Investigating the Determinants of Recycling Behavior in Youth by Using Theory of Planned Behavior.

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by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The aim of this study is to understand the determinants that influence the youth recycling behavior intention. In other words, this study wants to know the motivations and barriers behind university students' recycling behavior. The Theory of Planned Behavior (TPB), which provides a theoretical framework for systematically identifying the determinants of recycling behavior, is the basis for this study. Along with the TPB variables, additional predictor variables (moral norm, past experience, knowledge of how and what to recycle, knowledge of consequences, and inconvenience) that can influence behavior intentions were tested in the study. Online survey was used to collect the required information and the sample consists of 172 students from University of South Florida. The findings suggest that past recycling experience is the major contributor to recycling behavior. Moral norm, knowledge of how and what to recycle and knowledge of consequences are also significant predictors of recycling behavior. In other words, students are more likely to form the intention to recycle, when they have prior experience with recycling on campus, if they personally feel recycling is the right thing to do, when they have appropriate knowledge of recycling and when they are aware of consequences of recycling. Recommendations to promote recycling behavior among students are discussed in this study.

CHAPTER 1: INTRODUCTION

Recycling is the procedure by which waste is collected and processed into raw materials that are then manufactured into new products (Environmental Protection Agency, 2013). Recycling processes have various benefits for society and the environment, including reduction of waste, prevention of pollution, reduction of greenhouse gas emissions, conservation of natural resources and energy, stimulation of economic and technological development, cost savings, and protecting the natural habitat (EPA, 2016). Recycling helps in maintaining a clean environment for future generations. Recyclable materials include many kinds of glass, paper, metal, plastic, cardboards, textiles and electronics. In the United States, the need to reduce the amount of waste produced, because landfill sites are being exhausted, resulted in several states implementing mandatory recycling policies (Vining & Ebreo, 1990). Recycling is very important to reduce the amount of solid waste generated every year. According to the EPA in 2014, the country generated about 254.1 million tons of trash and recycled about 87 million tons of this material, equivalent to a 34.3 percent recycling rate. The revenue of the US solid waste industry is $56.7 billion.

According to the most recent statistics, the university system is a major waste-producing sector, contributing between 20 and 35% of the national total (EPA, 2010) and thus providing an excellent opportunity to divert waste into recycled materials. Therefore, students' have to be encouraged to proactively participate in recycling behavior. Reducing solid waste is one of the key strategies to develop a green and sustainable university campus (Smyth et al., 2010). A number of studies have found that younger people are more knowledgeable, interested in, and worried about environmental problems more than older citizens (Nord, Luloff, & Bridger, 1998;

Lindén, 2004; Arcury and Christianson, 1990; Pearce & Prestin, 2010). However, inconvenience was reported as a major influence on college student recycling behavior by McCarty and Shrum (1994), who further said that such concerns appeared to out- weigh attitudes about the long-term importance of recycling behaviors. Williams (1991) reported that a lack of storage space was the main reason for university students not recycling. Environmental knowledge serves as one of the best predictors of environmental concern for adolescents (Lyons and Breakwell, 1994). The challenge now is to build on the earlier recycling work and understand student behavior completely. The original research is designed in two subsequent phases that include both qualitative and quantitative methodology. The two phases are required to get a clear and in depth overview of motivations and barriers to students' recycling behaviors. The pilot study phase includes a preliminary qualitative study, which is done to find out the antecedents of recycling behavior among undergraduate students of University of South Florida (USF). The questionnaire of the main study is partly based on the findings of the preliminary qualitative study. The main study uses quantitative methodology to find the determinants of youth recycling behavior. Once these determinants are identified, by using the results an effective campaign and targeting strategies could be created to promote recycling behavior in students.

CHAPTER 2: LITERATURE REVIEW

Theory of Planned Behavior

This study requires an understanding of the recycling choices made by youth and the factors that underpin these choices. The Theory of Planned Behavior (Ajzen, 1991) provided a theoretical framework for systematically investigating the factors that influence behavioral choices (Tonglet, Phillips & Read, 2004). TPB has been widely used to investigate behaviors, such as leisure choice (Ajzen and Driver, 1992), driving violations (Parker et al., 1992), shoplifting (Tonglet, 2002) and dishonest actions (Beck & Ajzen, 1991). TPB theory was developed from the earlier Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980).

Theory of Reasoned Action (TRA) suggested that a person's behavior is determined by his/her intention to perform the behavior and that this behavior intention is in turn, a function of two factors: 1) his/her attitude toward the behavior and 2) his/her subjective norm (Ajzen and Fishbein, 1980). Attitude generally refers to the favorability of an individual toward certain behaviors, while a subjective norm involves perceived social pressure or acceptance of that behavior. Researcher Liska (1984) argued that, "the performance of certain behaviors is usually deterred by the lack of appropriate opportunities, knowledge, skills, and time" (p. 71).

By taking the previous claims into consideration, Ajzen (1991) revised TRA by incorporating another variable into the model that accounts for an individual's ability to have control over the behavior. This additional variable is referred to as perceived behavioral control. PBC reflects two dimensions: (a) an individual's external conditions that may augment or moderate his or her

ability to adopt certain behavior and (b) an individual's perceived ability to carry out the behavior (Oom Do Valle, Rebelo, Reis, Menezes, 2005, p. 367). In the context of recycling behavior, external conditions can be explained in terms of the ease and convenience of performing recycling activities, while individual perceived ability depends on an individual's understanding and knowledge of the behavior, i.e. the extent to which an individual knows how to recycle (Wan, Cheung & Shen, 2012)
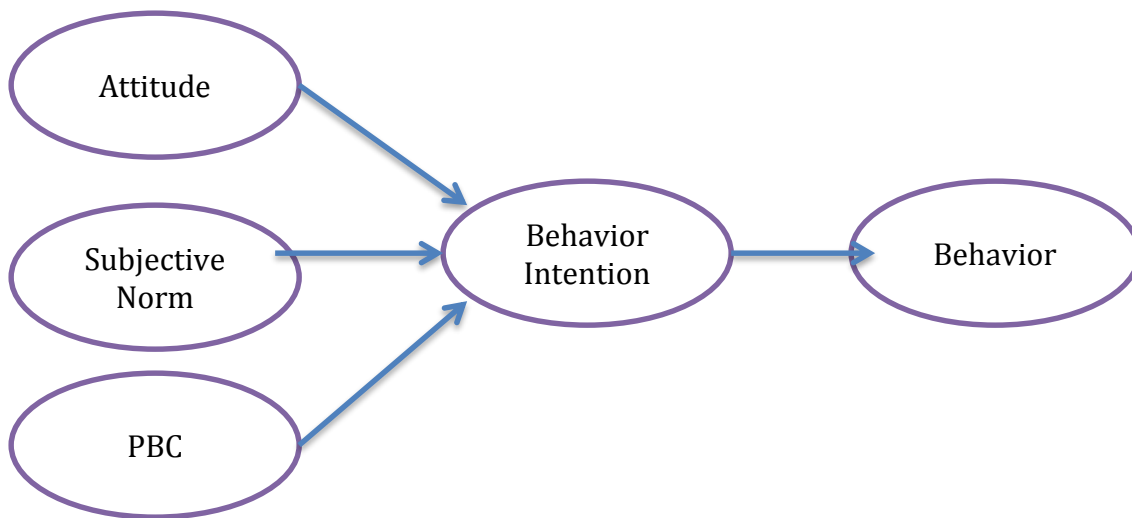
Figure1: Theory of Planned Behavior: Ajzen (1991).

