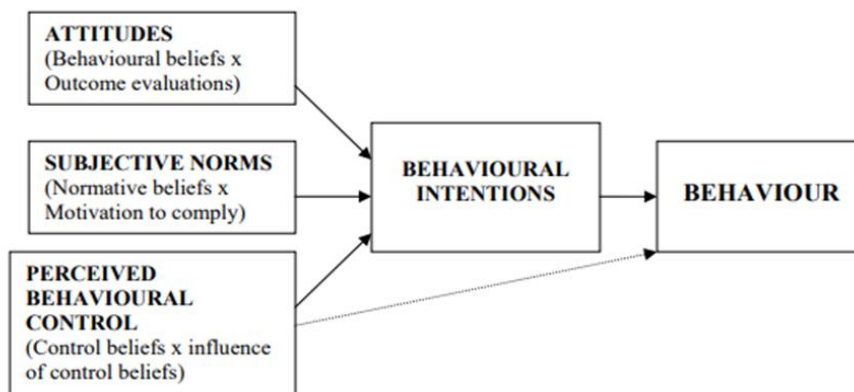


Figure 1. The Theory of Planned Behaviour (Ajzen, 1991)

2. Methodology

2.1 Overview

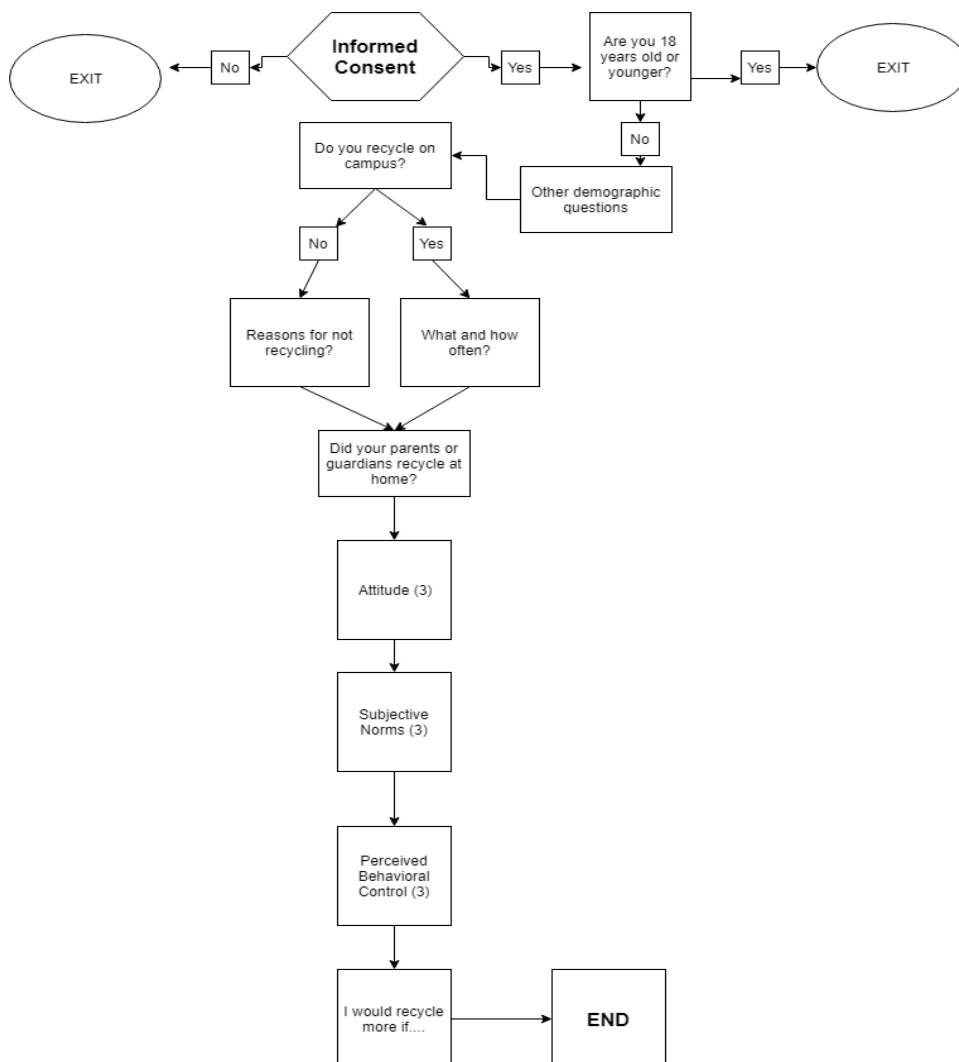
This research study used the Theory of Planned Behavior (TPB) model to conduct human subject surveys and collect quantitative data. This study had three main steps that included designing a survey, distributing the survey, and analyzing the data results for future use. The overall objective of this research is to further understand University students on campus recycling behaviors. As discussed in the literature review, the Theory of Planned Behavior is a common way to predict and explain recycling behaviors (Poškus, 2015). “The Theory of Planned Behavior (TPB) assumes that people behave rationally when they consider the implications of their actions. TPB hypothesizes that the immediate determinant is the individual’s intention to perform or not to perform that behavior” (Mahmud, 2010). According to the Theory of Planned Behavior, behavior can be predicted by intentions to behave or act in a certain way (Poškus, 2015). Intention is influenced by three factors: attitude, subjective norm, and perceived behavior control (PBC) (Mahmud, 2010). The survey, found in Appendix A, was designed to measure the components of the Theory of Planned Behavior: behavior, attitude, subjective norm and perceived behavioral control.

