5-2014

Antecedents of Environmentally Sensitive Consumer Behaviors : an Investigation of Goal Framing Theory

Naz Onel
Montclair State University

ANTECEDENTS OF ENVIRONMENTALLY SENSITIVE CONSUMER BEHAVIORS: AN INVESTIGATION OF GOAL FRAMING THEORY

A DISSERTATION

Submitted to the Faculty of

Montclair State University in partial fulfillment

of the requirements

for the degree of Doctor of Philosophy

by

NAZ ONEL

Montclair State University

Montclair, NJ

2014

Dissertation Chair: Avinandan Mukherjee, Ph.D.

MONTCLAIR STATE UNIVERSITY

THE GRADUATE SCHOOL

DISSERTATION APPROVAL

We hereby approve the Dissertation

ANTECEDENTS OF ENVIRONMENTALLY SENSITIVE CONSUMER BEHAVIORS: AN INVESTIGATION OF GOAL FRAMING THEORY

of

Naz Onel

Candidate for the Degree:

Doctor of Philosophy

Department of Earth and Environmental Studies

Certified by:

[redacted]

Dr. Joan C. Ficke
Dean of The Graduate School

5/6/14

Date

Dissertation Committee:

[redacted]

Dr. Avinandan Mukherjee
Dissertation Chair

[redacted]

Dr. Dibyendu Sarkar

[redacted]

Dr. Neeraj Vedwan

[redacted]

Dr. Yanli Zhang

[redacted]

Dr. Gurumurthy Kalyanaram

ABSTRACT

ANTECEDENTS OF ENVIRONMENTALLY SENSITIVE CONSUMER BEHAVIORS: AN INVESTIGATION OF GOAL FRAMING THEORY

by Naz Onel

Human behavior strongly impacts environmental quality. Altering behaviors that significantly affect the well-being of the environment can reduce the impact of human actions in a way that could help overcome environmental deterioration. However, this requires understanding the factors affecting consumer behavior towards acting in a more ecologically conscious manner. Further, the effects of these factors could vary based on the different types of consumer behaviors, such as environmentally sensitive purchase (acquisition), usage, and post-use (disposal) behaviors. The purpose of this dissertation is to analyze the predicting factors of different types of environmentally sensitive consumer behavior by examining the extent to which such behaviors towards ecological well-being are dependent on moral considerations, feelings, or self-interest motives. Study I, using the National Opinion Research Center 2010 General Social Survey data, identified different predictors for five types of environmentally sensitive behaviors, while pointing to the need for more psychological predictors. In Studies II, III, and IV, based on Goal Framing Theory (GFT), the explanatory values of the variables of three theories, Theory of Planned Behavior (TPB), Value-Belief-Norm (VBN), and Theory on Affect (TA), which focus on gain motives, moral concerns, and hedonic motives, respectively, were compared with each other for three different pro-environmental consumer behaviors. The analysis of primary data collected through an online survey using Structural Equation

Modeling (SEM) indicate that GFT is an important framework in explaining the eco-sensitive purchase, usage, and post-use behaviors of consumers. The findings suggest that values (biospheric, egoistic), environmental concern, awareness of consequences, subjective norms, attitudes towards behavior, affect, and especially intention seemed to be important predictors for all examined behaviors. While variables of the VBN seemed to have the greatest explanatory power for eco-sensitive purchase behavior, variables of the TPB seemed to have the greatest explanatory power for eco-sensitive post-use. Two types of usage behaviors, transportation and household energy use, were mostly explained by variables of the TA. Furthermore, transportation was explained by variables of the VBN. Results obtained from this study are important in developing better intervention strategies in order to alter the relevant environmentally harmful consumer behaviors. Such information will be critical to the development of necessary strategies and expansion of environmentally sensitive purchase, usage, and post-use behaviors.

ACKNOWLEDGEMENTS

I would like to express my deepest appreciation and gratitude to my advisor, Dr. Avinandan Mukherjee, for the excellent guidance and mentorship he provided to me during my Ph.D. studies at Montclair State University (MSU). His mentorship was paramount in providing continuous support in excelling academically as well as professionally with his motivation, enthusiasm, and immense knowledge. His commitment to the highest standards inspired and motivated me greatly, and he encouraged me to not only grow academically as a researcher but also as an independent thinker. I would also like to thank my dissertation committee members, Drs. Dibyendu Sarkar, Neeraj Vedwan, Yanli Zhang, and Gurumurthy Kalyanaram for the friendly guidance, encouragement, thought provoking suggestions, and the general collegiality that each of them offered to me over the years. In a similar vein, I would also like to thank Dr. Archana Kumar for providing guidance and valuable feedback on my data analysis with her congenial, genuine, and friendly attitude.

I would like to gratefully and sincerely thank the School of Business and College of Science and Mathematics for their financial, academic and technical support which they provided to me while I was working on this first truly interdisciplinary environmental study using both schools' facilities and available opportunities. I would like to recognize and thank the staffs in both schools, especially Lynda Trainor from the Department of Marketing and Jasey Araque from the Environmental Management Doctoral Program, for their support during my years of study at MSU. I am also grateful to Dean Dr. Joan Ficke and her exceptional staff in the Graduate School, particularly

Stacy Wahlstrom, for their enduring support and guidance. I would also like to acknowledge the financial support of MSU and, in particular, the award of a research assistantship.

My special thanks go to TerraCycle Inc. and its supportive and compassionate team, especially Michael Waas, who was always willing to help and give his best suggestions on the means to collect my research data. It would have been a very difficult voyage without their support. I was exceptionally fortunate to have them on board with me.

Finally, I'd be remiss if I didn't acknowledge the innumerable sacrifices made by my delightful and benevolent family, who have always supported, encouraged and believed in me, in all my endeavors and who so lovingly and unselfishly shouldered far more than their fair share of the daily household burdens while I pursued this final degree. The honor of the opportunities that this degree will provide me with will be just as much yours as mine.

DEDICATION

For Elif Naz, my pride and joy, and to all my beloved family.

TABLE OF CONTENTS

Content **Page**

Content **Page**

Content **Page**

Content **Page**

Content **Page**

Content **Page**

LIST OF TABLES

Table **Page**

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF ABBREVATIONS

AC	Awareness of consequences
AMOS	Analysis of Moment Structures
AR	Ascription of responsibility
AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Composite reliability
EC	Environmental concern
EPA	Environmental Protection Agency
ESPB	Environmentally sensitive purchase behavior
ESPUB	Environmentally sensitive post-use behavior
ESUB	Environmentally sensitive usage behavior
GFT	Goal Framing Theory
GSS	General Social Survey
IFI	Incremental fit index
MSV	Maximum shared variance
NEP	New Environmental Paradigm
NNFI	Non-normed fit index
PN	Personal norms
RMSEA	Root mean square error of approximation
SES	Socio-economic status
SN	Subjective norms
SPSS	Statistical Package for the Social Sciences
TA	Theory on Affect
TLI	Tucker-Lewis index
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
VBN	Value-Belief-Norm Theory

Chapter 1

"Human activity now shapes the earth more than any other independent geologic or climatic factor. Our impact on the planet's surface and atmosphere has become so powerful that scientists are considering changing the way we measure geologic time"

(Bryan Walsh, 2012, Time Magazine)

Introduction

CHAPTER 1

This chapter provides a general background on environmentally sensitive behavior beginning with a brief discussion of the Earth system, the influence of human activities, approaches to solving environmental problems caused by humans, and the literature on environmentally sensitive consumer behavior. The following sections also cover the importance of altering consumer behavior towards being more ecologically sensitive in order to protect the environment. The last part of the Chapter 1 will cover research question, objectives, the dissertation outline, and a brief definition of terms.

1. Introduction

Environmental problems have become an increasingly major social and fiscal subject of concern all around the world. There is a growing trepidation over frequent and devastating natural disasters, constant flooding in different regions, water contamination, land degradation, air pollution, and similar high human impact environmental problems. As such, it is imperative to better understand and address these environmental issues for the prosperity and well-being of future generations.

The application of solutions that address these widespread problems will need the full participation of citizens throughout the world because a majority of these environmental difficulties are caused by human actions (Gardner & Stern, 2002; DuNann Winter & Koger, 2004; Vlek & Steg, 2007; Gifford, 2007). In fact, many of these environmental problems can be better managed by altering associated behaviors. Altering behaviors that significantly affect the well-being of the environment can reduce the

impact of human actions in a way that could help overcome environmental deterioration. Without each individual's help, it is difficult to overcome environmental degradation and/or implement necessary actions (Steg & Vlek, 2009; Sheth, Sethia, & Srinivas, 2011).

Additionally, garnering overall societal support requires a deep understanding of the factors affecting citizen behaviors, especially towards acting in a more ecologically conscious manner, such as buying ecologically friendly products, recycling, using water vigilantly, or driving less frequently. But the important question is: "What are the mechanisms between various factors, such as environmental values, concerns, social and personal norms, and attitudes towards related behaviors that affect environmental actions?" This dissertation focuses primarily on this key question by looking at human behaviors and, by doing so; tries to uncover insights to help alleviate our impact on the environment. In this way, we can overcome environmental deterioration, at least to an important degree.

The purpose of this dissertation is to understand the predicting factors of environmentally sensitive behaviors of individuals by examining different types of consumer behaviors and see whether these predictors differ depending on the type of the behavior that is being performed. As Geller (2002) and Steg and Vlek (2009) suggest, promoting behavior change is more effective if the factors causing environmentally significant behaviors are examined carefully, and well-tuned interventions are applied depending on the type of the behavior in order to change relevant behaviors and their

antecedents. Following their suggestions, this study looks at different types of behaviors and examines their potential predictors.

An interdisciplinary approach to understand pro-environmental behaviors

Although different disciplines focus on different aspects of environmental behaviors and try to underpin the factors by utilizing different theories and frameworks, to gain a deeper understanding of the phenomenon and overcome inadequate and/or limited results needs an interdisciplinary approach. According to the European Commission (2012), a single approach that is coming from only one discipline does not have to be taken at the expense of the others to explain and promote green behaviors. Instead, different approaches as well as contributions from various disciplines, such as the rational economic model and social practices approach, should be acknowledged and taken into account. A multi-dimensional view that considers all relevant theories and models helps support our understanding and promotes necessary actions (Jackson, 2005). The contributions of various disciplines should be acknowledged (Wilson & Chatterton, 2011) and may "help green behavior initiatives to work at multi levels with appropriate techniques, whether they are financial incentives, regulation or encouraging community transition" (European Commission, 2012, p. 5).

Even though the necessity of using an interdisciplinary approach has been suggested by various scholars and entities (e.g., Jackson, 2005; Wilson & Chatterton, 2011; European Commission, 2012), we do not see an accumulation of empirical studies that consider the different aspects of various disciplines and consolidate them into one

study in the context of environmental behavior research. Thus, there is a need to develop unique studies with a holistic approach and synthesis of various areas in different disciplines. This dissertation aims to be one of the rare examples of such an approach in this field of research.

The eclectic approach of this dissertation will combine consumer behavior studies from business management and marketing, neoclassical economic theories of economics, social and personal norms approaches and models of sociology, and emotional motivation (e.g., affect theories) models from psychology. Currently, there is no other example in the literature using a similar approach to examine consumer environmentally sensitive behaviors.

1.1 Human Activities and the Environment

1.1.1 Variables in the Earth system and influence of human activities

The Earth system is composed of constantly interacting physical, chemical, and biological processes that transform and transport materials and energy on Earth. This highly complex entity includes multiple nonlinear reactions and thresholds, with associations and interactions between distinct components (Jickells et al., 2005). Thus, it can be inferred that the Earth behaves as a system in which all its components (e.g., oceans, atmosphere, land, and the living parts) within, are connected and function as a whole (Steffen et al., 2004). This continually interacting system provides the necessary conditions for life on Earth. There are also numerous distinct components in earth's

systems that change as a result of internal and/or external forces. Some of these variables include: temperature (air, water, ground, subsurface at the top, middle, or bottom of the layer); precipitation; wind patterns and wind intensity; ocean current patterns and intensity; structure and rate of deep ocean circulation; chemical composition of air, water, land, ice; biomass or vegetation patterns; biogeochemical cycles; rate of seafloor spreading; volcanic eruptions; locations of the continents over time; sea level; and the sun's energy output.

Except for a few, such as volcanic eruptions, location changes of the continents, and the sun's energy output, most of the aforementioned variables of the earth's systems can be impacted and altered by human activities. For example, changes in the global carbon cycle with an increase of carbon dioxide (CO_2) and methane (CH_4) emissions; alteration of nitrogen, sulphur, and phosphorous cycles; changes in ground and surface water resources, disruptions in river flows that alters the water cycle; and destruction of ecosystems and modification of land covers that cause extinction of many species (Rockstrom et al., 2009) can be listed as some of these impacts.

In fact, over the last one-hundred years, human influences on the planet have increased more than ever**,** growing exceptionally in terms of both population (exceeding 7 billion) and the size of the global economy, with both altering the operation of many Earth system processes. The rapidly growing number of people using goods and services produced within the Earth system is proceeding at a rate that wears down its supporting capacity, for example, by generating vast amount of waste and carbon output (Steffen et al., 2011). Because of the interconnectedness among the various processes in distinct

systems, changes in any single process can influence all the others, creating a chain reaction (UN, 2012) that threatens the stability of the Earth (Zalasiewicz et al., 2011).

As mentioned, the changes in the functioning of Earth's processes are mainly happening as a result of fundamental changes in the intensity, size, and nature of people's relationship with the natural environment. These changes are affecting the well-being of the environment and societies (UNEP, 2012). Altering the behaviors of individuals that are significantly affecting the well-being of the environment will reduce the overall impact. This will only be possible by developing and executing superior management strategies. Adopting widespread sustainable consumer habits is one of the most important steps towards having a healthier environment. As such, it is important to have high-level environmental management strategies that take an interdisciplinary approach as a base concept.

1.1.2 Solving environmental problems caused by humans

The great challenge faced by nations today is to integrate economic growth with environmental sustainability and social welfare. The rapid growth of the middle class is causing a rapid increase in consumption around the world. According to the World Economic Forum (WEF, 2012), "Each year until 2030, at least 150 million people will be entering the middle class. This will bring almost 60% of the world's population into a middle-income bracket. Over the same period, energy demand is projected to increase by 40%, and water demand is expected to outstrip supply by 40%." This tells us that future

human actions will be even more significant than today's in terms of impacting the planet.

These predictions in growth, and the environmental problems we are already facing today, are an indicator of the challenges ahead. Thus, immediately altering the behaviors of individuals that are significantly affecting the well-being of the environment can reduce the impact of human actions sooner and can help us and future generations to overcome environment related problems. Changes in environmentally significant behaviors can address many environmental challenges, for example by decreasing harmful emissions, reducing waste, toxins, harmful chemicals, and the introduction of similar components into the environment.

As a definition, Stern (2000) states that "environmentally significant behavior can reasonably be defined by its impact: the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself" (p. 408). Therefore, balancing the dynamics of the ecosystem by changing human eco-actions can be very significant for the well-being of planet Earth. But first, we need to understand the underlying causes of these environmentally-sensitive human actions. This is one of the reasons we in recent years see an increasing number of studies in behavioral research looking at environmental attitudes and behavior that try to understand relationships with different variables (e.g., Barr, 2007; Kilbourne & Pickett, 2008; Steg & Vlek, 2009; Young et al., 2010; Albayrak et al., 2011). These studies, however, largely lack an interdisciplinary approach. As such, this study will take a holistic approach to explore the functioning of human behavior,

which is needed to uncover every aspect of the forces behind consumer environment-related behaviors.

In the context of environmentally sensitive behavior, there is a scarcity of knowledge in the literature regarding the determinants of this behavior and thus further clarification and investigation is warranted. A clear understanding of the factors affecting consumers' sustainable behavior can be helpful in changing environmentally harmful consumerism behavior (Sheth et al., 2011).

1.2 Research Questions

The main research question is:

- Why do consumers act in an environmentally sensitive way and what are the determinants and/or barriers to pro-environmental behavior?

Why is the answer to this question important?

There are many techniques to get people to engage in more pro-environmental behavior, such as providing information, instruction, or feedback (e.g., social marketing, labeling, etc.), giving incentives, making it easier, more convenient, or cheaper, etc. (Steg & Vlek, 2009). As Steg and Vlek (2009) suggest, "Which techniques are effective for which behaviors?" is still a big question. If we can answer the main research question, we can then also determine the best techniques for influencing consumers' environmental behaviors. By focusing on different types of behaviors, it may be possible to determine which techniques are most appropriate for each type of behavior.

1.3 Relevant Prior Research

Accepted by numerous researchers, identifying the motives for human behavior toward the environment is a critical step that is necessary to understand the underlying causes of each environmental action (e.g., Clayton & Brook, 2005; Saunders, Brook, & Eugene Myers, 2006; Gifford, 2007). In fact, over the last 40 years many psychologists and sociologists have been trying to do exactly this, exploring the root causes of direct and indirect environmental actions (Kollmuss & Agyeman, 2002). Although there are a growing number of studies in this area (e.g., Hines, Hungerford, & Tomera, 1987; Kollmuss & Agyeman, 2002; Barr, 2007; Kilbourne & Pickett 2008; Birgelen, Semeijn, & Keicher, 2009; Young et al. 2010; Park & Ha, 2012; Elgaaied, 2012), the underlying causes and functioning of consumers' environmental behaviors remain unclear. Current accumulated relevant research offers some guidance on potential research paths.

1.3.1 Environmentally sensitive behavior and its predictors

Environmentally sensitive behavior, defined as efforts by individuals to limit damaging actions that can harm the physical and natural environment (Albayrak et al., 2011), has become a research interest of many scholars (e.g., Hines et al., 1987; Gatersleben, Steg, & Vlek, 2002; Kollmuss & Agyeman, 2002; Barr, 2007; Kilbourne & Pickett, 2008; Young et al. 2010). Researchers examining the origins of environmental attitudes and behavior for the concept of green consumerism have come to a conclusion that potential predictors are multi-dimensional and not based on a single factor (e.g. Cleveland, Kalamas, & Laroche, 2005; Jansson, Marell, & Nordlund, 2010). Similarly,

according to Kollmuss and Agyeman (2002), environmentally sensitive behaviors such as decreasing resource and energy usage, using non-toxic materials, or decreasing waste production can be influenced by many different factors.

In fact, wide-ranging studies in the area of environmental behavior have examined and shown that a number of variables, such as environmental attitudes, ethical values, socio-economic characteristics, anthropocentric and bio-centric orientations, national culture, environmental values, moral norms, pragmatic beliefs, multidimensional socio-cultural factors, socio-demographics, emotions, and many others can all be predicting factors of eco-behaviors (e.g., Park, Russell, & Lee, 2007; Thogersen, 1999; Jansson et al., 2010; Dunlap et al., 2000; Owens, Dickerson, & Macintosh, 2000).

As an example, environmental attitudes are widely accepted as being influenced by ethical values, anthropocentric and bio-centric orientations, and pragmatic beliefs. Park et al. (2007) point out that a person's willpower, determination, and capability to protect the environment from harmful actions are influenced by multidimensional socio-cultural factors. Thogersen (1999) focusing on an individual's green consumption habits, identified moral norms as a contributing factor to pro-environmental behavior. Similar results come from Jansson et al. (2010) with regard to the influence of values, beliefs, and norms. Furthermore, Dunlap et al. (2000) identified three key elements as components of environmental values: (1) limits to growth, (2) beliefs about nature's balance, and (3) humanity's dominance over the environment. Many of the researchers consider environmental values to be the most crucial predictor of the behavior towards the environment (Davis et al., 2011).

Another widely defined and accepted determinant of environmental behavior is one's willingness to protect the environment. For instance, Iwata's (2002) study showed an individual's willingness to protect the environment as a predictor variable and found a positive correlation with that individual's environment-related behavior. Looking at some other variables, Gelissen (2007) tried to explain the causes of changing patterns of willingness to protect the environment by considering income and education levels as predictors and showed a strong association between these variables.

A study by Kollmuss and Agyeman (2002) conceptually classified a comprehensive set of determinants that predict environmentally sensitive behavior through a multi-layered framework. By pointing out the importance of categorizing the potential factors, they identified various environmental behavior determinants as: (1) demographic factors, (2) external factors such as institutional, economic, social as well as cultural factors, and (3) internal factors related to a person's internal forces such as pro-environmental knowledge, values, attitudes, environmental concern, awareness, motivation, emotion, priorities, locus of control, and perceived responsibilities. This study touches upon all of these identified factors.

1.3.2 Research gaps and challenges

There are a few shortcomings in the accumulated environmental behavior studies in the literature. One such issue is that studies in this area typically pay attention to only one type of behavior or invoke a clustering of all types of environmental behaviors into one behavioral outcome. As suggested by Gatersleben et al. (2002), Stern (2000) and

Steg and Vlek (2009), different types of environmentally sensitive behaviors are related to various types of causal factors. Thus, while identifying target environmental behavior is important, this is not done well in most studies in the literature. Furthermore, comparative behavioral outcome studies are limited and should be the main focus of more studies.

Another major limitation is that studies on environmental behavior mostly focus on a specific discipline in order to answer the research questions of interest. This tight focus, however, is limiting and does not help answer broader questions. As environment-related issues originate from many causes, and impact many different areas, it is essential to also take an interdisciplinary approach. According to Stern (2000) and Steg and Vlek (2009), because possible causal variables come from various disciplines that interact continuously, it is critical to draw on insights from different disciplines, such as the behavioral and social sciences. This kind of an "interdisciplinary research is necessary for full understanding" (Stern, 2000, p.422). Although it is challenging to gather related information from different disciplines and combine them into one study with a meaningful rationalization focused on the same purpose (i.e., understanding environmentally sensitive behaviors), it is crucial to develop interdisciplinary empirical studies with this approach.

The literature review shows us that moral-focused theories, such as the norm activation model (NAM) and values-beliefs-norms (VBN) theories are successful in predicting relatively low-cost behaviors and associated intentions in the environmental domain, such as political behaviors, environmental citizenship, or policy acceptability

(e.g., Garling et al., 2003; Nordlund & Garvill, 2003; Stern et al., 1999; Steg, Dreijerink, & Abrahamse, 2005). These moral-focus theories, however, usually seem to be less explanatory in situations involving high-cost behaviors, such as altering car use or using public transportation (e.g., Bamberg & Schmidt, 2003; Hunecke et al. 2001). In cases where high-cost behaviors are involved, the Theory of Planned Behavior (TPB) seems to be more successful in explaining related ecologically sensitive behavior (Bamberg &Schmidt, 2003). Steg and Vlek (2009) suggest that this is possible because of the wider range of factors the TPB covers, which extend beyond just environment related motivations. There are a limited set of studies that tell us the importance of emotions, such as affect theory and similar models and theories, and how this may play role in environmental behavior studies. Currently, these theories and frameworks have not been brought together to predict environmental behaviors and thus, is another research gap that should be addressed in future studies.

In considering broader theories, Goal Framing Theory (Lindenberg, 2001a, 2001b, 2006) covers different motivations to explain a certain behavior. This theory has been suggested to be appropriate as an integrative framework that can explain eco-sensitive behaviors (Steg & Vlek, 2009). It is not yet known how multiple motivations may affect these types of behaviors. Goal Framing Theory appears to be a promising integrative framework and is introduced in detail in Part II of the dissertation.

The aforementioned research gaps lead to two important focus areas of this dissertation:

1. Each target behavior should be examined separately.

2. Goal framing theory is promising, thus should be tested in different environmental domains.

Focusing on these two aspects while elaborating on the aforementioned principles can help us further understand environmentally sensitive behaviors and can provide useful inputs in order to come up with appropriate intervention strategies for environmental protection.

1.4 Research Objectives

This dissertation emphasizes two important objectives, which will jointly help answer the stated main research question.

The first objective of the study is to understand if predicting factors of different types of environmentally sensitive behaviors vary depending on the behavior that is being performed. More specifically, the first objective of the study is to determine predictor variables of five different environmentally sensitive behaviors (i.e., buying pesticide-free fruits/vegetables, recycling cans and bottles, avoiding environmentally harmful products, driving less for environmental reasons, and saving water) and see whether the predicting variables vary depending on the type of behavior. The study will develop and test hypotheses by running causal models linking predictor variables to each behavioral outcome, and analyze the results.

The second objective of the study is to understand why consumers act in a pro-environmental way and what are the determinants and/or barriers to pro-environmental behaviors, i.e., environmentally sensitive purchases, environmentally sensitive usage, and

environmentally sensitive post-use behaviors. More specifically, the aim is to examine whether behaving in favor of, or against, ecological well-being is more strongly dependent on moral considerations, feelings, or gain (i.e., self-interest) motives. We will determine this by developing three studies examining the aforementioned green consumer behaviors as behavioral outcomes and testing them by applying Goal Framing Theory to all three different types of behaviors separately.

1.5 Organization of Thesis

This study will examine in detail the predicting factors of consumer environmentally sensitive behaviors empirically with the help of theoretical support from different disciplines. The dissertation is presented in two main parts: the first part will be based on a secondary dataset and cover the first research objective, comprised of Study I. The second part will be based on the primary dataset and cover the second research objective which will include Study II, Study III, and Study IV. An outline is provided below:

- Part I: Empirical study explaining environmentally sensitive behaviors based on secondary data.
    - Study I: Analysis of the Predictors of Five Eco-Sensitive Behaviors.
- Part II: Empirical studies explaining environmentally sensitive behaviors using Goal Framing Theory based on primary data.
    - Study II: Identifying the Drivers of Environmentally Sensitive Purchase Behavior: Is it Morality, Feelings, or Self-interest?

- Study III: Investigation of the Predictors of Environmentally Sensitive Usage Behavior.
- Study IV: Why do Consumers Recycle? A Goal Framing Theory Approach.

The first part, namely Study I, looks at whether different consumer behaviors can be categorized and examined in different groups instead of clustering them into one category, as is typically done and expressed as only one eco-friendly behavior outcome. It also tries to determine whether different types of behaviors (i.e., buying pesticide-free fruits/vegetables, recycling cans and bottles, avoiding environmentally harmful products, driving less for environmental reasons and saving water) have different underlying predicting factors. Study I is based on measures and data obtained from a highly reliable large-sample secondary database of the U.S. General Social Survey (GSS). Based on the hypotheses developed after an inclusive literature review, a conceptual model was built for the study. In order to examine the casual relationships between the identified variables and behavioral outcomes, separate multiple regression analyses were run, one for each of the eco-sensitive behaviors. The model, analyses, and results are reported in the Part I.

After completing the first part and analyzing and reporting the results, based on this study, the second part of the dissertation covers three further studies: Study II, Study III, and Study IV. These studies cover three types of environmentally sensitive consumer behaviors, i.e., environmentally sensitive purchase, use, and post-use. This part of the dissertation uses primary data for empirical analyses by administering three sets of surveys to consumers. A main research model was developed based on the same

theoretical framework, i.e., Goal Framing Theory, to use in three studies covered in part two and represented as a separate chapter (Chapter 3).

For each of these studies (Study II, Study III, and Study IV), separate hypotheses were developed based on the main research model and relevant literature. After developing related surveys for each study, questionnaires were administered via online surveys to examine and understand three different types of consumer eco-friendly behaviors. These three studies use Goal Framing Theory as a base theory to explain three types of behaviors and Structural Equation Modeling (SEM) as a research method to test the hypothesized model for each of the three studies. The research framework, model, analyses, and results are reported for all three studies in the Part II.

1.6 Important Definitions

i. ***Environmentally sensitive behavior:*** Environmentally sensitive behavior, also called pro-environmental behavior, is defined as efforts by individuals to limit damaging actions that can harm the physical and natural environment (Albayrak et al., 2011).

ii. ***Environmentally sensitive purchase behavior:*** Environmentally sensitive purchasing (also known as environmentally preferable purchasing) is the purchase of goods and services that have minimal impact to the natural environment relative to the products that serve a similar purpose (NJDEP, 2006).

iii. ***Environmentally sensitive usage behavior:*** Environmentally sensitive usage means using products and services, such as automobile, household energy, and water in a way that has the least environmental impact.

iv. ***Environmentally sensitive post-use behavior:*** Disposing, recycling, or reusing products after their initial use in order to have the least environmental impact. This behavior also includes reducing the amount of waste produced.

v. ***Attitudes toward a behavior***: The degree to which a person gives value to performing a certain behavior (Ajzen, 1991; Ajzen & Fishbein, 1980).

vi. ***Subjective norms***: An individual's beliefs about whether significant social surrounding, such as family and friends, approves or disapproves of performing a particular behavior (Ajzen, 1991; Ajzen & Fishbein, 1980).

vii. ***Personal norms***: A person's internal expectations (not based on others' views) of how he/she should act based on his/her inner values (Schwartz, 1968).

viii. ***Perceived behavioral control***: The degree to which a person perceives ease or difficulty of implementing an intended behavior (Ajzen, 1991).

ix. ***Intention***: Individuals' willingness to perform a certain behavior (e.g., buying eco-friendly products, recycling, taking a public transportation)

x. ***Values***: The criteria that people use to select and justify actions and assign worth to objects and the actions of others (Fraj & Martinaz, 2006).

xi. ***Environmental concern:*** Environmental concern defined as people's orientation toward the environment in general (Choi & Kim, 2005).

1.7 References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, N.J.: Prentice-Hall.

Albayrak, T., Caber, M., Moutinho, L. & Herstein, R. (2011). The influence of skepticism on green purchase behavior, *International Journal of Business and Social Science, 2*(13), 189-197.

Bamberg, S., & Schmidt, P. (2003). Incentives, morality, or habit? Predicting students car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environment and Behavior, 35*(2), 264–285.

Barr, S. (2007). Factors influencing environmental attitudes and behaviors, *Environment and Behavior, 39*(4), 435-473.

Birgelen, M. V., Semeijn, J., & Keicher, M. (2009). Packaging and pro-environmental consumption behavior: investigating purchase and disposal decisions for beverages. *Environment and Behavior, 41*(1), 125-146.

Choi, M., & Kim, Y. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research, 32*(1), 592-599.

Clayton, S., & Brook, A.T. (2005). Can psychology help save the world? A model for conservation psychology. *Analyses of Social Issues and Public Policy, 5*(1), 87-102.

Cleveland, M., Kalamas, M. & Laroche, M. (2005). Shades of green: Linking environmental locus of control and pro-environmental behaviors. *Journal of Consumer Marketing, 22*(4), 198-212.

Davis, J. L., Le, B. & Coy, A. (2011). Building a model of commitment to the natural environment to predict ecological behavior and willingness to sacrifice, *Journal of Environmental Psychology, 31*(3), 257-265.

DuNann Winter, D., & Koger, S. M. (2004). *The psychology of environmental problems*. Mahwah, NJ: Lawrence Erlbaum.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R.E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425-442.

Elgaaied, L. (2012). Exploring the role of anticipated guilt on pro-environmental behavior–a suggested typology of residents in France based on their recycling patterns. *Journal of Consumer Marketing, 29*(5), 369-377.

European Commission (2012). Science for environment policy, future brief: green behavior. Retrieved from http://ec.europa.eu/environment/integration/research/newsalert/pdf/FB4.pdf

Fraj, E., & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis, *Journal of Consumer Marketing, 23*(3), 133-44.

Gardner, G. T., & Stern, P. C. (2002). *Environmental problems and human behavior* (2nd ed.). Boston, MA: Pearson Custom Publishing.

Garling, T., Fujii, S., Garling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proevenvironmental intention. *Journal of Environmental Psychology*, *23*, 1–9.

Gatersleben, B., Steg, L., & Vlek, C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior*, *34*(3), 335-362.

Gelissen, J. (2007). Explaining popular support for environmental protection a multilevel analysis of 50 nations. *Environment and Behavior*, *39*(3), 392-415.

Geller, E. S. (2002). The challenge of increasing proenvironmental behavior. In R. B. Bechtel & A. Churchman (Eds.), *Handbook of environmental psychology* (pp. 525–540). New York: Wiley.

Gifford, R. (2007). *Environmental psychology: Principles and practice*. Colville, WA: Optimal books.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible pro-environmental behavior: a meta-analysis. *The Journal of Environmental Education*, *18*(2), 1–8.

Hunecke, M., Blobaum, A., Matthies, E., & Hoger, R. (2001). Responsibility and environment: ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, *33*, 830–852.

Iwata, O. (2002). Coping style and three psychological measures associated with environmentally responsible behavior. *Social Behavior and Personality*, *30*(7), 661-670.

Jackson, T. (2005). Motivating sustainable consumption: A review of evidence on consumer behavior and behavioral change. London: Sustainable Development Research Network. Centre for Environmental Strategy. Retrieved from http://www.sd-research.org.uk/wp-content/uploads/motivatingscfinal_000.pdf

Jansson, J., Marell, A., & Nordlund, A. (2010). Green consumer behavior: Determinants of curtailment and eco-innovation adoption, *Journal of Consumer Marketing*, *27* (4), 358–370.

Jickells, T. D., Z.S. An, *et al.* (2005). Global iron connections between desert dust. *Ocean Biogeochemistry, and Climate. Science*, *308*(5718), 67-71.

Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally responsible behavior. *Journal of Business Research*, *61*(9), 885-893.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239-260.

Lindenberg, S. (2001a). Social rationality versus rational egoism. In J. Turner (Ed.), *Handbook of sociological theory* (pp. 635–668). US: Springer.

Lindenberg, S. (2001b). Intrinsic motivation in a new light. *Kyklos*, *54*(2-3), 317–342.

Lindenberg, S. (2006). Prosocial behavior, solidarity and goal-framing processes. In D. Fetchenhauer, A. Flache, B. Buunk, & S. Lindenberg (Eds.), *Solidarity and prosocial behavior. An integration of sociological and psychological perspectives.* Amsterdam: Kluwer.

NJDEP (2006). Green purchasing: Guide for local governments and communities. Retrieved from http://www.state.nj.us/dep/opsc/docs/green_purchasing_guide_local_governments.pdf on November 28, 2013.

Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, *23*(4), 339-347.

Owens, J., Dickerson, S., & Macintosh, D. L. (2000). Demographic covariates of residential recycling efficiency. *Environment and Behavior*, *32*(5), 637-650.

Park, H., Russell, C. & Lee, L. (2007). National culture and environmental sustainability: A cross-national analysis. *Journal of Economics and Finance*, *31*(1), 104-121.

Park, J., & Ha, S. (2012). Understanding pro-environmental behavior: A comparison of sustainable consumers and apathetic consumers. *International Journal of Retail & Distribution Management*, *40*(5), 388-403.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., … & Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society*, *14*(2), 32.

Saunders, C. D., Brook, A. T., & Eugene Myers, O. (2006). Using psychology to save biodiversity and human well-being. *Conservation Biology*, *20*(3), 702–705.

Schwartz, S. H. (1968). Words, deeds and the perception of consequences and responsibility in action situations. *Journal of Personality and Social Psychology*, *10*(3), 232.

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: A customer-centric approach to sustainability. *Journal of the Academy of Marketing Science*, *39*(1), 21–39.

Steffen, W., A. Anderson, et al. (2004). *Global change and the earth system: A planet under pressure*, Springer.

Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., … & Svedin, U. (2011). The Anthropocene: From global change to planetary stewardship. *Ambio*, *40*(7), 739-761.

Steg, L. & Vlek, C. (2009). Encouraging pro-environmental behavior: an integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317.

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, *25*(4), 415-425.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407–424.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: the case of environmentalism. *Human Ecology Review*, *6*(2), 81–97.

Thogersen, J. (1999). The ethical consumer. moral norms and packaging choice. *Journal of Consumer Policy*, *22*(4), 439–460.

UN (2012). World economic situation and prospects 2012. Retrieved from http://www.un.org/en/development/desa/policy/wesp/wesp_current/2012wesp_prerel.pdf on December 08, 2013.

UNEP (2012). United Nations Environment Programme's (UNEP) 5th Global Environment Outlook, 2012. Retrieved from: http://www.unep.org/geo/pdfs/geo5/GEO5_report_full_en.pdf on December 08, 2013.

Vlek, C., & Steg, L. (2007). Human behavior and environmental sustainability: problems, driving forces and research topics. *Journal of Social Issues*, *63*(1), 1–19.

Walsh, B. (2012, March 7). Anthropocene: Why You Should Get Used to the Age of Man (and Woman). *Time Magazine*. Retrieved from http://science.time.com/2012/03/07/anthropocene-why-you-should-get-used-to-the-age-of-man-and-woman/ on December 12, 2013.

WEF (2012). World Economic Forum. Retrieved from http://www.weforum.org/issues/sustainable-consumption on December 09, 2013.

Wilson, C. & Chatterton, T. (2011). Multiple models to inform climate change policy: A pragmatic response to the `beyond the ABC' debate. *Environment and Planning A. 43*(12), 2781-2787.

Young, W., Hwang, K., McDonald, S. & Oates, C. J. (2010). Sustainable consumption: Green consumer behavior when purchasing products. *Sustainable Development, 18*(1), 20-31.

Zalasiewicz, J., Williams, M., Haywood, A., Ellis, M., Zalasiewicz, J., Williams, M., ... & Ellis, M. (2011). The Anthropocene: A new epoch of geological time? *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *369*(1938), 835-841.

Part I

Chapter 2

"There is nothing more frightful than ignorance in action"

(Johann Wolfgang von Goethe, 1826)

Study I: Analysis of the predictors of five eco-sensitive behaviors[1]

[1] This chapter represents a slightly modified version of:
Onel, N., & Mukherjee, A. (2014). Analysis of the predictors of five eco-sensitive behaviors. *World Journal of Science, Technology, and Sustainable Development*, *11*(1), 16-27.

CHAPTER 2

Analysis of the Predictors of Five Eco-Sensitive Behaviors

Abstract

The aim of this study is to examine five different types of eco-sensitive behaviors separately and understand if determinants of these behaviors vary depending on the type of action being performed. The study investigates factors influencing five different eco-sensitive behaviors by empirically testing the effects of socio-economic status (SES), gender, age and environmental values. Theoretically guided hypotheses and models were formulated and tested with multiple linear regression models by employing a dataset from the National Opinion Research Center (NORC) 2010 General Social Survey. Results conclude that different types of behavior have different predictors. While age differences only explain recycling cans and bottles (RCB), gender difference explains buying pesticide-free fruits/vegetables and avoiding environmentally harmful products (AHP). Values, on the other hand, predict all five eco-behaviors. Driving less and saving water for environmental reasons were least explained by the examined predictors. These results contribute to untangling the confusing research evidence on the effects of SES, age, gender and environmental values on different environmental behaviors and on the relationship between them by examining each behavior separately.

Keywords: Environmentally Sensitive Behavior, Socio-economic status, Age, Gender, Environmental values, Green Consumer Behavior, Sustainable consumption

2. Introduction

An increasing number of environmental problems and their detrimental impacts all around the world are signaling the urgency of finding immediate solutions. Application of the possible solutions to these widespread problems will need the full participation of individuals (Steg & Vlek, 2009). Gaining society's support to overcome these environmental problems will be possible only if we can understand the factors affecting individuals' behaviors towards acting in a more ecologically conscious manner (e.g., buying ecologically friendly products, recycling and driving less frequently) and the mechanisms between these factors.

While research on understanding factors influencing individual eco-sensitive behaviors has grown in recent years, there has been very little attempt at distinguishing between different types of eco-sensitive behavior. Consumer motivations towards these different types of behavior could vary significantly depending on their demographics and psychographics, as well as facilitators and inhibitors. Also, most research has tended to use small surveys or qualitative approaches to address these issues.

The purpose of this research is to construct a model and examine the relationships that link an individual's age, gender, SES, and environmental values with five different pro-environmental behaviors. The study is based on measures and data obtained from the highly reliable large-sample secondary database of the U.S. General Social Survey (GSS). The main objectives of the study are to (1) determine predictor variables of five different environmentally sensitive behaviors (i.e. buying pesticide-free fruits/vegetables, RCB, AHP, driving less for environmental reasons and saving water) and (2) see if the

predicting variables vary depending on the type of behavior. The study develops and tests hypotheses by running causal models linking predictor variables to each behavioral outcome, and analyses the results. Gaining a detailed understanding of individuals' different environmentally sensitive behaviors will be important for policy makers as well as researchers who are in search of solutions to the ever-increasing environmental problems that will eventually require human behavioral changes.

2.1 Previous Studies and Hypotheses Construction

Environmentally sensitive behavior, defined as efforts by individuals to limit damaging actions that can harm the physical and natural environment (Albayrak et al., 2011), has become a research interest of many scholars (e.g., Kollmuss & Agyeman, 2002; Barr, 2007; Young et al., 2010). According to Kollmuss and Agyeman (2002), environmentally sensitive behaviors such as decreasing resource and energy usage, using non-toxic materials, or decreasing waste production can be influenced by many different factors.

By pointing out the importance of categorizing the potential factors, Kollmuss and Agyeman (2002) identify the various environmental behavior determinants as: (1) demographic factors; (2) external factors such as economic, social and cultural factors; and (3) internal factors such as environmental awareness, knowledge, concern, values, attitudes, motivation, emotion, priorities, locus of control and perceived responsibilities. While Kollmuss and Agyeman's (2002) contribution is to conceptually identify a comprehensive set of determinants, our study provides empirical validity by testing the

effects of four critical determinants that predict different environmentally sensitive behaviors. For demographic factors, we consider age and gender to have an effect on environmentally sensitive behaviors. For the second category, external factors, we capture the SES of the individuals. Finally, for the internal factors, we examine environmental values as another important and significant determinant of environmentally sensitive behaviors.

According to Stern (2000), environmentally sensitive behaviors depend on various causal factors (general or behavior-specific) and different types of environmentally significant behaviors have varied causes. The author also points out that since the vital causal factors differ across behaviors, each aimed behavior should be theorized and examined separately. Similarly, Steg and Vlek (2009) state that "promoting behavior change is more effective when one (1) carefully selects the behaviors to be changed to improve environmental quality, (2) examines which factors cause those behaviors…" (p. 309). Following their suggestions, in this study we examine different environmentally sensitive behaviors (i.e. buying pesticide-free fruits/vegetables, RCB, AHP, driving less for environmental reasons and saving water) separately.

2.1.1 Socio-economic status (SES)

One of the most widely used factors in research on the influences of environmental behavior is SES (Pauw & Petegem, 2010). SES is a construct that incorporates multiple variables; these include objective features such as material wealth and access to resources such as education and income, and also societal perceptions of

SES (Piff et al., 2010). There are different approaches and findings in terms of the effects of the socio-economic background of individuals and their environmental attitudes/behaviors. For instance, Torgler, García-Valiñas, and Macintyre (2011) investigated a cross-section of individuals from 38 countries using micro-data from the World Values Survey (1995-1997) and suggest that individuals' active participation in environmental issues, specifically participating in environmental organizations, is highly related to their SES (Torgler et al., 2011). Similarly, Owens, Dickerson, and Macintosh (2000) asserted the importance of the socio-economic characteristics of individuals in relation to their environmental behaviors. Their study examined and reported a strong and positive correlation between individuals' environmental behavior (recycling habits) and their educational level, household income and home ownership status.

As a component of SES, income has also been identified as a predictor of environmental attitudes and behavior. According to Shen and Saijo (2008), higher levels of environmentalism in general are associated with higher income levels. This association between income and environmental well-being support can also be linked to better educational possibilities and higher level education that are both associated with higher income in general. Higher levels of education are confirmed to be positively associated with environmentalism (Barr, 2007). The typical assertion is that education exposes people to wide-ranging beliefs, point-of-views and ideas and a more liberal outlook on life. In addition, according to Piff et al. (2010), lower social class (or SES) can be linked to higher possibility of exposure to threat, fewer economic resources, fewer educational opportunities and a reduced feeling of personal control. Furthermore, individuals with

lower class backgrounds usually deal with higher levels of stress in their relationships and even domestic violence (Piff et al., 2010).These life circumstances might suggest that individuals with lower SES engage in less pro-social behavior, prioritizing self-interest over the welfare of others. Hence, we put forth our first set of hypotheses:

H1a: There is a positive relationship between individuals' SES and buying pesticide-free fruits/vegetables.

H1b: There is a positive relationship between individuals' SES and recycling.

H1c: There is a positive relationship between individuals' SES and AHP.

H1d: There is a positive relationship between individuals' SES and driving less for environmental reasons.

H1e: There is a positive relationship between individuals' SES and saving water for environmental reasons.

2.1.2 Gender

Gender differences in environmental behaviors have also received much attention in this field of research. In general, academics seem to broadly agree that women inclined to be more concerned about the environment than men (Pauw & Petegem, 2010). Regarding environmental attitudes, a number of studies have shown that women are more sympathetic than men to environmental concerns (e.g., Tindall, Davies, & Mauboules, 2003; Dietz, Kalof, & Stern, 2002; Xiao & Hong, 2010), whereas others have been inconclusive in this regard (e.g., Evans et al., 2007). Although some studies have found no differences between men and women, a larger majority of studies have found that in contrast to men, women have at least a modestly higher level of concern for the

environment (e.g., Davidson & Freudenburg 1996; Zelezny, Chua, & Aldrich, 2000). According to Xiao and Hong (2010), a comparatively higher concern about the environment might be expected to translate to more environmentally focused behaviors.

A typical theoretical approach to explain gender differences in attitudes towards the environment considers gender roles in a society and socialization (Zelezny et al., 2000). Socialization theory asserts that behavior and related behavioral attitudes can be predicted from the socialization course of action and that individuals are shaped by the context of cultural norms and expectations for their gender. Women across cultures are socialized to be more nurturing, to have a greater concern for caregiving, to be more interdependent, expressive, cooperative and supportive (Han et al., 2011; Jain & Kaur, 2006; Shen & Saijo, 2008). Men, by contrast, are socialized to be the opposites, mostly independent and competitive (Eagly, 1987). As such, the differences in socialization could be revealed in attitudes toward the environment (Pauw & Petegem, 2010). This approach helps us to identify our next hypotheses:

H2a: Women buy pesticide-free fruits/vegetables more often than men.

H2b: Women recycle more often than men.

H2c: Women avoid environmentally harmful products more often than men.

H2d: Women reduce driving for environmental reasons more often than men.

H2e: Women save water for environmental reasons more than men.

2.1.3 Age

Researchers have also identified age as a determining factor of environmentally sensitive behaviors. The research evidence on age and its impact on eco-sensitive

behaviors is mixed. Olli, Grendstad, and Wollebaek (2001) pointed out the complex relationship between age and individuals' environmentally significant behaviors, such that it has not been possible to determine unerringly a consistent significant correlation. For example, some studies in the literature reported a non-significant or positive relationship between various environmental-conscious components and age (Shrum, McCarty, & Lowrey, 1995). Luo and Deng (2008) sampled 438 visitors to one of the China's national forests and found that older respondents were more pro-environment. Similarly, Chen, Hsu, and Lin (2011) found that older people were more likely to engage in pro-environmental actions than their younger counterparts. Also, a large-scale study by Schultz et al. (2013) on littering behavior showed that age negatively predicted individual littering. However, some other studies in the literature showed that younger people have more environmentally positive attitudes than older segments of the population (e.g., Diamantopoulos et al., 2003, Pauw & Petegem, 2010). For instance, a study from Lee (2008) showed that younger individuals were more concerned about degradation of environmental well-being than their older counterparts. Consequently, this concern is expected to be reflected in their values and attitudes towards the environment. Therefore, we identify our third group of hypotheses as follows:

H3a: There is a positive relationship between individuals' age and buying pesticide-free fruits/vegetables.

H3b: There is a positive relationship between individuals' age and recycling.

H3c: There is a positive relationship between individuals' age and AHP.

H3d: There is a positive relationship between individuals' age and driving less for environmental reasons.

H3e: There is a positive relationship between individuals' age and saving water for environmental reasons.

2.1.4 Environmental values

One of the most crucial predictors of behaviors towards the environment is considered to be environmental values (Davis, Le, & Coy, 2011). Values are defined as the criteria that people use to choose and rationalize actions and assign worth to objects and the actions of others (Fraj & Martinaz, 2006). Each person has her/his own specific values that are shaped by experiences and learning processes (Kahle, 1996). People can express their values through their actions. For example, a person with higher environmental values might buy more ecologically friendly products, recycle and take part in environmental protection activities. In fact, some studies show that individuals who expressed that their personal values included respect toward the environment were more willing to purchase ecologically friendly products. There have been findings that those who most value ecological concerns are likely to have higher environmentally friendly behaviors (Fraj & Martinaz, 2006). Hence, we put forth that:

H4a: There is a positive relationship between individuals' environmental values and buying pesticide-free fruits/vegetables.

H4b: There is a positive relationship between individuals' environmental values and recycling.

H4c: There is a positive relationship between individuals' environmental values and AHP.

H4d: There is a positive relationship between individuals' environmental values and driving less.

H4e: There is a positive relationship between individuals' environmental values and saving water.

Based on these hypotheses, we aim to answer the following questions: (1) is there any difference between environmentally sensitive behaviors in terms of their predictors? and (2) is there a clear line of causality from SES, age, gender and environmental values to different environmentally sensitive behaviors? This study is designed to address these questions by exploring the relationships between SES, age, gender, environmental values and five environmentally sensitive behaviors.

2.2 Methodology

Based on the above hypotheses, we built a conceptual model for the study. The model is illustrated in Figure 2-1.

According to the proposed model, individuals' SES, age, gender and environmental values have associations with their different personal behaviors towards the environment. In order to examine the casual relationships between identified variables and behavioral outcomes, we ran five multiple regression analyses, one for each of the eco-sensitive behaviors.

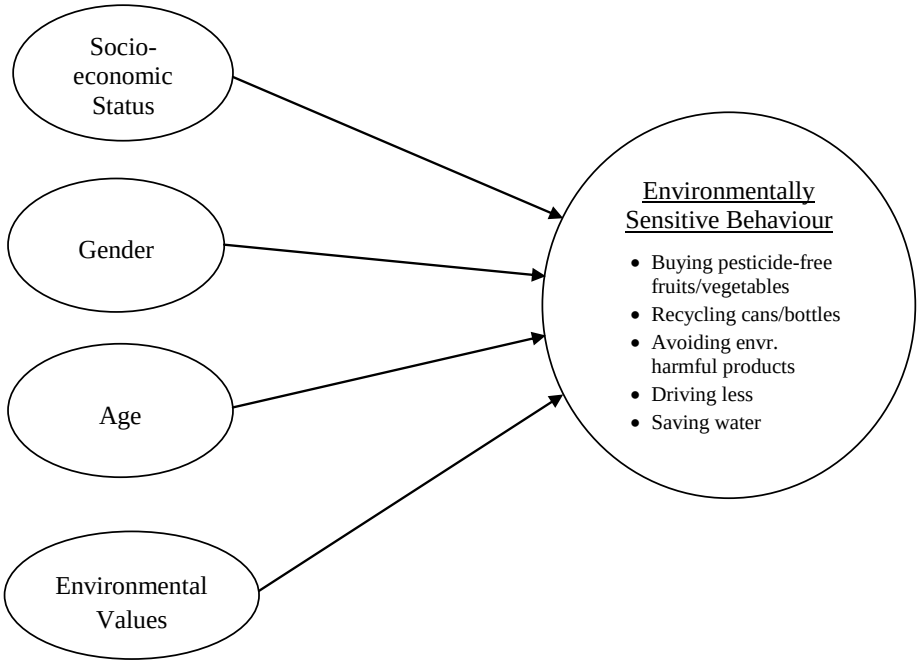


Figure 2-1: Proposed model showing the influence of socio-economic status, gender, age and environmental values on environmentally sensitive behavior.

2.3 Data

The dataset was compiled from the 2010 National Opinion Research Center (NORC) General Social Survey (GSS) of the University of Chicago, which includes a set of environmental items (GSS, 2010). The GSS is a bi-annual nationally representative full-probability weighted sample set of the U.S. adult population compiled by NORC. It is designed to support social indicator research with modules touching upon various current and emerging issues. The 1993 (N=1606), 2000 (N=1541) and 2010 (N=2044) GSS surveys include a module for the environment consisting of 60 items addressing environmental attitudes and behaviors (GSS, 2009).

SES was measured by a single index, called the socio-economic index, which included education and income (GSS, 2009). For environmental values, the GSS's environmental value survey questions were used to come up with an appropriate single measure. The survey items the GSS uses for this variable are: concerned about the environment; almost everything we do harms the environment; worrying too much about progress harms the environment; economic growth is necessary to protect the environment; and economic growth always harms the environment. Scale items of negatively worded statements were reversed (almost everything we do harms the environment; worrying too much about progress harms the environment; and economic growth always harms the environment) to create consistency between items. Lastly, the data for the outcome variable capturing environmentally sensitive behaviors gathered from personal behaviors towards the environment were given as: recycle can bottles, buy pesticide-free fruits and vegetables, avoid purchasing environmentally harmful products, drive less and save water for environmental reasons. Missing data were replaced with the mean of the column in the dataset. The gender distribution of the sample of 2044 respondents was: 56.4% women and 43.6% men.

2.4 Results

In order to explain each outcome variable by identified predictor variables, a series of multiple regression analyses was performed. A summary of results is displayed in Table 2-1.

Table 2-1. Summary of results

Regression results of the effects of Socio-economic Status, Gender, Age and Environmental Values on five Environmentally Sensitive Behaviors

Hypotheses	R^2	(F-Sig.)	Std. Beta	*p-Value*	Results
H1a. SEI → Buying pesticide-free fruits/vegetables	0.027	(0.000)	-0.003	0.880	Not supported
H1b. SEI → Recycling cans and bottles	0.096	(0.000)	0.087	0.000	Supported
H1c. SEI → Avoiding envr. harmful products	0.068	(0.000)	0.046	0.033	Supported
H1d. SEI → Driving less for environmental reasons	0.015	(0.000)	0.004	0.850	Not supported
H1e. SEI → Saving water for environmental reasons	0.010	(0.000)	-0.038	0.083	Not supported
H2a. Gender → Buying pesticide-free fruits/vegetables	0.027	(0.000)	0.071	0.001	Supported
H2b. Gender → Recycling cans and bottles	0.096	(0.000)	0.002	0.924	Not supported
H2c. Gender → Avoiding envr. harmful products	0.068	(0.000)	0.042	0.050	Supported
H2d. Gender → Driving less for environmental reasons	0.015	(0.000)	0.008	0.719	Not supported
H2e. Gender → Saving water for environmental reasons	0.010	(0.000)	0.003	0.134	Not supported
H3a. Age → Buying pesticide-free fruits/vegetables	0.027	(0.000)	-0.024	0.282	Not supported
H3b. Age → Recycling cans and bottles	0.096	(0.000)	0.116	0.000	Supported
H3c. Age → Avoiding envr. harmful products	0.068	(0.000)	0.021	0.328	Not supported
H3d. Age → Driving less for environmental reasons	0.015	(0.000)	0.027	0.221	Not supported
H3e. Age → Saving water for environmental reasons	0.010	(0.000)	0.000	0.987	Not supported
H4a. Values → Buying pesticide-free fruits/vegetables	0.027	(0.000)	0.141	0.000	Supported
H4b. Values → Recycling cans and bottles	0.096	(0.000)	0.266	0.000	Supported
H4c. Values → Avoiding envr. harmful products	0.068	(0.000)	0.246	0.000	Supported
H4d. Values → Driving less for environmental reasons	0.015	(0.000)	0.120	0.000	Supported
H4e. Values → Saving water for environmental reasons	0.010	(0.000)	0.088	0.000	Supported

All hypotheses tested at $p<0.05$

The first regression equation including the four factors (i.e. SES, gender, age and values) affecting buying pesticide-free fruits/vegetables (BPF) is significant with an R Square (R^2) value of 0.027. Standardized beta coefficients for the GENDER → BPF link (0.071, *p*=0.001) and for the VALUE → BPF link (0.141, *p*=0.000) are both significant. However, the AGE → BPF (-0.024, *p*=0.282) and the SEI → BPF (-0.003, *p*=0.880) links are not significant. So, for the first analysed behavior, buying pesticide-free fruits/vegetables, the direct effects of gender (*H2a*) and values (*H4a*) are significant and, as hypothesized, the analysis shows a positive relationship for both. The direct effects of SES (*H1a*) and age (*H3a*) are not significant. Thus, *H2a* and *H4a* are supported, whereas *H1a* and *H3a* are not.

The second regression analysis with the same four predictor variables and RCB as an outcome is significant (*p*=0.000), with an R^2 value of 0.096. Standardized beta coefficient for the GENDER → RCB link (0.002, *p*=0.924) is not significant. For the SEI → RCB link (0.087, *p*=0.000), AGE → RCB link (0.116, *p*=0.000) and VALUE → RCB link (0.266, *p*=0.000), beta coefficients are all significant. Since the direct effects of SES (*H1b*), age (*H3b*) and values (*H4b*) on recycling behavior are significant, *H1b*, *H3b* and *H4b* are supported, whereas the hypothesis on gender (*H2b*) is not.

The results of the next regression analysis that considers AHP as an outcome show an R^2 value of 0.068. Standardized beta coefficients for the GENDER → AHP link (0.042, *p*=0.050), SEI → AHP link (0.046, *p*=0.033) and VALUE → AHP link (0.042, *p*=0.000) are all significant. For this behavior, only the AGE → AHP link (0.021, *p*=0.328) is not significant. So, while gender difference, SES and values show a positive

relationship with AHP behavior, age difference does not explain any of the variance. Thus, *H1c*, *H2c* and *H4c* are supported, whereas *H3c* is not.

The next regression equation including the same four factors affecting driving less for environmental reasons (DL) is significant with an R^2 value of 0.015. The regression results show significant standardized beta coefficient just for the VALUE → DL link (0.120, *p*=0.000). The AGE → DL (0.027, *p*=0.221), GENDER → DL (0.008, *p*=0.719) and SEI → DL (0.004, *p*=0.850) links are not significant. Thus, *H4d* is supported but *H1d*, *H2d* and *H3d* are not.

Finally, the last regression of four factors affecting saving water for environmental reasons (SW) is significant (*p*=0.000) with an R^2 value of 0.010. Similar to the driving less behavior, only the standardized beta coefficient for the VALUE → SW link (0.088, *p*=0.000) is significant. However, the AGE → SW (0.000, *p*=0.987), GENDER → SW (0.033, *p*=0.134) and SEI → SW (-0.038, *p*=0.083) links are not significant. Thus, *H4e* is supported but *H1e*, *H2e* and *H3e* are not.

2.5 Discussion and Conclusion

The results of the study show that values can predict the five examined environmentally sensitive behaviors of individuals. According to the results, environmental values significantly explain all five eco-sensitive behaviors in the study. No other predictor explains all five behaviors. This tells us that the environmentally sensitive behaviors of individuals are most affected by the environmental values they carry. The conclusion regarding values and sensitive behaviors towards the environment

echoes the suggestion of Peattie (2010), who proposed that the emerging phenomenon of green consumption, which is complex and diverse in nature, is strongly influenced by consumer values and norms.

This study also reveals that SES is positively correlated with recycling and AHP. Similar to many of the prior research findings (e.g., Owens et al., 2000; Shen & Saijo, 2008; Torgler et al., 2011) that examine and report a strong positive correlation between individuals' environmental behavior and their SES, the results of this study also reveal that this association holds true for recycling and AHP.

In the literature, researchers have generally reported that women have higher, or modestly higher, levels of concern about the environment than men (Tindall et al., 2003; Dietz et al., 2002; Xiao & Hong, 2010; Davidson & Freudenburg, 1996; Zelezny et al., 2000; Pauw & Petegem, 2010). Interestingly, this study found a significant relationship between gender and pro-environmental actions only for the purchase behaviors (i.e. buying pesticide-free fruits/vegetables and avoiding purchase of environmentally harmful products). This result supports the findings of Zelezny *et al*. (2000) and Pauw and Petegem (2010), who used gender and socialization as bases to understand attitudes and behaviors toward the environment. For the recycling, driving less and saving water behaviors, the results parallel the findings of the study by Xiao and Hong (2010). In their comprehensive study examining 39 empirical studies focused on gender differences in environmentally significant behaviors, Xiao and Hong (2010) found no gender differences in publicly oriented environmentally significant behaviors. A similar study by Chen et al. (2011) on environmentally sensitive air travel behavior did not show a

significant difference in environmental knowledge, behavioral and environmental attitudes, and actual environmentally sensitive behavior. As a form of travel behavior, this result echoes our findings for the less driving behavior. Future studies should take these results into account and analyze gender issues by considering other environmentally sensitive behaviors, especially the ones related to consumption.

The study results also reveal that age differences can significantly explain recycling behavior. This result is similar to the prior research findings from Luo and Deng (2008) and Chen et al. (2011), which found that older respondents were found to be more environmentally positive in their behaviors than younger respondents. The present study's findings, however, are contrary to the prior research findings of Diamantopoulos et al. (2003) and Lee (2008). Their studies reported a significant and negative association between age and pro-environmental attitudes and environmental sensitive behaviors. It is possible that depending on the type of the environmental behavior itself, the impact of age difference could vary. Furthermore, cultural differences might influence how older or younger individuals approach social issues, such as environmental deterioration, which can lead to a certain type of behavior. Thus, it is also possible that studies developed and conducted in different regions of the world can give different results for the same type of behavior.

To sum up, the results of this study confirm that different pro-environmental behaviors have varying results in terms of gender, SES and age differences. Although, all the behaviors we examined showed significant impact of values, this impact also varied depending on the type of the behavior.

This study points to several interesting areas of future research. The results of the study show that the assessment of the relationship between different variables may need more explanatory items in the model. For instance, according to Nordlund and Garvill (2002), the decision to act in an environmentally friendly manner may involve clashing interests, such as the interests of the immediate individual versus those of the long-term collective. The individual benefits obtained from driving less or purchasing products that are pesticide-free are more significant than RCB. Furthermore, the model developed for Study I considered only five different types of behaviors. If we aim to study each type of consumer behavior separately, it would need hundreds of behavioral studies to fully understand, compare, and contrast each environmental behavior. This approach is not practical and impossible to implement. On the other hand, different types of consumer behaviors could conceptually fall under three distinct categories (i.e. purchase, usage, and post-use) according to the sustainability marketing literature, which will be further elaborated in the next section. This kind of approach and categorization can help us to conduct a more manageable and comprehensive environmental behavior studies. These important suggestions from this study open new directions that need more attention.