The Theory of Planned Behavior (TPB) has been used in several studies, which investigate recycling behavior (see, e.g. Boldero, 1995; Chan, 1998; Cheung et al., 1999; Davies et al., 2002; Tonglet et al., 2004; Davies et al., 2005; Taylor & Todd, 1995; Terry et al., 1999; Wan et al., 2012). Majority of the above mentioned studies employed TPB in the context of recycling behavior and have tried to incorporate additional predictors. This study incorporated TPB variables to investigate students recycling behavior.

H1: As " **attitude"** (A) of students becomes more favorable to recycling, intentions to recycle increases.

H2: As **"subjective norm"** (SN) of students becomes more favorable to recycling, intentions to

recycle will increases.

H3: As **"perceived behavior control"** (PBC) increases, intention to recycle increases.

Although there is considerable support for TPB usage, there are concerns that it does not adequately explain recycling behavior, and that additional variables should be included within the model (Boldero, 1995; Cheung et al., 1999; Davies et al., 2002; Tonglet et al., 2004; Davies et al., 2005; Macey & Brown, 1983; Terry et al., 1999). However, Ajzen (1991) argued that the influence of external factors is indirect, and mediated through the components of the model. It is recognized that factors external to the model, for example personality, past experience and demographic characteristics may also influence behavior (Davies et al., 2005, p. 119). By considering other researchers' speculations, TPB allowed for the incorporation of additional variables, provided that these variables make a significant contribution to the explanation of behavior (Ajzen, 1991).

Additional Variables

Moral Norm

The moral norm relates to the individual's personal beliefs about the moral correctness or incorrectness of performing a specific behavior (Tonglet et al., 2004, p. 198). The theory of planned behavior postulates that individuals are influenced by subjective norms laid upon them by society. While subjective norm captures the individual's behavior in reaction to what other people think, the scholars (Tonglet et al., 2004; Davies et al., 2005) argue that the theory of planned behavior does not capture norms the individuals put upon herself/himself. For example, some people might engage/not engage in a certain kind of behavior because they believe it is the right thing to do and not because of what others think. Tonglet et al (2004) explained that, "Inclusion of a moral factor has significantly improved the prediction of intention in studies of

behaviors, which are either, socially unacceptable, or which contain a moral dimension" (p. 198); for example, cannabis use (Conner & McMillan, 1999); dishonest actions (Beck & Ajzen, 1991); committing driving violations (Parker et al., 1992); and shoplifting (Tonglet, 2000, 2002). As the recycling behavior in students is likely to have elements of personal morality and social responsibility, it was considered as an appropriate predictor to be included within the model.

H4: Students with high "**moral norm"** will have more favorable intentions to recycle.

Past Experience

Past experience is said to have an effect on the way we behave in the future. However, Ajzen (1991) argues that past behavior indirectly contributes to the formation of attitude, subjective norm and perceived control; it is not an additional variable to the model. However, Tonglet et al (2004) stated that, "several studies indicate past experience has a direct effect on intention and/or behavior not mediated by the variables contained within the model" (as cited in Bentler & Speckart, 1979; Fredericks & Dossett, 1983) (p. 198). Though, past behavior is not the cause for the future behavior, engaging in a certain behavior more frequently will increase the likelihood of repeating the same kind of behavior in the future (Conner & Armitage, 1998). Many previous studies indicated that past experience should be included when predicting recycling behavior (Boldero, 1995; Cheung et al., 1999; Terry et al., 1999; Tonglet et al., 2004). Therefore, the past behavior variable is included in the study, to test its influence on future behavior.

H5: Students who have positive recycling "**past experience"** will have more favorable intentions to recycle.

Situational Factors

Students may hold positive attitudes towards recycling, however, this does not necessarily mean that they will engage in recycling behavior (Tonglet et al, 2004, p. 198). They may be constrained by the lack of opportunities, skills or resources. According to the TPB (Ajzen, 1991), perceived behavioral control covers factors such as lack of recycling skill and having easy access to recycling facilities. Recycling skill is often preconceived as relating to knowledge of which waste to recycle while access translates for most people into convenience. Previous recycling studies using the TPB (Boldero, 1995; Davies et al., 2002; Tonglet et al., 2004) report that perceived behavior control alone is not a significant predictor of recycling. A preliminary qualitative study done on students' recycling behavior revealed that knowledge and convenience are major antecedents of recycling behavior. Therefore, by considering previous studies (Davies et al., 2002; Tonglet et al., 2004) and the results of the preliminary study, knowledge and convenience are considered as additional situational variables in this study.

Knowledge of How and What to Recycle. "Knowledge" about recycling, (i.e. which waste to separate and which bin to use) is a significant factor for explaining recycling behavior (De Young, 1989; Hornik, Cherian, Madansky & Narayana, 1995; Schultz, Oskamp & Mainieri, 1995; Oskamp, Burkhardt , Schultz , Hurin & Zelezny, 1998). For example, Vining and Ebreo (1990) found that the level of knowledge of recycling differentiated recyclers from non-recyclers. De Young (1989) from his research findings explained that, "simple lack of information, such as how much space to be allocated to the recycling activity, or how much time to a lot, can avoid people from attempting the activity regardless of their attitudes or opinions." (p. 350). However, information about how to recycle is only an explaining factor for people's recycling behavior if they are not familiar with recycling. In cases where people recycle

regularly, information/knowledge is not contributing toward explaining recycling behavior (De Young, 1989).

H6: Students who have more "**knowledge of how and what to recycle"** will have more favorable intentions to recycle

Knowledge of Consequences. Knowledge of consequences differs from knowledge of what and how to recycle. Knowledge of consequences represents the person's tendency to relate his own behavior to the welfare of others (Park & Ha, 2014, p. 281). With regard to the impact of knowledge of consequences, Park et al (2014) states that, "it is hard for a person to feel a strong obligation to perform a behavior without being aware of the consequence of his own behavior"(p. 282). Knowledge of consequences had been found to be significant predictors of recycling behavior (Tonglet et al, 2004)

H7: Students who have more "**knowledge of consequences of recycling"** will have more favorable intentions to recycle.

Inconvenience. Convenience is considered as the time, space and the perceived ease of an individual in managing waste (Barr et al., 2001; Tonglet et al., 2004; Wan et al., 2012). Next to knowledge about recycling, the convenience of recycling has been mentioned to influence recycling behavior in a multitude of studies (Derksen & Gartrell, 1993; McCarty & Shrum, 1994; Domina & Koch, 2002; Kelly et al., 2006). Derksen & Gartrell (1993) discovered that individuals who held a general positive attitude about recycling were more likely to recycle if it was convenient for them to do so. Kelly et al (2006), found that students and employees of the university were more likely to participate in the campus-recycling scheme if it was more convenient for them. Even in our preliminary study, USF freshmen students stated that convenience was the major factor that influences their recycling behavior. Therefore,

inconvenience is considered as an additional variable in this study.

H8: Students who perceive recycling as "**inconvenient"** will have a less favorable intention to recycle.

