

Can Big Whales Inspire Big Behaviors? A Study of Environmental Communication, and Nature Immersion

Theresa Soley
Marquette University

Recommended Citation

Soley, Theresa, "Can Big Whales Inspire Big Behaviors? A Study of Environmental Communication, and Nature Immersion" (2017).
Master's Theses (2009 -). 423.
http://epublications.marquette.edu/theses_open/423

CAN BIG WHALES INSPIRE BIG BEHAVIORS?
A STUDY OF ENVIRONMENTAL COMMUNICATION,
AND NATURE IMMERSION

by

Theresa Elisabeth Soley

A Thesis submitted to the Faculty of the Graduate School,
Marquette University,
In Partial Fulfillment of the Requirements for
The Degree of Master of Arts

Milwaukee, Wisconsin

August 2017

ABSTRACT
CAN BIG WHALES INSPIRE BIG BEHAVIORS?
A STUDY OF ENVIRONMENTAL COMMUNICATION,
AND NATURE IMMERSION

Theresa Elisabeth Soley

Marquette University, 2017

Direct contact with wild nature is becoming harder for people to access in present times, yet research suggests that experiencing nature is important to the formation of environmental values, which may lead to conservation behaviors. My thesis experiment theorizes that direct contact with nature has the ability to impact people's behavioral beliefs and intentions toward the environment, applying Icek Ajzen's Theory of Planned Behavior (TPB) and the New Ecological Paradigm Scale as measures.

A questionnaire was administered post-whale watching trips in Juneau, Alaska to determine whether whales, direct experience with charismatic megafauna, could stimulate positive attitudes and behaviors toward recycling. The proposed study fills in gaps of previous research by adding a communication variable, in addition to the whales experienced, and measuring its effect with the questionnaire. This communication message expressed the link between people's recycling behaviors and whales' well-being. The study utilized participants' intensity of experience with a whale as a second independent variable, and this whale acts as a proposed symbol for the environment at large. Recycling was chosen as the targeted behavior for this study, but the behavior is meant to represent positive behaviors toward the environment on a grander scale. This thesis research is intended to be a case study of whether nature, and human-mediated communication about it, can stimulate positive behaviors toward the environment.

The study's results affirmed positive TPB correlations, providing further support for the TPB model when applied to environmentally friendly behavioral intentions. Overall participants reported high ecological values, but questionnaire responses indicated that level of intensity of nature experience, and a human-mediated communication message, had little to no significant effect on reported behavioral intentions toward recycling, negating what had been hypothesized. More research is needed to further comprehend the interactions between experience in nature, human-mediated communication, and TPB.

TABLE OF CONTENTS

LIST OF TABLES.....	iv
LIST OF FIGURES.....	vi
PREFACE.....	vii
CHAPTER	
I. INTRODUCTION.....	1
a. Background.....	1
b. Purpose of study.....	2
c. Significance of study.....	2
II. LITERATURE REVIEW.....	4
a. Theory of Planned Behavior overview.....	4
1. Breaking down behavioral beliefs>attitudes.....	6
2. Breaking down normative beliefs>subjective norms.....	7
3. Breaking down control beliefs>perceived behavioral control.....	8
4. The creation of TPB and its limitations.....	9
5. TPB interventions.....	11
6. TPB and the environment.....	12
b. Nature influences the formation of human attitudes.....	14
c. Recycling behaviors.....	16
d. New Ecological Paradigm scale.....	17
e. Charismatic megafauna and communication.....	20
f. Use of visuals in environmental communication.....	21

g. Research questions and hypotheses.....	22
III. METHOD.....	27
a. Study design background and overview.....	27
b. Participants.....	27
c. Instrumentation.....	29
d. Procedure: TPB and interventions	37
1. Nature intervention.....	38
2. The communication intervention/animation.....	41
e. Independent variables.....	44
f. Dependent variables.....	45
g. Apparatus.....	45
h. Data analysis.....	46
i. Recoding the instrument.....	49
j. Reliability testing.....	50
k. Meeting assumptions/validity testing.....	52
IV. RESULTS.....	54
a. Research question 1, 2 & 3.....	54
1. Behavioral beliefs.....	53
2. Attitudes.....	57
3. Behavioral intentions.....	58
b. Research question 4.....	61
c. Research question 5.....	63
d. Research question 6.....	67

V.	DISCUSSION.....	69
	a. Research question 1.....	69
	b. Research question 2.....	72
	c. Research question 3.....	73
	d. Research question 4.....	75
	e. Research question 5.....	77
	f. Research question 6.....	78
	g. Constraints of the study.....	78
VI.	CONCLUSION.....	81
	a. Summary of findings.....	81
	b. Future research.....	83
	BIBLIOGRAPHY.....	87
	APPENDIX A Demographics charts.....	91
	APPENDIX B Descriptive statistics.....	93
	APPENDIX C Correlations.....	95
	APPENDIX D Questionnaire.....	96

LIST OF TABLES

TABLE 1. Number of participants by experimental or control group.....	30
TABLE 2. 2x2 experimental design factors	31
TABLE 3. Reliability of dependent variables.....	49
TABLE 4. Reliability of New Ecological Paradigm scale ($\alpha=.584$) by item.....	50
TABLE 5. Relationship of whale viewing experience + animation presence and cognitive structure.....	55
TABLE 6. GLM ANOVA data, Relationship of whale viewing experience, animation presence, and whale viewing experience + animation presence with cognitive structure.....	55
TABLE 7. Relationship of whale viewing experience + animation presence and summated attitude toward the act.....	57
TABLE 8. GLM ANOVA data, Relationship of whale viewing experience, animation presence, and whale viewing experience + animation presence with summated attitude toward the act of recycling.....	57
TABLE 9. Relationship of whale viewing experience + animation presence and behavioral intention to recycle.....	59
TABLE 10. GLM ANOVA data, Relationship of whale viewing experience, animation presence, and whale viewing experience + animation presence with behavioral intention to recycle.....	60
TABLE 11. Multiple hierarchical regression: Relationship of TPB's behavioral intention to recycle to other measured TPB variables	62
TABLE 12. Multiple hierarchical regression: Relationship of TPB's summated attitude toward the act of recycling (dependent variable) to other measured variables	64
TABLE 13. TPB path analysis, predicting behavioral intention.....	65
..	
TABLE 13a. TPB path analysis, predicting behavioral intention (revised model).....	66
TABLE 14. Relationship of whale viewing experience + animation presence and summated New Ecological Paradigm Scale.....	68

TABLE 15. GLM ANOVA data, Relationship of whale viewing experience, animation presence, and whale viewing experience + animation presence with summated new ecological paradigm scale.....	68
TABLE 16. Sex of participants.....	91
TABLE 17. Age of participants.....	91
TABLE 18. Years of education of participants.....	92
TABLE 19. Descriptive statistics: Dependent variable means.....	93
TABLE 20. Pearson correlations of independent variables.....	95

LIST OF FIGURES

FIGURE 1. Adapted from the Theory of Planned Behavior (Ajzen, 2006).....	4
FIGURE 2. Behavioral beliefs lead to the enactment of behaviors (Ajzen, 2006).....	6
FIGURE 3. Normative beliefs lead to the enactment of behaviors (Ajzen, 2006).....	7
FIGURE 4. Control beliefs lead to the enactment of behaviors (Ajzen, 2006).....	8
FIGURE 5. Map of participants' countries of origin.....	29
FIGURE 6. Predicting behavioral beliefs > behavior of recycling.....	37
FIGURE 7. Whale intervention applied to this study, TPB.....	38
FIGURE 8. Whale and communication interventions applied to this study, TPB.....	43
FIGURE 9. TPB path analysis, predicting behavioral intention.....	65
FIGURE 9a. TPB path analysis, predicting behavioral intention (revised model).....	66
FIGURE 10. Missing path: "the intention-action gap"	76
FIGURE 11. Pie chart, sex of participants.....	91
FIGURE 12. Pie chart, age of participants.....	91
FIGURE 13. Pie chart, years of education of participants.....	92

PREFACE

The student researcher began leading nature-based trips in Alaska in 2011, and started working for Gastineau Guiding Company as a science guide in 2013. Through her time outside, and communicating with the public about the natural world, she began to consider human-mediated nature communication, and became exceptionally interested in research questions involving humans and the ecosystem. When she began her master's degree in communication at Marquette University in 2014, she tried to integrate her summer work with her studies, and research questions.

CHAPTER I: INTRODUCTION

A. Background

There is substantial research investigating whether human-generated whale watching vessels impact whales (Asociacion RUVID, 2016; IFAW Australia, 2013), but little research has been done to investigate how whale encounters impact humans on these vessels. In 2008 nearly 13 million people went whale watching worldwide (O'Connor et al., 2009). With so many people encountering whales in the wild, it is hypothesized that these whales could impact humans as much as humans impact these whales. This study will attempt to measure whether nature, and whales, can inspire environmentally friendly behaviors.

Whales are both charismatic megafauna and a flagship species, meaning that the animals, large mammals that people often connect with emotionally, can be used as a tool to instigate conservation of the environment. Charismatic megafauna, like whales, can play an important role in conservation campaigns because they attract public attention toward environmental issues (Barua, 2011).

A previous whale watching study suggests that there is a disconnection between people's whale watching experience and post-trip environmental awareness (Harms, Asmutis-Silvia, & Rosner, 2013). This study was designed to measure awareness, and take research a step farther by testing two different experimental variables using a post-trip questionnaire. In addition to measuring the influence of whale encounters (first manipulated variable, first intervention) on watchers' environmental attitudes, a communication message was applied as the

second manipulated variable (second manipulated variable, second intervention). This second variable tested whether a visual animation message (or lack of this animation), specifically depicting a link between human plastic waste and whales' well-being, led to greater post-trip environmental awareness after experiencing whales. These manipulated variables were measured using two social science questionnaire models on post-trip instruments.

B. Purpose of study

This study employed a field experiment to measure whether observation of whales, charismatic megafauna in the wild, combined with a communication message depicting the effects of recycling on whales' habitat, can affect people's beliefs, attitudes, and behavioral intentions to recycle, employing Ajzen's (2006) Theory of Planned Behavior and the revised New Ecological Paradigm scale.

C. Significance of study

This research is unique because of its applications across many disciplines. While the study mostly assessed nature's ability to influence attitudes and behavioral intentions, and the effectiveness of environmental communication strategies, the results are useful across several applied fields. The tourism industry, educators, social scientists, environmental managers, and scientists interested in human-ecology interactions may find results useful.

The research results have implications for tourism managers that will aid in the development of wildlife tourism plans that benefit people as well as whales.

Educators will find the information applicable when designing ways to interpret and communicate nature more effectively. Social scientists will note whether direct experience with nature can affect behaviors, environmental managers can use the data to create rules for wildlife viewing, and scientists can find ways to make their research applicable to the general public. In order to effectively conserve the environment, many disciplines must be involved.