2.6 References

Albayrak, T., Caber, M., Moutinho, L. & Herstein, R. (2011). The influence of skepticism on green purchase behavior. *International Journal of Business and Social Science, 2*(13), 189-197.

Barr, S. (2007). Factors influencing environmental attitudes and behaviors. *Environment and Behavior, 39*(4), 435-473.

Chen, F., Hsu, P. & Lin, T. (2011). Air travelers' environmental consciousness: A preliminary investigation in Taiwan. *International Journal of Business and Management, 6*(12), 78-86.

Davidson, D. J. & Freudenburg, W. R. (1996). Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior*, 28(3), 302-339.

Davis, J. L., Le, B. & Coy, A. (2011). Building a model of commitment to the natural environment to predict ecological behavior and willingness to sacrifice. *Journal of Environmental Psychology, 31*(3), 257-265.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R. & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence, an empirical investigation, *Journal of Business Research, 56*(6), 465-480.

Dietz, T., Kalof, L., & Stern, P. C. (2002). Gender, values, and environmentalism. *Social Science Quarterly, 83*(1), 353-364.

Eagly, A. (1987). *Sex Differences in Social Behavior: A Social Interpretation*, Erlbaum: Hillsdale.

Evans, G. W., Brauchle G., Haq A., Steckler R., Wong K. & Shapiro, E. (2007). Young children's environmental attitudes and behaviors. *Environment and Behavior, 39*(5), 635-659.

Fraj, E. & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis. *Journal of Consumer Marketing, 23*(3), 133-44.

GSS (2010), General Social Survey Data. Retrieved from http://www3.norc.org/GSS+Website/ on May 14, 2012.

GSS (2009), General Social Survey, Appendix A: Sampling Design & Weighting. Retrieved from http://publicdata.norc.org:41000/gss/.%5CDocuments%5CCodebook%5CA.pdf on 16 May 2012.

Han, H., Hsu, L., Lee, J. & Sheu, C. (2011). Are lodging customers ready to go green? an examination of attitudes, demographics, and eco-friendly intentions. *International Journal of Hospitality Management, 30*(2), 345-355.

Jain, S. K. & Kaur, G. (2006). Role of socio-demographics in segmenting and profiling green consumers. *Journal of International Consumer Marketing, 18*(3), 107-146.

Kahle, L. R. (1996). Social values and consumer behavior: research from the list of values. In *The Psychology of Values: The Ontario Symposium*, (Vol. 8, pp. 135 151). Mahwah, NJ: Lawrence Erlbaum Associates.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research, 8*(3), 239-260.

Lee, K. (2008). Making environmental communications meaningful for female adolescents: A study in Hong Kong", *Science Communication, 30*(2), 147-176.

Luo, Y., & Deng, J. (2008). The New Environmental Paradigm and nature-based tourism motivation. *Journal of Travel Research*, *46*(4), 392-402.

Nordlund, A. M., & Garvill, J. (2002). Value structures behind pro-environmental behavior. *Environment and Behavior, 34*(6), 740-756.

Olli, E., Grendstad, G., & Wollebaek, D. (2001). Correlates of environmental behaviors: Bringing back social context. *Environment and Behavior, 33*(2), 181-208.

Owens, J., Dickerson, S., & Macintosh, D. L. (2000). Demographic covariates of residential recycling efficiency. *Recycling Behavior*, *32*(5), 637-50.

Pauw, J. B. & Petegem, P. V. (2010). A cross-national perspective on youth environmental attitudes. *Environmentalist*, 30(2), 133-144.

Peattie, K. (2010). Green consumption: Behavior and norms. *Review of Environment and Resources*, *35*(1), 195-228.

Piff, P. K., Kraus, M. W., Côté, S., Cheng, B. H. & Keltner, D. (2010). Having less, giving more: the influence of social class on prosocial behavior. *Journal of Personality and Social Psychology*, *99*(5), 771-784.

Schultz, P. W., Bator, R. J., Brown Large, L., Bruni, C. M. & Tabanico, J. J. (2013). Littering in context: Personal and environmental predictors of littering behavior. *Environment and Behavior*, *45*(1), 35-59.

Shen, J. & Saijo, T. (2008). Re-examining the relations between sociodemographic characteristics and individual environmental concern: Evidence from Shanghai data. *Journal of Environmental Psychology, 28*(1), 42-50.

Shrum, L. J., McCarty, J. A. & Lowrey, T. M. (1995). Buyer characteristics of the green consumer and their implications for advertising strategy. *Journal of Advertising*, *24*(2), 71-82.

Steg, L. & Vlek, C. (2009). Encouraging pro-environmental behavior: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*(3), 309-317.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407-424.

Tindall, D. B., Davies, S. & Mauboules, C. (2003). Activism and conservation behavior in an environmental movement: the contradictory effects of gender. *Society and Natural Resources*, *16*(10), 909-932.

Torgler, B., García-Valiñas, M. A. & Macintyre, A. (2011). Participation in environmental organizations: An empirical analysis", *Environment and Development Economics, 16*(5), 591-620.

Xiao, C. & Hong, D. (2010). Gender differences in environmental behaviors in China. *Population and Environment, 32*(1), 88-104.

Young, W., Hwang, K., McDonald, S. & Oates, C. J. (2010). Sustainable consumption: Green consumer behavior when purchasing products. *Sustainable Development, 18*(1), 20-31.

Zelezny, L., Chua, P. P. & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*(3), 443-457.

Part II

Chapter 3

"People's behavior makes sense if you think about it in terms of their goals, needs, and motives"

(Thomas Mann, 1875 – 1955)

An integrative research perspective to understand environmentally sensitive consumer behaviors: the goal framing theory approach

CHAPTER 3

An Integrative Research Perspective to Understand Environmentally Sensitive Consumer Behaviors: The Goal Framing Theory Approach

Abstract

Environmental behaviors' potential underlying factors have been examined from various theoretical angles by mostly focusing on individual motivations in the literature. This paper reviews these distinct theoretical approaches and, based on the integrative perspective, develops a model using the framework of the Goal Framing Theory (GFT). On the basis of the GFT, we propose that twelve variables influence pro-environmental behaviors of consumers: (1) biospheric values, (2) egoistic values, (3) altruistic values, (4) environmental concern, (5) awareness of consequences, (6) ascription of responsibility, (7) subjective norms, (8) attitudes towards behavior, (9) perceived behavioral control, (10) personal norms, (11) affect, and (12) behavioral intention. Furthermore, we categorize behavioral outcomes based on different stages of consumption process of consumers: namely purchase, usage, and post-use. The proposed model will help future studies to analyze those factors that predict environmentally sensitive behaviors of consumers and explore the extent to which such behaviors depend mostly on moral considerations, feelings, or self-interest motives.

Keywords: Research perspectives, Environmental behavior, Integrative approach, Goal Framing Theory, Environmentally sensitive behavior.

3. Introduction

In the environmental behavior literature, various research perspectives, concepts, and variables applied by scholars to understand the root causes of eco-sensitive behaviors. Mainly, the necessity of an integrative approach has been suggested to fully understand these types of behaviors (Lindenberg & Steg, 2007; Steg & Vlek, 2009) because of considered effects of multiple motivations in environmental behavior domain.

In considering broader theories, Goal Framing Theory (Lindenberg, 2001a, 2001b, 2006) covers different motivations to explain a certain behavior. This theory has been suggested to be appropriate as an integrative framework that can explain eco-sensitive behaviors (Steg & Vlek, 2009). Although suggested, it is not yet known how multiple motivations may affect these types of behaviors. This study reviews several distinct theoretical approaches and, based on the integrative perspective, develops a model using the framework of the Goal Framing Theory (GFT).

3.1 Theories of Environmental Behavior Studies

There are a wide range of theories in the literature that have been applied to environmental behavior studies. Environmental behaviors' potential underlying factors have been examined from various theoretical angles (see, e.g., Vining & Ebreo, 2002; Steg & Vlek, 2009) by mostly focusing on individual motivations. According to Steg and Vlek's (2009) perspective of taking a multi-line research approach in this area, different environmental behaviors can be explained by individual motivations, such as: (1) perceived cost and benefits, (2) normative and moral considerations, and (3) affective and

symbolic motives. These three research paths suggest different perspectives in an attempt to explain individual motivations toward pro-environmental behaviors.

The perspective of "perceived costs and benefits" considers "the assumption that individuals make reasoned choices and choose alternatives with highest benefits against lowest costs (e.g., in terms of money, effort and/or social approval)" (Steg & Vlek, 2009, p. 311). Fishbein and Ajzen (1975) and Ajzen and Fishbein's (1980) Theory of Reasoned Action, as well as Ajzen's (1991) Theory of Planned Behavior frameworks are good examples of this cost/benefit approach. These frameworks have been used widely in many diverse disciplines, such as business management, behavioral economics, and consumer behavior studies. It is also common to see similar theoretical constructs in environmental behavior studies (e.g., Bamberg & Schmidt, 2003; Heath & Gifford, 2002; Mannetti, Pierro, & Livi, 2004, Kaiser & Gutscher, 2003).

Moral and normative frameworks look at the role of values, moral, and normative aspects in determining environmental behaviors. Theories about values, altruism and environmental concerns, such as New Environmental Paradigm (Dunlap & Van Liere, 1978; Dunlap, et al., 2000), theory of normative conduct (Cialdini, Kallgren, & Reno, 1991), norm-activation model (Schwartz, 1977; Schwartz & Howard, 1981), and value-belief-norm theory of environmentalism (Stern et al., 1999; Stern, 2000), are good examples of these frameworks. These theoretical frameworks have been widely employed by many scholars in the environmental behavior research literature (e.g., De Groot & Steg, 2007, 2008; Poortinga, Steg, & Vlek, 2004; Nordlund & Garvill, 2002; Schultz & Zelezny, 1999; Dunlap et al., 2000; Steg, Dreijerink, & Abrahamse, 2005).

Although not widely examined, affective and symbolic motives are also another important perspective adopted in environmental behavior research. For example, some studies have looked at car use and tried to explicitly examine the role of affect in explaining its use (Gatersleben, 2007). Within this perspective, other than a few studies, most research has been exploratory and not theory based (Steg & Vlek, 2009). Dittmar's (1992) material possessions theory was used by Steg (2005) to examine symbolic and affective motives, which she suggests could be a promising viewpoint for motivations why individuals act environmentally friendly. However, more empirical studies are needed to further elucidate this perspective.

Apart from these three lines of research, according to Steg and Vlek (2009), there is also an integrative perspective regarding environmental motivation that should not be neglected. In fact, the literature shows that many scholars have incorporated different concepts, models, and variables from various theories with the aim of demonstrating that multiple motivations play a crucial role in explaining environmental behavioral outcomes (Heath & Gifford, 2002).

As such, the three aforementioned theoretical perspectives should not be considered as mutually exclusive (Steg & Vlek, 2009). It may in fact be that integrating them can provide us with superior explanatory power for our own models and frameworks. As suggested by Steg and Vlek (2009), Goal Framing Theory (Lindenberg, 2001a, 2001b, 2006) is promising as an integrated theory that recognizes the importance of examining multiple motivations in order to explain related behaviors. To date, this theory has not been applied to environmental behavior research (Steg & Vlek, 2009).

3. 2 Theoretical Framework based on Goal Framing Theory

3.2.1 Goal Framing Theory (Lindenberg, 2001a, 2001b, 2006)

Goal Framing Theory looks at the influence of multiple motives and the interactions between them. The theory suggests that goals outline how individuals may want to process information taken from the outside and act accordingly. "When a goal is activated (that is, when it is the focal goal or "goal-frame"), it influences what a person thinks of at the moment, what information (s)he is sensitive to, what alternatives (s)he perceive, and how (s)he will act" (Steg & Vlek, 2009, p.311). According to Lindenberg and Steg (2007), there are three general goal-frames that can be distinguished:

- *Gain goal-frame* "advancing or protecting individual resources"
- *Normative goal-frame* "behaving properly", and
- *Hedonic goal-frame* "feeling better."

This theory suggests that motivations are hardly ever homogeneous. When one of the goals is focal (i.e., main goal), it has a strong influence on information processing. This process is also called a "goal-frame." The two other background goals strengthen or weaken the power of the focal goal, the "goal-frame." Thus, multiple goals are dynamic at any given moment. For example, an individual can make a decision to behave in a certain way while holding a particular goal-frame, that is, one goal will be the strongest and thus will guide that individual more than the other goals. At the same time, other goals may also weaken the influence of the foreground goal.

There are also three theoretical frameworks widely used in the literature that coincide with the three mentioned goal-frames:

- The Theory of Planned Behavior (TPB) focuses on gain goal-frames,
- The Norm-activation Model (NAM), Value-Belief-Norm (VBN) theory and other similar value and environmental-concern focused frameworks coincide with normative goal-frames, and,
- Theories and frameworks on affect that coincide with hedonic goal-frames.

3.2.2 Underlying theories of Goal Framing Theory

In order to understand Goal Framing Theory (GFT) and develop the research based on its framework, it is important to look at the underlying theories that form it. As such, in this section, we elaborate on these sub-theories and how they form the base components of a macro and integrative GFT.

Theory 1: Theory of Planned Behavior (Ajzen, 1991).

Various studies in environmental behavior literature focus on the assumption that individuals make reasoned choices, and by doing this, they evaluate and choose low cost alternatives with high benefits. A low cost does not only mean material cost, but can also include social and/or effort associated costs. The Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1980) is one of the theories weighing costs and benefits. An updated version was formulated in 1991 by Ajzen and is called the Theory of Planned Behavior (TPB).

This theory suggests that human actions are guided by behavioral beliefs (a person's beliefs about his/her action's possible consequences), normative beliefs (a person beliefs about the others' normative expectations on a behavior), and perceived

control beliefs (a person's beliefs about the ease or difficulty of performing the behavior) (Figure 3-1). Furthermore, a combination of behavioral attitude, subjective norm, and behavioral control perception all lead to a behavioral intention formation (Steg & Vleg, 2009). The TPB presumes an individual's intent to perform a behavior is formed when his/her attitude towards that behavior and the subjective norms relating to performing that behavior are favorable, and the perceived behavioral control is also greater.

The TPB has proven to be able to explain different types of pro-environmental actions, such as purchasing environmentally friendly products, choosing travel mode, water usage, household recycling, waste composting, and some other behaviors generally categorized as environmentally-sensitive behaviors (Bamberg & Schmidt, 2003; Shaw, 2008; Ramayah, Lee, & Lim, 2012; Kaiser & Gutscher, 2003; Mannetti et al., 2004).

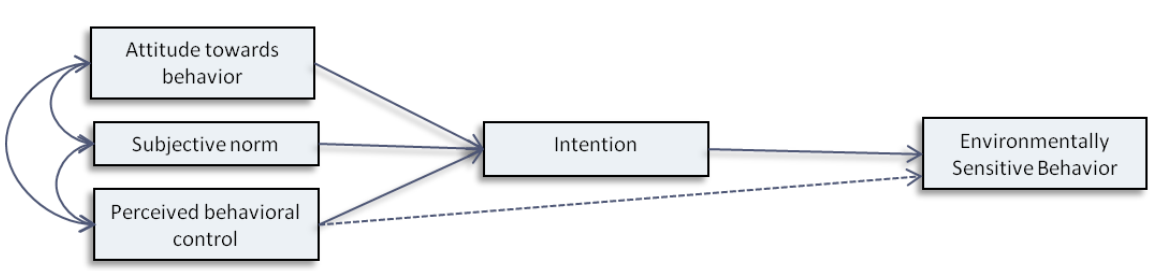


Figure 3-1. Theory of Planned Behavior is widely used to explain environmental behaviors. Source: Adapted from Ajzen (1991)

Theory 2. Value-Belief-Norm (VBN) Theory (Stern et al., 1999; Stern, 2000)

In general, Value-Belief-Norm (VBN) theory builds upon some earlier theoretical constructs. It connects value theory, norm-activation model, and the New Environmental Paradigm (NEP) viewpoint using a causal series of connected variables that lead to

relevant behavior. These connected variables in VBN are: (1) personal values (biospheric, altruistic, and egoistic), (2) ecological worldview (NEP), (3) awareness of undesirable consequences (AC), (4) ascription of responsibility to self (AR), and (5) personal norms (PN) for acting pro-environmentally (Figure 3-2).

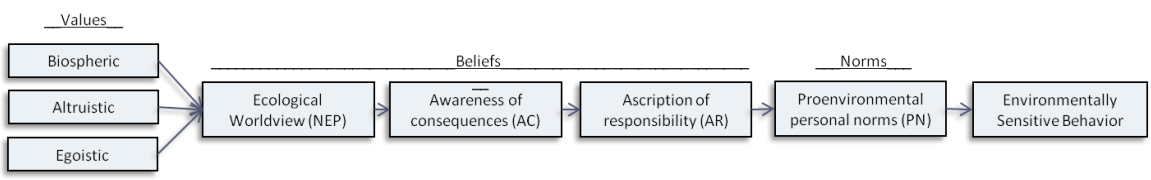


Figure 3-2. Value-Belief-Norm (VBN) Theory is also used to explain environmental behaviors. Source: Adapted from Stern (2000)

VBN theory consists of two sub-theories: (1) Schwartz's model of human values, and (2) New Environmental Paradigm (NEP).

Sub-theory 1. Schwartz's Model of Human Values

Theories on human values have also been used widely by scholars to explain environmental behaviors. One of these theories is based on Schwartz's (1992, 1994a) organizational structure for human values. In Schwartz's model, the classification of values is outlined in two core dimensions:

Dimension 1: self-transcendence to self-enhancement

Dimension 2: openness-to-change to conservatism

These two dimensions carry specific underlying motivational types where each contains particular life goals (Schwartz, 1994b). For instance, self-transcendence contains 18 different life goals, such as being helpful, honest, forgiving, and loyal. These kinds of

goals promote “the interests of other persons and the natural world” (p.101). In contrast, self-enhancement includes goals like authority, wealth, success, and ambition that “promote own interests regardless of others’ interests” (p.101). The second value-type dimension, openness-to-change and conservatism, orients around being supportive to change or the retention of known traditions. In this dimension, openness comprises life goals such as creativity, curiosity, and living an exciting life. Conversely, conservatism contains life goals like politeness, respect for tradition, and honoring parents and elders.

The definition provided by Schwartz and subsequent studies applying the dimension show that self-transcendent values are the most closely aligned with environmental concern and the action related dimension. In fact, as Schwartz points out, self-transcendent values include “protecting the environment” and “unity with nature” as core items (Schultz & Zelezny, 2003).

Research showed that the more strongly an individual subscribe to values other than his/her direct own interests, such as being self-transcendent, altruistic, ecocentric, pro-social, or biospheric, the more likely they are to be inclined towards environmentally sensitive behaviors (Steg & Vleg, 2009; De Groot & Steg, 2008).

Sub-theory 2. New Environmental Paradigm – NEP (revised) (Dunlap et al., 2000).

The first New Environmental or Ecological Paradigm (NEP) measurement instrument was developed by Riley Dunlap and colleagues at Washington State University in 1978 (Dunlap & Van Liere, 1978). They were inspired by the environmental movement of the 1960s and 1970s in the U.S., which started after the publication of *Silent Spring* by Rachel Carson. This original NEP had twelve items.

Although the measurement was used by various scholars in different studies, it was extensively criticized because of several shortcomings (e.g., lacking internal consistency among responses, poor correlation between the scale and behavior). In 2000, the NEP scale was further developed by Dunlap and colleagues to respond to these criticisms and overcome the shortcomings. This updated measurement is sometimes referred to as the revised NEP scale. See Appendix A.3 for the list of question items used for environmental concern measurement (for Part II of the dissertation) using the revised NEP.

There is a wide use of the NEP scale in studies that focus on the role of environmental concern. In general, when environmental concern is high, individuals are expected to act more pro-environmentally, although studies generally did not find a strong association between the two (e.g., Schultz & Zelezny, 1998; Poortinga et al., 2004).

Theory 3. Theory on Affective Motives (e.g., Dittmar, 1992; Russell, 1980).

Apart from other commonly applied theories, the literature also has a few studies that explicitly examine the role of affect and related theories and models in explaining environmental behavior, mostly in the context of car use (Gatersleben, 2007; Steg, 2005). For example, Gatersleben's study showed that there is an association between car use and affective and symbolic factors. These studies that focus on the role of affective or symbolic motivations usually do not utilize relevant theories as the base concept. However, according to Steg (2005), Dittmar's (1992) material possession focused theory can be a good approach towards a more theoretical perspective in this line of research on

environmental behavior. The theory by Dittmar suggests that by using material goods and services, individuals can fulfill three essential functions: (1) affective, (2) instrumental, and (3) symbolic. The study by Steg (2005) on car use and its possible predicting factors in terms of affective motives showed that this specific behavior is most strongly associated with symbolic and affective motives. Instrumental motives, on the other hand, were not as important.

The circumplex model of affect developed by Russell (1980) has also been increasingly used in consumer behavior studies. According to Russell, affective responses may be categorized into two separate dimensions: (1) pleasure and (2) arousal. The approach by Russell is also promising for environmental behavior studies.

According to Ajzen (2001), affect influences behavioral attitudes directly. Furthermore, as pointed out by Huijts, Molin, and Steg (2012) in their study on sustainable energy technology acceptance, it influences behavioral intention indirectly following the theory of planned behavior. In their conceptual study, Huijts et al. also develop a model representing hedonic motives in this context. A simplified version of this model on affect is displayed in Figure 3-3.

These aforementioned theories and models of affect are promising approaches to understand individual motives to perform environmentally sensitive behaviors; however, they require further investigation in this specific context.

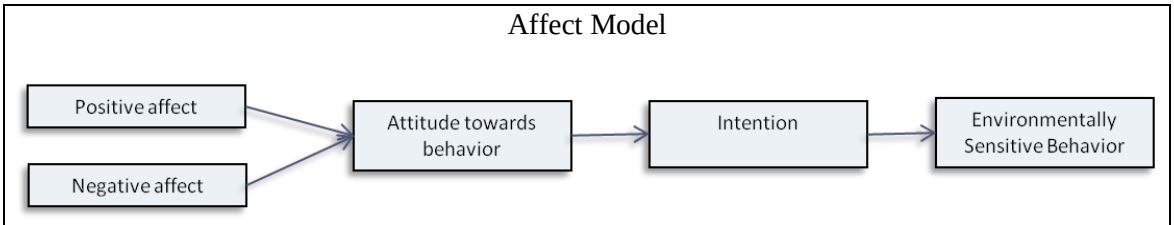


Figure 3-3. Affect model and theories are rarely used to explain environmental behaviors. Source: Adapted from Huijts et al. (2012).

3.3 Environmental Behavior Research Framework

3.3.1 Model development

The following three studies adopt Goal Framing Theory (GFT) as an overarching framework that will cover important theories/models underneath. As mentioned in earlier sections, this theory looks at the influence of multiple motives and interactions between them. The theory suggests that goals outline or "frame" how individuals want to process information and how they act accordingly. According to Lindenberg and Steg (2007), three general goal-frames can be distinguished: (1) *Gain goal-frame* "advancing or protecting individual resources", (2) *Normative goal-frame* "behaving properly", and (3) *Hedonic goalframe* "feeling better." Following these three categorization of goals, three main theories of focus have been identified for the purpose of this study:

- Theory of Planned Behavior (TPB): Represents gain goal-frames,
- Value-Belief-Norm (VBN) Theory: Represents normative goal-frames, and
- Theory on Affect (TA): Represents hedonic goal-frames

Linking the various goal frames to these theories begins the process of integrating the various theories. These three theories help us to develop a model that can be used for

future studies. The developed model based on the GFT is displayed in Figure 3-4. This model is applied in the next three studies of this dissertation.

As suggested by GFT, motivations can be considered as rarely homogeneous. When one goal is focal and influencing information processing the most, it is called a "goal-frame." In this processing, the other two goals are in the background and strengthen or minimize the effectiveness of the focal goal. Thus at any given moment, it is considered that multiple goals are dynamic and working together simultaneously. As such, the developed model covers three goal frames with their respective variables.

The **main purpose** of the next three studies undertaken here is to understand the functioning of motivations for different environmentally sensitive behaviors by applying GFT. More specifically, the studies will focus on three different types of behaviors and help us understand when an individual makes a decision to behave in a certain way in the environmental context, which goal frames are the strongest, and how this guides that individual more than other goals. The three studies will also show us the most important predicting individual factors of these goals frames.

Using the same theoretical framework and developed research model, STUDY II, III, and IV will look at three categories of environmentally sensitive behavior. This means that only the outcome variable will vary depending on the type of the behavior under investigation. These behavior types are categorized using the method from consumer behavior studies. The next section elaborates on these three types of consumer environmental behavior.

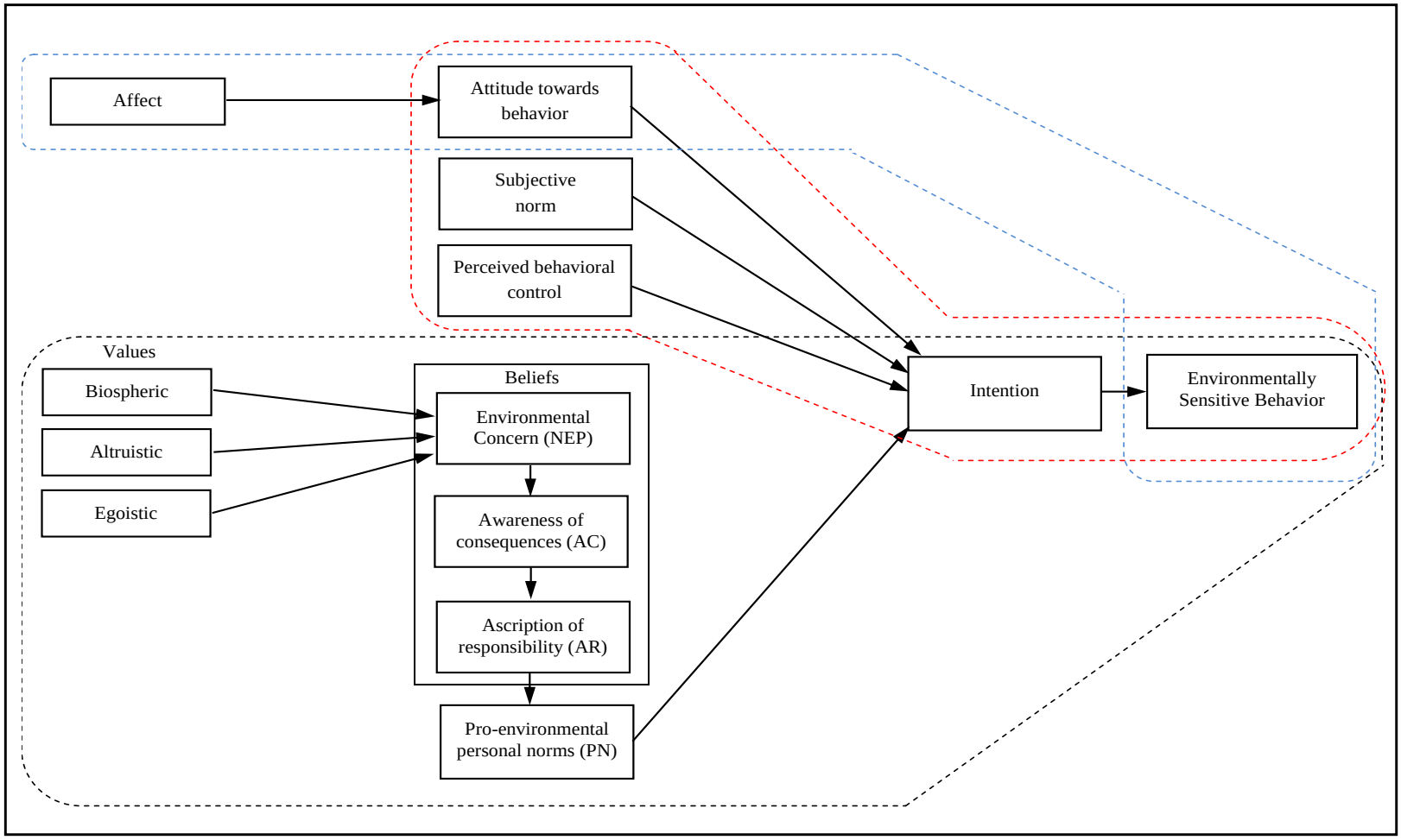


Figure 3-4. Proposed combined model showing the influence of gain goal-frames, normative goal-frames, and hedonic goal-frames on environmentally sensitive behavior.

Theory of Planned Behavior (TPB) variables (gain goal-frame),
Value-Belief-Norm (VBN) Theory variable (normative goal-frame), and
Theory on Affect variables (hedonic goal-frame)

3.3.2 Environmental behavior categorization

As stated earlier, environmentally sensitive behavior is defined as "behavior that harms the environment as little as possible, or even benefits the environment" (Steg & Vlek, 2009, p. 309). In the environmental psychology literature, common adopted measures of environmentally sensitive behavior are usually based on a list of environmentally sensitive behaviors developed by the researcher (Gatersleben, Steg, & Vlek, 2002). Alternatively, some studies in the literature focus on only one type of behavior, for example, recycling behavior as seen in studies from Tonglet, Phillips, & Read (2004) and Best and Mayerl (2013), household energy use as seen in study from Abrahamse and Steg (2011), or traveling behavior as seen in studies from Steg, Vlek, & Slotegraaf (2001) and Van Lange et al. (1998).

In contrast, other scholars have developed various scales that combine various types of eco-sensitive behaviors (see Gatersleben et al., 2002). As pointed out by Stern et al. (1997) and Gatersleben et al. (2002), many studies focus on a relatively limited set of behaviors in terms of their environmental impacts. Their limited scopes and associated results are mainly caused by considering only certain stages of the consumer behavior processes. Thus, it is crucial to focus on a wide variety of consumer behaviors at different stages of consumer behavior processes and to look at how they eventually impact our surroundings and significantly contribute to environmental problems.

Building upon this notion, it is important to categorize and define different types of environmentally sensitive behaviors in order to examine and understand the underlying causes and/or barriers of these actions separately and thoroughly. This approach is also

needed for the purpose of practicality and manageability of the studies. Taking a unique approach, our work utilizes sustainability marketing literature to define and categorize consumer green behaviors, namely environmentally sensitive behaviors.

In fundamental terms, green consumer behavior is the behavior of an individual who considers environmental or social issues while making consumption decisions – acquiring, purchasing, using, disposing, etc. (Peattie, 2010). Therefore, green consumer behavior deals with consumers' attitudes about green products and services, as well as their decision making processes considering environmental impacts with regard to purchase, usage, and post-use behaviors, such as disposal, recycling, or reuse.

In their book "*Sustainability Marketing: A Global Perspective,*" Belz and Peattie (2009) mention that consumer behavior is a key to societal impact on the environment. The consumption process of consumers covers six stages, (1) recognition of need and want, (2) information search, (3) evaluation of alternatives, (4) purchase, (5) use, and (6) post-use (see Figure 3-5) (Belz & Peattie, 2009). Conventional marketing emphasizes only the purchase stage and it often leads people to overlook the negative impact of consumption activities. In comparison, negative social and environmental consequences are evaluated at each stage of the consumption process in sustainability marketing. Understanding the entire consumption process is essential in that sense. For the purpose of this study, three stages of consumer behavior process are considered: ***purchase, usage, and post-use***. These three stages are shown in the darker color on the right side of the graph of Figure 3-5.

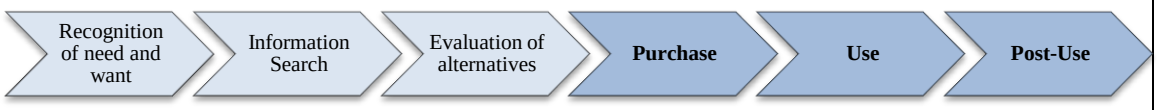


Figure 3-5. Total consumption process. Source: Adapted from Belz and Peattie (2009).

The purchase stage comes after evaluation of alternatives and reflects a purchasing of goods and services that have minimal environmental impacts relative to similar competing products that also serve the same purpose. The use stage, shown as the second dark blue arrow in the figure, is the most ecologically disruptive phase due to the consumption of energy and water (e.g., automobiles and washing machines). The use phase generates more ecological impacts than all the other stages. The post-use stage, on the other hand, reflects the disposal of the product, recycling or remanufacturing, selling, trading, renting or loaning, placing into storage, or altering use in another way (Belz & Peattie, 2009). This also has an impact on the environment due to the fast pace at which the world is accumulating wastes and the consequent distressing impacts.

3.4 Application of the Research Model

Based on the aforementioned categorization of consumer behavior, the following three studies of this dissertation focus on understanding three types of consumer behaviors: environmentally sensitive purchase, usage, and post-use. The research model developed here was based on the GFT, and was used for these three studies.

3.4.1 Overall sample and methodology of Part II studies

The following three studies are based on primary data. A questionarrie survey was used to collect data and verify the research framework leading to hypotheses which were developed for each type of behavior. The participants were recruited from the active members of the TerraCycle recycling company account database. These account members receive a monthly TerraCycle company letter and the links to three separate surveys were placed into this newsletter (see Appendix A.1). Members who would like to participate in the study followed the link which took him/her to the online survey of interest. Participants' completed anonymous surveys were compiled in the SoGoSurvey online survey database account. Survey IRB approval was received before disseminating the relevant questionnerie (see Appendix A.2).

Overall, 781 participants from TerraCycle's 70,000 U.S. based account holders completed the surveys, making the response rate equal to 1.12%. Out of these responses, 29 respondents' submitted questionnaires were not used in the study due to missing values, unengaged responses, or incompleteness, thus, making the total completed responses used for the study 752. This final competed number of responses gave response rate of 1.07%. In general, response rates to e-mail surveys are considered to be lower than any other methods used for conducting surveys (Sheehan, 2001). Generally, for online surveys typical response rates are between 0.5% and 1.5% (Resnick, 2012). If there are no follow-up e-mails or reinforcements by the researcher, similar to this study, e-mail response rates are expected to be low (Yun & Trumbo, 2000). The 1.07% response rate was considered an acceptable response rate to conduct further analysis.

3.5 Conclusion

An integrative perspective is an important approach to understand environmental behaviors of consumers. Here, we developed a research model using the framework of the Goal Framing Theory. We proposed that twelve variables influence pro-environmental behaviors of consumers; biospheric, egoistic, and altruistic values, environmental concern, awareness of consequences, ascription of responsibility, subjective norms, attitudes towards behavior, perceived behavioral control, personal norms, affect, and behavioral intention. We also categorized behavioral outcomes as purchase, usage, and post-use considering different stages of consumption process of consumers. The proposed model will be helpful for future studies that aim to analyze those factors that predict environmentally sensitive behaviors of consumers.

3. 6 References

Abrahamse, W. & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review, 18*(1), 30-40.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology, 52*(1), 27–58.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, N.J.: Prentice-Hall.

Bamberg, S., & Schmidt, P. (2003). Incentives, morality, or habit? Predicting students car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environment and Behavior, 35*(2), 264–285.

Belz, F. M., & Peattie K. (2009). *Sustainability Marketing: A Global Perspective.* Chichester: John Wiley & Sons, Ltd.

Best, H., & Mayerl, J. (2013). Values, beliefs, attitudes: An empirical study on the structure of environmental concern and recycling participation. *Social Science Quarterly, 94*(3), 691-714.

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology, 24*(20), 1-243.

Day, G. S., & Schoemaker, P. J. H. (2011). Innovating in uncertain markets: 10 lessons for green technologies. *MIT Sloan Management Review, 52*(4), 37-45.

De Groot, J. I., & Steg, L. (2007). Value orientations and environmental beliefs in five countries validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of Cross-Cultural Psychology, 38*(3), 318-332.

De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*(3), 330-354.

Dittmar, H. (1992). *The social psychology of material possessions: To have is to be.* Hemel Hempstead: Harvester Wheatsheaf.

Dunlap, R. E., & Van Liere, K. D. (1978). *Environmental concern: a bibliography of empirical studies and brief appraisal of the literature.* Monticello, Illinois: Vance Bibliographies.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56, 425-442.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Gatersleben, B. (2007). Affective and symbolic aspects of car use. In T. Garling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 219–233). Amsterdam: Elsevier.

Gatersleben, B., Steg, L., & Vlek, C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior*, *34*(3), 335-362.

Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior: predicting the use of public transportation. *Journal of Applied Social Psychology*, *32*(10), 2154–2185.

Huijts, N. M. A., Molin, E. J. E., & Steg, L. (2012). Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework. *Renewable and Sustainable Energy Reviews*, *16*(1), 525-531.

Kaiser, F. G., & Gutscher, H. (2003). The proposition of a general version of the Theory of Planned Behavior: Predicting ecological behavior. *Journal of Applied Social Psychology*, *33*(3), 586-603.

Lindenberg, S. (2001a). Social rationality versus rational egoism. In J. Turner (Ed.), *Handbook of sociological theory*. (pp. 635–668). US: Springer.

Lindenberg, S. (2001b). Intrinsic motivation in a new light. *Kyklos*, *54*(2-3), 317–342.

Lindenberg, S. (2006). Prosocial behavior, solidarity and goal-framing processes. In D. Fetchenhauer, A. Flache, B. Buunk, & S. Lindenberg (Eds.), *Solidarity and prosocial behavior. An integration of sociological and psychological perspectives*. Amsterdam: Kluwer.

Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues*, *63*(1), 117-137.

Mannetti, L., Pierro, A., & Livi, A. (2004). Recycling: Planned and self-expressive behavior. *Journal of Environmental Psychology*, *24*(2), 227–236.

Nordlund, A. M. & Garvill, J. (2002). Value structures behind pro-environmental behavior. *Environment and Behavior*, *34*(6), 740-756.

Peattie, K. (2010). Green consumption: Behavior and norms. *Review of Environment and Resources*, *35*(1), 195-228.

Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern, and environmental behavior a study into household energy use. *Environment and Behavior*, *36*(1), 70-93.

Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, *102*, 141-147.

Resnick, R. M. (2012). Comparison of postal and online surveys cost, speed, response rates and reliability. Education Market Research and MCH Strategic Data. Retrieved from http://mchdata.com/collateral/white-papers/Comparison-of-Postal-and-Online-Surveys.pdf on January 10, 2014.

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, *39*(6), 1161–1178.

Schultz, P. W., & Zelezny, L. C. (2003). Reframing environmental messages to be congruent with American values. *Human Ecology Review*, *10*(2), 126-136.

Schultz, P. W., & Zelezny, L. C. (1998). Values and proenvironmental behavior. A five-country study. *Journal of Cross-Cultural Psychology*, *29*(4), 540–558.

Schultz, P. W., & Zelezny, L. C. (1999). Values as predictors of environmental attitudes: evidence for consistency across 14 countries. *Journal of Environmental Psychology, 19*(3), 255–265.

Schwartz, S. H. (1977). Normative influences on altruism. *Advances in experimental social psychology, 10,* 221–279.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25*(1), 1-65.

Schwartz, S. H. (1994a). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*(4), 19-45.

Schwartz, S. H. (1994b). Beyond individualism/collectivism: New cultural dimensions of values. Sage Publications, Inc.

Schwartz, S. H., & Howard, J.A. (1981). A normative decision-making model of altruism. In J. P. Rushton (Ed.), Altruism and developmental perspectives (pp. 189–211). Hillsdale, NJ: Erlbaum.

Shaw, P. J. (2008). Nearest neighbor effects in kerbside household waste recycling. Resources, *Conservation and Recycling*, *52*(5), 775-784.

Sheehan, K. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication, 6*(2). Available at: http://jcmc.indiana.edu/vol6/issue2/sheehan.htmlAccessed

Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. Transportation Research Part A: *Policy and Practice, 39*(2), 147-162.

Steg, L. & Vlek, C. (2009). Encouraging pro-environmental behavior: an integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology, 25*(4), 415-425.

Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F: Traffic Psychology and Behavior*, 4(3), 151-169.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, *56*(3), 407–424.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*(2), 81–97.

Stern, P. C., Dietz, T., Ruttan, V. W., Socolow, R. H., & Sweeney, J. L. (Eds.). (1997). Environmentally significant consumption. Washington, D.C.: National Academy Press for the National Research Council.

Tonglet, M., Phillips, P. S., & Read, A. D. (2004). Using the Theory of Planned Behavior to investigate the determinants of recycling behavior: a case study from Brixworth, UK. Resources, *Conservation and Recycling*, *41*(3), 191-214.

Van Lange, P. A. M., Van Vugt, M., Meertens, R. M., & Ruiter, R. A. C. (1998). A social dilemma analysis of commuting preferences: The roles of social value orientation and trust. *Journal of Applied Social Psychology*, *28*(9), 796-820

Vining, J., & Ebreo, A. (2002). Emerging theoretical and methodological perspectives on conservation behavior. In R. B. Bechtel, & A. Churchman (Eds.), Handbook of environmental psychology (pp. 551–558). New York: Wiley.

Yun G. W., & Trumbo C. W. (2000). Comparative response to a survey executed by post, e-mail, & web form. *Journal of Computer-Mediated Communication*, *6*(1). Retrieved from http://jcmc.indiana.edu/vol6/issue1/yun.html.

Chapter 4

"One of the best things about the growing number of environmentally responsible initiatives is that they demonstrate how powerful individual citizens can be. Businesses respond to consumer demand, and the right demands can result in real benefits for the environment."

(Drs. David Suzuki and Faisal Moola, 2009)

Study II: Identifying the Drivers of Environmentally Sensitive Purchase Behavior: Is it Morality, Feelings, or Self-interest?[2]

[2] This chapter is being prepared for peer reviewed journal submission as: Identifying the Drivers of Environmentally Sensitive Purchase Behavior: Is it Morality, Feelings, or Self-interest?

CHAPTER 4

Identifying the Drivers of Environmentally Sensitive Purchase Behavior: Is it Morality, Feelings, or Self-interest?

Abstract

This study examined environmentally sensitive purchase behavior of consumers using the framework of the Goal Framing Theory (GFT). The purpose of this study was to analyze the factors that predict environmentally sensitive purchase behavior (ESPB) of consumers by examining the extent to which such behaviors depend mostly on moral considerations, feelings, or self-interest motives. The hypotheses and model were formulated and tested with Structural Equation Modeling (SEM) using the data from 281 individuals. The results of the study indicated that GFT is an important framework in explaining eco-sensitive purchase behaviors of consumers. The findings suggest that while values (biospheric, egoistic), environmental concern, awareness of destructive consequences, ascription of responsibility to self, personal and subjective norms, attitudes towards behavior, and intention explain ESPB, perceived behavioral control does not have any power in explaining behavior related intention. Variables of the values-beliefs-norms theory, which assess moral concerns, seemed to have the greatest explanatory power for ESPB of consumers. The findings have important implications for marketers, managers, and practitioners, as discussed in detail.

Keywords: Green consumption, Goal Framing Theory, Environmentally sensitive purchase, Theory of Planned Behavior, Value-Belief-Norm model, Theory on Affect.

4. Introduction

In the late 1960s and early 70s, as a result of the emergence of disturbing environmental conditions – such as land degradation; air, soil, and water pollution; and animal extinction – the term "ecologically-conscious consumers" started to be used (Fisk, 1973; Kinnear, Taylor, & Ahmed, 1974). At that time and in the following decade, green issues were not the main concerns of consumers because of economic affluence and focused pollution control activities (Schlegelmilch, Bohlen, & Diamantopoulos, 1996). However, in the 1990s, this point of view changed with the emergence of various larger-scale environmental problems, such as climate change, ozone depletion, and the Exxon Valdez oil spill. The ecologically conscious consumers began to inquire about more ecologically friendly alternatives when purchasing goods and services in the marketplace. This inclination generated the new "eco-sensitive consumer" segment at the beginning of the new millennia (Leonidou, Leonidou, & Kvasova, 2010). This type of consumers wanted to eliminate or limit the damaging actions to the environment caused by their purchase patterns and aimed to protect environmental well-being as much as possible. Today, these types of consumers are also called environmentally sensitive buyers or green consumers.

Recently, the growing number of buyers with an inclination towards purchasing goods and services that are ecologically sensible has become increasingly significant in the market place. For instance, a recent study "Green Gap Trend Tracker" conducted by a market research company Cone Communications reported that 71% of American consumers are considering the environment when they make purchase decisions, in which

is a 15% increase since 2008 (Cone Communications, 2013). This and similar reports suggest that when consumers are more concerned about the results of their purchase actions, they are more inclined to make decisions towards eco-friendly alternatives.

Although consumers' consideration of the environment when making purchase decisions may lead them to choose from eco-sensitive alternatives, which would eventually help balance the well-being of the natural environment, research shows that people's actions do not depend solely on this consideration. In fact, a study by Deloitte reported a significant gap between intention to buy an eco-sensitive product and actual purchase behavior. In a study on green product purchase behavior, Deloitte reported that although 95% of the consumers surveyed said that they were willing to purchase sustainable products, only 22% of the total number surveyed actually made such purchase (GMA Deloitte, 2009). Similarly, Rahbar and Wahid (2010) stated that even though "many environmentally friendly products with green attributes have been introduced in the markets, consumers have not changed their taste and old habits completely" (p.323). Thus, we can say that many unexplained determinants or barriers may affect consumers' environmentally sensitive purchase actions which clearly need to be better emphasized and explored. Furthermore, while an increasing number of environmentally sound goods and services has been available in recent years (e.g., recyclable products, products that are made from recycled content, energy efficient appliances, hybrid vehicles, organic food), the overall benefits gained by these means have been outpaced by the fast paced growth in consumption (Midden, Kaiser, & McCalley, 2007). Therefore, altering consumer product consumption in a way that would not be harmful to the environmental

well-being is important. This also underlines the importance of understanding individuals' consumption behavior in the context of environmentally sensitive product purchases. Increasing these types of consumption habits can help overcome environmental deterioration to some extent.

Although many scholars in recent years have begun to be interested in green purchase behavior of consumers and growing number of studies on this topic have emerged (e.g., Birgelen, Semeijn, & Keicher, 2009; Hartmann & Apaolaza-Ibáñez, 2012; Han, Hsu, & Sheu, 2010; Sheth, Sethia, &Srinivas, 2011; Vermeir & Verbeke, 2006), the underlying causes of these types of behaviors have not been understood exactly. Therefore, the main causes of environmentally sensitive purchase behavior are still not understood; thus, require more focused research and examinations. The present study aims to understand the factors that influence consumers' environmentally sensitive purchase behaviors by focusing on three different types of motivations: hedonic, self-interest, and moral. Finding the root causes of environmentally sensitive purchase behaviors that significantly affect the well-being of environment and altering them accordingly can reduce the effect of human purchase actions, as also stated by Sheth et al. (2011) in the context of environmentally harmful consumerism behavior.

While research on factors that influence individual eco-sensitive behaviors has grown in recent years, only a few attempts have been made to distinguish between different types of eco-sensitive behavior, and only few have used a combined theory to explain them. Consumer motivations to engage in different types of behavior, such as environmentally sensitive purchases (ESP), could vary significantly depending on many

personal factors (e.g., demographics, psychographics), as well as related facilitators and inhibitors. In addition, most research has tended to use small surveys or qualitative approaches to address these issues. This study will fill this research gap in the context of eco-sensitive purchase behavior.

The purpose of the Study II was to understand why people purchase environmentally sensitive products and what are the determinants and/or barriers to pro-environmental purchase behaviors. For this purpose, we constructed a model and examined the relationships of individual's behavioral attitudes, affect (i.e., pleasure), subjective norms, perceived behavioral control, personal norms, values (i.e., biospheric, altruistic, egoistic), environmental concern (NEP), awareness of consequences (AC), ascription of responsibility (AR), proenvironmental personal norms (PN), and intention with environmentally sensitive purchase behaviors. The study was based on a primary data obtained from individuals who are the active members of the TerraCycle recycling company. The main objectives of the study were to (1) determine predictor variables of environmentally sensitive purchase behavior and (2) see whether this type of behavior depends mostly on variables which associated with moral considerations, feelings, or self-interest motives. The study develops and tests hypotheses by running causal models linking predictor variables to environmentally sensitive purchase behavior outcome.

4.1 Literature Review and Hypotheses Construction

4.1.1 Environmentally sensitive products

Today, there is an emergence and growth of markets for goods that are produced ethically, harmless to the environment, and traded fairly (Chan & Kotchen, 2012). These goods are called "green products", which are products typically "made with a reduced amount of material, highly recyclable material, non-toxic material, do not involve animal testing, do not adversely affect protected species, require less energy during production or use, or have minimal or no packaging" (Mukherjee & Onel, 2013, p.3). Green products help reduce individuals' carbon footprints by influencing their aggregate consumption, such as purchasing and using hybrid and hydrogen powered vehicles and recycled materials (Day & Schoemaker, 2011). Thus, we can state that the overarching phenomenon of environmentally sensitive (or green) products incorporates different concepts directly related to product itself, such as reduced materials for packaging of materials, recycling strategies that can be used for specific product, contents that need recycling, and environmentally harmless ingredients added during production and/or usage stages. In this study, environmentally sensitive products stand for goods and services with minimal or reduced environmental effects on the natural environment relative to alternative products that serve the similar purpose (NJDEP, 2006).

4.1.2 Environmentally sensitive purchase (ESP) behavior

In fundamental terms, green consumer behavior is the behavior of an individual who considers environmental or social issues while making consumption decisions (Peattie, 2010). In the context of acquisition (i.e., purchase), it can be defined as a behavior of an individual who considers environmental or social issues while making

purchase decisions. Mainieri et al. (1997) proposed similar definition, stating that "buying products that are environmentally beneficial" (p.189). This study considered environmentally sensitive purchasing (also known as environmentally preferable purchasing) as the purchase of goods and services that have minimal effect on the natural environment.

Today, environmentally conscious and ecologically sensitive buyers purchase and consume wide variety of goods and services. Named as "green consumers", these buyers purchase three basic types of goods and services: (1) tangible non-durable green products that are frequently bought and consumed, such as organic food and environmentally friendly dishwashing liquid, (2) tangible durable green products that are bought in order to use over a longer period of time, such as clothing made from certified organic cotton and green shopping bags, (3) and lastly, green services that are non-tangible but fulfill the specific needs of green consumers, such as non-toxic house cleaning services and green (or organic) dry cleaning. Within each aforementioned category, green consumer behavior varies broadly (e.g., frequency, quantity of purchase, and consumption of these goods and services) depending on many different factors. Therefore, this study covered these different categories when examining environmentally sensitive purchase behavior.

4.1.3 Understanding and predicting the ESP behaviors

Consumers purchase environmentally beneficial products primarily for three reasons. First, they want to purchase products that have minimal negative effect on the

natural environment. Second, in terms of decision on purchasing pro-environment products, consumers also want superior products and services for themselves that would cause the least harm. For example, people are willing to purchase organic foods because they believe these types of products are healthier, harmless, and much tastier (Ginsberg & Bloom, 2004). It is also argued that consumers might be willing to purchase green products and pay higher prices up-front considering they might be saving in the long-term. For instance, purchasing energy efficient light bulbs or water-conserving washers and driers might help to accomplish this purpose. The good news is that initial price premiums have been diminishing in recent years, which makes it easier for consumers to make eco-sensitive decisions (Hamilton & Zilberman, 2006; Dagher & Itani, 2012) and save over time. Consequently, consumers can make decisions considering self-interest while benefitting the environment, which provides dual benefits (Ginsberg & Bloom, 2004).

Although it is difficult to argue that only the environmental benefits of products alter consumer behaviors towards making eco-sensitive decisions when purchasing goods, changing market conditions by companies' attempt to provide competitive ecosensitive products and services force decision-making to be more dependent on factors other than product attributes, such as price, performance, quality, and effectiveness. This is a valuable transformation because consumers are generally unwilling to compromise attributes of traditional products and services (e.g., convenience, price, quality) (Vermeir & Verbeke, 2006).

Understanding the environmentally sensitive purchase behaviors of consumers is not an easy task. According to Diamantopoulos et al. (2003), while widely used in consumer market segmentations, demographics cannot define eco-sensitive consumers because of the importance of other crucial factors. Additionally, Roberts (1996) pointed out the significance of variables other than demographics, such as behavioral variables and related attitudes and personality attributes, in identifying environmentally conscious consumers. Similarly, in their study on sustainable food purchases, Robinson and Smith (2002) found that psychosocial variables (i.e., attitudes, beliefs, subjective norms) have more explanatory power than demographics in predicting intentions to purchase environmentally friendly products. This study, thus, focuses on psychosocial variables to explain eco-sensitive purchase behaviors of consumers by adopting three theories aforementioned in the previous chapter, i.e., Theory of Planned Behavior, Value-Belief-Norm Theory, and Theory on Affect. Goal Framing Theory, which was the main theory adopted when developing a research model for Study II, combines the three theories. In the next section, relevant hypotheses were developed separately based on each of the three theories.

4.1.4 Hypotheses development

Theory of Planned Behavior and ESP behavior

Many studies on consumer purchase behavior of environmentally sensitive goods and services adopt the aspects of Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980) and Theory of Planned Behavior (TPB) (Ajzen, 1991), such as attitudes, intentions,

perceived behavioral control, and behavior (e.g., Birgelen et al., 2009; Vermeir & Verbeke, 2008; Cook et al., 2002; Han et al., 2010). For example, Vermeir and Verbeke's (2008) empirical study on sustainable food consumption (i.e., sustainable dairy products) using TPB showed that personal attitudes, perceived consumer effectiveness, social influences, and perceived availability together explain approximately 50% of the variance in the intention to display this kind of behavior. Using a modified model based on TPB, Cook et al. (2002) looked at purchasing genetically modified food and found that attitudes, subjective norms, and perceived behavioral control (and additionally self-identity) were all significant determinants of intention to purchase genetically modified (GM) food.

It is important to point out that the purchase behaviors do not constitute simply buying products (tangible goods) but also utilizing services that are green oriented. Han et al.'s (2010) study on green hotel choice can be a good example. Their study tested Ajzen's TPB model for green hotel choice using structural equation modeling. Its aim was to explain the formation of customers' intentions to visit green hotels. The results of the study showed that the model based on TPB fit the data well, with a strong predictive power of intention. The results revealed that hotel customers' attitudes, subjective norms (SN), and perceived behavioral control (PBC) positively affected their intentions to stay at a green hotel.

In the TPB, three factors determine behavioral intentions: (1) attitudes toward the behavior, (2) subjective norms, and (3) perceived behavioral control (PBC). The following sections explain each determinant and develop relevant hypotheses.

Attitudes toward the behavior

Sustainable consumption can be stimulated by having a positive attitude towards sustainable products and services and displaying a positive behavior by purchasing such goods. Studies in the literature have widely focused on attitudes towards sustainable consumption, also called green purchase behavior (Birgelen et al., 2009; Chan, 2001; Shrum, McCarty, & Lowrey, 1995; Tanner & Kast, 2003; Vermeir & Verbeke, 2008). In general, it is claimed that consumers with positive attitudes towards green purchases pay attention to packaging of the products (e.g., less packaging materials, recycled content), the source of the products (e.g., fair trade, local produce), and absence of pesticides or genetically modified organisms (GMOs) (e.g., organically grown products) (Vermeir & Verbeke, 2006). Their perception of these types of products and services involves better taste and freshness, positive human and environmental health benefits, higher quality and safety of products and services as well as various benefits to the regional economies (Vermeir & Verbeke, 2006). A favorable attitude towards these types of products and services as well as behaviors related to them lead to environmentally sensitive actions through intentions in the context of eco-sensitive purchase behaviors. Thus, the attitudes towards these types of behaviors act as a crucial antecedent of behavioral intentions, which would lead to the evaluation of the related behavior favorably or unfavorably, as described by Ajzen (1991). As underlined by Ajzen (1991), if a person has a positive attitude towards performing a certain behavior, it strengthens his/her intention to act on that particular behavior. Following this discussion, it is hypothesized that:

H1a: There is a positive relationship between individuals' attitudes towards purchasing environmentally sensitive products and their intentions to buy environmentally sensitive products.

Subjective norm

Subjective norm has been defined as an individual's beliefs about whether significant social surrounding, such as family and friends, approves or disapproves of performing a particular behavior (Ajzen, 1991; Ajzen & Fishbein, 1980). In the context of environmentally sensitive purchase behavior, if we believe the significant others (family, close friends, etc.) approve of our decision to purchase such products and services (pressure to act in certain way), then we would be more likely to engage in sensitive purchase behavior. Hence, it is expected that having positive subjective norms would lead to relevant behavior through increased behavioral intentions. Subjective norm has been used widely in studies that have utilized TPB or TRA as research models, and it has been extensively adopted in the environmentally responsible or sustainable behavior research (Biel & Thøgersen, 2007). For example, Vermeir and Verbeke's (2006) research on sustainable food product purchases and Chen (2007) and Gotschi et al.'s (2007) studies on organic food purchases showed a significant and positive relationship between consumers' subjective norms and their environmentally sensitive behavioral intentions. This discussion leads to next hypothesis:

H2a: There is a positive relationship between individuals' subjective norms and their intentions to buy environmentally sensitive products.

Perceived behavioral control

Another variable under the investigation is perceived behavioral control (PBC) from the TPB model. PBC is defined as the degree to which a person perceives the implementation of an intended behavior as easy or difficult (Ajzen, 1991). Stern (2000), Thøgersen (2005), and Steg and Vlek (2009) stated the importance of contextual factors that affect individuals' motivation to behave in environmentally sensitive fashion. For instance, a customer aspiring to purchase organic dairy product (e.g., milk, eggs) needs to have access to such goods (product availability and convenience). Similarly, if there is no green hotel in the area where a customer wants to spend a holiday, then it is irrelevant to have high attitudes or subjective norms towards staying in a green hotel. The severe constraints in these kinds of situations may possibly outweigh the customer's motivation to act pro-environmentally (Corraliza & Berenguer, 2000). In such situations, PBC, which reflects the perceived ease or difficulty of performing a certain behavior by the consumers, becomes important (Steg & Vlek, 2009).

The present study operationalized perceived behavioral by asking respondents directly how much control they have over the behavior of interest (ESP). Furthermore, the respondents were asked how easy or difficult it would be for them to perform the action (Tonglet, Phillips, & Read, 2004). If they believe that it would be easy for them to perform such behavior (availability, accessibility, degree of difficulty or ease in locating the product or service) then their behavioral intention should be high. In some cases, unavailability (actual or perceived) of such goods and services could cancel out the person's intention to act in that certain way (Vermeir & Verbeke, 2006), which also

indicates the importance of PBC in the models designed to explain ESP behaviors of consumers. This review of the literature led us to hypothesize that:

H3a: There is a positive relationship between individuals' perceived behavioral control and their intentions to buy environmentally sensitive products.

Behavioral intention

Intention is an individuals' willingness to perform a certain behavior, and in this study, it was operationalized as willingness to buy ecologically sensitive products. Ajzen's Theory of Planned Behavior (1991) includes intention as an immediate antecedent of the behavior that is being performed. As suggested by Ajzen (1991), it is possible to determine related behavior of interest from the intention an individual displays with a considerable accuracy. The positive relationship between intention and actual behavior has been confirmed in many studies on eco-sensitive purchases, such as buying sustainable dairy product (Vermeir & Verbeke, 2008), organic food (Saba & Messina, 2003; Thøgersen, 2009), sustainable beverages (Birgelen et al., 2009), or choosing green hotels (Han et al., 2010). Furthermore, in their meta-analysis on environmental behavior, Hines, Hungerford, and Tomera (1987) found a positive relationship between intention and various environmentally sensitive behaviors examined by a number of researchers. In view of the preceding discussion, it is hypothesized that:

H4a: There is a positive relationship between individuals' intentions to buy environmentally sensitive products and environmentally sensitive purchase behavior.

Value-Belief-Norm Theory and ESP Behavior

The second subset of Goal Framing Theory comprises value focused theory and framework variables, including altruistic, biospheric, egoistic values, environmental concern, awareness of consequences, personal norms, and ascription of responsibility. For the purpose of this study, Value-Belief-Norm (VBN) Theory of Stern et al. (1999) and Stern (2000) was used as the base theory to develop a model that would explain normative motivations for purchasing environmentally sensitive products. In general, VBN theory builds upon some of the earlier theoretical accounts (see Chapter 3) and represents a causal series of connected variables that lead to relevant behavior. These variables are personal values (biospheric, altruistic, and egoistic), ecological worldview (measured with NEP), awareness of undesirable consequences (AC), ascription of responsibility to self, and personal norms (PN) for acting pro-environmentally. This study will focus on purchasing environmentally sensitive products. Various studies that have been published on consumer environmentally friendly purchase behavior variables have shown the relationships among various constructs, such as environmental concern (Bamberg, 2003; Choi & Kim, 2005; Hartmann & Apaolaza-Ibáñez, 2012), different types of values (De Groot & Steg, 2008; Follows & Jobber, 2000; Fraj & Martinez, 2006; Gärling et al., 2003; Nordlund & Garvill, 2002), environmental consequences (Follows & Jobber, 2000), and personal norms (Corbett, 2005; Nordlund & Garvill, 2002). In this study, each variable coming from the VBN theory will have related hypothesis developed as follows with the support of relevant literature.

Values

Green purchase behavior studies have centered widely on values as a potential determinant of relevant behaviors (e.g., De Groot & Steg, 2008; Follows & Jobber, 2000; Fraj & Martinez, 2006; Gärling et al., 2003; Nordlund & Garvill, 2002). Although the literature defines this construct in many different ways (Van Deth & Scarbrough, 1995), in general, values are defined as the criteria that are used to choose and justify actions and assign worth to objects and the actions of others (Fraj & Martinaz, 2006). Each person has her/his own specific values that are shaped by experiences and learning process (Kahle, 1996). People can express their values through their actions. For example, a person with higher altruistic and biospheric values may be inclined to buy more ecologically friendly products and services. Some studies indicate that those who most value ecological concerns are likely to have higher environmentally friendly behaviors (Fraj & Martinaz, 2006).