This study adopts and extends the research done by Tonglet, Phillips and Read (2004), in predicting the recycling behaviors at household level in Brixworth (UK). This study used TPB theoretical framework with additional variables, as TPB allows for the incorporation of additional variables, provided that these variables make significant contribution for the explanation of behavior (Ajzen, 1991). Thus, this study has incorporated a number of additional variables, including: the moral norm, past experience and situational factors like knowledge of how and what to recycle, knowledge of consequences and inconvenience to predict the behavior intentions of youth at University of South Florida.
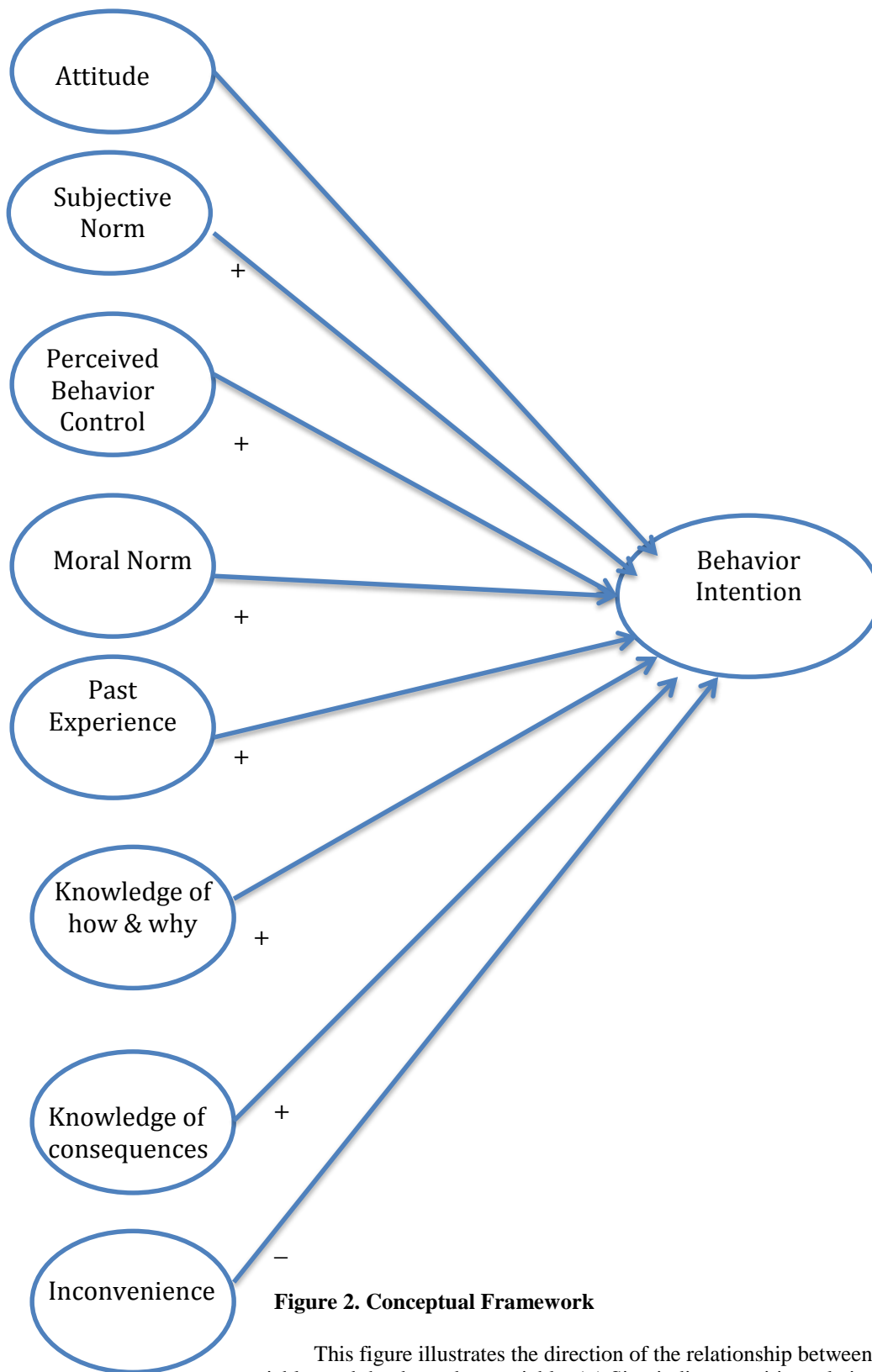
Figure 2. Conceptual Framework

This figure illustrates the direction of the relationship between the independent variables and the dependent variable. (+) Sign indicate positive relationship while (-) Sign indicate negative relationship.

CHAPTER 3: METHODOLOGY

Research Design

The aim of this research is to discover the determinants that explain youth recycling behavior on University of South Florida Campus. Various independent variables have been discussed in the literature to influence the recycling behavior. A total 8 independent variables were chosen for inclusion within the conceptual model. Behavioral intention to recycle is considered as the dependent variable. Intention to recycle can directly predict actual behavior if the behavior is under volitional control (Ajzen, 1991). Each of the 8 variables, specific attitude, subjective norm, perceived behavioral control, moral norm, past experience, knowledge of how and what to recycle, knowledge of consequences and inconvenience were considered as independent variables. All the independent variables were assumed to be directly proportional to behavioral intention. To test the 8 hypotheses a causal conceptual design was chosen and the hypotheses were tested by means of an online survey.

Pilot Study

In an effort to fully explain the factors that influence the students recycling behavior, a qualitative pretest was conducted. The goal of this particular pilot study was to learn as much as possible from a small diverse sample, so a focus group appeared to be an appropriate methodology toward obtaining a rich understanding of the topic under consideration. A total of 8 students (3 female and 5 male) participated in this study. Participants are students enrolled at the University of South Florida (USF). The sample size was limited based on the time and resource constraints, however the existing sample has provided in-depth data that formed sufficient

themes to answer our research question. A semi structure questionnaire was used to get all the required answers in the pilot study. The investigator asked participants to share their own thoughts and opinions on the given topic and further explained that there were no right or wrong answers. Some key topic areas covered in the discussion were: recycling habits at university, high school and home, overall concern about the recycling and the environment, barriers to recycling, advantages of recycling, threats to society from not recycling, peer, parents and celebrity influence on their recycling, opinions about recycling, effective advertising/messages to improve recycling behavior and advice to improve recycling.

Data was analyzed using thematic analysis. Themes are patterns across data sets that are important to the description of a phenomenon and are associated with a specific research question (Daly et al., 1997). The process involves the identification of themes through reading the data in multiple iterations (Prestin & Pearce, 2010). The primary investigator performed thematic analysis through the process of open coding in different phases to find and create meaningful patterns. The phases followed in the study were: familiarization with data, generating initial codes in the code document, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report (Braun et al., 2006). In the final stage, similar themes were combined into categories; and those unrelated to this study were eliminated from the analysis.

The results show that students' intention to recycle is related to convenience of recycling, knowledge of how and what to recycle, past experience and credibility of message source. Results also stated that perceived behavior control play a moderate role or do not significantly contribute to the recycling behavior of students. The most frequently cited outcomes such as knowledge of how to recycle; knowledge of consequences; inconvenience; past experience were

used to develop the quantitative measures for the main study.