2.2 Survey

The first step in the survey process was to have the participants read and accept an informed consent form. This informed consent confirms that all participants and responses will remain confidential. At the beginning of the survey each respondent was asked general demographic questions like gender, age, current educational standing and ethnicity. The first demographic question asked the students if they were 18 years old or younger. If the participants answered “yes” then they were automatically removed from the survey. Students participants must be 19 years or older to participate in the survey questionnaire without parental permission. If the participants were at least 19 years old they were directed to further demographic questions.

To measure behavior, the survey included a question if the respondents recycle on campus or not. Depending on if they answered “yes” or “no” the survey asked two different sets of questions. Those who answered “yes” were also asked to what degree they recycled on campus; everyday, once a week, once a month,

once every year or when possible. In addition, these respondents were asked what types of materials they recycle on campus; paper, cans, glass, plastic, and cardboard. Student participants were asked to mark all that apply. For the respondents that answered “no”, they were asked why they do not recycle on campus; lack of signage for recycling bins, lack of recycling bins, it takes too much time, I do not know how to properly recycle, recycling is not significant for the environment and others important to me do not recycle. Student participants were asked to mark all that apply. All respondents were then asked whether their parents or guardians recycled at home. All of the student participants were then asked to elicit their attitudes, subjective norms, and perceived behavioral control. These questions were all measured on a five-point Likert scale. Three questions measured each attitude, subjective norm and perceived behavioral control towards respondents on campus recycling behaviors. The figure provided below is a flow chart that depicts how the survey questions were asked.



(Figure 2: The Flow Chart Indicates Different Steps UNL Students Took While Completing the Questionnaire Survey)

The survey was constructed using Qualtrics, an online survey software. The survey link was provided to student participants in a classroom setting, those who agreed to participate used their personal laptops and devices to complete the survey.

2.3 Selection of Student Population

This research study was conducted with the assistance of two professors on UNL's campuses over the fall semester 2018. These professors allowed me to sample from their Anthropology 110 classrooms. ANTH 110 was a course that fulfilled an ACE 6 course requirement at the University of Nebraska-Lincoln which would provide for a variety of students. Students who participated in the surveys had the opportunity to take home a reusable shopping bag or aluminum water bottle. Measures were taken to protect students' rights who participated in the survey. This study ensured that the confidentiality of student participants was never breached.

2.4 Description of Variables

This section identifies the main dependent and independent variables used in the questionnaire, including how they are measured. For a full details on the questions asked see Appendix A.

2.4.1 Dependent Variable

The dependent variable was whether or not a student recycles on campus (and the degree of recycling performed). This variable was measured through a question in the survey: the students were asked to indicate if s(he) recycled on campus and the degree to which s(he) recycled.

2.4.2 Independent Variables

The independent variables in this study are attitude, subjective norm, and perceived behavioral control:

Attitude

Attitude can be defined as a psychological tendency that is expressed by evaluating a particular behavior with some degree of favor or disfavor (Francis, 2004). The variable used to measure a student's attitude is: 'att'.

On a five-point Likert scale each student had to pick a point that most likely represented his/her belief for each of the statements that represent different environmental benefits of recycling. Each of the variables that measured a students' belief are represented by: 'att1', 'att2' and 'att3'. The following is an example of the questions measuring a students' beliefs:

Indicate the degree to which you agree or disagree with regards to the following statements.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Recycling does not make a difference.					
I regularly think about how my actions affect the planet Earth.					
Consuming environmentally friendly products has important and direct benefits to the environment.					

Subjective Norm

The subjective norm is defined as the perceived social pressure to perform a behavior (Francis, 2004). The variable used to measure subjective norm is: "sn". On a five-point Likert scale each student had to pick a point that most likely represented his/her belief for each of the statements. Each of the variables that measured a students' belief are represented by: 'sn1', 'sn2' and 'sn3'. The following is an example of the questions measuring a students' beliefs of the subjective norm variable:

Indicate the degree to which you agree or disagree with regards to the following statements.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
I feel social pressure from peers on campus to recycle.					
People who are important to me want me to recycle on campus.					
I don't see others recycle so I don't recycle on campus					

Perceived Behavioral Control

Perceived behavioral control (PBC) is defined as the perception of how easy or difficult it is to perform the behavior (Francis, 2004). The variable used to measure perceived behavioral control is: “pbc”. On a five-point Likert scale each student had to pick a point that most likely represented his/her belief for each of the statements. Each of the variables that measured a students’ belief are represented by: ‘pbc1’, ‘pbc2’ and ‘pbc3’. The following is an example of the questions measuring a students’ beliefs of their perceived behavioral control:

Indicate the degree to which you agree or disagree with regards to the following statements.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
For me to recycle on campus this is an easy task.					
There are ample bins for recycling on campus.					
Recycling on campus takes up too much time.					

2.5. Survey Participants

The participants (N=78) participated in a 5-10 minutes survey about their on campus recycling behaviors. The data was analyzed using Statistical Package for the Social Sciences (SPSS) analyzing software.

3. Results

3.1 General Demographic Data

The student participants were first asked to fill out questions regarding their general demographic information. Table 1 shows that the majority of the student participants were 19-20 years old (84.34%), followed by 21-22 (10.84%), 23-24 (2.41%) and >25 (1.20%).

#	Answer	%	Count
1	18 or younger	1.20%	1
2	19-20	84.34%	70
3	21-22	10.84%	9
4	23-24	2.41%	2
5	>25	1.20%	1
	Total	100%	83

(Table 1: Demographic Data)

The survey asked students what gender they identify with the most. Table 2 shows that the participants identified as male (53.09%) and female (46.91%).