The research has shown that the more strongly an individual subscribes to values other than his/her own interests, such as self-transcendent, altruistic, ecocentric, pro-social, or biospheric values, the more likely he/she is to be inclined towards environmentally sensitive behaviors (Steg & Vleg, 2009). Schwartz (1992, 1994a, 1994b) identified 56 different values. Using a 9-point scale, respondents had to assign the importance of each value in their lives, revealing 10 motivational types of values. Although valuable, this set of value orientations was not found to be practical and measurable in environmental behavior research, as stated by some researchers (De Groot & Steg, 2008; Steg & Vleg, 2009; Stern, 2000). Following this notion, in their study on

value orientations of individuals to explain environmentally sensitive behaviors, De Groot and Steg (2008) distinguished three different types of values, altruistic, biospheric, and egoistic. They also suggested using these three types of value orientations "to better understand relationships between values, beliefs, and intentions related to environmentally significant behavior" (p.330). Similarly, Stern (2000) and Stern and Dietz (1994) argued that these three types of value orientations could affect ESB through environment related beliefs. When a customer has egoistic value orientation, he/she considers and calculates personal costs or benefits of an environmentally sensitive behavior. This means that if perceived benefits are higher than the perceived costs, an individual can have an intention to act environmentally friendly. When a customer has altruistic value orientation, he/she makes environmental behavioral decisions based on that decision's costs or benefits to other people rather than herself/himself. Lastly, if the person has biospheric value orientation, his/her decisions will be based on perceived cost or benefits to the ecosystem (biosphere) when acting in an environment related fashion (De Groot & Steg, 2008).

Altruistic, biospheric, and egoistic value orientations cover the basic beliefs related to environmentally sensitive behaviors. Stern and Dietz (1994), Stern, Dietz, and Guagnano (1998), and De Groot and Steg (2008) suggested a positive relationship of these types of beliefs with altruistic and biospheric values and a negative relationship between the same types of beliefs and egoistic values. Thus, the next hypotheses are set forth as:

H5a: There is a positive relationship between individuals' altruistic values and their environmental concern.

H6a: There is a positive relationship between individuals' biospheric values and their environmental concern.

H7a: There is a negative relationship between individuals' egoistic values and their environmental concern.

Environmental concern

Environmental concern is defined as people's orientation toward the environment in general (Choi & Kim, 2005). Environmental behavior studies have used environmental attitudes and concerns interchangeably. The VBN theory uses the term ecological worldview and suggests that this construct influences individual's awareness of undesirable environment-related consequences (AC). People's concern about the environment has mostly been measured using the widely known scale "New Environmental Paradigm" (Dunlap & Van Liere, 1978; Dunlap et al., 2000).

Various studies in the literature showed that being more concerned about environment is associated with behaving in a more environmentally cautious manner (e.g., Choi & Kim, 2005; Poortinga, Steg, & Vlek, 2004; Schultz & Zelezny, 1998). Hines et al.'s (1987) meta-analytic review of 187 studies showed a moderate positive correlation between environmental attitude and related ecological behavior. Additionally, as stated by Fraj and Martinaz (2006), numerous findings have indicated that those who are most likely to value ecological concerns are also likely to have higher environmentally friendly behaviors. It has also been found that the level of concern could

be a valuable predictor of environmentally sensitive behavior (Choi & Kim, 2005). Stern (2000) suggested that this association is based on the functioning of causal chain from values to environmental concern that leads to awareness of destructive consequences, then to ascription of responsibility to the self, and finally to personal norms. This chain reaction then finally determines the extent to which a person behaves in an environmentally sensitive way. Thus, the next hypothesis is set forth as:

H8a: There is a positive relationship between individuals' environmental concern and their awareness of consequences.

Awareness of consequences

Together with values, various types of beliefs have been shown to affect environmental behavior (Jansson, Marell, & Nordlund, 2010). According to the moral norm-activation theory by Schwartz (1977) as well as Value-Belief-Norm theory by Stern et al. (1999) and Stern (2000), an individual's level of awareness of environmental consequences (AC) of a certain behavior and ascribed responsibility (AR) to him/herself to act in a preventive way help develop a pro-environmental norm that leads to eco-sensitive behavior (Bamberg, 2003; Stern, 2000). As Follows and Jobber (2000) suggested, if the consumer believes that buying and consuming certain products will create destructive consequences for the environment, he/she might choose to purchase eco-friendly alternatives. This happens by ascribing responsibility to the self. The person feels the responsibility about consequences of an action, which is not environmentally sensitive. Thus, the next hypothesis is set forth as:

H9a: There is a positive relationship between individuals' awareness of consequences and their ascription of responsibility.

Ascription of responsibility

Ascription of responsibility (AR) reflects the degree to which the consumer ascribes personal responsibility for the environmental problems resulting from not purchasing environmentally sensitive products. Individual might believe that not purchasing eco-sensitive products/services presents a threat to the environment that s/he values and subsequently ascribes responsibility to her/himself to solve the problem. According to Stern (2000), ascription of responsibility activates personal norms of an individual, which may predispose a person to act in a more ecologically sound manner.

H10a: There is a positive relationship between individuals' ascription of responsibility and their pro-environmental personal norms.

Personal norms

Personal norms construct is defined as a person's internal expectations (not based on others' views) of how he/she should act based on his/her inner values (Schwartz, 1968). Thus, we can say that it can be viewed as internalized self-expectations (Schwartz, 1977). It reflects the extent to which a person may feel a moral obligation to behave in a certain way. Various studies in the environmental behavior literature reported that personal norms are successful in predicting various factors of different environmental behaviors (e.g., Hunecke et al., 2001; Nordlund & Garvill, 2003; Thøgersen, 2002). Personal norms make the individual feel moral obligation to behave in a certain eco-friendly way and help him/her develop a willingness to act in the same fashion (Jansson

et al., 2010). For example, Wiidegren (1998) found that personal norms could affect willingness to pay more for ecologically friendly foods. In another study, Thøgersen (2002) showed that personal norms positively influence actual purchasing behavior of organic wine.

In this study, personal norms are proposed to have direct effect on behavioral intention, which is considered the immediate antecedent of environmentally sensitive purchase behavior. Thus, the next hypothesis states that:

H11a: There is a positive relationship between individuals' pro-environmental personal norms and their intentions to buy environmentally sensitive products.

Theory on Affective Motives and ESP Behavior

In addition to the commonly applied theories, the literature covers also a few studies that explicitly examine the role of affect and related theories and models in explaining environmental behavior, mostly in the context of car use (Gatersleben, 2007). For example, Gatersleben's study showed an association of car use with affective and symbolic factors. The studies that have focused on the role of affective or symbolic motivations are usually not taking relevant theories as the base concept. However, according to Steg (2005), Dittmar's (1992) material possession focused theory can be a good approach towards a more theoretical perspective in this line of research on environmental behavior. The theory by Dittmar suggests that by using material goods and services, individuals can fulfill three essential functions: (1) affective, (2) instrumental, and (3) symbolic. The study by Steg (2005) on car use and its factors that predict affective motives showed that this specific behavior is most strongly associated with

symbolic and affective motives. Instrumental motives, on the other hand, were not as important.

Other than Dittmar's theory, the circumplex model of affect developed by Russell (1980) has also been increasingly used in consumer behavior studies. According to Russell, affective responses may be categorized into two separate dimensions: (1) pleasure and (2) arousal. The approach by Russell is also promising for environmental behavior studies.

Affect

Although not commonly researched in this field of study, affect is found to be another crucial factor explaining environmental behaviors by several researchers (e.g., Gatersleben, 2007; Steg & Vlek, 2009). In fact, a limited amount of studies has also examined the potential role of affect in the context of environmentally sensitive behaviors (e.g., Steg, Vlek, & Slotegraaf, 2001; Steg, 2005). These studies focused mostly on car use and found that this behavior is significantly associated with affective factors. Although mostly exploratory, these types of studies tell us the importance of and a need to focus on emotions and feeling by conducting empirical studies in different behavioral categories other than car use employing affect as a possible determinant. This can also inform us about the functioning of goal framing theory with the hedonistic goal frame focus in the context of environmentally sensitive behaviors.

For the purpose of this study, the affect model developed by Russell (1980) was used. As mentioned, according to the model, affective responses can be categorized into two separate dimensions: (1) pleasure and (2) arousal (Steg, 2005). Because the arousal

dimension might capture irrelevant concept in the context of usage behavior, only the pleasure dimension was used to identify the affect variable.

H12a: There is a positive relationship between individuals' gained pleasure from buying environmentally products and attitudes towards purchasing environmentally sensitive products.

4.2 Empirical Model

Based on the above hypotheses, a conceptual model of the study was developed. The proposed model (Figure 4.1) included three variables as antecedents to environmental concern: biospheric, altruistic, and egoistic values. Environmental concern is hypothesized to affect awareness of consequences, awareness of consequences is hypothesized to affect ascription of responsibility, and ascription of responsibility is hypothesized to affect pro-environmental personal norms. Furthermore, in the proposed model, affect is conceptualized to influence attitude towards behavior, and perceived behavioral control (PBC), subjective norm, and attitude towards behavior are hypothesized to affect intention to perform the relevant purchase behavior. Finally, in the proposed model, intention is hypothesized to be the immediate antecedent of the actual environmentally sensitive purchase behavior. The proposed model will be useful for analyzing goal framing theory based on three different theoretical frameworks (i.e., value-belief-norm theory, theory of planned behavior, and theory on affect) and these frameworks' individual determinants with an aggregated approach. The model for Study II is displayed in Figure 4-1.

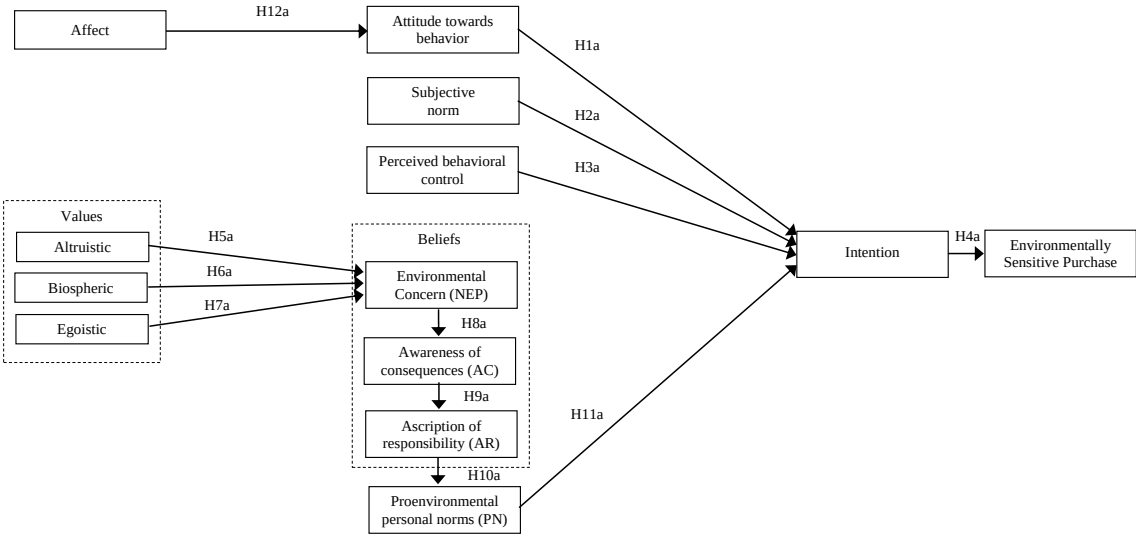


Figure 4-1. Study II model shows the influence of gain, normative, and hedonic goal-frames on environmentally sensitive purchase behavior with their corresponding hypotheses.

4.3 Methodology

The study was based on primary data. Questionnaire survey was used to collect data and verify the research framework guiding the hypotheses. The participants were recruited from the active members of the TerraCycle recycling company account database. These account members receive monthly TerraCycle company letter; thus, a link to the purchse survey was placed into this newsletter (see Appendix A.1). Members could participate in the study by following the link, which took them to the online survey. Participants' completed anonymous surveys were compiled in the SoGoSurvey online survey database account. Survey IRB approval was received before disseminating the relevant questionnerie (see Appendix A.2).

When the surveys were complete, the data gathered were collated and tabulated. Individual identifiers were not collected and were removed from the surveys if necessary. The data were entered into the SPSS statistical software for analyses.

4.3.1 Survey sample

In total, 296 participants from TerraCycle's 70,000 U.S. based account holders completed the survey. Out of these responses, the questionnaires from 15 respondents not used in the study because of missing values, unengaged responses (i.e., giving answers randomly, such as choosing a midpoint 4 answer option for all questions), or incomplete data, thus, leaving a total of 281 completed responses used for the study. Table 4.1 displays the descriptive statistics and demographic profiles of Study II participants.

Demographics of Study II Participants *(n=281)*

Demographic		***N***	***%***
Gender			
	Female	178	63.4
	Male	103	36.7
Age			
	18 to 24	72	25.6
	25 to 34	87	31
	35 to 44	52	18.5
	45 to 54	45	16
	55 to 64	20	7.1
	65 to 74	5	1.8
	75 or older	0	0
Education			
	Less than High School	0	0
	High School	22	7.8
	Some College	96	34.2
	Bachelor's degree	107	38
	Master's degree	49	17.4
	Ph.D.	2	0.7
	Professional	5	1.8
Household annual income			
	Less than $20,000	49	17.4
	$20,000-$40,000	66	23.5
	$40,000-$70,000	73	26
	$70,000-$100,000	51	18.1
	$100,000-$150,000	22	7.8

$150,000-$200,000	11	3.9
More than $200,000	9	3.2
Race/Ethnicity		
American Indian/Alaska Native	3	1.1
Asian	23	8.2
African American	17	6
Hispanic or Latino	9	3.2
Multi-Race	10	3.6
Native Hawaiian/Pacific Islander	3	1.1
White	216	76.9

Table 4-1. Sample descriptive statistics and demographic profiles of Study II participants.

4.3.2 Questionnaire design

All items were taken from well-established standardized scales from the literature all with acceptable reliabilities. The items were adapted to the environmentally sensitive purchase context. In order to assess whether survey items, measurements, and associated survey links were working as intended and to find out whether there was any ambiguity in terms or meanings of items, a pre-test survey was conducted. For this purpose, students from two marketing classes at Montclair State University's (MSU) School of Business completed the survey links. After mentioning the purpose of this survey, i.e., to see whether the questions and links are working properly and whether there are any misspellings or unclear sentences in the survey, the links were sent out to each student participant. Overall, 20 out of 43 marketing students completed the surveys. The results obtained from the survey helped modify some of the questions to improve the survey's clarity. One repetitive question was deleted, a few minor grammatical errors were corrected, and a few questions were re-worded for better understanding. Survey items were developed by applying the accepted procedures suggested by Nunnally and Berstein

(1994). Before applying the pre-test survey, anonymity and confidentiality were also guaranteed to the student participants.

4.3.3 Measurement instruments

Environmentally Sensitive Purchase Behavior. The environmentally sensitive purchase behavior (ESPB) measure was based on the General Social Survey (GSS) (2010) and a scale developed by Schlegelmilch et al. (1996). The ESPB scale consisted of the following five items: (1) ESPB1 "How often do you make a special effort to buy fruits and vegetables grown without pesticides or chemicals, also known as organic fruits and vegetables?", (2) ESPB2 "How often do you avoid purchasing products that are harmful to the environment?", (3) ESPB3 "How often do you purchase products that are not tested on animals?", (4) ESPB4 "How often do you make a special effort to buy household chemicals, such as detergent and cleaning solutions that are environmentally friendly?", (5) ESPB5 "How often do you make a special effort to buy paper and plastic products that are made from recycled materials?" Self-reported behavioral items were assessed on a 7-point Likert scale, with always, very often, often, sometimes, rarely, very rarely, and never as response options.

Before getting into the next set of questions in the survey, the questionnaire asked participants to read the definition of environmentally sensitive purchase (i.e., purchase of goods and services that has minimal effect on the natural environment relative to the products that serve similar purpose) and then to complete the questions about this behavior.

Attitudes. Attitude towards environmentally sensitive purchase (ATESP) construct was measured with a 5-item scale adapted from Abrahamse and Steg (2011), and Smith, Haugtvedt, & Perry (1994). The ATESP scale items were: (1) ATESP1 "Environmentally sensitive purchase is too much of a hassle," (2) ATESP2 "Environmentally sensitive purchasing means I have to live less comfortably," (3) ATESP3 "Environmentally sensitive purchases will restrict my freedom," (4) ATESP4 "Environmentally sensitive buying is valuable," and (5) ATESP5 "Environmentally sensitive buying is necessary." From the five items representing attitudes toward environmentally sensitive purchase behavior, first three negatively worded ones were reverse coded. This psychological variable was measured on a 7-point Likert scale (Vaigas, 2006), with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options.

Intention. For the behavioral intention scale, a three-item measure was used. Because a single-item measure of this construct has been criticized (Peter, 1979), Ajzen's suggestion to use multiple questions for behavioral intention was followed. This method usually helps to obtain a relatively reliable self-report (Ajzen, 2002; Fishbein & Ajzen, 2010). The scale consisted of three items: (1) IESP1 "I intend to purchase environmentally sensitive products in the forthcoming months," (2) IESP2 "I will try to purchase environmentally sensitive products in the forthcoming months," (3) IESP3 "I expect to purchase environmentally sensitive products in the forthcoming months." Behavioral intention was measured on a 7-point Likert-scale with the scores ranging from "strongly disagree" to "strongly agree."

Subjective Norm. Subjective norm refers to social pressure to behave in a certain way and operationalized by four questions (Abrahamse & Steg, 2011; Tonglet et al., 2004). The scale items were: (1) SNESP1 "Most people who are important to me think that I should purchase environmentally sensitive products," (2) SNESP2 "Most people who are important to me would approve of me purchasing environmentally sensitive products," (3) SNESP3 "My household/family members think I ought to be purchasing environmentally sensitive products," (4) SNESP4 "My friends/colleagues think I ought to be purchasing environmentally sensitive products." All four items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Perceived Behavioral Control. Perceived behavioral control was operationalized by asking respondents directly how much control they have over the behavior of interest (ESPB) and how easy or difficult they think it would be to perform the action (Tonglet et al., 2004). Measurements are taken from Abrahamse and Steg (2011) and Tonglet et al. (2004). The six items measuring perceived behavioral control were: (1) PBCESP1 "I can find and purchase environmentally sensitive products easily," (2) PBCESP2 "I have plenty of opportunities to purchase environmentally sensitive products," (3) PBCESP3 "Purchasing environmentally sensitive products is inconvenient," (4) PBCESP4 "Stores provide satisfactory resources to purchase environmentally sensitive products," (5) PBCESP5 "I know which products are environmentally sensitive," and (6) PBCESP6 "I know where to find environmentally sensitive products." The third statement was reverse coded to keep the measurement items consistent. All six items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Values. Environmental behavior research has widely used 56-item Schwartz's values inventory (SVI) (e.g., Barr, 2007; De Groot & Steg, 2007; Poortinga et al., 2004). Because the SVI is too long; hence, it takes too long to complete, Stern et al. (1998) developed a short version of the scale. This short version was found to be an acceptable measure of values (Aoyagi-Usui, Vinken, & Kuribayashi, 2003; Stern et al., 1995). In her environmental behavior focused study, Steg et al. (2011) used part of this shorter version of Stern et al.'s value instrument and suggested this method for this area of research. In this approach, only the related dimensions of environmental values are measured. For the purpose of this study, similar approach was adopted and relevant dimensions were measured, namely, altruistic, biospheric, and egoistic dimensions.

To measure value dimensions of interest, the participants were asked to rate the importance of following 13 values "as guiding principles in your life" on a 7-point scale ranging from 1 *not at all important* to 7 *extremely important*. Answer choices used for this scale were not at all important, low importance, slightly important, neutral, moderately important, very important, and extremely important. Following items were used to measure each value dimension:

Altruistic Values: (1) ALT1 "Social justice, correcting injustice, care for the weak," (2) ALT2 "Equality, equal opportunity for all," (3) ALT3 "A world of peace, free of war and conflict," and (4) ALT4 "Being helpful."

Biospheric Values:(1) BIO1 "Preventing pollution, conserving natural resources," (2) BIO2 "Unity with nature, fitting into nature," (3) BIO3 "Respecting the earth,

harmony with other species," and (4) BIO4 "Protecting the environment, preserving nature."

Egoistic Values: (1) EGO1 "Social power, control over others, dominance," (2) EGO2 "Influential, having an impact on people and events," (3) EGO3 "Wealth, material possessions, money," (4) EGO4 "Authority, the right to lead or command," and (5) EGO5 "Being ambitious."

Environmental Concern. The revised version of the New Environmental Paradigm (NEP) was used to measure environmental concern (Dunlap et al., 2000). Following Bruni, Schultz, & Saunders (2012), this section of the questionnaire stated: "Now we would like to get your opinion on a wide range of environmental issues. For each of the following statements, please indicate the extent to which you agree or disagree." The revised NEP scale by Dunlap et al. (2000) includes 15 items: (1) EC1"We are approaching the limit of the number of people the earth can support," (2) EC2 "Humans have the right to modify the natural environment to suit their needs," (3) EC3"When humans interfere with nature, it often produces disastrous consequences," (4) EC4 "Human ingenuity will insure that we do NOT make the earth unlivable," (5) EC5 "Humans are severely abusing the environment," (6) EC6 "The earth has plenty of natural resources if we just learn how to develop them," (7) EC7 "Plants and animals have as much right as humans to exist," (8) EC8 "The balance of nature is strong enough to cope with the impacts of modern industrial nations," (9) EC9 "Despite our special abilities humans are still subject to the laws of nature," (10) EC10 "Human destruction of the natural environment has been greatly exaggerated," (11) EC11 "The earth has only

limited room and resources," (12) EC12 "Humans were meant to rule over the rest of nature," (13) EC13 "The balance of nature is very delicate and easily upset," (14) EC14 "Humans will eventually learn enough about how nature works to be able to control it," and (15) EC15 "If things continue on their present course, we will soon experience a major ecological disaster." Items 2, 4, 6, 8, 10, 12, and 14 were reverse coded.

Awareness of Consequences. Awareness of consequences (AC) was measured using *six* items referring mainly to the extent to which participants believe that non-ecofriendly purchasing is a problem (adapted from Abrahamse et al., 2009; Abrahamse & Steg, 2011; Stern et al., 1999). The scale consisted of the following items: (1) AC1 "Pesticides and chemicals used in fruits and vegetables are problem for the environment," (2) AC2 "Environmentally sensitive purchases contribute to a reduction of the environmental problems," (3) AC3 "Environmentally sensitive purchases contribute to habitat conservation," (4) AC4 "Environmentally sensitive purchases contribute to improving the ability to meet environmental goals," (5) AC5 "Environmentally sensitive purchases contribute to improving individuals' safety and health," and (6) AC6 "Organically grown product consumption can help improving environmental conditions." All six items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Ascription of Responsibility. Ascription of responsibility (AR) scale measures the degree to which survey participants ascribe responsibility to themselves for the environmental problems resulting from not purchasing environmentally sensitive products. The scale was adapted from Abrahamse et al. (2009) and Abrahamse and Steg,

(2011). The scale items used for the purpose of this study were: (1) AR1 "I feel personally responsible for the problems resulting from my non-ecofriendly product purchases," (2) AR2 "My non-ecofriendly purchases contribute to environmental problems," and (3) AR3 "I take joint responsibility for environmental problems." Items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Personal Norms. The personal norm (PN) scale consists of three items assessing the degree to which participants feel moral obligations to behave pro-environmentally, in this case, the degree to which they feel moral obligation to purchase eco-friendly products (Abrahamse et al., 2009; Abrahamse & Steg, 2011). The items used were: (1) PN1 "I feel morally obliged to purchase environmentally sensitive products, regardless of what other people do," (2) PN2 "I feel guilty when I purchase environmentally harmful products," and (3) PN3 "I would consider myself a better person if I purchase environmentally sensitive products."

Affect. To measure affect, Russell's (1980) model was adopted as a base, similar to Steg's (2005) study. Russell demonstrated that affective responses could be categorized into two different dimensions: (1) pleasure and (2) arousal. Although some environmental behavior studies focusing on travel mode used these two dimensions in order to provide an overall full representation of the scale, for the meaningfulness of the measurement items, the arousal dimension was not included in the final study. The pre-test of the survey questionnaire also supported the necessity of excluding arousal items because of the lack of meaningfulness. Asking participants to rate statements such as "I

feel calm when I purchase environmentally sensitive products," "I feel peaceful when I purchase environmentally sensitive products," or "purchasing environmentally sensitive products is making me feel relaxed" would not be particularly useful for the analyses. Thus, only the pleasure dimension of affect was used in the context of environmentally sensitive purchase behavior. The scale included three items in total (Bigné, Andreu, & Gnoth, 2005; Russell, 1980; Steg, 2005). These items were: (1) AFPL1 "Purchasing environmentally sensitive products is giving me a feeling of satisfaction," (2) AFPL2 "When I purchase environmentally sensitive products, I feel happy," (3) AFPL3 "Purchasing environmentally sensitive products is giving me a feeling of pleasure." In line with Vaigas (2006), items were measured on a 7-point Likert scale with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options. See Appendix A.3 for all measurement items.

Sociodemographics. Most sociodemographic variables were measured on a 7-point scale. Education was categorized into seven groups: Less than high school, high school, some college, bachelor's degree, master's degree, Ph.D., and professional. Estimated household annual income was also categorized into seven groups. Gender was coded as a dummy variable, with 1 representing 'male' and 2 representing 'female.' Age and race/ethnicity were also measured on a 7-point scale.

4.4 Analysis Technique and Model Evaluation

After the data obtained from the survey was collated and tabulated, the data was downloaded to the SPSS 20 statistical software for analyses. First, to provide basic

information on the data and sample, descriptive statistics, such as standard deviations, means, and percentages were calculated. Next, the survey data was analyzed using the latent variable structural equation modeling (SEM). For this statistical method, the computer software tool SPSS Analysis of Moment Structures (AMOS) version 22.0 was used to test the hypothesized model (Byrne, 2001) introduced in the previous section. To meet the required assumptions of structural equation modeling, the data was first assessed in terms of missing values, outliers, normal distributions (univariate and multivariate), and multicollinearity.

4.4.1 Data analysis

From 296 returned surveys, 3 surveys with missing responses were eliminated. By checking the standard deviation of each case and thru visual inspection, 12 unengaged responses were eliminated. This process left 281 participant responses for the analyses.

Missing Data: Missing data can be problematic especially in structural equation modeling using AMOS, since it may cause the program not to work properly. It also decreases the power and leads to biased standard errors (Allison, 2003). Thus, it is important to examine whether the data are missing (if any) at random. For this study, all missing data was at the individual item level. Items with missing values were AT3, INT1, INT2, SN2, PBC4, EC2, EC6, EC7, EC8, EC12, AC4, AR3, PN2, ALT2, BIO3, BIO4, and EGO1, each with only one missing case. On the other hand, items AT4, INT3, SN1, EC4, PN1, AFPL1, AFPL3, EGO2, and EGO4 had two and EC1 had three missing cases. Thus, missing values for the variables accounted for 0 to 1.07%. A higher percentage of

missing data for education (i.e., 8 cases, 2.85%) was not a concern, as this demographic information was only used for descriptive purposes. For the missing values, median substitution technique was used because of Likert type responses.

Outliers: When an extreme value appears on a single variable within a case, that specific case is called a univariate outlier. In order to detect univariate outliers, *Z* scores were obtained and tested for each variable. Univariate outliers were detected for variables that exceeded $z = \pm 3.29$ ($p < .001$, two-tailed test) (Tabachnick & Fidell, 2007). This method provided information that 17 variables had one or more cases as univariate. Each univariate case was examined and treated separately. To deal with these univariate outliers, following Tabachnick and Fidell (2007), "a raw score on the offending variable that is one unit larger (or smaller) than the next most extreme score in the distribution" (p.77) was assigned to the outlying cases. Since the SEM analysis is very sensitive to the extreme outliers (Bollen, 1989; Kline, 2005), SPSS histograms, box plots, and normal probability plots of the dataset were examined to identify additional outliers. No further extreme outliers were found. To identify multivariate outliers (i.e., cases with extreme values on multiple variables), Mahalanobis Distance (D^2) was used (Tabachnick & Fidell, 2007) when conducting SEM analysis using SPSS AMOS.

Distribution normality: High skewness and kurtosis indicate that the data distribution is not normal. Thus, normality, skewness, and kurtosis statistics were used to test univariate distribution. If the skewness statistics is less than 3 and kurtosis statistics is less than 8, then we can assume the normality of the data (Kline, 2005; Tabachnick &

Fidell, 2007). In this study, skewness and kurtosis values for the items were within acceptable limits.

Exploratory Factor Analysis: To see whether the data reflect the hypothesized factor structure, an exploratory factor analysis with Varimax rotation was conducted on both antecedent and consequence measures based on a baseline eigenvalue of 1.0. Although most measurement items loaded on their respective factors, environmental concern items seemed to be problematic since the factor solutions supported at least three factor structures. Thus, a partial disaggregation method was used for this particular construct, which is explained in the next section.

4.4.1.1 Partial disaggregation of NEP construct

A total disaggregation approach (i.e., using each item as a separate indicator of the relevant construct) was used for all the constructs in the study except environmental concern. For environmental concern (New Environmental Paradigm - NEP) construct, partial disaggregation approach was used based on the dimensions of Albrecht et al. (1982), Bechtel, Verdugo, & de Queiroz Pinheiro (1999), Noe and Snow (1990), and Van Petegem and Blieck (2006). These authors suggested using three dimensions for the NEP construct. Initially, environmental concern comprised 15 items. Using the partial disaggregation approach reduced the number of environmental concern parameters to be estimated while retaining the advantages of SEM analysis technique. It also provided assessment of a higher-order model while reducing the level of random error (Bagozzi & Heatherington, 1994; Baumgartner & Homberg, 1996).

The partial disaggregation method involves the creation of composite variables (ideally two or more) for the construct of interest. Following Bagozzi and Heatherington (1994), the composite variables were created from identified subdimensions of NEP construct. For this, principal components factor analysis (PCA) with Varimax rotation was used (see Appendix, A.4). The factor analysis was unconstrained, and the primary factors explained 58.9% of the variance in the results obtained. The examination of the PCA supported the three dimensional model that was also found in previous research (Albrecht et al., 1982; Bechtel et al., 1999; Noe & Snow, 1990; Van Petegem & Blieck, 2006). The three dimensions were: (1) Balance of nature, identified as environmental concern total (ECT1), (2) Limits to growth, identified as environmental concern total (ECT2), and (3) Humans over nature, identified as environmental concern total (ECT3) (see Appendix, A.3). Out of all environmental concern items, items 4, 6, 8, 14 loaded heavily on the "Balance of nature" component (ECT1). Four items (1, 11, 13, and 15) loaded on the "Limits to growth" component and items 2, 3, 5, 7, 9, 10, and 12 loaded on the third component "Humans over nature." To develop partially disaggregated indicators of the environmental concern construct, average of subsets of items (i.e., items representing three dimensions), also called parcels, was created (Bandalos and Finney, 2001) and used for further analysis in confirmatory factor analysis and structural equation modeling.

4.4.2 Structural Equation Modeling Analysis

As mentioned previously, the survey data was analyzed using structural equation modeling (SEM). SEM is a statistical technique that allows testing and estimating the causal relationships (Hoyle, 1995), and it is widely used in behavioral sciences (Hox and Bechger, 1998). It can be considered as an extensive version of the general linear model that allows researcher to test several regression equations simultaneously. Thus, this technique is also called simultaneous equation modeling. The structural equations represent a model's causal relationships in between variables. According to Fox (2002), "unlike the more traditional multivariate linear model, the response variable in one regression equation in an SEM may appear as a predictor in another equation" (p.1). Additionally, SEM provides overall tests of model fit which is important for determining the effects of variables simultaneously rather than separately. Moreover, SEM will help us analyze the model as a whole.

Following the suggestion of Anderson and Gerbing (1988), a two-stage approach was adopted in the analysis. The first stage involved estimating the measurement model and the second stage involved estimating the structural model to analyze the strength of the relationships between each of the constructs in the proposed model.

4.4.2.1 Stage I: Measurement Model

The first stage of the two-stage process used the confirmatory factor analysis (CFA) to estimate the measurement model to determine the measurement properties of the underlying latent constructs. The initial CFA model included all constructs: Affect

(three item scale), Attitude (five item scale), Subjective Norm (four item scale), Perceived Behavioral Control (six item scale), Altruistic Values (four item scale), Biospheric Values (four item scale), Egoistic Values (five item scale), Environmental Concern (three item scale), Awareness of Consequences (six item scale), Ascription of Responsibility (three item scale), Personal Norm (three item scale), Environmentally Sensitive Purchase Intention (three item scale), and Environmentally Sensitive Purchase Behavior (five item scale). The initial CFA revealed that the model needed some adjustments. The goodness-of-fit statistics of this initial CFA model indicated the following values:

CFA Initial:

$\chi 2$ = 2785.35; p = .00; df = 1299; $\chi 2 / df$ = 2.14, GFI = .73; IFI = .89; TLI = .87, CFI = .89

RMSEA = .064

The initial CFA suggested that some items should be eliminated because they had low factor loadings or because they loaded on more than one factor. Thus, items AT1, AT4, AT5, SN2, PBC3, PBC5, PBC6, ECT1, ALT2, EGO3, EGO5, and AC1 were excluded from further analysis, leaving at least two measurement items for each factor. Modification indices of initial CFA suggested additional covariances among several error terms. After adding 7 covariances between some of the error terms, which were all under their respective factors, next CFA was conducted. The results of this last CFA revealed the following model fit indices:

CFA Final:

$\chi 2$ = 1198.95; p = .00; df = 735; $\chi 2 / df$ = 1.63, GFI = .836; IFI = .96; TLI = .95, CFI = .96

RMSEA = .047

This final CFA model provided acceptable goodness-of-fit statistics, with all items loading significantly on their respective factors. Final measurement model is presented in Appendix A.5. The reported results allow us to suggest that the measurement model achieves a good fit to the data. Additionally, construct reliabilities, factor loadings, and average variance extracted (AVE) for the final model are displayed in the Appendix A.6 & A.7.

To examine construct reliability and convergent and discriminant validities, the following measures were used: composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV) (Hair et al., 2010).The results showed strong psychometric properties for the measurement model by exhibiting high composite reliability estimates, ranging from 0.718 to 0.967, for all constructs. In general, Cronbach's α value of 0.7 or higher indicates satisfactory internal consistency reliability (Nunnally & Berstein, 1994). The average variance extracted indicates the amount of variance captured by that particular measurement of the construct relative to error terms of the measurement and correlations with other latent constructs. Generally, AVE values should be greater than 0.5 to consider acceptable convergent validity. Only altruistic value (ALT) construct showed an AVE value (0.48) slightly below acceptable limit of 0.5 convergent (Fornell & Larcker, 1981). Table A.8 in Appendix shows that convergent validity exists because variables within factor correlate well with each other. All indicators loaded significantly ($p<.01$) and substantively (standardized regression coefficients (loadings) >.6) on to their respective

constructs, providing evidence of convergent validity. Hair et al. (2010) suggested acceptable limit of 0.5 for factor loadings. For our model, high factor loadings mean that observed variables explain the latent factors well.

To examine the discriminant validity of the model, Maximum Shared Variance (MSV) and the Average Shared Squared Variance (ASV) were examined (Fornell & Larcker, 1981). Although both values are expected to be lower than the Average Variance Extracted (AVE) for all constructs (Hair et al., 2010), MSV showed slightly higher values for ascription of responsibility, personal norms, purchase behavior, and altruism (Appendix A.6). ASV values, on the other hand, were all lower compared to AVE, suggesting adequate discriminant validity. The issue with ascription of responsibility and purchase behavior caused by high correlation with purchase intention construct for both (see Appendix A.8 for correlation matrix). In the SEM, multicollinearity would be problematic if exogenous constructs correlated highly with each other. On the other hand, high correlations between endogenous and exogenous constructs are desirable (Shiu et al., 2011). High MSV values resulting from high correlations between aforementioned predicting and outcome variables and not between exogenous variables support the discriminant validity of the set of exogenous constructs except altruistic values. Altruistic value is an exogenous variable, and its relatively high correlation with biospheric value seems to create issue related to discriminant validity. De Groot and Steg (2008) reported similar findings in their study on value orientations of various environmental behaviors. In three separate studies, De Groot and Steg found that altruistic and biospheric values were positively correlated; however, “altruistic values

[were] correlated most strongly with the altruistic value scale, and biospheric values with the biospheric value scale" (p.348), similar to our findings. They suggested that although these two value orientations are highly correlated, they are differently related to environment-related beliefs, especially when the goals conflict. Both convergent and discriminant validity results for all constructs are presented in Appendix A.6 & A.7.

4.4.2.2 Stage II: Structural Equation Modeling

In the second stage, based on the final confirmatory factor analysis, structural equation modeling was conducted using AMOS 22.0 to determine the fit between the theoretical structure and the data. Exogenous or also called upstream variables for this study, which are assumed to be measured without error in SEM (also known as independent variables in traditional multivariate linear models), were the affect and value variables as well as subjective norms and perceived behavioral control. On the other hand, the endogenous or downstream variables (dependent or mediating variables) were the beliefs, personal norms, attitudes, intentions, and behavioral outcomes. Observed variables were measured directly with survey questions while latent or unobserved variables (i.e., all psychological variables) were inferred by these observed variables in the analysis.

Fit measures for the model were calculated to evaluate the goodness-of-fit criteria. Garver and Mentzer (1999) recommended using non-normed fit index (NNFI), also known as the Tucker-Lewis index, the comparative fit index (CFI), and the root mean squared approximation of error (RMSEA) as measures of the goodness of fit. Thus, NNFI

and CFI (>0.90 indicates good fit), RMSEA (<0.08 indicates acceptable fit), and commonly used $\chi 2$ statistic ($\chi 2/ df$ ratio of 3 or less) fit indices are used to assess goodness-of-fit of the model.

The structural model achieved a good level of fit:

$\chi 2$ = 1779.07; p = .00; df = 869; $\chi 2 /df$ = 2.05; IFI = .92; TLI = .91, CFI = .91

RMSEA = .061

These results show that the observed data fit the model reasonably well, except the high $\chi 2$ statistic. It is important to note that the $\chi 2$ statistic is usually upwardly biased by sample size and thus is an excessively stringent fit measure that should be examined along with other fit measures (Fornell & Larcker, 1981; Sharma et al, 2005). Because of the limitation of the chi-square test, the $\chi 2$ to degrees of freedom ratio has been proposed as an alternate way to evaluate the model (Joreskog & Sorbom, 1993). A reasonable model fit is when the $\chi 2 /df$ ratio is less than 3 (Kline, 2005). Our model satisfied this requirement with $\chi 2 /df$ = 2.05. Garver and Mentzer (1999) recommend using the Tucker-Lewis index (TLI), the RMSEA (root mean squared approximation of error), and CFI (comparative fit index) as additional model fit statistics. Thus, researchers commonly apply these fit indices. For TLI and CFI, values greater than 0.90 indicate a good fit and for RMSEA, values smaller than 0.08 indicate an acceptable fit (Hoe, 2008). The research model satisfied these requirements, with TLI, CFI, and RMSEA being within the suggested limits. Thus, the model satisfied all relevant goodness-of-fit criteria. The results for each index value and corresponding threshold values for fit measures are reported in Table 4.2 (also see Appendix A.9 for SEM AMOS output). Since this was a

confirmatory and not exploratory analysis, modification indices were not taken into account to adjust the model and improve corresponding model fit.

Measure	Threshold	Stage I. CFA $\chi2 = 1198.95; df = 735$	Stage II. SEM $\chi2 = 1779.07; df = 869$
p-value	> .05	.00	.00
$\chi2$ /df	< 3 good; < 5 permissible	1.63	2.05
IFI	> .95 great; > .90 traditional	.96	.92
TLI	> .95 great; > .90 traditional	.95	.91
CFI	> .95 great; > .90 traditional; > .80 sometimes	.96	.91
RMSEA	< .05 good; .05 -.10 moderate; > .10 bad	.047	.061

Table 4-2. Study II measurement and structural model fit. The results suggest that the measurement & structural models achieve good fit to the data.

4.5 Results

Based on theoretical considerations and extensive literature review, twelve hypotheses were proposed for the research model. According to Hair el al. (2010), it is necessary to assess individual parameter estimates to validate a proposed model. In this study, ten out of twelve hypotheses were supported (statistically significant) and only two were rejected (statistically non-significant). An outline of the results with standardized parameter estimates, statistical significance level, and R^2 values for all the proposed hypotheses are presented in Table 4-3.

Hypotheses				R^2	Std. parameter estimate	*p*-Value	Results
H1a.	Attitude towards behavior	→	Behavioral intention	0.75	0.26	$p < 0.01$	Supported
H2a.	Subjective norm	→	Behavioral intention	0.75	0.33	$p < 0.01$	Supported
H3a.	PBC	→	Behavioral intention	0.75	0.03	$p = 0.43$	Not supported
H4a.	Behavioral intention	→	ESPB	0.73	0.85	$p < 0.01$	Supported
H5a.	Altruistic values	→	Environmental concern	0.79	-0.54	$p = 0.45$	Not supported
H6a.	Biospheric values	→	Environmental concern	0.79	0.85	$p < 0.01$	Supported
H7a.	Egoistic values	→	Environmental concern	0.79	-0.26	$p < 0.01$	Supported
H8a.	Environmental concern	→	Awareness of conseq.	0.54	0.74	$p < 0.01$	Supported
H9a.	Awareness of conseq.	→	Ascription of resp.	0.68	0.82	$p < 0.01$	Supported
H10a.	Ascription of resp.	→	Personal norm	0.80	0.89	$p < 0.01$	Supported
H11a.	Personal norm	→	Behavioral intention	0.75	0.59	$p < 0.01$	Supported
H12a.	Affect	→	Attitude towards behavior	0.27	0.52	$p < 0.01$	Supported

Table 4-3. Summary of the Study II (purchase behavior) results – structural model coefficients.
Notes: PBC, perceived behavioral control; ESPB, environmentally sensitive purchase behavior.

Behavioral intention

The effects of attitude towards behavior on behavioral intention (*H1a*) as well as subjective norm on behavioral intention (*H2a*) were significant ($p < 0.01$), with standardized beta coefficient values of 0.26 and 0.33, respectively. Additionally, the standardized regression coefficient for the effect of personal norm on behavioral intention (H11a) was also significant ($\beta = 0.59$, $p < 0.01$). Perceived behavioral control (*H3a*), on the other hand, was not significantly related to behavioral intention ($\beta = 0.03$, $p = 0.43$). The R Square (R^2) for the relationship between these variables and behavioral intention outcome was .75. Hence, *H1a*, *H2a*, and *H11a* were supported, whereas *H3a* was not.

Environmentally sensitive purchase behavior

The effect of behavioral intention on environmentally sensitive purchase behavior was significant ($p < 0.01$), with a standardized beta value of $\beta = 0.85$, supporting *H4a*. Empirical evidence supporting actual eco-sensitive behavior and the behavioral intention relationship could be found widely in the literature (Birgelen et al., 2009; Saba & Messina, 2003; Thøgersen, 2009; Vermeir & Verbeke, 2008). The R Square (R^2) value for the relationship between these two variables was 0.73, which suggests that purchase intention explains 73% of the variance in behavioral outcome.

Environmental concern

The effects of biospheric (*H6a*) and egoistic (*H7a*) values on environmental concern were found to be significant. Especially, the standardized regression coefficient for the effect of biospheric values on environmental concern was quite strong ($\beta = 0.85$, $p < 0.01$). Although the effect of biospheric values on environmental concern was positive,

egoistic values showed negative effect on the same variable (β= -0.26, $p < 0.01$). Thus, both *H6a* and *H7a* were supported. The standardized regression coefficient of altruistic values on environmental concern (*H5a*) was not significant (β = -0.54, $p = 0.45$); hence, *H5a* was not supported.

Awareness of consequences

The effect of environmental concern (*H8a*) on the awareness of consequences was significant with standardized beta coefficient of 0.74 ($p < 0.01$) and R^2 value of 0.54. Since the direct effect of environmental concern was significant, *H8a* was supported.

Ascription of responsibility

The effect of the awareness of consequences (*H9a*) on ascription of responsibility was found to be significant. The standardized regression coefficient for the effect of awareness of consequences on ascription of responsibility was quite strong (β = 0.82, $p < 0.01$). Hence, *H9a* was supported.

Personal norm

Ascription of responsibility was found to predict personal norms related to the environment. The effect of ascription of responsibility (*H10a*) on environmental personal norms was significant. The standardized regression coefficient was the strongest for the effect of ascription of responsibility (β = 0.89, $p < 0.01$); hence, *H10a* was supported.

Attitude towards behavior

The analysis showed that the effect of affect (*H12a*) on attitude towards behavior was significant. This direct effect of affect on attitude towards behavior was medium (β = 0.52, $p < 0.01$); hence, *H12a* was supported.

The results of the structural equation model are displayed in Figure 4.2 with standardized regression estimates and significance of each path. The same results were found when controlled for age, gender, income, and education.

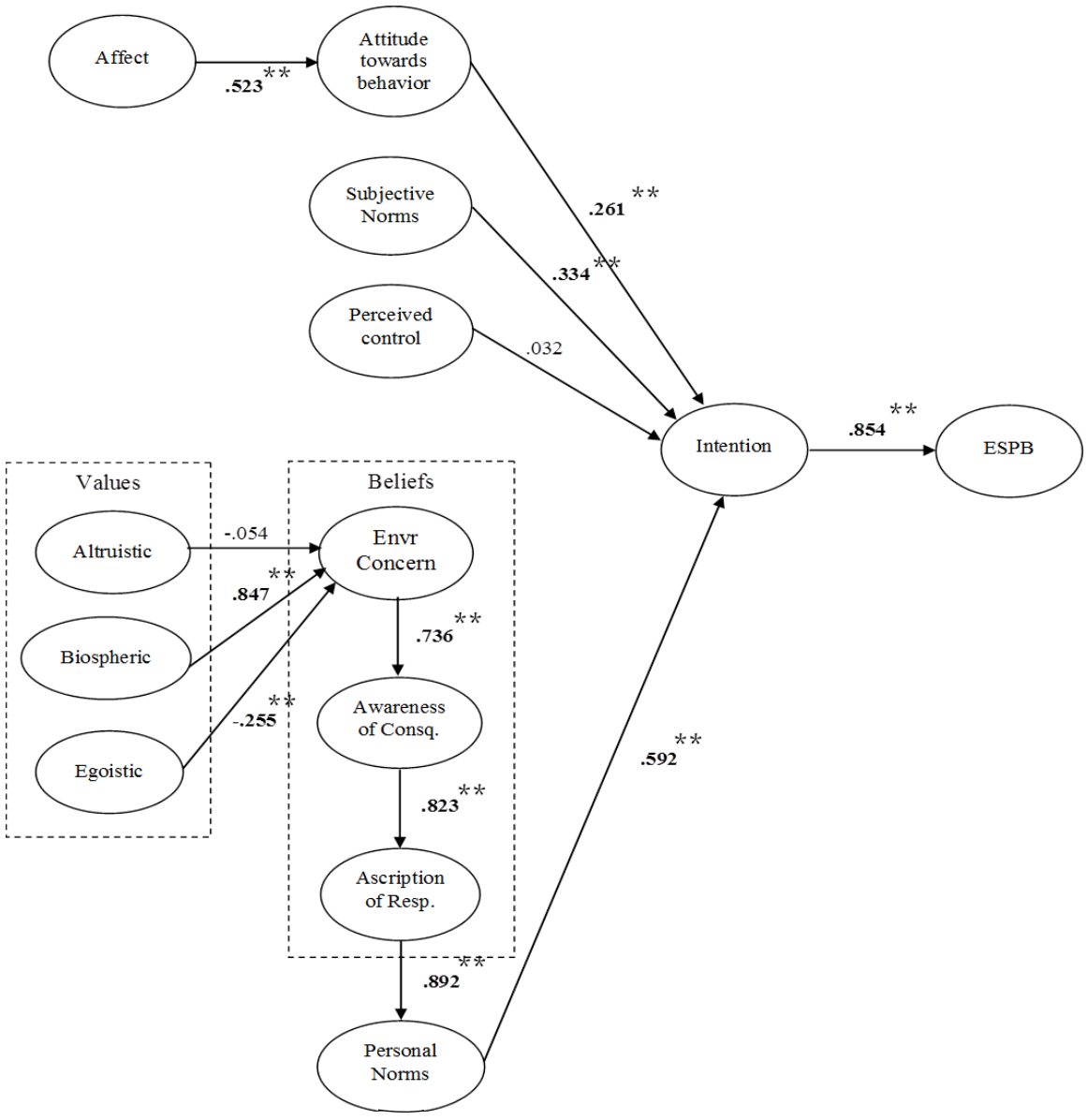


Figure 4-2. The structural equation model with hypothesized relationships and standardized beta values.
Notes: ** denotes paths significant at $p<0.01$

4.6 Comparison of the GFT Models: the Theory of Planned Behavior (TPB), Theory on Affect (TA), and Value-Belief-Norm (VBN) Model

Following the satisfactory results of the combined model evaluations, the three models developed based on the underlying theories of GFT were compared for model fit. Table 4-4 summarizes the degree to which each model fits the data using various fit measures. The table indicates that all three models provide a good fit to the data. This suggests that all three models based on GFT can be successfully applied to the domain of consumers' environmentally sensitive purchase behavior.

In a setting in which all three GFT models reveal a reasonable fit to the data in explaining similar target behavior, to determine the best model, other possible criteria must be examined as suggested by Rust, Lee, & Valente (1995). In this study, the Chi-square difference test is not employed to determine the best performed model because of the non-nested structure of the three GFT models (Anderson & Gerbing, 1988). When conducting the comparison between the non-nested competing models, similar to this study, parsimony fit measures such as the Akaike information criterion (AIC) (Akaike, 1987) and the Browne–Cudeck criterion (BCC) (Browne & Cudeck, 1989) are considered appropriate because they assess model parsimony and fit (Rust et al., 1995). As shown in Table 4-5, in the TPB, AIC is 225.782 and BCC is 230.953, in the TA, AIC is 268.154 and BCC is 271.312, the values for the VBN are 1096.309 and 1119.252 for AIC and BCC, respectively. As smaller values of these criteria give us a better fit of the model, these results indicate a preference for the TPB over the TA and VBN. On the other hand, additional parsimony fit measures such as the parsimony goodness of fit index (PGFI)

(the TPB: 0.662; the TA: 0.604; the VBN: 0.714) and the parsimony normed fit index (PNFI) (the TPB: 0.769; the TA: 0.739; the VBN: 0.804), which assess the parsimony fit of GFT models, favor the VBN. For the non-nested model comparisons, the most common statistical test is the normed Chi-square (Rust et al., 1995). In the TPB, the normed Chi-square is 1.52, in the AT, the value is 3.41, and the value for the VBN is 1.95, respectively. Since a smaller value of this criteria indicates a better parsimony and a better fit of the model, this result indicates a superior fit for the TPB over the TA and VBN. Overall, in terms of the model fit and model parsimony, the results suggest that in a comparison of the GFT models, the TPB is slightly superior to both the TA and VBN. Following the TPB, the VBN model offers the second best explanation for this specific behavior relative to the TA.

Three Model Fit Comparisons (Purchase)

Measure	TPB	TA	VBN
Chi-square	145.78	208.154	930.309
IFI	0.99	0.96	0.94
TLI	0.98	0.95	0.94
CFI	0.99	0.96	0.94
RMSEA	0.043	0.093	0.058

Table 4-4. The table indicates that all three models provide a reasonable fit to the data. Notes: TPB, theory of planned behavior; TA, theory on affect; VBN, value-belief-norm; IFI, incremental fit index, TLI, Tucker–Lewis index; CFI, comparative fit index; RMSEA, root mean square error of approximation.

Parsimony Fit Measure Comparisons (Purchase)

Measure	TPB	TA	VBN
Normed Chi-square	**1.52**	3.41	1.95
PNFI	0.769	0.739	**0.804**
BCC	**230.953**	271.312	1119.252
AIC	**225.782**	268.154	1096.309
PGFI	0.662	0.604	**0.714**

Table 4-5. Comparison between the non-nested competing models using parsimony fit measures.
Notes: PNFI, parsimony normed fit index; BCC, Browne–Cudeck criterion; AIC, Akaike information criterion; PGFI, parsimony goodness of fit index. The measures in bold show the better fit compared to other values in the same index.

4.7 Discussion and Conclusions

This study helps to understand the functioning of goal framing theory (GFT) in the environmental behavior context and the significance of each individual variable of the theory in determining consumers' environmentally sensitive purchase behavior. Goal framing theory emerged to be a crucial framework and is suggested to be applied further in studies which focus on environmental behavior. The theory covers three substantial motivations of individuals: hedonistic, gain, and normative related concerns. Considering GFT, this study tested a model developed by combining three theories, i.e., theory of planned behavior, values-beliefs-norms theory, and theory on affect. The results of the study showed that GFT could explain environmentally sensitive purchase behaviors (ESPB) of consumers. All three motivational predictors (hedonistic, gain, and normative related concerns) had an effect to a certain degree on ESPB through behavioral intention.

Examining each individual variable based on the developed model, especially VBN theory variables were strong predictors along with subjective norms and attitudes towards purchase behavior. This tells us that the environmentally sensitive behaviors of individuals in the context of environmentally sensitive purchases are mostly affected by their environmental values, beliefs, personal and subjective norms, and attitudes. In other words, consumers with high biospheric values, environmental concern, personal and subjective norms, positive attitudes, affect, and intention towards behavior, high awareness of consequences, ascription of responsibility, and low egoistic values purchase more eco-friendly products.

The power of VBN theory variables to explain ESPB parallels the suggestion of Vermeir and Verbeke (2008), such that sustainable consumption and actions related to it are based on not just needs and wants of the consumers but also a decision-making process that considers their social responsibilities. These social responsibilities, which the individual considers when making a behavioral decision, are found to be affected by the environmental concern. This in turn increases the awareness of the detrimental effects of relevant behaviors. This finding is similar to Bamberg's (2003) study, which found a direct effect of environmental concern on the awareness and evaluation of the behavior related situation. Additionally, Dagher and Itani (2012) found a similar significant relationship between environmental concern and behavior in their study focuses on green purchasing behavior.

From three types of value orientations, biospheric values seemed to be the strongest predictor of the ecological worldview of individuals. This result parallels the

finding of Fraj and Martinez (2006) who showed that the individuals with high value orientation towards ecological matters display more eco-sensitive behavior. In their study based on VBN theory, Steg, Dreijerink, and Abrahamse (2005) also found that from the three values examined (i.e., altruistic, biospheric, egoistic), biospheric values were most strongly related to behavior specific beliefs in the context of energy policy acceptability. These findings suggest that valuing the ecological well-being is important when a customer makes an eco-sensitive inclined decision. Although the results of this study as well as findings of De Groot and Steg (2008) suggest the link between low egoistic values and higher environmental worldview, the predicting power of this type of value orientation seems to be much lower than that of biospheric values.

While literature suggests a strong positive relationship between consumer perceived behavioral control (PBC) and behavioral intention (Cook et al., 2002; Vermeir & Verbeke, 2008), this study's results did not show a significant relationship between these two variables. One explanation of this could be that in today's market conditions, accessing these types of eco-sensitive products by consumers is not as difficult due to the increased availability (Hamilton & Zilberman, 2006) and growing green market (Dagher & Itani, 2012). In fact, it is expected that the global growth of green markets will take place with an annual increase of more than 25% (Ulasewicz & Vouchilas, 2008). Thus, accessibility of an eco-sensitive product may not influence purchase behavior, as in the past. Although the insignificant result found for PBC weakens the explanatory power of TPB on ESPB, other variables belonging to this theory, i.e., subjective norms, attitude towards behavior, and especially intention to purchase environmentally sensitive

products, all still have strong predicting power. According to the results, purchase intention explains 73% of the variance in the behavioral outcome, which shows that intention has strong predicting power as an immediate antecedent of the behavior in question. Furthermore, similar to Cook et al. (2002), Chan and Lau (2002), and Vermeir and Verbeke's (2008) studies, the results indicated that subjective norms and attitudes are significant determinants of eco-sensitive purchase behaviors. Contrary to previous suggestions of Cialdini and Trost (1998), this study did not show a weaker effect of subjective norms on behavioral intention relative to other TPB variables in the model. The result is consistent with the findings of Dagher and Itani (2012) on green purchasing behavior, which showed the importance of social influence on these types of behaviors.

Bonini and Oppenheim (2008) identified barriers to pro-environmental purchasing behavior as a lack of awareness (AC), perceived effectiveness, negative perceptions, and low availability. Although the current study did not show any significant relationship with ease or difficulty perceived by the consumer in performing a behavior and intention to perform that behavior, which could be presented as low availability, study results provided similar findings in terms of the importance of being aware of the negative consequences of the related behavior and attitudes.

In addition to examining the effects of each individual variable of the developed research model, the present study performed a further model comparison among the three GFT frameworks (i.e., the TPB, TA, and VBN) for explaining consumers' environmentally sensitive purchase behavior (ESPB), which can demonstrate how each model provides understanding of consumers' ESPB. Based on the previous studies of

model comparison (Akaike, 1987; Browne & Cudeck, 1989; Rust et al., 1995), this study displayed reasonable model fit to evaluate the three GFT models and identified the best model**.** Empirical results showed that all the three underlying models of GFT achieve comparable fit to the data. Overall, the results of the model comparison generally indicated that the ESPB of consumers could be better explained by the TPB relative to the VBN or the TA. This result gives us an important insight on explaining environmentally sensitive purchase behavior using different theories and shows that self-interest based theories can better explain this type of behavior compared to hedonic and moral based theories.

4.7.1 Implications and recommendations

Based on the study results, it is clear that pro-environmental behavior change in the context of environmentally sensitive purchase behavior could be possible with various social and sustainability marketing strategies that focus on communicating different aspects of purchase decisions. According to the results, practitioners can focus on promoting consumers' intentions to purchase environmentally friendly options by strengthening their values, beliefs, personal and subjective norms, attitudes, and emotions regarding the behavior. The results imply that especially strengthening biospheric values can be crucial in promoting these types of behaviors as opposed to altruistic values. A similar suggestion also comes from De Groot and Steg (2010) with regard to making biospheric values more salient in order to promote pro-environmental behaviors. Here, we can say that focusing on welfare of the environment and biosphere makes a difference

for these types of behaviors rather than focusing on welfare of others (altruistic values) or the self (egoistic values). Altering human values is a difficult task, and it would take a long time to achieve. However, by making the biospheric values more salient, as suggested by De Groot and Steg (2010), we can significantly influence relevant behavior through changing behavioral intention. Evidently, making it more salient could be possible with appropriate social marketing strategies as well as promotional efforts.

Furthermore, when developing marketing strategies, it would be important to communicate the detrimental consequences of a certain purchase behavior. This way, consumers would be aware of the direct consequences of their actions, which would help them make decisions based on their environmental concerns and increase their perception of self-responsibility to solve these problems. Knowing how their actions affect the environmental well-being seems to be very important in the decision-making process in the context of ESPB because it affects personal moral obligations to act pro-environmentally, which also has a great effect on pro-environmental behaviors. In addition to this, designing marketing communications to positively shape and/or change eco-sensitive purchase behavior attitudes seems to be crucial because of the influence of positive attitudes on strong intention to purchase ecologically harmless products.

It would also be important for companies that produce and promote green products to focus on these products' ecological aspects and their effect on protecting environmental well-being. This kind of direct relation to the actual products could increase the awareness and ascribed self-responsibility of consumers.

4.8 References

Abrahamse, W., & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review, 18*(1), 30-40.

Abrahamse, W., Steg, L., Gifford, R., & Vlek, C. (2009). Factors influencing car use for commuting and the intention to reduce it: A question of self-interest or morality?. *Transportation Research Part F: Traffic Psychology & Behavior, 12*(4), 317-324.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Ajzen, I. (2002). Constructing a TPB questionnaire: Conceptual and methodological considerations. Retrieved from http://www.people.umass.edu/aizen/pdf/tpb.measurement.pdf

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall, Englewood Cliffs, NJ: Prentice-Hall.

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika 52*(3), 317–332.

Albrecht, D., Bultena, G., Hoiberg, E., & Nowak, P. (1982). The new paradigm scale. *Journal of Environmental Education, 13,* 39–43.

Allison, P. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology, 112*(4), 545-557.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modelling in practice: a review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-23.

Aoyagi-Usui, M., Vinken, H., & Kuribayashi, A. (2003). Pro-environmental attitudes and behaviors: An international comparison. *Human Ecology Review,10*(1), 23-31.

Bagozzi, R. P., & Heatherington, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to self-esteem. *Structural equation modeling, 1*(1), 35-67.

Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of Environmental Psychology, 23*(1), 21-32.

Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides & R. E. Shumaker (Eds.), *Advanced structural equation modeling: New developments and techniques*. Mahwah, NJ: Lawrence Erlbaum Associates.

Barr, S. (2007). Factors influencing environmental attitudes and behaviors A UK case study of household waste management. *Environment and Behavior,39*(4), 435-473.

Baumgartner, H., & Homberg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing, 13*, 139-161.

Bechtel, R. B., Verdugo, V. C., & de Queiroz Pinheiro, J. (1999). Environmental belief systems: United States, Brazil, and Mexico. *Journal of Cross-cultural Psychology, 30*(1), 122–128.

Biel, A., & Thøgersen, J. (2007). Activation of social norms in social dilemmas: A review of the evidence and reflections on the implications for environmental behavior. *Journal of Economic Psychology*, *28*(1), 93-112.

Bigné, J. E., Andreu, L., & Gnoth, J. (2005). The theme park experience: An analysis of pleasure, arousal and satisfaction. *Tourism Management, 26*(6), 833-844.