Main Study

University of South Florida students are considered as sample for this study based on the convenience and availability factor. The survey questionnaire was built in the online survey tool, Qualtrics. Surveys are a good tool to reach university students. This study used survey techniques to obtain the necessary information from the students. Online surveys were preferred because they have a higher reach and response rate compared to paper-based survey and it is easy for students to take surveys online as they spend a considerable amount of time online. How the data was collected is explained in the data collection procedure section.

Instrumentation

The questionnaire is based on the recycling literature and previous applications of the TPB (see for example, Beck and Ajzen, 1991; Boldero, 1995; Davies et al., 2006; Tonglet, 2004; Kelly et al., 2006; Lee et al., 1995), and information obtained from the qualitative research with a sample of eight focus group students. As recommended by Ajzen (1991), seven-point rating scales are used to measure the components of the TPB (recycling intentions, recycling attitudes, the subjective norm, and perceived behavioral control), and the additional components included for the purposes of this study (moral norm, previous recycling behavior, situational factors). Likert scales range from three to eleven answer options. According to Alwin & Krosnick (1991) increasing the number of response options in a Likert scale increases the reliability of the answer. Therefore, a seven-point Likert scale was used for the study. The questions are scaled: 1 to indicate a negative view of recycling and 7 to indicate a positive view of recycling. Questionnaire consists of a total of thirty-four questions. The thirty-four questions are spread out in nine parts. Each part is dedicated to one variable under study and the ending parts include

13

additional comments and demographics. The structure of the questionnaire is as follows:

Attitude; Subjective norm; Perceived behavioral control; Past behavior and behavior intention;

Perceived moral obligation; Knowledge; Inconvenience; Additional comments; Demographics.

TPB Variables

Attitude. Attitude is measured using three general questions about recycling. Seven-point

semantic differential scales were used to measure attitudes to recycling. The attitudes can be

measured as: "recycling is bad/good"; "recycling is negative/positive"; "recycling is

unfavorable/favorable". The beliefs identified in the previous literature (Tonglet et al., 2004;

Davies et al., 2006) were measured using three questions: "recycling is useful/a waste of time";

"recycling is rewarding/not rewarding"; "recycling is "responsible/not responsible".

Subjective norm. The subjective norm refers to social pressure to recycle household

waste. Subjective norm is measured using 3 questions. "Most people who are important to me

think that I should recycle my household waste" and "most people who are important to me

would approve of me recycling my household waste" (Tonglet et al., 2004; Davies et al., 2006).

The last question asks directly about the influence of other people on the recycling behavior on

the participant, "If more people recycled, I would recycle more" (Knussen & Yule, 2008).

Perceived behavior Control. Perceived behavior control is tested using four questions.

All the questions have been taken from literature but adapted to the current study. Firstly, "There

are plenty of opportunities for me to engage in recycling at USF" and "Recycling is easy"

(Tonglet et al., 2004). The third and fourth questions are as follows: and "I know where to take

my waste for recycling at USF" and "USF provides satisfactory resources for recycling"

(Tonglet et al., 2004).

Past experience & behavior intention. Past recycling experience and behavioral intention to recycle were measured using the following questions. All questions have been taken from Tonglet et al. (2004) and adapted to the existing study. "How frequently have you recycled the waste in the past few months at USF" (previous recycling behavior) "How likely would you recycle the waste" and "I intended to recycle waste at USF everyday in the forthcoming month" (behavior intentions).

Additional variables likely to influence recycling behavior

Moral norm. The perceived moral obligation of students was be measured using the following five questions: "I feel I should not waste anything if it can be used again", "It would be wrong of me not to recycle my waste", "I would feel guilty if I did not recycle my waste", "Not recycling goes against my principles" and "Everybody should share the responsibility to recycle waste" (Tonglet et al., 2004).

Knowledge. Knowledge of how and what to recycle was measured using the following three questions. "I know how to recycle my waste" (Tonglet et al., 2004), "I know what items can be recycled" (Tonglet et al., 2004). Knowledge of how and what to recycle differ from knowledge of consequences. Knowledge of consequences was measured using the following two questions: "If I knew what was happening to the recyclables after I dispose of them, I would recycle more often" (Kelly et al., 2006), and "There is little information about recycling at USF" (Lee et al., 1995).

Inconvenience. Inconvenience is measured using the following three questions: "I don't have time to recycle" (Kelly et al., 2006); "Recycling is inconvenient" (Kelly et al., 2006); "Recycling is too complicated" (Tonglet et al., 2004).

Additional comments. Additional information gives the participants a chance to share their personal feelings about recycling. "Would you like to give us any suggestions to improve recycling at your school?"

Demographics. Demographics information includes participant's age, gender, study year and status.

Sampling

A convenience sampling technique is chosen for this research. This non-probability sampling technique aims to include all subjects in the study that are available at a given time (Babbie, 2001). The unit of analysis is a student, and the sample consists of mass communication majors at University of South Florida.

Data Collection Procedure

Due to the availability of email address and based on the benefits of the Internet-based surveys an online mode of survey administration was used to collect data for this study. The survey questionnaire was built in the online survey tool, Qualtrics. This tool generates a customizable link distributed via email to students. To ensure respondent confidentiality, online survey responses were not linked to email addresses in any way. Students were contacted via email on two occasions. They received a request to participate, and a reminder notice. The USF School of Mass Communications blackboard listserv was used to distribute the survey. The notifications were sent to 1,063 students within the department of Mass Communications; 181 surveys were attempted, of those 172 were completed fully for data analysis resulting in an approximate 16% return rate. Two reasons can be assumed for the low response rate. Firstly, the online questionnaires delivered through email to students will not be taken seriously since there is no

potential reward involved in doing the survey. Secondly, the length of the survey may have reduced the number of potential respondents. According to Stacks (2011), a return response rate of this size is relevant in a convenience sample and can provide informative data toward the population surveyed.

Data Analysis

Data analysis was conducted using SPSS 22 version for MAC. A $p < .05$ significance level was required for the statistical tests performed. To test the reliability of scales, Cronbach's alpha was performed on each set of questions to test the internal consistency of the scales. A Cronbach alpha of .70 was considered reliable (Stacks, 2011). When a Cronbach's alpha was not above .70, each item was tested individually. Two sets of items did not meet Cronbach's alpha reliable .70 levels. The items for subjective norm and knowledge of consequences did not exceed .70. The items for subjective norm were analyzed individually and one item was dropped from subjective norm. An inter-item correlation test was performed to check whether any item in the set of tests was inconsistent with the averaged behavior of the other items. Scales that demonstrated strong internal consistency were collapsed to create a composite measure for hypothesis testing. Pearson Correlation tests were run to test the correlations between the variables. The data will be analyzed in SPSS using a linear model, multiple regression analysis. Multiple regression analysis is chosen because this particular analysis results will tell us how much the variables influence the outcome; i.e. the predictive power of the outcome by the variables can be gauged (Davis et al., 2006).

CHAPTER 4: RESULTS

The purpose of this study is to find the determinants that influence the recycling behavior intention of students. A conceptual model was suggested on how to better predict behavior intentions by combining the variables of the theory of planned behavior and additional variables suggested from the previous recycling research (Tonglet et al, 2004). Eight hypotheses were tested and the results were discussed in the sections below.