#	Answer	%	Count
1	Male	53.09%	43
2	Female	46.91%	38
3	Transgender male	0.00%	0
4	Transgender female	0.00%	0
5	Prefer not to answer	0.00%	0
	Total	100%	81

(Table 2: Demographic Data)

Students who engaged in the surveys were also asked to indicate the ethnicity that they identify with the most. Table 3 shows that the majority of students who participated in the survey identify as white (80.25%), followed by Asian (14.81%), other (2.4%), Hispanic or Latino (1.23%) and Black or African American (1.23%).

#	Answer	%	Count
1	White	80.25%	65
2	Hispanic or Latino	1.23%	1
3	Black or African American	1.23%	1
4	American Indian or Alaskan Native	0.00%	0
5	Asian	14.81%	12
6	Native Hawaiian or Pacific Islander	0.00%	0
7	Other	2.47%	2
	Total	100%	81

(Table 3: Demographic Data)

Table 4 shows the results of the participant's current educational standing. The majority of the student population that completed the survey were sophomores (41.98%), followed by freshman (27.16%), juniors (24.69%), seniors (4.94%) and 5th year seniors (1.23%).

#	Answer	%	Count
1	Freshman	27.16%	22
2	Sophomore	41.98%	34
3	Junior	24.69%	20
4	Senior	4.94%	4
5	5th year	1.23%	1
	Total	100%	81

(Table 4: Demographic Data)

Table 5 shows the college within the University of Nebraska-Lincoln that were represented in this sample of students. The majority of the students who took the survey represent the college of Arts and Sciences (45.00%), followed by Business (23.75%) and Education and Human Services (12.50%). Other colleges that were represented include Engineering (8.75%), Journalism and Mass Communications (5%), Agriculture Sciences and Natural resources (3.75%) and Law (1.25%).

#	Answer	%	Count
1	Agriculture Sciences and Natural Resources	3.75%	3
2	Architecture	0.00%	0
3	Arts and Sciences	45.00%	36
4	Business	23.75%	19
5	Education and Human services	12.50%	10
6	Engineering	8.75%	7
7	Hixson-Lied College of Fine and Performing Arts	0.00%	0
8	Journalism and Mass Communication	5.00%	4
#	Answer	%	Count
9	Law	1.25%	1
	Total	100%	80

(Table 5: Demographic Data)

The survey also asked students if they lived on-campus or off-campus. Table 6 shows that the participants lived on-campus (43.75%) and off-campus (56.25%).

#	Answer	%	Count
1	On-campus	43.75%	35
2	Off-campus	56.25%	45
	Total	100%	80

(Table 6: Demographic Data)

Table 7 show the results for where the students grew up either in Nebraska, out of state or international. The majority of the students were raised in Nebraska (61.25%), followed by out of state (27.50%) then international (11.25%).

#	Answer	%	Count
1	Nebraska	61.25%	49
2	Out of State	27.50%	22
3	International	11.25%	9
	Total	100%	80

(Table 7: Demographic Data)

Students were asked where they grew up whether it was mostly rural or mostly urban. Table 8 shows that participants responded mostly urban (66.25%) and mostly rural (33.75%).

#	Answer	%	Count
1	Mostly Urban Area	66.25%	53
2	Mostly Rural Area	33.75%	27
	Total	100%	80

(Table 8: Demographic Data)

3.2 Dependent Variable Data

Students were asked if they recycled when they were on campus. Table 9 results show that students responded 'yes' (78.75%) and 'no' (21.25%).

#	Answer	%	Count
1	Yes	78.75%	63
2	No	21.25%	17
	Total	100%	80

(Table 9: Dependent Variable Data)

Students that answered 'yes' to recycling on campus were also asked to what degree they recycle on campus. Table 10 shows that students self-report to recycling when possible (38.10%), followed by once a week (36.51%), then every day (22.22%). Student participants also responded that they recycle once a month (1.59%) and once every year (1.59%).

#	Answer	%	Count
1	Everyday	22.22%	14
2	Once a week	36.51%	23
3	Once a month	1.59%	1
4	Once every year	1.59%	1
5	When possible	38.10%	24
	Total	100%	63

(Table 10: Dependent Variable Data)

Students who answered 'yes' to on campus recycling were also asked what types on materials they recycle on campus, they were asked to mark all that apply. The results in table 11 show that students self-report recycling the most plastic bottles (28.49%), followed by paper (27.37%) then cans (20.11%). Respondents also reported recycling cardboard (18.99%) and glass (5.03%).

#	Answer	%	Count
1	Paper	27.37%	49
2	Cans (pop cans)	20.11%	36
3	Glass	5.03%	9
4	Plastic (pop bottles)	28.49%	51
5	Cardboard (pizza boxes)	18.99%	34
	Total	100%	179

(Table 11: Dependent Variable Data)

The student participants who answered ‘no’ to recycling on campus were asked why they do not recycle on campus. They were asked to check all that apply. Table 12 results show why students do not recycle on campus. The majority of the students reported that they do not recycle because there is a lack of recycling bin available (40.91%), followed by lack of signage for recycling bins (27.27%). Students also stated that it takes too much time to recycle on campus (13.64%), they do not know/understand how to recycle (9.09%), and others important to them do not recycle on campus (9.09%).