CHAPTER II: LITERATURE REVIEW

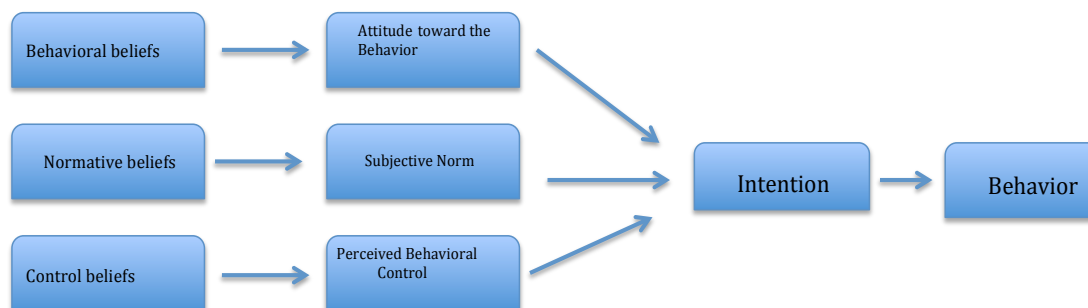
The primary objective of this study is to assess the extent to which an individual's direct experience with nature (in this case, a whale), combined with a communication message about the natural world, can influence one's beliefs or attitudes toward the environment, and thus inspire environmentally friendly behavioral decisions. A wide range of psychological, communication, and ecological studies were investigated as part of this literature review.

a. Theory of Planned Behavior overview

The main theory applied to this study is Ajzen's (2006) Theory of Planned Behavior (TPB), used to measure how belief systems lead to an individual's creation of behavioral intentions, and ultimately affect their enacted behaviors. In this study, behavioral intentions toward the environment are the focused measure.

This study will follow the TPB model, which asserts that an individual's attitude toward a behavior (a person's specific attitude toward personally

Figure 1: adapted from The Theory of Planned Behavior (Ajzen, 2006)



performing a behavior), subjective norm (felt social pressures to perform a behavior), and perceived behavioral control (perception of one's own ability to enact a behavior) determine behavioral intentions, and thus personal behaviors (Figure 1).

As demonstrated in Figure 1, behavioral beliefs, normative beliefs, and control beliefs are responsible for the formation of attitudes, subjective norms, and perceived behavioral control (Ajzen, 2006). The three interact to form behavioral intentions, the direct antecedent of enacted behaviors, according to TPB.

TPB proposes that an individual's beliefs essentially determine attitudes, subjective norms, and perceived behavioral control. According to TPB, the three work in unison to predict behavioral intentions. Behaviors themselves are difficult to assess in studies, but behavioral intentions are more accessible for testing. Ajzen (2005) suggests that behavioral intentions are a good, but not perfect predictor of enacted behaviors. Typically positive attitudes and subjective norms combined with high perceived behavioral control lead to the formation of intention, and increase the likelihood that a person will enact a certain behavior (Ajzen, 2006).

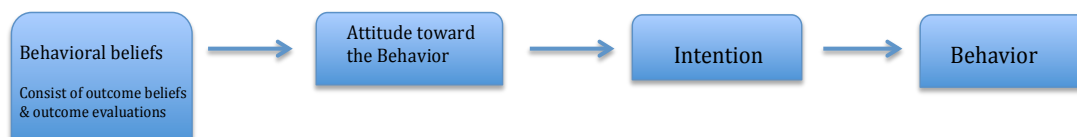
Two studies, one by Cordano and Frieze (2000) and the other by Cheung et al. (1999) reinforce the latter part of Ajzen's theory, indicating that behavioral intentions are strong predictors of enacted behaviors. But while research suggests that intentions are strong predictors, in practice some intentions don't become enacted behaviors. A discussion of this limitation of TPB is discussed in greater depth later in this paper.

This study will emphasize behavioral beliefs, attitudes, and intentions toward the environment, with less focus on subjective norms and perceived behavioral control, while still controlling and measuring these factors.

1. *Breaking down behavioral beliefs>attitudes*

Behavioral beliefs are the birthplace of attitudes, which lead to the formation of intentions, and ultimately help determine behaviors, according to the TPB. Behavioral beliefs are an individual's perception of the likelihood that an enacted behavior will produce a personally favored or unfavored outcome. Behavioral beliefs link to attitudes, intentions and eventually enacted behaviors (Figure 2).

Figure 2: Behavioral beliefs lead to the enactment of behaviors (Ajzen 2006)



According to Ajzen (2006), behavioral beliefs constitute a subject's conception of the outcome of a certain behavior. They consist of outcome beliefs and outcome evaluations. Outcome beliefs refer to a subject's perceived likelihood that personal performance of a behavior will lead to a certain outcome. Outcome evaluations are the value a subject puts on the behavioral outcome, ranging from good to bad. People often have conflicting beliefs about a specific behavior, so enacting the behavior represents tradeoffs. Behavioral beliefs are subjective and lead to the formation of attitudes toward a behavior.

Attitudes refer to the value system created by an individual regarding a behavior, ranging from positive to negative. Attitude toward a behavior leads to the formation of behavioral intentions. Intentions are subjects' readiness to perform a specific behavior, and are immediate predecessors of enacted behaviors, according to Ajzen (2006). Behavioral intentions are good indicators of behaviors, and ultimately lead to the enacted performance of behaviors.

The following equation allows us to understand the formation of attitudes in a quantitative fashion. It indicates that attitudes (A) form as a summative interaction of salient beliefs (b) and outcome evaluations (e):

$$A \propto \sum b_i e_i$$

The equation indicates that a person's attitude is directly proportional (α) to the multiplied belief index.

2. *Breaking down normative beliefs>subjective norms*

Normative beliefs constitute an individual's conception of social acceptance of a behavior. One's normative beliefs link subjective norms (perceived social pressure) with behavioral intentions, and eventually enacted behaviors (Figure 3). Subjective norms are antecedent to behavioral intentions, when combined with attitudes and perceived behavioral control.

Figure 3: Normative beliefs lead to the enactment of behaviors (Ajzen, 2006)

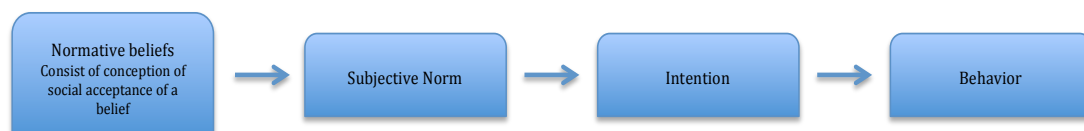


Figure 3 demonstrates the importance of perceived social acceptance of others in an individual's formation of behavioral intentions. Subjective norms (SN) are the summation of a multiplied interaction between normative beliefs (n) and motivation to comply to other's beliefs (m):

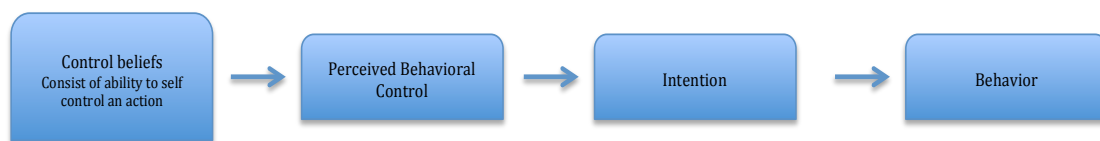
$$SN \propto \sum n_i m_i$$

The formation of subjective norms is proportional to the sum of a factor of normative beliefs and motivation to comply. When combined with attitudes and perceived behavioral control, they establish behavioral intentions.

3. Breaking down control beliefs > perceived behavioral control

Lastly control beliefs consist of an individual's perception of ability to control factors that facilitate or complicate the performance of a behavior. Control beliefs lead to an individual's perception of ability to perform a behavior, behavioral intentions, and eventually performance of a behavior (Figure 4).

Figure 4: Control beliefs lead to the enactment of behaviors (Ajzen, 2006)



Perceived behavioral control (PBC) can be calculated quantitatively as the summed product of control beliefs (c) multiplied by perceived power of control (p):

$$PBC \propto \sum p_i c_i$$

Perceived behavioral control is directly proportional to both control beliefs and perceived power to control one's behaviors. When combined with subjective norms and attitudes, the three interact to determine one's behavioral intentions, and enacted behaviors, according to TPB.

4. The creation of TPB and its limitations

The present TPB, proposed by Ajzen in 1991, is the evolved version of a Theory of Reasoned Action (TRA). Ajzen's original theory contains aspects of the TPB, but has now been refined and tested in the field for years. Ajzen (1985) describes TRA as a means for predicting human behaviors that are under personal control. In his original theory, Ajzen weighs both attitude toward the behavior and social pressures, or subjective norms, as antecedent components of behavioral intentions. While TRA does not consider behavioral control specifically, Ajzen describes the TRA as one that predicts volitional behaviors, or ones that are specifically under personal control of the individual. The TPB further defines the significance of volition, or perceived behavioral control, as an important determinant of behavioral intentions.

Ajzen (1985) describes behavioral beliefs as salient, strong and longstanding. They consist of a psychological evaluation of the outcome of a behavior, and are responsible for the formation of attitudes toward a behavior, according to Ajzen (2005). He suggests that positive outcome beliefs about a behavior often lead to enactment of the behavior, whereas negative outcome beliefs often do not lead to enactment of the behavior (Ajzen, 1980). Inherent personality traits are thought to

have no direct effects upon the performance of behaviors (Ajzen, 1980), but are rather considered a factor of behavioral beliefs.

The TRA assumes that humans behave sensibly, have volitional control and that an individual's intention to perform a behavior is the immediate predecessor of the enacted behavior itself. Based on these three factors, the model assumes that intentions are strong predictors of enacted behaviors. Ajzen (2006) writes that there can be inconsistencies between a person's reported verbal responses and their enacted behaviors. Both the TRA and the TPB assume that verbal responses of behavioral intentions correlate strongly with enacted behaviors, but this is not always the case in practice.

Ajzen (1980) notes that intentions change over time, and that unforeseen events also alter behavioral intentions. He admits that the longer the period of time between the creation of an intention and enactment of the behavior, the less accurate the reported behavioral intention will be (Ajzen, 1980). Ajzen (1980) also writes that with time new information emerges, which may inspire new behavioral beliefs, attitudes, and intentions in individuals. Time is a factor that must be taken into account when measuring behavioral intentions' ability to predict enacted behaviors. Ajzen suggests that in order to increase the strength of behavioral intentions' predictability, the behavioral intention should be measured immediately prior to the enacted behavior, which is a difficult task in practice.

Ajzen (1991) writes, "The relations of beliefs, attitudes, and subjective norms to intentions are more clearly delineated than are the factors that determine whether or not the behavioral intention will be carried out," (p. 18). As with every

theory, the TPB has its limitations, which must be noted. The question of whether reported behavioral intentions accurately predict enacted behaviors is one of great relevance, and concern, to this study. The TPB limitation is addressed in greater detail in chapter five.

Ideologies are a deeply rooted, shared belief system acquired by social structures and situations, as defined by Van Dijk (1998). They are antecedent to the formation of behavioral beliefs, attitudes, and behavioral intentions. Ideologies take a long time to form, and due to the time constraints of this study, ideologies will likely not be altered by the two interventions applied. In order to truly affect the long-term outcome of intentions and behaviors toward the environment, inspiring environmental ideologies is necessary (Corbett, 2006). The proposed study will rather measure changes in behavioral beliefs and attitudes, which are more readily influenced over the short time period available for this study.

5. TPB interventions

According to Azjen (2006), an intervention can be introduced to a study, “designed to change behavior,” and can be directed at either attitudes, subjective norms or perceived behavioral control. An intervention is any manipulated variable that allows a researcher to measure the difference between a group that received an intervention, and a group that did not (control). An instrument is used to measure whether respondents’ behavioral intentions were affected by this intervention, and comparing the control group with the intervention group.