Birgelen, M. V., Semeijn, J., & Keicher, M. (2009). Packaging and pro-environmental consumption behavior: Investigating purchase and disposal decisions for beverages. *Environment and Behavior, 41*(1), 125-146.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Bonini, S. M., & Oppenheim, J. M. (2008). Helping 'green'products grow. *The McKinsey Quarterly, 3*(2), 1-8.

Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research 24*(4), 445–455.

Bruni, C. M., Schultz, P. W., & Saunders, C. (2012). CONPSYCHMeasures, Measurement Tools for Environmental Practioners. Retrieved from http://www.conpsychmeasures.com/CONPSYCHMeasures/Measures/NEP_R/NEP_R.html

Byrne, B. M. (2001). *Structural Equation modeling with AMOS: Basic concepts, applications, and programming* (Multivariate applications series). (pp. 57-91), New Jersey: Mahwah Publishers.

Chan, R. Y. K. (2001). Determinants of Chinese consumers' green purchase behavior. *Psychology and Marketing*, *18*(4), 389–413.

Chan, R. Y. K., & Lau, L. B. Y. (2002). Explaining green purchasing behavior. *Journal of International Consumer Marketing*, *14*(2-3), 9-40.

Chan, N., & Kotchen, M. J. (2012). A generalized impure public good and linear characteristics model of green consumption. Working paper, Yale University. Retrieved from http://environment.yale.edu/kotchen/wpapers/linchar.pdf on December 12, 2012.

Chen, M. F. (2007). Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: Moderating effects of food-related personality traits. *Food Quality and Preference*, *18*(7), 1008-1021.

Choi, M., & Kim, Y. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research, 32*(1), 592-599.

Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 151–192). Boston: McGraw-Hill.

Cook, A. J., Kerr, G. N., & Moore, K. (2002). Attitudes and intentions towards purchasing GM food. *Journal of Economic Psychology*, *23*(5), 557-572.

Cone Communications (2013). Cone Communication Research and Insights. Retrieved from http://www.conecomm.com/2013-cone-communications-green-gap-trend-tracker.

Corbett, J. B. (2005). Altruism, self-interest, and the reasonable person model of environmentally responsible behavior. *Science Communication, 26*(4), 368-389.

Corraliza, J. A., & Berenguer, J. (2000). Environmental values, beliefs and actions. *Environment and Behavior, 32*, 832–848.

Dagher, Grace K. & Itani, Omar S. (2012). The influence of environmental attitude, environmental concern and social influence on green purchasing behavior. *Review of Business Research, 12*(2), 104.

De Groot, J. I., & Steg, L. (2007). Value orientations and environmental beliefs in five countries validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of Cross-Cultural Psychology, 38*(3), 318-332.

De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*(3), 330-354.

De Groot, J. I. M., & Steg, L. (2010). Relationships between value orientation, self-determined motivational types and pro-environmental behavioral intentions. *Journal of Environmental Psychology, 30*(4), 368-378.

Diamantapoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research, 56*(4), 465–480.

Dittmar, H. (1992). *The social psychology of material possessions: To have is to be.* Hemel Hempstead: Harvester Wheatsheaf.

Dunlap, R. E., & Van Liere, K.D. (1978). *Environmental concern: a bibliography of empirical studies and brief appraisal of the literature*. Monticello, Illinois: Vance Bibliographies.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56,* 425-442.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.

Fisk, G. (1973). Criteria for a theory of responsible consumption. *The Journal of Marketing*, 24-31.

Follows, S. B., & Jobber, D. (2000). Environmentally responsible purchase behavior: A test of a consumer model. *European journal of Marketing, 34*(5/6), 723-746.

Fornell, C. & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Fox, J. (2002). Structural Equation Models. Retrieved from http://cran.r-project.org/doc/contrib/Fox-Companion/appendix-sems.pdf on December 09, 2013.

Fraj, E., & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis. *Journal of Consumer Marketing, 23*(3), 133-144.

Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of pro-environmental behavior intention. *Journal of Environmental Psychology, 23*(1), 1-9.

Garver, M. S., & Mentzer, J.T. (1999). Logistics research methods: Employing structural equation modeling to test for construct validity. *Journal of Business Logistics, 20*(1), 33-57.

Gatersleben, B. (2007). Affective and symbolic aspects of car use. In T. Garling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 219–233). Amsterdam: Elsevier.

Ginsberg, J.M., & Bloom, P.N. (2004). Choosing the Right Green Marketing Strategy. Retrieved from http://korny.uni-corvinus.hu/angol/cem-zgy/st_makeuparticle_no2.pdf

GMA, Deloitte (2009). Finding the green in today's shoppers: Sustainability trends and new shopper insights. Retrieved from http://www.gmaonline.org/downloads/research-and-reports/greenshopper09.pdf

Gotschi, E., Vogel, S., Lindenthal, T., & Larcher, M. (2009). The role of knowledge, social norms, and attitudes toward organic products and shopping behavior: Survey results from high school students in Vienna. *The Journal of Environmental Education, 41*(2), 88-100.

GSS (2010), General Social Survey Ballot 1. Retrieved from http://publicdata.norc.org:41000/gss/documents//OTHR/GSS2010_Ballot1_AREA_English.pdf on May 14, 2012.

Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Hamilton, S. F., & Zilberman, D. (2006). Green markets, eco-certification, and equilibrium fraud. *Journal of Environmental Economics and Management, 52*(3), 627-644.

Han, H., Hsu, L. T. J., & Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management, 31*(3), 325-334.

Hartmann, P., & Apaolaza-Ibáñez, V. (2012). Consumer attitude and purchase intention toward green energy brands: The roles of psychological benefits and environmental concern. *Journal of Business Research, 65*(9), 1254-1263.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible pro-environmental behavior: A meta-analysis. *The Journal of Environmental Education, 18*(2), 1–8.

Hoe, S. L. (2008). Issues and procedures in adopting structural equation modeling technique. *Journal of Applied Quantitative Methods, 3*(1), 76-83.

Hox, J. J., & Bechger, T. M. (1998). An introduction to structural equation modeling. *Family Science Review, 11*, 354-373.

Hoyle, R. (1995). *Structural Equation Modeling: Concepts, Issues, and Applications*. Thousand Oaks, CA: Sage Publications.

Hunecke, M., Blobaum, A., Matthies, E., & Hoger, R. (2001). Responsibility and environment: ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior, 33,* 830–852.

Jansson, J., Marell, A., & Nordlund, A. (2010). Green consumer behavior: Determinants of curtailment and eco-innovation adoption, *Journal of Consumer Marketing, 27* (4), 358–370.

Joreskog, K. G., & Sorbom, D. (1993). *LISREL VIII: Analysis of linear structural relations by the method of maximum likelihood*. Chicago, IL: National Education Resources.

Kahle, L. R. (1996). Social values and consumer behavior: research from the list of values. In *The Psychology of Values: The Ontario Symposium*, (Vol. 8, pp. 135-151). Mahwah, NJ: Lawrence Erlbaum Associates.

Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: Guilford Press.

Leonidou, L. C., Leonidou, C. N., & Kvasova, O. (2010). Antecedents and outcomes of consumer environmentally friendly attitudes and behavior. *Journal of Marketing Management, 26*(13-14), 1319-1344.

Mainieri, T., Barnett, E. G., Valdero, T. R., Unipan, J. B., & Oskamp, S. (1997). Green buying: The influence of environmental concern on consumer behavior. *The Journal of social psychology*, *137*(2), 189-204.

Midden, C., Kaiser, F., & McCalley, T. (2007). Technology's four roles in understanding individuals' conservation of natural resources. *Journal of Social Issues, 63*(1), 155–174.

Mukherjee, A., & Onel, N. (2013). Building green brands with social media: Best practices from case studies. *Journal of Digital & Social Media Marketing, 1*(3), 292 - 311.

NJDEP (2006). Green purchasing: Guide for local governments and communities. Retrieved from http://www.state.nj.us/dep/opsc/docs/green_purchasing_guide_local_governments.pdf on November 28, 2013.

Noe, F. & Snow, R. (1990) The new environmental paradigm and further scale analysis. *Journal of Environmental Education, 21,* 20–26.

Nordlund, A. M., & Garvill, J. (2002). Value structures behind proenvironmental behavior. *Environment and Behavior, 34*(6), 740-756.

Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, *23*(4), 339-347.

Nunnally, J. C. & Berstein, I.H. (1994). *Psychometric theory*. New York: McGraw-Hill.

Ulasewicz, C., & Vouchilas, G. (2008). Sustainable design practices and consumer behavior: FCS student perceptions. *Journal of Family and Consumer Sciences, 100*(4), 17-20.

Peattie, K. (2010). Green consumption: Behavior and norms. *Review of Environment and Resources, 35*(1), 195-228.

Peter, J. P. (1979). Reliability: A review of psychometric basics and recent marketing practices. *Journal of Marketing Research, 16*(1), 6-17.

Poortinga, W., Steg, L., Vlek, C. (2004). Values, environmental concern and environmental behavior: A study into household energy use. *Environment and Behavior, 36*(1), 70-93.

Rahbar, E., & Wahid, N. A. (2010). The Malaysian consumer and the environment: Purchase behavior. *Global Business and Management Research: An International Journal, 2*(4), 323-336.

Roberts, J. A. (1996). Green consumers in the 1990s: Profile and implications for advertising. *Journal of Business Research, 36*(3), 217–231.

Robinson, R., & Smith, C. (2002). Psychosocial and demographic variables associated with consumer intention to purchase sustainably produced foods as defined by the Midwest Food Alliance. *Journal of Nutrition Education and Behavior, 34*(6), 316-325.

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39*(6), 1161.

Rust, R. T., Lee, C., Valente, E. (1995). Comparing covariance structure models: a general methodology. *International Journal of Research in Marketing* 12 (4), 279–291.

Saba, A. & Messina, F. (2003). Attitudes towards organic foods and risk/benefit perception associated with pesticides. *Food Quality and Preference, 14*, 637-45.

Schlegelmilch, B.B., Bohlen, G.M., & Diamantopoulos, A. (1996). The link between green purchasing decisions and measures of environmental consciousness. European *Journal of Marketing, 30*(5), 35-55.

Schultz, P. W., & Zelezny, L. C. (2003). Reframing environmental messages to be congruent with American values. *Human Ecology Review*, *10*(2), 126-136.

Schwartz, S. H. (1968). Words, deeds and the perception of consequences and responsibility in action situations. *Journal of Personality and Social Psychology*, *10*(3), 232.

Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology*, *10*, 221–279.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*(1), 1-65.

Schwartz, S. H. (1994a). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, *50*(4), 19-45.

Schwartz, S. H. (1994b). Beyond individualism/collectivism: New cultural dimensions of values. Sage Publications, Inc.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. R. (2005). A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research, 58*(1), 935-43.

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: A customer-centric approach to sustainability. *Journal of the Academy of Marketing Science, 39*(1), 21–39.

Shiu, E., Pervan, S. J., Bove, L. L., & Beatty, S. E. (2011). Reflections on discriminant validity: Reexamining the Bove et al.'s (2009) findings. *Journal of Business Research, 64*(5), 497-500.

Shrum, L. J., McCarty, J. A., & Lowrey, T. M. (1995). Buyer characteristics of the green consumer and their implications for advertising strategy. *Journal of Advertising, 24*(2), 71–82.

Smith, S. M., Haugtvedt, C. P., & Petty, R. E. (1994). Attitudes and recycling: does the measurement of affect enhance behavioral prediction?. *Psychology & Marketing, 11*(4), 359-374.

Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice*, *39*(2), 147-162.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F: Traffic Psychology and Behavior*, 4(3), 151-169.

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology, 25*(4), 415-425.

Steg, L., De Groot, J. I., Dreijerink, L., Abrahamse, W., & Siero, F. (2011). General antecedents of personal norms, policy acceptability, and intentions: The role of values, worldviews, and environmental concern. *Society and Natural Resources, 24*(4), 349-367.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407–424.

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, *50*, 65-84.

Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A brief inventory of values. *Educational and Psychological Measurement, 58*(6), 984-1001.

Stern, P. C., Dietz, T., Kalof, L., & Guagnano, G. A. (1995). Values, beliefs, and proenvironmental action: attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology, 25*, 1611–1636.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, *6*(2), 81–97.

Suzuki, D. & Moola, F. (2009, Jun). Consumer demand spurs a corporate sea change. David Suzuki Foundation. Retrieved from http://www.davidsuzuki.org/blogs/science-matters/2009/06/consumer-demand-spurs-a-corporate-sea-change/.

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Needham Heights, MA: Allyn & Bacon.

Tanner, C. & Kast, S. W. (2003). Promoting sustainable consumption: Determinants of green purchases by Swiss consumers. *Psychology and Marketing, 20*(10), pp. 883–902.

Thøgersen, J. (2002). Direct experience and the strength of the personal norm–behavior relationship. *Psychology & Marketing, 19*(10), 881-893.

Thøgersen, J. (2005). How may consumer policy empower consumers for sustainable lifestyles? *Journal of Consumer Policy, 28*, 143–178.

Thøgersen, J. (2009). Consumer decision-making with regard to organic food products. In M. T. N. Vaz, P. Nijkamp and J. L. Rastoin (Eds.), *Traditional food production and rural sustainable development: A European challenge*, (pp. 173-94), Aldershot, UK: Ashgate.

Tonglet, M., Phillips, P. S., & Read, A. D. (2004). Using the Theory of Planned Behavior to investigate the determinants of recycling behavior: a case study from Brixworth, UK. Resources, *Conservation and Recycling, 41*(3), 191-214.

Wiidegren, Ö. (1998). The new environmental paradigm and personal norms. *Environment and Behavior, 30*(1), 75-100.

Van Deth, J. W., & Scarbrough, E. (Eds.). (1995). *The impact of values* (Vol. 4). Oxford, UK: Oxford University Press.

Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer "attitude–behavioral intention" gap. *Journal of Agricultural and Environmental Ethics, 19*(2), 169-194.

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behavior and the role of confidence and values. *Ecological Economics, 64*, 542-553.

Vagias, W. M. (2006). Likert-type scale response anchors. *Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management.* Clemson University. Retrieved from http://enrd.ec.europa.eu/app_templates/enrd_assets/pdf/Guidance-on-Surveys/Likertscales-responses.pdf

Van Petegem, P., & Blieck, A. (2006). The environmental worldview of children: A cross-cultural perspective. *Environmental Education Research, 12*(5), 625-635.

Chapter 5

"It is a simple fact of life on earth that there is going to be no successful mitigation of the climate change problem without a truly global effort."

(Ross Garnaut, Parliament House Victoria, 2008)

Study III: Investigation of the Predictors of Environmentally Sensitive Usage Behavior

CHAPTER 5

Investigation of the Predictors of Environmentally Sensitive Usage Behavior

Abstract

One of the most environmentally detrimental effects of consumer behaviors is identified to take place at the usage stage of consumption process. This study examined environmentally sensitive usage behavior of consumers by adopting the framework of the Goal Framing Theory (GFT). The purpose of this study was to analyze the factors that predict environmentally sensitive usage behavior (ESUB) of consumers by examining the extent to which such behaviors depend mostly on moral considerations, feelings, or self-interest motives. The hypotheses and model were formulated and tested with Structural Equation Modeling (SEM) using the data from 265 individuals. The analysis identified two different types of consumer usage behaviors; environmentally sensitive transportation and household energy saving. Examination of these two types of usage behavior indicated that GFT could be an important framework in explaining both of the behaviors. The findings suggest that while values (biospheric, egoistic), environmental concern, subjective norms, affect, attitudes towards behavior, perceived behavioral control, and intention explain both types of usage behavior, altruistic values do not have any power in explaining either one of them. Variables of the values-beliefs-norms and affect theories that assess moral and hedonic concerns, respectively, seemed to have the greatest explanatory power for transportation behavior. Gain motive variable subjective norms had relatively less explanatory power for this behavior. On the other hand, for household energy use, moral concern related variables were not significant predictors and

feelings seemed to be playing a big role in explaining these types of actions. The implications of these findings for marketers, managers, and practitioners have been discussed.

Keywords: Environmentally sensitive usage, Transportation, Household energy use, Goal Framing Theory, Theory of planned behavior, Value-Belief-Norm model, Theory on Affect.

5. Introduction

Increasing the understanding of environmentally sensitive usage behavior of consumers is important for maintaining and/or improving environmental conditions. By understanding the functioning of motivations that lead individuals to use products and services in different ways, it can be possible to develop necessary policies as well as business strategies to alter environmentally harmful consumption behaviors. Although understanding purchase behaviors that are significant on the environment is also important to develop necessary actions, it is not enough from policy, business and marketing perspectives. As Jansson, Marell, and Nordlund (2010) point out; it is an ineffective strategy to develop environmentally harmless or less harmful products as long as consumers are not willing to adopt eco-sensitive technologies and lifestyles. There will be need to use products and services in an environmentally conscious way to improve environmental welfare and consequently, people's quality of life.

One of the most significant behaviors of consumers is identified to take place at the usage stage of the consumer consumption process, which covers six stages: recognition of need and want, information search, evaluation of alternatives, purchase, use, and post-use. According to the sustainability marketing, from these six stages of the consumption process, the usage stage has the highest negative social and environmental consequences (Belz & Peattie, 2009). Also, several researchers state that global environmental problems stem from individual usage behaviors, such as household energy consumption or travel behavior (Brandon & Lewis, 1999; Noorman & Schoot Uiterkamp, 1998; Poortinga, Steg, & Vlek, 2004; Abrahamse & Steg, 2011). According to the U.S.

Environmental Protection Agency's (EPA) "Inventory of U.S. Greenhouse Gases and Sinks" report that publishes annual total emissions across the United States and tracks changes, greenhouse gas emissions primarily come from electricity production (33%), which is mostly based on fossil fuels, coal, or natural gas burning, and transportation (28%), which is mainly relied upon fossil fuels. Although not as much as electricity production or transportation, residential greenhouse gas emissions are also reported to comprise a significant amount of total emissions nationwide (11%, including commercial). These types of emissions primarily come from burning fossil fuels for heating purposes or using products that produce greenhouse gases (EPA, 2011). Thus, from the environmental well-being stand-point, it is crucial for consumers to lessen the negative impacts caused by their product and energy use, both indoors and outdoors, such as by decreasing household energy consumption or choosing environmentally sound transportation options. This also underlines the importance of examining and understanding individual consumption behavior in the context of environmentally sensitive usage behavior.

Although a number of scholars in recent years have begun to look at consumer environmentally sensitive usage behavior, and a growing number of studies on this topic have emerged (e.g., Nordlund & Garvill, 2003; Steg, 2005; Moll et al., 2005; Abrahamse & Steg, 2011; Corradi et al., 2013), the underlying causes of these types of behaviors are not yet fully understood. Steg (2008) points out the importance of an interdisciplinary approach to understand and influence household usage behavior by stating "any single discipline will provide a limited view of the topic at most. Interdisciplinary studies allow

us to obtain a broader and more comprehensive view of the issues involved and of successful ways to reduce household energy use" (p. 4452). Following her suggestion, Study III of this dissertation tries to understand the factors that influence consumers' environmentally sensitive usage behaviors by focusing on three different types of motivations: hedonic, self-interest, and moral, based on the Goal Framing Theory. It is important to understand why consumers choose eco-friendly usage options over others in order to alter these types of behaviors.

This study is organized as follows. First, based on the Goal Framing Theory (GFT) (Lindenberg, 2001a, 2001b, 2006) we constructed a model and developed hypotheses with the relevant literature. Second, we examined the relationships of individual's behavioral attitudes, affect (i.e., pleasure), subjective norms, perceived behavioral control, personal norms, values (i.e., biospheric, altruistic, egoistic), environmental concern, awareness of consequences (AC), ascription of responsibility (AR), pro-environmental personal norms (PN), and intention with environmentally sensitive usage behaviors, namely household energy use and transportation. The study was based on a primary data obtained from individuals who are the active members of the TerraCycle recycling company. The main objectives of the study were to (1) determine predictor variables of environmentally sensitive usage behavior and (2) see whether this type of behavior depends mostly on moral considerations, feelings, or self-interest motives. . Finally, the results of the study on factors influencing usage behaviors, i.e. household energy use and transportation, were presented.

5.1 Literature Review and Hypotheses Construction

5.1.1 Environmentally sensitive usage (ESU) behavior and its predictors

Environmentally sensitive usage (ESU) behavior can be considered as a behavior of an individual who considers environmental or social issues while using products and services. This study considered environmentally sensitive usage as using goods and services in a way that have minimal effect on the natural environment.

Consumers use products and services in an environmentally beneficial way mainly for three reasons. First, they want to use products and services in a way that would have a minimal negative effect on the natural environment. Second, consumers also want to save on costs by making eco-sensitive usage decisions, such as choosing public transportation instead of driving, or using less energy at home (Abrahamse & Steg, 2011; Steg, 2008). It is also argued that consumers might be willing to save from energy use for normative reasons which they want to comply with. Although all of these could be important reasons for individuals to act eco-sensitively, understanding their environmentally sensitive usage behaviors fully with significant predicting factors is not an easy task. This study, thus, focuses on psychosocial variables to explain eco-sensitive usage behaviors of consumers by adopting three theories aforementioned in the previous chapter, i.e., Theory of Planned Behavior, Values-Beliefs-Norms Theory, and Theory on Affect. Goal Framing Theory, which was the main theory adopted when developing a research model for Study III, combines the three theories. In the next section, relevant hypotheses were developed separately based on each of the three theories.

5.1.2 Hypotheses development

Theory of Planned Behavior and ESU Behavior

The theory of planned behavior (TPB) considers behavior to be a result of a consumer's cost-benefit analyses (Ajzen, 1985; Ajzen & Fishbein, 1980). As such, in the context of environmentally sensitive usage behavior, it is assumed that if the person perceives a benefit from the behavior in question without additional costs (material, social, or effort related cost), (s)he would use products and services in an eco-sensitive way. With a similar approach, Steg (2008) states that "people are less likely to reduce their energy use when saving energy involves high behavioral costs in terms of money, effort or convenience" (p.4450). In the TPB, three factors determine behavioral intentions: (1) attitudes toward the behavior, (2) subjective norms, and (3) perceived behavioral control.

The TPB has been used in the environmental behavior literature to explain different types of usage behaviors, such as transportation (e.g., Abrahamse et al., 2009; Gardner & Abraham, 2008; Bamberg & Schmidt, 2003; Heath & Gifford, 2002), and household energy use (e.g., Abrahamse & Steg, 2011; Armitage & Conner, 2001). For instance, Bamberg and Schmidt (2003), in their study on predicting students' car use for university routes found that variables of TPB significantly predicted the students' car use intention, which consequently predicted their future car use decision. In a similar study, Heath and Gifford (2002) found that university students' intention to take the bus could be predicted by TPB variables, i. e., attitudes, subjective norms, and perceived behavioral control. These variables were significantly and positively related to the bus use intention.

They also looked at reported bus usage of these students and found it to be highly and positively related to intentions to use buses for transportation. In another study, Abrahamse et al. (2009) looked at car use for commuting and found that this behavior was mainly predicted by TPB variables, particularly perceived behavioral control and attitudes.

Some other researchers looked at TPB and its functioning in the context of energy usage and water consumption in the households (e.g., Abrahamse & Steg, 2011; Steg, 2008). These studies suggested that sustainable usage behavior in households can be stimulated by having a positive attitude towards sustainable usage, high subjective norms, perceived behavioral control, and intentions to use in an environmentally sensitive way. For example, Abrahamse and Steg (2011) found that energy conservation in households was positively related to intention to reduce household energy use, attitudes, and perceived behavioral control of individuals. Also, according to Steg (2008), perceived behavioral control (an important variable of TPB) reflects the contextual factors related to sustainable usage behaviors and, therefore, plays a substantial role in determining ESU behaviors. This discussion leads to the following hypotheses:

H1b: There is a positive relationship between individuals' attitudes towards using products and services in an environmentally sensitive fashion and their intentions to use them environmentally sensitively.

H2b: There is a positive relationship between individuals' subjective norms and their intentions to intentions to use products in an environmentally sensitive way.

H3b: There is a positive relationship between individuals' perceived behavioral control and their intentions to use products in an environmentally sensitive way.

H4b: There is a positive relationship between individuals' intentions to use environmentally sensitively and environmentally sensitive usage behavior.

Value-Belief-Norm Theory and ESU Behavior

The second subset of Goal Framing Theory comprises value focused theory and framework variables, including altruistic, biospheric, egoistic values, environmental concern, awareness of consequences, personal norms, and ascription of responsibility. Definitions of each variable provided in the Study II of this dissertation.

For the purpose of the Study III, Value-Belief-Norm (VBN) Theory of Stern et al. (1999) and Stern (2000) was used as the base theory to develop a model that would explain normative motivations for using products and services in an environmentally sensitive way. The VBN theory combines the perspectives of value theory, norm-activation theory, and the New Environmental Paradigm (NEP) using a causal series of connected variables that lead to relevant behavior. These variables are personal values (biospheric, altruistic, and egoistic), ecological worldview (measured with NEP), awareness of undesirable consequences (AC), ascription of responsibility to self, and personal norms (PN) for acting pro-environmentally. Stern (2000) suggested that the association based on the functioning of causal chain from values to environmental concern that leads to awareness of destructive consequences, then to ascription of responsibility to the self, and finally to personal norms. This chain reaction then finally

determines the extent to which a person behaves in an environmentally sensitive way, and in this study, using products and services in an environmentally sensitive way.

Various studies that have been published on consumer environmentally friendly usage behavior variables have shown the relationships among various constructs, such as environmental concern (Bamberg & Schmidt, 2003; Poortinga et al., 2004), different types of values and personal norms (Nordlund & Garvill, 2003; Poortinga et al., 2004; De Groot & Steg, 2008; Abrahamse et al., 2009), and environmental consequences and risk concerns (Poortinga et al., 2002). For example, Abrahamse et al. (2009) found that stronger personal norms are important predictors of behavioral intentions for transportation behavior. Similarly, Hunecke et al. (2001) and Nordlund and Garvill (2003) found that personal norms are positively associated with the environmentally friendly travel mode decision making. In another study, Poortinga et al. (2004) found that although not reported as a strong relationship, when a person has higher environmental concerns (s)he would be more inclined to act pro-environmentally in the context of household energy use. Furthermore, the research has shown that the more strongly an individual subscribes to values other than his/her own interests, such as self-transcendent, altruistic, ecocentric, pro-social, or biospheric values, the more likely he/she is to be inclined towards environmentally sensitive behaviors (Steg & Vleg, 2009). Following this notion, in their study on value orientations of individuals to explain environmentally sensitive behaviors, De Groot and Steg (2008) distinguished three different types of values, altruistic, biospheric, and egoistic. They suggested using these three types of value orientations “to better understand relationships between values, beliefs, and

intentions related to environmentally significant behavior" (p.330). Altruistic, biospheric, and egoistic value orientations cover the basic beliefs related to environmentally sensitive behaviors. Stern and Dietz (1994), Stern, Dietz, and Guagnano (1998), and De Groot and Steg (2008) suggested a positive relationship of these types of beliefs with altruistic and biospheric values and a negative relationship between the same types of beliefs and egoistic values. Following this discussion, each variable's hypothesis coming from the VBN theory developed as follows:

H5b: There is a positive relationship between individuals' biospheric values and their environmental concern.

H6b: There is a positive relationship between individuals' altruistic values and their environmental concern.

H7b: There is a negative relationship between individuals' egoistic values and their environmental concern.

H8b: There is a positive relationship between individuals' environmental concern and their awareness of consequences.

H9b: There is a positive relationship between individuals' awareness of consequences and their ascription of responsibility.

H10b: There is a positive relationship between individuals' ascription of responsibility and their proenvironmental personal norms.

H11b: There is a positive relationship between individuals' proenvironmental personal norms and their intentions to use products in an environmentally sensitive way.

Theory on Affective Motives and ESU Behavior

Although not commonly researched in this field of study, affect is suggested to be another crucial factor explaining environmental behaviors by several researchers (e.g., Gatersleben, 2007; Steg & Vlek, 2009; Steg, 2005). In fact, a limited amount of studies has also examined the potential role of affect in the context of environmentally sensitive usage behaviors (e.g., Steg, Vlek, & Slotegraaf, 2001; Steg, 2005). These studies focused mostly on car use and found that this behavior is significantly associated with affective factors. For example, Gatersleben's study showed an association of car use with affective and symbolic factors. Similarly, the study by Steg (2005) on car use and its factors that predict affective motives showed that this specific behavior is most strongly associated with symbolic and affective motives. Instrumental motives, on the other hand, were not as important.

For the purpose of this study, the affect model developed by Russell (1980) was used. As mentioned, according to the model, affective responses can be categorized into two separate dimensions: (1) pleasure and (2) arousal (Steg, 2005). Because the arousal dimension might capture irrelevant concept in the context of usage behavior, only the pleasure dimension was used to identify the affect variable.

H12b: There is a positive relationship between individuals' gained pleasure from using products in an environmentally sensitive way and attitudes towards environmentally sensitive usage behavior.

5. 2 Empirical Model

Based on the above hypotheses, a conceptual model of the study was developed using a path-analysis approach. The proposed model (Figure 5.1) included three variables as antecedents to environmental concern: biospheric, altruistic, and egoistic values. Environmental concern is hypothesized to affect awareness of consequences, awareness of consequences is hypothesized to affect ascription of responsibility, and ascription of responsibility is hypothesized to affect pro-environmental personal norms. Furthermore, in the proposed model, affect is conceptualized to influence attitude towards behavior, and perceived behavioral control (PBC), subjective norm, and attitude toward behavior are hypothesized to affect intention to perform the relevant usage behavior. Finally, in the proposed model, intention is hypothesized to be the immediate antecedent of the actual environmentally sensitive usage behavior. The proposed model will be useful for analyzing goal framing theory based on three different theoretical frameworks (i.e., value-belief-norm theory, theory of planned behavior, and theory on affect) and these frameworks' individual determinants with an aggregated approach. The model for Study III is displayed in Figure 5-1.

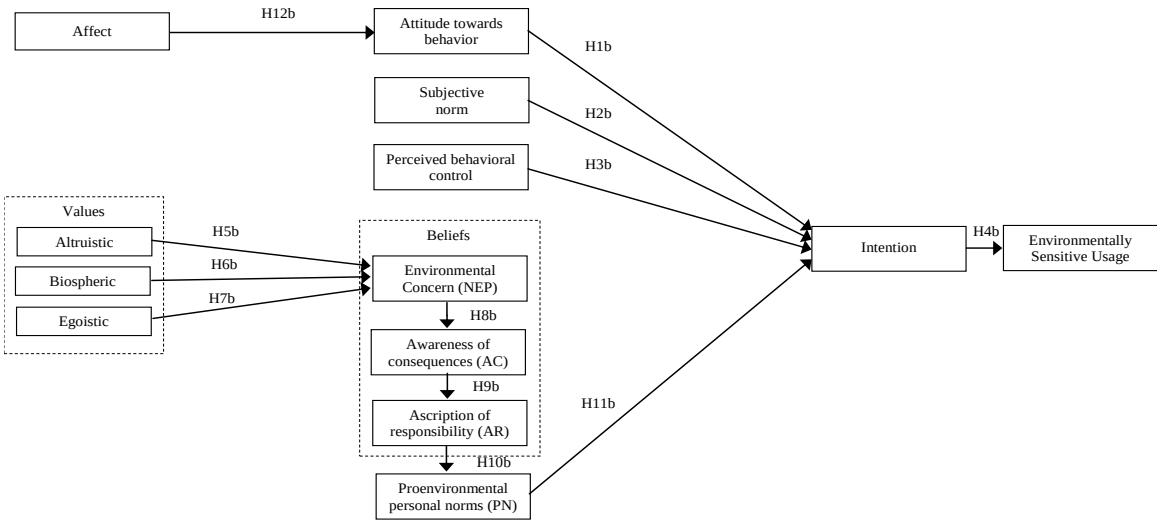


Figure 5-1. Study III model shows the influence of gain goal-frames, normative goal-frames, and hedonic goal-frames on environmentally sensitive purchase behavior with their corresponding hypotheses.

5. 3 Methodology

Similar to Study II, Study III was also based on primary data. A questionnaire survey was used to collect data and verify the research framework guiding the hypotheses. Again, the participants were recruited from the active members of the TerraCycle recycling company account database. These account members receive a monthly TerraCycle company letter; thus, a link to the usage survey was placed into this newsletter (see Appendix A.1). Members could participate in the study by following the environmentally sensitive usage link, which took them to the online survey. Participants' completed anonymous surveys were compiled in the SoGoSurvey online survey database account. Survey IRB approval was received before disseminating the relevant questionnerie (see Appendix A.2).

When the surveys were complete, the data gathered were collated and tabulated. Individual identifiers were not collected and were removed from the surveys if necessary. The data were entered into the SPSS statistical software for analyses.

5.3.1 Survey sample

Data for this study were collected during the months of December (2013) and January (2014). In total, 272 participants from TerraCycle's 70,000 U.S. based account holders completed the survey. Out of these responses, the questionnaires from seven respondents were not used in the study because of missing values, unengaged responses (i.e. giving answers randomly, such as choosing a midpoint 4 answer option for all questions), or incomplete data, thus, leaving a total of 265 completed responses used for the study. Table 5.1 displays the descriptive statistics and demographic profiles of Study III participants.

In the responsive sample, female and male respondents were fairly representative of the U.S. population, 51.3% and 48.7%, respectively. All respondents in the sample were 18 years or older, 26% were between 18 and 24 years old, 35.9% were between 25 and 34 years old, and 18.9% were between 35 and 44 years old. Respondents were at least high school graduates. Also, the highest participation came from college (39.2%) and bachelor (38.5) graduates. In the sample, the highest percentage of annual income was 31.4% for the income level of $40,000-$70,000.

Demographics of Study III Participants *(n=265)*

Demographic	***n***	***%***
Gender		
Female	136	51.3
Male	129	48.7
Age		
18 to 24	69	26
25 to 34	95	35.9
35 to 44	50	18.9
45 to 54	33	12.5
55 to 64	15	5.7
65 to 74	3	1.1
75 or older	0	0
Education		
Less than High School	0	0
High School	21	7.9
Some College	104	39.2
Bachelor's degree	102	38.5
Master's degree	34	12.8
Ph.D.	2	0.8
Professional	2	0.8
Household annual income		
Less than $20,000	51	19.2
$20,000-$40,000	64	24.2
$40,000-$70,000	83	31.4
$70,000-$100,000	38	14.3
$100,000-$150,000	19	7.2
$150,000-$200,000	7	2.6
More than $200,000	3	1.1

Table 5-1. Sample descriptive statistics and demographic profiles of Study III participants.

5.3.2 Questionnaire design

All items were taken from well-established standardized scales from the literature all with acceptable reliabilities. The items were adapted to the environmentally sensitive usage context. In order to assess whether survey items, measurements, and associated

survey links were working as intended and to find out whether there was any ambiguity in terms or meanings of items, a pre-test survey was conducted. For this purpose, students from two marketing classes at Montclair State University's (MSU) School of Business completed the surveys. After mentioning the purpose of this survey, i.e., to see whether the questions and links are working properly and whether there are any misspellings or unclear sentences in the survey, the links were sent out to each student participant. Overall, 20 out of 56 marketing students completed the surveys. The results obtained from the survey helped modify some of the questions to improve the survey's clarity. One repetitive question was deleted, a few minor grammatical errors were corrected, and a few questions were re-worded for better understanding. Survey items were developed by applying the accepted procedures suggested by Nunnally and Berstein (1994). Before applying the pre-test survey, anonymity and confidentiality were also guaranteed to the student participants.

5.3.3 Measurement instruments

Environmentally Sensitive Usage Behavior. The environmentally sensitive usage behavior (ESUB) measure was based on the General Social Survey (GSS) (2010), Cleveland, Kalamas, and Laroche (2005), Abrahamse *et al*. (2007), and Marandu, Moeti, & Joseph (2010). The ESUB scale comprised sixteen items, first four were related to environmentally sensitive automobile use, next eight were related to household energy reduction, and last four questions were related to water use reduction. The items included in the scale were: (1) EAU1 "How often do you cut back on driving a car for

environmental reasons?", (2) EAU2 "How often do you use public transport whenever that option is available?", (3) EAU3 "How often do you drive your car more slowly?", (4) EAU4 "How often do you walk rather than driving to a store that is just a few blocks away?, (5) HER1 "How often do you turn off all lights before leaving the house?", (6) HER2 "How often do you turn down the heat a little in winter, and wear extra sweaters?", (7) HER3 "How often do you wash your clothes in cold water?", (8) HER4 "How often do you use more expensive but more energy efficient light bulbs?", (9) HER5 "How often do you lower thermostat before leaving?", (10) HER6 "How often do you turn off thermostat when absent?, (11) HER 7 "How often do you use dishwasher while not full?", (12) HER 8 "How often do you leave lights on in unoccupied rooms?", (13) WR1 "How often do you turn tap water off during brushing teeth?", (14) WR2 "Save water when washing a car: by using a bucket or putting a spray nozzle on the end of your hose to prevent the hose from continuously releasing water?", (15) WR3 "How often do you wait until having a full load for laundry?", (16) WR4 "How often do you turn the shower off while soaping or shampooing?". Self-reported behavioral items were assessed on a 7-point Likert scale, with always, very often, often, sometimes, rarely, very rarely, and never as response options.

Before getting into the next set of questions in the survey, the questionnaire asked participants to read the definition of environmentally sensitive usage (i.e., using products and services, such as automobile, household energy, and water in a way that has the least environmental impact) and then to complete the questions about this behavior.

Attitudes. Attitude towards environmentally sensitive usage (ATESU) construct was measured with a 5-item scale adapted from Abrahamse and Steg (2011) and Smith, Haugtvedt, & Perry (1994). The ATESU scale items were: (1) ATESU1 "Environmentally sensitive usage is too much of a hassle," (2) ATESU2 "Environmentally sensitive usage means I have to live less comfortably," (3) ATESU3 "Environmentally sensitive usage will restrict my freedom," (4) ATESU4 "Environmentally sensitive usage is valuable," and (5) ATESP5 "Environmentally sensitive usage is necessary." From the five items representing attitudes toward environmentally sensitive usage behavior, first three negatively worded ones were reverse coded. This psychological variable was measured on a 7-point Likert scale (Vaigas, 2006), with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options.

Intention. For the behavioral intention scale, a three-item measure was used. Because a single-item measure of this construct has been criticized (Peter, 1979), Ajzen's suggestion to use multiple questions for behavioral intention was followed. This method usually helps to obtain a relatively reliable self-report (Ajzen, 2002; Fishbein & Ajzen, 2010). The scale consisted of three items: (1) IESU1 "I intend to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months," (2) IESU2 "I will try to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months," (3) IESU3 "I expect to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming

months." Behavioral intention was measured on a 7-point Likert-scale with the scores ranging from strongly disagree to strongly agree.

Subjective Norm. Subjective norm refers to social pressure to behave in a certain way and operationalized by four questions (Abrahamse & Steg, 2011; Tonglet, Phillips, & Read, 2004). The scale items were: (1) SNESP1 "Most people who are important to me think that I should use my car, household items and energy in an environmentally sensitive way," (2) SNESP2 "Most people who are important to me would approve of me using my car, household items and energy in an environmentally sensitive way," (3) SNESP3 "My household/family members think I ought to be using my car, household items and energy in an environmentally sensitive way," (4) SNESP4 "My friends/colleagues think I ought to be using my car, household items and energy in an environmentally sensitive way." All four items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Perceived Behavioral Control. Perceived behavioral control was operationalized by asking respondents directly how much control they have over the behavior of interest (ESUB) and how easy or difficult they think it would be to perform the action (Tonglet et al., 2004). Measurements were taken from Abrahamse and Steg (2011) and Tonglet et al. (2004). The six items measuring perceived behavioral control were: (1) PBCESU1 "I can use my car, household items and energy in an environmentally sensitive way easily," (2) PBCESU2 "I have plenty of opportunities to use my car, household items and energy in an environmentally sensitive way," (3) PBCESU3 "Using my car, household items and energy in an environmentally sensitive way is inconvenient," (4) PBCESU4 "Stores I

have been provided satisfactory resources to use my car, household items and energy in an environmentally sensitive way," (5) PBCESU5 "I know how to use my car, household items and energy in an environmentally sensitive way," and (6) PBCESU6 "I know when and where to use my car, household items and energy in an environmentally sensitive way." The third statement was reverse coded to keep the measurement items consistent. All six items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Values. For the measurement of values, similar to Study II, Steg et al.'s (2011) short version of value instrument was used. In this approach, only the related dimensions of environmental values are measured, namely, altruistic, biospheric, and egoistic dimensions.

To measure value dimensions of interest, the participants were asked to rate the importance of following 13 values "as guiding principles in your life" on a 7-point scale ranging from 1 *not at all important* to 7 *extremely important*. Answer choices used for this scale were not at all important, low importance, slightly important, neutral, moderately important, very important, and extremely important. Following items were used to measure each value dimension:

Altruistic Values: (1) ALT1 "Social justice, correcting injustice, care for the weak," (2) ALT2 "Equality, equal opportunity for all," (3) ALT3 "A world of peace, free of war and conflict," and (4) ALT4 "Being helpful."

Biospheric Values:(1) BIO1 "Preventing pollution, conserving natural resources," (2) BIO2 "Unity with nature, fitting into nature," (3) BIO3 "Respecting the earth,

harmony with other species," and (4) BIO4 "Protecting the environment, preserving nature."

Egoistic Values: (1) EGO1 "Social power, control over others, dominance," (2) EGO2 "Influential, having an impact on people and events," (3) EGO3 "Wealth, material possessions, money," (4) EGO4 "Authority, the right to lead or command," and (5) EGO5 "Being ambitious."

Environmental Concern. The revised version of the New Environmental Paradigm (NEP) was used to measure environmental concern (Dunlap et al., 2000). Following Bruni, Schultz, & Saunders (2012), this section of the questionnaire stated: "Now we would like to get your opinion on a wide range of environmental issues. For each of the following statements, please indicate the extent to which you agree or disagree." The revised NEP scale includes 15 items (Dunlap et al., 2000): (1) EC1"We are approaching the limit of the number of people the earth can support," (2) EC2 "Humans have the right to modify the natural environment to suit their needs," (3) EC3"When humans interfere with nature, it often produces disastrous consequences," (4) EC4 "Human ingenuity will insure that we do NOT make the earth unlivable," (5) EC5 "Humans are severely abusing the environment," (6) EC6 "The earth has plenty of natural resources if we just learn how to develop them," (7) EC7 "Plants and animals have as much right as humans to exist," (8) EC8 "The balance of nature is strong enough to cope with the impacts of modern industrial nations," (9) EC9 "Despite our special abilities humans are still subject to the laws of nature," (10) EC10 "Human destruction of the natural environment has been greatly exaggerated," (11) EC11 "The earth has only

limited room and resources," (12) EC12 "Humans were meant to rule over the rest of nature," (13) EC13 "The balance of nature is very delicate and easily upset," (14) EC14 "Humans will eventually learn enough about how nature works to be able to control it," and (15) EC15 "If things continue on their present course, we will soon experience a major ecological disaster." Items 2, 4, 6, 8, 10, 12, and 14 were reverse coded.

Awareness of Consequences. Awareness of consequences (AC) was measured using six items referring mainly to the extent to which participants believe that using products and services in an environmentally harmful way is a problem (adapted from Abrahamse et al., 2009; Abrahamse & Steg, 2011; Stern et al., 1999). The scale consisted of the following items: (1) ACESU1 "Using car, household items and energy incautiously is problem for environment," (2) ACESU2 "Environmentally sensitive usage contributes to a reduction of the environmental problems," (3) ACESU3 "Environmentally sensitive usage contributes to habitat conservation," (4) ACESU4 "Environmentally sensitive usage contributes to improving ability to meet environmental goals," (5) ACESU5 "Environmentally sensitive usage contributes to improving individuals' safety and health," and (6) ACESU6 "Lessening car usage, reusing household items, and reducing household energy use can help improving environmental conditions." All six items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Ascription of Responsibility. Ascription of responsibility (AR) scale measures the degree to which survey participants ascribe responsibility to themselves for the environmental problems resulting from using products and services in an environmentally harmful fashion. The scale was adapted from Abrahamse et al. (2009) and Abrahamse

and Steg, (2011). The scale items used for the purpose of this study are: (1) ARESU1 "I feel personally responsible for the problems resulting from my environmentally harmful product and energy usage," (2) ARESU2 "My non-ecofriendly product and energy usage contribute to environmental problems," and (3) ARESU3 "I take joint responsibility for environmental problems." Items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Personal Norms. The personal norm (PN) scale consists of three items assessing the degree to which participants feel moral obligations to behave pro-environmentally, in this case, the degree to which they feel moral obligation to use products and services in an environmentally sensitive fashion (Abrahamse et al., 2009; Abrahamse & Steg, 2011). The items are: (1) PNESU1 "I feel morally obliged to use products and energy in an environmentally sensitive fashion, regardless of what other people do," (2) PNESU2 "I feel guilty when I use products and energy in an environmentally harmful fashion," and (3) PNESU3 "I would consider myself a better person if I use products and energy in an environmentally sensitive way."

Affect. To measure affect, Russell's (1980) model was adopted as a base, similar to Steg's (2005) study. Russell demonstrated that affective responses could be categorized into two different dimensions: (1) pleasure and (2) arousal. Although some environmental behavior studies focusing on travel mode used these two dimensions in order to provide an overall full representation of the scale, for the meaningfulness of the measurement items, the arousal dimension was not included in the final study. The pre-test of the survey questionnaire also supported the necessity of excluding arousal items

because of the lack of meaningfulness. Asking participants to rate statements such as “I feel calm when I use products and services in an environmentally sensitive way,” “I feel peaceful when I use products and services in an environmentally sensitive way,” or “using products and services in an environmentally sensitive way is making me feel relaxed” would not be particularly useful for the analyses. Thus, only the pleasure dimension of affect was used in the context of environmental sensitive usage behavior. The scale included three items in total (Bigné, Andreu, & Gnoth, 2005; Russell, 1980; Steg, 2005). These items were: (1) AFESU1 “Using products and energy in an environmentally sensitive way is giving me a feeling of satisfaction,” (2) AFESU2 “When I use products and energy in an environmentally sensitive way, I feel happy,” (3) AFESU3 “Using products and energy in an environmentally sensitive way is giving me a feeling of pleasure.” In line with Vaigas (2006), items were measured on a 7-point Likert scale with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options. See Appendix B.1 for all measurement items.

Sociodemographics. Most sociodemographic variables were measured on a 7-point scale. Education was categorized into seven groups: Less than high school, high school, some college, bachelor's degree, master's degree, Ph.D., and professional. Estimated household annual income was also categorized into seven groups. Gender was coded as a dummy variable, with 1 representing ‘male’ and 2 representing ‘female.’ Age and race/ethnicity were also measured on a 7-point scale.

5.4 Analysis Technique and Model Evaluation

After the data obtained from the survey was collated and tabulated, the data was downloaded to the SPSS 20 statistical software for analyses. First, to provide basic information on the data and sample, descriptive statistics, such as standard deviations, means, and percentages were calculated (Table 5.1). Next, the survey data was analyzed using the latent variable structural equation modeling (SEM). For this statistical method, the computer software tool SPSS Analysis of Moment Structures (AMOS) version 22.0 was used to test the hypothesized model (Byrne, 2001) introduced in the previous section. To meet the required assumptions of structural equation modeling, the data was first assessed in terms of missing values, outliers, normal distributions (univariate and multivariate), and multicollinearity.

5.4.1 Data analysis

From 272 returned surveys, two surveys with missing responses were eliminated. Also, by checking the standard deviation of each case and visual inspection, four unengaged responses and one extreme outlier were eliminated. This process left 265 participant responses for the analyses.

Missing Data: Missing data can be problematic especially in structural equation modeling using AMOS, since it may cause the program not to work properly. It also decreases the power and leads to biased standard errors (Allison, 2003). Thus, it is important to examine whether the data are missing (if any) at random. For this study, all missing data was at the individual item level. Items with missing values were ESUB4,

ESUB9, ESUB12, ESUB14, INT3, SN2, SN3, EC5**,** EC11, EC13**,** AC1**,** AC5**,** AR2, PN3, AFESU1, AFESU2, ALT3, BIO4, EGO1, and EGO2 each with only one missing case. On the other hand, items ESUB13 and AT3 had two and ESUB11 had three missing cases. Thus, missing values for the variables accounted for 0 to 1.07%. To replace these missing values, median substitution technique was used because of Likert type responses. Also, in the cases where the construct items were all the same or had similar answer choices (e.g., giving answer option "1" to all other questions in the same construct), a missing value related to this construct was treated by considering this inclination of the respondent. For instance, for EGO1 only one case (#251) had a missing value, and to treat this missing value, other egoistic value items were examined. The close look revealed that answers to all other egoistic value items were "1", meaning the respondent carried the least egoistic value. Following this notion, the missing value of EGO1 for this case was replaced with "1".

Outliers: In order to detect univariate outliers, *Z* scores were obtained and tested for each variable. Univariate outliers were detected for variables that exceeded $z = \pm 3.29$ ($p < .001$, two-tailed test) (Tabachnick & Fidell, 2007). This method provided information that 16 variables had one or more cases as univariate. Each univariate case was examined and treated separately. To deal with these univariate outliers, following Tabachnick and Fidell (2007), "a raw score on the offending variable that is one unit larger (or smaller) than the next most extreme score in the distribution" (p.77) was assigned to the outlying cases. One extreme outlier case has been deleted (case#119). Since the SEM analysis is very sensitive to extreme outliers (Bollen, 1989; Kline, 2005),

SPSS histograms, box plots, and normal probability plots were examined to identify additional outliers. No further extreme outliers were found. To identify multivariate outliers (i.e., cases with extreme values on multiple variables), Mahalanobis Distance (D^2) was used (Tabachnick & Fidell, 2007) when conducting SEM analysis using SPSS AMOS.

Distribution normality: High skewness and kurtosis indicate that the data distribution is not normal. Thus, normality, skewness, and kurtosis statistics were used to test univariate distribution. If the skewness statistics is less than 3 and kurtosis statistics is less than 8, then we can assume the normality of the data (Kline, 2005; Tabachnick & Fidell, 2007). In this study, skewness and kurtosis values for the items were within acceptable limits.

Exploratory Factor Analysis: To see whether the data reflect the hypothesized factor structure, an exploratory factor analysis with Varimax rotation was conducted on both antecedent and consequence measures based on a baseline eigenvalue of 1.0. Although most measurement items loaded on their respective factors, environmental concern and behavioral outcome items seemed to be problematic since the factor solutions supported at least three factor structures for environmental concern and two factor structures for behavioral outcome. Therefore, a partial disaggregation method was used for the environmental concern and two separate behavioral outcomes used for the environmentally sensitive usage constructs. The next two sections explain how these constructs were treated before the further analysis.

5.4.1.1 Partial disaggregation of NEP construct

A total disaggregation approach (i.e., using each item as a separate indicator of the relevant construct) was used for all the constructs in the study except environmental concern. For environmental concern (New Environmental Paradigm - NEP) construct, a partial disaggregation approach was used based on the dimensions of Albrecht et al. (1982), Bechtel, Verdugo, & de Queiroz Pinheiro (1999), Noe and Snow (1990), and Van Petegem and Blieck (2006). These authors suggested using three dimensions for the NEP construct. Initially, environmental concern comprised 15 items. Using the partial disaggregation approach reduced the number of environmental concern parameters to be estimated while retaining the advantages of SEM analysis technique. It also provided assessment of a higher-order model while reducing the level of random error (Bagozzi & Heatherington, 1994; Baumgartner & Homberg, 1996).

The partial disaggregation method involves the creation of composite variables (ideally two or more) for the construct of interest. Following Bagozzi and Heatherington (1994), the composite variables were created from identified subdimensions of NEP construct. For this, principal components factor analysis (PCA) with Varimax rotation was used (see Appendix, B.2). The factor analysis was unconstrained, and the primary factors explained 61.8% of the variance in the results obtained. The examination of the PCA supported the three dimensional model that was also found in previous research (Albrecht et al., 1982; Bechtel et al., 1999; Noe & Snow, 1990; Van Petegem & Blieck, 2006). The three dimensions were: (1) Balance of nature, identified as environmental concern total (ECT1), (2) Limits to growth, identified as environmental concern total

(ECT2), and (3) Humans over nature, identified as environmental concern total – (ECT3) (see Appendix, B.2). Out of all environmental concern items, items 2, 7, 12 loaded heavily on the "Balance of nature" component (ECT1). Four items (4, 6, 8, and 14) loaded on the "Limits to growth" component and items 1, 3, 5, 9, 10, 11, 13, and 15 loaded on the third component "Humans over nature". To develop partially disaggregated indicators of the environmental concern construct, average of subsets of items, also called parcels, was created (Bandalos & Finney, 2001) and used for further analysis in confirmatory factor analysis and structural equation modeling.

5.4.1.2 Environmentally sensitive usage behavior categorization

As mentioned previously, to see whether the data reflect the hypothesized factor structure, an exploratory factor analysis with Varimax rotation was conducted on consequence measure, i.e. usage behavior, based on a baseline eigenvalue of 1.0. As a result, behavioral outcome items seemed to be problematic since the factor solutions supported at least two factor structures. Thus, two separate behavioral outcomes were determined for the environmentally sensitive usage construct: (1) Transportation, and (2) Household energy use. Environmental behavior questions that were related to traveling decisions (i.e. EUB1, EUB2, and EUB4) all loaded in one factor and was named as "transportation behavior" and those questions related to household energy use decisions (i.e. EUB5, EUB6, EUB7, EUB8, EUB9, and EUB10) all loaded in another factor and was named as "household energy use behavior" (see Appendix, B3). These two types of behaviors were used separately in further analysis to understand environmentally sensitive consumer usage behaviors in more detail.

5.4.2 Transportation Behavior Structural Equation Modeling Analysis

The survey data was analyzed using structural equation modeling (SEM). As mentioned in detail in Study II, SEM is a statistical technique that allows testing and estimating the causal relations (Hoyle, 1995), and it is widely used in behavioral sciences (Hox & Bechger, 1998).

Following the suggestion of Anderson and Gerbing (1988), a two-stage approach was adopted in the analysis. The first stage involved estimating the measurement model and the second stage involved estimating the structural model to analyze the strength of the relationships between each of the constructs in the proposed model.

5.4.2.1 Stage I: Measurement Model - Transportation

The first stage of the two-stage process used the confirmatory factor analysis (CFA) to estimate the measurement model to determine the measurement properties of the underlying latent constructs. The initial CFA model included all constructs: Affect (three item scale), Attitude (five item scale), Subjective Norm (four item scale), Perceived Behavioral Control (six item scale), Altruistic Values (four item scale), Biospheric Values (four item scale), Egoistic Values (five item scale), Environmental Concern (three item scale), Awareness of Consequences (six item scale), Ascription of Responsibility (three item scale), Personal Norm (three item scale), Environmentally Sensitive Usage Intention (three item scale), and Environmentally Sensitive Transportation Behavior (three item scale). The initial CFA revealed that the model needed some adjustments. Thus, items AT1, AT4, AT5, AC1, PBC3, PBC5, ALT3,

EGO3, and SN2 were excluded from further analysis, leaving at least two measurement items for each factor. The results of this last CFA revealed the following model fit indices:

CFA Final:

$\chi 2$ = 1297.74; p = .00; df = 701; $\chi 2 / df$ = 1.85, GFI = .813; IFI = .93; TLI = .92, CFI = .93

RMSEA = .047

The final CFA model provided acceptable goodness-of-fit statistics, with all items loading significantly on their respective factors. The final measurement model for transportation behavior is presented in Appendix B.4. The reported results allow us to suggest that the measurement model achieves a good fit to the data.

To examine construct reliability and convergent and discriminant validities, the following measures were used: composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV) (Hair et al., 2010).The results showed strong psychometric properties for the measurement model by exhibiting high composite reliability estimates, ranging from 0.750 to 0.956, for all constructs. Cronbach's α value of 0.7 or higher indicates satisfactory internal consistency reliability (Nunnally & Berstein, 1994). The average variance extracted indicates the amount of variance captured by that particular measurement of the construct relative to error terms of the measurement and correlations with other latent constructs. Generally, AVE values expected to be greater than 0.5 to consider acceptable convergent validity (Fornell & Larcker, 1981). All of the constructs showed an AVE value of 0.5 and higher (see Appendix B.5). Table B.6 in Appendix

shows that convergent validity exists because variables within factor correlate well with each other. All indicators loaded significantly (p<.01) and substantively (standardized regression coefficients (loadings) >.6) on to their respective constructs, providing evidence of convergent validity. Hair et al. (2010) suggested acceptable limit of 0.5 for factor loadings. For our model, high factor loadings we found mean that observed variables explain the latent factors well. Both convergent and discriminant validity results for all constructs are presented in Appendix B.5.

5.4.2.2 Stage II: Structural Equation Modeling - Transportation

In the second stage, based on the final confirmatory factor analysis, structural equation modeling was conducted using AMOS 22.0 to determine the fit between the theoretical structure and the data. Exogenous variables for this study were the affect and value variables as well as subjective norms and perceived behavioral control. On the other hand, the endogenous or downstream variables were the beliefs, personal norms, attitudes, intentions, and transportation behavior outcomes.

Fit measures for the model were calculated to evaluate the goodness-of-fit criteria. Garver and Mentzer (1999) recommended using non-normed fit index (NNFI), also known as the Tucker-Lewis index, the comparative fit index (CFI), and the root mean squared approximation of error (RMSEA) as measures of the goodness of fit. Thus, NNFI and CFI (>0.90 indicates good fit), RMSEA (<0.08 indicates acceptable fit), and commonly used $\chi 2$ statistic ($\chi 2/ df$ ratio of 3 or less) fit indices are used to assess goodness-of-fit of the model.

The structural model achieved a good level of fit for transportation:

$\chi 2$ = 1520.98; p = .00; df = 748; $\chi 2 / df$ = 2.03; IFI = .92; TLI = .91, CFI = .91

RMSEA = .066

These results show that the observed data fit the model reasonably well, except the high $\chi 2$ statistic. It is important to note that the $\chi 2$ statistic is usually upwardly biased by sample size and, thus, is an excessively stringent fit measure that should be examined along with other fit measures (Fornell & Larcker, 1981; Sharma et al, 2005). Because of the limitation of the chi-square test, the $\chi 2$ to degrees of freedom ratio has been proposed as an alternate way to evaluate the model (Joreskog & Sorbom, 1993). A reasonable model fit is when the $\chi 2 / df$ ratio is less than 3 (Kline, 2005). Our model satisfied this requirement with $\chi 2 / df$ = 2.03. Garver and Mentzer (1999) recommend using the Tucker-Lewis index (TLI), the RMSEA (root mean squared approximation of error, and CFI (comparative fit index) as additional model fit statistics. For TLI and CFI, values greater than 0.90 indicate a good fit and for RMSEA, values smaller than 0.08 indicate an acceptable fit (Hoe, 2008). The research model satisfied these requirements, with TLI, CFI, and RMSEA being within the suggested limits. Thus, the model satisfied all relevant goodness-of-fit criteria. The results for each index value and corresponding threshold values for fit measures are reported in Table 5.2 (also see Appendix B.7 for SEM AMOS output). Since this was a confirmatory and not exploratory analysis, modification indices were not taken into account to adjust the model and improve corresponding model fit.

Measure	Threshold	Stage I. CFA $\chi2$ = 1297.7; *df* = 701	Stage II. SEM $\chi2$ = 1520.98; *df* = 748
p-value	> .05	.00	.00
$\chi2$ /df	< 3 good; < 5 permissible	1.85	2.03
IFI	> .95 great; > .90 traditional	.93	.91
TLI	> .95 great; > .90 traditional	.92	.90
CFI	> .95 great; > .90 traditional; > .80 sometimes	.93	.91
RMSEA	< .05 good; .05 -.10 moderate; > .10 bad	.057	.066

Table 5-2. Study III - Transportation measurement and structural model fit. The results suggest that the measurement & structural models achieve good fit to the data.

5.4.3 Household Energy Use Structural Equation Modeling Analysis

Again, a two-stage approach was adopted in the analysis following the suggestion of Anderson and Gerbing (1988).

5.4.3.1 Stage I: Measurement Model – Household Energy Use

The first stage of the two-stage process used the confirmatory factor analysis (CFA) to estimate the measurement model to determine the measurement properties of the underlying latent constructs. The initial CFA model included all constructs: Affect (three item scale), Attitude (five item scale), Subjective Norm (four item scale), Perceived Behavioral Control (six item scale), Altruistic Values (four item scale), Biospheric Values (four item scale), Egoistic Values (five item scale), Environmental Concern (three item scale), Awareness of Consequences (six item scale), Ascription of Responsibility (three item scale), Personal Norm (three item scale), Environmentally

Sensitive Usage Intention (three item scale), and Environmentally Sensitive Household Energy Use (six item scale). The initial CFA revealed that the model needed some adjustments. Thus, items AT1, AT2, PBC3, PBC5, ALT3, EGO3, EGO5, SN2, and EUB10 were excluded from further analysis. The results of this last CFA revealed the following model fit indices:

CFA Final:

$\chi 2$ = 1546.7; p = .00; df = 867; $\chi 2 / df$ = 1.78, GFI = .803; IFI = .93; TLI = .92, CFI = .93

RMSEA = .054

The final CFA model provided acceptable goodness-of-fit statistics, with all items loading significantly on their respective factors. Final measurement model for environmentally sensitive household energy usage behavior is presented in Appendix B.8. The reported results allow us to suggest that the measurement model achieves a good fit to the data.

To examine construct reliability and convergent and discriminant validities, the following measures were used: composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV) (Hair et al., 2010).The results showed strong psychometric properties for the measurement model by exhibiting high composite reliability estimates, ranging from 0.710 to 0.956, for all constructs. The average variance extracted indicates the amount of variance captured by that particular measurement of the construct relative to error terms of the measurement and correlations with other latent constructs. Generally, AVE values expected to be greater than 0.5 to consider acceptable convergent validity (Fornell &

Larcker, 1981). All of the constructs showed an AVE value of 0.5 and higher (see Appendix B.5), except behavioral outcome. Table B.10 in Appendix shows that convergent validity exists because variables within factor correlate well with each other. Both convergent and discriminant validity results for all constructs are presented in Appendix B.10.