#	Answer	%	Count
1	Lack of signage for recycling bins	27.27%	6
2	Lack of recycling bins available	40.91%	9
3	It takes too much of my time	13.64%	3
4	I do not know/understand how to properly recycle	9.09%	2
5	Recycling is not significant for the environment	0.00%	0
6	Others important to me do not recycle	9.09%	2
	Total	100%	22

(Table 12: Dependent Variable Data)

All of the student participants were then asked if their parents/guardians recycled at home. Students reported in table 13 that their parents/guardians did recycle at home (67.50%) and they did not recycle at home (32.50%).

#	Answer	%	Count
1	Yes	67.50%	54
2	No	32.50%	26
	Total	100%	80

(Table 13: Dependent Variable Data)

In the survey students were asked what would help increase on campus recycling, they were asked to mark all that apply. In table 14 the students stated that they would recycle more if there were more recycling bins accessible (36.99%), followed by establishing a norm about recycling on campus (21.23%) then more signs

influencing students to recycle (18.49%). Students also stated that if everyone recycled on campus (13.01%) this would increase overall campus recycling. Some students stated that an incentive towards recycling (9.59%) would help increase campus recycling, while one student stated that they would not recycle more on campus (0.68%).

#	Answer	%	Count
1	there were more signs influencing me to recycle.	18.49%	27
2	there were more recycling bins accessible	36.99%	54
3	everyone recycled on campus.	13.01%	19
4	there was an established norm about on campus recycling.	21.23%	31
5	there were more incentives towards recycling.	9.59%	14
6	I am not going to recycle on campus.	0.68%	1

(Table 14: Dependent Variable Data)

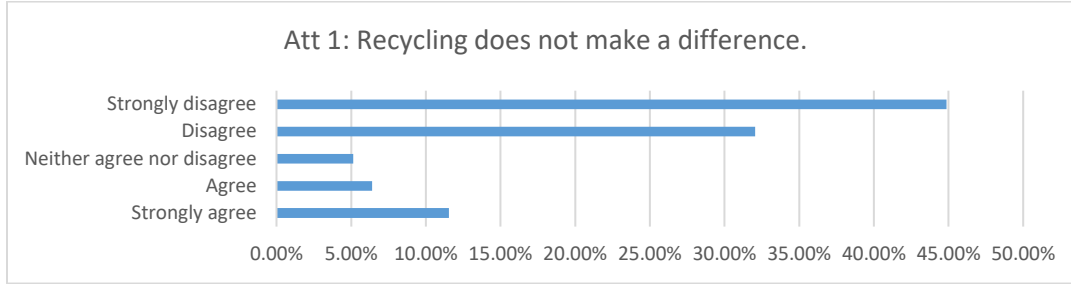
3.3 Independent Variable Data

“To predict whether a person intends to do something, we need to know, whether the person is in favor of doing it (‘attitude’), how much the person feels social pressure to do it (‘subjective norm’) and whether the person feels in control of the action in question (‘perceived behavioral control’)” (Francis, 2004). On a five-point Likert scale each student participant was asked to indicate whether they strongly agree, agree, neither agree nor disagree, disagree or, strongly disagree to a series of statements that evaluate their on campus recycling behaviors. These questions evaluate students’ attitude, subjective norm and perceived behavioral control.

3.3.1 Attitude

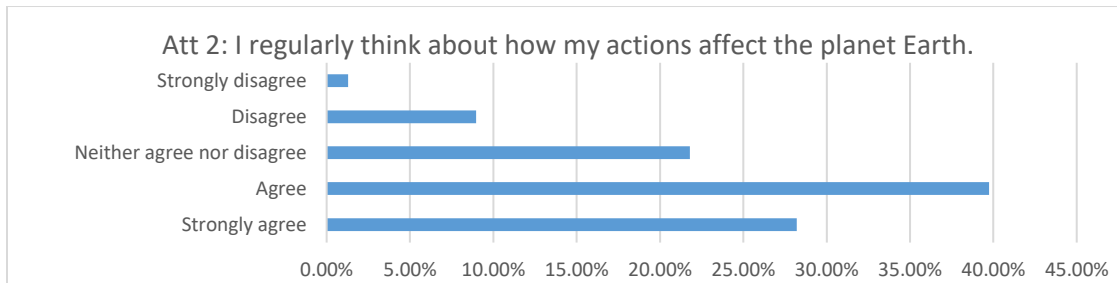
Students that participated in the survey were provided the following statement: “Recycling does not make a difference”. This statement helps establish the students’ attitude (att1) towards recycling and the environment. In chart 1 the results show that the majority of the students responded that they ‘strongly disagree’ (44.87%), followed by ‘disagree’ (32.05%). Chart 1 also show that students surveyed responded with

‘strongly agree’ (11.54%) and ‘agree’ (6.42%). Students also responded that they ‘neither agree nor disagree’ (5.13%).