This study enacted two interventions, and then instruments were used to measure reported beliefs, subjective norms, perceived behavioral control, attitudes, and behavioral intentions. The reported differences between control and intervention groups' responses were assessed using statistical analyses in Statistical Package for the Social Sciences (SPSS).

Whales, and two differing levels of intensity of this whale encounter, were one naturally varying intervention applied to this study. The intensity of this whale encounter was determined by the distance between the whale (or whales) and the boat: an encounter of less than 100 yards was considered a more intense experience, while an encounter of 100 yards or more was considered a less intense experience. Nearly half of participants had a less intense whale encounter, and nearly half had a more intense whale encounter.

A communication variable was used as the second, manipulated intervention applied to this study. Nearly half of participants received an animated communicated message, and nearly half of participants did not. Because two interventions were utilized, the study measured the differences between 4 different subgroups, based on the interacting interventions, and TPB dependent variables were measured using the questionnaire.

6. TPB and the environment

The TPB has been applied to environmental behavior research in several past studies, and this research supports TPB as a successful model for predicting environmentally friendly behavioral intentions. In 2000, Cordano and Frieze

conducted a study of 295 managers of environmental organizations, and found mostly positive TPB correlations. The study measured pollution prevention attitudes, subjective norms of environmental regulations, and perceived behavioral control of personal actions. Attitudes and subjective norms correlated positively with behavioral intentions, but the study found a negative correlation in perceived behavioral control's ability to predict pro-environmental behaviors, writing that managers felt "limited control to initiate and implement" (p. 635) environmental programs.

A study by Mancha and Yoder (2015) also validated TPB's ability to predict environmentally friendly behavioral intentions. In their paper, the researchers wrote that their goal was "to develop, validate and evaluate an environmental theory of planned behavior that can explain sustainable behavioral intent in multicultural settings," (p. 145). The study had 162 participants from around the world, and results indicated that green subjective norms, preservation attitudes, and green perceived behavioral control correlated positively with green behavioral intentions (Mancha & Yoder, 2015). This study's results suggest that TPB can be applied to environmentally friendly behavioral intentions, and support its application to a diverse group of participants.

Another study by Oreg and Katz-Gerro (2006) also focused on multicultural groups, TPB and pro-environmental behaviors. This study covered 27 countries and a large sample size of 31,042 respondents (the large sample was possible due to its linkage to the International Social Survey Programme). Study results indicate positive correlations between pro-environmental attitudes, perceived behavioral

control, willingness to make sacrifices for the environment, and pro-environmental behaviors across the large, international sample group. Overall, past research supports TPB's ability to predict environmentally positive intentions and behaviors.

b. *Nature influences the formation of human attitudes*

Several human psychological studies indicate that human contact with nature can affect people's psyche, and even inspire positive feelings toward the environment (Kals et al., 1999; Mayer & Frantz, 2004; Dutcher et al., 2007).

Literature and past research supports nature's ability to influence the formation of human ideologies and beliefs. What about behaviors?

In *Communicating Nature*, Corbett (2006) argues that direct experience with nature can affect people's attitudes and behaviors. She defines direct experience with nature as the deep relationship a person develops with a specific place in the outdoors. Corbett writes that, "There is no substitute for direct one-on-one experiences with authentic nature..." (p.14). She believes that these direct experiences with the natural world, which cannot be replicated in other ways, influence a person's beliefs and attitudes toward the environment throughout their life.

Jurow (2016) states that a nature experience "encompasses visitor, landscape, time, social interactions, physical conditions, and emotional response" (p.6). This description contends that there is a multifaceted web of human-environment interactions that develops when a person spends time outside, and

that these interactions can conjure emotional responses in people.

Social science research indicates that people immersed in nature report a greater sense of well-being (Howell et al., 2011; Weinstein, Mayer et al., 2009; Przybylski & Ryan, 2009), and report lower value to external goods and rewards, compared to those who were not immersed in nature (Weinstein, Przybylski & Ryan, 2009). Another study by Hoot and Friedman (2011) indicates that a sense of interconnectedness, both with nature and the future, can lead to environmentally friendly behaviors and decisions.

McKay, Brownlee and Hallo (2012) define direct experience with nature in their own terms. The researchers describe two different ways of experiencing nature: outdoor recreation and appreciative recreation. Outdoor recreation is active, and includes activities like hiking, camping, and biking (Florida Department of Environmental Protection, 2000). Appreciative recreation involves learning, observing, or identifying nature (McKay, Brownlee & Hallo, 2012). In their 2012 study, McKay, Brownlee and Hallo (2012) questioned how appreciative recreation in nature influences the “environmental focus of participants,” (p.179). Results found increased environmental focus by participants after taking part in appreciative recreation activities. Results also indicate that participants who spent a longer period of time in nature reported greater environmental focus, compared to participants who spent a shorter time period in nature and reported lower environmental focus.

Jurow (2016) suggests that participants may report different outcomes after short-term experiences in nature, compared to long-term wilderness immersion experiences. She writes that there is a lack of research investigating impacts of short-term nature experiences, compared to long-term wilderness immersion. This study assessed the impact of a short-term nature experience.

A study by Milstein (2008) suggests that direct contact with nature has the ability to influence people nonverbally. In her research, Milstein found that experiencing a whale in its wild environment can “communicate” messages to the public through silence. She argues that human words cannot replicate the messages nature conveys, and writes that sometimes whales “speak for themselves” (p.1).

The uniqueness of this communication TPB study is its attempt to assess the extent to which direct experience with nature can influence a person’s beliefs, attitudes, and behavioral intentions toward the environment.

c. Recycling behaviors

This study targeted people’s behavioral intentions to recycle. Recycling behaviors were selected over other environmentally friendly behaviors because the behavior is relevant to nearly all participants, that is, individuals taking part in guided whale-watching excursions in Alaska’s waters. Most people have at least basic knowledge of what recycling means, as well as an ability to participate in the behavior (GfK, 2011). Recycling was chosen as one easy, applicable, positive behavior toward the environment, and is the behavior to be measured and analyzed

in this TPB study. It is also a behavior that has been well investigated by previous research.

In one study Cheung, Chan and Wong (1999) utilized TPB to determine whether attitudes, social norms, and perceived behavioral control could predict people's behavior of wastepaper recycling. Researchers surveyed 282 college students in China and the results indicated that the three factors correlated positively with behavioral intentions, and enacted waste-paper recycling behaviors a month after the survey.

Another recycling study by Mannetti, Pierro and Livi (2004), composed of 230 Italian participants, supported the application of TPB in this context as well. Their research results further demonstrated positive correlations between attitudes, subjective norms, perceived behavioral control, identity and intention to recycle.

In 2012 Largo-Wight, Bian and Lange conducted another study to confirm that TPB can be applied to people's recycling behaviors. The study found that behavioral intentions were often consistent with actual recycling behaviors (Largo-Wight et al., 2012). The results indicated that attitude and moral obligations were the two greatest factors determining behavioral intentions to recycle. The paper suggested that future studies should utilize interventions to investigate the correlation between attitude toward the act of recycling and moral obligation to recycle. This thesis study focused on attitude toward the act of recycling.

d. New Ecological Paradigm scale

The original New Environmental Paradigm (NEP) Scale was developed by Riley Dunlap et al. in 1978 to measure human ideologies and environmental perceptions using twelve questions (Anderson, 2012). The original instrument was created in response to the dominant social paradigm (DSP), described by social scientists as anthropocentric, and the most common view of humanity and life on Earth at the time of the environmental movement in the 1960s-1970s. The original NEP focused on beliefs about humanity's view of nature, human population growth limits, and humanity's right to rule over the rest of nature (Dunlap et al., 2000). From 1978 until today, the instrument has gone through revisions to increase reliability and internal consistency (Anderson, 2012).

The original NEP scale was revised by its creator some twenty years later, and is now called the New *Ecological* Paradigm (NEP) Scale. The first NEP contained 12 items, but the revised instrument developed in 2000 by Dunlap et al. contains 15. According to Dunlap et al. (2000) the revised NEP was improved in several facets, including its adaption of modern language, creation of wider ranging measures, and a statistical increase of internal consistency. The revised NEP scale is considered "the most widely used measure of environmental values or attitudes, worldwide," (p. 261).

Both the original NEP and the revised NEP are considered by its authors, and the research that followed, a measure of one's primitive beliefs, or the inner core of their belief system, about humanity's place on planet Earth (Dunlap et al., 2000). According to Dunlap et al. (2000) these environmental beliefs also correlate with environmental behaviors (although researchers have urged against expecting a

strong NEP-behavior relationship). For this reason the NEP serves as a sufficient instrument to pair with TPB measures in this study, but NEP measures worldview, ideologies, beliefs, and attitudes, rather than behavioral intentions (Anderson, 2012).

The revised NEP often utilizes a 7-point Likert scale. The 15 NEP statements developed by Dunlap et al. (2000) are listed below, and can be ranked on a scale of agreement to disagreement:

1. We are approaching the limit of the number of people the earth can support
2. Humans have the right to modify the natural environment to suit their needs
3. When humans interfere with nature it often produces disastrous consequences
4. Human ingenuity will ensure that we do not make the earth unlivable
5. Humans are severely abusing the environment
6. The earth has plenty of natural resources if we just learn how to develop them
7. Plants and animals have as much right as humans to exist
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations
9. Despite our special abilities humans are still subject to the laws of nature
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated
11. The earth is like a spaceship with very limited room and resources
12. Humans were meant to rule over the rest of nature
13. The balance of nature is very delicate and easily upset
14. Humans will eventually learn enough about how nature works to be able to control it
15. If things continue on their present course, we will soon experience a major ecological catastrophe

This study selected six of the NEP statements listed above and used them as part of its instrument to measure ideologies, beliefs, and attitudes toward the environment. The selected NEP statements are discussed further in Chapter three.

e. Charismatic megafauna and communication

Whales were chosen as a figure to symbolize nature in this study. Whales represent nature well because they are large, charismatic, and can act as a figure for the marine environment at large. Smith, Diogo, Nicholas and Jones (2012) write that popular animal species give the environment a “face,” and that this increases salience with the public. By making a whale’s “face” symbolize nature, people can create a personal and memorable connection with the environment. Leader-Williams and Dublin (2000) suggest that charismatic megafauna may be the best way to communicate the appeal of conservation to a public audience. The ability for charismatic megafauna to act as an engaging symbol for nature is widely accepted in the field of conservation biology (Ducarme, Luque & Courchamp, 2013; Marris, 2013).

Not only are whales charismatic megafauna with a memorable “face,” but they are also a flagship species (Barua, 2011). The theory of flagship species suggests that conserving one species can act to conserve the ecosystem as a whole (Leader-Williams & Dublin, 2000). The theories behind charismatic megafauna and flagship species work in tandem, and act as communication tools, to urge support for environmental conservation. In this study direct observation of a whale was utilized, and then tested for its ability to “communicate” the need for environmental conservation.