Descriptive Statistics

The demographic composition of the sample is shown in Table 1. There was a bias in the sample toward females 82.5% (n=142). Male 17.5% (n=31) were under represented in the sample. In addition, Of the 172 respondents (n=172), the majority of those surveyed (94.4%) were undergraduate students (graduate 3.3%, other 1.1%, abstained 3.9%). Participants ranged in age from 18 to 30, with an average age of 21.19. Although there is biasing effect in the sample toward females, the purpose of this study is to test the utility of using the TPB to investigate recycling amongst all the students', but not to divide the test results based on gender. Next, descriptive statistics were used to examine the mean scores for each of the items used to measure the variables of interest of this study.

The set of statistics provided in Table 2 are the means and standard deviations of all the variables tested in the study based on a seven-point Likert scale from one (*Strongly Disagree*) to seven (*Strongly Agree*). Based on descriptive results (Table 2), the third item in the attitude set had the highest mean (*M*=6.58, StDev.= 0.854). The lowest mean was the fourth moral norm item (*M*=

4.5, StDev.= 1.764).

Table 1. Respondents Composition

	n	%
Sex		
Male	31	17.5
Female	142	82.5
total	172	100
missing	8	4.4
Age		
18-25	171	94.4
26-30	10	5.6
total	181	100
Academic Level		
Freshman	18	9.9
Sophomore	37	20.4
Junior	63	34.8
Senior	48	26.5
Graduate	6	3.3
Other	2	1.1
Missing	7	3.9
Total	181	100

Table 2: Description Statistics

	N	Mean	Std. Deviation
Attitude1	178	6.53	0.909
Attitude2	178	6.54	0.877
Attitude3	178	6.58	0.854
Subjective Norm1	173	4.6	1.58
Subjective Norm2	173	5.81	1.128
PBC1	172	4.82	1.581
PBC2	173	4.49	1.987
Behavior Intention1	173	4.66	1.552
Behavior Intention2	173	4.35	1.613

Table 2: Continued

Moral Norm1	173	5.58	1.157
Moral Norm2	173	5.42	1.317
Moral Norm3	173	4.96	1.637
Moral Norm4	173	4.5	1.764
Moral Norm5	173	5.99	1.102
Past Behavior	173	4.27	1.66
Knowledge of how and what to recycle1	173	5.05	1.487
Knowledge of how and what to recycle2	173	5.23	1.327
Knowledge of consequences	173	5.31	1.42
Knowledge of consequences	172	5.26	1.457
Inconvenience	177	5.31	4.706
Inconvenience	177	5.83	4.461
Inconvenience	177	6.41	4.133

Reliability Testing

To test the internal consistency of the questionnaire, Cronbach's alpha was calculated using

SPSS 22 for each of the constructs in the study. The guiding principle in interpreting Cronbach's

alpha is that "the closer it is to 1.0 the greater the internal consistency of the items in the scale"

(Gliem & Gliem, 2003). As seen in Table 3, the majority of constructs show satisfying results for

Cronbach's alpha, which are close to 1. Reliability analysis indicated that the multi-item scales

used to measure attitude (α = .962), perceived behavior control (α = .858), behavior intention (α

= .854), moral norm (α = .877), and inconvenience (α = .980) demonstrated strong internal

consistency. The constructs subjective norm (α = 0.632) and knowledge of consequences (α =

0.643) showed a moderate consistency and should be interpreted with caution. The subjective

norm set initially produced a Cronbach's alpha of .480. After further scrutiny of the internal

consistency test, and by checking the inter-item correlation between the variables, decision was

made to use a two-item measure instead of three for measuring subjective norm. Specifically

item one and two; "Most people who are important to me think that I should recycle waste." and

"Most people who are important to me would approve of me recycling waste." were used as

items of measure for subjective norm. The Cronbach's alpha for perceived behavior control was .825. Based on the wording of the questionnaire and correlation between variable items, second item was removed from the four-question set of PBC, leaving questions one, three and four resulting in a Cronbach's alpha of .859.

For the two-item measure constructs such as subjective norm, knowledge of how and what to recycle and knowledge of consequences and behavior intention a bivariate correlations were done to check the strength of correlation. As seen in the Table 3, The Pearson correlation of the measures shows that they have a significant positive correlation with each other. For subjective norm (r= .489**, p = .00), knowledge of how and what to recycle (r= .477**, p = .00), knowledge of consequences (r= .568**, p = .00), behavior intention (r= .746**, p = .00).

Table 3. Cronbach's Alpha

Constuct	Item	Cronbach's Alpha
Attitude	3	α= 0.962
Subjective Norm	2	r= 0.489
Perceived Behavior Control	3	α= 0.859
Behavior Intention	2	r= 0.746
Moral Norm	5	α= 0.877
Knowledge of how and why to recycle	2	r= 0.477
Knowledge of consequences	2	r= 0.568
Inconvenience	3	α= 0.980

α= Cronbach's Alpha. r = inter-item correlation representing two-item constructs.

Correlations

Correlation between the dependent variable (behavior intention) and independent variables (attitude, subjective norm, PBC, moral norm, past behavior, knowledge, inconvenience) were tested. Results (Table 4) for the Pearson correlation show that almost all the individual components in the model have a significant correlated relationship with recycling intention. Past behavior and moral norm were strongly correlated measures. However, knowledge of

consequences shows a low correlation and the value is not significant ($r = .134$, $p > .05$).

Inconvenience shows a negative correlation ($r = -.444^{**}$, $p < .05$) with behavior intention and that result was predicted, since they variables were inversely related.

Table 5: Correlations

		Attitude	SubjectiveNorm	PBC	MoralNorm
Behavior Intention	Pearson Correlation	.310**	.316**	.430**	.517**
	Sig. (2-tailed)	0	0	0	0
	N	173	173	173	173

* Significant at P<0.05. ** Significant at P<0.01.

Table 6: Correlations of additional variables

		Past behavior	Knowledge	Knowledge of consequences	Inconvenience
Behavior Intention	Pearson Correlation	.876**	.542**	0.134	-.444**
	Sig. (2-tailed)	0	0	0.078	0.00
	N	173	173	173	173

* Significant at P<0.05. ** Significant at P<0.01

Multiple Regressions

Multiple regressions calculate R^2, the proportion of the variance in the dependent variable accounted for by the independent variables. Multiple regression analysis was conducted to see whether the variables of the study predict the recycling intention of students. As shown in Table 7, these three components collectively explained 29.8% of the variance in recycling intentions ($F(3, 172) = 23.952$, $p < .01$, $R^2 = .298$, $R^2 Adjusted = .286$). All the three components are statistically significant predictors of behavior intention. When the additional components added to the model were entered into the multiple regression, the percentage of variance explained increased to 82.8%, with moral norm, past recycling behavior, knowledge of how and what to recycle and knowledge of consequences of recycling being statistically significant.