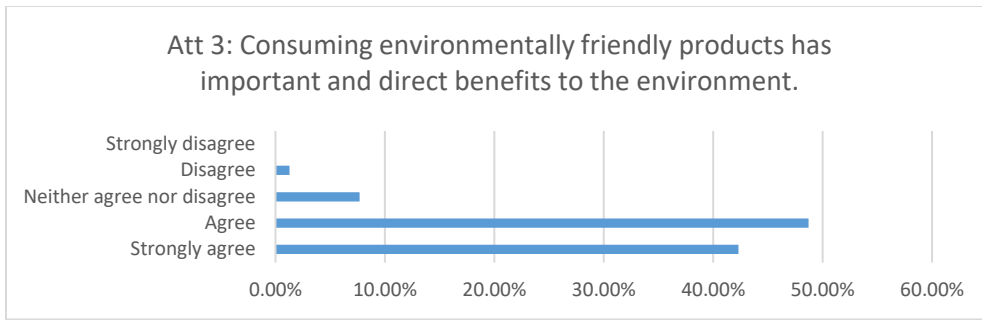
(Chart 1: Independent Variable Data)

Students that engaged in the survey were provided the following statement: “I regularly think about how my actions affect the planet Earth”. This statement helps determine the students’ attitude (att2) towards recycling and the environment. In chart 2 the results show that the majority of the students responded with ‘agree’ (39.74%), followed by ‘strongly agree’ (28.21%). Chart 2 also show that the student participants responded they ‘neither agree nor disagree’ (21.79%) to the statement. Students that took the survey also responded with ‘disagree’ (8.97%) and ‘strongly disagree’ (1.28%).



(Chart 2: Independent Variable Data)

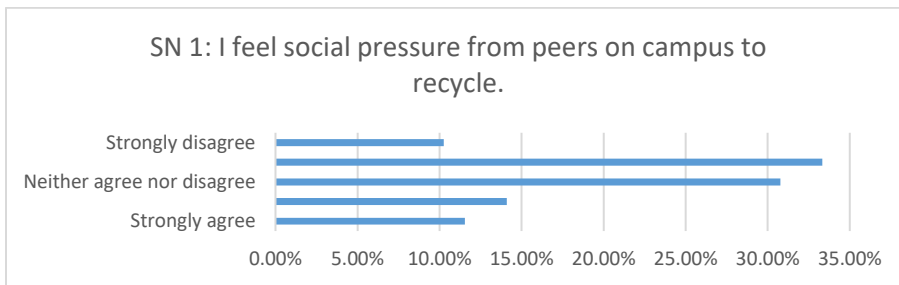
Student participants were provided the following statement: “Consuming environmentally friendly products has important and direct benefits to the environment”. This statement helps determine the students’ attitude (att3) towards recycling and the environment. In chart 3 the results show that the majority of the students responded that they ‘agree’ (48.72%), followed by ‘strongly agree’ (42.31%). Students who participated in the survey responded that they ‘neither agree nor disagree’ (7.69%) and ‘disagree’ (1.28%). No students responded with ‘strongly disagree’.



(Chart 3: Independent Variable Data)

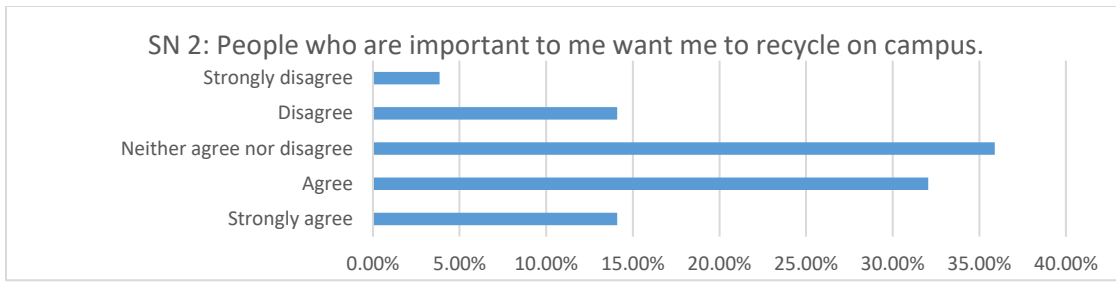
3.3.2 Subjective Norm

Students that agreed to engage in the survey were provided the following statement: “I feel social pressure from peers on campus to recycle”. This statement was asked to determine the respondents’ subjective norm (sn1). Chart 4 shows that the majority of students responded with ‘disagree’ (33.33%), followed by ‘neither agree nor disagree’ (30.77%). The rest of the students responded with ‘agree’ (14.10%), ‘strongly agree’ (11.54%), and strongly disagree (10.26%).



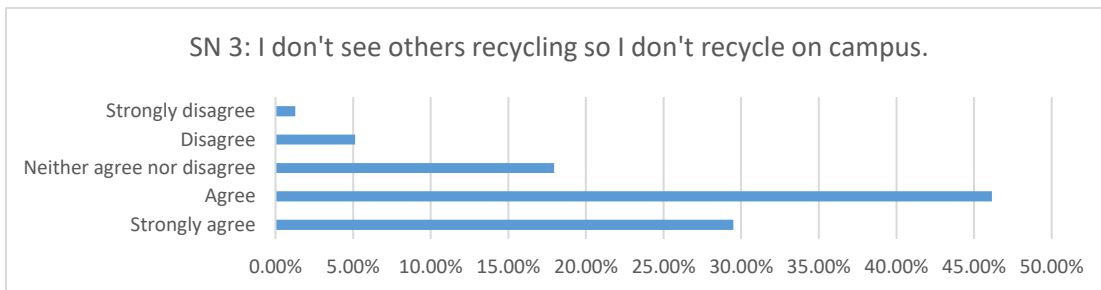
(Chart 4: Independent Variable Data)

Students that participated in the survey were provided the following statement: “People who are important to me want me to recycle on campus”. This statement was asked to determine the respondents’ subjective norm (sn2). Chart 5 shows that the majority of students responded ‘neither agree nor disagree’ (35.90%), followed by ‘agree’ (32.05%). Students responded that they ‘strongly agree’ (14.10%) as well as ‘disagree’ (14.10%). Chart 5 also shows that students responded ‘strongly disagreed’ (3.85%) with the statement.