Results from a whale watching study in 2013 on the east coast of the United States indicated that participants’ attitudes toward the environment changed

slightly after viewing whales, but failed to both increase visitors' environmental awareness and influence positive behaviors in the long term (Harms et al., 2013). Harms et al. (2013) wrote that their study's whale watching narrations lacked communication of the connection between human actions and the environment. The researchers (2013) suggested that future whale watching trips should, "foster behavioral intentions,...more strongly emphasize the adverse consequences of personal actions towards the marine environment and communicate initiatives for whale watchers to help protect the marine environment" (p. 69). So, that is what this study attempted to do.

f. Visual communication and communicating nature

A long history of human communication research supports the emotional power of visuals, and recent research indicates that visuals are an efficient component of science communication (Krause, 2016). Krause (2016) wrote that visuals have been used to communicate science from the time of Copernicus, and his conceptual design of our solar system. Krause also suggests that a combination of data and aesthetic, computed into "graphics or illustrations...enable learning and comprehension," (p.1) of scientific topics. She writes that these visuals communicate science successfully, "through the lens of signs, metaphor, symbolism, and analogy," (p. 9).

Environmental issues can be difficult for people to visualize, according to Hansen and Machin (2013). In turn human-generated visuals can be very useful for environmental communication purposes. Hansen and Machin (2013) contend that

images, which decontextualize issues, and aestheticize physical settings using imagery, deeply resonate with viewers. The researchers also suggest that “a sense of optimism, intimacy and familiarity,” (p. 159) created using a visual, can generate a deeper connection with environmental topics. Trumbo (2013) goes as far to write that, “visual representation in its many forms is a necessary part of science communication,” (p. 381). For this reason, a visual animation was selected to act as a science communication intervention in this study, and its impact on TPB was then measured using the instrumental questionnaire.

g. Research questions and hypotheses

Previous studies and literature discussed above indicate that direct contact with nature (in this case charismatic whales), can affect people’s behaviors toward the environment. A recent study by Harms et al. (2013) suggests that human-mediated communication about the environment would be a useful asset to academic research. The following five research questions involve human perceptions, environmental behaviors, human-mediated communication, and nature’s ability to affect these factors.

The first research question targets behavioral beliefs, asking whether they can change after intervention one: viewing a whale in its natural environment.

RQ1: Can the intensity level of experience of watching whales directly in the wild from whale watching vessels ("whale watching experience") influence behavioral beliefs, attitudes, and behavioral intentions toward recycling?

It is hypothesized that greater intensity of experiences with whales, which varies naturally in terms of the proximity to the viewer on the boat, affects behavioral beliefs, especially by affecting the value observers put on saving, and enhancing the health of, whales (including their ecosystem), and thus inspire positive behaviors toward recycling.

H1(a-c): Intensity of the whale watching experience correlates positively with: (a) behavioral beliefs, outcome beliefs and evaluations, about recycling behaviors that can help whales; (b) attitudes toward the act of recycling; and (c) behavioral intentions toward recycling.

A second intervention will be applied to the study: a communication message suggesting that plastic in the ocean harms whales (half of participants received the message, and half did not). The second research question asks whether human-mediated visual communication can inspire positive behavioral intentions to recycle.

RQ2: After experiencing a whale, does an animation suggesting that individuals' recycling behaviors can benefit whales, have the ability to induce more positive changes toward behavioral intentions to recycle?

H2(a-d): The communication manipulation will positively affect: (a) outcome beliefs subjects have that recycling will likely help save, and enhance the health of, whales; (b) behavioral beliefs toward recycling behaviors that can help whales; (c) attitudes toward the act of recycling; and (d) behavioral intentions toward recycling.

RQ3: Will whale watching intensity and the communication variable interact to affect behavioral beliefs toward recycling behaviors that can help whales, attitude toward recycling, and behavioral intention to recycle?

H3: There will be an interaction between (1) the intensity of the subjects' whale watching experiences and (2) the manipulated variable of whether or not the participants receive information demonstrating the effect of individuals' recycling behaviors on whales' well-being, such that those subjects who have a more intense viewing experience with the whales and who also get the communication animation will have, as compared to the other subjects:

(H3a) the strongest behavioral beliefs that recycling will help save the whales;

(H3b) the strongest behavioral beliefs that recycling will help improve the natural environment;

(H3c) the most positive attitudes toward the act of recycling; and

(H3d) the strongest behavioral intentions to recycle.

This study questions whether charismatic megafauna can inspire the behavioral decision to recycle, using the Theory of Planned Behavior (TPB).

RQ4: What are the relationships between behavioral intention to recycle and the proximate predictors from TPB studied in this experiment?

H4: Behavioral intention to recycle will be positively associated with:

H4a: Attitudes toward the act of recycling;

H4b: Subjective norms regarding recycling;

H4c: Perceived behavioral control regarding recycling.

This study investigates whether exposure to charismatic megafauna, as a symbol for nature, can affect people's behavioral beliefs. The fifth research question asks:

RQ5: What are the relationships between behavioral beliefs and attitudes toward the act of recycling?

H5: Behavioral beliefs toward recycling will be positively associated with attitudes toward recycling.

The final research question investigates the extent to which whale experience intensity can influence NEP scale responses. It asks:

RQ6: Can the level of exposure to whales, and the communication animation, acting separately and interacting, affect one's reported environmental beliefs via the NEP scale?

H6: The high intensity, animation present group D will report the highest NEP scale responses, compared to groups A-C.

The following methodology was generated to answer the research questions above, using a combination of previous theory and research, the TPB and NEP scale, naturally varying experiences in nature, and experimental communication animation manipulation by the researcher.

CHAPTER III: METHOD

a. Study design background and overview

For this quantitative study, questionnaires seemed to be the most efficient way of collecting data about human perceptions from individuals on whale watching trips. This study used a post-test-only experimental design to determine whether differing levels of direct experience with nature, and the presence or lack of a communication message, can inspire environmentally friendly behaviors (recycling), following TPB and NEP questionnaire design framework.

Methods are based on previous research, but unique to this study is its attempt to measure how differing experiences in nature influence people's beliefs, attitudes and behavioral intentions toward recycling, and its combination with a communication message.

b. Participants

Study participation consisted of adults from countries around the world who chose to travel to Juneau, Alaska in the summer of 2016, and purchase a citizen science-based whale watching excursion from Gastineau Guiding Company. Those who purchased a citizen science-based boat excursion elected to participate in scientific research through their excursion choice. Of the people who selected this excursion, participants were those randomly assigned to a trip with the student researcher as their science guide. Participation in the student researcher's experiment was voluntary for all those who went on the excursion with her. All of

the study participants went on a 2-hour-plus boat trip on the ocean, and observed humpback whales (*Megaptera novaeangliae*) in their natural environment.

A total of 227 people participated in this experiment and completed usable questionnaires. 86 of the participants, or 37.9%, were male, and 128 participants, or 56.4%, were female. 13 of the participants did not disclose their sex, or 5.7%, and were still considered valid participants in the study (See Figure 10 in appendix).

Participants represented countries worldwide, with 83.9% of participants who disclosed their country origins being from the United States, 3.5% being Canadian, 3.5% being Australian, 2.6% being from the United Kingdom, and 6.5% from other countries. A map of the study's participants is pictured below (Figure 5). In total, 15 different countries were represented in the study, including Japan, Panama, Romania, Mexico and United Arab Emirates, to name a few.

Participants ranged in age from 18 to 82, with a mean age of 53.31 and median age of 54. Of those who shared their age, 7.5% of participants were between 18-29 years old, 13.2% between 30-41 years old, 25.6% between 42-53 years old, 24.7% between 54-65 years old, 24.7% were 66 years old and above, and 4.0% did not disclose their age (See Figure 11 in appendix).

The mean years of education was college, 16 years, and the median was also 16 years. 22.4% of participants completed high school or less, 32.5% completed some college to four years of college, 18.9% had master's degrees, 10.1% had PhD level (or equivalent) education, and 15.9 did not disclose their education level. The study was approved by the Marquette University human subjects review board. The 227 participants that composed this study were split into one of four categories

Figure 5: Map of participants' countries of origin



Google Map data (2016)

The red markers above each stand for one participant of American origin, and represent the city/zip code where the participant reported to live. The pink markers above represent only the country, and not region, where the participant lives. The pink markers don't take into account the number of participants from that country, but rather represent that at least one person from that country was represented in the study.

based on independent, experimental variables (Table 1). 103 participants had a less intense whale viewing experience, in which the whales were 100 yards away or more, constituting group A and group C in Table 1 below. Of these 103 participants, a random 47 received no communication animation (group A), and a random 56 participants received the communication animation (group C). 124 participants had a more intense viewing experience, in which the whales were less than 100 yards away. Of the 124 participants, a random 66 received no communication animation (group B), and a random 58 received the communication animation (group D).

c. Instrumentation

Post-test only questionnaires were created to measure human perceptions using Ajzen's (2010) previous TPB questionnaires, and the NEP scale, as design

models. After going on a 2-hour-plus boat trip and observing whales, all participants were classified into one of four random groups, A-D (Table 2). Then

Table 1: Number of participants by experimental group			
	Whale viewing experiences (measured, randomly distributed to groups below)		
Receive information manipulation animation (Random assignment)	Number of participants Less intense (long distance from whales, 100 yards away or more)	Number of participants More intense (close distance from whales, less than 100 yards away)	Total
No	Group A 47 20.7%	Group B 66 29.1%	113 49.8%
Yes	Group C 56 24.7%	Group D 58 25.6%	114 50.2%
Total	103 45.4%	124 54.6%	227 100%

participants were asked to help the student researcher by filling out a questionnaire. This questionnaire acted as an instrument to assess the interactions between the four randomly assigned groups, and the intervening variables.

Table 2: 2x2 experimental design factors		
	Whale viewing experiences (measured, naturally occurring)	
Receive information manipulation animation (Random assignment)	Less intense (long distance from whales, 100 yards away or more)	More intense (close distance from whales, less than 100 yards away)
No	Group A	Group B
Yes	Group C	Group D

A verbal speech was given to all participants before receiving the questionnaire, indicating that participation in the study was voluntary, and that no personally identifying information would be included in research reports. Subjects were informed that they could answer or refuse any of the instrument's questions.

The selected environmental behavior of interest, recycling, was measured using the questionnaire, by comparing varying responses between groups A-D. A 7-point Likert scale was utilized to measure the range of participants' attitudes, beliefs, subjective norms (SN), perceived behavioral control (PBC), NEP ideologies and past behaviors. A 7-point unipolar scale is appropriate for ranking beliefs and perceptions about a given topic and choosing the most appropriate ranking on a continuum scale between two adjectives (matched with numbers) with opposite meanings (Wrench, Thomas-Maddox, Richmond & McCroskey, 2013). Fifteen questions were generated to measure dependent variables targeted by research questions.

The questionnaire emphasized beliefs and attitudes toward the behavior of recycling. Subjective norms and perceived behavioral control were accounted for with one question dedicated to each, but didn't receive as much focus as behavioral beliefs, attitude toward the behavior, and behavioral intention to recycle.

Behavioral beliefs, made up of outcome beliefs and outcome evaluations, constituted a significant portion of the questionnaire, and were measured using six questions. Questions one through three asked about outcome evaluations and were measured on a scale ranging from (1) very bad to (7) very good. These three outcome evaluations coincide with three questions about outcome beliefs (question #15a-15c), which were measured on a (1) very unlikely to (7) very likely, or (1) strongly disagree to (7) strongly agree scale. Question one is exemplified below:

For me, improving the general health of ecosystems and oceans would be:

Very bad: 1 2 3 4 5 6 7: Very good

This question asked how the participant feels about the outcome of improved environmental and ocean health. The lower numbers on the scale (1), on the very bad end, correlate with more anthropocentric beliefs. The higher numbers (7) on the very good end of the scale, correlate with more ecocentric beliefs.