Table 7: Multiple regression-Intentions to recycle

	B	Std. Error	Beta	t	Sig.
Attitude	0.265	0.121	0.149	2.183	0.03
Subjective Norm	0.301	0.085	0.236	3.533	0.001
PBC	0.408	0.062	0.425	6.539	0.000

Dependent Variable: Behavior Intention

Predictor Variables: PBC, Subjective Norm, Attitude

Table 8: Multiple regressions with additional variables

Dependent Variable: Behavior Intention

Predictor Variables: Attitude, Subjective Norm, PBC, Moral Norm, Past Behavior, Knowledge of How and What to Recycle, Knowledge of Consequences and Inconvenience

	B	Std. Error	Beta	t	Sig.
Attitude	0.003	0.066	0.001	0.038	0.97
Subjective Norm	0.06	0.047	0.047	1.274	0.205
PBC	-0.01	0.037	-0.011	-0.281	0.779
Moral Norm	0.117	0.056	0.092	2.087	0.038
Past behavior	0.66	0.037	0.741	17.668	0.000
Knowledge of how & what to recycle	0.189	0.05	0.163	3.751	0.000
Knowledge of consequences	0.128	0.045	0.105	2.867	0.005
Inconvenience	-0.042	0.037	-0.044	-1.124	0.262

Beta= regression coefficient for the sample. The variables whose beta weight has a Sig. t of less than 0.05 are described as statistically significant at the 95% confidence level. ΔR^2= total variance explained by the model.

Analysis (Table 8) shows that the overall model significantly predicts student's intention to recycle ($F_{(8, 172)} = 99.590$, $p < .01$, $R^2 = .829$, $R^2 Adjusted = .821$). Hence, there is a significant relationship between the predictor variables and the outcome variable. In other words, there is at least one variable in the model that predicts student's intention to recycle. In this case, all the additional predictor variables were significant except the inconvenience.

Hypotheses Testing

Hypothesis 1 posited that, as the **"attitude"** (A) of students becomes more favorable toward recycling, intention to recycle increases. Results from multiple regression analysis of only TPB variables indicate that attitude is significant predictor of recycling, (β= .162, t = 2.361, p < .05). However, analysis of TPB variables combined with additional variables in the model indicates that attitude is not a significant predictor of intention to recycling (β = .001, t = .038, p > .05).

Hypothesis 2 posited that, as the **"subjective norm"** (SN) of students becomes more favorable to recycling, intention to recycle increases. Results from multiple regression analysis of only TPB variables indicate that subjective norm is a significant predictor of recycling, (β = .162, t = 2.361, p < .05). However, analysis of TPB variables combined with additional variables in the model indicates that subjective norm is not a significant predictor of intention to recycling (β = .047, t = 1.274, p > .05).

Hypothesis 3 posited that, as **"perceived behavior control"** (PBC) of students becomes more favorable to recycling, intention to recycle increases. Results from multiple regression analysis of only the TPB variables indicate that perceived behavior control is a significant predictor of recycling, (β = .390, t = 5.953, p < .05). However, analysis of TPB variables combined with additional variables in the model indicates that PBC is not a significant predictor of intention to recycle (β = -.011, t = -.281, p > .05).

Hypothesis 4 posited that, students with high "**moral norm"** would have more favorable intention to recycle. Results from multiple regression analysis indicate that moral norm is a significant predictor of behavior intention to recycle, (β = .092, t = 2.087, p < .05).

Hypothesis 5 posited that, students who have positive recycling "**past experience**" will have more favorable intention to recycle. Results from the multiple regression analysis indicate that past experience is a significant predictor of behavior intention to recycle, (β = .741, t = 17.668, p < .05). In more detail, when past experience rises by one standard deviation, behavior intention to recycle will rise by 0.74 standard deviations. These results provide enough evidence to support hypothesis 5.

Hypothesis 6 posited that, students who have more "**knowledge of how and what to recycle**" would have more favorable intention to recycle. Results from multiple regression analysis indicate that knowledge of how and what to recycle is a significant predictor of behavior intention to recycle, (β = .163, t = 3.751, p < .05). These results provide enough evidence to support hypothesis 6.

Hypothesis 7 posited that, students who have more "**knowledge of consequences of recycling**" would have more favorable intention to recycle. Results from multiple regression analysis indicate that knowledge of consequences is a significant predictor of behavior intention to recycle, (β = .105, t = 2.867, p < .05). These results provide enough evidence to support hypothesis 7.

Hypothesis 8 posited that, students who perceive recycling as "**inconvenient**" would have less favorable intention to recycle. Results from multiple regression analysis indicate that inconvenience is not a significant predictor of behavior intention (β = -.044, t = -1.124, p > .05). If inconvenience rises by one standard deviation the behavioral intention to recycle will go down by .044 standard deviations.

CHAPTER 5: DISCUSSION

The purpose of this study is to test the determinants of recycling behavior of students. Correlation tests resulted in positive significant relationships between all the predictor variables and behavior intention except inconvenience. A negative relationship existed between inconvenience and behavior intention. The negative relationship is expected, because when inconvenience increases, student's intention to perform recycling behavior decreases.

The TPB provides a useful base foundation in explaining recycling behavior. In the TPB model tested in the study, attitudes, subjective norms, and PBC significantly correlated with behavioral intention. The additional measures such as moral norms, past experience, knowledge of how and what to recycle, knowledge of consequences and inconvenience were included in the conceptual model tested in the study. The results show that all the additional variables except inconvenience significantly predict the recycling behavior intention of students. In other words, students are more likely to form the intention to recycle if they personally feel recycling is the right thing to do, when they have prior experience with recycling on campus, when they have necessary knowledge of what and how to recycle and lastly, when they have complete awareness of consequences of not recycling.

Though TPB provides a useful model for exploring the factors which influence students' recycling decisions, different concerns over the use of the TPB to investigate recycling behaviors were discussed in the literature review, and the analysis of the findings from this study raise similar views and concerns. The concern is about the sufficiency of the model. The TPB (attitudes, subjective norm and perceived control) explained only 29.8% of the variance in

recycling intentions. However, the percentage of variance explained increased to 82.8% when the additional measures of moral norm, past experience, and situation factors like knowledge and inconvenience were included. This is consistent with the conclusions of Boldero (1995), Davies et al. (2002) and Tonglet et al. (2004), who argue for the inclusion of additional variables when applying the TPB model to recycling behavior. Though Ajzen (1991) stated that additional variables could be considered along with TPB variables, he argues that additional variables should contribute significantly to the explanation provided by the TPB model. This study provides some of the additional measures that can be used for understanding recycling behavior.

Some additional observations made from the regression analysis were, additional variables without TPB variables also contributed to a variance of 82.7%. Of all the measures, past experience is the strongest predictor of recycling intention since additional variables without past experience accounted only for 43.2% variance. Furthermore, standard coefficient of past experience is the highest (β =0.741). In more detail, when past experience rises by one standard deviation, behavior intention to recycle rise by 0.74 standard deviations. Consistent with earlier studies (Boldero, 1995; Cheung et al., 1999; Terry et al., 1999; Tonglet et al., 2004) past experience of recycling is a strong significant predictor of recycling.

In the conceptual model, TPB variables became insignificant when the additional variables where added to the model. Additional variables outweighed the relative importance of TPB variables. There might be various reasons for the TPB variables to become insignificant. Firstly, All the TPB variables are highly correlated with the additional variables, which might be the strong reason why the TPB variables became insignificant with the addition of new measures to the model. Secondly, the survey was titled "Recycling at University of South Florida" which might have resulted in sampling bias, or self-selection bias. Namely, students who are already

interested in recycling and who have a positive opinion about recycling might have clicked the survey link, while students less interested did not even attempt the survey. This could explain why attitude, the first TPB variable has no effect on students' intention to recycle. Moreover, students might have been reluctant to state their true attitude about recycling, even though the questionnaire was anonymous, because they subconsciously feel that they should be in favor of recycling. There is a strong correlation between subjective norms, the second TPB variable and moral norm ($r = .422**$, $p < .05$). Though subjective norm is a predominant factor representing students' recycling behavior in TPB, the addition of a moral norm in the model, have reduced the significance level of subjective norm due to its strong correlation with moral norm. In other words, even though students were influenced by what their friends and family believe as the right thing to do; they were more guided by their own personal norms.