(Chart 5: Independent Variable Data)

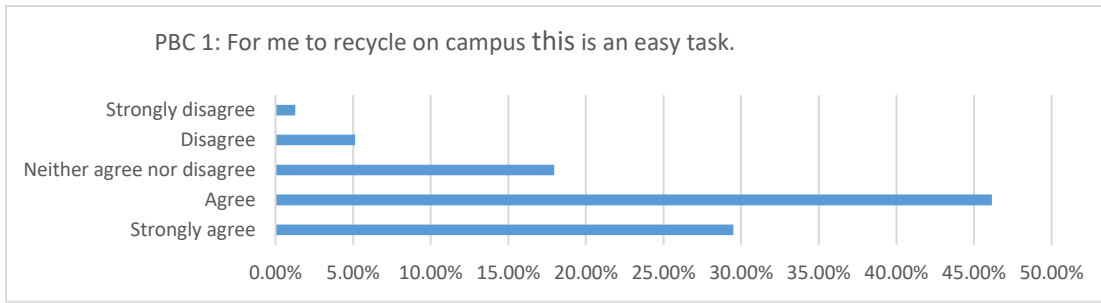
Students that engaged in the survey were provided the following statement: “I don't see others recycling so I don't recycle on campus”. This statement was asked to determine the respondents’ subjective norm (sn3). Chart 6 shows that the majority of students responded that they ‘disagree’ (47.44%) with the statement, followed by ‘neither agree nor disagree’ (21.79%). The student participants responded that they ‘strongly disagree’ (17.95%), ‘agree’ (8.97%) and ‘strongly agree’ (3.85%).



(Chart 6: Independent Variable Data)

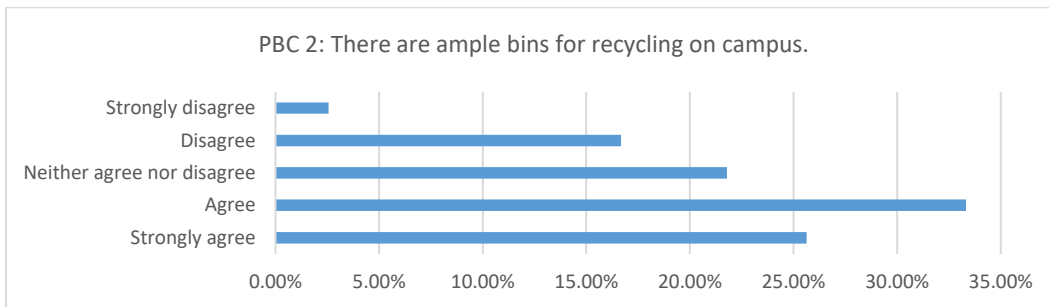
3.3.3 Perceived Behavioral Control

Students that engaged in the survey were given the following statement: “For me to recycle on campus this is an easy task”. This statement was asked to determine the respondents’ perceived behavioral control (pbc1). In chart 7 the results show that students responded they ‘agree’ (46.15%) to this statement, followed by ‘strongly agree’ (29.49%). Students stated they ‘neither agree nor disagree’ (17.95%) to the statement regarding PBC. Chart 7 also shows that the students responded ‘disagree’ (5.13%) and ‘strongly disagree’ (1.28%).



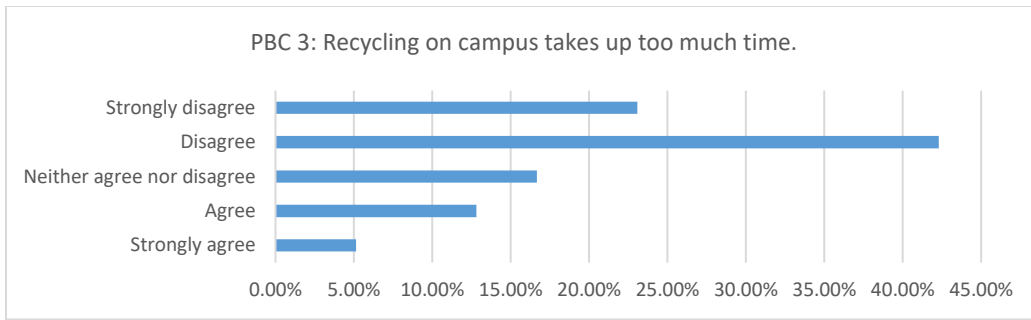
(Chart 7: Independent Variable Data)

Students that agreed to participate in the survey were given the following statement: “There are ample bins for recycling on campus”. This statement was asked to determine the respondents’ perceived behavioral control (pbc2). In chart 8 the results show that the majority of the students who completed the survey ‘agreed’ (33.33%) to this statement, followed by ‘strongly agree’ (25.64%). The students responded that they ‘neither agree nor disagree’ (21.79%) to the statement regarding PBC. Chart 8 also shows students ‘disagree’ (16.67%) to the statement and ‘strongly disagree’ (2.56%).



(Chart 8: Independent Variable Data)

Students that agreed to participate in the survey were given the following statement: “Recycling on campus takes up too much time”. This statement was asked to determine the respondents’ perceived behavioral control (pbc3). In chart 9 the results show that the students responded that they ‘disagree’ (42.31%), followed by ‘strongly disagree’ (23.08%). The participants responded that they ‘neither agree nor disagree’ (16.67%) with the statement regarding PBC. Chart 9 also shows that students responded they ‘agree’ (12.82%) and ‘strongly agree’ (5.13%).