Questions 1-3, assessing outcome evaluations, correlate with questions 15a-c, outcome beliefs. Question 15b is exemplified below, and correlates with question one above:

My recycling at home regularly for the next three months would help improve the general health of ecosystems and oceans:

Very unlikely: 1 2 3 4 5 6 7: Very likely

This question, correlating directly with question one, measured outcome evaluations, and indicates whether the participant connects their beliefs about ecosystems with their personal behavior of recycling.

Attitude toward the act of recycling was measured by five questions (#4a-4e), which asked the participant to rank their feelings about recycling in different ways, on a scale of one through seven. For example, the questionnaire asked whether the participants' recycling at home regularly over the next few months would be (1) very bad to (7) very good. The low numbers, or very bad end of the scale, correlate with anthropocentric ideologies, whereas the very good end of the scale, high numbers, correlate with more ecocentric ideologies. Question 4b is exemplified below:

My recycling at home regularly over the next few months would be:

Very unrewarding: 1 2 3 4 5 6 7: Very rewarding

The five questions that focused on attitude toward the act of recycling allowed a reliability measure because all five were similar. The responses were compared to determine how well they correlated in predicting attitude toward the act.

Behavioral intentions were measured using one question (#14). This question asked over the next three months whether participants planned to recycle regularly at home. This question is exemplified below:

Over the next three months, I plan to recycle regularly at home:

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

This question, measuring behavioral intention to recycle, links TPB behavioral beliefs and attitudes with future behavioral intentions.

One question, number 12, measured past behaviors, and asked how regularly the participant recycled materials at home previously, using a 7-point scale. It asked:

In the past three months I have recycled materials regularly in my home:
 Very rarely: 1 2 3 4 5 6 7: Extremely often

Past behaviors are often, but not always, a good predictor of future behaviors.

One question was asked to assess subjective norms, and one was asked to assess perceived behavioral control. To assess subjective norms, question 13 asked what most people important to the participant think about recycling, using a 7-point scale. It asked:

Most people who are important to me think I should recycle regularly.
 Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

Question 13 measured perceived social pressures of the participant, which affects one's behavioral intentions, according to TPB.

Question 11 was developed to measure perceived behavioral control. It asked about the participant's confidence in their ability to recycle at home over the next three months, using a 7-point scale. It asked:

I am confident that if I wanted to I could recycle at home over the next three months:

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

This question measured the participant's perceived capacity and autonomy to control their personal recycling behavior.

Six questions, five through ten, used the New Ecological Paradigm scale (Anderson, 2012). These questions were designed to assess deeply rooted environmental ideologies. From the 15 items listed as part of the revised NEP in the literature review, six were selected to become a part of this study's instrument. Items 5, 6, 7, 10, 12 and 15 from the revised NEP were utilized. The six items chosen, and what they measure according to Dunlap et al. (2000), are discussed below.

5. Humans are negatively affecting the environment (measures eco-crisis).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

The revised NEP uses the terminology "severely abusing" rather than "negatively affecting." Due to study constraints (owner of Gastineau Guiding Company didn't like the wording of this phrase on the revised NEP), the language was revised for this study's questionnaire.

6. The earth has plenty of natural resources if we just learn how to develop them (measuring environmental limits).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

7. Plants and animals have as much right as humans to exist (measuring anti-anthropomorphism).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

10. The so-called "ecological crisis" facing humankind has been greatly exaggerated (measuring eco-crisis).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

12. If things continue on their present course, we will soon experience a major ecological catastrophe (measuring anti-anthropomorphism).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

Humans were meant to rule over the rest of nature (measuring eco-crisis).

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

Scoring high (close to a 7 on the Likert Scale) on the odd numbered questions, like item 7 above, represented higher ecological ideologies (ecocentric), and correlated with the new ecological paradigm (Anderson, 2012). Conversely, scoring low on the odd numbered questions demonstrated more anthropocentric ideologies, and correlated with the dominant social paradigm (Anderson, 2012).

Even numbered questions 6, 8, and 10 use the NEP scale, but a low number, on the strongly disagree side of the scale, indicated higher ecological ideologies (ecocentric), whereas a high number indicated lower ecological ideologies (anthropocentric). Question 8 is exemplified below:

The so-called “ecological crisis” facing humankind has been greatly exaggerated.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

The responses to questions 6, 8, 10 were recoded before analyzing responses, so that they match with the rest of the instrument’s measures in which scoring high (near 7) represented more ecocentric ideologies, and scoring low (near 1) represented more anthropocentric ideologies.

The fifteen-question instrument measured beliefs, past behaviors, behavioral intentions, subjective norms, perceived behavioral control, and deeply rooted environmental ideologies. The questionnaire emphasized environmental attitudes

by measuring outcome evaluations, outcome beliefs and attitude toward the act of recycling as well as utilized the NEP scale. Research questions one through six were covered by the questionnaire.

Five demographics questions were asked of the participants: sex, age, country of residence, zip code and highest year of education completed. Most participants chose to answer these questions, but some left the questions blank. Sex, age, and education were considered covariates.

d. Procedure: TPB and interventions

This study's instrument heavily relied upon the TPB and previous research supporting it. It emphasized attitude and behavioral intentions toward one behavior: recycling. It emphasized behavioral beliefs, attitudes toward the behavior, and behavioral intentions to recycle (Figure 6), giving less attention to subjective norms and perceived behavioral control, although still controlling for these factors in the post-test instrument. By narrowing the questionnaire to focus on behavioral beliefs, the experiment could more easily assess the impact of experimental interventions (Ajzen, 2006) that were applied in this study.

Figure 6: Predicting behavioral beliefs > behavior of recycling

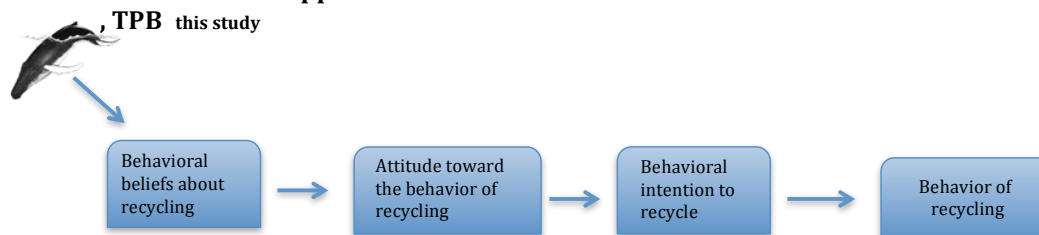


The two interventions applied to this TPB field experiment, and the extent to which these interventions might influence behavioral intentions, and behaviors, were measured using questionnaires.

1. *The nature experience intervention*

The first intervention applied to all participants was a whale (Figure 7), or several whales. The intensity of subjects' exposure to whales was measured and recorded, splitting participants into one of two groups: more intense and less intense encounters. The results incurred by the intervention were assessed via post-test questionnaires. The experiment assessed whether the intervention positively influenced people's behavioral intention to recycle, or not. The questionnaire measured whether participants had positive, negative, or neutral behavioral intentions to recycle, and in turn measured the influence of both interventions.

Figure 7: Whale intervention applied to



Whales are the charismatic megafauna figure chosen to symbolize nature in this study. The level of exposure to whales in the wild was recorded as one of two scenarios: a less intense encounter with nature (100 yards away or

more), or a more intense encounter with nature (less than 100 yards away). A distance of 100 yards was selected because of its legal significance: the federal Marine Mammal Protection Act forbids approach of a humpback whale by less than 100 yards in Alaskan and Hawaiian waters (National Oceanic and Atmospheric Administration, 2016). Often marine mammals, including humpback whales, approach a boat within a distance of 100 yards, and this encounter is considered legal, as long as the whale rather than human is responsible for the distance. Although the 100-yard rule is based on legalities, I propose that an encounter of less than 100 yards is a more intimate experience with nature, and define it as an intense encounter in this study. I also propose that an encounter of 100 yards away or more is a less intimate experience with nature, and define it as a less intense encounter.

These two different variables of intensity were created in order to compare differing levels of nature experience, and were measured using the questionnaire. A more intense encounter is predicted to enhance one's feelings of connectedness to nature, based on physical distance, enhanced sensory abilities to hear and see the animals, and emotional reaction. A less intense encounter is predicted to conjure less enhanced feelings of connectedness to nature, compared to the more intense encounter, based on greater physical distance, reduced ability to hear and see the animals, and thus a lesser emotional reaction is predicted. The extent to which nature intensity, via whales, affected reported behavioral beliefs and intentions toward the environment was measured using the questionnaire.

Ajzen (2006) suggested that few behavioral beliefs are readily accessible for change at a given moment. The whale intervention could make behavioral beliefs more readily accessible for change due to emotional elicitation, and thus, it was hypothesized, could have a measured effect on behavioral intentions toward the environment. Due to study constraints that allowed only one round of questionnaires, it was difficult to assess the difference between immediate emotional elicitation and long-term influence on behavioral intentions and enacted behaviors.

The researcher documented subjects' varying experiences with whales (either less than 100 yards, or 100-plus yards). Number of whales experienced was originally going to be factored into the intensity equation as well, but after the study was completed, it was decided that distance was the most important factor involved. The student researcher decided that either one whale, or twenty whales, less than one hundred yards away should be considered a more intense encounter. It was concluded that the number of whales was less significant, when compared to the distance of the encounter.

While the varying nature intensity experience is an important variable, wildlife cannot be manipulated or controlled, so this variable changed on a daily basis according to the animals' accords. This allowed assessment of the degree to which natural variation in whale observation, or intensity of direct experience with nature, influenced people's behavioral beliefs, attitudes and behavioral intentions to recycle.

Of the 227 participants, 103 (45.4%) had a less intense nature experience and 124 (54.6%) had a more intense nature experience, as defined by the parameters of distance in this study.

2. The communication intervention/animation

Harms et al. (2013) suggest that naturalists on whale watching trips should find better ways to connect to viewers, because participants demonstrated detachment and few lasting sentiments on follow-up questionnaires in their research. This study attempted to specifically communicate the connectivity between people and whales by sharing an animation with half of the participants. This manipulation was a controlled variable, so the other half of participants did not view the animation, and thus the difference between these groups was assessed. The experiment measured whether a communication message can indeed resolve the problems mentioned in the study by Harms et al. (2013).

114 (49.8%) of the study's 227 participants received the manipulated communication variable, an animation, and 113 (50.2%) participants did not (control variable). Because everyone on a tour had to follow the same conditions, tour groups alternated between the control and manipulated options. On one day the entire tour group received the manipulated communication variable, and the next day the entire group was the control, and did not receive it. This variable was determined as randomly as possible, but was largely influenced by access to technology (presence or lack of a computer screen on the bus that could show the animation). Nearly half of those who had a more intense viewing experience with

whales were randomly assigned to the animation present group, and half not; similarly, nearly half of those in the less intense viewing group were, as a byproduct, randomly assigned to the animation present or absent group.