5.4.2.2 Stage II: Structural Equation Modeling – Household Energy Use

Based on the final confirmatory factor analysis, structural equation modeling was conducted using AMOS 22.0 to determine the fit between the theoretical structure and the data. Exogenous variables were the affect and value variables as well as subjective norms and perceived behavioral control. On the other hand, the endogenous variables were the beliefs, personal norms, attitudes, intentions, and environmentally sensitive household energy use behavior outcomes.

Fit measures for the model were calculated to evaluate the goodness-of-fit criteria. The structural model achieved a good level of fit for household energy use:

$\chi 2$ = 1842.5; p = .00; df = 912; $\chi 2 / df$ = 2.02; IFI = .90; TLI = .89, CFI = .90

RMSEA = .065

These results show that the observed data fit the model reasonably well. A reasonable model fit is when $\chi 2 / df$ ratio is less than 3 (Kline, 2005). Our model satisfied this requirement with $\chi 2 / df$ = 2.02. The results for each index value and corresponding threshold values for fit measures are reported in Table 5.3 (also see Appendix B.11 for SEM AMOS output).

Measure	Threshold	Stage I. CFA $\chi2$ = 1546.7; *df* = 867	Stage II. SEM $\chi2$ = 1842.5; *df* = 912
p-value	> .05	.00	.00
$\chi2$ /df	< 3 good; < 5 permissible	1.78	2.02
IFI	> .95 great; > .90 traditional	.93	.90
TLI	> .95 great; > .90 traditional	.92	.89
CFI	> .95 great; > .90 traditional; > .80 sometimes	.93	.90
RMSEA	< .05 good; .05 -.10 moderate; > .10 bad	.054	.065

Table 5-3. Study III – Household energy use measurement and structural model fit. The results suggest that the measurement & structural models achieve acceptable fit to the data.

5. 5 Results

5.5.1 Transportation results

Based on theoretical considerations and extensive literature review, twelve hypotheses were proposed for the research model. According to Hair el al. (2010), it is necessary to assess individual parameter estimates to validate a proposed model. For the transportation section of this study, eleven out of twelve hypotheses were supported and only one was rejected. An outline of the results with standardized parameter estimates, statistical significance level, and R^2 values for all the proposed hypotheses are presented in Table 5.4.

Hypotheses				R^2	Std. parameter estimate	*p*-Value	Results
H1b.	Attitude towards behavior	→	Behavioral intention	0.70	0.31	$p < 0.01$	Supported
H2b.	Subjective norm	→	Behavioral intention	0.70	0.11	$p = 0.02$	Supported
H3b.	PBC	→	Behavioral intention	0.70	0.39	$p < 0.01$	Supported
H4b.	Behavioral intention	→	ESUB - Transportation	0.26	0.51	$p < 0.01$	Supported
H5b.	Altruistic values	→	Environmental concern	0.68	0.01	$p = 0.95$	Not supporte
H6b.	Biospheric values	→	Environmental concern	0.68	0.79	$p < 0.01$	Supported
H7b.	Egoistic values	→	Environmental concern	0.68	-0.22	$p < 0.01$	Supported
H8b.	Environmental concern	→	Awareness of conseq.	0.73	0.85	$p < 0.01$	Supported
H9b.	Awareness of conseq.	→	Ascription of resp.	0.66	0.81	$p < 0.01$	Supported
H10b.	Ascription of resp.	→	Personal norm	0.78	0.88	$p < 0.01$	Supported
H11b.	Personal norm	→	Behavioral intention	0.70	0.38	$p < 0.01$	Supported
H12b.	Affect	→	Attitude towards behavior	0.29	0.54	$p < 0.01$	Supported

Table 5-4. Transportation behavior summary of the results – structural model coefficients.
Notes: PBC, perceived behavioral control; ESUB, environmentally sensitive usage behavior.

Behavioral intention

The effects of attitude towards behavior on behavioral intention (*H1b*) ($p < 0.01$), subjective norm on behavioral intention (*H2b*) ($p = 0.02$) as well as perceived behavioral control on behavioral intention were significant *(H3b)* ($p < 0.01$), with standardized beta coefficient values of 0.31, 0.11, and 0.39, respectively. Additionally, the standardized regression coefficient for the effect of personal norm on behavioral intention *(H11b)* was also significant ($\beta = 0.38$, $p < 0.01$). The R Square (R^2) for the relationship between these variables and behavioral intention outcome was .70. Hence, *H1b, H2b, H3b*, and *H11b* were supported.

Environmentally sensitive transportation behavior

The effect of behavioral intention on environmentally sensitive transportation behavior was significant ($p < 0.01$), with standardized beta value of $\beta = 0.51$, supporting *H4b*. Empirical evidence supporting actual eco-sensitive behavior and behavioral intention relationship could be found widely in literature (Birgelen, Semeijn, & Keicher, 2009; Saba & Messina, 2003; Thøgersen, 2009; Vermeir & Verbeke, 2008). The R Square (R^2) value for the relationship between these two variables was 0.26, which suggests that eco-sensitive transportation intention explains only 26% of the variance in actual transportation behavior.

Environmental concern

The effects of biospheric (*H6b*) and egoistic (*H7b*) values on environmental concern were found to be significant. Especially, the standardized regression coefficient for the effect of biospheric values on environmental concern was quite strong ($\beta = 0.79$, *p*

< 0.01). Although the effect of biospheric values on environmental concern was positive, egoistic values showed negative effect on the same variable (β= -0.22, $p < 0.01$). These two types of values explained 68% of the variance in environmental concern of individuals. Thus, both *H6b* and *H7b* were supported. The standardized regression coefficient of altruistic values on environmental concern (*H5b*) was not significant (β = 0.01, $p = 0.95$); hence, *H5b* was not supported.

Awareness of consequences

The effect of environmental concern (*H8b*) on the awareness of consequences was significant with standardized beta coefficient of 0.85 ($p < 0.01$) and R^2 value of 0.73. Since the direct effect of environmental concern was significant, *H8b* was supported.

Ascription of responsibility

The effect of the awareness of consequences (*H9b*) on ascription of responsibility was found to be significant. The standardized regression coefficient for the effect of awareness of consequences on ascription of responsibility was quite strong (β = 0.81, $p <$ 0.01). Hence, *H9b* was supported.

Personal norm

Ascription of responsibility was found to predict personal norms related to the environment. The effect of ascription of responsibility (*H10b*) on environmental personal norms was significant. The standardized regression coefficient was the strongest for the effect of ascription of responsibility (β = 0.88, $p < 0.01$); hence, *H10b* was supported.

Attitude towards behavior

The analysis showed that the effect of affect (*H12b*) on attitude towards behavior was significant. This direct effect of affect on attitude towards behavior was medium ($\beta = 0.54$, $p < 0.01$) with R^2 value of 0.29; hence, *H12b* was supported.

The results of the structural equation model for transportation behavior are displayed in Figure 5-2 with standardized regression estimates and significance of each path.

Controlling for age, gender, income, and education gave interesting results for the transportation behavior. While income and education were not significant in predicting environmentally sensitive transportation, age and gender played a different role in determining this certain type of usage behavior. The results showed that age was negatively related to environmentally sensitive transportation ($\beta = -0.23$, $p < 0.01$), meaning younger the age more leaning towards eco-sensitive traveling. Also, gender difference seemed to be making a difference on how consumers choose to travel. Surprisingly, males seemed to be inclined to choose eco-sensitive transportations more often than women ($\beta = -0.18$, $p < 0.01$). Although both gender and age were significant in predicting environmentally sensitive transportation behavior, their beta values were rather low relative to other predictors in the model.

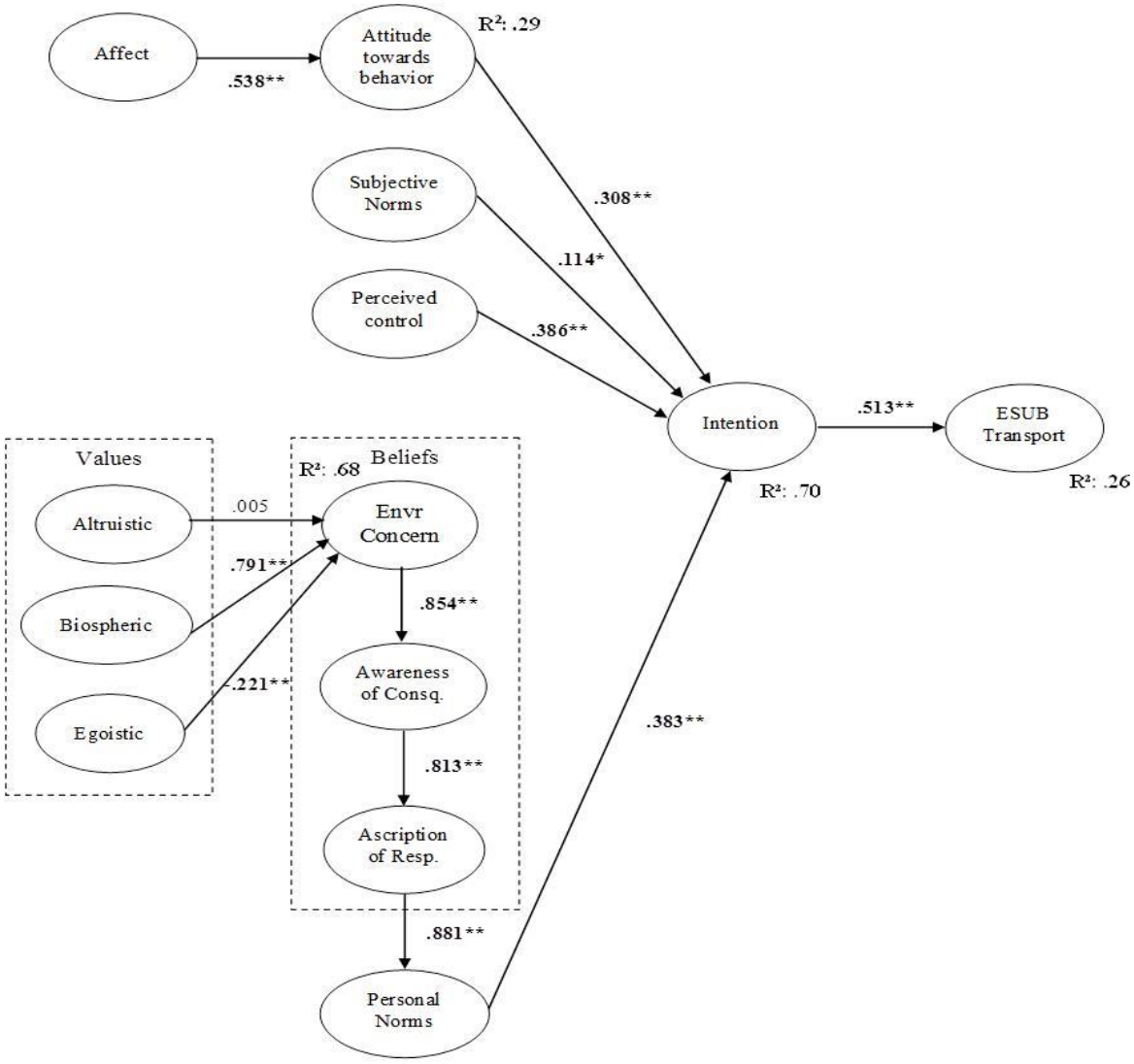


Figure 5-2. The structural equation model with hypothesized relationships, standardized beta values for transportation behavior. Notes: ** denotes paths significant at p<0.01.

5.5.2 Household Energy Use Results

Ten out of twelve hypotheses were supported for environmentally sensitive energy use behavior. Only those hypotheses related to altruism and personal norms were not supported. An outline of the results with standardized parameter estimates, statistical significance level, and R^2 values for all the proposed hypotheses are presented in Table 5-5.

Hypotheses				R^2	Std. parameter estimate	*p*-Value	Results
H1b.	Attitude towards behavior	→	Behavioral intention	0.85	0.69	$p < 0.01$	Supported
H2b.	Subjective norm	→	Behavioral intention	0.85	0.13	$p < 0.01$	Supported
H3b.	PBC	→	Behavioral intention	0.85	0.23	$p < 0.01$	Supported
H4b.	Behavioral intention	→	ESUB - HouseholdUse	0.48	0.69	$p < 0.01$	Supported
H5b.	Altruistic values	→	Environmental concern	0.72	0.04	$p = 0.58$	Not supported
H6b.	Biospheric values	→	Environmental concern	0.72	0.80	$p < 0.01$	Supported
H7b.	Egoistic values	→	Environmental concern	0.72	-0.19	$p < 0.01$	Supported
H8b.	Environmental concern	→	Awareness of conseq.	0.82	0.90	$p < 0.01$	Supported
H9b.	Awareness of conseq.	→	Ascription of resp.	0.66	0.81	$p < 0.01$	Supported
H10b.	Ascription of resp.	→	Personal norm	0.77	0.88	$p < 0.01$	Supported
H11b.	Personal norm	→	Behavioral intention	0.85	0.03	$p = 0.44$	Not supported
H12b.	Affect	→	Attitude towards behavior	0.63	0.79	$p < 0.01$	Supported

Table 5-5. Household energy use behavior summary of the results – structural model coefficients.
Notes: PBC, perceived behavioral control; ESUB, environmentally sensitive usage behavior.

Behavioral intention

The effects of attitude towards behavior on behavioral intention (*H1b*) as well as subjective norm on behavioral intention (*H2b*) were significant ($p < 0.01$), with standardized beta coefficient values of 0.69 and 0.13, respectively. Additionally, the standardized regression coefficient for the effect of perceived behavioral control on behavioral intention (*H3b*) was also significant ($\beta = 0.23$, $p < 0.01$). Personal norm (*H11b*), on the other hand, was not significantly related to behavioral intention ($\beta = 0.03$, $p = 0.44$). The R Square (R^2) for the relationship between these variables and behavioral intention outcome was .85. Hence, *H1b*, *H2b*, and *H3b* were supported, whereas *H11b* was not.

Environmentally sensitive household energy use

The effect of behavioral intention on environmentally sensitive household energy use behavior was significant ($p < 0.01$), with standardized beta value of $\beta = 0.69$, supporting the *H4b*. The R Square (R^2) value for the relationship between these two variables was 0.48, which suggests that intention explains 48% of the variance in environmentally sensitive household energy use outcome behavior.

Environmental concern

The effects of biospheric (*H6b*) and egoistic (*H7b*) values on environmental concern were found to be significant. Especially, the standardized regression coefficient for the effect of biospheric values on environmental concern was quite strong ($\beta = 0.80$, $p < 0.01$). Similar to the previous findings, although the effect of biospheric values on environmental concern was positive, egoistic values showed negative effect on the same

variable (β= -0.19, $p < 0.01$). Thus, both *H6b* and *H7b* were supported. The standardized regression coefficient of altruistic values on environmental concern (*H5b*) was not significant (β = 0.04, $p = 0.58$); hence, *H5b* was not supported.

Awareness of consequences

The effect of environmental concern (*H8b*) on the awareness of consequences was significant with standardized beta coefficient of 0.90 ($p < 0.01$) and R^2 value of 0.82. Since the direct effect of environmental concern was significant, *H8b* was supported.

Ascription of responsibility

The effect of the awareness of consequences (*H9b*) on ascription of responsibility was found to be significant. The standardized regression coefficient for the effect of awareness of consequences on ascription of responsibility was quite strong (β = 0.81, $p < 0.01$). Hence, *H9b* was supported.

Personal norm

Ascription of responsibility was found to predict personal norms related to the environment. The effect of ascription of responsibility (*H10b*) on environmental personal norms was significant. The standardized regression coefficient was the strongest for the effect of ascription of responsibility (β = 0.88, $p < 0.01$); hence, *H10b* was supported.

Attitude towards behavior

The analysis showed that the effect of affect (*H12b*) on attitude towards behavior was significant. This direct effect of affect on attitude towards household energy use behavior was stronger than in the case of transportation behavior (β = 0.79, $p < 0.01$); hence, *H12b* was supported.

The results of the structural equation model for household energy use are displayed in Figure 5.3 with standardized regression estimates and significance of each path. The same results were found when controlling for age, gender, income, and education.

After the results were reported for the second part of the analysis (i.e. for household energy use), a further test was conducted to see if other variables related to the VBN model had significant impact on energy usage behavior. In the initial analysis, personal norms variable was not significantly related to behavioral intention ($\beta = 0.03$, $p = 0.44$). Further examination also showed non-significant results between ascription of responsibility, awareness of consequences, environmental concern and behavioral intention relationships. When we checked if any of these variables had direct effect on behavioral outcome, we found a significant relationship between awareness of consequences and household energy use ($\beta = 0.16$, $p < 0.05$) (see Figure 5.3). Consequently, our results showed that awareness of negative consequences influences behavioral outcome directly, without being mediated through ascription of responsibility, personal norms, or behavioral intentions.

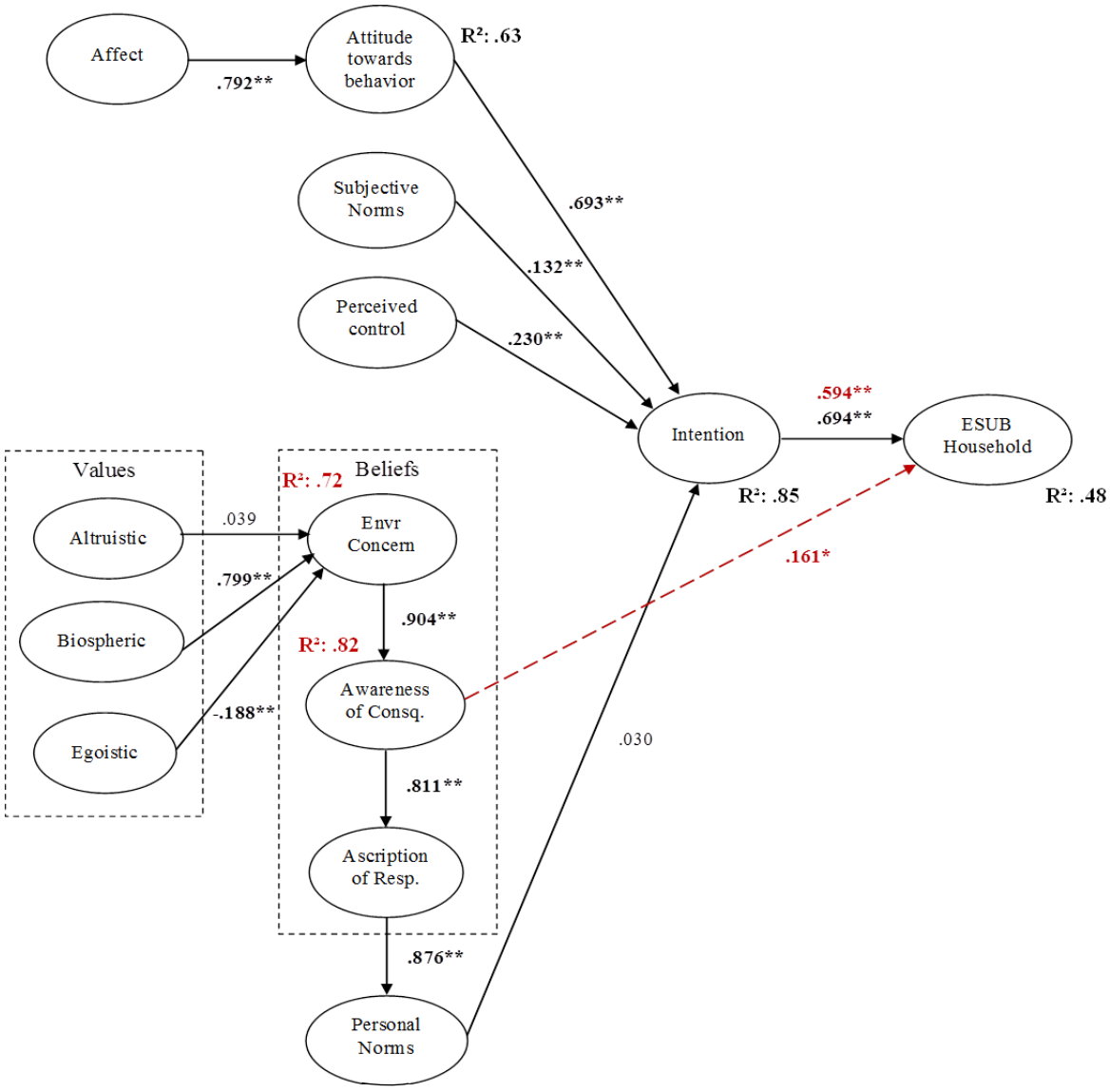


Figure 5-3. The structural equation model with hypothesized relationships and standardized beta values for environmentally sensitive household energy use. Notes: ** denotes paths significant at $p<0.01$.

5.6 Comparison of the GFT Models (Transportation & Household Energy Use): the Theory of Planned Behavior (TPB), Theory on Affect (TA), and Value-Belief-Norm (VBN) Model

Following the satisfactory results of the combined model evaluations, the three models developed based on the underlying theories of GFT were compared for model fit for both environmentally sensitive transportation and household energy use behaviors. Tables 5-6 and 5-7 summarize the degree to which each model fits the data using various fit measures for transportation and household energy use, respectively. The tables indicate that all three models provide acceptable fit to the data for both behaviors. Although fit to the data for affect model displays a poor fit because of high RMSEA value (0.106) for transportation behavior, we still accept the model fit because of satisfactory values of other index measures. This suggests that all three models based on GFT can be successfully applied to the domain of consumers' environmentally sensitive usage behaviors.

In a setting in which all three GFT models reveal a reasonable fit to the data in explaining similar target behaviors, to determine the best model, other possible criteria must be examined as suggested by Rust, Lee, & Valente (1995). When conducting the comparison between the non-nested competing models, similar to this study, parsimony fit measures such as the Akaike information criterion (AIC) (Akaike, 1987) and the Browne–Cudeck criterion (BCC) (Browne & Cudeck, 1989) are considered appropriate because they assess model parsimony and fit (Rust et al., 1995). As shown in Table 5-8 for transportation behavior, in the TPB, AIC is 191.284 and BCC is 196.084, in the TA, AIC is 200.097 and BCC is 202.834, the values for the VBN are 885.145 and 907.393 for AIC and BCC, respectively. As smaller values of these criteria give us a better fit of the model, these results indicate a preference for the TPB over the TA and VBN. On the

other hand, additional parsimony fit measures such as parsimony goodness of fit index (PGFI) (the TPB: 0.612; the TA: 0.546; the VBN: 0.697) and parsimony normed fit index (PNFI) (the TPB: 0.726; the TA: 0.683; the VBN: 0.794), which assess the parsimony fit of GFT models, favor the VBN. For the non-nested model comparisons, the most common statistical test is normed Chi-square (Rust et al., 1995). In the TPB, normed Chi-square is 1.73, in the TA, the value is 3.702, and the value for the VBN is 1.89. Since a smaller value of this criteria indicates a better parsimony and a better fit of the model, this result indicates a superior fit for the TPB over the TA and VBN. Overall, in terms of the model fit and model parsimony, the results suggest that in a comparison of the GFT models for transportation behavior, the TPB is slightly superior to both the TA and VBN. Following the TPB, VBN model explains the second best this specific behavior relative to TA.

To assess the non-nested competing models of GFT for household energy use, similar steps have been taken. As shown in Table 5-9 for household energy use, in the TPB, AIC is 255.555 and BCC is 262.397, in the TA, AIC is 210 and BCC is 159.17, the values for the VBN are 1038.619 and 1065.487 for AIC and BCC, respectively. As smaller values of these criteria give us a better fit of the model, these results indicate a preference for the TA over the TPB and VBN. On the other hand, additional parsimony fit measures such as parsimony goodness of fit index (PGFI) (the TPB: 0.669; the TA: 0.652; the VBN: 0.706) and parsimony normed fit index (PNFI) (the TPB: 0.770; the TA: 0.765; the VBN: 0.793), which assess the parsimony fit of GFT models, favor the VBN. Furthermore, in the TPB, normed Chi-square is 1.55, in the TA, the value is 1.23, and the

value for the VBN is 1.83. Overall, in terms of the model fit and model parsimony, the results suggest that in a comparison of the GFT models for household energy use behavior, the TA is slightly superior to both TPB and VBN models. Following the TA, VBN model explains the second best this specific behavior.

Three Model Fit Comparisons (Transportation)

Measure	TPB	TA	VBN
Chi-square	119.284	148.097	735.145
IFI	0.98	0.96	0.94
TLI	0.98	0.94	0.94
CFI	0.98	0.96	0.94
RMSEA	0.055	0.106	0.061

Table 5-6. The table indicates that all three models provide a reasonable fit to the data.

Three Model Fit Comparisons (Household energy use)

Measure	TPB	TA	VBN
Chi-square	171.555	88.751	876.619
IFI	0.98	0.99	0.94
TLI	0.97	0.99	0.93
CFI	0.98	0.99	0.94
RMSEA	0.048	0.031	0.059

Table 5-7. The table indicates that all three models provide a reasonable fit to the data. Notes for Tables 5-4 and 5-5: TPB, theory of planned behavior; TA, theory on affect; VBN, value-belief-norm; IFI, incremental fit index; TLI, Tucker–Lewis index; CFI, comparative fit index; RMSEA, root mean square error of approximation

Parsimony Fit Measure Comparisons (Transportation)

Measure	TPB	TA	VBN
Normed Chi-square	**1.73**	3.702	1.89
PNFI	0.726	0.683	**0.794**
BCC	**196.084**	202.834	907.393
AIC	**191.284**	200.097	885.145
PGFI	0.612	0.546	**0.697**

Tables 5-8. Comparison between the non-nested competing models using parsimony fit measures.

Parsimony Fit Measure Comparisons (Household energy use)

Measure	TPB	TA	VBN
Normed Chi-square	1.55	**1.23**	1.83
PNFI	0.77	0.765	**0.793**
BCC	262.397	**159.17**	1065.487
AIC	255.555	**210**	1038.619
PGFI	0.669	0.652	**0.706**

Tables 5-9. Comparison between the non-nested competing models using parsimony fit measures.
Notes for Tables 5-8 and 5-9: PNFI, parsimony normed fit index; BCC, Browne–Cudeck criterion; AIC, Akaike information criterion; PGFI, parsimony goodness of fit index. The measures in bold show the better fit compared to other values in the same index.

5. 7 Discussion and Conclusions

With this study, we were able to examine and understand the functioning of goal framing theory in the environmental behavior context and the significance of each individual theory variable in determining consumers' environmentally sensitive usage

behavior, namely eco-sensitive transportation and household energy use. The results of the study show that the theory of goal framing by Lindenberg (2001a, 2001b, 2006) is a useful framework for examining the motivational determinants of both types of environmentally sensitive usage behaviors.

Based on the goal framing theory, this study tested a model developed by combining three theories, i.e., theory of planned behavior (TPB), values-beliefs-norms (VBN) theory, and theory on affect (TA). All three motivational predictors (hedonistic, gain, and normative related concerns) had an effect to a certain degree on transportation and household energy use behavior of consumers through behavioral intentions.

For transportation behavior, especially VBN theory variables were strong predictors as well as perceived behavioral control and attitudes towards environmentally sensitive transportation behavior. Affect seemed to be explaining about 30% of the variance in attitudes towards the behavior, which can be considered a moderate factor in explaining travel decision making. The analysis also showed that subjective norms were not strongly related to behavioral intention compared to other predictors of intention examined in the study. This tells us that the expectations of significant social surroundings, such as family, friends, and colleagues, are not as important in determining one's behavioral decision on how to commute. In general, the results of the study show that environmentally sensitive behaviors of individuals in the context of environmentally sensitive transportation, such as cutting back on driving a car when possible, choosing public transportation whenever that option is available, walking short distances instead of driving, are mostly affected by their environmental values, beliefs, personal norms,

perceived behavioral control and attitudes. In other words, consumers with high biospheric values, environmental concern, personal norms, perceived behavioral control, positive attitudes, affect, and intention towards behavior, high awareness of consequences, ascribed responsibility, and low egoistic values choose more eco-friendly transportation alternatives. Although these are important results to report, it is also essential to note the low explanatory power of intention in the model. In the study, we were able to explain only 26% of the variance in transportation behavior by intention to choose eco-sensitive transportation behavior. Furthermore, gender and age seemed to be related to choosing eco-sensitive transportation suggesting young males perform this type of behaviors more often, although the relationship was not seemed to be strong. It is possible that other predictors also might be important in explaining this specific environmentally sensitive behavior of individuals.

According to the results of the study, household use was better explained than transportation behavior with intention as the immediate antecedent (48% vs. 26%). For eco-sensitive household energy use, especially TA variables were strong predictors along with perceived behavioral control and subjective norms. Affect seemed to be explaining about 63% of the variance in attitudes towards this behavior, which can be considered a significant factor in explaining household energy use behavior. Contrary to transportation behavior, household use seemed to be less impacted by personal norms and associated VBN theory variables. On the other hand, affect theory and TPB variables better explained this specific usage behavior. The power of TPB theory variables to explain eco-sensitive usage behavior parallels the suggestion of Kaiser et al. (2005), such that

conservation behavior and actions related to it are based on variables coming from TPB more than the ones from VBN model. Kaiser et al.'s study found that the TPB could explain 95% of the variance in conservation behavior of individuals whereas the VBN model could only explain 64%. They stated that "compared to the VBN model, the TPB covered its concepts more fully in terms of proportions of explained variance" (p. 2150). Although the results of our study showed a weak effect of VBN theory variables, it also showed subjective norms were important in determining intention to use household energy in an environmentally sensitive way.

From three types of value orientations, biospheric values seemed to be the strongest predictor of ecological worldview of individuals for both types of usage behaviors examined in the study. This result parallels the finding of Fraj and Martinez (2006) who proved that the individuals with high value orientation towards ecological matters display more eco-sensitive behavior. In their study based on VBN theory, Steg, Dreijerink, and Abrahamse (2005) also found that from three values examined (i.e., altruistic, biospheric, egoistic), biospheric values were most strongly related to behavior specific beliefs in the context of energy policy acceptability. These findings suggest valuing the ecological well-being is important when a customer makes an eco-sensitive inclined decision. Although, the results of this study as well as findings of De Groot and Steg (2008) suggest the link between low egoistic values and higher environmental worldview, the predicting power of this type of value orientation seems to be much lower than that of biospheric values.

In addition to examining the effects of each individual variable of the research model, the present study performed a further model comparison among the three Goal Framing Theory (GFT) frameworks (i.e., the TPB, TA, and VBN) for explaining consumers' environmentally sensitive usage behavior (ESPB), in which categorized as transportation and household energy use. Based on the previous studies of model comparison (Akaike, 1987; Browne & Cudeck, 1989; Rust et al., 1995), this study displayed reasonable model fit to evaluate the three GFT models and identified the best model**.** Empirical results showed all the three underlying models of GFT achieve comparable fit to the data. Overall, the results of model comparison indicated that while environmentally sensitive transportation behavior of consumers could be better explained by TPB (compared to VBN and TA), environmentally sensitive household energy use could be better explained by TA (compared to VBN and TPB). These results give us an important insight on explaining these two types of usage behavior using different theories and show that gain and hedonic motive based theories can better explain these types of behaviors compared to those based on moral concern.

5.7.1 Implications and recommendations

Based on the study results, it is clear that pro-environmental behavior change in the context of environmentally sensitive usage behavior can be achieved with various social and sustainability marketing strategies, management decisions as well as government interventions that focus on communicating different aspects of usage behavior. According to the results, practitioners can promote consumers' intentions to use

products and services in an environmentally friendly way by strengthening their values, beliefs, personal norms (for transportation), subjective norms (for household energy use), perceived control, attitudes, emotions, and intentions regarding the behavior.

Our results showed that VBN theory variables along with perceived behavioral control and attitudes were strong predictors of environmentally sensitive transportation behavior. Thus, normative based approaches can be important in developing social marketing and management strategies. Also, making eco-sensitive transportation easily accessible would be essential. For instance, introducing non-driving options for communities can be the key to reduce attachment to vehicle use, which would eventually improve air quality (Corbett, 2005). Hence, upgrading neighborhoods and business districts in a way that allow people to travel from one point to the other by walking or using mass transportation can be considered as one of the essential management strategies. Such approaches provide changes in structural factors and help improve perceived control among individuals that will be the key to achieving success in reducing private vehicle use. In sum, all of these actions can help reduce harmful emissions to the atmosphere.

Although important results related to transportation behavior reported in this study, it is also essential to note the low explanatory power of behavioral intention in the model. We were able to explain only 26% of the variance in this behavioral outcome. It is possible other predictors might be important in explaining this specific environmentally sensitive behavior of individuals, such as situational characteristics (e.g., living in the city

or suburbs, occupation), habits, past experiences related to behavior, etc. All these could be focus areas for future studies.

The results of the study showed that environmentally sensitive usage behaviors of consumers are complex and determining the predicting factors need detailed examination of these behaviors thru categorization. Here we looked at two types of usage behavior, transportation and household energy use. However, future studies can also include other usage, such as water use or park visits, to fully understand the causes of different types of behaviors. Although we tried to measure water use behavior by applying the Marandu *et al*. (2010) measurement instrument, the items of the measure fell into separate factors in exploratory factor analysis, and thus were excluded from further analysis. Using a different measurement instrument can give us different results.

Furthermore, comparative studies on different types of usage behavior can expand the goal framing theory by including contextual factors and would be an important focus for future studies. Here, we were able to look at the effects of contextual factors as the way it was covered in the perceived behavioral control (PBC) variable. The PBC is the ease or difficulty in performing a certain behavior perceived by the consumer. As such, this variable is mostly based on the subjective perception of the individual and not derived from actual contextual factors. Future experimental studies can focus on situational and contextual conditions and explain the relationships in more detail with a different perspective.

5.8 References

Abrahamse, W., & Steg, L. (2011) Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review, 18*(1), 30-40.

Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, J. A. (2007). The effect of tailored information, goal setting and feedback on household energy use, energyrelated behaviors and behavioral determinants. *Journal of Environmental Psychology*, *27*, 265–276.

Abrahamse, W., Steg, L., Gifford, R., & Vlek, C. (2009). Factors influencing car use for commuting and the intention to reduce it: A question of self- interest or morality? *Transportation Research Part F: Traffic Psychology and Behavior, 12*, 317-324.

Ajzen, I. (2002). Constructing a TPB questionnaire: Conceptual and methodological considerations. Retrieved from http://www.people.umass.edu/aizen/pdf/tpb.measurement.pdf

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin: Springer.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall, Englewood Cliffs, NJ: Prentice-Hall.

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika, 52* (3), 317–332.

Albrecht, D., Bultena, G., Hoiberg, E., & Nowak, P. (1982). The new paradigm scale. *Journal of Environmental Education, 13*, 39–43.

Allison, P. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology, 112*(4), 545-557.

Anderson, J. C. & Gerbing, D. W. (1988). Structural equation modelling in practice: a review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-23.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Bagozzi, R. P. & Heatherington, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to self-esteem. *Structural equation modeling, 1*(1), 35-67.

Bamberg, S., & Schmidt, P. (2003). Incentives, morality or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environment and Behavior, 35*, 264–285.

Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides & R. E. Shumaker (Eds.), *Advanced structural equation modeling: New developments and techniques*. Mahwah, NJ: Lawrence Erlbaum Associates.

Baumgartner, H. & Homberg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing, 13*, 139-161.

Bechtel, R. B., Verdugo, V. C., & de Queiroz Pinheiro, J. (1999). Environmental belief systems: United States, Brazil, and Mexico. *Journal of Cross-cultural Psychology, 30*(1), 122–128.

Belz, F. M., & Peattie K. (2009). *Sustainability Marketing: A Global Perspective.* Chichester: John Wiley & Sons, Ltd.

Birgelen, M. V., Semeijn, J., & Keicher, M. (2009). Packaging and Pro-environmental Consumption Behavior: Investigating Purchase and Disposal Decisions for Beverages. *Environment and Behavior, 41*(1), 125-146.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Brandon, G., & Lewis, A. (1999). Reducing household energy consumption: A qualitative and quantitative field study. *Journal of Environmental Psychology, 19,* 75-85.

Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioural Research 24*(4), 445–455.

Bruni, C. M., Schultz, P. W., & Saunders, C. (2012). CONPSYCHMeasures, Measurement Tools for Environmental Practioners. Retrieved from http://www.conpsychmeasures.com/CONPSYCHMeasures/Measures/NEP_R/NEP_R.html

Byrne, B. M. (2001). *Structural Equation modeling with AMOS: Basic concepts, applications, and programming* (Multivariate applications series) (pp. 57-91). New Jersey: Mahwah Publishers.

Cleveland, M., Kalamas, M., & Laroche, M. (2005), Shades of Green: Linking Environmental Locus of Control and Pro-Environmental Behaviors. *Journal of Consumer Marketing*, *22*(4), 198-212.

Corbett, J. B. (2005). Altruism, self-interest, and the reasonable person model of environmentally responsible behavior. *Science Communication, 26*(4), 368-389.

Corradi, N., Priftis, K., Jacucci, G., & Gamberini, L. (2013). Oops, I forgot the light on! The cognitive mechanisms supporting the execution of energy saving behaviors, *Journal of Economic Psychology, 34*(February), 88-96.

De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*(3), 330-354.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56,* 425-442.

EPA (2011). Sources of greenhouse gas emissions. Environmental Protection Agency, Retrieved from http://www.epa.gov/climatechange/ghgemissions/sources.html

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Fraj, E., & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis. *Journal of Consumer Marketing, 23*(3), 133-144.

Gardner, B., & Abraham, C. (2008). Psychological correlates of car use: A meta-analysis. *Transportation Research Part F, 11*, 300–311.

Garver, M. S., & Mentzer, J. T. (1999). Logistics research methods: Employing structural equation modeling to test for construct validity. *Journal of Business Logistics, 20*(1), 33-57.

Gatersleben, B. (2007). Affective and symbolic aspects of car use. In T. Garling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 219–233). Amsterdam: Elsevier.

GSS (2010), General Social Survey Ballot 1. Retrieved from http://publicdata.norc.org:41000/gss/documents//OTHR/GSS2010_Ballot1_AREA_English.pdf on May 14, 2012.

Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior: Predicting the use of public transportation. *Journal of Applied Social Psychology, 32*, 2154–2189.

Hoe, S. L. (2008). Issues and procedures in adopting structural equation modeling technique. *Journal of Applied Quantitative Methods, 3*(1), 76-83.

Hox, J. J., & Bechger, T. M. (1998). An introduction to structural equation modeling. *Family Science Review, 11*, 354-373.

Hoyle, R. (1995). *Structural Equation Modeling: Concepts, Issues, and Applications*. Thousand Oaks, CA: Sage Publications.

Hunecke, M., Blobaum, A., Matthies, E., & Hoger, R. (2001). Responsibility and environment: ecological norm orientation and external factors in the domain of travel mode choice behavior. *Environment and Behavior*, *33*, 830–852.

Jansson, J., Marell, A., & Nordlund, A. (2010). Green consumer behavior: Determinants of curtailment and eco-innovation adoption, *Journal of Consumer Marketing, 27* (4), 358–370.

Joreskog, K.G., & Sorbom, D. (1993). *LISREL VIII: Analysis of linear structural relations by the method of maximum likelihood*. National Education Resources, Chicago, IL.

Kaiser, F. G., Hübner, G., & Bogner, F. X. (2005). Contrasting the theory of planned behavior with the value-belief-norm model in explaining conservation behavior. *Journal of Applied Social Psychology, 35*, 2150-2170.

Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: Guilford Press.

Lindenberg, S. (2001a). Social rationality versus rational egoism. In J. Turner (Ed.), *Handbook of sociological theory* (pp. 635–668). New York: Kluwer Academic/Plenum.

Lindenberg, S. (2001b). Intrinsic motivation in a new light. *Kyklos, 54*, 317–342.

Lindenberg, S. (2006). Prosocial behavior, solidarity and goal-framing processes. In D. Fetchenhauer, A. Flache, B. Buunk, & S. Lindenberg (Eds.), *Solidarity and prosocial behavior. An integration of sociological and psychological perspectives.* Amsterdam: Kluwer.

Marandu, E. E., Moeti, N., & Joseph, H. (2010). Predicting residential water conservation using the Theory of Reasoned Action. *Journal of Communication, 1*(2), 87-100.

Moll, H. C., Noorman, K. J., Kok, R., Engström, R., Throne-Holst, H., & Clark, C. (2005). Pursuing more sustainable consumption by analyzing household metabolism in European countries and cities. *Journal of Industrial Ecology, 9,* 259-275.

Noe, F. & Snow, R. (1990) The new environmental paradigm and further scale analysis. *Journal of Environmental Education, 21*, 20–26.

Noorman, K. J.,& Schoot Uiterkamp, A. J. M. (Eds.). (1998). *Green households? Domestic consumers, environment, and sustainability.* London: Earthscan.

Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology, 23,* 339-347.

Nunnally, J. C., & Berstein, I. H. (1994). *Psychometric theory*. New York: McGraw-Hill.

Peter, J. P. (1979). Reliability: A Review of Psychometric Basics and Recent Marketing Practices. *Journal of Marketing Research, 16*(1), 6-17.

Poortinga, W., Steg, L., & Vlek, C. (2002). Environmental risk concern and preferences for energy-saving measures. *Environment and Behavior 34*(4), 455–478.

Poortinga, W., Steg, L., & Vlek, C. (2004). Values, environmental concern and environmental behavior: A study into household energy use *Environment and Behavior, 36*(1), 70-93.

Russell, J. A. (1980). A circumplex model of affect. *Journal of personality and social psychology*, *39*(6), 1161.

Rust, R. T., Lee, C., & Valente, E., (1995). Comparing covariance structure models: A general methodology. *International Journal of Research in Marketing 12* (4), 279–291.

Saba, A., & Messina, F. (2003). Attitudes towards organic foods and risk/benefit perception associated with pesticides. *Food Quality and Preference, 14,* 637-45.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W.R. (2005). A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research, 58*(1), 935-43.

Smith, S. M., Haugtvedt, C. P., & Petty, R. E. (1994). Attitudes and recycling: does the measurement of affect enhance behavioral prediction? *Psychology & Marketing, 11*(4), 359-374.

Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice, 39*(2), 147-162.

Steg, L. (2008). Promoting household energy conservation. *Energy Policy, 36*, 4449–4453.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F: Traffic Psychology and Behavior*, 4(3), 151-169.

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology, 25*(4), 415-425.

Steg, L., De Groot, J. I., Dreijerink, L., Abrahamse, W., & Siero, F. (2011). General antecedents of personal norms, policy acceptability, and intentions: The role of values, worldviews, and environmental concern. *Society and Natural Resources, 24*(4), 349-367.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407–424.

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65-84.

Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A brief inventory of values. *Educational and Psychological Measurement, 58*(6), 984-1001.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review, 6*(2), 81-98.

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Needham Heights, MA: Allyn & Bacon.

Thøgersen, J. (2009). Consumer decision-making with regard to organic food products. In M. T. N. Vaz, P. Nijkamp and J. L. Rastoin (Eds.), *Traditional food production and rural sustainable development: A European challenge*, (pp. 173-94), Aldershot, UK: Ashgate.

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behavior and the role of confidence and values. *Ecological Economics, 64*, 542-553.

Vagias, W. M. (2006). Likert-type scale response anchors. *Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management.* Clemson University. Retrieved from http://enrd.ec.europa.eu/app_templates/enrd_assets/pdf/Guidance-on-Surveys/Likertscales-responses.pdf

Van Petegem, P., & Blieck, A. (2006). The environmental worldview of children: A cross-cultural perspective. *Environmental Education Research, 12*(5), 625-635.

Chapter 6

"Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has"

(Margaret Mead, 1901- 1978)

Study IV: Why do Consumers Recycle? A Goal Framing Theory Approach

CHAPTER 6

Why do Consumers Recycle? A Goal Framing Theory Approach

Abstract

In this study, the environmentally sensitive post-use behavior of consumers was examined using a model developed based on the Goal Framing Theory (GFT). The purpose of this study was to analyze the factors that predict environmentally sensitive post-use behavior (ESPUB) of consumers by examining the extent to which such behaviors depend mostly on moral considerations, feelings, or self-interest motives. Formulated hypotheses and the model were tested with Structural Equation Modeling (SEM) using the data from 206 individuals. The focus was mainly on recycling behavior. The results of the study indicated that GFT is an important framework in explaining eco-sensitive post-use behavior of consumers. The findings suggest that while values (biospheric, egoistic), environmental concern, awareness of destructive consequences, ascription of responsibility to self, personal and subjective norms, attitudes towards behavior, perceived behavioral control and intention explain ESPUB, altruistic values do not have any power in explaining behavior related intention. In particular, perceived behavioral control seems to be the strongest predictor of behavioral intention. Variables of the theory of planned behavior, which assess gain motives, seemed to have the greatest explanatory power for ESPUB of consumers. The important implications of the study for marketers, managers, and practitioners are discussed.

Keywords: Environmentally sensitive post-use, Recycling, Goal Framing Theory, Theory of Planned Behavior, Value-Belief-Norm model, Theory on Affect.

6. Introduction

Achieving a sustainable future could be possible by altering life-styles toward the notion of "Think Global, Act Local" (Steel, 1996; Barr, 2007). Altering the behaviors of consumers that have detrimental environmental impacts can solve bigger and larger environmental problems world-wide. This is one of the reasons why global agencies and governmental organizations aim to advocate eco-friendly actions and encourage individuals and households to behave in an ecologically sound manner (UNEP, 2007; OECD, 2008; EPA, 2012a).

The importance of examining and understanding purchase and usage behaviors of consumers were underlined in Studies II and III of this dissertation. However, it is also crucial to analyze and determine reasons for behaving in different ways after these two stages of consumer behaviors are complete. This last stage of consumer behavior is named as "post-use behavior" in the consumer behavior literature. The post-use stage means disposing of the product, recycling or remanufacturing it, selling, trading, renting or loaning, placing it into storage, or altering it to use in another way (Belz & Peattie, 2009). This has an impact on the environment as the fast-paced accumulation of waste can have distressing impacts all around the world (e.g., landfills, water and soil contamination). According to the Environmental Protection Agency (EPA), just in the U.S., 250.9 million tons of solid waste was generated in 2012, which makes nearly 4.38 pounds of waste per capita per day. From this total waste generated, only 34.5% has been recycled, meaning the addition of 135 million tons of solid waste into landfills, (EPA, 2012b). This tremendous accumulation of discarded wastes in landfills is putting pressure

on the well-being of land, air, water systems, as well as communities (El-Fadel, Findikakis, & Leckie, 1997). Thus, from the environmental well-being stand point, it is crucial for consumers to lessen negative impacts caused by their post-use behaviors, for instance, by adopting recycling or reusing actions which both would lead to household waste reduction.

By understanding the functioning of motivations that lead individuals to treat their consumed goods in different ways (after usage stage), it can be possible to develop necessary policies to alter environmentally harmful post-use behaviors. In fact, according to Barr (2007), one of the end results of irresponsible post-use behavior, the waste problem, could be "resolved only when policies are implemented that are based on a clear understanding of what factors influence individual intentions and behaviors, which in turn have to be grounded in rigorous social research" (p.436).

This study tries to understand the factors that influence consumers' environmentally sensitive post-use behaviors by focusing on three different types of motivations: hedonic, self-interest, and moral, based on the Goal Framing Theory. It is important to understand why consumers choose eco-friendly post-usage options (e.g., recycling, reusing, or reducing waste) over others in order to alter these types of behaviors.

This study is organized as follows. First, based on the Goal Framing Theory (GFT) (Lindenberg, 2001a, 2001b, 2006) we constructed a model and developed hypotheses with the relevant literature. Second, we examined the relationships of individual's behavioral attitudes, affect (i.e., pleasure), subjective norms, perceived

behavioral control, personal norms, values (i.e., biospheric, altruistic, egoistic), environmental concern, awareness of consequences (AC), ascription of responsibility (AR), proenvironmental personal norms (PN), and intention with environmentally sensitive post-use behaviors. The study was based on a primary data obtained from individuals who are the active members of the TerraCycle recycling company. The main objectives of the study were to (1) determine predictor variables of environmentally sensitive post-use behavior and (2) see whether this type of behavior depends mostly on moral considerations, feelings, or self-interest motives. Finally, results of the study on factors influencing post-use behaviors were presented.

6.1 Literature Review and Hypotheses Construction

6.1.1 Environmentally sensitive post-use (ESPU) behavior and its predictors

Environmentally sensitive post-use (ESPU) behavior can be defined as a behavior of an individual who considers environmental issues in the actions taken after the initial use of the product. This study considered ESPU behaviors as recycling, reusing, and reducing waste in order to minimize the negative effects of postconsumer products on the natural environment.

As Barr (2007) states, it can be possible to tackle waste problem effectively if we can understand how individuals make decisions at the disposal stage of the consumption process, in addition to understanding decision making in purchase and usage stages. He also suggests the complexity of household post-use behaviors. In his study on household

waste management, Barr (2007) attributes these types of behaviors to different groups of independent variables, such as environmental values, situational variables, and psychological factors. For instance, consumers may prefer recycling products after initial use to have minimal adverse effect on the natural environment (high environmental value). They may also want to save monetarily by making eco-sensitive post-use decisions, for example, reusing plastic containers instead of buying new ones. The convenience of the action can also be a key factor determining these types of behaviors as suggested by some researchers (e.g., Sidique, Lupi, & Joshi, 2010; Barr, 2007; McCarty & Shrum, 2001).

Although all of these could be important reasons for individuals to act eco-sensitively, understanding their environmentally sensitive post-use behaviors fully with significant predicting factors is not an easy task. This study, thus, focuses on psychosocial variables to explain eco-sensitive post-use behaviors of consumers by adopting three theories aforementioned in the earlier chapters, i.e., Theory of Planned Behavior, Value-Belief-Norm Theory, and Theory on Affect. Goal Framing Theory, which was the main theory adopted when developing a research model for Study VI, combines the three theories. In the next section, relevant hypotheses were developed separately based on each of the three theories.

6.1.2 Hypotheses development

Theory of Planned Behavior and ESPU Behavior

The theory of planned behavior (TPB) considers behavior to be a result of a consumer's cost-benefit analyses (Ajzen, 1985; Ajzen & Fishbein, 1980). As such, in the context of environmentally sensitive post-use behavior, it is assumed that if the person perceives a benefit from the behavior in question without additional costs (material, social, or effort related cost), (s)he would reuse, reduce, or recycle the post-used products. For example, inconvenience of the action can be problematic in performing these types of behaviors. Thus, it can be assumed that reducing effort related costs should decrease the barriers to post-use actions (e.g., household recycling). Following this approach, Sidique et al. (2010) state that since "recycling requires investment of time, space, money and effort, making recycling convenient should increase household participation" (p.164).

In the TPB, three factors determine post-use behavioral intentions: (1) attitudes toward the post-use behavior, (2) subjective norms, and (3) perceived behavioral control (PBC). Covering these three factors, numerous studies have used the TPB in the environmental behavior literature to explain different types of post-use behaviors, such as household recycling (Kaiser & Gutscher, 2003), employee recycling (Greaves, Zibarras, & Stride, 2013), and waste composting (Mannetti, Pierro, & Livi, 2004; Taylor & Todd, 1995). For example, Greaves et al. (2013) examined three different types of environmental behaviors and found that TPB constructs, attitudes, subjective norms, and perceived behavioral control, could explain 46% to 61% of the variance in intention to engage in these eco-sensitive behaviors that included recycling.

Some other studies focused on situational characteristics of the behavior, reflected as consumers' own perceptions towards contextual factors in the TPB. This perception is expressed in the perceived behavioral control construct of the theory (Steg & Vlek, 2009). Several researchers suggested a strong relationship between recycling behavior and convenience as represented in perceived behavioral control (e.g., Sidique et al., 2010; Barr, 2007, McCarty & Shrum, 2001). For example, according to McCarty and Shrum (2001), physical proximity of recycling containers is a crucial factor in the recycling behavior of individuals. Higher levels of recycling are expected in general if there are recycling bins in close proximity which is assumed to trigger promotion of this specific behavior (Sidique et al., 2010; Barr, 2007).

The studies in environmental behavior literature focusing on TPB (e.g., Kaiser & Gutscher, 2003; Mannetti et al, 2004; Taylor & Todd, 1995; Greaves et al., 2013) suggest that sustainable post-use behaviors can be stimulated by having a positive attitude towards sustainable post-use, high subjective norms, perceived behavioral control, and intentions to post-use in an environmentally sensitive way. This discussion leads to the following hypotheses:

H1c: There is a positive relationship between individuals' attitudes towards environmentally sensitive post-use behavior and their intentions to practice environmentally sensitive post-use.

H2c: There is a positive relationship between individuals' subjective norms and their intentions to practice environmentally sensitive post-use.

H3c: There is a positive relationship between individuals' perceived behavioral control and their intentions to practice environmentally sensitive post-use.

H4c: There is a positive relationship between individuals' intentions to practice environmentally sensitive post-use behavior and their environmentally sensitive post-use behavior.

Value-Belief-Norm Theory and ESPU Behavior

The second subset of Goal Framing Theory comprises value focused theory variables, including altruistic, biospheric, egoistic values, environmental concern, awareness of consequences, personal norms, and ascription of responsibility. Definitions of each variable are provided in Study II of this dissertation.

For the purpose of Study IV, the Value-Belief-Norm (VBN) Theory of Stern et al. (1999) and Stern (2000) was used as the base theory to develop a model that would explain normative motivations for post-use actions that are environmentally sensitive. The VBN theory combines the perspectives of value theory, norm-activation theory, and the New Environmental Paradigm (NEP) using a causal series of connected variables that lead to relevant behavior. These variables are personal values (biospheric, altruistic, and egoistic), environmental concern, awareness of undesirable consequences (AC), ascription of responsibility to self, and personal norms (PN) for acting pro-environmentally. Stern (2000) suggested that the association based on the functioning of causal chain from values to environmental concern that leads to awareness of destructive consequences, then to ascription of responsibility to the self, and finally to personal

norms. This chain reaction then finally determines the extent to which a person behaves in an environmentally sensitive way (i.e., ESPU).

For example, Meneses and Palacio (2005) studied household recycling behavior and reported a positive relationship between high attitudes towards ecology, greater concern for the environment and intention to recycle. In another study, Barr, Gilg, & Ford (2001) suggested that when individuals hold strong moral and personal norms; they feel personal responsibility to act pro-environmentally in the context of recycling. In the same context, Barr (2007) found the importance of normative concerns in determining intention to recycle. His waste management focused study also suggested the significance of environmental values and concerned based variables in predicting reuse and reduction behaviors. The research also has shown that the more strongly an individual subscribes to values other than his/her own interests, such as self-transcendent, altruistic, ecocentric, pro-social, or biospheric values, the more likely he/she is to be inclined towards environmentally sensitive behaviors (Steg & Vleg, 2009). Following this notion, in their study on value orientations of individuals to explain environmentally sensitive behaviors, De Groot and Steg (2008) distinguished three different types of values, altruistic, biospheric, and egoistic and suggested using them in environmental behavior studies. Altruistic, biospheric, and egoistic value orientations cover the basic beliefs related to environmentally sensitive behaviors. Stern and Dietz (1994), Stern, Dietz, and Guagnano (1998), and De Groot and Steg (2008) suggested a positive relationship of these types of beliefs with altruistic and biospheric values and a negative relationship between the same

types of beliefs and egoistic values. Following this discussion, each variable's hypothesis coming from the VBN theory developed as follows:

H5c: There is a positive relationship between individuals' biospheric values and their environmental concern.

H6c: There is a positive relationship between individuals' altruistic values and their environmental concern.

H7c: There is a negative relationship between individuals' egoistic values and their environmental concern.

H8c: There is a positive relationship between individuals' environmental concern and their awareness of consequences.

H9c: There is a positive relationship between individuals' awareness of consequences and their ascription of responsibility.

H10c: There is a positive relationship between individuals' ascription of responsibility and their proenvironmental personal norms.

H11c: There is a positive relationship between individuals' proenvironmental personal norms and their intentions to practice environmentally sensitive post-use.

Theory on Affective Motives and ESPU Behavior

A number of researchers suggested that affect can be another crucial factor explaining environmental behaviors (e.g., Gatersleben, 2007; Steg & Vlek, 2009; Steg, 2005). In fact, a limited amount of studies has also examined the potential role of affect in the context of environmentally sensitive behaviors (e.g., Steg, Vlek, & Slotegraaf ,

2001; Steg, 2005). These studies focused mostly on car use and found that this behavior is significantly associated with affective factors. For example, Gatersleben's study showed an association of car use with affective and symbolic factors. Similarly, the study by Steg (2005) on car use and its factors that predict affective motives showed that this specific behavior is most strongly associated with symbolic and affective motives.

For the purpose of this study, the affect model developed by Russell (1980) was used. This model has been increasingly applied in consumer behavior studies. As mentioned, according to the model, affective responses can be categorized into two separate dimensions: (1) pleasure and (2) arousal (Steg, 2005). Because the arousal dimension could capture an irrelevant concept in the context of usage behavior, only the pleasure dimension was used to identify the affect variable.

H12c: There is a positive relationship between individuals' gained pleasure from environmentally sensitive post-use behavior and attitudes towards environmentally sensitive post-use behavior.

6. 2 Empirical Model

Based on the above hypotheses, a conceptual model of the study was developed using a path-analysis approach. The proposed model (Figure 6.1) included three variables as antecedents to environmental concern: biospheric, altruistic, and egoistic values. Environmental concern is hypothesized to affect awareness of consequences, awareness of consequences is hypothesized to affect ascription of responsibility, and ascription of responsibility is hypothesized to affect pro-environmental personal norms. Furthermore,

in the proposed model, affect is conceptualized to influence attitude towards behavior, and perceived behavioral control (PBC), subjective norm, and attitude toward behavior are hypothesized to affect intention to perform the relevant usage behavior. Finally, in the proposed model, intention is hypothesized to be the immediate antecedent of the actual environmentally sensitive post-use behavior. The proposed model for Study IV is displayed in Figure 6-1.

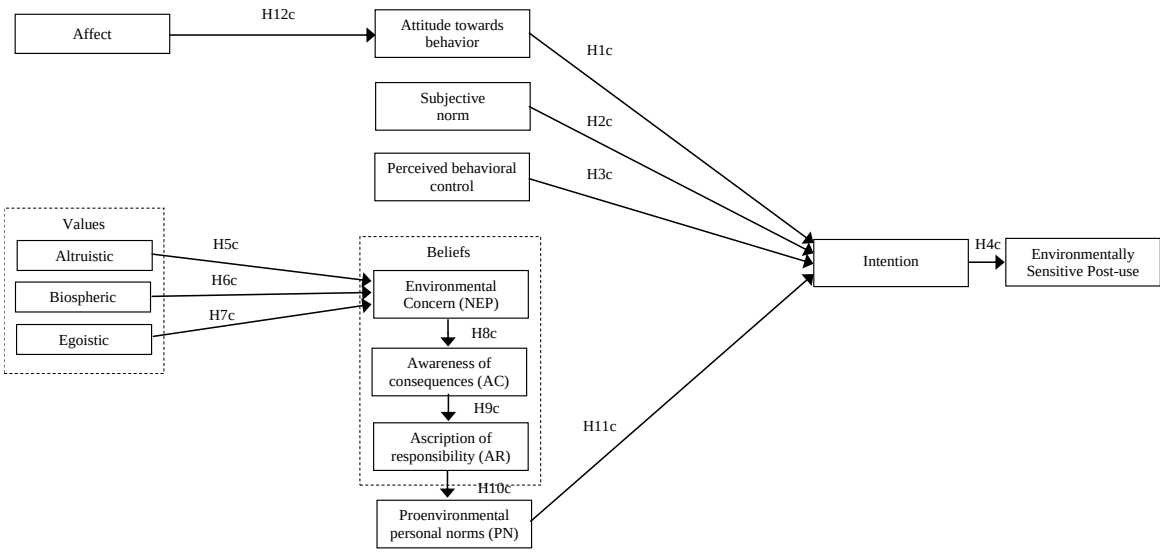


Figure 6-1. Study IV model shows the influence of gain goal-frames, normative goal-frames, and hedonic goal-frames on environmentally sensitive post-use (recycling) behavior with their corresponding hypotheses.

6. 3 Methodology

Similar to Study II and III, Study IV was also based on primary data. A questionnaire survey was used to collect data and verify the research framework guiding the hypotheses. Again, the participants were recruited from the active members of the TerraCycle recycling company account database. A link to the post-use survey was

placed into the monthly TerraCycle company newsletter (see Appendix A.1). Members could participate in the study by following the environmentally sensitive post-use link, which took him/her to the online survey. Participants' completed anonymous surveys were compiled in the SoGoSurvey online survey database account. Survey IRB approval was received before disseminating the relevant questionnerie (see Appendix A.2).

6.3.1 Survey sample

Data for this study were collected during the months of December (2013) and January (2014). In total, 213 participants completed the survey. Out of these responses, the questionnaires from seven respondents were not used in the study because of missing values, unengaged responses (i.e., giving answers randomly, such as choosing a midpoint 4 answer option for all questions), or incomplete data, thus, leaving a total of 206 completed responses used for the study. Table 6-1 displays the descriptive statistics and demographic profiles of Study IV participants.

In the responsive sample, female and male respondents were 57.3% and 42.7%, respectively. All respondents in the sample were 18 years or older, 21.8% were between 18 and 24 years old, 34% were between 25 and 34 years old, and 24.2% were between 35 and 44 years old. Respondents were at least high school graduates. Also, the highest participation came from college (39.3%) and bachelor (38.4) graduates. In the sample, the highest percentage of annual income was 28.7% for the income level of $40,000-$70,000.