(Chart 9: Independent Variable Data)

4. Discussion

The data provided by the survey could help inform policy updates and other recycling interventions at UNL. These measures are necessary to accommodate an ever increasing amount of waste that is produced and sent to landfills.

Using the Theory of Planned Behavior we can use the survey questions about attitude, subjective norm, and perceived behavioral control to understand students' recycling behaviors on campus. For each of the three determinates of behavior under the Theory of Planned Behavior, multiple questions were asked and measured on a 5-point Likert scale, with a minimum of 1.00 (strongly agree) and a maximum of 5.00 (strongly disagree). The mean was calculated for each question using all of the responses, and then an aggregated score was produced for each category or determinant under the TPB. The aggregate score was calculated by taking the mean values (or means) of the three individual questions. This aggregate score was used to make conclusions about whether or not each determinant influences the respondents' on-campus recycling behavior. To test if the respondents were reading the questions, I used both negative and positively framed questions, (which meant that I had to account for the change in direction of the mean for these negative questions.)

The first attitude question ("Recycling does not make a difference") was a negative question about students recycling behaviors, so this question needed to be recoded. Reflected in table 15, the mean for the first attitude question (att1) was 3.92. When att1 was reframed into a positive question, the mean was 1.08. The mean from the second attitude question (att2) ("I regularly think about how my actions affect the planet Earth") was 2.15. The third attitude question (att3) ("Consuming environmentally friendly products has important and direct benefits to the environment") mean result was 1.68. All of these mean scores added together results in an

aggregate score of 1.64. These results prove that the student respondents strongly agree with these statements, which is a determinate of their recycling behaviors on campus. These results show that attitude is an influencing factor of university students' recycling behaviors.

The first subjective norm question (sn1) ("I feel social pressure from peers on campus to recycle") mean was 3.17. The second subjective norm question (sn2) ("People who are important to me want me to recycle on campus") had a mean result of 2.62. The mean for the third subjective norm question (sn3) ("I don't see others recycling so I don't recycle on campus") was 3.67. The aggregate score for the subjective norm questions, or average of the three results, is 3.15. These results show that the student respondents neither agree nor disagree with these statements, which is a determinate of their recycling behaviors on campus. This data suggests that subjective norm is not an influencing factor of the students' behavior to either recycle or not recycle on campus.

The mean result from the first perceived behavioral control question (pbc1) ("For me to recycle on campus this is an easy task") was 2.03. The second perceived behavioral control question (pbc2) ("There are ample bins for recycling on campus") had a mean score of 2.37. The last perceived behavioral control question ("Recycling on campus takes up too much time") was a negative question about students recycling behaviors. Displayed in table 15, the mean for the last perceived behavioral question (pbc3) was 3.65, the resulting mean for pbc3 reframed into a positive questions is 1.35. The aggregate score for the perceived behavioral control questions is 1.92. These results show that the student respondents strongly agree/agree with these statements, which is a determinate of their recycling behaviors on campus. These results suggest that perceived behavioral control is an influencing factor of university students' recycling behaviors.

#	Field	Min.	Max.	Mean	Std. Dev	Variance	Count
1	Recycling does not make a difference.	1	5	3.92	1.34	1.79	78
2	I regularly think about how my actions affect the planet Earth.	1	5	2.15	0.98	0.95	78
3	Consuming environmentally friendly products has important and direct benefits to the environment.	1	4	1.68	0.67	0.45	78
4	I feel social pressure from peers on campus to recycle.	1	5	3.17	1.15	1.32	78
5	People who are important to me want me to recycle on campus.	1	5	2.62	1.02	1.03	78
6	I don't see others recycling so I don't recycle on campus.	1	5	3.67	1	0.99	78
7	For me to recycle on campus this is an easy task.	1	5	2.03	0.89	0.79	78
8	There are ample bins for recycling on campus.	1	5	2.37	1.11	1.23	78
9	Recycling on campus takes up too much time.	1	5	3.65	1.12	1.25	78

(Table 15: 5-point Likert scale data results)

4.1 Conclusions

The ever increasing amount of waste sent to landfills create a challenge to increase recycling efforts. Understanding university student recycling behaviors is critical to increasing recycling program efforts on campuses. Increasing recycling and diversion rates requires student participation, and maximizing student participation required a thorough understanding of students' current recycling behaviors. Modeling through the Theory of Planned Behavior can help identify the driving motivational factors behind environmental friendly behaviors, such as recycling. These factors can be utilized to design policies and revise current recycling programs to increase participation.

After student participants were surveyed about their attitude, subjective norm, and perceived behavioral control, aggregate scores (produced through the data analysis) were used to determine the motivators of their recycling behaviors on campus. The overall aggregate score for the attitude category was 1.64, meaning that students responded that they strongly agree/agree with the statements about their attitude towards on campus

recycling. The overall aggregate score for subjective norm was 3.15, showing how students responded that they neither agree nor disagree with the statements about their subjective norm towards on campus recycling. The overall aggregate score for PBC was 1.92, showing how students responded that they strongly agree/agree with the statements about their perceived behavioral control towards on-campus recycling. These results suggest that attitude and perceived behavioral control are influencing factors for university students' recycling behaviors, while subjective norm is not an influencing factor.

The use of the TPB has provided valuable insight into what factors motivate recycling behaviors on campus. The results show that students have a positive attitude towards recycling on campus, they do not feel there is an established subjective norm to recycling on campus, and they feel in control over their ability to recycle on campus. These results demonstrate that establishing a subjective norm about recycling on campus could help increase recycling efforts. This research study helped identify that attitude and perceived behavioral control are the main determinates of student's recycling behaviors within the campus setting. The information provided from this research can be used to develop a more efficient recycling program and make revisions to current recycling strategies.