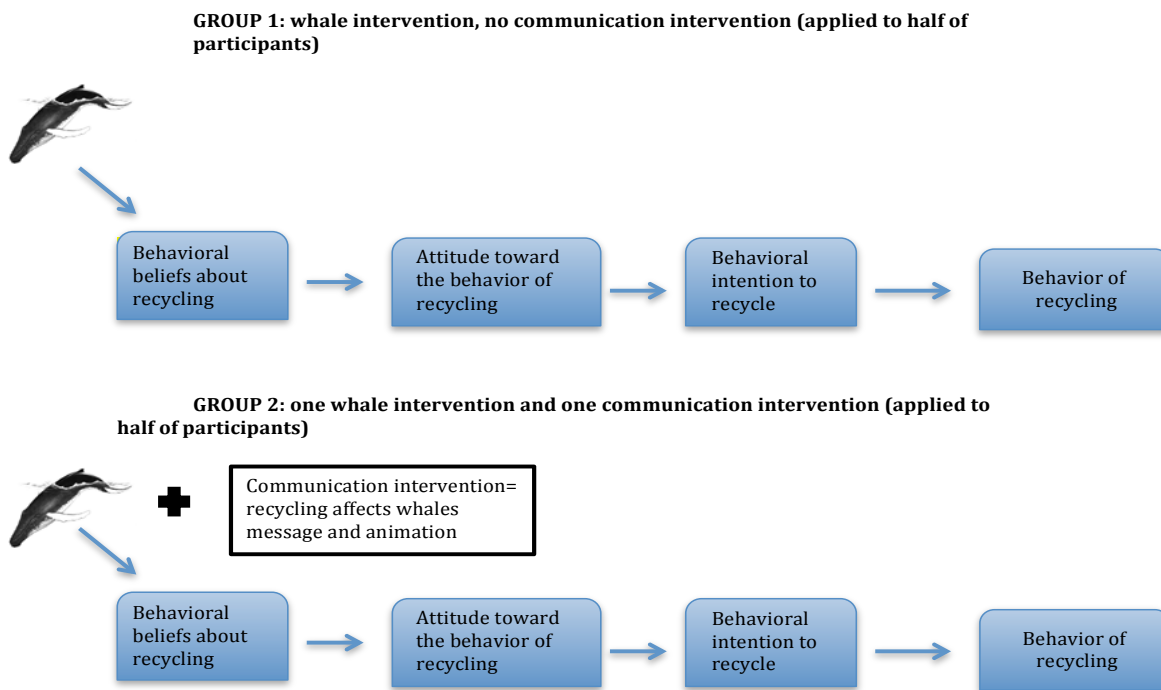
The animation was shown to half of the study participants, used as the controlled communication variable. The animation, *Plastic Whale*, was produced by the Surfrider Foundation, a nationwide organization dedicated toward preserving the world's oceans. In 2013 the Surfrider Foundation created this 30-second animated whale video, and it is publicly available on youtube (<https://www.youtube.com/watch?v=7RPvzbzQghkM>). The short animation illustrates a whale swimming in its natural marine habitat through plastic bottles, bags, and 6-pack aluminum can holders. Then the whale jumps, lands on a heap of garbage, and dies. A written message is then displayed on the screen, which reads: "Plastics kill 1.5 million marine mammals each year." The animation is visually appealing and acts to fill a communication gap between the human behavior of recycling and the well-being of whales.

The communication intervention depicted the link between recycling and whales' well-being using visual communication: an animation. According to Ajzen (2006), both experience and information can alter current beliefs or lead to the formation of new beliefs. This intervention visually communicates the connectivity between human-generated plastic waste and whales' well-being. The animation is intended to inform those who view it about ecosystem connectivity, and how a person's behaviors affect the animals they had direct experience with.

After experiencing whales, and prior to receiving questionnaires, half of the study participants watched the animation on a screen on a bus. The animation was looped so that it played continuously without sound for twenty minutes while participants filled out questionnaires.

This controlled intervention came after the first intervention of whales had already been experienced. Figure 8 demonstrates the interventions applied to all participants in the study. These two interventions were chosen to test and compare changes in behavioral intentions inspired via the two different interventions: experience in nature (intervention 1: whales) and information (intervention 2: communication animation).

Figure 8: Whale and communication interventions applied to this study, TPB



This study is intended to fill the communication gap discussed by Harms et al. (2013) in their whale watching study. Results of that study indicated that in order for people to understand the link between their environmental behaviors and whales' well-being, they may need the concept communicated to them explicitly. This research study offered a communication message that demonstrated the relationship between a person's recycling behaviors and whales in the ocean, as well as a control group without the message, which allowed this study to compare and then draw conclusions about the intervention's effectiveness.

The 2013 study by Harms et al. assessed numerous behaviors, whereas the proposed study focused on just one. By isolating one particular behavior (recycling), it is hoped that behavioral intentions could be measured more accurately.

After participants experienced whales of differing intensity levels, and half randomly received the communication message (or didn't receive the communication message), questionnaires were distributed to all groups. This instrument assessed whether whale experiences affected responses to the various aspects of TPB, especially related to behavioral beliefs, attitude toward the behavior, and behavioral intention to recycle. Questionnaires were distributed about 15 minutes after return to land from the whale-watching excursion.

e. Independent variables

Independent variables are those that were part of the environment, and were manipulated (Wrench et al., 2013). The two independent variables were also

experimental variables: nature intensity level and animation presence (or lack of animation). Participants were segregated according to these variables, into one of four groups, A-D. The independent variables were either manipulated by the researcher (communication animation), or varied naturally (whale experience intensity), and impacted the dependent variables. The independent variables were recorded, and then the dependent variables were measured via responses on the questionnaire.

f. Dependent variables

Dependent variables included subjects' environmental ideologies (NEP), behavioral beliefs about recycling (including measures related to the impact of recycling on whales and on the environment), attitude toward the act of recycling, behavioral intention to recycle, past behaviors, subjective norms, and perceived behavioral control. The dependent variables were measured using questionnaire responses, targeted by questions 1 through 15. Hypothetically the greatest, positive responses in the dependent variable were expected for group D (Table 2).

g. Apparatus

The student researcher used paper questionnaires for the post-test instrument. She also had access to boats, which brought participants to whales, and to a screen that enabled half of participants to view an animation. Another tool was needed to obtain the most accurate measurement of distance between the boat and whale(s). In previous studies whale researchers and marine mammal observers

have used laser range finders to obtain accurate distance measurements between vessels and marine mammals (Bard & Burhart, 2000; National Marine Fisheries Service, 2014).

In this study, laser range finders couldn't always accurately measure the distance between a boat and whale because the animals were moving, and only seen for brief moments when the animals surfaced for air. In order to use a laser range finder, the student researcher had to point and shoot a laser on the animal at the unpredictable time it surfaced from the ocean. When the laser range finder couldn't determine the closest, most accurate distance, the student researcher estimated the distance instead, using the laser range finder and other measurements to make the best estimate possible. Because there were only two groups for distance, less than 100 yards and 100 yards away or more, estimates are considered to be quite accurate for this classification. When whales were calculated or estimated to be 100 yards away or more, it was considered a less intense experience with nature. When whales were calculated or estimated to be less than 100 yards away, the experience was classified as a more intense experience with nature.

h. Data analysis

Questionnaires were used as the main instrument for assessing the extent to which direct experience with nature, and then a communication animation, affected participants' responses. IBM Statistical Package for the Social Sciences (SPSS) Version 24 was used to analyze data and measure independent variables.

Two different intensity levels of direct experience with nature were documented, so participants were split into one of these two categories. To measure the extent to which a communication animation affected dependent variables, two more categories were created as well, making this experiment 2x2 factorial design. Each participant was classified into one of four groups, A-D (Figure 1). The extent to which each one of the four groups differed in questionnaire responses was then measured and compared using General Linear Model (GLM) tests run in SPSS. Univariate Analyses of Variance (ANOVA) tests were run to determine whether there was a statistically significant difference between means of the four groups.

Dependent variables ranged from cognitive structure, to attitude toward the act, behavioral intentions, and lastly the NEP scale. Fixed factors were constant across all ANOVA tests: intensity of nature experience and animation presence. Covariates were also constant, and included sex, education, and age. Demographic variables were considered covariates because this study's research questions don't take demographics into account, so they are considered insignificant factors in affecting dependent variables for the purposes of this study. NEP was considered a covariate in the cognitive structure ANOVA test, as the two had a statistically significant correlation ($\beta=.250$, $p<.001$), but NEP did not have a significant correlation with attitude toward the act or behavioral intentions, as demonstrated by regression tests (Tables 11 & 12), so it was ignored in these instances. ANOVA tests were used to answer research questions 1, 2, 3 and 6. The results are presented and discussed in the next two chapters.

Multiple hierarchical regressions were run in SPSS to determine the effectiveness of the TPB model applied in the context of this study. Regression tests reported the correlations between dependent TPB variables, and the results are listed, then discussed in the next two chapters. The two different regressions measured TPB dependent variables: behavioral intention and attitude toward the act of recycling. Blocks 1-3 measured the impacts of TPB variables, predictors, on the dependent variables. Block 1 was composed of the estimated lowest predictors, which in both cases were demographics: education, age, and sex. Block 2 was composed of the next lowest estimated predictors: summated new ecological paradigm scale and past recycling behavior. Block 3 contained the next lowest estimated predictors: animation presence and intensity of nature experience. The first regression run was for behavioral intention, and included a fourth block for summated outcome evaluations*outcome beliefs. This regression used subjective norms, perceived behavioral control, and summated attitude toward the act as focus predictors, which were estimated to be the greatest predictors of behavioral intention. The second regression had just three blocks, and used evaluations*beliefs as its focus predictors because these variables equate to attitude toward the act, the dependent variable.

A path analysis was constructed using SPSS regression tests, and then checked using AMOS. The path analysis image in the next chapter illustrates TPB correlations and betas that predicted behavioral intention. The dependent variable was behavioral intention to recycle, and predictors were outcome beliefs and

evaluations (which predicted AAct), attitude toward the act, subjective norms, and perceived behavioral control.

i. *Recoding the instrument*

To assess TPB and NEP responses, the questionnaires were recoded to allow for consistency. All questions were recoded in such a way that response number 1, on the 7-point Likert scale, equated to less intention toward the act of recycling, or more anthropocentric values. The even numbered NEP items were reverse coded to maintain this consistency. This means that the number 7 equated to positivity toward the environment, greater intention toward the act of recycling, or more ecocentric beliefs. In order for all the data responses to be tested for reliability, they first had to be recoded in this manner.