Demographics of Study IV Participants *(n=206)*

Demographic		***n***	***%***
Gender			
	Female	88	42.7
	Male	118	57.3
Age			
	18 to 24	45	21.8
	25 to 34	70	34
	35 to 44	50	24.2
	45 to 54	23	11.2
	55 to 64	15	7.3
	65 to 74	2	1
	75 or older	1	0.5
Education			
	Less than High School	0	0
	High School	17	8.3
	Some College	81	39.3
	Bachelor's degree	79	38.4
	Master's degree	25	12.1
	Ph.D.	2	1
	Professional	2	1
Household annual income			
	Less than $20,000	33	16
	$20,000-$40,000	58	28.2
	$40,000-$70,000	59	28.7
	$70,000-$100,000	38	18.4
	$100,000-$150,000	16	7.8
	$150,000-$200,000	1	0.5
	More than $200,000	1	0.5

Table 6-1. Sample descriptive statistics & demographic profiles of Study IV participants.

6.3.2 Questionnaire design

All items were taken from well-established standardized scales from the literature all with acceptable reliabilities. The items were adapted to the environmentally sensitive post-use context. In order to assess whether survey items, measurements, and associated survey links were working as intended and to find out whether there was any ambiguity

in terms or meanings of items, a pre-test survey was conducted using procedures similar to Studies II and III.

6.3.3 Measurement instruments

Environmentally Sensitive Post-use Behavior. The environmentally sensitive post-use behavior (ESPUB) measure was based on Barr (2007). The ESPUB scale comprises fifteen items, the first four are related to reducing household waste, the next five are related to reusing household items, and the last six questions are related to recycling behavior. The items were: (1) RED1 "How often do you make special effort to buy produce with as little packaging as possible?", (2) RED2 "How often do you use your own bag when going shopping, rather than one provided by the shop?", (3) RED3 "How often do you look for packaging that can be easily re-used or recycled?", (4) RED4 "How often do you buy products that can be used again, rather than disposable items?", (5) REU1 "How often do you try to repair things before buying new items?", (6) REU2 "How often do you reuse paper?, (7) REU3 "How often do you reuse glass bottles and jars?", (8) REU4 "How often do you wash and reuse dishcloths rather than buying them new?", (9) REU5 "How often do you reuse old plastic containers, like margarine tubs?, (10) REC1 "How often do you recycle glass?", (11) REC2 "How often do you recycle newspaper/magazines?, (12) REC3 "How often do you recycle food/drink cans?", (13) REC4 "How often do you recycle junk mail?", (14) REC5 "How often do you recycle cardboard?, (15) REC6 "How often do you recycle plastic bottles?" Self-reported

behavioral items were assessed on a 7- point Likert scale, with always, very often, often, sometimes, rarely, very rarely, and never as response options.

Before getting into the next set of questions in the survey, the questionnaire asked participants to read the definition of environmentally sensitive post-use behavior (i.e., disposing, recycling, or reusing products after their initial use in order to have the least environmental impact. This behavior includes reducing the amount of waste produced) and then to complete the questions about this behavior.

Attitudes. The attitude towards environmentally sensitive post-use (ATESPU) construct was measured with a 5-item scale adapted from Abrahamse and Steg (2011) and Smith, Haugtvedt, & Perry (1994). The ATESPU scale items were: (1) ATESPU1 "Environmentally sensitive post-use (i.e., recycling, reusing products, reducing waste) is too much of a hassle," (2) ATESPU2 "Environmentally sensitive post-use means I have to live less comfortably," (3) ATESU3 "Environmentally sensitive post-use will restrict my freedom," (4) ATESU4 "Environmentally sensitive post-use is valuable," and (5) ATESP5 "Environmentally sensitive post-use is necessary." From the five items representing attitudes toward environmentally sensitive post-use behavior, the first three negatively worded questions were reverse coded. This psychological variable was measured on a 7-point Likert scale (Vaigas, 2006), with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options.

Intention. For the behavioral intention scale, a three-item measure was used. The scale consisted of three items: (1) IESPU1 "I intend to engage in post-use behavior that

are environmentally sensitive in the forthcoming months," (2) IESPU2 "I will try to engage in post-use behavior that are environmentally sensitive in the forthcoming months," (3) IESU3 "I expect to engage in post-use behavior that are environmentally sensitive in the forthcoming months." Behavioral intention was measured on a 7-point Likert-scale with the scores ranging from strongly disagree to strongly agree.

Subjective Norm. Subjective norm refers to social pressure to behave in a certain way and was operationalized by four questions (Abrahamse and Steg, 2011; Tonglet et al., 2004). The scale items were: (1) SNESPU1 "Most people who are important to me think that I should engage in environmentally post-use behavior," (2) SNESPU2 "Most people who are important to me would approve of me engaging in environmentally sensitive post-use behavior," (3) SNESPU3 "My household/family members think I ought to be engaging in environmentally sensitive post-use behavior," (4) SNESPU4 "My friends/colleagues think I ought to be engaging in eco-sensitive post-use behavior." All four items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Perceived Behavioral Control. Perceived behavioral control was operationalized by asking respondents directly how much control they have over the behavior of interest (ESPUB) and how easy or difficult they think it would be to perform the action (Tonglet et al., 2004). Measurements are taken from Abrahamse and Steg (2011) and Tonglet et al. (2004). The six items measuring perceived behavioral control were: (1) PBCESPU1 "I can engage in environmentally sensitive post-use behavior easily," (2) PBCESU2 "I have plenty of opportunities to engage in environmentally sensitive post-use behavior," (3)

PBCESU3 “Environmentally sensitive post-use behavior is inconvenient,” (4) PBCESU4 “I have been provided satisfactory resources to engage in environmentally sensitive post-use behavior,” (5) PBCESU5 “I know which materials/products are recyclable, reusable, and reducible,” and (6) PBCESU6 “I know when and where I can recycle, reuse, reduce materials/products.” The third statement was reverse coded to keep the measurement items consistent. All six items were measured on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree.”

Values. The measurement items for values are the same as the *Environmentally Sensitive Purchase (Study II)* and *Environmentally Sensitive Usage Behavior (Study III)* survey items.

Environmental Concern. The measurement items for environmental concern are the same as the *Environmentally Sensitive Purchase (Study II)* and *Environmentally Sensitive Usage Behavior (Study III)* survey items.

Awareness of Consequences. Awareness of consequences (AC) was measured using *six* items referring mainly to the extent to which participants believe that not recycling, reusing, or reducing is a problem (adapted from Abrahamse et al., 2009; Abrahamse & Steg, 2011; Stern et al., 1999). The scale consisted of the following items: (1) ACESPU1 “Not engaging in environmentally sensitive post-use behavior is problem for environment,” (2) ACESPU2 “Engaging in environmentally sensitive post-use behavior contributes to a reduction of the environmental problems,” (3) ACESPU3 “Engaging in environmentally sensitive post-use behavior contributes to habitat conservation,” (4) ACESPU4 “Engaging in environmentally sensitive post-use behavior

contributes to improving ability to meet environmental goals," (5) ACESPU5 "Engaging in environmentally sensitive post-use behavior contributes to improving individuals' safety and health," and (6) ACESPU6 "Environmentally sensitive post-use behavior can help improving environmental conditions." All six items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Ascription of Responsibility. The ascription of responsibility (AR) scale measures the degree to which survey participants ascribe responsibility to themselves for the environmental problems resulting from post-use actions that are environmentally harmful. The scale was adapted from Abrahamse et al. (2009) and Abrahamse and Steg, (2011). The scale items used for the purpose of this study were: (1) ARESPU1 "I feel personally responsible for the problems resulting from my post-use behavior that is not eco-sensitive," (2) ARESPU2 "My post-use behavior that is not eco-sensitive contributes to environmental problems," and (3) ARESPU3 "I take joint responsibility for environmental problems." Items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree."

Personal Norms. The personal norm (PN) scale consisted of three items assessing the degree to which participants feel moral obligations to behave pro-environmentally, in this case, the degree to which they feel a moral obligation to recycle, reuse, and reduce household items (Abrahamse et al., 2009; Abrahamse & Steg, 2011). The items were: (1) PNESU1 "I feel morally obliged to recycle, reuse, and reduce materials/products regardless of what other people do," (2) PNESU2 "I feel guilty when I do not recycle,

reuse, or reduce materials/products," and (3) PNESU3 "I would consider myself a better person if I recycle, reuse, and reduce materials/products."

Affect. To measure affect, Russell's (1980) model was adopted as a base, similar to Steg's (2005) study. Russell demonstrated that affective responses could be categorized into two different dimensions: (1) pleasure and (2) arousal. Following the same notion as Studies II and III, only the pleasure dimension of affect was used in the context of environmental sensitive post-use behavior. The scale included three items in total (Bigne et al., 2005; Russell, 1980; Steg, 2005). These items were: (1) AFESPU1 "Recycling, reusing, and reducing materials/products are giving me a feeling of satisfaction," (2) AFESU2 "When I recycle, reuse, and reduce materials/products, I feel happy," (3) AFESU3 "Recycling, reusing, and reducing materials/products are giving me a feeling of pleasure." In line with Vaigas (2006), items were measured on a 7-point Likert scale with strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, and strongly agree as response options. See Appendix C.1 for all measurement items.

Sociodemographics. Most sociodemographic variables were measured on a 7-point scale. Education was categorized into seven groups: Less than high school, high school, some college, bachelor's degree, master's degree, Ph.D., and professional. Estimated household annual income was also categorized into seven groups. Gender was coded as a dummy variable, with 1 representing 'male' and 2 representing 'female.' Age and race/ethnicity were also measured on a 7-point scale.

6.4 Analysis Technique and Model Evaluation

After the data obtained from the survey was collated and tabulated, the data was downloaded to the SPSS 20 statistical software for analyses. First, to provide basic information on the data and sample, descriptive statistics, such as standard deviations, means, and percentages were calculated (Table 6.1). Next, the survey data was analyzed using the latent variable structural equation modeling (SEM). For this statistical method, the software tool SPSS Analysis of Moment Structures (AMOS) version 22.0 was used to test the hypothesized model (Byrne, 2001). To meet the required assumptions of structural equation modeling, the data was first assessed in terms of missing values, outliers, normal distributions (univariate and multivariate), and multicollinearity.

6.4.1 Data analysis

From 213 returned surveys, three surveys with missing responses were eliminated. Also, by checking the standard deviation of each case and visual inspection, four unengaged responses were excluded from the data set. This process left 206 participant responses for the analyses.

Missing Data: Generally, it is important to examine whether the data are missing (if any) at random. For this study, all missing data was at the individual item level. Items with missing values were ESPUB2**,** ESUB8, ESUB9, ESUB14**,** AT4, INT3, SN1, PBC1, EC4, EC8, EC15, AC3, AR1, PN2, ALT1, ALT3, ALT4, BIO2, EGO1, and EGO5 each with only one missing case. On the other hand, items ESPUB5, ESPUB6, ESPUB11, AT3, PBC3, PBC4, EC3, EC5, AC1, AC4, AR3, AFPL2 AFPL3, BIO1, BIO3, BIO4,

EGO2, EGO3, and EGO4 had two, ESPUB1, ESPUB3, ESPUB12, ESPUB13, AT2, INT2, EC1, EC7, EC11, EC13, EC14, AC5, AC6, and AR2 had three, ESPUB10, SN2, PBC5, EC2, EC9, and AFPL1 had four, AT1, AT5, EC6, and ALT2 had five, ESPUB7 had six, and, PBC2 had 10 missing cases. For the missing values, median substitution technique was used because of Likert type responses. Also, in the cases where the construct items were all the same or had similar answer choices (e.g., giving answer option "1" to all other questions in the same construct), a missing value related to this construct was treated by considering this inclination of the respondent.

Outliers: In order to detect univariate outliers, *Z* scores were obtained and tested for each variable. Univariate outliers were detected for variables that exceeded $z = \pm 3.29$ ($p < .001$, two-tailed test) (Tabachnick & Fidell, 2007). This method showed that 22 variables had one or more cases as univariate. Each univariate case was examined and treated separately. To deal with these univariate outliers, following Tabachnick and Fidell (2007), "a raw score on the offending variable that is one unit larger (or smaller) than the next most extreme score in the distribution" (p. 77) was assigned to the outlying cases. Since the SEM analysis is very sensitive to extreme outliers (Bollen, 1989; Kline, 2005), SPSS histograms, box plots, and normal probability plots were examined to identify additional outliers. No further extreme outliers were found. To identify multivariate outliers (i.e., cases with extreme values on multiple variables), Mahalanobis Distance (D^2) was used (Tabachnick & Fidell, 2007) when conducting SEM analysis using SPSS AMOS.

Distribution normality: Normality, skewness, and kurtosis statistics were used to test univariate distribution. If the skewness statistics is less than 3 and kurtosis statistics is less than 8, then we can assume the normality of the data (Kline, 2005; Tabachnick & Fidell, 2007). In this study, skewness and kurtosis values for the items were within acceptable limits.

Exploratory Factor Analysis: To see whether the data reflect the hypothesized factor structure, an exploratory factor analysis with Varimax rotation was conducted on both antecedent and consequence measures based on a baseline eigenvalue of 1.0. Although most measurement items loaded on their respective factors, environmental concern and behavioral outcome items seemed to be problematic since the factor solutions supported at least three factor structures for environmental concern and three factor structures for behavioral outcome. Therefore, a partial disaggregation method was used for the environmental concern and three separate behavioral outcomes used for the environmentally sensitive post-use constructs. The next two sections explain how these constructs were treated before further analysis.

6.4.1.1 Partial disaggregation of NEP construct

For environmental concern (New Environmental Paradigm - NEP) construct, partial disaggregation approach was used based on the dimensions of Albrecht et al. (1982), Bechtel, Verdugo, & de Queiroz Pinheiro (1999), Noe and Snow (1990), and Van Petegem and Blieck (2006). These authors suggested using three dimensions for the NEP construct. Initially, environmental concern comprised 15 items. Using the partial disaggregation approach reduced the number of environmental concern parameters to be

estimated while retaining the advantages of the SEM analysis technique. Following Bagozzi and Heatherington (1994), the composite variables were created from identified subdimensions of the NEP construct. For this, principal components factor analysis (PCA) with Varimax rotation was used (see Appendix, C.2). The examination of the PCA supported the three dimensional model that was also found in previous research **(**Albrecht et al., 1982; Bechtel et al., 1999; Noe & Snow, 1990; Van Petegem & Blieck, 2006). The three dimensions were: (1) Balance of nature, identified as environmental concern total (ECT1), (2) Limits to growth, identified as environmental concern total (ECT2), and (3) Humans over nature, identified as environmental concern total (ECT3) (see Appendix, C.2). To develop partially disaggregated indicators of the environmental concern construct, the average of subsets of items, also called parcels, was created (Bandalos & Finney, 2001) and used for further analysis in confirmatory factor analysis and structural equation modeling.

6.4.1.2 Environmentally sensitive post-use behavior categorization

As mentioned previously, to see whether the data reflected the hypothesized factor structure, an exploratory factor analysis with Varimax rotation was conducted on the consequence measure, i.e. post-use behavior, based on a baseline eigenvalue of 1.0. As a result, behavioral outcome items seemed to be problematic since the factor solutions supported at least three factor structures. Thus, three separate behavioral outcomes determined for environmentally sensitive post-use construct: (1) Reduce (ESBUP1), (2) Reuse (ESPUB2), and (3) Recycling (ESPUB3) (see Appendix C3). Although the aim

was to use these three types of behaviors separately in further analysis to understand environmentally sensitive post-use behaviors of consumers in greater detail, we were not be able to achieve this because of the poor model fit of two types of behaviors, i.e. reduce and reuse. Thus, only recycling behavior was used in further analysis.

6.4.2 Structural Equation Modeling Analysis - Recycling

The survey data was analyzed using structural equation modeling (SEM). Following the suggestion of Anderson and Gerbing (1988), a two-stage approach was adopted in the analysis. The first stage involved estimating the measurement model and the second stage involved estimating the structural model to analyze the strength of the relationships between each of the constructs in the proposed model.

6.4.2.1 Stage I: Measurement Model

The first stage of the two-stage process used confirmatory factor analysis (CFA) to estimate the measurement model to determine the measurement properties of the underlying latent constructs. The initial CFA model included all constructs: Affect (three item scale), Attitude (five item scale), Subjective Norm (four item scale), Perceived Behavioral Control (six item scale), Altruistic Values (four item scale), Biospheric Values (four item scale), Egoistic Values (five item scale), Environmental Concern (three item scale), Awareness of Consequences (six item scale), Ascription of Responsibility (three item scale), Personal Norm (three item scale), Environmentally Sensitive Post-use Intention (three item scale), and Environmentally Sensitive Post-use Behavior-Recycling (six item scale). The initial CFA revealed that the model needed some adjustments (GFI

= .696; IFI = .87; TLI = .85, CFI = .86; RMSEA = .069). Thus, items AT1, AT5, ECT2, PBC4, ALT4, BIO1, EGO3, EGO5, AC1, PN1, SN2, and AFPL1 were excluded from further analysis, leaving at least two measurement items for each factor. The results of this last CFA revealed the following model fit indices:

CFA Final:

$\chi 2$ = 1110.2; p = .00; df = 737; $\chi 2 / df$ = 1.51, GFI = .806; IFI = .95; TLI = .94, CFI = .95

RMSEA = .050

The final CFA model provided acceptable goodness-of-fit statistics, with all items loading significantly on their respective factors. The final measurement model for post-use behavior is presented in Appendix C.4. The reported results allow us to suggest that the measurement model achieves a good fit to the data.

To examine construct reliability and convergent and discriminant validities, the following measures were used: composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV) (Hair et al., 2010).The results showed strong psychometric properties for the measurement model by exhibiting high composite reliability estimates, ranging from 0.770 to 0.957, for all constructs. Cronbach's α value of 0.7 or higher indicates satisfactory internal consistency reliability (Nunnally & Berstein, 1994). The average variance extracted indicates the amount of variance captured by that particular measurement of the construct relative to error terms of the measurement and correlations with other latent constructs. Generally, AVE values expected to be greater than 0.5 to consider acceptable convergent validity (Fornell & Larcker, 1981). All of the constructs

showed an AVE value of 0.5 and higher with the lowest value of 0.59 for Altruistic values (see Appendix C.5). Table C.6 in Appendix shows that convergent validity exists because variables within a factor correlate well with each other. All indicators loaded significantly (p<.01) and substantively (standardized regression coefficients >.6) on to their respective constructs, providing evidence of convergent validity. Both convergent and discriminant validity results for all constructs are presented in Appendix C.5.

6.4.2.2 Stage II: Structural Equation Modeling

In the second stage, based on the final confirmatory factor analysis, structural equation modeling was conducted using AMOS 22.0 to determine the fit between the theoretical structure and the data. Exogenous variables for this study were the affect and value variables as well as subjective norms and perceived behavioral control. On the other hand, the endogenous or downstream variables were the beliefs, personal norms, attitudes, intentions, and recycling behavior outcomes.

Fit measures for the model were calculated to evaluate the goodness-of-fit criteria. Garver and Mentzer (1999) recommended using non-normed fit index (NNFI), also known as the Tucker-Lewis index, the comparative fit index (CFI), and the root mean squared approximation of error (RMSEA) as measures of the goodness of fit. Thus, NNFI and CFI (>0.90 indicates good fit), RMSEA (<0.08 indicates acceptable fit), and commonly used $\chi 2$ statistic ($\chi 2$/ df ratio of 3 or less) fit indices are used to assess goodness-of-fit of the model.

The structural model achieved a good level of fit for recycling:

$\chi 2$ = 1478.8; p = .00; df = 790; $\chi 2 / df$ = 1.87; IFI = .90; TLI = .89, CFI = .90

RMSEA = .065

These results show that the observed data fit the model reasonably well, except the high $\chi 2$ statistic. It is important to note that the $\chi 2$ statistic is usually upwardly biased by sample size and thus is an excessively stringent fit measure that should be examined along with other fit measures (Fornell & Larcker, 1981; Sharma et al, 2005). Because of the limitation of the chi-square test, the $\chi 2$ to degrees of freedom ratio has been proposed as an alternate way to evaluate the model (Joreskog & Sorbom, 1993). A reasonable model fit is when $\chi 2 / df$ ratio is less than 3 (Kline, 2005). Our model satisfied this requirement with $\chi 2 / df = 1.87$. Garver and Mentzer (1999) recommend using the Tucker-Lewis index (TLI), the RMSEA (root mean squared approximation of error), and CFI (comparative fit index) as additional model fit statistics. For TLI and CFI, values greater than 0.90 indicate a good fit and for RMSEA, values smaller than 0.08 indicate an acceptable fit (Hoe, 2008). The research model satisfied these requirements, with TLI, CFI, and RMSEA being within the suggested limits. Thus, the model satisfied all relevant goodness-of-fit criteria. The results for each index value and corresponding threshold values for fit measures are reported in Table 6-2 (also see Appendix C.7 for SEM AMOS output).

Measure	Threshold	Stage I. CFA $\chi2$ = 1110.2; *df* = 737	Stage II. SEM $\chi2$ = 1478.8; *df* = 790
p-value	> .05	.00	.00
$\chi2$ /df	< 3 good; < 5 permissible	1.51	1.87
IFI	> .95 great; > .90 traditional	.95	.90
TLI	> .95 great; > .90 traditional	.94	.89
CFI	> .95 great; > .90 traditional; > .80 sometimes	.95	.90
RMSEA	< .05 good; .05 -.10 moderate; > .10 bad	.050	.065

Table 6-2. Study IV - Recycling behavior measurement and structural model fit. The results suggest that the measurement & structural models achieve good fit to the data.

6.5 Results

Based on theoretical considerations and extensive literature review, twelve hypotheses were proposed for the research model. Following the suggestions of Hair el al. (2010), individual parameter estimates were assessed to validate the proposed model. For recycling behavior, eleven out of twelve hypotheses were supported and only one was rejected. An outline of the results with standardized parameter estimates, statistical significance level, and R^2 values for all the proposed hypotheses are presented in Table 6-3.

Behavioral intention

The effects of attitude towards behavior on behavioral intention (*H1c*) ($p < 0.01$), subjective norm on behavioral intention (*H2c*) ($p = 0.01$) as well as subjective norm on behavioral intention were significant *(H3c)* ($p < 0.01$), with standardized beta coefficient

values of 0.30, 0.29, and 0.40, respectively. Also, the standardized regression coefficient for the effect of personal norm on behavioral intention *(H11c)* was significant ($\beta = 0.24$, $p < 0.01$). The R Square (R^2) for the relationship between these variables and behavioral intention outcome was .68. Hence, *H1c, H2c, H3c*, and *H11c* were supported.

Environmentally sensitive post-use behavior (Recycling)

The effect of behavioral intention on environmentally sensitive post-use behavior was significant ($p < 0.01$), with standardized beta value of β =064, supporting the *H4c*. Empirical evidence supporting actual eco-sensitive behavior and behavioral intention relationship could be found widely in literature (Birgelen, Semeijn, & Keicher, 2009; Saba & Messina, 2003; Thøgersen, 2009; Vermeir & Verbeke, 2008). The R^2 value for the relationship between these two variables was 0.42, which suggests that recycling intention explains 26% of the variance in actual recycling behavior.

Environmental concern

The effects of biospheric (*H6c*) and egoistic (*H7c*) values on environmental concern were found to be significant. Especially, the standardized regression coefficient for the effect of biospheric values on environmental concern was strong ($\beta = 0.63$, $p < 0.01$) relative to egoistic values ($\beta = -0.28$, $p < 0.01$). Although the effect of biospheric values on environmental concern was positive, egoistic values showed a negative effect on the same variable. These two types of values explained 60% of the variance in environmental concern of individuals. Thus, both *H6c* and *H7c* were supported. The standardized regression coefficient of altruistic values on environmental concern (*H5c*) was not significant ($\beta = 0.08$, $p = 0.30$); hence, *H5c* was not supported.

Hypotheses				R^2	Std. parameter estimate	*p*-Value	Results
H1c.	Attitude towards behavior	→	Behavioral intention	0.68	0.30	$p < 0.01$	Supported
H2c.	Subjective norm	→	Behavioral intention	0.68	0.29	$p < 0.01$	Supported
H3c.	PBC	→	Behavioral intention	0.68	0.40	$p < 0.01$	Supported
H4c.	Behavioral intention	→	EPUB - Recycling	0.42	0.64	$p < 0.01$	Supported
H5c.	Altruistic values	→	Environmental concern	0.60	0.08	$p = 0.30$	Not supported
H6c.	Biospheric values	→	Environmental concern	0.60	0.63	$p < 0.01$	Supported
H7c.	Egoistic values	→	Environmental concern	0.60	-0.28	$p < 0.01$	Supported
H8c.	Environmental concern	→	Awareness of conseq.	0.57	0.76	$p < 0.01$	Supported
H9c.	Awareness of conseq.	→	Ascription of resp.	0.45	0.67	$p < 0.01$	Supported
H10c.	Ascription of resp.	→	Personal norm	0.73	0.85	$p < 0.01$	Supported
H11c.	Personal norm	→	Behavioral intention	0.68	0.24	$p < 0.01$	Supported
H12c.	Affect	→	Attitude towards behavior	0.16	0.41	$p < 0.01$	Supported

Table 6-3. Recycling behavior summary of results – structural model coefficients
Notes: PBC, perceived behavioral control; EPUB, environmentally sensitive post-use behavior.

Awareness of consequences

The effect of environmental concern (*H8c*) on the awareness of consequences was significant with standardized beta coefficient of 0.76 ($p < 0.01$) and R^2 value of 0.57. Since the direct effect of environmental concern was significant, *H8c* was supported.

Ascription of responsibility

The effect of the awareness of consequences (*H9c*) on ascription of responsibility was found to be significant. The standardized regression coefficient for the effect of awareness of consequences on ascription of responsibility was quite strong ($\beta = 0.67$, $p < 0.01$). Hence, *H9c* was supported.

Personal norm

Ascription of responsibility was found to predict personal norms related to the environment. The effect of ascription of responsibility (*H10c*) on environmental personal norms was significant. The standardized regression coefficient was the strongest for the effect of ascription of responsibility ($\beta = 0.85$, $p < 0.01$); hence, *H10c* was supported.

Attitude towards behavior

The analysis showed that the effect of affect (*H12c*) on attitude towards behavior was significant. This direct effect of affect on attitude towards behavior was medium ($\beta = 0.41$, $p < 0.01$) with R^2 value of 0.16; hence, *H12c* was supported.

The results of the structural equation model for recycling behavior are displayed in Figure 6-2 with standardized regression estimates and significance of each path. The same results were found when controlled for age, gender, income, and education.

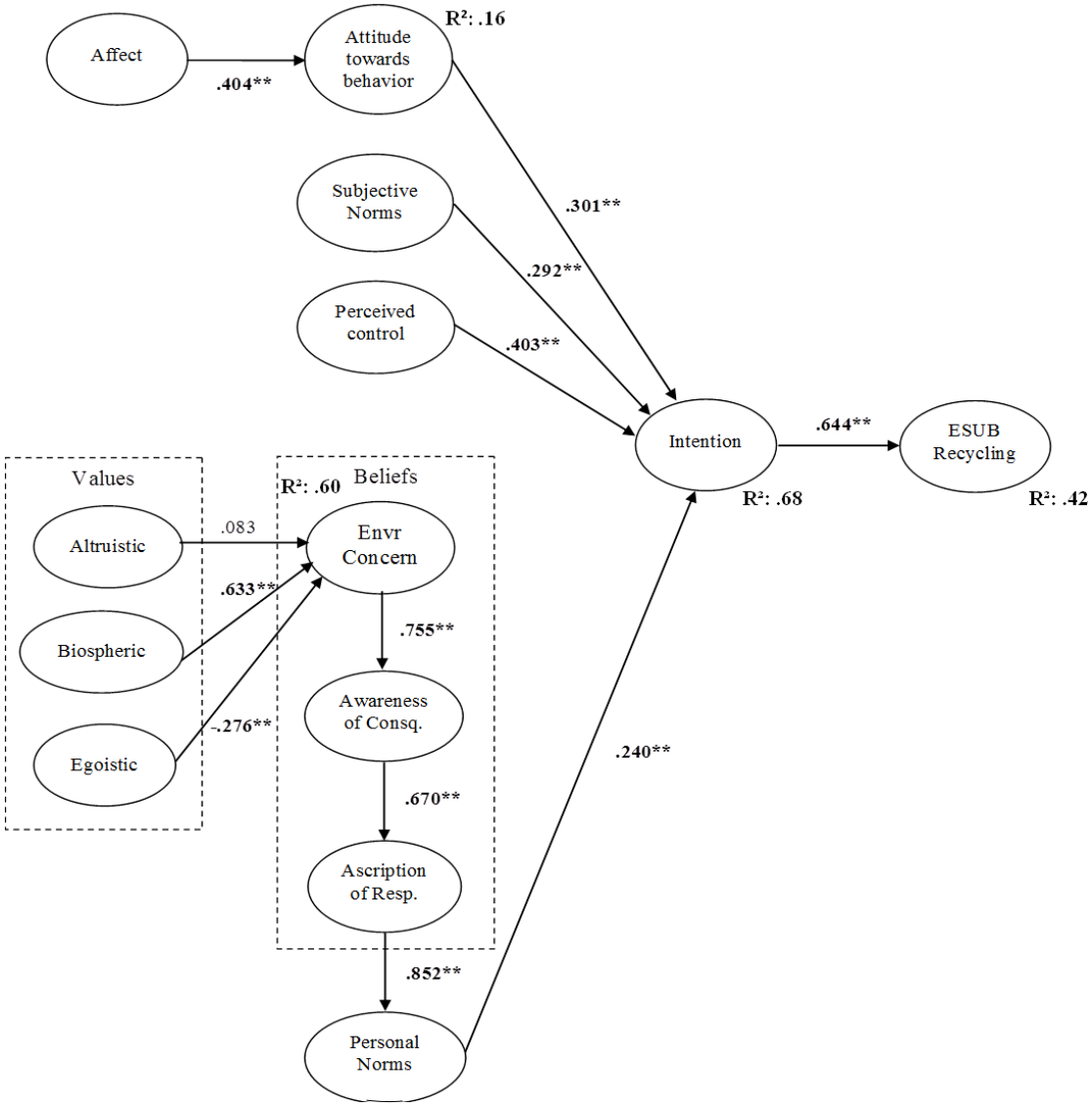


Figure 6-2. The structural equation model with hypothesized relationships and standardized beta values for environmentally sensitive post-use behavior.
Notes: ** denotes paths significant at $p<0.01$.

6.6 Comparison of the GFT Models (Recycling): the Theory of Planned Behavior (TPB), Theory on Affect (TA), and Value-Belief-Norm (VBN) Model

Following the satisfactory results of the combined model evaluations, the three models developed based on the underlying theories of GFT were compared for model fit for recycling behavior. Table 6-4 summarizes the degree to which each model fits the data using various fit measures. The table indicates that all three models provide a good fit to the data. This suggests that all three models based on GFT can be successfully applied to the domain of consumers' environmentally sensitive post-use behavior (i.e., recycling).

In a setting in which all three GFT models reveal a reasonable fit to the data in explaining similar target behavior, to determine the best model, other possible criteria must be examined as suggested by Rust, Lee, Valente (1995). Because of the non-nested structure of the three GFT models, a Chi-square difference test was not employed to determine the best performing model (Anderson & Gerbing, 1988). When conducting the comparison between the non-nested competing models, similar to this study, parsimony fit measures such as the Akaike information criterion (AIC) (Akaike, 1987) and the Browne–Cudeck criterion (BCC) (Browne & Cudeck, 1989) are considered appropriate because they assess model parsimony and fit (Rust et al., 1995). As shown in Table 6-5, in the TPB, AIC is 378.283 and BCC is 388.445, in the TA, AIC is 232.386 and BCC is 237.596, the values for the VBN are 881.289 and 907.301 for AIC and BCC, respectively. As smaller values of these criteria give us a better fit of the model, these results indicate a preference for the TA over the TPB and VBN. On the other hand,

additional parsimony fit measures such as parsimony goodness of fit index (PGFI) (the TPB: 0.66; the TA: 0.615; the VBN: 0.686) and parsimony normed fit index (PNFI) (the TPB: 0.770; the TA: 0.743; the VBN: 0.777), which assess the parsimony fit of GFT models, favor the VBN. Furthermore, in the TPB, the normed Chi-square is 1.99, in the AT, the value is 2.31, and the value for the VBN is 1.88, respectively. Since a smaller value of this criteria indicates a better parsimony and a better fit of the model, this result indicates a superior fit for the VBN over the TA and TPB. Overall, in terms of the model fit and model parsimony, the results suggest that in a comparison of the GFT models, the VBN is slightly superior to both TA and TPB.

Three Model Fit Comparisons (Recycling)

Measure	TPB	TA	VBN
Chi-square	284.283	166.386	735.289
IFI	0.96	0.96	0.93
TLI	0.95	0.95	0.92
CFI	0.96	0.96	0.93
RMSEA	0.069	0.080	0.065

Table 6-4. The table indicates that all three models provide a good fit to the data.
Notes: TPB, theory of planned behavior; TA, theory on affect; VBN, Value-belief-norm; IFI, incremental fit index, TLI, Tucker–Lewis index; CFI, comparative fit index; RMSEA, root mean square error of approximation.

Parsimony Fit Measure Comparisons (Recycling)

Measure	TPB	TA	VBN
Normed Chi-square	1.99	2.31	**1.88**
PNFI	0.77	0.743	**0.777**
BCC	388.445	**237.596**	907.301
AIC	378.283	**232.386**	881.289
PGFI	0.66	0.615	**0.686**

Table 6-5. Comparison between the non-nested competing models.
Notes: PNFI, parsimony normed fit index; BCC, Browne–Cudeck criterion; AIC, Akaike information criterion; PGFI, parsimony goodness of fit index. The measures in bold show the better fit compared to other values in the same index.

6. 7 Discussion and Conclusions

This study allowed us to examine environmentally sensitive post-use (ESPU) behaviors of consumers using Goal Framing Theory (GFT). The study results showed the significance of each individual theory variable in determining consumers' recycling behavior. The GFT covers three substantial motivations of individuals: hedonistic, gain, and normative related concerns. In the developed model, these three motivations were represented with three theories, i.e., theory of planned behavior, value-belief-norm theory, and theory on affect. The results of the study showed that all three motivational predictors (hedonistic, gain, and normative related concerns) had an effect to a certain degree on ESPU through behavioral intention. Especially, TPB theory variables found to be strong predictors in addition to personal norms**.** This tells us that environmentally sensitive behaviors of individuals in the context of recycling behavior are mostly affected by their attitudes towards recycling, subjective norms, perceived behavioral control, and

personal norms. VBN and affect theory variables seemed to be weaker in explaining this specific eco-behavior.

The power of TPB theory variables to explain ESPU parallels the suggestion of Greaves et al. (2013), such that recycling behavior is based on attitudes toward behavior, subjective norms, and perceived behavioral control, which all could explain a large variance in intention to engage in this eco-sensitive action. Similarly, Kaiser and Gutscher (2003) and Mannetti et al. (2004) also found that sustainable post-use behaviors can be stimulated by having a positive attitude towards sustainable post-use, high subjective norms, perceived behavioral control, and intentions to post-use in an environmentally sensitive way.

From the TPB variables examined in the study, perceived behavioral control was found to be the strongest predictor of recycling behavior. Accordingly, perceived ease or difficulty in performing this specific eco-sensitive behavior is highly critical for consumers. Thus, it can be assumed that reducing effort related costs should decrease the barriers to post-use action of household recycling. This notion parallels the suggestion of Sidique et al. (2010) who state that since "recycling requires investment of time, space, money and effort, making recycling convenient should increase household participation." (p.164). Also, similar to our results, several studies' findings suggested a strong relationship between recycling behavior and convenience represented in perceived behavioral control (e.g., Sidique et al., 2010; Barr, 2007, McCarty & Shrum, 2001).

The personal norms variable that was represented to be the immediate antecedent of intention which belongs to the VBN theory seemed to have a relatively less

explanatory power than TPB. Although not as strong, the relationship between personal norms and intention to recycle was still significant. From three types of value orientations under VBN theory, biospheric values were the strongest predictor of the ecological worldview of individuals. This result parallels the finding of Fraj and Martinez (2006) who proved that the individuals with high value orientation towards ecological matters display more eco-sensitive behavior. Although the results of the current study as well as findings of De Groot and Steg (2008) suggest the link between low egoistic values and higher environmental worldview, the predicting power of this type of value orientation seems to be much lower than that of biospheric values. The results of the study also supported the chain reaction type of effects from values (i.e. biospheric, egoistic) to personal norms, following through the environmental concern, awareness of destructive consequences, and ascribed responsibility variables.

In addition to examining the effects of each individual variable of the research model, the present study performed a further model comparison among the three GFT frameworks (i.e., the TPB, TA, and VBN) for explaining consumers' environmentally sensitive post-use behavior (i.e. recycling). Based on the previous studies of model comparison (Akaike, 1987; Browne & Cudeck, 1989; Rust et al., 1995), this study displayed reasonable model fit to evaluate the three GFT models and identified the best model**.** Overall, the results of the model comparison generally indicated that the recycling behavior of consumers could be better explained by the VBN theory relative to the TPB or the AT. This result gives us an important insight on explaining recycling behavior

using different theories and shows that value-based theories can better explain this type of behavior compared to self interest and gain motive based theories.

6.7.1 Implications and recommendations

Household waste production and accumulation in landfills are growing concerns all around the world. Successful attempts by government entities as well as individuals to reduce the amount of waste sent to landfills are necessary (Barr, 2007). According to the U.S. Environmental Protection Agency (EPA), in 2012, about 251 million tons of trash was generated in the U.S., and from this amount, only 87 million tons of materials were recycled or composted by citizens (EPA, 2012b). This gives a recycling rate equivalent to 34.5% for the nation (EPA, 2012b), which is way behind some other developed countries, such as Austria (63%), Germany (62%), Belgium (58%), Switzerland (51%), and the Netherlands (51%) (European Environment Agency, 2013). This tells us the importance of making progress on reducing the landfill waste by encouraging consumers. The study results showed us this could be possible by primarily providing easy access to recycling and making the action more convenient for individuals in addition to focusing on normative motives.

According to McCarty and Shrum (2001), the physical proximity of recycling containers is a crucial factor in the recycling behavior of individuals. A higher level of recycling is expected in general if there are recycling bins in close proximity which is assumed to trigger this specific behavior (Sidique et al., 2010; Barr, 2007). McCarty and Shrum (2001) propose that even households without a positive attitude toward the

behavior would recycle as long as a curbside recycling bin is provided in close proximity. This plays a triggering role regardless of household's attitude toward this behavior. Based on these findings and suggestions, we can underline the importance of making recycling facilities easily accessible and the action itself more convenient.

Furthermore, these steps should be supported with some social and sustainability marketing strategies that focus on communicating different aspects of recycling behavior, such as how and where to recycle, which products are recyclable, etc. According to the results, practitioners can also focus on promoting consumers' intentions to recycle by strengthening their attitudes, subjective norms, values, beliefs, and personal norms regarding the behavior. The results imply that especially strengthening biospheric values can be crucial in promoting these types of behaviors as opposed to altruistic values.

With this study, we aimed to explain environmentally sensitive post-use behaviors of consumers using goal framing theory. The study allowed us to examine only recycling behavior because of poor model fit to the data for reuse and reduce behaviors. These differing results for post-use behavior subcategories are similar to Barr's (2007) waste management study. In his study, Barr examined the same post-use behaviors (i.e. reuse, reduce, recycling) and found household reduction and reuse behaviors to mostly depend on environmental values, knowledge, and waste issue concerns. In the current study, we did not cover knowledge or behavior specific concerns, which both might be important in determining environmentally sensitive post-use behaviors. As such, future studies can include these two variables in the GFT and examine reuse, reduction, and recycling behaviors thru a comparative approach.

6.8 References

Abrahamse, W. & Steg, L. (2011). Factors related to household energy use and intention to reduce it: The role of psychological and socio-demographic variables. *Human Ecology Review, 18*(1), 30-40.

Abrahamse, W., Steg, L., Gifford, R., & Vlek, C. (2009). Factors influencing car use for commuting and the intention to reduce it: A question of self- interest or morality? *Transportation Research Part F: Traffic Psychology and Behavior, 12*, 317-324.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin: Springer.

Ajzen, I, & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Akaike, H., (1987). Factor analysis and AIC. *Psychometrika 52*(3), 317–332.

Albrecht, D., Bultena, G., Hoiberg, E., & Nowak, P. (1982). The new paradigm scale. *Journal of Environmental Education, 13*, 39–43.

Anderson, J. C. & Gerbing, D. W. (1988). Structural equation modelling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-23.

Bagozzi, R. P. & Heatherington, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to self-esteem. *Structural equation modeling, 1*(1), 35-67.

Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides & R. E. Shumaker (Eds.), *Advanced structural equation modeling: New developments and techniques*. Mahwah, NJ: Lawrence Erlbaum Associates.

Barr, S. (2007). Factors Influencing Environmental Attitudes and Behaviors A UK Case Study of Household Waste Management. *Environment and Behavior,39*(4), 435-473.

Barr, S., Gilg, A. W. & Ford, N. J. (2001). A conceptual framework for understanding and analyzing attitudes towards household-waste management. *Environment and Planning A, 33*(11), 2025-2048.

Bechtel, R. B., Verdugo, V. C., & de Queiroz Pinheiro, J. (1999). Environmental belief systems: United States, Brazil, and Mexico. *Journal of Cross-cultural Psychology, 30*(1), 122–128.

Belz, F. M., & Peattie K. (2009). *Sustainability Marketing: A Global Perspective.* Chichester: John Wiley & Sons, Ltd.

Bigné, J. E., Andreu, L., & Gnoth, J. (2005). The theme park experience: An analysis of pleasure, arousal and satisfaction. *Tourism Management, 26*(6), 833-844.

Birgelen, M.V., Semeijn, J., & Keicher, M. (2009). Packaging and pro-environmental consumption behavior: Investigating purchase and disposal decisions for beverages. *Environment and Behavior, 41*(1), 125-146.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioural Research 24*(4), 445–455.

Byrne, B. M. (2001). *Structural Equation modeling with AMOS: Basic concepts, applications, and programming* (Multivariate applications series) (pp. 57-91). New Jersey: Mahwah Publishers.

De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*(3), 330-354.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56,* 425-442.

El-Fadel, M. , Findikakis, A. N., & Leckie, J. O. (1997). Environmental impacts of solid waste landfilling, *Journal of Environmental Management*, 50(1), 1–25.

EPA (2012a). Wastes basic information. Retrieved from http://www.epa.gov/epawaste/basicinfo.htm

EPA (2012b). Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012. Retrieved from http://www.epa.gov/waste/nonhaz/municipal/pubs/2012_msw_fs.pdf

European Environment Agency (2013). Managing municipal solid waste - a review of achievements in 32 European countries. EEA Report No 2/2013. Retrieved from http://www.eea.europa.eu/publications/managing-municipal-solid-waste

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press.

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Fraj, E., & Martinez, E. (2006). Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis. *Journal of Consumer Marketing, 23*(3), 133-144.

Garver, M. S., & Mentzer, J. T. (1999). Logistics research methods: Employing structural equation modeling to test for construct validity. *Journal of Business Logistics, 20*(1), 33-57.

Gatersleben, B. (2007). Affective and symbolic aspects of car use. In T. Garling & L. Steg (Eds.), *Threats to the quality of urban life from car traffic: Problems, causes, and solutions* (pp. 219–233). Amsterdam: Elsevier.

Greaves, M., Zibarras, L. D. & Stride, C. (2013). Using the theory of planned behavior to explore environmental behavioral intentions in the workplace. *Journal of Environmental Psychology, 34*, 109-120.

Joreskog, K. G., & Sorbom, D. (1993). *LISREL VIII: Analysis of linear structural relations by the method of maximum likelihood*. National Education Resources, Chicago, IL.

Kaiser, F. G., & Gutscher, H. (2003). The proposition of a general version of the theory of planned behavior (TPB): predicting ecological behavior. *Journal of Applied Social Psychology, 33*, 586–603.

Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: Guilford Press.

Lindenberg, S. (2001a). Social rationality versus rational egoism. In J. Turner (Ed.), *Handbook of sociological theory* (pp. 635–668). New York: Kluwer Academic/Plenum.

Lindenberg, S. (2001b). Intrinsic motivation in a new light. *Kyklos, 54*, 317–342.

Lindenberg, S. (2006). Prosocial behavior, solidarity and goal-framing processes. In D. Fetchenhauer, A. Flache, B. Buunk, & S. Lindenberg (Eds.), *Solidarity and prosocial behavior. An integration of sociological and psychological perspectives.* Amsterdam: Kluwer.

Mannetti, L., Pierro, A., & Livi, S. (2004). Recycling: planned and self-expressive behavior. *Journal of Environmental Psychology, 24*, 227–236.

McCarty, J. & Shrum, L. (2001). The influence of individualism, collectiivism, and locus of control on environmental beliefs and behavior. *Journal of Public Policy & Marketing, 20*(1), 93-104.

Meneses, G. D. & Palacio, A. B. (2005). Recycling behavior: A multidimensional approach. *Environment & Behavior, 37*(6), 837-860.

Noe, F. & Snow, R. (1990). The new environmental paradigm and further scale analysis. *Journal of Environmental Education, 21*, 20–26.

Nunnally, J. C. & Berstein, I. H. (1994). *Psychometric theory*. New York: McGraw-Hill.

OECD (2008). Promoting Sustainable Consumption, Organisation for Economic Co-Operation and Development (OECD) Report. Retrieved from http://www.oecd.org/greengrowth/40317373.pdf

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39*(6), 1161.

Rust, R. T., Lee, C., Valente, E. (1995). Comparing covariance structure models: a general methodology. *International Journal of Research in Marketing, 12*(4), 279–291.

Saba, A. & Messina, F. (2003). Attitudes towards organic foods and risk/benefit perception associated with pesticides. *Food Quality and Preference, 14*, 637-45.

Sidique, S. F, Lupi, F., & Joshi, S. V. (2010) The effects of behavior and attitudes on drop-off recycling activities. *Resources, Conservation and Recycling, 54*(3). 163-170.

Smith, S. M., Haugtvedt, C. P., & Petty, R. E. (1994). Attitudes and recycling: does the measurement of affect enhance behavioral prediction? *Psychology & Marketing, 11*(4), 359-374.

Steel, B. S. (1996). Thinking globally, acting locally? Environmental attitudes, behavior and activism. *Journal of Environmental Management, 47*, 27-36.

Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice, 39*(2), 147-162.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Steg, L., Vlek, C., & Slotegraaf, G. (2001). Instrumental-reasoned and symbolic-affective motives for using a motor car. *Transportation Research Part F: Traffic Psychology and Behavior*, *4*(3), 151-169.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407–424.

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65-84.

Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A brief inventory of values. *Educational and Psychological Measurement, 58*(6), 984-1001.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, *6*(2), 81–97.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Allyn & Bacon.

Taylor, S., & Todd, P. (1995). An integrated model of waste management behavior. A test of household recycling and composting intentions. *Environment and Behavior*, *27*, 603–630.

Thøgersen, J. (2009). Consumer decision-making with regard to organic food products. In M. T. N. Vaz, P. Nijkamp and J. L. Rastoin (Eds.), *Traditional food production and rural sustainable development: A European challenge*, (pp. 173-94), Aldershot, UK: Ashgate.

Tonglet, M., Phillips, P. S., & Read, A. D. (2004). Using the Theory of Planned Behavior to investigate the determinants of recycling behavior: a case study from Brixworth, UK. Resources, *Conservation and Recycling*, *41*(3), 191-214.

UNEP (2007). Global Environmental Outlook (GEO 4): Environment for Development, United Nations Environment Programme (UNEP) Report. Retrieved from http://www.unep.org/geo/GEO4/report/GEO-4_Report_Full_en.pdf

Vagias, W. M. (2006). Likert-type scale response anchors. *Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management.* Clemson University. Retrieved from http://enrd.ec.europa.eu/app_templates/enrd_assets/pdf/Guidance-on-Surveys/Likertscales-responses.pdf

Van Petegem, P., & Blieck, A. (2006). The environmental worldview of children: A cross-cultural perspective. *Environmental Education Research, 12*(5), 625-635.

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behavior and the role of confidence and values. *Ecological Economics, 64*, 542-553.

Chapter 7

“‘We cannot hope to create a sustainable culture with any but sustainable souls”

(Derrick Jensen, Endgame, Vol. 1: The Problem of Civilization, 2006)

Conclusion

CHAPTER 7

7. Conclusion

International communities are in general agreement that fulfilling environmental goals is only possible with the reduction of consumptions' detrimental effects (UNEP, 2007, OECD, 2008). This, however, requires a deep understanding of the factors affecting citizen behaviors, especially towards acting in a more ecologically conscious manner, such as buying ecologically friendly products, recycling, using household energy vigilantly, or driving less frequently. This dissertation investigated the predicting factors of environmentally sensitive behaviors of individuals by examining different types of consumer behaviors and seeing whether these predictors differ depending on the type of the behavior. Furthermore, the functioning of Goal Framing Theory in the environmental behavior context and the significance of each individual theory variable in determining consumers' environmentally sensitive behaviors were examined.

The results of the studies covered in this dissertation confirm that different pro-environmental behaviors have varying results in terms of gender, socio-economic status, age differences (Study I), attitudes, feelings, perceived behavioral control, subjective and personal norms, environmental concern, awareness, ascribed responsibility to self, values, and behavioral intentions (Studies II, III, and IV). Although all the behaviors we examined showed the significant impact of values, this impact also varied depending on the type of the behavior.

The results of the studies showed that the Goal Framing Theory by Lindenberg (2001a, 2001b, 2006) is a useful framework for examining the motivational determinants

of environmentally sensitive purchase, usage, and post-use behaviors of consumers. The theory covers three substantial motivations of individuals: hedonistic, gain, and normative related concerns. We tested a model developed by combining three theories representing these three motivations, i.e., values-beliefs-norms theory (VBN), theory of planned behavior (TPB), and theory on affect (TA). All three motivational predictors (hedonistic, gain, and normative related concerns) had an effect to a certain degree on environmentally sensitive behaviors through behavioral intentions.

For environmentally sensitive purchase behavior (ESPB), variables belonging to VBN theory were especially strong predictors along with subjective norms and attitudes towards purchase behavior. In other words, consumers with high biospheric values, environmental concern, personal and subjective norms, positive attitudes, affect, and intention towards behavior, high awareness of consequences, ascription of responsibility, and low egoistic values purchase more eco-friendly products.

Another eco-behavior that showed a strong explanatory power of VBN theory variables was transportation behavior that was examined under environmentally sensitive usage behaviors (ESUB). For eco-sensitive transportation, other than VBN theory variables, perceived behavioral control and attitudes toward behavior also seemed to be strong predictors.

Relatively less explanatory power of VBN theory variables was found for recycling behavior. The personal norms variable that was represented to be the immediate antecedent of recycling intention which belongs to the VBN theory seemed to have a relatively less explanatory power than TPB. Although not as strong, the relationship

between personal norms and intention to recycle was still significant. The least explanatory power of VBN theory variables was found for household energy use behavior. Contrary to transportation behavior, household use seemed to be less impacted by personal norms and associated VBN theory variables. On the other hand, affect theory and TPB variables better explained this specific usage behavior.

The power of VBN theory variables to explain some of the examined ESBs parallels the suggestion of Vermeir and Verbeke (2008), such that sustainable consumption and actions related to it are based on not just individual needs and wants of consumers, but also involve a decision-making process that considers their social responsibilities. Within the VBN theory by Stern et al. (1999) and Stern (2000), it has been suggested that an individual's level of awareness of environmental consequences (AC) of a certain behavior, and ascribed responsibility (AR) to him/herself to act in a preventive way, helps with developing a pro-environmental norm that leads to a high potential to perform eco-sensitive behavior (Stern, 2000; Bamberg & Schmidt, 2003). Overall, the results of our study showed that VBN theory variables play a large role, especially in determining both purchase and transportation behaviors.

From the three types of value orientations examined in the studies focusing on different types of environmentally sensitive behaviors, biospheric values seemed to be the strongest predictor of ecological worldview of individuals. This result parallels the finding of Fraj and Martinez (2006) who proved that the individuals with high value orientation towards ecological matters display more eco-sensitive behavior. In their study based on VBN theory, Steg, Dreijerink, and Abrahamse (2005) also found that from three

values examined (i.e., altruistic, biospheric, egoistic), biospheric values were most strongly related to behavior specific beliefs in the context of energy policy acceptability. These findings suggest that valuing the ecological well-being is important when an individual makes an eco-sensitive inclined decision. Although the results of the studies covered here as well as findings of De Groot and Steg (2008) suggest the link between low egoistic values and higher environmental worldview, the predicting power of this type of value orientation seems to be much lower than that of biospheric values for all examined eco-sensitive behaviors of consumers.

In the three studies conducted, the variables from TPB were mainly found to be strong predictors of recycling behavior. This tells us that the environmentally sensitive behaviors of individuals in the context of recycling behavior are mostly affected by their attitudes towards recycling, subjective norms, and perceived behavioral control. From these three TPB variables, perceived behavioral control was found to be the strongest predictor of recycling. Consequently, we can state that perceived ease or difficulty in performing this specific eco-sensitive behavior is highly critical for consumers.

Although not as strong of a relationship, other eco-behaviors that showed the explanatory power of TPB variables in explaining behavioral intentions were two environmentally sensitive usage behaviors (ESUB), transportation and household energy use. For transportation behavior, while statistically significant, subjective norms were not as strongly related to behavioral intentions. This tells us the expectations of significant social surroundings, such as family, friends, and colleagues, are not as important in determining one's behavioral decision on how to commute. Contrarily, for household

energy use, subjective norms were important in explaining behavioral intentions. The results also showed that from TBP variables, attitudes toward energy saving had the most explanatory power in the household energy use model. In fact, the attitudes seemed to best explain this behavior compared to the other environmentally sensitive behaviors examined in the present studies.

While the subjective norms variable of TPB was significant and found to be very important in determining eco-sensitive purchase intentions in the model for ESPB, perceived behavioral control (PBC) proved to be non-significant and less important. One explanation of this could be that in today's market conditions, accessing eco-sensitive products by consumers is not as difficult because of increased availability (Hamilton & Zilberman, 2006) and the growing green market (Dagher & Itani, 2012). Thus, the accessibility of an eco-sensitive product may not influence purchase behavior, as in the past. Although non-significant results found for PBC weakens the explanatory power of TPB on ESPB, other variables belonging to this theory, i.e., subjective norms, attitude towards behavior, and especially intention to purchase environmentally sensitive products, all still showed strong predicting power. Overall, the results of our study showed that the TPB variables play a large role, especially in determining both household energy use and recycling behaviors, and a relatively weaker role in explaining eco sensitive purchase and transportation behaviors.

The results also showed that the affect theory variables were strong predictors of mainly environmentally sensitive household energy use behavior. In other words, hedonic goal-frame variables explained this particular consumer behavior the best in the overall

model. Affect (i.e. gained pleasure) was able to explain about 63% of the variance in attitudes towards this behavior, which can be considered the most significant factor in explaining household energy use behavior. This tells us that feeling good about saving energy triggers more energy saving behaviors in households. Considering theory on affect (TA) variables, we also found significant results for transportation, purchase, and recycling behaviors. These results, however, were not as strong as in the case for household energy use. Affect was able to explain about 30% of the variance in attitudes towards transportation behavior, which can be considered a moderate factor in explaining travel decision making. This value was 27% for purchase and 16% for recycling behaviors. Overall, the results of our study showed that the TA variables play an important role in determining primarly household energy use and a relatively weaker role in explaining eco-sensitive transportation and purchase behaviors. The TA variable of pleasure was found to be the weakest factor in explaining recycling behavior.

In general, the literature suggests that social motivators are more important in explaining environmentally sensitive behaviors than personal motivators (Freestone & McGoldrick, 2008). According to the results of our study, this approach is pertinent for some of our examined eco-sensitive behaviors. For instance, for eco-sensitive household energy use and recycling behaviors, subjective norms were able to explain behavioral intentions better than personal norms. These results imply that social motivators are stronger levers than personal ones for these two types of eco-sensitive behaviors. This finding is consistent with Cialdini's (2001) suggestion that people often consider social norms to decide how to act upon in different social situations, such as recycling. On the

other hand, our results also showed that for purchase and transportation behaviors, personal norms were able to explain behavioral intentions better than subjective norms. Some other studies from the ethical behavior literature reports similar results that personal norms are more significant predictors of various ethical behaviors (Thøgersen, 2007). These different results regarding the importance of social and personal motivators in explaining different types of environmentally sensitive behaviors should be examined in detail in future research. One suggestion could be that the importance of material possessions may be playing a role in decision making processes for different types of behaviors. Future studies can look at these two different types of motivations (i.e., social, personal) and examine them in different environmental behavior categories to fully understand their functioning in this domain.

Finding the relative importance of the aforementioned psychological variables helps us in determining whether intervention techniques should focus mostly on institutions (e.g., legal structures, regulation), incentives (e.g., subsidies, rewards), introducing sanctions (i.e. costs), improving availability, convenience, promoting appropriate behavior with the help of marketing strategies (e.g., social marketing), or other attributes and areas to influence behavior. For instance, if consumers are considering that poor infrastructure is limiting their post-use actions, then improving the related infrastructure can motivate individuals to act eco-friendly because of easing the effort needed to engage in this type of behavior. This and similar insights provide necessary and important guidance to both local and federal level decision makers to implement associated policies. We will further discuss these important implications in the

"Environmental Management Implications" and "Marketing Strategy Implications" sections.

7.1 Mapping the Three Goal Frames

Although the overall purpose of the studies presented here was aimed at examining the functioning of the Goal Framing Theory (GFT) as the main framework for understanding each motivational determinant of eco-sensitive behaviors, we additionally performed a model comparison among the three underlying GFT frameworks, i.e., value-belief-norm theory (VBN), theory of planned behavior (TPB), and theory on affect (TA). This additional analysis gave us insights into how each framework explained consumers' different environmentally sensitive behaviors. Empirical results showed all the three underlying models achieved comparable fit to the data for each of the eco-sensitive behaviors examined. Overall, the results of the model comparisons indicated that consumer environmentally sensitive purchase and transportation behaviors can be better explained by TPB, environmentally sensitive household energy use can be better explained by TA, and consumer recycling behavior can be better explained by VBN theory. The overall identified best models are displayed in Table 7-1 for each type of behavior.

These results give us important insights in explaining different types of eco-sensitive behaviors using different theoretical approaches and show that while gain-motive based theories are better in predicting purchase and transportation behaviors,

hedonistic based theories are superior for household energy use, and normative related theories are better in predicting recycling behaviors of consumers.

Summary of Best Models	
Environmentally Sensitive Behavior	**Best Model**
Purchase	Theory of Planned Behavior (TPB)
Transportation	Theory of Planned Behavior (TPB)
Household Energy Use	Theory on Affect (TA)
Recycling	Value-Belief-Norm (VBN)

Table 7-1. Best models for different environmentally sensitive behaviors. Additional analysis revealed the best theoretically based models explaining each target behavior.

A number of studies in the literature reports that the moral focused theories, such as the Norm Activation Model and Value-Belief-Norm theories are successful in predicting relatively low-cost behaviors and associated intentions in environmental domain, such as political behaviors, environmental citizenship, or policy acceptability (e.g., Garling et al., 2003; Nordlund & Garvill, 2003; Stern et al., 1999; Steg et al., 2005). However, these theories with moral focus usually seem to be less explanatory in situations involve high-costs behaviors, such as altering car use or using public transportation (e.g., Bamberg & Schmidt, 2003; Hunecke et al. 2001). In cases where high-cost behaviors are involved, the Theory of Planned Behavior (TPB) seems to be more successful in explaining the related ecologically sensitive behavior (Bamberg & Schmidt, 2003). Similar findings are also reported in our studies.

While recycling behavior, which can be considered as a relatively low-cost behavior, was explained better with VBN theory, transportation and purchase behaviors

were better explained with TPB. According to Steg and Vlek (2009), this difference in explanatory power of theories for high and low-cost behaviors could be because of the wider range of factors covered under the TPB. Indeed, the TPB covers those important variables (e.g., perceived behavioral control, attitudes) rather than the mainly environment related motivations represented within VBN theory, which could have higher explanatory power for high-cost behaviors.

As mentioned earlier, a limited number of studies tell us the importance of emotions (such as theory on affect) and how they play role (or if should be counted for) in environmental behavior context. This has been one of the first studies examining the role of emotions, covered under hedonic goal-frame, in a behavioral setting other than car use in the environmental domain. Our results reported that the household energy use behavior could be better explained by affect theory, and thus, by hedonic goal-frame. Noteworthy, this was the only private behavior we examined, which could be the reason why this dissimilar result was found relative to the other eco-behaviors examined in this dissertation. It could be possible that public/private behaviors vary in terms of their predictors which can be a focus of future research.

Although we reported best goal frames for each behavior here, the main purpose of the present study was to understand how these underlying theories and frameworks work together to predict the environmental behaviors under investigation. As mentioned earlier, finding the relative importance of each individual psychological variable helps us to determine which intervention techniques to focus on to influence related behavior. We further discuss these important implications in the following sections.

7.2 Environmental Management Implications

The majority of environmental problems we are witnessing today in a rapidly increasing manner are direct or indirect results of continuous human activities (Gardner & Stern, 2002). Knowing what motivates consumers to act in favor of environmental well-being for each type of behavior can help environmental managers with developing strategies that encourage eco-friendly behaviors. This study tried to identify the constraints and/or supporting factors for societies to act in an ecologically cautious manner at the individual level. The results of the study can eventually help with strategy developments that are environmentally desirable and feasible, which are important aims of environmental management.

Three distinct management stances can be adopted by environmental managers: (1) preventive, (2) reactive or punitive, and (3) compensatory (Barrow, 2006). Two of the management strategies, reactive and compensatory management, try to eliminate or ease the problem by limiting, controlling, or mitigating the adverse conditions that have already occurred. On the other hand, the preventive stance aims to preclude adverse impacts on the environment before they occur. This study takes a preventive environmental management approach since it aims to prevent further damage to the environment caused by human activities. This also meets the environmental management goal of sustaining and, if possible, improving existing conditions and resources, establishing limits and identifying opportunities, and where possible, improving ‘quality of life.