4.2 Limitations

The findings from this study are limited because a statistical analysis has yet to be completed, but the survey results have important implications that can be explored further in additional studies. Further analysis of the collected data will be conducted to provide statistical support for the conclusions drawn from the survey responses. Another limitation was the number of respondents, as a larger sample size would have provided more conclusive data. Were this study to be conducted again, other classrooms would be utilized to collect data from a more diverse of university students.

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APPENDIX A

Informed Consent and Survey

ANTH 110 Recycling Survey

Dear Participant,

We are conducting research about students' behavior involving recycling on campus at the University of Nebraska-Lincoln. The research involves a short online survey. If you are 19 years of age or older you are invited to participate in the survey as a student who use campus facilities at the University of Nebraska-Lincoln.

Participation in this study involves taking an online survey about your recycling behaviors or lack of. This survey consists of some basic demographic information then asks about your recycling behaviors on campus. Responding to the survey should take you 10 minutes or less.

All responses will be completely anonymous and confidential. Information gathered in this research could be published in scientific journals and other outlets and/or presented at scientific meetings. Nobody, including the researchers, will know participants answers to the survey questions.

There are no known risks or discomforts correlated with this research. Benefits of this study might be an increased awareness of recycling behaviors on campus. The information gathered during this study will bring more knowledge about students on campus recycling behaviors and habits at the University of Nebraska-Lincoln.

By participating in this survey, students will receive a choice of a **FREE** water bottle or reusable shopping bag courtesy of the Office of Sustainability.

If you have any questions about the study, please feel free to contact the investigators (Vanessa Sonnenfeld, (402)658-2572 or sonnenfeld2012@gmail.com; Prabhakar Shrestha, (402) 613-5023 or pshrestha3@unl.edu) If you have any questions concerning your rights as a research [participant that have not been answered by the investigators or if you want to report any concerns about the study, please contact the University of Nebraska-Lincoln Institutional Review Board at 402-472-6965.

This survey is being used to identify the barriers of students' ability to recycle at the University of Nebraska-Lincoln. The survey includes questions about students recycling habits and behaviors within campus facilities. This information could be used to improve overall campus recycling rates.

You are free to decide not to participate in this study without adversely affecting your relationship with the investigators or the University of Nebraska-Lincoln. Your decision will not result in any loss of benefits to which you are otherwise entitled. You choosing to proceed to the next screen to start filling out the questionnaire certifies that you have decided to join the research study, having read and understood the information presented. Thank you for your time and consideration of the research.

Section 1- Demographic information

- 1) Are you 19 years or older?
- Yes
 No
- 2) What is your age?
- 18 or younger
 19-20
 21-22
 23-24
 >25
- 3) What gender do you identify the most with?
- Female
 Male
 Transgender female
 Transgender male
 Prefer not to answer
- 4) What is your ethnicity?
- White
 Hispanic or Latino
 Black or African American
 American Indian or Alaskan Native
 Asian
 Native Hawaiian or Pacific Islander
 Others _____
- 5) What is your current Educational Standing?
- Freshman
 Sophomore
 Junior
 Senior
 5th year

6) Which college do you represent? If you have not chosen a major yet, indicate what college you are planning to join.

- Agriculture Sciences and Natural Resources
- Architecture
- Arts and Sciences
- Business
- Education and Human Sciences
- Engineering
- Hixson-Lied College of Fine and Performing Arts
- Journalism and Mass Communication
- Law

7) Do you live on-campus or off-campus?

- On-Campus
- Off-Campus

8) Where did you grow up?

- Nebraska
- Out of State
- International

9) Where did you grow up?

- Mostly Urban Area
- Mostly Rural Area

Section 2-Each question in this section refers to YOUR ON CAMPUS RECYCLING BEHAVIORS

10) Do you recycle on campus? (If answer is no, skip to question 11)

- Yes
- No

10a) You indicated above that you do recycle on campus. To what degree do you recycle on campus?

- Everyday
- Once a week
- Once a month
- Once every year
- When possible

10b) You indicated above that you do recycle on campus. What type of materials do you recycle on campus? (Check all that apply)

- Paper
- Cans
- Glass
- Plastic
- Cardboard (Pizza Boxes)

11) You indicated above that you do not recycle on campus. Why do you not recycle on campus? (Check all that apply) (If answer to question 10 was “yes” then skip this question)

- Lack of signage for recycling bins
- Lack of recycling bins available
- It takes too much of my time
- I do not know/understand how to properly recycle
- Recycling is not significant for the environment
- Others important to me do not recycle

12) Did your parent or guardian recycle at home?

- Yes
- No

13. Indicate the degree to which you agree or disagree with regards to the following statements.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Recycling does not make a difference.					
I regularly think about how my actions affect the planet Earth.					
Consuming environmentally friendly products has important and direct benefits to the environment.					
I feel social pressure from peers on campus to recycle.					
People who are important to me want me to recycle on campus.					
I don't see others recycle so I don't recycle on campus					
For me to recycle on campus this is an easy task.					
There are ample bins for recycling on campus.					
Recycling on campus takes up too much time.					

14) I would recycle more if..... (Check all that apply)

- there were more signs influencing me to recycle.
- there were more recycling bins accessible.
- everyone recycled on campus.
- there was an established norm about on campus recycling.
- if there was more incentives towards recycling
- I am not going to recycle on campus