The three outcome evaluation measures were recoded to a bipolar scale (-3 to +3) and multiplied by unipolar outcome beliefs (1 to 7). The compounded, summated means could range on a scale of -63 (anthropocentric) to +63 (ecocentric), and created the cognitive structure compound. Next five attitude

Measure	Number of items/questions	Cronbach's alpha
Attitude toward the act of recycling (unipolar)	5	.901
Environmental outcome evaluations and beliefs (unipolar)	6	.768
Cognitive structure Environmental outcome evaluations (bipolar) x beliefs (unipolar)=	3x3	.840
New Ecological Paradigm scale (unipolar)	6	.584

Table 4: Reliability of New Ecological Paradigm scale (alpha=.584) by item		
Item	Cronbach's alpha if item deleted	Corrected item-total correlations
NEP 1: Humans are negatively affecting the environment	.496	.445
NEP 2: The earth has plenty of natural resources if we just learn how to develop them	.669	.016
NEP 3: Plants and animals have as much right as humans to exist	.545	.314
NEP 4: The so-called "ecological crisis" facing humankind has been greatly exaggerated	.494	.414
NEP 5: If things continue on their present course, we will soon experience a major ecological catastrophe	.506	.404
NEP 6: Humans were meant to rule over the rest of nature	.492	.416

NEP item 2 (in bold), if deleted, would increase reliability to .669, but due to internal reliability tests run in previous NEP research, this item is not being deleted

toward the act measures were compounded to create a summated attitude toward the act means range from +5 to +35. Behavioral intention to recycle was made of one measure, and the means range is thus between +1 to +7. Lastly summated New Ecological Paradigm Scale is composed of 6 measures, compounded to create a means range from +6 to +42.

j. Reliability testing

Reliability was calculated using the Cronbach's alpha reliability test in SPSS, to ensure that participants' responses were consistent and accurate. The Cronbach's alpha reliability test was chosen because there was only one set of questionnaires administered, so reliability had to be measured within the single

questionnaire. During questionnaire construction, questions were developed to assess environmental beliefs, attitudes, and behavioral intentions. Many of the questionnaire items targeted the same research question, so the reliability test assessed internal reliability amongst questions. Cronbach's alpha scores for attitude toward the act of recycling, environmental outcome evaluations and beliefs about recycling, and the New Ecological Paradigm scale are listed in Table 3.

The five items for attitude toward the act of recycling revealed a high Cronbach's alpha (.901), indicating excellent internal reliability (Wrench et al., 2013). Environmental outcome evaluations and beliefs were measured using six items, and had a slightly lower Cronbach's alpha of .768, which is considered a respectable and acceptable score. When the bipolar outcome evaluations were multiplied by the unipolar outcome beliefs, creating a measure of cognitive structure, the Cronbach's alpha was slightly higher, at .840, which is considered a good score. The lowest Cronbach's alpha was for the six NEP scale items, at .584, which is considered an unacceptable score.

All six NEP scale questions are still being analyzed for this study, despite a low Cronbach's alpha score, for several reasons. The NEP scale is composed of standard questions that have been used in hundreds of previous studies, suggesting that internal reliability of the questions is acceptable.

There are a few possible reasons that the Cronbach's alpha is low in this study. One possibility is that the six items used on the questionnaire, as opposed to the 15 items used in traditional NEP studies (Anderson, 2012), caused a drop in the alpha score. Another possibility is that the sample size of participants

was not large enough to increase reliability of these NEP items. Lastly, one particular item, NEP 2, reduced the Cronbach's alpha score most considerably, suggesting that the other five items had higher reliability (See Table 4).

According to Dunlap et al. (2000), who created the revised NEP scale, "Results of a 1990 Washington State survey suggest that the items can be treated as an internally consistent summated rating scale" (p. 425). Removing an item from the study was considered, but decided against due to the already generated statistical support and reliability of the NEP scale supported by previous research.

k. Meeting assumptions/validity testing

Validity, the degree to which the questionnaire instrument truly assessed the research questions asked, was measured in several ways. Fortunately both the TPB and NEP have been proven valid measures in previous literature and research, and this supports the validity of the questionnaire designed for this study.

Questionnaire validity was also assessed when running regressions and ANOVAs in SPSS, by calculating significance values and correlations for all dependent variables. For the purposes of this study, a statistical difference was considered significant when $p < .05$, although instances when $p < .005$ were also labeled, and documented in the tables below.

For most of this study's questionnaire items, several different types of questions were asked to assess the same research question (outcome beliefs and evaluations, AAct, NEP scale), which increased validity of the questionnaire. In some instances only one question could be used to measure dependent variables

(SN, PBC, behavioral intention), and these cases have lower validity than those that had several items. At times one question was used to measure a dependent variable due to limited time and space by company owners.

Chapter IV: RESULTS

a. *Research questions 1, 2 & 3*

Research questions one, two and three ask whether intensity of whale experience, or animation presence, or an interaction between the two experimental variables can influence behavioral beliefs, attitudes and intentions to recycle. To answer these questions, and test the hypotheses, factorial ANOVA tests were run in SPSS to determine whether there were statistically significant differences between means of groups A-D. The results of the factorial ANOVA tests of means for behavioral beliefs, attitudes, and behavioral intentions are below.

1. *Behavioral beliefs*

Table 5 contains cognitive structure, or the summated outcome evaluations multiplied by outcome beliefs compound. None of the means in Table 5, groups A-D, demonstrated statistically significant differences ($p > .05$). All of the means displayed in Table 5 were positive, within a small range between 40.91 (less intense viewing, animation present) to 45.61 (less intense viewing, no animation). This small range, and the $p > .05$, indicate that there was no statistically significant difference between groups A-D. Cognitive structure had high Cronbach's alpha reliability of .840, yet there was no statistically significant difference among the means. The high p-value indicates that the null hypotheses can't be rejected, and instead it is assumed that there was no significant difference between viewing intensity, animation presence, or an interaction between the two variables.

<p align="center">Table 5: Relationship of whale viewing experience and animation presence with cognitive structure (Summated outcome evaluations (bipolar) * beliefs (unipolar) means (3*3 measures, compounded))= $\sum b_i e_i$</p> <p align="center">Scale: -63.....+63 low environmental evaluations and beliefs high environmental evaluations and beliefs</p>			
		<p align="center">Whale viewing experiences (measured, randomly distributed to groups below)</p>	
<p>Receive information manipulation animation (Random assignment)</p>	<p>Less intense (long distance from whales, 100 yards away or more)</p>	<p>More intense (close distance from whales, less than 100 yards away)</p>	<p>Mean behavioral beliefs</p>
No	Group A 45.61 N=47	Group B 44.99 N=66	45.30
Yes	Group C 40.91 N=56	Group D 42.43 N=57	41.67
Mean behavioral beliefs	43.26	43.71	43.49 Total N=226

p>.05
covariates: sex, age, education, NEP

<p align="center">Table 6: GLM ANOVA data Relationship of whale viewing experience, animation presence, and whale viewing experience and animation presence with Cognitive structure</p>				
Fixed factors	F	df	Sig.	Eta²
Whale viewing experience intensity	.376	1, 218	.540	.002
Animation presence	2.125	1, 218	.146	.010
Whale viewing experience X animation presence	.836	1, 218	.361	.004

Hypothesis 1a contended that intensity of whale watching experience would correlate positively with behavioral beliefs, outcome beliefs and evaluations, about recycling behaviors that can help whales. Because $p > .05$, we cannot reject, but rather accept the null. Results indicate that there was no positive correlation between intensity of whale watching experience and reported behavioral beliefs toward recycling.

Hypothesis 2a predicted that the communication animation would positively affect subjects' outcome beliefs that recycling could help save, and enhance the health of, whales; and H2b, predicted that the communication animation would correlate positively with behavioral beliefs. Again, due to a high p-value, the nulls of both of these hypotheses cannot be rejected, but are rather accepted. The communication animation did not positively affect outcome beliefs or behavioral beliefs toward recycling.

Hypothesis 3a predicted that there would be an interaction between (1) the intensity of the subjects' whale watching experiences and (2) the manipulated variable of whether or not they received information demonstrating the effect of people's recycling behaviors on whales' well-being, predicting that those subjects in group D would have, as compared to the other groups, the strongest behavioral beliefs that recycling would help save whales, and H3b help save the environment. The nulls of H3a and H3b must both be accepted because $p > .05$. The accepted nulls contend that there was no positive, significant interaction between the intensity of experience or animation presence, and group D did not report the most positive behavioral beliefs toward saving whales and the environment.

2. Attitudes

The summated 5 measures of attitude toward the act of recycling approached statistical significance. Between the four groups A-D

Table 7: Relationship of whale viewing experience and animation presence with summated attitude toward the act of recycling (5 measures)			
Scale: 5 35			
weaker attitude toward recycling		stronger attitude toward recycling	
	Whale viewing experiences (measured, randomly distributed to groups below)		
Receive information manipulation animation (Random assignment)	Less intense (long distance from whales, 100 yards away or more)	More intense (close distance from whales, less than 100 yards away)	Mean attitude toward the act
No	Group A 29.91 N=47	Group B 29.44 N=66	29.68
Yes	Group C 27.63 N=56	Group D 30.99 N=57	29.31
Mean attitude toward the act	28.77	30.22	29.50 Total N=226

p>.05

covariates: sex, age, education

Table 8: GLM ANOVA data				
Relationship of whale viewing experience, animation presence, and whale viewing experience and animation presence with Summated attitude toward the act of recycling				
Fixed factors	F	df	Sig.	Eta²
Whale viewing experience intensity	3.79	1, 219	.053	.017
Animation presence	.246	1, 219	.620	.001
Whale viewing experience X animation presence	6.49	1, 219	.012	.029

(see Table 7), intensity of experience had a $p=.053$, demonstrating greater responsibility for difference between groups than animation presence (ns), though the interaction between animation presence and intensity of experience was the most statistically significant ($p=.012$). Intensity of experience proved of greater influence in producing a significant difference in means than animation presence, which was not statistically significant on its own.

Due to a p-value of .053 (just above .050) for intensity alone, null hypothesis 1c must not be rejected. The null of H1c is that whale watching experience does not correlate positively with attitude toward the act of recycling ($F_{1,219}=3.79$, ns).

H3c, which predicted that there would be an interaction between the two experimental variables, can be supported ($F_{1,219}=6.49$, $p=.012$). H3c predicted that for attitude toward the act of recycling, group D, the more intense and animation present group, would report higher, statistically significant recycling attitudes than groups A, B & C, and the data in Table 8 rejects the null, or supports this hypothesis. Attitude toward the act of recycling was the only case in which there was a statistically significant difference between groups, in the case of interacting experimental variables, supporting H3c.

H2c predicted that the communication manipulation would positively affect attitudes toward the act of recycling, but due to the low p-value ($F_{1,219}=.246$, ns), this null cannot be rejected. Instead we accept the null, which contends that the communication animation did not positively affect attitudes toward recycling.

3. Behavioral intentions to recycle

The factorial ANOVA test run for behavioral intentions to recycle revealed statistically significant differences between groups A-D ($p < .05$), as demonstrated in Table 9. For the interaction between the two experimental variables there was statistical significance ($F_{1,220} = 5.50, p = .02$). For the communication animation alone there was statistical significance ($F_{1,220} = 4.03, p = .046$), and for intensity of whale experience alone the variable was not considered statistically significant ($F_{1,220} = .712, ns$).

Table 9: Relationship of whale viewing experience and animation presence and behavioral intention to recycle (1 measure) Over the next three months, I plan to recycle regularly at home. Scale: Strongly disagree 1 2 3 4 5 6 7 Strongly agree weaker intention to recycle stronger intention to recycle			
Whale viewing experiences (measured, randomly distributed to groups below)			
Receive information manipulation animation (Random assignment)	Less intense (long distance from whales, 100 yards away or more)	More intense (close distance from whales, less than 100 yards away)	Mean behavioral intention
No	Group A 6.51 N=47	Group B 6.23 N=66	6.37
Yes	Group C 5.71 N=56	Group D 6.30 N=58	6.00
Mean behavioral intention	6.11	6.27	6.19 Total N=227

$p < .05$
covariates: sex, age, education

Fixed factors	F	df	Sig.	Eta²
Whale viewing experience intensity	.712	1, 220	.400	.003
Animation presence	4.03	1, 220	.046	.018
Whale viewing experience X animation presence	5.50	1, 220	.020	.024

Due to $p > .05$ for whale intensity alone, H1c, which predicted that whale intensity would correlate positively with behavioral intentions to recycle, cannot be accepted. Instead we accept the null, that whale-watching experience does not correlate positively with behavioral intention to recycle.