Previous recycling studies have indicated that PBC, the third TPB variable, does not contribute significantly to the explanation of intentions and behavior (Boldero, 1995; Davies et al., 2002; Tonglet et al., 2004). Davies et al. (2002) study argue that control factors, which facilitate or inhibit the performance of the behavior in question, provide a more accurate measure of perceived behavioral control than the measures more normally used. This study operationalized perceived behavioral control by using a mix of traditional perceived control variables (ease and opportunity) and facilitating/inhibiting factors (inconvenience, knowledge of how, what to recycle and knowledge of consequences), as provided in previous studies (Davies et al., 2002; Tonglet et al., 2004). Facilitating factors (knowledge of how and what to recycle and knowledge of consequences) were significant compared to the traditional PBC mix. Correlation analysis in (Appendix) shows that PBC have strong correlations with past experience ($r=.480**$, $p = 000$), and knowledge of how and what to recycle ($r=.368**$, $p = 000$). Additional variables dominated

the variance level of PBC resulting in a negative correlation between PBC and behavior intention. When additional variables were not present in TPB model, PBC is the major significant factor influencing the behavior intention to recycle (Table 7).

Among the additional variables present in the conceptual model, inconvenience is not a significant predictor. However, it has a strong correlation to knowledge of how and what to recycle (r=-.499**, $p = 000$). Due to this strong correlation, inconvenience did not produce significant results in multiple regression analysis. Inconvenience might fall under the behavior beliefs that directly influence the attitude towards the behavior in the theory of planned behavior. Considering inconvenience as an additional variable might have caused the insignificance.

Another opportunity was provided for the students' to express their opinions on recycling in the questionnaire. Namely, there was a question at the end of the survey questionnaire asking respondents suggestions to improve recycling. There were about 60 responses to this end question. The answers provided by the students about suggestions for recycling were qualitatively analyzed. There were a few recurrent themes, as in students placed utmost importance on getting more information on how and what to recycle (knowledge) and were interested in knowing consequences of not recycling. For example, one student said, "giving each student information on what sort of things should be recycled will definitely improve the MRFs". Another student said, "more information on recycling should be provided, possibly describing what would happen if no one recycled." Most of the people suggested providing more recycling bins on campus and thereby making it convenient for them to recycle. For example, one student said, "place more recycling bins on campus-make the holes bigger so it is easy to recycle large items". Another student said, "put the recycle bin in the room along with the regular trash bin. It helps a lot more." This shows that inconvenience can play a major prominent

role, by negatively impacting the recycling behavior of students.

Recommendations to Promote Recycling

The findings from this study have several implications for the development and implementation of future communication campaigns that promote the recycling behavior among students. TPB was used to identify the main factors, which influence respondents' decision to recycle. Moral norm and Knowledge of how and what to recycle were significant factors of recycling. Posters and flyers should be developed concentrating on students' moral responsibility and also include necessary information of how and what items to be recycled. Information provided in the posters should include points such as recycling is your responsibility, by participating in recycling you are saving the mother earth from pollution. Posters with cartoons of how and what to recycle will grab the students' attention, so they should be placed near the library and in the campus buildings. Short videos describing how and what to recycle can be sent to students' emails and also should be placed in library portal. Students groups and student organizations should be encouraged to participate in clean and green environment campaign, in which students' can make placards of recycling, and group rallies can be held through out the campus. Incentives should be offered to the groups that participate in the rallies. Awareness of environmental consequences is one more important factor of intentions to recycle. Therefore, environmental consequences of not recycling should be taught to students' through their respective professors.

Limitations

There are a few limitations to this study. Although random sampling technique would have produced more generalizable results to the student population, instead of it a convenient sampling technique was used in the study due to the availability and accessibility issues. The results should be interpreted with caution because of the relatively low sample size (n=172). The

30

sample size included only 17.5% male, so the sample size was not equally distributed between male and female. Therefore the sample cannot be generalizable to the entire student population. A general rule for the sample size is that the more respondents participate in the survey, the higher the explanatory power will be (Field, 2013). The relatively low sample size (n=172) could be explained by the manner in which the questionnaire was distributed. The questionnaire was distributed to the chosen population via university email. Distributing a web survey has the risk of "coverage error" i.e. not including people without Internet access. Furthermore, the length of the questionnaire is also a limitation factor that decides whether students are willing to participate (Porter, 2004). The questionnaire consists of thirty-five questions, which might have discouraged students from participating or finishing the questionnaire. Finally, due to improper wording on the survey and due to inconsistency of items in constructs such as subjective norm and perceived behavior control, few items were removed from these constructs during the analysis, that could have led to skewed results and the weaker significance of TPB variables.

Future Research

Future research should take the additional variables (moral norm, past experience, knowledge of how and what, knowledge of consequences, inconvenience) into consideration along with TPB variables and test it on a larger specific variety of population. Recycling habits might differ for different races. Future research should analyze recycling habits based on race in order to understand how the recycling intentions vary according to the race. Future research should try to investigate students' intention to recycle both on campus and off campus because recycling habits might differ according to the place. Concentrating on students on and off campus would require two different conceptualizations of a questionnaire. Using the finding of the conceptual model, future research can place an emphasis on different contexts in which the survey can be

done. For example, the questionnaire could be distributed to teaching and administrative staff along with the students at a large university. Instead of focusing on recycling in general the focus should be placed on specific recycling materials. For example, focusing the research on paper or plastic item based recycling instead of asking about general recycling behavior. Based on the time and resource constraints a survey technique was used for this study. But future research should use observational study technique to test actual recycling behavior of students. This technique will produce more accurate results as students actual behavior might differ from the self reported behavior. Observational study is also helpful in providing insights about students' true understandings of the variables under study.

Chapter 6: Conclusion

To encourage students to participate in recycling, thorough understanding of students' intention to recycling, and students' perceptions of the barriers to recycling are required. Based on the TPB (Ajzen, 1991), this research determined the psychological factors, which influenced the intention to recycle in students' at USF. The behavior considered in this study was students' on campus recycling behavior, and the intention was near future participation. The actual relationship between behavior intention and behavior was not be gauged in this study. Results from the multiple regression analysis showed that the students' intention to recycle was heavily influenced by their past recycling experience. Findings from the study suggest that moral norm, past experience, knowledge of how and what to recycle and knowledge of consequences are significant predictors of recycling. This information can be used to understand students' recycling habits and in future advertising campaign can be developed to improve students' recycling behavior.

TPB has proved to have considerable utility for identifying the factors, which are likely to encourage recycling behavior, but additional variables should be included to maximize the prediction of recycling behavior intentions. In summary, this study was successful in identifying the factors that affect students recycling intentions.