For instance, increasing recycling habits can help reduce waste accumulation which can lead to improvements in the well-being of natural resources, or reduction of packaging can be an opportunity for the businesses if there is a motivation for consumers to buy these types of products. Successful attempts by government entities as well as individuals to reduce the amount of waste sent to landfills are necessary (Barr, 2007) and increasing recycling habits can be a good way of achieving this. The study results showed us that this could be possible mainly by providing easy access and making recycling more convenient for individuals in addition to focusing on normative motives. Environmental managers can use these kinds techniques based on our study findings to promote environmentally sensitive consumer behaviors to improve environmental quality.

Another important implication for environmental managers is related to consumer energy saving behaviors. Over the last 30 years, total energy consumption by U.S. households has remained relatively stable with a slight downward trend, according to the data released from the Residential Energy Consumption Survey (RECS) (EIA, 2012). Although there have been increases in the size and numbers of homes, as well as in the number of electronics and appliances used in these households, energy efficiencies have led to a decrease in consumption per household. Today, it is easier to access technological innovations and reduce energy use (e.g., energy efficient TVs, refrigerators, hybrid cars, etc.). However, it is still possible to achieve more energy saving by encouraging households to alter their energy-related behaviors. This can help us meet the Millennium Development Goals (WHO, 2014) at a faster pace and ensure environmental sustainability. The current study results can help environmental managers to solve energy

use related environmental problems by adopting various strategies. For instance, according to the results of the study, household energy use behavior could be altered by mostly focusing on hedonistic motivations rather than gain or normative ones. Also, transportation behavior could be changed by making it easily accessible and more convenient, similar to recycling behavior. Consequently, managers can try to alter neighborhoods and business districts in a way that allow people to walk and/or use mass transportations. This can be considered one of the essential management strategies for promoting eco-sensitive transportation behavior.

Further practical implication of the present study pertains to environmental education. Based on the results of the study, developing strategies to inform individuals on general environmental conditions as well as detrimental impacts that their actions may have on environmental well-being is needed. Also, various similar studies in the literature suggest that being more concerned about the environment leads to behaving in a more environmentally cautious manner (e.g., Poortinga, Steg, & Vlek, 2004; Choi & Kim, 2005; Schultz & Zelezny, 1998). Thus, managers can design and implement environmental education campaigns (e.g., courses, talks, conferences) to the general public in order to increase environmental awareness and knowledge that need to be promoted to induce changes in individual behavior through increased ascription of self-responsibility (Pooley & O'Connor, 2000). When individuals see the close connection between their behaviors and environmental destruction, their personal norms will be environmentally inclined which can be considered as an important requisite to display eco-sensitive behaviors.

In conclusion, with this kind of interdisciplinary research and strategy implementation, it is possible to develop an approach to environmental problems that addresses the main source, "humans". Today, there is a realization that 'end-of-pipe' solutions, cleaning up rather than prevention, are limited as well as more costly to both government entities (Adams, 2011) and companies (Barrow, 2006), and that environmental management prevention-focused intervention strategies can be a path towards long-term solutions.

7.3 Marketing Strategy Implications

Based on the study results, it is clear that pro-environmental behavior change in the context of environmentally sensitive consumer behavior can be achieved with various social and sustainability marketing strategies, management decisions as well as government interventions that focus on communicating different aspects of decision making processes. According to the results, practitioners can focus on promoting consumers' intentions to purchase environmentally friendly options by strengthening their values, beliefs, personal and subjective norms, attitudes, and emotions regarding the behavior. For environmentally sensitive usage behavior, they can try to promote consumers' intentions to use products and services in an environmentally friendly way by strengthening their values, beliefs, personal norms (for transportation), subjective norms (for household energy use), perceived control, attitudes, and emotions regarding the behavior. Finally, to promote recycling behavior, they can develop social and sustainability marketing strategies that focus on elevating perceived behavioral control of

consumers (e.g., information on how and where to recycle, and products that are recyclable, etc.). Practitioners can also focus on promoting consumers' intentions to recycle by strengthening their attitudes, subjective norms, values, beliefs, and personal norms regarding this behavior. In the following section, we portray a more specific marketing strategy to promote consumer pro-environmental behaviors.

7.3.1 Developing marketing strategies to promote environmentally sensitive behaviors

The results of the study showed that an individual's level of awareness on detrimental consequences (i.e. awareness of consequences – AC) of his/her environmental behavior impacts how he/she acts upon that specific behavior. This result was consistent across all of the behaviors examined for the purpose of this study. This is an important finding that can help us develop effective marketing strategies. When developing a marketing strategy to promote a certain eco-sensitive behavior, it would be important to communicate the detrimental consequences of that specific behavior. In this way, consumers would be aware of the direct consequences of their actions, which would help them make decisions based on their environmental concerns and increase their perception of self-responsibility to solve these problems. Knowing how their actions affect environmental well-being seems to be very important in the decision-making process in the context of ESB because it affects personal moral obligations to act pro-environmentally, which also has a great effect on pro-environmental actions. For instance, to promote recycling behavior, social marketing strategy should focus on how

this behavior solves environmental problems caused by non-recycling behaviors. Some examples of advertisements can be listed as follows:

- "*Recycle and Reduce Waste!* Each one of us discards about eight pounds of waste daily. You can reduce the amount of garbage that goes into landfills by recycling your water bottle";
- "*Recycle and Reduce Water Pollution and Protect Natural Resources!* When we make products from recycled materials, we generate less water pollution than making them from scratch, and most importantly, we use fewer natural resources".

In the context of eco-sensitive purchase behavior (ESPB), it would be important for companies that are producing and promoting green products to focus on the products' ecological aspects and their effects on protecting environmental well-being. This kind of direct relation to the actual products can increase awareness and the ascribed self-responsibility of consumers. Buyers should first see the beneficial effects of the product before evaluating it in their eco-sensitive purchase behavior process. By focusing on how this ESPB solves or minimizes environmental problems caused by non-eco-sensitive purchase behaviors, it would be possible to increase individuals' inclination towards acting in a more ecologically conscious manner in this context. Some examples can be as follows:

- "*Buy Organic and Help Protect the Soil!* Organic farming means crop rotation, soil-friendly (green) manure and biological pest management, no

synthetic pesticides or herbicides. Long and healthy living not just for you, but also for the soil."

- "*Clean dishes and sparkling water supplies!* Green detergent means no chemicals in the water supplies."

Furthermore, the results imply that when developing marketing strategies, strengthening biospheric values in particular (as opposed to altruistic values) can be crucial in promoting environmentally sensitive behaviors. As such, focusing on welfare of the environment and biosphere can make a difference for these types of behaviors rather than focusing on the welfare of others (altruistic values) or the self-interest (egoistic values). Altering human values is a difficult task, and it would take a long time to achieve. However, by making biospheric values more salient, we can significantly influence relevant behavior through changing behavioral intention (De Groot & Steg, 2010). Evidently, making this aspect more salient or increasing the cognitive accessibility of these values is possible with appropriate social marketing strategies and promotional efforts. Following the suggestions of De Groot and Steg (2010), to achieve this, we can highlight the importance of biosphere and increase this type of value accessibility to the individual, which will affect the way that person prioritizes his/her values in different situations that cover environmental related issues.

According to the study results, hedonic goal-frame explained household energy use well. Consequently, promoting these types of behaviors can be possible by increasing affect and behavioral attitudes. For instance, by providing personal emotional rewards, such as giving feedback on how much energy a household used and saved in previous

months/years, giving information on comparative energy usage in the community, etc., works well. In general, people know very little about their detailed energy consumption (Steg, 2008). In Europe, and recently in the U.S., to provide more detailed feedback on energy use to consumers, a system called "smart meters" has been introduced. Although for some it is a privacy concern (Nunez, 2012), "smart meters" can be an efficient way of saving energy by giving necessary feedback and consequently altering the related usage behavior. This kind of an instrument could be an important tool to educate consumers about their personal energy use and make energy saving more engaging and fun.

Overall, when developing marketing strategies to promote environmentally sensitive behaviors, it is important to make sure that the consumers do not get the impression that they will lose from or be harmed by making eco-sensitive inclined decisions. As Kaplan (2000) claims, "people prefer making the environmentally responsible choice when they are not seriously disadvantaged by doing so" (p. 502). Thus, providing assurance within marketing strategies is crucial to retaining eco-sensitive consumers. For instance, if an eco-friendly dishwashing liquid is harmless to the environment and/or human health, we need to make sure we inform consumers that the product cleans as well as conventional products.

Furthermore, according to Pickett-Baker and Ozaki (2008), except for the cleaning products category, most consumers are having trouble in identifying eco-friendly products and services. One way of explaining this could be lack of impressions created in the minds of shoppers by green labels and messages. Thus, green marketers should exercise resourceful communication strategies and address this major area of

weakness in marketing communications. Most importantly, these marketers can publicize associated environmental information clearly as customers seek more concrete information from them so they can make more informed decisions on their purchases (D'Souza et al., 2006). This informational strategy should also cover communicating environmental related company initiations, such as being a part of different Environment Management Systems (EMAS, ISO 14001), or participating in Sustainability Reporting Guidelines (SRG) (Fraj & Martinez, 2006). This way, it could be possible to make the environmental message credible for the consumer.

7.4 Limitations and Recommendations for Future Research

The present study has some limitations that need to be recognized. First, the study was conducted using a sample covering environmentally inclined consumers which could raise issues concerning the generalization of the results. Although we aimed at investigating and determining differences in various eco-sensitive behaviors by selecting this specific group of consumers, a more representative sample of the general population could give us different results in the context of eco-sensitive behaviors.

Another limitation of the study is that all variables were based on self-report measures which could lead to the possibility of common method variance (bias) (Armstrong & Overton, 1977). Individuals sometimes can give different answers than what they normally prefer for social approval to questions about their general preferences and everyday actions (social desirability response bias). Although in the present study individuals' behavioral intentions and actions were captured under conditions of

respondent anonymity to minimize self-report bias (Singh, 2000), as well as measured with balanced scales to reduce the damaging effects of response bias (Baumgartner & Steenkamp, 2006), future studies could measure environment related attitudes and actions using more objective methods. A study by Gatersleben, Steg, and Vlek (2002) underlines the importance of measuring actual consumer behavior directly. In their study on household energy use, the authors compared a common social science measure of pro-environmental behavior with actual energy usage and found that study respondents who indicated that they behave more eco-sensitively do not actually use less energy in their homes. This discrepancy between self-reports and actual consumer behavior underlines the importance of adopting objective methods. Thus, measuring environmental behavior directly (e.g., determining actual car use with a tracking device, measuring household energy use with a "smart meter", etc.) can eliminate response bias and may lead to different insights about determinants of consumer behaviors. Future research should take this into account when developing environmental behavior studies.

In most environmental behavior intervention, changing behavior is the goal; however, altering human behavior is extremely difficult. As the exploration in preceding sections has made abundantly clear, this task is extremely complex for a variety of reasons. First of all, human behavior covers a wide-spectrum of aspects. Many different social factors, in addition to a vast number of individual ones, influence human actions, such as cultural effects (being under the influence of a certain social and/or cultural settings), the organization and behavior of different groups, political and economic organizations, social change processes (e.g., technological developments), social trade-

offs (in addition to individual trade-offs), social conflicts and regulations to resolve them, and national and global social systems. All these constantly changing and rapidly evolving aspects of human societies impact each individual's behavior to a great extent (Zastrow & Kirst-Ashman, 2007). Therefore, explaining human behaviors fully with a relatively simple model as developed here in this study is rather confined. This is an important limitation of this type of behavioral study that needs to be recognized.

Although based on the results of the present study we made some recommendations about informing consumers on environmental consequences of their actions, it is crucial to point out the potential limitations of these suggestions. The reason for this is the obstacle known as "socially organized denial." Today, most research emphasizes inadequate information as a restrictive factor for public responses (Norgaard, 2006). Thus, they support the idea of informing individuals as much as possible to protect the environment. However, Norgaard (2011) suggests that for the highly educated and knowledgeable citizens, actual environmental degradation and information related to it could be inconceivable because of common social denial. According to Norgaard (2011), the phenomenon of socially organized denial mainly "emphasizes that ignoring occurs in response to social circumstances and is carried out through a process of social interaction" (p.9). When actual knowledge on environmental issues is disconnected from the key aspects of political, social, and private life; citizens of industrialized countries lack a display of the necessary responses (Norgaard, 2006). Tracing this denial and examining it by focusing on different nations (developed vs. emerging) and regions with disproportionate environmental exposures (severely harmed by global warming vs. no-

harm) in future studies can give important insights on how social processes in different settings impact human actions in the environmental domain.

In spite of these limitations, this study takes the first step in opening a new phase by testing the promising Goal Framing Theory in environmental behavior research. The study points to several interesting areas of future research based on the current findings. First of all, the results of the study showed that environmentally sensitive behaviors of consumers are complex and determining the predicting factors needs categorization and detailed examination. The study looked at three types of environmentally sensitive consumer behaviors, purchase, use, and post-use, however, future studies can examine other types of eco-behaviors based on different categorizations. For instance, public/private behaviors could differ in terms of their predictors. Also, under the eco-sensitive usage behavior, the present study focused on two types of usage, transportation and household energy use. Future studies can include other kinds of usage, such as water use or park visits, to fully understand the causes of different types of behaviors.

Additionally, comparative studies on different types of behaviors can expand the Goal Framing Theory by including contextual factors. Here, we were able to look at the effects of contextual factors as the way it was covered in the perceived behavioral control (PBC) variable. The PBC is the ease or difficulty in performing a certain behavior perceived by consumers. So, this variable is mostly based on the subjective perception of the individual and not derived from actual contextual factors. Future experimental studies can focus on situational and contextual conditions and explain the relationships in more detail with a different perspective.

It is also essential to note the low explanatory power of behavioral intention in the model for eco-sensitive transportation behavior. The model was able to explain only 26% of the variance in this behavioral outcome, which was the lowest explained variance compared to other behaviors. It is possible some other predictors might be important in explaining this specific environmentally sensitive behavior of individuals, such as situational characteristics (e.g., urban/suburban residency, occupation), habits, past experiences related to behavior, etc. All these could be the additional focus areas of future studies.

Furthermore, in the current study, we did not cover knowledge, behavior specific concerns, or culture, which all might be important in determining environmentally sensitive behaviors. Future studies can include these variables in the GFT and examine purchase, use, and post-use behaviors with a similar comparative approach.

Overall, the study findings suggest some patterns in the variety of environmentally sensitive behaviors which all deserve further investigation. In this area, application of different theoretical perspectives is lacking, and a systematic research is necessary (Steg & Vlek, 2009). Additional research is called upon to validate the identified variables and the model developed here with further studies in order to achieve behavioral changes for greater sustainability.

7.5 References

Adams, L. (2011). EPA Superfund cleanup costs outstrip funding. Retrieved from http://www.publicintegrity.org/2011/02/22/2121/epa-superfund-cleanup-costs-outstrip-funding on December 09, 2013.

Armstrong, J. S., & Overton, T.S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research, 14*(3).

Barr, S. (2007). Factors influencing environmental attitudes and behaviors. *Environment and Behavior, 39*(4), 435-473.

Barrow, C. (2006). *Environmental management for sustainable development*. Routledge.

Baumgartner, H., & Steenkamp, J. B. E. (2006). Response biases in marketing research. In R. Grover & M. Vriens, (pp. 95-109), *The handbook of marketing research,* Thousand Oaks, California: Sage Publications.

Cialdini, R. B. (2001). *Influence: Science and practice.* (4th ed.). Boston: Allyn & Bacon.

Dagher, Grace K. & Itani, Omar S. (2012). The influence of environmental attitude, environmental concern and social influence on green purchasing behavior. *Review of Business Research*, *12*(2), 104.

De Groot, J. I., & Steg, L. (2008). Value Orientations to Explain Beliefs Related to Environmental Significant Behavior How to Measure Egoistic, Altruistic, and Biospheric Value Orientations. *Environment and Behavior, 40*(3), 330-354.

De Groot, J. I. M., & Steg, L. (2010). Relationships between value orientation, self-determined motivational types and pro-environmental behavioral intentions. *Journal of Environmental Psychology, 30*(4), 368-378.

D'Souza, C., Taghian, M., & Lamb, P. (2006), An empirical study on the influence of environmental labels on consumers, *Corporate Communications: An International Journal, 11*(2), 162-73.

Fraj, E. & Martinez, E. (2006), Environmental values and lifestyles as determining factors of ecological consumer behavior: An empirical analysis, *Journal of Consumer Marketing, 23*(3), 133-44.

EIA (2012). U.S. Energy Information Administration. Residential Energy Consumption Survey data show decreased energy consumption per household. Retrieved from http://www.eia.gov/todayinenergy/detail.cfm?id=6570

Freestone, O. M., & McGoldrick, P. J. (2008). Motivations of the ethical consumer. *Journal of Business Ethics, 79*, 445–467.

Gardner, G. T., & Stern, P. C. (2002). *Environmental problems and human behavior* (2nd ed.). Boston, MA: Pearson Custom Publishing.

Gatersleben, B., Steg, L., & Vlek, C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior, 34*(3), 335-362.

Hamilton, S. F., & Zilberman, D. (2006). Green markets, eco-certification, and equilibrium fraud. *Journal of Environmental Economics and Management, 52*(3), 627-644.

Lindenberg, S. (2001a). *Social rationality versus rational egoism*. In J. Turner (Ed.),Handbook of sociological theory (pp. 635–668). New York: Kluwer Academic/Plenum.

Lindenberg, S. (2001b). Intrinsic motivation in a new light. *Kyklos, 54*, 317–342.

Lindenberg, S. (2006). Prosocial behavior, solidarity and goal-framing processes. In D. Fetchenhauer, A. Flache, B. Buunk, & S. Lindenberg (Eds.), Solidarity and prosocial behavior. An integration of sociological and psychological perspectives. Amsterdam: Kluwer.

Lindenberg, S., & Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues, 63*(1), 117-137.

Norgaard, K. M. (2006). "We don't really want to know" environmental justice and socially organized denial of global warming in Norway. *Organization & Environment, 19*(3), 347-370.

Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life*. Boston, US: MIT Press.

Nunez, C. (2012). Who's Watching? Privacy Concerns Persist as Smart Meters Roll Out. National Geographic. Retrieved from http://news.nationalgeographic.com/news/energy/2012/12/121212-smart-meter-privacy/

OECD (2008). Promoting Sustainable Consumption, Organisation for Economic Co-Operation and Development (OECD) Report. Retrieved from http://www.oecd.org/greengrowth/40317373.pdf

Pickett-Baker, J. & Ozaki, R. (2008), Pro-environmental products: marketing influence on consumer purchase decision, *Journal of Consumer Marketing, 25*(5), 281-93.

Pooley, J.A., & O'Connor, M. (2000). Environmental education and attitudes emotions and beliefs are what is needed. *Environment and Behavior, 32*(5), 711-723.

Steg, L. (2005). Car use: lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice, 39*(2), 147-162.

Steg, L. & Vlek, C. (2009), Encouraging Pro-Environmental Behavior: An Integrative Review and Research Agenda, *Journal of Environmental Psychology*, *29*(3), 309-317.

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology, 25*(4), 415-425.

Thøgersen, J. (2007). Social norms and cooperation in real-life social dilemmas. *Journal of Economic Psychology, 29*, 458–472.

UNEP (2007). Global Environmental Outlook (GEO 4): Environment for Development, United Nations Environment Programme (UNEP) Report. Retrieved from http://www.unep.org/geo/GEO4/report/GEO-4_Report_Full_en.pdf

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behavior and the role of confidence and values. *Ecological Economics, 64*, 542-553.

WHO (2014). World Health Organization. Multiple links between household energy and the Millennium Development Goals. Retrieved from http://www.who.int/indoorair/mdg/energymdg/en/

Zastrow, C., & Kirst-Ashman, K.K. (2007). *Understanding human behavior and the social environment* (7th ed.). Belmont, CA: Thomson Brooks/Cole.

APPENDIX A

A.1: TerraCycle Company newsletter with survey links.

December 2013 Edition

Exciting End-of-Year Announcements

We've got updates and new programs ready for 2014. Between zero waste initiatives and changes to shipment size requirements, we've got plenty of updates to get you excited for the holiday season and the new year.

Zero Waste Boxes

People across the nation are moving towards zero waste through our new innovative recycling system.

Click here to learn more.

Updated Cheat Sheet

There are many updates happening at the start of 2014, so be sure to download the latest cheat sheet.

Download the Cheat Sheet.

Spotlight on...

Spotlight Brigade: Scotch Tape Brigade

As you wrap gifts this holiday season, remember that each empty tape dispenser can be recycled through TerraCycle.

Spotlight Guide: Scotch Tape Brigade DIY Collection Bin Kit

Use this guide to create your own unique collection bin for the Scotch Tape Brigade.

Download the kit.

Spotlight DIY: Seasonal DIY Collection

'Tis the season to create upcycled seasonal gifts! Be sure to check out our seasonal DIY projects to make your holiday eco-friendly.

Make it!

Spotlight Location: Travis Air Force Base

Contribute to an Environmental Behavior Study

If you have a few minutes, please take the time to answer at least one of the three surveys found below. You absolutely do not need to complete all three, but as with any research study, the more information, the better! Thank you for your time and participation.

Click to take the survey on Environmentally Sensitive Purchase Behavior

Click to take the survey on Environmentally Sensitive Usage Behavior

Click to take the survey on Environmentally Sensitive Post-Use Behavior

The Milestone Program

We're introducing the Milestone program, an innovative new program that rewards you for collecting drink pouches at different levels.

Click to learn more.

New Charity Partner

Since 2000, ShelterBox has provided shelter, warmth and dignity to families following more than 200 disasters in over 85 countries. You can now donate your TerraCycle points to provide needed resources for a ShelterBox.

Click to learn more.

Win extra rewards from TerraCycle

Travis Air Force Base

Learn how Travis Air Force Base engages their community and staff members in their recycling efforts.

Click here to see this Spotlight Location and our other Spotlight Locations.

Spotlight Charity Partner: Feeding America

You can make a difference on the environment and on people's lives. With just 50 TerraCycle points, you can donate a meal to an American facing hunger.

Click here to learn more about this Charity Partner.

A.2: IRB Approval

MONTCLAIR STATE UNIVERSITY

Institutional Review Board
College Hall, Room 248
VOICE: 973-655-7583
FAX: 973-655-3022

September 4, 2013

Ms. Naz Onel
12 Ivy Ct.
Perrineville, NJ 08535

Re: IRB Number: **001391**
Project Title: **Investigation of the Predictors of Environmentally Sensitive Behaviors**

Dear Ms. Onel:

After Expedited 7 review, Montclair State University's Institutional Review Board (IRB) approved this protocol on **September 4, 2013**. The study is valid for one year and will expire on **September 4, 2014**.

Before requesting amendments, extensions, or project closure, please reference MSU's IRB website and download the current forms.

Should you wish to make changes to the IRB-approved procedures, prior to the expiration of your approval, submit your requests using the Amendment form.

For Continuing Review, it is advised that you submit your form 60 days before the month of the expiration date above. If you have not received MSU's IRB approval by your study's expiration date, ALL research activities must STOP, including data analysis. If your research continues without MSU's IRB approval, you will be in violation of Federal and other regulations.

After your study is completed, submit your Project Completion form.

If you have any questions regarding the IRB requirements, please contact me at 973-655-5189, reviewboard@mail.montclair.edu, or the Institutional Review Board.

Sincerely yours,

Dr. Katrina Bulkley
IRB Chair

cc: Dr. Avinandan Mukherjee, Faculty Sponsor
Ms. Amy Aiello, Graduate School

Dear Respondent,

You are invited to take part in a study on environmental behaviors. With this study, we want to learn the root causes of people's behaviors that can affect the environment. By learning this, we can help reduce the human impacts on the environmental well-being.

If you decide to be a part of this study, please complete the following survey. Finishing the survey will be your consent to participate in this research study. The survey is designed to learn about your behaviors that can affect the environment. It covers questions to understand if these behaviors are more strongly dependent on moral considerations, feelings, or self-interest motives. Also, you will be asked to answer questions about your general values, beliefs, and norms. The survey will take about 15-20 minutes of your time. No direct benefits accrue to you for answering the survey. However, your answers to this survey will help protect the environment in the long run.

Data will be collected using the Internet. We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet. However, you may feel emotional discomfort when answering questions related to social norms and approvals. Your responses will not be identified with you personally. Though we are taking precautions to protect your privacy, you should be aware that information sent through email could be read by a third party.

Your participation is entirely voluntary. It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you. Leaving the study will not result in any penalty.

Please feel free to ask questions regarding this study. You may contact me at onelgarmkhb1@mail.montclair.edu or (973) 655-7037, or my faculty advisor, Prof. Avinandan Mukherjee, at mukherjeeav@mail.montclair.edu or (973) 655-5126 if you have additional questions.

Any questions about your rights may be directed to Dr. Katrina Bulkley, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-5189.

Thank you for your time.

Sincerely,
Naz Onel
Ph.D. Candidate, Environmental Management.
Earth and Environmental Studies, College of Science and Mathematics.
Montclair State University, Montclair, NJ 07043, USA.

By clicking the link below, I confirm that I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age.

Please feel free to print a copy of this consent.
The study has been approved by the Montclair State University Institutional Review Board as study #001391 on September 4, 2013.

☐ I agree to participate (click next to go to survey)

☐ I decline (link to close webpage)

A.3: Study II measurement items

Sociodemographics	Education, Estimated household annual income, Gender, Age, Location, Race/ Ethnicity
Affect (AFPL) (Russell, 1980; Bigne *et al.*, 2005; Steg, 2005)	AFPL1 Purchasing environmentally sensitive products is giving me a feeling of satisfaction. AFPL2 When I purchase environmentally sensitive products, I feel happy. AFPL3 Purchasing environmentally sensitive products is giving me a feeling of pleasure.
Personal Norms (PNESP): Abrahamse & Steg, 2011; Abrahamse *et al.,* 2009)	PNESP1 I feel morally obliged to purchase environmentally sensitive products, regardless of what other people do. PNESP2 I feel guilty when I purchase environmentally harmful products. PNESP3 I would consider myself a better person if I purchase environmentally sensitive products.
Ascription of Responsibility (ARESP) (Abrahamse *et al.*, 2009; Abrahamse & Steg, 2011)	ARESP1 I feel personally responsible for the problems resulting from my non-ecofriendly product purchases. ARESP2 My non-ecofriendly purchases contribute to environmental problems. ARESP3 I take joint responsibility for environmental problems.
Awareness of Consequences (ACESP) (Abrahamse *et al*., 2009; Abrahamse & Steg, 2011; Stern *et al.*, 1999)	ACESP1 Pesticides and chemicals used in fruits and vegetables are problem for environment. ACESP2 Environmentally sensitive purchases contribute to a reduction of the environmental problems. ACESP3 Environmentally sensitive purchases contribute to habitat conservation. ACESP4 Environmentally sensitive purchases contribute to improving ability to meet environmental goals. ACESP5 Environmentally sensitive purchases contribute to improving individuals' safety and health. ACESP6 Organically grown product consumption can help improving environmental conditions.
Environmental Concern (EC) **(**Dunlap *et al*., 2000) *(New Environmental Paradigm- NEP)*	EC 1.We are approaching the limit of the number of people the earth can support. EC 2.Humans have the right to modify the natural environment to suit their needs. (R) EC 3.When humans interfere with nature, it often produces disastrous consequences. EC 4.Human ingenuity will insure that we do NOT make the earth unlivable. (R) EC 5.Humans are severely abusing the environment. EC 6.The earth has plenty of natural resources if we just learn how to develop them. (R) EC 7.Plants and animals have as much right as humans to exist. EC 8.The balance of nature is strong enough to cope with the impacts of modern industrial nations. (R) EC 9.Despite our special abilities humans are still subject to the laws of nature. EC 10.Human destruction of the natural environment has been greatly exaggerated. (R)

	EC 11.The earth has only limited room and resources. EC 12.Humans were meant to rule over the rest of nature. (R) EC 13.The balance of nature is very delicate and easily upset. EC 14.Humans will eventually learn enough about how nature works to be able to control it. (R) EC 15.If things continue on their present course, we will soon experience a major ecological disaster.
Values (VL) (Stern *et al.*, 1998; Steg *et al*., 2011)	***Altruistic:*** ALT1 Social justice, correcting injustice, care for the weak ALT2 Equality, equal opportunity for all ALT3 A world of peace, free of war and conflict ALT4 Helpful ***Biospheric:*** BIO1 Preventing pollution, conserving natural resources BIO2 Unity with nature, fitting into nature BIO3 Respecting the earth, harmony with other species BIO4 Protecting the environment, preserving nature ***Egoistic:*** EGO1 Social power, control over others, dominance EGO2 Influential, having an impact on people and events EGO3 Wealth, material possessions, money EGO4 Authority, the right to lead or command EGO5 Ambitious
Perceived Behavioral Control (PBCESP) **(**Abrahamse and Steg, 2011; Tonglet *et al.*, 2004)	PBCESP1 I can find and purchase environmentally sensitive products easily. PBCESP2 I have plenty of opportunities to purchase environmentally sensitive products. PBCESP3 Purchasing environmentally sensitive products is inconvenient. (R) PBCESP4 Stores provide satisfactory resources to purchase environmentally sensitive products. PBCESP5 I know which products are environmentally sensitive. PBCESP6 I know where to find environmentally sensitive products.
Subjective Norm (SNESP) **(**Tonglet *et al.*, 2004; Abrahamse & Steg, 2011)	SNESP1 Most people who are important to me think that I should purchase environmentally sensitive products SNESP2 Most people who are important to me would approve of me purchasing environmentally sensitive products SNESP3 My household/family members think I ought to be purchasing environmentally sensitive products. SNESP4 My friends/colleagues think I ought to be purchasing environmentally sensitive products.
Attitudes (ATESP) **(**Abrahamse & Steg, 2011; Smith *et al.*, 1994)	ATESP1 Environmentally sensitive purchase is too much of a hassle. (R) ATESP2 Environmentally sensitive purchasing means I have to live less comfortably. (R) ATESP3 Environmentally sensitive purchases will restrict my freedom. (R) ATESP4 Environmentally sensitive buying is valuable ATESP5 Environmentally sensitive buying is necessary
Intention (IESP) **(**Ajzen, 2002; Fishbein & Ajzen, 2010)	INT1 I intend to purchase environmentally sensitive products in the forthcoming months. INT2 I will try to purchase environmentally sensitive products in the forthcoming months. INT3 I expect to purchase environmentally sensitive products in the forthcoming months.

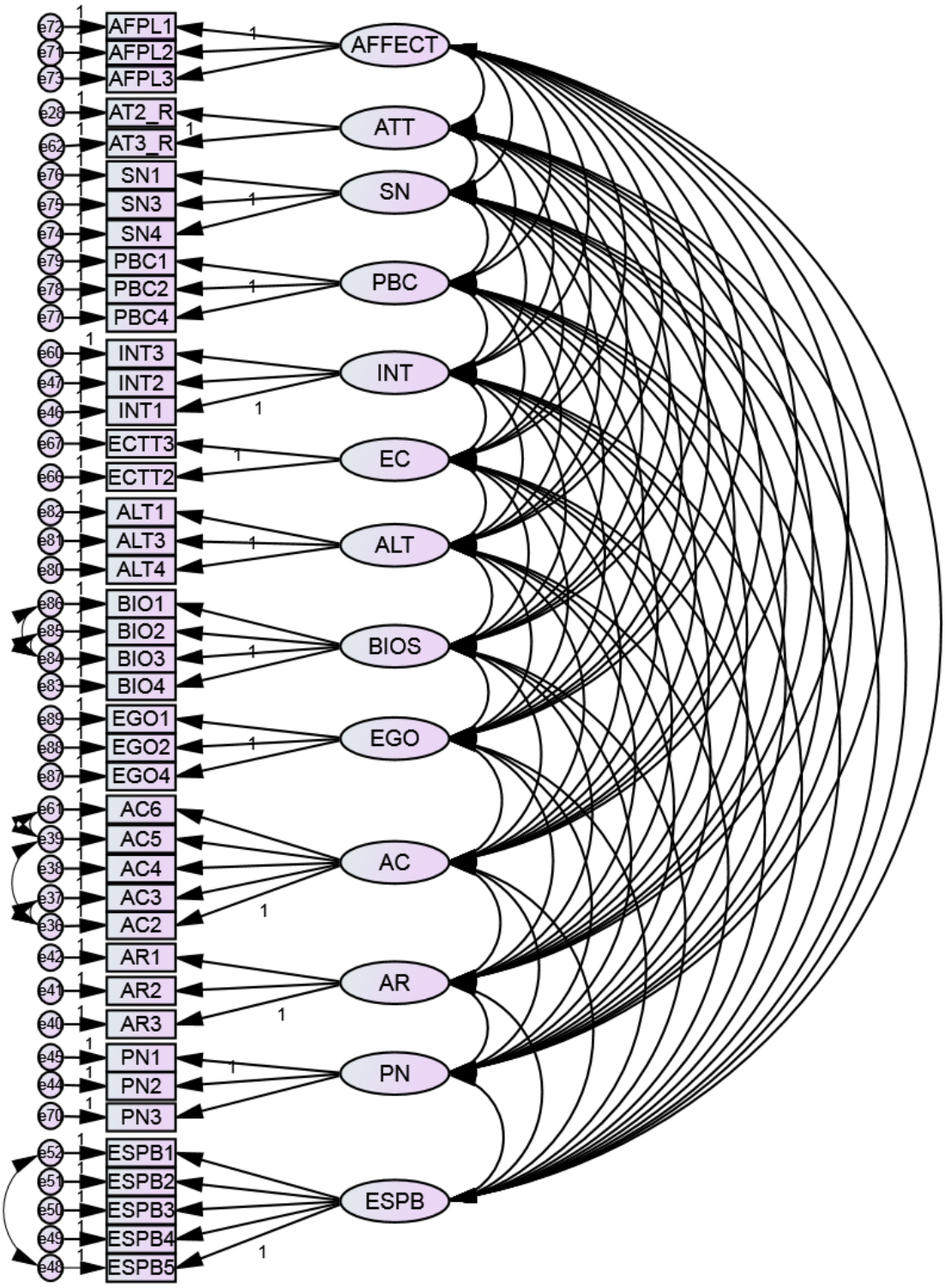
Environmentally Sensitive Purchase Behavior (ESPB) (GSS, 2010, Schlegelmilch *et al*., 1996)	ESPB1 How often do you make a special effort to buy fruits and vegetables grown without pesticides or chemicals; also known as organic fruits and vegetables? ESPB2 How often do you avoid purchasing products that are harmful to the environment? ESPB3 How often do you purchase products that are not tested on animals? ESPB4 How often do you make a special effort to buy household chemicals such as detergent and cleaning solutions that are environmentally friendly? ESPB5 How often do you make a special effort to buy paper and plastic products that are made from recycled materials?

A.4. Rotated component matrix and parcels for environmental concern construct: (1) Balance of nature (ECT1), (2) Limits to growth (ECT2) and (3) Humans over nature (ECT3). Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Parcels for Environmental Concern Purchase Behavior				
Items	**Component**			**PARCELS**
	1	2	3	
EC7	**.785**			
EC9	**.623**			
EC2_R	**.612**		.431	
EC5	**.609**	.542		**ECT3**
EC3	**.606**	.355		
EC10_R	**.549**	.457	.333	
EC12_R	**.468**		.356	
EC11		**.862**		
EC1		**.816**		**ECT2**
EC15	.471	**.591**		
EC13	.334	**.529**		
EC4_R			**.768**	
EC6_R		.354	**.717**	**ECT1**
EC14_R			**.691**	
EC8_R	.363	.400	**.470**	

Notes: ECT, environmental concern total; R, reversed items.

A.5: Study II final measurement model.



A.6: Measurement items, reliability, and validity table. The table presents the number of items for each construct, mean and standard deviations, Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Squared Variance (MSV), and Average Shared Squared Variance (ASV) of all factors.

STUDY II - Purchase							
	# of items	**Mean**	**SD**	**Cronbach's α**	**AVE**	**MSV**	**ASV**
PBC	3	4.439	1.388	0.871	0.711	0.120	0.081
ATT	2	5.217	1.449	0.823	0.699	0.417	0.241
EC	2	5.405	1.034	0.809	0.687	0.664	0.390
INT	3	5.191	1.641	0.967	0.909	0.766	0.442
AR	3	4.714	1.414	0.859	0.682	0.728	0.402
PN	3	4.735	1.576	0.886	0.720	0.780	0.478
ESPB	5	4.337	1.483	0.905	0.677	0.766	0.409
AC	5	5.405	1.068	0.929	0.726	0.584	0.349
AFFECT	3	4.887	1.469	0.950	0.868	0.780	0.393
SN	3	4.157	1.294	0.842	0.642	0.555	0.288
ALT	3	5.820	0.992	0.718	0.476	0.573	0.199
BIOS	4	5.585	1.293	0.933	0.776	0.664	0.371
EGO	3	3.214	1.333	0.742	0.511	0.143	0.048

A.7: CR = Construct reliability, AVE = Average Variance Extracted, (R) = Reverse coded item, Figure in parenthesis after each item denotes standardized estimate, also known as factor loadings.

Measurement items and standardized estimates of constructs & construct reliabilities	
Affect *Cronbach's a = 0.950;* *CR = 0.952; AVE = 0.868*	AFPL1 (0.920) AFPL2 (0.957) AFPL3 (0.917)
Personal Norms *Cronbach's a = 0.886* *CR = 0.885; AVE = 0.720*	PNESP1 (0.887) PNESP2 (0.810) PNESP3 (0.847)

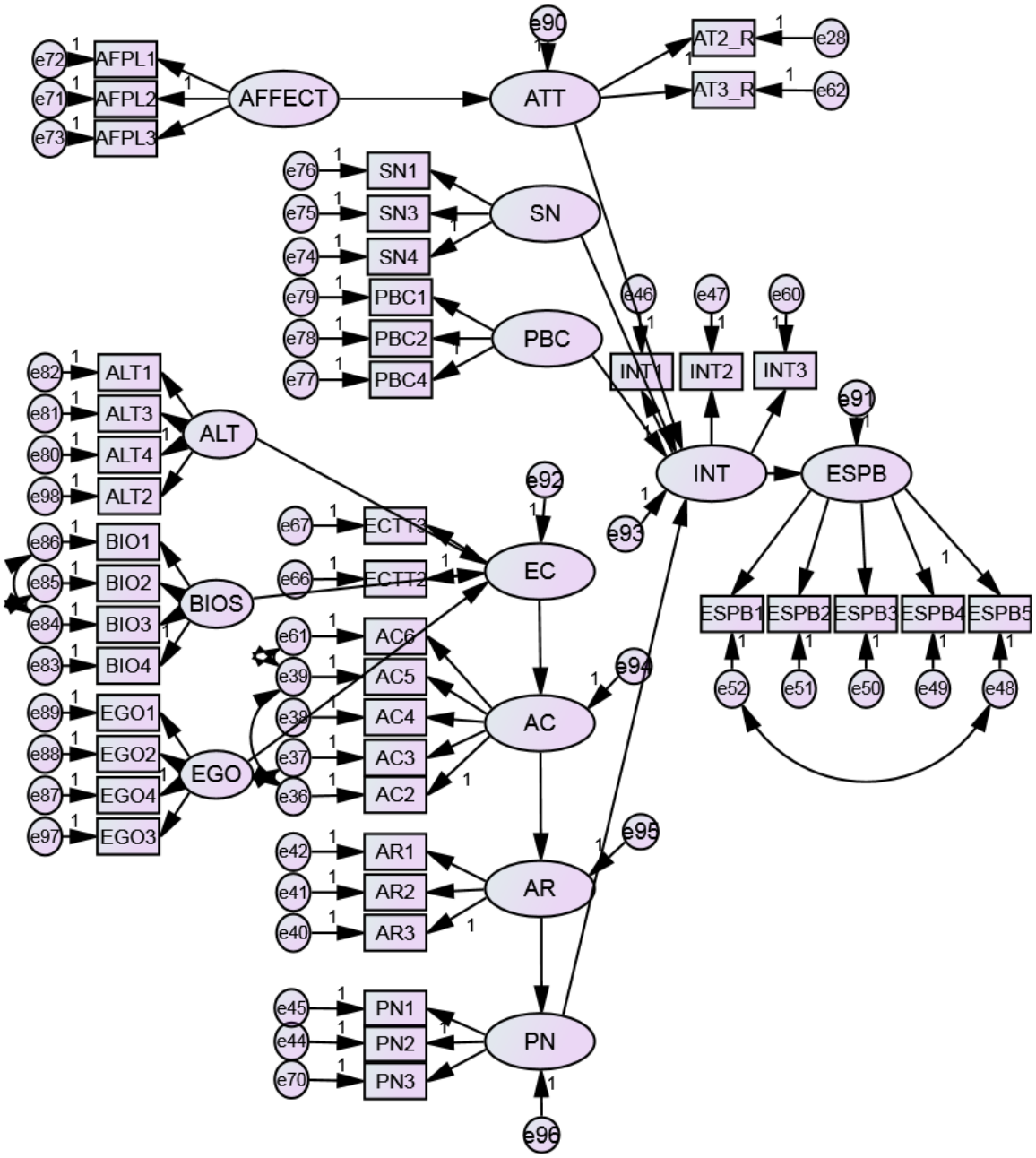
Ascription of Responsibility *Cronbach's a = 0.859* *CR = 0.865; AVE = 0.682*	ARESP1 (0.816) ARESP2 (0.878) ARESP3 (0.780)
Awareness of Consequences *Cronbach's a = 0.929* *CR = 0.930; AVE = 0.726*	ACESP2 (0.900) ACESP3 (0.865) ACESP4 (0.910) ACESP5 (0.784) ACESP6 (0.780)
Environmental Concern *Cronbach's a = 0.809* *CR = 0.814; AVE = 0.687*	ECT2 (0.783) ECT3 (0.872)
Values **Altruistic:** *Cronbach's a = 0.718* *CR = 0.731; AVE = 0.476* **Biospheric:** *Cronbach's a = 0.933* *CR = 0.933; AVE = 0.776* **Egoistic:** *Cronbach's a = 0.742* *CR = 0.753; AVE = 0.511*	***Altruistic:*** ALT1 (0.730) ALT3 (0.684) ALT4 (0.653) ***Biospheric:*** BIO1 (0.930) BIO2 (0.821) BIO3 (0.887) BIO4 (0.882) ***Egoistic:*** EGO1 (0.629) EGO2 (0.616) EGO4 (0.870)
Perceived Behavioral Control *Cronbach's a = 0.871* *CR = 0.878; AVE = 0.711*	PBCESP1 (0.945). PBCESP2 (0.899) PBCESP4 (0.658)
Subjective Norm *Cronbach's a = 0.842* *CR = 0.843; AVE = 0.642*	SNESP1 (0.815) SNESP3 (0.835) SNESP4 (0.752)
Attitudes *Cronbach's a = 0.823* *CR = 0.823; AVE = 0.699*	ATESP2 *(R)* (0.813) ATESP3 *(R)* (0.859)
Intention *Cronbach's a = 0.967* *CR = 0.968; AVE = 0.909*	INT1 (0.972) INT2 (0.931) INT3 (0.957)
Environmentally Sensitive Purchase Behavior *Cronbach's a = 0.905* *CR = 0.913; AVE = 0.677*	ESPB1 (0.822) ESPB2 (0.854) ESPB3 (0.726) ESPB4 (0.857) ESPB5 (0.847)

A.8: Study II Factor Correlation Matrix.

	PBC	**ATT**	**EC**	**INT**	**AR**	**PN**	**ESPB**	**AC**	**AFFECT**	**SN**	**ALT**	**BIOS**	**EGO**
PBC	1.000												
ATT	0.336**	1.000											
EC	0.252**	0.596**	1.000										
INT	0.328**	0.646**	0.697**	1.000									
AR	0.290**	0.476**	0.710**	0.754**	1.000								
PN	0.259**	0.569**	0.750**	0.842**	0.853**	1.000							
ESPB	0.346**	0.599**	0.710**	0.875**	0.671**	0.810**	1.000						
AC	0.335**	0.494**	0.656**	0.673**	0.756**	0.764**	0.601**	1.000					
AFFECT	0.284**	0.506**	0.652**	0.767**	0.721**	0.883**	0.738**	0.707**	1.000				
SN	0.347**	0.523**	0.458**	0.745**	0.621**	0.711**	0.670**	0.517**	0.610**	1.000			
ALT	0.177	0.274**	0.579**	0.429**	0.524**	0.469**	0.417**	0.497**	0.409**	0.293**	1.000		
BIOS	0.188	0.447**	0.815**	0.656**	0.683**	0.743**	0.685**	0.591**	0.678**	0.479**	0.757**	1.000	
EGO	-0.194**	-0.234	-0.378**	-0.206	-0.213	-0.222	-0.244**	-0.259	-0.152	-0.037	-0.154	-0.162	1.000

Note: ** Correlation is significant at the 0.01 level.

A.9: Structural Equation Modeling output for environmentally sensitive purchase behavior using AMOS 22.0.



APPENDIX B

B.1: Study III measurement items (environmentally sensitive usage).

Sociodemographics	Education, Estimated household annual income, Gender, Age, Location, Race/ Ethnicity
Affect (AFESU) (Russell, 1980; Bigne *et al.*, 2005; Steg, 2005)	AFESU1 Using products and energy in an environmentally sensitive way is giving me a feeling of satisfaction. AFESU2 When I use products and energy in an environmentally sensitive way, I feel happy. AFESU3 Using products and energy in an environmentally sensitive way is giving me a feeling of pleasure.
Personal Norms (PNESU): Abrahamse & Steg, 2011; Abrahamse *et al.*, 2009)	PNESU1 I feel morally obliged to use products and energy in an environmentally sensitive fashion, regardless of what other people do. PNESU2 I feel guilty when I use products and energy in an environmentally harmful fashion. PNESU3 I would consider myself a better person if I use products and energy in an environmentally sensitive way.
Ascription of Responsibility (ARESU) (Abrahamse *et al.*, 2009; Abrahamse & Steg, 2011)	ARESU1 I feel personally responsible for the problems resulting from my environmentally harmful product and energy usage. ARESU2 My non-ecofriendly product and energy usage contribute to environmental problems. ARESU3 I take joint responsibility for environmental problems.
Awareness of Consequences (ACESU) (Abrahamse *et al*., 2009; Abrahamse & Steg, 2011; Stern *et al.*, 1999)	ACESU1 Using car, household items and energy incautiously is problem for environment. ACESU2 Environmentally sensitive usage contributes to a reduction of the environmental problems. ACESU3 Environmentally sensitive usage contributes to habitat conservation. ACESU4 Environmentally sensitive usage contributes to improving ability to meet environmental goals. ACESU5 Environmentally sensitive usage contributes to improving individuals' safety and health. ACESU6 Lessening car usage, reusing household items, and reducing household energy use can help improving environmental conditions.
Environmental Concern (EC) **(**Dunlap *et al*., 2000) *(New Environmental Paradigm- NEP)*	EC 1.We are approaching the limit of the number of people the earth can support. EC 2.Humans have the right to modify the natural environment to suit their needs. EC 3.When humans interfere with nature, it often produces disastrous consequences. EC 4.Human ingenuity will insure that we do NOT make the earth unlivable. EC 5.Humans are severely abusing the environment. EC 6.The earth has plenty of natural resources if we just learn how to develop them. EC 7.Plants and animals have as much right as humans to exist. EC 8.The balance of nature is strong enough to cope with the impacts of modern industrial nations. EC 9.Despite our special abilities humans are still subject to the laws of nature. EC 10.Human destruction of the natural environment has been greatly

	exaggerated. EC 11.The earth has only limited room and resources. EC 12.Humans were meant to rule over the rest of nature. EC 13.The balance of nature is very delicate and easily upset. EC 14.Humans will eventually learn enough about how nature works to be able to control it. EC 15.If things continue on their present course, we will soon experience a major ecological disaster.
Values (VL) (Stern *et al.*, 1998; Steg *et al*., 2011)	***Altruistic:*** VL1 Social justice, correcting injustice, care for the weak VL2 Equality, equal opportunity for all VL3 A world of peace, free of war and conflict VL4 Helpful ***Biospheric:*** VL5 Preventing pollution, conserving natural resources VL6 Unity with nature, fitting into nature VL7 Respecting the earth, harmony with other species VL8 Protecting the environment, preserving nature ***Egoistic:*** VL9 Social power, control over others, dominance VL10 Influential, having an impact on people and events VL11 Wealth, material possessions, money VL12 Authority, the right to lead or command VL13 Ambitious
Perceived Behavioral Control (PBCESU) **(**Abrahamse and Steg, 2011; Tonglet *et al.*, 2004)	PBCESU1 I can use my car, household items and energy in an environmentally sensitive way easily. PBCESU2 I have plenty of opportunities to use my car, household items and energy in an environmentally sensitive way. PBCESU3 Using my car, household items and energy in an environmentally sensitive way is inconvenient. PBCESU4 I have been provided satisfactory resources to use my car, household items and energy in an environmentally sensitive way. PBCESU5 I know how to use my car, household items and energy in an environmentally sensitive way. PBCESU6 I know when and where to use my car, household items and energy in an environmentally sensitive way.
Subjective Norm (SNESU) **(**Tonglet *et al.*, 2004; Abrahamse & Steg, 2011)	SNESU1 Most people who are important to me think that I should use my car, household items and energy in an environmentally sensitive way SNESU2 Most people who are important to me would approve of me using my car, household items and energy in an environmentally sensitive way SNESU3 My household/family members think I ought to be using my car, household items and energy in an environmentally sensitive way SNESU4 My friends/colleagues think I ought to be using my car, household items and energy in an environmentally sensitive way
Attitudes (ATESU) **(**Abrahamse & Steg, 2011; Smith *et al.*, 1994)	ATESU1 Environmentally sensitive usage is too much of a hassle. ATESU2 Environmentally sensitive usage means I have to live less comfortably ATESU3 Environmentally sensitive usage will restrict my freedom ATESU4 Environmentally sensitive usage is valuable ATESU5 Environmentally sensitive usage is necessary

Intention (IESU) **(**Ajzen, 2002; Fishbein & Ajzen, 2010)	IESU1 I intend to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months IESU2 I will try to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months IESU3 I expect to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months
Environmentally Sensitive Usage (ESU) Behavior (GSS, 2010; Cleveland *et al.*, 2005; Abrahamse *et al.*, 2007; Marandu *et al*., 2010)	***Environmentally Sensitive Automobile Use*** – *EAU* (GSS, 2010; Cleveland *et al.*, 2005) all questions start with "How often do you…" EAU1: Cut back on driving a car for environmental reasons EAU2: Use public transport whenever that option is available EAU3: Drive your car more slowly EAU4: Walk rather than driving to a store that is just a few blocks away ***Household energy use reduction*** – *HER* (Cleveland *et al.*, 2005; Abrahamse et al., 2007) all questions start with "How often do you…" HER1 Turn off all lights before leaving the house HER2 Turn down the heat a little in winter, and wear extra sweaters HER3 Wash your clothes in cold water HER4 Use more expensive but more energy efficient light bulbs HER5 Lower thermostat before leaving HER6 Turn off thermostat when absent HER 7 Use dishwasher while not full HER 8 Leave lights on in unoccupied rooms ***Water use reduction*** – *WR* (Marandu *et al*., 2010) WR1 Save water when washing a car: by using a bucket or putting a spray nozzle on the end of your hose to prevent the hose from continuously releasing water. WR2 Wait until having a full load for laundry. WR3 Turning the shower off while soaping or shampooing.

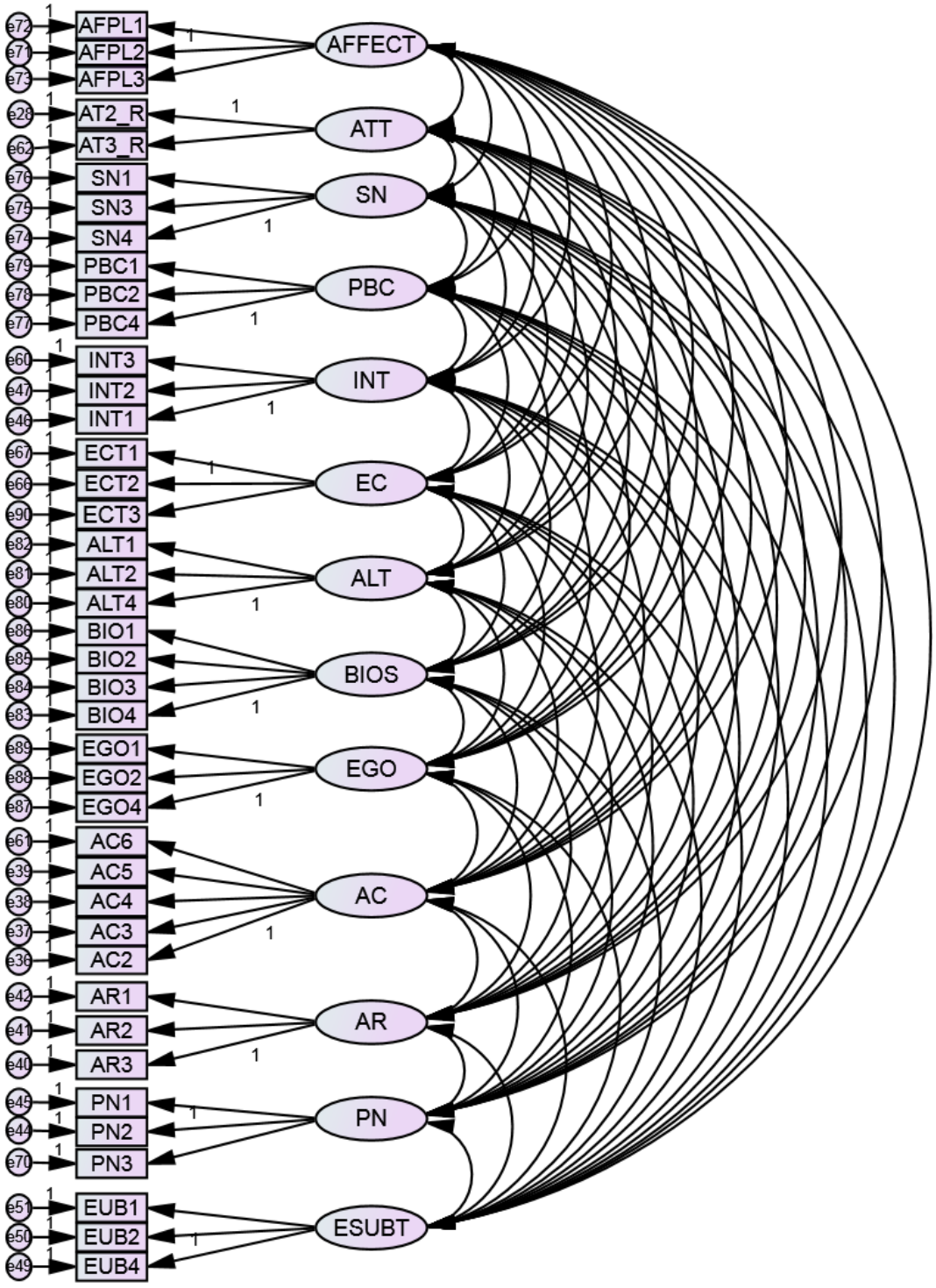
B.2. Rotated component matrix and parcels for environmental concern construct: (1) Balance of nature (ECT1), (2) Limits to growth (ECT2) and (3) Humans over nature (ECT3). Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Parcels for Environmental Concern Usage Behavior				
Items	**Component**			**PARCELS**
	1	2	3	
EC15	**.833**			ECT3
EC5	**.765**			
EC3	**.707**		.372	
EC11	**.696**			
EC1	**.689**	.319		
EC13	**.668**			
EC9	**.557**		.356	
EC10_R	.519	**.393**	.344	ECT2
EC4_R		**.769**		
EC6_R		**.767**		
EC14_R		**.684**	.334	
EC12_R			**.737**	ECT1
EC2_R		.480	**.674**	
EC7	.462		**.672**	

B.3. Rotated component matrix for environmental sensitive usage construct: (1) Transportation (EBUT1) and (2) Household energy use (EUBT2). Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrix - Usage			
Items	**Component**		**Usage Behaviors**
	1	2	
EUB1		**.706**	EUBT1
EUB2		**.845**	
EUB4		**.845**	
EUB5	**.637**		EUBT2
EUB6	**.623**	.300	
EUB7	**.602**		
EUB8	**.598**		
EUB9	**.780**		
EUB10	**.611**		

B.4: Study III final measurement model - Transportation.



B.5. Measurement items, reliability, and validity table of Transportation. The table presents the number of items for each construct, mean and standard deviations, Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Squared Variance (MSV), and Average Shared Squared Variance (ASV) of all factors.

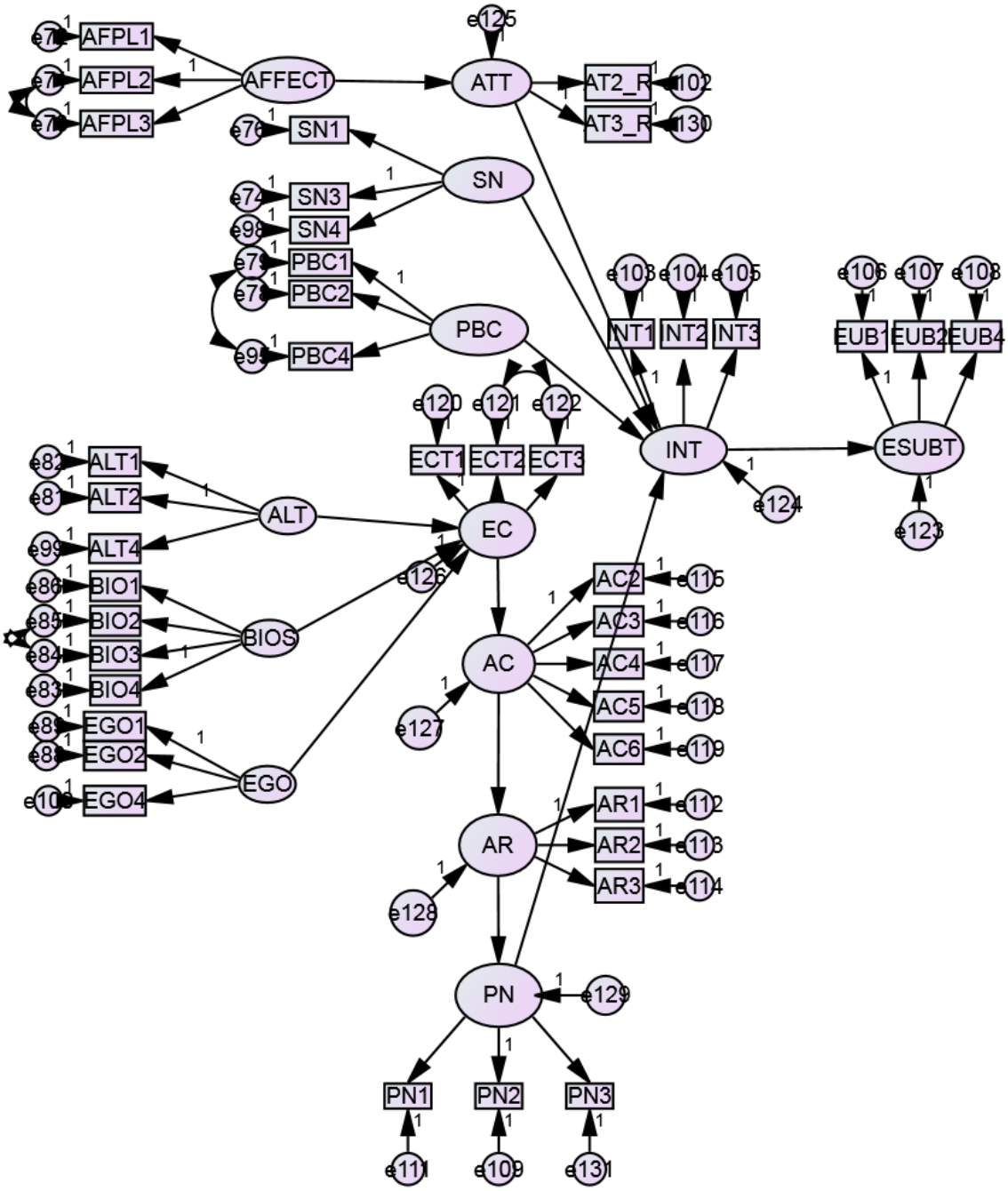
STUDY III - Transportation								
	# of item	**Mean**	**SD**	**Cronb. α**	**CR**	**AVE**	**MSV**	**ASV**
PBC	3	4.902	1.184	0.804	0.822	0.613	0.635	0.315
ATT	2	4.615	1.471	0.828	0.831	0.711	0.446	0.225
EC	3	4.828	1.002	0.783	0.792	0.566	0.468	0.273
INT	3	5.214	1.355	0.956	0.956	0.88	0.635	0.381
AR	3	4.83	1.213	0.822	0.83	0.62	0.629	0.333
PN	3	5.048	1.309	0.866	0.867	0.685	0.834	0.388
ESUB-T	3	3.634	1.467	0.743	0.75	0.501	0.348	0.172
AC	5	5.484	0.98	0.928	0.93	0.727	0.452	0.303
AFF	3	5.143	1.24	0.924	0.928	0.81	0.834	0.333
SN	3	4.289	1.403	0.9	0.902	0.755	0.359	0.215
ALT	3	5.674	1.093	0.812	0.825	0.614	0.353	0.167
BIOS	4	5.432	1.257	0.93	0.931	0.771	0.49	0.321
EGO	3	3.205	1.459	0.802	0.81	0.592	0.072	0.016

B.6: Study III – Transportation Factor Correlation Matrix.

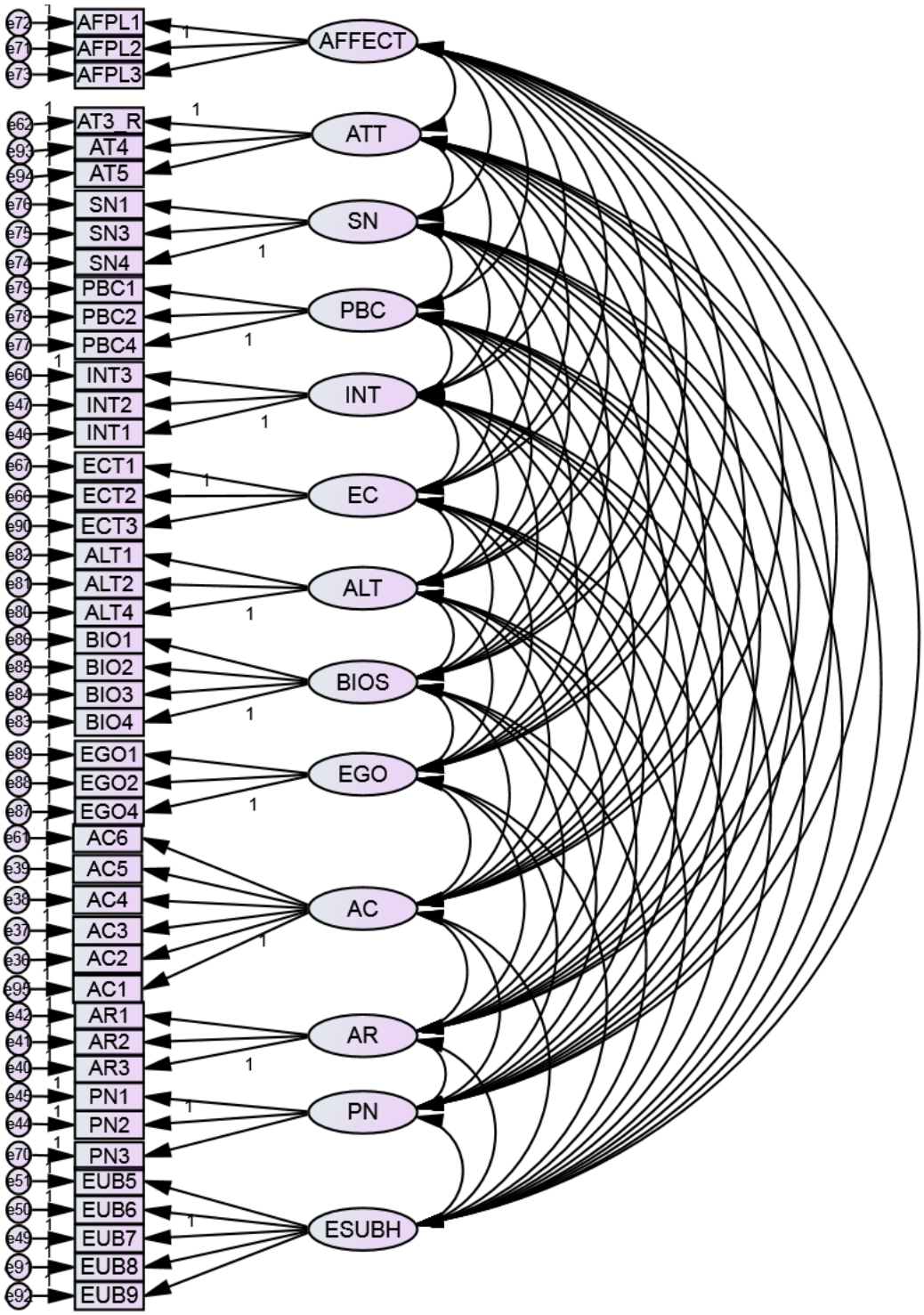
	PBC	ATT	EC	INT	AR	PN	ESUB-T	AC	AFF	SN	ALT	BIOS	EGO
PBC	1.000												
ATT	0.634**	1.000											
EC	0.506**	0.454**	1.000										
INT	0.797**	0.668**	0.544**	1.000									
AR	0.545**	0.471**	0.684**	0.676**	1.000								
PN	0.596**	0.520**	0.657**	0.719**	0.793**	1.000							
ESUB-T	0.559**	0.440**	0.382**	0.590**	0.353**	0.410**	1.000						
AC	0.591**	0.428**	0.672**	0.637**	0.656**	0.642**	0.421**	1.000					
AFF	0.61**	0.512**	0.508**	0.679**	0.642**	0.913**	0.387**	0.627**	1.000				
SN	0.592**	0.399**	0.337**	0.599**	0.533**	0.57**	0.458**	0.407**	0.518**	1.000			
ALT	0.349**	0.296**	0.364**	0.475**	0.467**	0.455**	0.310**	0.501**	0.425**	0.328**	1.000		
BIOS	0.562**	0.512**	0.669**	0.626**	0.668**	0.700**	0.373**	0.621**	0.624**	0.481**	0.594**	1.000	
EGO	-0.100	-0.043	-0.269**	-0.156	-0.080	-0.127	-0.035	-0.162	-0.114	-0.021	-0.142	-0.029	1.000

Note: ** Correlation is significant at the 0.01 level.

B.7: Structural Equation Modeling output for environmentally sensitive transportation behavior using AMOS 22.0.



B.8: Study III final measurement model – Household energy use.



B.9. Measurement items, reliability, and validity table of Household Energy Use. The table presents the number of items for each construct, mean and standard deviations, Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Squared Variance (MSV), and Average Shared Squared Variance (ASV) of all factors.

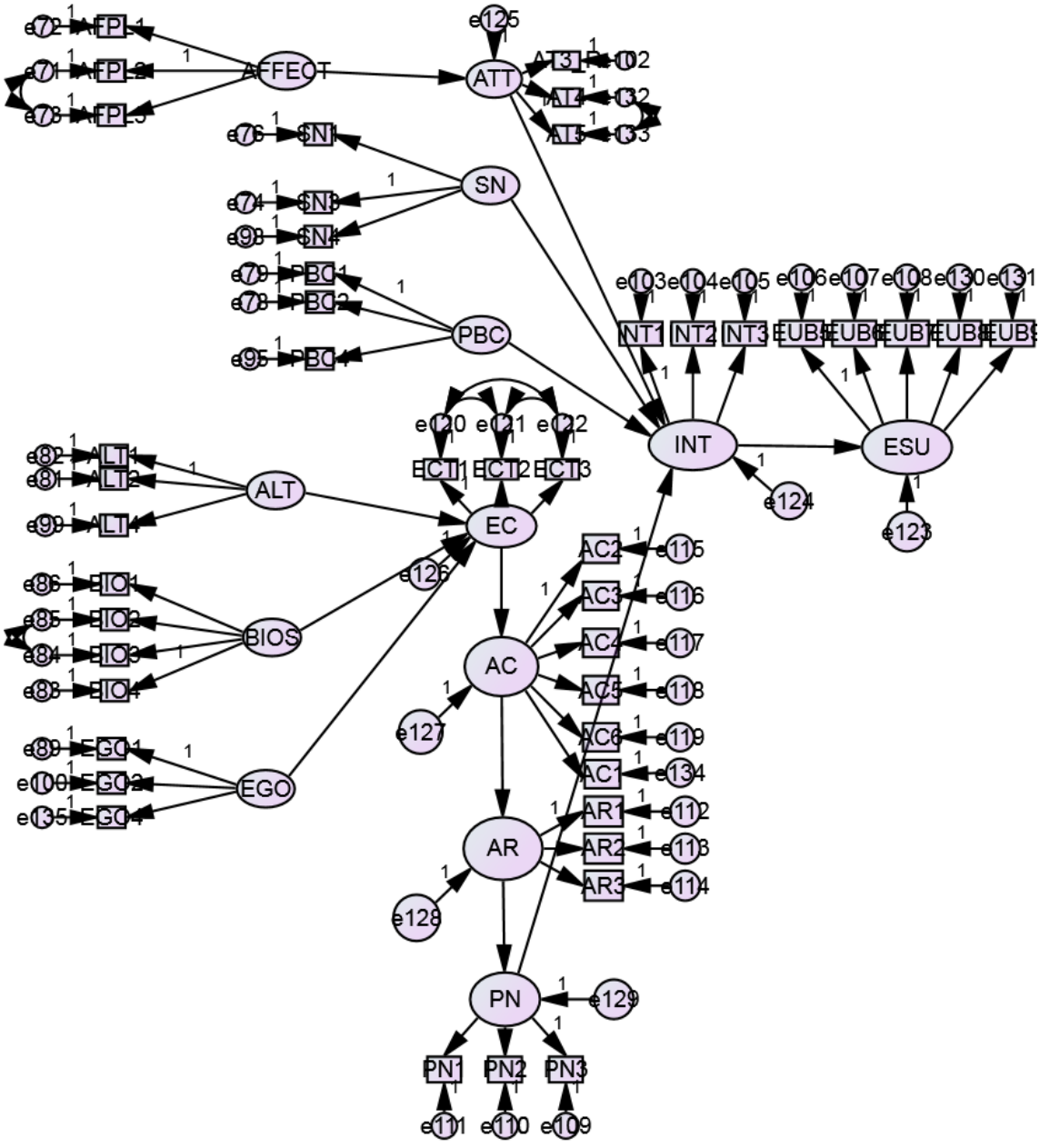
STUDY III - Household Energy Use								
	# of item	**Mean**	**SD**	**Cronb. α**	**CR**	**AVE**	**MSV**	**ASV**
PBC	3	4.902	1.184	0.804	0.823	0.614	0.635	0.328
ATT	3	5.369	1.106	0.737	0.783	0.552	0.776	0.497
EC	3	4.828	1.002	0.873	0.792	0.566	0.618	0.317
AFFECT	3	5.143	1.24	0.924	0.928	0.81	0.834	0.359
SN	3	4.289	1.403	0.9	0.902	0.756	0.359	0.217
ALT	3	5.674	1.092	0.812	0.824	0.614	0.352	0.193
BIOS	4	5.432	1.257	0.93	0.931	0.771	0.563	0.352
EGO	3	3.205	1.459	0.802	0.81	0.592	0.071	0.025
INT	3	5.214	1.355	0.956	0.956	0.88	0.776	0.424
ESUB-H	5	5.07	1.1	0.708	0.71	0.33	0.516	0.265
PN	3	5.048	1.309	0.866	0.867	0.686	0.834	0.429
AR	3	4.83	1.213	0.822	0.831	0.621	0.629	0.376
AC	6	5.474	0.983	0.932	0.935	0.707	0.711	0.369

B.10: Study III Household Energy Use Factor Correlation Matrix.

	PBC	ATT	EC	AFFECT	SN	ALT	BIOS	EGO	INT	ESUBH	PN	AR	AC
PBC	1.000												
ATT	0.759**	1.000											
EC	0.504**	0.786**	1.000										
AFFECT	0.609**	0.683**	0.509**	1.000									
SN	0.592**	0.488**	0.337**	0.518**	1.000								
ALT	0.347**	0.565**	0.365**	0.425**	0.327**	1.000							
BIOS	0.561**	0.750**	0.668**	0.625**	0.481**	0.593**	1.000						
EGO	-0.097	-0.250	-0.266**	-0.114	-0.023	-0.143	-0.030	1.000					
INT	0.797**	0.881**	0.544**	0.680**	0.599**	0.475**	0.627**	-0.157	1.000				
ESUBH	0.543**	0.675**	0.482**	0.495**	0.388**	0.427**	0.437**	-0.228	0.718**	1.000			
PN	0.595**	0.773**	0.656**	0.913**	0.571**	0.455**	0.701**	-0.128	0.720**	0.550**	1.000		
AR	0.543**	0.764**	0.683**	0.642**	0.534**	0.466**	0.669**	-0.081	0.676**	0.510**	0.793**	1.000	
AC	0.600**	0.843**	0.695**	0.641**	0.421**	0.505**	0.632**	-0.166	0.652**	0.542**	0.663**	0.669**	1.000

Note: ** Correlation is significant at the 0.01 level.

B.11: Structural Equation Modeling output for environmentally sensitive household energy use behavior using AMOS 22.0.



APPENDIX C

C.1: Study IV measurement items (environmentally sensitive post-use behavior).

Sociodemographics	Education, Estimated household annual income, Gender, Age, Location, Race/ Ethnicity
Affect (AFESPU) (Russell, 1980; Bigne *et al.*, 2005; Steg, 2005)	AFESPU1 Recycling, reusing, and reducing materials/products are giving me a feeling of satisfaction. AFESPU2 When I recycle, reuse, and reduce materials/products, I feel happy. AFESPU3 Recycling, reusing, and reducing materials/products are giving me a feeling of pleasure.
Personal Norms (PNESPU) Abrahamse & Steg, 2011; Abrahamse *et al.*, 2009)	PNESPU1 I feel morally obliged to recycle, reuse, and reduce materials/products regardless of what other people do. PNESPU2 I feel guilty when I do not recycle, reuse, or reduce materials/products. PNESPU3 I would consider myself a better person if I recycle, reuse, and reduce materials/products.
Ascription of Responsibility (ARESPU) (Abrahamse *et al.*, 2009; Abrahamse & Steg, 2011)	ARESPU1 I feel personally responsible for the problems resulting from my post-use behavior that is not environmentally sensitive. ARESPU2 My post-use behavior that is not environmentally sensitive contributes to environmental problems. ARESPU3 I take joint responsibility for environmental problems
Awareness of Consequences (ACESPU) (Abrahamse *et al*., 2009; Abrahamse & Steg, 2011; Stern *et al.*, 1999)	ACESPU1 Not engaging in environmentally sensitive post-use behavior is problem for environment. ACESPU2 Engaging in environmentally sensitive post-use behavior contributes to a reduction of the environmental problems. ACESPU3 Engaging in environmentally sensitive post-use behavior contributes to habitat conservation. ACESPU4 Engaging in environmentally sensitive post-use behavior contributes to improving ability to meet environmental goals. ACESPU5 Engaging in environmentally sensitive post-use behavior contributes to improving individuals' safety and health. ACESPU6 Environmentally sensitive post-use behavior can help improving environmental conditions.
Environmental Concern (EC) **(**Dunlap *et al*., 2000) *(New Environmental Paradigm- NEP)*	EC 1.We are approaching the limit of the number of people the earth can support. EC 2.Humans have the right to modify the natural environment to suit their needs. EC 3.When humans interfere with nature, it often produces disastrous consequences. EC 4.Human ingenuity will insure that we do NOT make the earth unlivable. EC 5.Humans are severely abusing the environment. EC 6.The earth has plenty of natural resources if we just learn how to develop them. EC 7.Plants and animals have as much right as humans to exist. EC 8.The balance of nature is strong enough to cope with the impacts of modern industrial nations. EC 9.Despite our special abilities humans are still subject to the laws of nature. EC 10.Human destruction of the natural environment has been greatly exaggerated. EC 11.The earth has only limited room and resources. EC 12.Humans were meant to rule over the rest of nature. EC 13.The balance of nature is very delicate and easily upset.

	EC 14.Humans will eventually learn enough about how nature works to be able to control it. EC 15.If things continue on their present course, we will soon experience a major ecological disaster.
Values (VL) (Stern *et al.*, 1998; Steg *et al*., 2011)	***Altruistic:*** VL1 Social justice, correcting injustice, care for the weak VL2 Equality, equal opportunity for all VL3 A world of peace, free of war and conflict VL4 Helpful ***Biospheric:*** VL5 Preventing pollution, conserving natural resources VL6 Unity with nature, fitting into nature VL7 Respecting the earth, harmony with other species VL8 Protecting the environment, preserving nature ***Egoistic:*** VL9 Social power, control over others, dominance VL10 Influential, having an impact on people and events VL11 Wealth, material possessions, money VL12 Authority, the right to lead or command VL13 Ambitious
Perceived Behavioral Control (PBCESPU) **(**Abrahamse and Steg, 2011; Tonglet *et al.*, 2004)	PBCESPU1 I can engage in environmentally sensitive post-use behavior easily. PBCESPU2 I have plenty of opportunities to engage in environmentally sensitive post-use behavior. PBCESPU3 Environmentally sensitive post-use behavior is inconvenient. PBCESPU4 I have been provided satisfactory resources to engage in environmentally sensitive post-use behavior. PBCESPU5 I know which materials/products are recyclable, reusable, and reducible. PBCESPU6 I know when and where I can recycle, reuse, reduce materials/products.
Subjective Norm (SNESPU) **(**Tonglet *et al.*, 2004; Abrahamse & Steg, 2011)	SNESPU1 Most people who are important to me think that I should engage in environmentally post-use behavior. SNESPU2 Most people who are important to me would approve of me engaging in environmentally sensitive post-use behavior. SNESPU3 My household/family members think I ought to be engaging in environmentally sensitive post-use behavior. SNESPU4 My friends/colleagues think I ought to be engaging in environmentally sensitive post-use behavior.
Attitudes (ATESPU) **(**Abrahamse & Steg, 2011; Smith *et al.*, 1994)	ATESPU1 Environmentally sensitive post-use (i.e., recycling, reusing products, reducing waste) is too much of a hassle. ATESPU2 Environmentally sensitive post-use means I have to live less comfortably ATESPU3 Environmentally sensitive post-use will restrict my freedom ATESPU4 Environmentally sensitive post-use is valuable ATESPU5 Environmentally sensitive post-use is necessary
Intention (IESPU) **(**Ajzen, 2002; Fishbein & Ajzen, 2010)	IESPU1 I intend to engage in post-use behavior that are environmentally sensitive in the forthcoming months IESPU2 I will try to engage in post-use behavior that are environmentally sensitive in the forthcoming months IESPU3 I expect to engage in post-use behavior that are environmentally sensitive in the forthcoming months

Environmentally Sensitive Post-use (ESPU) Behavior (Barr, 2007)	***Reducing household waste*** – RED (Barr, 2007) RED1 Make special effort to buy produce with as little packaging as possible? RED2 Use your own bag when going shopping, rather than one provided by the shop? RED3 Look for packaging that can be easily re-used or recycled? RED4 Buy products that can be used again, rather than disposable items? ***Reusing household items*** - REU (Barr, 2007) REU1 Try to repair things before buying new items REU2 Reuse paper REU3 Reuse glass bottles and jars REU4 Wash and reuse dishcloths rather than buying them new REU5 Reuse old plastic containers, like margarine tubs ***Recycling*** – REC (Barr, 2007) REC1 Recycle glass REC2 Recycle newspaper/magazines REC3 Recycle food/drink cans REC4 Recycle junk mail REC5 Recycle cardboard REC6 Recycle plastic bottles

C.2. Rotated component matrix and parcels for environmental concern construct: (1) Balance of nature (ECT1), (2) Limits to growth (ECT2) and (3) Humans over nature (ECT3). Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

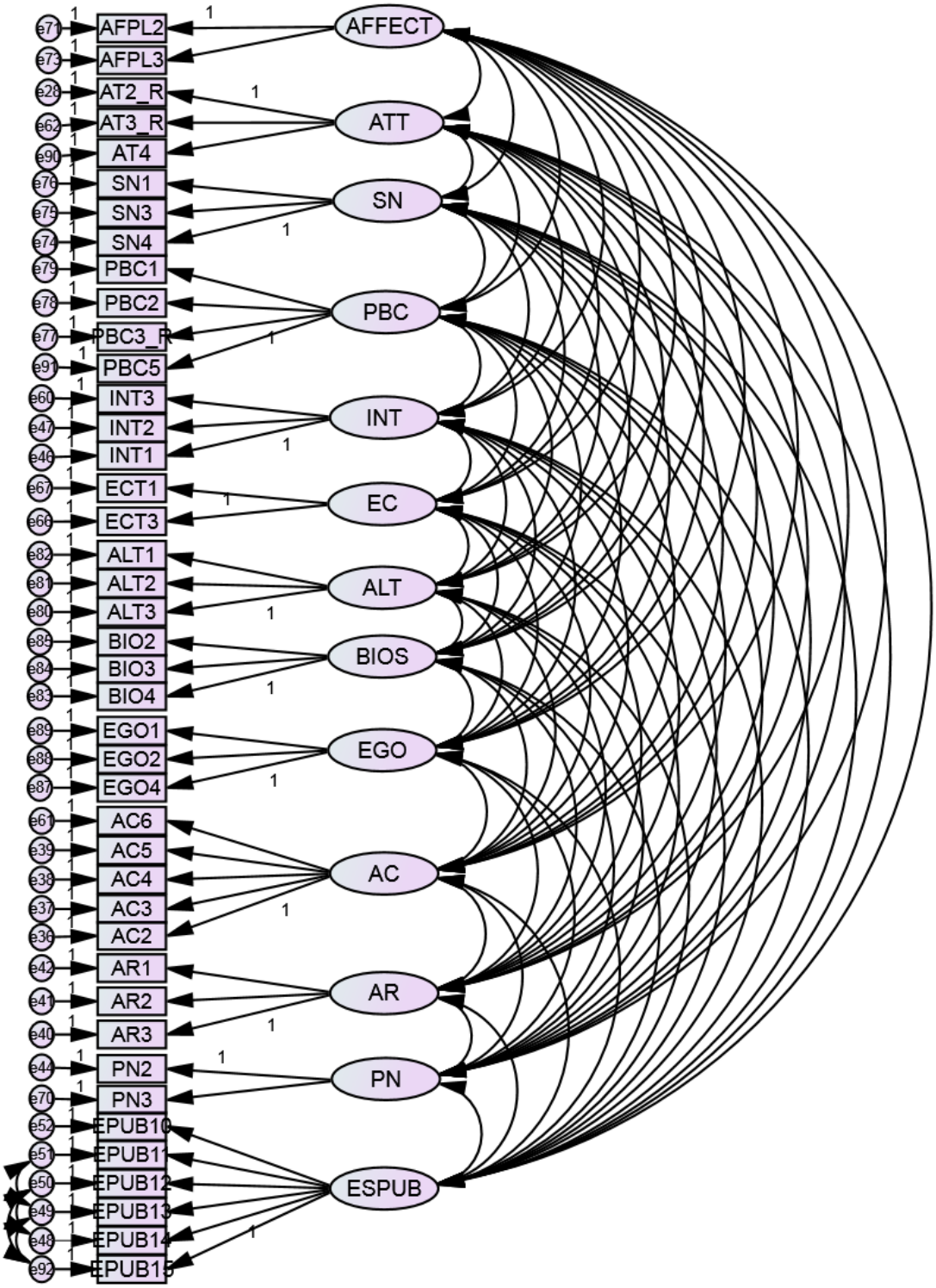
Parcels for Environmental Concern Post-use Behavior				
Items	**Component**			**PARCELS**
	1	2	3	
EC1	**.825**			
EC15	**.720**			
EC5	**.703**		.499	ECT3
EC3	**.696**			
EC11	**.574**			
EC4_R		**.807**		
EC14_R		**.764**		
EC6_R	.411	**.674**		ECT2
EC2_R		**.641**		
EC8_R	.469	**.567**		
EC7			**.800**	
EC12_R		.482	**.609**	
EC9			**.580**	ECT1
EC10_R	.409		**.549**	
EC13	.419		**.432**	

C.3. Rotated component matrix for environmental sensitive post-use construct: (1) Reduce (ESBUP1), (2) Reuse (ESPUB2), and (3) Recycling (ESPUB3). Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrix Post-use Behavior				
Items	**Component**			**PARCELS**
	1	2	3	
EPUB1		**.821**		ESPUB1 (Reduce)
EPUB2		**.669**		
EPUB3	.366	**.756**		
EPUB4		**.629**	.425	
EPUB5			**.748**	ESPUB2 (Reuse)
EPUB6		.359	**.605**	
EPUB7		.389	**.625**	
EPUB8			**.718**	
EPUB9			**.681**	
EPUB10	**.876**			ESPUB3 (Recycling)
EPUB11	**.855**			
EPUB12	**.832**			
EPUB13	**.772**	.344		
EPUB14	**.823**	.326		
EPUB15	**.873**			

Note: ESPUB, environmentally sensitive post-use behavior

C.4: Study IV final measurement model – Recycling.



C.5. Measurement items, reliability, and validity table of Post-use Behavior-Recycling. The table presents the number of items for each construct, mean and standard deviations, Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Squared Variance (MSV), and Average Shared Squared Variance (ASV) of all factors.

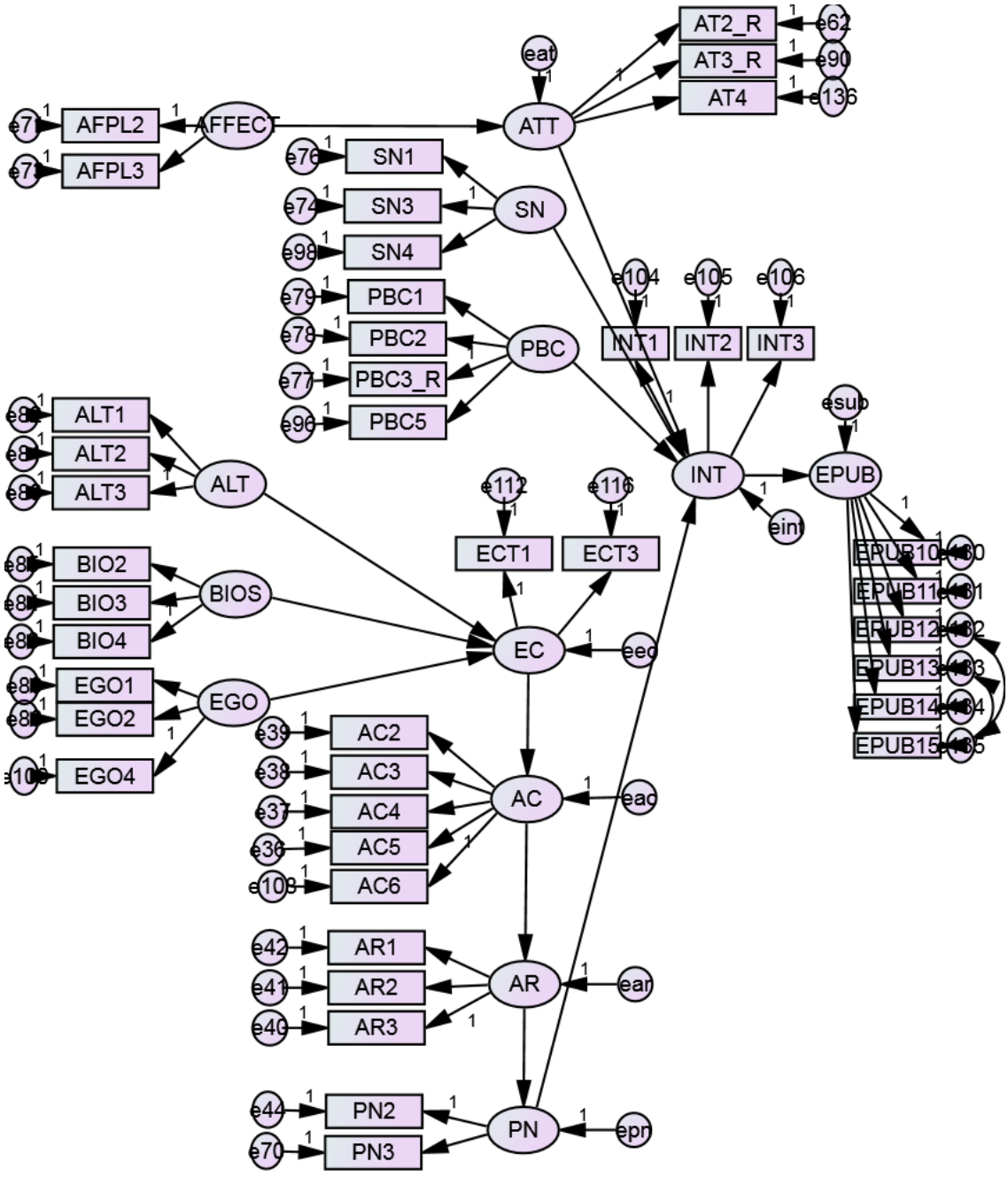
STUDY IV - Recycling								
	# of item	**Mean**	**SD**	**Cronb. α**	**CR**	**AVE**	**MSV**	**ASV**
PBC	3	5.22	1.302	0.852	0.866	0.622	0.579	0.284
ATT	3	5.691	1.145	0.841	0.856	0.667	0.493	0.239
EC	2	5.253	0.964	0.813	0.819	0.694	0.503	0.294
INT	3	5.558	1.274	0.957	0.957	0.88	0.579	0.351
AR	3	4.772	1.272	0.776	0.78	0.543	0.637	0.305
PN	2	5.148	1.366	0.761	0.77	0.627	0.637	0.356
ESPUB	6	5.053	1.737	0.937	0.938	0.715	0.477	0.194
AC	5	5.66	0.903	0.939	0.939	0.754	0.48	0.296
AFFECT	2	5.148	1.21	0.911	0.915	0.843	0.608	0.234
SN	3	4.764	1.355	0.884	0.884	0.718	0.448	0.224
ALT	3	5.668	1.065	0.797	0.81	0.589	0.326	0.156
BIOS	3	5.434	1.243	0.916	0.922	0.799	0.51	0.294
EGO	3	3.178	1.39	0.77	0.783	0.558	0.131	0.048

C.6: Study IV Recycling Factor Correlation Matrix.

	PBC	ATT	EC	INT	AR	PN	ESPUB	AC	AFFECT	SN	ALT	BIOS	EGO
PBC	1.000												
ATT	0.688**	1.000											
EC	0.484**	0.518**	1.000										
INT	0.761**	0.702**	0.598**	1.000									
AR	0.384**	0.436**	0.709**	0.548**	1.000								
PN	0.54**	0.472**	0.640**	0.651**	0.798**	1.000							
ESPUB	0.640**	0.366**	0.360**	0.691**	0.427**	0.503**	1.000						
AC	0.572**	0.576**	0.693**	0.621**	0.591**	0.640**	0.303**	1.000					
AFFECT	0.481**	0.376**	0.485**	0.477**	0.539**	0.780**	0.370**	0.630**	1.000				
SN	0.575**	0.434**	0.312**	0.669**	0.531**	0.566**	0.588**	0.397**	0.438**	1.000			
ALT	0.320**	0.384**	0.496**	0.388**	0.459**	0.419**	0.141	0.442**	0.272**	0.353**	1.000		
BIOS	0.503**	0.486**	0.659**	0.56**	0.714**	0.704**	0.383**	0.587**	0.503**	0.441**	0.571**	1.000	
EGO	-0.170*	-0.212*	-0.362**	-0.226**	-0.248**	-0.155	-0.006	-0.289**	-0.159*	-0.074	-0.315**	-0.132	1.000

Note: ** Correlation is significant at the 0.01 level.

C.7: Structural Equation Modeling output for environmentally sensitive post-use behavior using AMOS 22.0.



APPENDIX D

D.1: Environmentally Sensitive Purchase Survey.

*** Required Information**

page 1

*** 1. Dear Respondent, You are invited to take part in a study on environmental behaviors. With this study, we want to learn the root causes of people's behaviors that can affect the environment. By learning this, we can help reduce the human impacts on the environmental well-being. If you decide to be a part of this study, please complete the following survey. Finishing the survey will be your consent to participate in this research study. The survey is designed to learn about your behaviors that can affect the environment. It covers questions to understand if these behaviors are more strongly dependent on moral considerations, feelings, or self-interest motives. Also, you will be asked to answer questions about your general values, beliefs, and norms. The survey will take about 15-20 minutes of your time. No direct benefits accrue to you for answering the survey. However, your answers to this survey will help protect the environment in the long run. Data will be collected using the Internet. We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet. However, you may feel emotional discomfort when answering questions related to social norms and approvals. Your responses will not be identified with you personally. Though we are taking precautions to protect your privacy, you should be aware that information sent through email could be read by a third party. Your participation is entirely voluntary. It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you. Leaving the study will not result in any penalty. Please feel free to ask questions regarding this study. You may contact me at onelgarmkhb1@mail.montclair.edu or (973) 655-7037, or my faculty advisor, Prof. Avinandan Mukherjee, at mukherjeeav@mail.montclair.edu or (973) 655-5126 if you have additional questions. Any questions about your rights may be directed to Dr. Katrina Bulkley, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-5189. Thank you for your time. Sincerely, Naz Onel Ph.D. Candidate, Environmental Management. Earth and Environmental Studies, College of Science and Mathematics. Montclair State University, Montclair, NJ 07043, USA. By clicking the link below, I confirm that I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age. Please feel free to print a copy of this consent. The**

study has been approved by the Montclair State University Institutional Review Board as study #001391 on 09/04/2013. (Select one option)

◯ I agree to participate (click next to go to survey) ◯ I decline (link to close webpage)

I agree to participate (click next to go to survey):Go to Page No. 2
I decline (link to close webpage): Stop, you have finished the survey

page 2

Please answer each of the following questions by clicking the option that best describe your preference or opinion.

2. How often do you make a special effort to buy fruits and vegetables grown without pesticides or chemicals; also known as organic fruits and vegetables? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

3. How often do you avoid purchasing products that are harmful to the environment? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

4. How often do you make a special effort to purchase products that are not tested on animals? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

5. How often do you make a special effort to buy household chemicals such as detergent and cleaning solutions that are environmentally friendly? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

6. How often do you make a special effort to buy paper and plastic products that are made from recycled materials? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

page 3

Following section has questions related to "Environmentally Sensitive Purchasing", which is defined as: "Purchase of goods and services that has minimal or reduced environmental impacts compared with competing products that serve the same purpose."

7. Environmentally sensitive purchase (e.g. buying fruits and vegetables grown without pesticides or chemicals, environmentally-friendly detergents, organically grown products, products that are not tested on animals, avoiding purchasing products that are harmful to the environment) is too much of a hassle. (Select one option)

◯ Strongly disagree ◯ Disagree ◯ Somewhat disagree ◯ Neutral ◯ Somewhat A
◯ Agree ◯ Strongly agree

8. Environmentally sensitive purchasing means I have to live less comfortably. (Select one option)

◯ Strongly disagree ◯ Disagree ◯ Somewhat disagree ◯ Neutral ◯ Somewhat Ag
◯ Agree ◯ Strongly agree

9. Environmentally sensitive purchases will restrict my freedom. (Select on

◯ Strongly disagree ◯ Disagree ◯ Somewhat disagree ◯ Neutral ◯ Somewhat Agre
◯ Agree ◯ Strongly agree

10. Environmentally sensitive buying is valuable. (Select one option)

◯ Strongly disagree ◯ Disagree ◯ Somewhat disagree ◯ Neutral ◯ Somewhat Agre
◯ Agree ◯ Strongly agree

11. Environmentally sensitive buying is necessary. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

12. I intend to purchase environmentally sensitive products in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

13. I will try to purchase environmentally sensitive products in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

14. I expect to purchase environmentally sensitive products in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

15. Most people who are important to me think that I should purchase environmentally sensitive products. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

16. Most people who are important to me would approve of me purchasing environmentally sensitive products. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

17. My household/family members think I ought to be purchasing environmentally sensitive products. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agre | Agree | Strongly agree

18. My friends/colleagues think I ought to be purchasing environmentally sensitive products. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat Agre
○ Agree ○ Strongly agree

page 4

19. I can find and purchase environmentally sensitive products easily. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

20. I have plenty of opportunities to purchase environmentally sensitive products. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

21. Purchasing environmentally sensitive products is inconvenient. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

22. Stores provide satisfactory resources to purchase environmentally sensitive products. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

23. I know which products are environmentally sensitive. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

24. I know where to find environmentally sensitive products. (Select one)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

page 5

Now we would like to get your opinion on a wide range of environmental issues. For ea of the following statements please indicate the extent to which you agree or disagree.

25. We are approaching the limit of the number of people the earth can support. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agre | Agree | Strongly agree

26. Humans have the right to modify the natural environment to suit their needs. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agre | Agree | Strongly agree

27. When humans interfere with nature, it often produces disastrous consequences. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agre | Agree | Strongly agree

28. Human ingenuity will insure that we do NOT make the earth unlivable. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agre | Agree | Strongly agree

29. Humans are severely abusing the environment. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agre | Agree | Strongly agree

30. The earth has plenty of natural resources if we just learn how to develop them. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

31. Plants and animals have as much right as humans to exist. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

32. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

33. Despite our special abilities humans are still subject to the laws of nature. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

34. Human destruction of the natural environment has been greatly exaggerated. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

35. The earth has only limited room and resources. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

36. Humans were meant to rule over the rest of nature. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

37. The balance of nature is very delicate and easily upset. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

38. Humans will eventually learn enough about how nature works to be able to control it. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

39. If things continue on their present course, we will soon experience a major ecological disaster. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

page 6

40. Pesticides and chemicals used in fruits and vegetables are problem for environment. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

41. Environmentally sensitive purchases contribute to a reduction of the environmental problems. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

42. Environmentally sensitive purchases contribute to habitat conservation. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

43. Environmentally sensitive purchases contribute to improving ability to meet environmental goals. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

44. Environmentally sensitive purchases contribute to improving individuals' safety and health. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat ag
○ Agree ○ Strongly agree

45. Organically grown product consumption can help improving environmental conditions. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

46. I feel personally responsible for the problems resulting from my non-ecofriendly product purchases. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

47. My non-ecofriendly purchases contribute to environmental problems. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

48. I take joint responsibility for environmental problems. (Select one optior

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

49. I feel knowledgeable about the causes of environmental problems. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat ag

Agree Strongly agree

50. I feel knowledgeable about the solutions to environmental problems. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

page 7

51. I feel morally obliged to purchase environmentally sensitive products, regardless of what other people do. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

52. I feel guilty when I purchase environmentally harmful products. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

53. I would consider myself a better person if I purchase environmentally sensitive products. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

54. Purchasing environmentally sensitive products is giving me a feeling of satisfaction. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

55. When I purchase environmentally sensitive products, I feel happy. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agre
Agree Strongly agree

56. Purchasing environmentally sensitive products is giving me a feeling of pleasure. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

57. I feel calm when I purchase environmentally sensitive products. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

58. I feel peaceful when I purchase environmentally sensitive products. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

59. Purchasing environmentally sensitive products is making me feel relaxed. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agre
○ Agree ○ Strongly agree

page 8

Please rate the importance of following 13 items "as a guiding principle in your life".Choose only one answer for each that best represents your view and try to vary the scores.

60. Social justice, correcting injustice, care for the weak. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important
○ Very important ○ Extremely important

61. Equality, equal opportunity for all. (Select one option)

○ Not at all ○ Low importance ○ Slightly ○ Neutral ○ Moderately

important important important

○ Very important ○ Extremely important

63. Being helpful. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

64. Preventing pollution, conserving natural resources. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

65. Unity with nature, fitting into nature. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

66. Respecting the earth, harmony with other species. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

67. Protecting the environment, preserving nature. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

68. Social power, control over others, dominance. (Select one option)

○ Not at all important ○ Low importance ○ Slightly important ○ Neutral ○ Moderately important

○ Very important ○ Extremely important

69. Influential, having an impact on people and events. (Select one option)

- Not at all important
- Low importance
- Slightly important
- Neutral
- Moderately important
- Very important
- Extremely important

70. Wealth, material possessions, money. (Select one option)

- Not at all important
- Low importance
- Slightly important
- Neutral
- Moderately important
- Very important
- Extremely important

71. Authority, the right to lead or command. (Select one option)

- Not at all important
- Low importance
- Slightly important
- Neutral
- Moderately important
- Very important
- Extremely important

72. Being ambitious. (Select one option)

- Not at all important
- Low importance
- Slightly important
- Neutral
- Moderately important
- Very important
- Extremely important

page 9

Please fill out the following demographic questions which will be used only for the purpose of the study.

73. Education: (Select one option)

- Less than High School
- High School
- Some College
- Bachelor's degree
- Master's degree
- PhD

○ Professional

74. Estimated household annual income: (Select one option)

○ Less than $20,000 ○ $20,000-$40,000 ○ $40,000-$70,000 ○ $70,000-$100,000 ○ $100,000-$150,000
○ $150,000-$200,000 ○ More than $200,000

75. Age: (Select one option)

○ 18 to 24 ○ 25 to 34 ○ 35 to 44 ○ 45 to 54 ○ 55 to 64
○ 65 to 74 ○ 75 or older

76. Gender and Location

(a)	Gender (Select one option)
	○ Male ○ Female
(b)	City/Town
	_____ _____
(c)	State/Province
	_____ _____
(d)	Country (Select one option)

77. Race/Ethnicity (Select one option)

○ American Indian and Alaska Native ○ Asian ○ Black or African American ○ Hispanic or Latino ○ Mult Race
○ Native Hawaiian and Other Pacific Islander ○ White

Thank you for your participation in this study.

D.2: Environmentally Sensitive Usage Survey.

*** Required Information**

page 1

*** 1. Dear Respondent, You are invited to take part in a study on environmental behaviors. With this study, we want to learn the root causes of people's behaviors that can affect the environment. By learning this, we can help reduce the human impacts on the environmental well-being. If you decide to be a part of this study, please complete the following survey. Finishing the survey will be your consent to participate in this research study. The survey is designed to learn about your behaviors that can affect the environment. It covers questions to understand if these behaviors are more strongly dependent on moral considerations, feelings, or self-interest motives. Also, you will be asked to answer questions about your general values, beliefs, and norms. The survey will take about 15-20 minutes of your time. No direct benefits accrue to you for answering the survey. However, your answers to this survey will help protect the environment in the long run. Data will be collected using the Internet. We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet. However, you may feel emotional discomfort when answering questions related to social norms and approvals. Your responses will not be identified with you personally. Though we are taking precautions to protect your privacy, you should be aware that information sent through email could be read by a third party. Your participation is entirely voluntary. It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you. Leaving the study will not result in any penalty. Please feel free to ask questions regarding this study. You may contact me at onelgarmkhb1@mail.montclair.edu or (973) 655-7037, or my faculty advisor, Prof. Avinandan Mukherjee, at mukherjeeav@mail.montclair.edu or (973) 655-5126 if you have additional questions. Any questions about your rights may be directed to Dr. Katrina Bulkley, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-5189. Thank you for your time. Sincerely, Naz Onel Ph.D. Candidate, Environmental Management. Earth and Environmental Studies, College of Science and Mathematics. Montclair State University, Montclair, NJ 07043, USA. By clicking the link below, I confirm that I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age. Please feel free to print a copy of this consent. The study has been approved by the Montclair State University Institutional Review Board as study #001391 on 09/04/2013.** (Select one option)

○ I agree to participate (click next to go to survey) ○ I decline (link to close webpage)

I agree to participate (click next to go to survey):Go to Page No. 2
I decline (link to close webpage): Stop, you have finished the survey

page 2

Please answer each of the following questions by clicking the option that best describe your preference or opinion.

2. How often do you cut back on driving a car for environmental reasons? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

3. How often do youuse public transportation whenever that option is available? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

4. How often do youdrive your car more slowly? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

5. How often do youwalk rather than driving to a store that is just a few blocks away? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

6. How often do youturn off all lights before leaving the house? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often

Very often Always

7. How often do youturn down the heat a little in winter, and wear extra sweaters? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

9. How often do youuse more expensive but more energy efficient light bulbs? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

10. How often do youlower thermostat before leaving the house? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

11. How often do youturn off thermostat when absent? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

12. How often do youuse dishwasher while not full? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

13. How often do youleave lights on in unoccupied rooms? (Select one optio

Never Very rarely Rarely Sometimes Often
Very often Always

14. How often do yousave water when washing a car: by using a bucket or putting a spray nozzle on the end of your hose to prevent the hose from continuously releasing water? (Select one option)

Never Very rarely Rarely Sometimes Often

Very often Always

15. How often do youwait until having a full load for laundry? (Select one option)

Never Very rarely Rarely Sometimes Often

Very often Always

16. How often do youturn the shower off while soaping or shampooing? (Select one option)

Never Very rarely Rarely Sometimes Often

Very often Always

page 3

Following section has questions related to "Environmentally Sensitive Usage", which is defined as: "using products and services, such as automobile, household energy, and water in a way that has the least environmental impact."

17. Environmentally sensitive usage (e.g. cutting back on driving a car for environmental reasons, household energy use reduction, water use reduction) is too much of a hassle. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree

Agree Strongly agree

18. Environmentally sensitive usage means I have to live less comfortably. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree

Agree Strongly agree

19. Environmentally sensitive usage will restrict my freedom. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree
Agree | Strongly agree

20. Environmentally sensitive usage is valuable. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree
Agree | Strongly agree

21. Environmentally sensitive usage is necessary. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree
Agree | Strongly agree

22. I intend to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree
Agree | Strongly agree

23. I will try to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree
Agree | Strongly agree

24. I expect to use my car, household items and energy in an environmentally sensitive fashion in the forthcoming months. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly agree

25. Most people who are important to me think that I should use my car, household items and energy in an environmentally sensitive way.

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly agree

26. Most people who are important to me would approve of me using my c household items and energy in an environmentally sensitive way. (Select

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly agree

27. My household/family members think I ought to be using my car, household items and energy in an environmentally sensitive way. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly agree

28. My friends/colleagues think I ought to be using my car, household items and energy in an environmentally sensitive way. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly agree

page 4

29. I can use my car, household items and energy in an environmentally sensitive way easily. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

30. I have plenty of opportunities to use my car, household items and energy in an environmentally sensitive way. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

31. Using my car, household items and energy in an environmentally sensitive way is inconvenient. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

32. I am being provided satisfactory resources to use my car, household items and energy in an environmentally sensitive way. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

33. I know how to use my car, household items and energy in an environmentally sensitive way. (Select one option)

○ Strongly disagree ○ Disagree ○ Somewhat disagree ○ Neutral ○ Somewhat agree
○ Agree ○ Strongly agree

34. I know when and where to use my car, household items and energy in an environmentally sensitive way. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

page 5

Now we would like to get your opinion on a wide range of environmental issues. For ea of the following statements please indicate the extent to which you agree or disagree.

35. We are approaching the limit of the number of people the earth can support. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

36. Humans have the right to modify the natural environment to suit their needs. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

37. When humans interfere with nature, it often produces disastrous consequences. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

38. Human ingenuity will insure that we do NOT make the earth unlivable.

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

39. Humans are severely abusing the environment. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

40. The earth has plenty of natural resources if we just learn how to develop them. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

41. Plants and animals have as much right as humans to exist. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

42. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

43. Despite our special abilities humans are still subject to the laws of nature. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

44. Human destruction of the natural environment has been greatly exaggerated. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

45. The earth has only limited room and resources. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

46. Humans were meant to rule over the rest of nature. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

47. The balance of nature is very delicate and easily upset. (Select one optio

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

48. Humans will eventually learn enough about how nature works to be able to control it. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

49. If things continue on their present course, we will soon experience a major ecological disaster. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

page 6

50. Using car, household items and energy incautiously is problem for environment. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

51. Environmentally sensitive usage contributes to a reduction of the environmental problems. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

52. Environmentally sensitive usage contributes to habitat conservation. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

53. Environmentally sensitive usage contributes to improving ability to meet environmental goals. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

54. Environmentally sensitive usage contributes to improving individuals' safety and health. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

55. Lessening car usage, reusing household items, and reducing household energy use can help improving environmental conditions. (Select on)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

56. I feel personally responsible for the problems resulting from my environmentally harmful product and energy usage. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

57. My non-ecofriendly product and energy usage contribute to environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

58. I take joint responsibility for environmental problems. (Select one optior

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

59. I feel knowledgeable about the causes of environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

60. I feel knowledgeable about the solutions to environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

page 7

61. I feel morally obliged to use products and energy in an environmentally sensitive fashion, regardless of what other people do. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

62. I feel guilty when I use products and energy in an environmentally harmful fashion. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

63. I would consider myself a better person if I use products and energy in an environmentally sensitive way. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

64. Using products and energy in an environmentally sensitive way is giving me a feeling of satisfaction. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

65. When I use products and energy in an environmentally sensitive way, I feel happy. (Select one option)

- ○ Strongly disagree
- ○ Disagree
- ○ Somewhat disagree
- ○ Neutral
- ○ Somewhat agree
- ○ Agree
- ○ Strongly agree

66. Using products and energy in an environmentally sensitive way is

giving me a feeling of pleasure. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

67. I feel calm when I use products and energy in an environmentally sensitive way. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

68. I feel peaceful when I use products and energy in an environmentally sensitive way. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

69. Using products and energy in an environmentally sensitive way is making me feel relaxed. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

page 8

Please rate the importance of following 13 items "as a guiding principle in your life" Choose only one answer for each that best represents your view and try to vary them.

70. Social justice, correcting injustice, care for the weak. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

71. Equality, equal opportunity for all. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

72. A world of peace, free of war and conflict. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

73. Being helpful. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

74. Preventing pollution, conserving natural resources. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

75. Unity with nature, fitting into nature. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

76. Respecting the earth, harmony with other species. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

77. Protecting the environment, preserving nature. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

78. Social power, control over others, dominance. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

79. Influential, having an impact on people and events. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

80. Wealth, material possessions, money. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

81. Authority, the right to lead or command. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

82. Being ambitious. (Select one option)

- ○ Not at all important
- ○ Low importance
- ○ Slightly important
- ○ Neutral
- ○ Moderately important
- ○ Very important
- ○ Extremely important

page 9

Please fill out the following demographic questions which will be used only for the purpose of the study.

83. Education: (Select one option)

- ○ Less than High School
- ○ High School
- ○ Some College
- ○ Bachelor's degree
- ○ Master's degree
- ○ PhD
- ○ Professional

84. Estimated household annual income: (Select one option)

- ○ Less than $20,000
- ○ $20,000-$40,000
- ○ $40,000-$70,000
- ○ $70,000-$100,000
- ○ $100,000-$150,000
- ○ $150,000-$200,000
- ○ More than $200,000

85. Age: (Select one option)

- ○ 18 to 24
- ○ 25 to 34
- ○ 35 to 44
- ○ 45 to 54
- ○ 55 to 64
- ○ 65 to 74
- ○ 75 or older

86. Gender and Location

(a)	Gender (Select one option)

	○ Male ○ Female
(b)	City/Town
	_____ _____
(c)	State/Province
	_____ _____
(d)	Country (Select one option)

87. Race/Ethnicity: (Select one option)

○ American Indian and Alaska Native ○ Asian ○ Black or African American ○ Hispanic or Latino ○ Mul Rac

○ Native Hawaiian and Other Pacific Islander ○ White

Thank you for your participation in this study.

D.3: Environmentally Sensitive Post-use Survey.

*** Required Information**

page 1

*** 1. Dear Respondent, You are invited to take part in a study on environmental behaviors. With this study, we want to learn the root causes of people's behaviors that can affect the environment. By learning this, we can help reduce the human impacts on the environmental well-being. If you decide to be a part of this study, please complete the following survey. Finishing the survey will be your consent to participate in this research study. The survey is designed to learn about your behaviors that can affect the environment. It covers questions to understand if these behaviors are more strongly dependent on moral considerations, feelings, or self-interest motives. Also, you will be asked to answer questions about your general values, beliefs, and norms. The survey will take about 15-20 minutes of your time. No direct benefits accrue to you for answering the survey. However, your answers to this survey will help protect the environment in the long run. Data will be collected using the Internet. We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet. However, you may feel emotional discomfort when answering questions related to social norms and approvals. Your responses will not be identified with you personally. Though we are taking precautions to protect your privacy, you should be aware that information sent through email could be read by a third party. Your participation is entirely voluntary. It is okay if you want to stop at any time and not be in the study. You do not have to answer any questions you do not want to answer. Nothing will happen to you. Leaving the study will not result in any penalty. Please feel free to ask questions regarding this study. You may contact me at onelgarmkhb1@mail.montclair.edu or (973) 655-7037, or my faculty advisor, Prof. Avinandan Mukherjee, at mukherjeeav@mail.montclair.edu or (973) 655-5126 if you have additional questions. Any questions about your rights may be directed to Dr. Katrina Bulkley, Chair of the Institutional Review Board at Montclair State University at reviewboard@mail.montclair.edu or 973-655-5189. Thank you for your time. Sincerely, Naz Onel Ph.D. Candidate, Environmental Management. Earth and Environmental Studies, College of Science and Mathematics. Montclair State University, Montclair, NJ 07043, USA. By clicking the link below, I confirm that I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can discontinue participation at any time. My consent also indicates that I am 18 years of age. Please feel free to print a copy of this consent. The**

study has been approved by the Montclair State University Institutional Review Board as study #001391 on 09/04/2013. (Select one option)

◯ I agree to participate (click next to go to survey) ◯ I decline (link to close webpage)

I agree to participate (click next to go to survey):Go to Page No. 2
I decline (link to close webpage): Stop, you have finished the survey

page 2

Please answer each of the following questions by clicking the option that best describe your preference or opinion.

2. How often do you make special effort tobuy produce with as little packaging as possible? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

3. How often do youuse your own bag when going shopping, rather than one provided by the shop? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

4. How often do youlook for packaging that can be easily re-used or recycled? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

5. How often do youbuy products that can be used again, rather than disposable items? (Select one option)

◯ Never ◯ Very rarely ◯ Rarely ◯ Sometimes ◯ Often
◯ Very often ◯ Always

6. How often do youtry to repair things before buying new items? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

7. How often do youreuse paper? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

8. How often do youreuse glass bottles and jars? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

9. How often do youwash and reuse dishcloths rather than buying them new? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

10. How often do youreuse old plastic containers, like margarine tubs? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

11. How often do yourecycle glass? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

12. How often do yourecycle newspapers/magazines? (Select one option)

○ Never ○ Very rarely ○ Rarely ○ Sometimes ○ Often
○ Very often ○ Always

13. How often do yourecycle food/drink cans? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

14. How often do yourecycle junk mail? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

15. How often do yourecycle cardboard? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

16. How often do yourecycle plastic bottles? (Select one option)

Never Very rarely Rarely Sometimes Often
Very often Always

page 3

Following section has questions related to "Environmentally Sensitive Post-Use Behavi which is defined as: "disposing,recycling, or reusing products after their initial use in order to have the least environmental impact. This behavior also includes reducing the amount of waste produced."

17. Environmentally sensitive post-use (i.e., recycling, reusing products, reducing waste) is too much of a hassle. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

18. Environmentally sensitive post-use means I have to live less comfortably. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

19. Environmentally sensitive post-use will restrict my freedom. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

20. Environmentally sensitive post-use is valuable. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

21. Environmentally sensitive post-use is necessary. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

22. I intend to engage in post-use behavior that are environmentally sensitive in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree | Agree | Strongly agree

23. I will try to engage in post-use behavior that are environmentally sensitive in the forthcoming months. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat Agree

Agree Strongly agree

24. I expect to engage in post-use behavior that are environmentally sensitive in the forthcoming months. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

25. Most people who are important to me think that I should engage in environmentally post-use behavior. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

26. Most people who are important to me would approve of me engaging in environmentally sensitive post-use behavior. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

27. My household/family members think I ought to be engaging in environmentally sensitive post-use behavior. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

28. My friends/colleagues think I ought to be engaging in environmentally sensitive post-use behavior. (Select one option)

Strongly disagree Disagree Somewhat disagree Neutral Somewhat Agree
Agree Strongly agree

page 4

29. I can engage in environmentally sensitive post-use behavior easily. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

30. I have plenty of opportunities to engage in environmentally sensitive post-use behavior. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

31. Environmentally sensitive post-use behavior is inconvenient. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

32. I am being provided satisfactory resources to engage in environmentally sensitive post-use behavior. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

33. I know which materials/products are recyclable, reusable, and reducible. (Select one option)

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

34. I know when and where I can recycle, reuse, reduce materials/products. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

page 5

Now we would like to get your opinion on a wide range of environmental issues. For ea of the following statements please indicate the extent to which you agree or disagree.

35. We are approaching the limit of the number of people the earth can support. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

36. Humans have the right to modify the natural environment to suit their needs. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

37. When humans interfere with nature, it often produces disastrous consequences. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

38. Human ingenuity will insure that we do NOT make the earth unlivable. (Select one option)

○ Strongly disagree	○ Disagree	○ Somewhat disagree	○ Neutral	○ Somewhat agree
○ Agree	○ Strongly agree			

39. Humans are severely abusing the environment. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

40. The earth has plenty of natural resources if we just learn how to develop them. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

41. Plants and animals have as much right as humans to exist. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

42. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

43. Despite our special abilities humans are still subject to the laws of nature. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree
Agree | Strongly agree

44. Human destruction of the natural environment has been greatly exaggerated. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

45. The earth has only limited room and resources. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

46. Humans were meant to rule over the rest of nature. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

47. The balance of nature is very delicate and easily upset. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

48. Humans will eventually learn enough about how nature works to be ab to control it. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

49. If things continue on their present course, we will soon experience a major ecological disaster. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

page 6

50. Not engaging in environmentally sensitive post-use behavior is problem for environment. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

51. Engaging in environmentally sensitive post-use behavior contributes to a reduction of the environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

52. Engaging in environmentally sensitive post-use behavior contributes to habitat conservation. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

53. Engaging in environmentally sensitive post-use behavior contributes to improving ability to meet environmental goals. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

54. Engaging in environmentally sensitive post-use behavior contributes to improving individuals' safety and health. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

55. Environmentally sensitive post-use behavior can help improving environmental conditions. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

56. I feel personally responsible for the problems resulting from my post-use behavior that is not environmentally sensitive. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

57. My post-use behavior that is not environmentally sensitive contributes to environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

58. I take joint responsibility for environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

59. I feel knowledgeable about the causes of environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

60. I feel knowledgeable about the solutions to environmental problems. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree

Agree Strongly agree

page 7

61. I feel morally obliged to recycle, reuse, and reduce materials/products regardless of what other people do. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

62. I feel guilty when I do not recycle, reuse, or reduce materials/products (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

63. I would consider myself a better person if I recycle, reuse, and reduce materials/products. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

64. Recycling, reusing, and reducing materials/products are giving me a feeling of satisfaction. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree | Agree | Strongly agree

65. When I recycle, reuse, and reduce materials/products, I feel happy. (Select one option)

Strongly disagree | Disagree | Somewhat disagree | Neutral | Somewhat agree

Agree
Strongly agree

66. Recycling, reusing, and reducing materials/products are giving me a feeling of pleasure. (Select one option)

Strongly disagree
Disagree
Somewhat disagree
Neutral
Somewhat agree
Agree
Strongly agree

67. I feel calm when I recycle, reuse, and reduce materials/products. (Select one option)

Strongly disagree
Disagree
Somewhat disagree
Neutral
Somewhat agree
Agree
Strongly agree

68. I feel peaceful when I recycle, reuse, and reduce materials/products. (Select one option)

Strongly disagree
Disagree
Somewhat disagree
Neutral
Somewhat agree
Agree
Strongly agree

69. Recycling, reusing, and reducing materials/products are making me feel relaxed. (Select one option)

Strongly disagree
Disagree
Somewhat disagree
Neutral
Somewhat agree
Agree
Strongly agree

page 8

Please rate the importance of following 13 items "as a guiding principle in your life".Choose only one answer for each that best represents your view and try to vary th scores.

70. Social justice, correcting injustice, care for the weak. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

71. Equality, equal opportunity for all. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

72. A world of peace, free of war and conflict. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

73. Being helpful. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

74. Preventing pollution, conserving natural resources. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

75. Unity with nature, fitting into nature. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

76. Respecting the earth, harmony with other species. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

77. Protecting the environment, preserving nature. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

78. Social power, control over others, dominance. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

79. Influential, having an impact on people and events. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

80. Wealth, material possessions, money. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

81. Authority, the right to lead or command. (Select one option)

Not at all important | Low importance | Slightly important | Neutral | Moderately important | Very important | Extremely important

82. Being ambitious. (Select one option)

- Not at all important
- Low importance
- Slightly important
- Neutral
- Moderately important
- Very important
- Extremely important

page 9

Please fill out the following demographic questions which will be used only for the purpose of the study.

83. Education: (Select one option)

- Less than High School
- High School
- Some College
- Bachelor's degree
- Master's degree
- PhD
- Professional

84. Estimated household annual income: (Select one option)

- Less than $20,000
- $20,000-$40,000
- $40,000-$70,000
- $70,000-$100,000
- $100,000-$150,000
- $150,000-$200,000
- More than $200,000

85. Age: (Select one option)

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64

◯ 65 to 74 ◯ 75 or older

86. Gender and Location:

(a)	Gender (Select one option)
	◯ Male ◯ Female
(b)	City/Town
	_____ _____
(c)	State/Province
	_____ _____
(d)	Country (Select one option)

87. Race/Ethnicity (Select one option)

◯ American Indian and Alaska Native ◯ Asian ◯ Black or African American ◯ Hispanic or Latino ◯ Multi-Race

◯ Native Hawaiian and Other Pacific Islander ◯ White

Thank you for your participation in this study.

APPENDIX E

PREFACE

"This Doctoral Dissertation was produced in accordance with guidelines which permit the inclusion as part of the Doctoral Dissertation the text of an original paper, or papers, submitted for publication. Doctoral Dissertation must still conform to all other requirements explained in the "Guide for the Preparation of the Doctoral Dissertation at the Montclair State University." It must include a comprehensive abstract, a full introduction and literature review, and a final overall conclusion. Additional material (procedural and design data as well as descriptions of equipment) must be provided in sufficient detail to allow a clear and precise judgment to be made of the importance and originality of the research reported.

It is acceptable for this Doctoral Dissertation to include as chapters authentic copies of papers already published, provided these meet type size, margin, and legibility requirements. In such cases, connecting texts, which provide logical bridges between different manuscripts, are mandatory. Where the student is not the sole author of a manuscript, the student is required to make an explicit statement in the introductory material to that manuscript describing the student's contribution to the work and acknowledging the contribution of the other author(s). The signatures of the Supervising Committee which precede all other material in the Doctoral Dissertation attest to the accuracy of this statement."

Onel, N., & Mukherjee, A. (2014). Analysis of the predictors of five eco-sensitive behaviors. *World Journal of Science, Technology, and Sustainable Development*, *11*(1), 16-27.

This Page Intentionally Left Blank