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APPENDIX

Survey Questionnaire

Recycling at University of South Florida

Dear Participant,

We are interested in what you think about recycling and how you participate in recycling on campus. You will encounter the term "recycling", which for the purpose of the questionnaire can be understood as following: "Recycling is the procedure by which waste is collected and processed into raw materials that are then manufactured into new products (EPA, 2013)". There are no right or wrong answers, so please respond as honestly as possible. The questionnaire will take about 5 minutes to complete, and your responses are anonymous. As a student at USF, you are the only source of information we have for understanding how students feel about the recycling on campus. Your participation in this research is greatly appreciated.

Thank you,
Tejaswini Gadiraju

Attitude

My attitude towards recycling.

Bad	O	O	O	O	O	O	O	Good
Unfavorable	O	O	O	O	O	O	O	Favorable
Negative	O	O	O	O	O	O	O	Positive

Subjective Norm

Please choose the appropriate response for the following item:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Most people who are important to me think that I should recycle waste.	◯	◯	◯	◯	◯	◯	◯
Most people who are important to me would approve of me recycling waste.	◯	◯	◯	◯	◯	◯	◯
If more people would recycle, I would recycle more.	◯	◯	◯	◯	◯	◯	◯

Perceived Behavior Control

Please choose the appropriate response for the following item:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There are plenty of opportunities for me to engage in recycling at USF.	O	O	O	O	O	O	O
Recycling is easy.	O	O	O	O	O	O	O
I know what items can be recycled.	O	O	O	O	O	O	O
I know where to take my waste for recycling at USF.	O	O	O	O	O	O	O
USF provides satisfactory resources for recycling.	O	O	O	O	O	O	O

Behavior Intention & Past Behavior

Please choose the appropriate response for the following item:

	Never	Very Rarely	Rarely	Neutral	Frequently	Very Frequently	Always
How frequently do you recycle waste at USF?	O	O	O	O	O	O	O

Please choose the appropriate response for the following item:

	Never	Very Rarely	Rarely	Neutral	Frequently	Very Frequently	Always
How often will you recycle waste during the next month?	O	O	O	O	O	O	O
How often will you recycle waste during the next month at USF?	O	O	O	O	O	O	O

Moral Norm

Please choose the appropriate response for the following item:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I feel I should not waste anything if it can be used again.	O	O	O	O	O	O	O
It would be wrong of me not to recycle my waste.	O	O	O	O	O	O	O
I would feel guilty if I did not recycle my waste.	O	O	O	O	O	O	O
Not recycling goes against my principles.	O	O	O	O	O	O	O
Everybody should share the responsibility to recycle waste.	O	O	O	O	O	O	O

Knowledge

Please choose the appropriate response for the following item:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I would recycle more waste if I had more information on recycling.	O	O	O	O	O	O	O
More information about how to recycle should be available at USF.	O	O	O	O	O	O	O
I know how to recycle my waste.	O	O	O	O	O	O	O
If I knew what was happening to the recyclables after I dispose of them, I would recycle more often.	O	O	O	O	O	O	O
There is little information of recycling available at USF.	O	O	O	O	O	O	O

Inconvenience and Beliefs

My beliefs towards recycling:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I believe recycling is useful.	O	O	O	O	O	O	O
I believe recycling is rewarding.	O	O	O	O	O	O	O
I do not think recycling is not my responsibility.	O	O	O	O	O	O	O
I believe recycling is time consuming.	O	O	O	O	O	O	O
I believe recycling is inconvenient.	O	O	O	O	O	O	O
I believe recycling is too complicated.	O	O	O	O	O	O	O

Would you like to give us any suggestions to improve recycling at USF?

Age

Gender

Male
Female

What is your current academic level

Freshman
Sophomore
Junior
Senior
Graduate

Other

Correlations

		BI	Attitude	SubjectiveNorm	MoralNorm	Pastbehavior	Knowledgeof howandwhatt orecycle	knowledgeof consequence s	PBC	Incon
BI	Pearson Correlation	1	.310**	.316**	.517**	.876**	.542**	.134	.430**	-.444**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.078	.000	.000
	N	173	173	173	173	173	173	173	173	173
Attitude	Pearson Correlation	.310**	1	.297**	.448**	.252**	.174*	.295**	.185*	-.237**
	Sig. (2-tailed)	.000		.000	.000	.001	.022	.000	.015	.001
	N	173	178	173	173	173	173	173	173	177
SubjectiveNorm	Pearson Correlation	.316**	.297**	1	.422**	.235**	.113	.239**	.036	-.282**
	Sig. (2-tailed)	.000	.000		.000	.002	.138	.002	.641	.000
	N	173	173	173	173	173	173	173	173	173
MoralNorm	Pearson Correlation	.517**	.448**	.422**	1	.399**	.396**	.289**	.107	-.345**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.161	.000
	N	173	173	173	173	173	173	173	173	173
Pastbehavior	Pearson Correlation	.876**	.252**	.235**	.399**	1	.451**	.021	.480**	-.375**
	Sig. (2-tailed)	.000	.001	.002	.000		.000	.781	.000	.000
	N	173	173	173	173	173	173	173	173	173
Knowledgeofhow andwhattorecycle	Pearson Correlation	.542**	.174*	.113	.396**	.451**	1	-.141	.368**	-.499**
	Sig. (2-tailed)	.000	.022	.138	.000	.000		.065	.000	.000
	N	173	173	173	173	173	173	173	173	173
knowledgeofcons equences	Pearson Correlation	.134	.295**	.239**	.289**	.021	-.141	1	.048	.026
	Sig. (2-tailed)	.078	.000	.002	.000	.781	.065		.531	.730
	N	173	173	173	173	173	173	173	173	173
PBC	Pearson Correlation	.430**	.185*	.036	.107	.480**	.368**	.048	1	-.176*
	Sig. (2-tailed)	.000	.015	.641	.161	.000	.000	.531		.021
	N	173	173	173	173	173	173	173	173	173
Inconvienience	Pearson Correlation	-.444**	-.237**	-.282**	-.345**	-.375**	-.499**	.026	-.176*	1
	Sig. (2-tailed)	.000	.001	.000	.000	.000	.000	.730	.021	
	N	173	177	173	173	173	173	173	173	177

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

IRB Approval

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

February 16, 2016

Tejaswini Gadiraju
School of Advertising and Mass Communications
Tampa, FL 33612

RE: **Exempt Certification**

IRB#: Pro00025239

Title: Investigating the Determinants of Recycling Behavior in Youth by Using Theory of
Planned Behavior.

Dear Mr. Gadiraju:

On 2/16/2016, the Institutional Review Board (IRB) determined that your research meets criteria
for exemption from the federal regulations as outlined by 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement),
survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified,
directly or through identifiers linked to the subjects; and (ii) any disclosure of the human
subjects' responses outside the research could reasonably place the subjects at risk of criminal or
civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Approved Items:

G_TejaswiniThesis

Informed consent

As the principal investigator for this study, it is your responsibility to ensure that this research is
conducted as outlined in your application and consistent with the ethical principles outlined in
the Belmont Report and with USF HRPP policies and procedures.

Please note, as per USF HRPP Policy, once the Exempt determination is made, the application is
closed in ARC. Any proposed or anticipated changes to the study design that was previously
declared exempt from IRB review must be submitted to the IRB as a new study prior to initiation

of the change. However, administrative changes, including changes in research personnel, do not warrant an amendment or new application.

Given the determination of exemption, this application is being closed in ARC. This does not limit your ability to conduct your research project.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board