Although ANOVA tests revealed statistically significant differences between groups A-D ($p = .046$), group A (low intensity, animation not present) had the highest mean of 6.51. The mean for group C (low intensity, animation present) was lower, 5.71. Results refute H2d, which predicted that the communication manipulation would positively affect behavioral intentions. Instead, statistically significant results suggest it negatively correlated with behavioral intentions. Again, although groups A-D had statistically significant ($p = .020$) differences, the mean for group D was 6.30, lower than group A, 6.51. H3d predicted that there would be an interaction between intensity of experience and the communication variable, such that group D would have the greatest reported behavioral intentions to recycle. Results refute this hypothesis ($F_{1,220} = 5.50$, ns), so participants who had a high intensity whale

experience, and viewed the communication animation, did not report greater intention to recycle, but rather reported less intention to recycle, on average.

h. Research question 4

Research question number four asks about the TPB relationships between behavioral intention to recycle and attitude toward the act, subjective norms, and perceived behavioral control. Hypotheses predicted that these three would have a positive relationship with intention to recycle.

Attitude toward the act of recycling was targeted by five questions on the instrument, while subjective norms and perceived behavioral control were targeted with only one question each. As seen in Table 11, regressions run in SPSS (while factoring for covariates) determined a statistically significant ($p < .005$), positive correlation between behavioral intention to recycle and summated attitude toward the act ($\beta = .246$), subjective norms ($\beta = .122$), as well as perceived behavioral control ($\beta = .300$). For these three factors in control block 4, regression tests revealed a statistically significant R^2 change = .133, which indicates that attitude toward the act, subjective norms, and behavioral intention to recycle are significant predictors of behavioral intention. The only measure that was a greater predictor of behavioral intention to recycle was reported past behavior. Table 8 indicates that reported past behavior was the greatest predictor of behavioral intention to recycle ($\beta = .395$, $p < .005$). Demographic factors (sex, education, age), summated outcome evaluations* beliefs, animation presence, and intensity of nature experience had no statistically significant correlation with behavioral intention to recycle.

Table 11: Multiple hierarchical regression: Relationship of TPB's behavioral intention (BI) to recycle (dependent variable) with other measured TPB variables	
Predictors	Correlation with BI Standardized beta weight
Education	-.009
Age	-.061
Sex	-.010
Block 1: R² change	.021
Summated New Ecological Paradigm Scale	.020
Past recycling behavior	.395**
Block 2: R² change	.640**
Animation presence	-.057
Intensity of nature experience	-.010
Block 3: R² change	.002
Summated outcome evaluations* outcome beliefs	.032
Block 4: R² change	.012*
Subjective norms	.122**
Perceived behavioral control	.300**
Attitude toward the act	.246**
Focus predictors: R² change	.133**
Multiple R	.899**
Adjusted R ²	.798**
ANOVA	F_{11,214}=81.83**

*p<.05, **p<.005, significant figures in bold
covariates: sex, age, education N= 226

Because p was statistically significant for SN (beta=.122, p<.005), PBC (beta=.300, p<.005), and summated AAct (beta= .246, p<.005), the null of hypotheses 4a, 4b and 4c can be rejected. Thus the hypotheses, which contend that behavioral intention to recycle was positively associated with positive attitudes toward the act of recycling (H4a), subjective norms regarding recycling (H4b), and perceived behavioral control to recycle (H4c) can be supported. The results of this study support Ajzen's TPB, and attest that attitude toward the act, subjective norms,

and perceived behavioral control correlate positively with behavioral intentions, and indicate that past behaviors are a strong predictor of intentions as well.

a. Research question 5

According to Table 12, and regressions run in SPSS, there was statistical significance ($p < .005$) for the summated outcome evaluations (bipolar)* beliefs (unipolar) compound and its correlation with attitude toward the act ($\beta = .223$, R^2 change = .043). As a result, the null of H5 can be rejected, and thus H5 can be supported. H5 predicted that behavioral beliefs toward recycling would be positively associated with attitudes toward the act of recycling, and this hypothesis is supported in Table 12. As predicted by previous TPB research, positive behavioral beliefs toward recycling were found to correlate positively with attitudes toward the act of recycling.

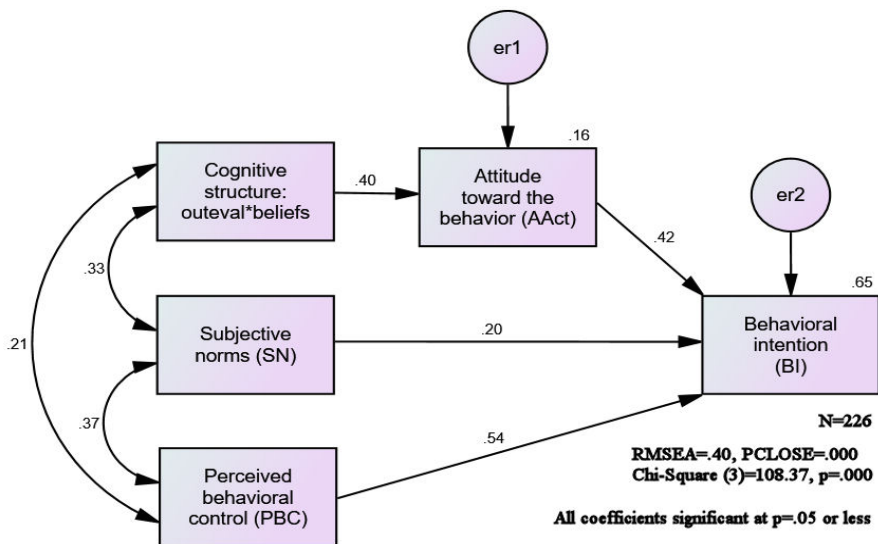
The greatest R^2 change (.394) was for control block 2, which involved reported past behaviors ($\beta = .553$, $p < .005$), indicating that it was the greatest predictor of attitude toward the act of recycling. The second highest, statistically significant R^2 change (.043) was for the focus predictor, summated outcome evaluations*beliefs discussed above ($\beta = .223$, $p < .005$). Reported past behavior and summated outcome evaluations*beliefs were the statistically significant predictors of attitude toward the act of recycling. Animation presence, whale experience intensity, the New Ecological Paradigm scale, sex, education and age had no significant effect in predicting AAct, due to $p > .05$ for these factors.

Table 12: Multiple hierarchical regression: Relationship of TPB's summated Attitude toward the act of recycling (AAct) (dependent variable) with other measured variables (including summated outcome evaluations * outcome beliefs)	
Predictors	Correlation with AAct Standardized beta weight
Sex	.028
Age	.031
Education	-.093
Block 1: R² change	.019
Past behavior	.553**
Summated New Ecological Paradigm Scale	.078
Block 2: R² change	.394**
Intensity of whale experience	.053
Animation presence	.039
Block 3: R² change	.004
Summated outcome evaluations*outcome beliefs	.223**
Focus predictor: R² change	.043**
Multiple R	.678**
Adjusted R ²	.439**
ANOVA	F_{8,217}=23.04**

*p<.05, **p<.005, significant figures in bold
covariates: sex, age, education N=226

Using SPSS, after running the regressions documented in Tables 11 and 12, a path analysis was created to assess TPB path correlations in the context of this study. Next AMOS was used to check and create the path analysis diagrams below.

Figure 9: TPB path analysis, predicting behavioral intention



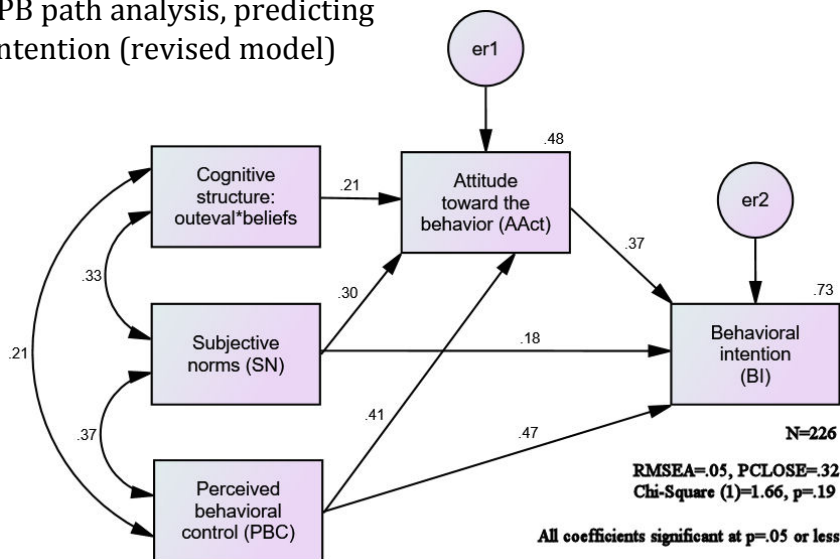
N=226
All coefficients significant at p<.05

Table 13: TPB path analysis, predicting behavioral intention				
	Outcome evaluations and outcome beliefs	Attitude toward the behavior	Subjective norm	Perceived behavioral control
Direct effects	n/a	.42	.20	.54
Indirect effects	.17	n/a	n/a	n/a
Total	.17	.42	.20	.54

The path analysis depicted in Figure 13 demonstrates support for TPB, indicating that outcome beliefs and evaluations correlated positively with attitudes (beta=.40, p<.05), and that attitude (beta=.42, p<.05), subjective norms (beta=.20, p<.05), and

perceived behavioral control (beta=.54, $p < .05$) are all positive predictors of behavioral intention to recycle. Both attitude toward the behavior and perceived behavioral control are strong predictors of intention, as demonstrated by their significant beta weights in Table 13. Subjective norms revealed itself as a weaker predictor of intention, with a lower beta of .20. The high RMSEA (.40) of Figure 13 indicates poor goodness of fit, so AMOS recommended a revised model with a lower RMSEA (.05), which is depicted in Figure 13a. The revised path analysis indicated that data supports another path of correlations: that cognitive structure, subjective norms and perceived behavioral control are all predictors of attitude toward the act,

Figure 9a: TPB path analysis, predicting behavioral intention (revised model)



N=226
All coefficients significant at $p < .05$

Table 13a: TPB path analysis, predicting behavioral intention(revised model)				
	Outcome evaluations and outcome beliefs	Attitude toward the behavior	Subjective norm	Perceived behavioral control
Direct effects	n/a	.37	.18	.47
Indirect effects	.08	n/a	.11	.16
Total	.08	.37	.29	.63

which is the direct predictor of behavioral intentions.

The path analysis depicted in Figure 13 supports H4 and H5, and confirms the strength of the TPB model and its ability to successfully predict behavioral intentions.

b. Research question 6

The last research question, and corresponding hypotheses, predicted that high whale experience intensity, animation presence, and the two combined would correlate positively with reported New Ecological Paradigm scale responses. Due to statistically insignificant differences ($p > .05$) between all four groups, intensity levels of whale watching experience, as well as the animation, and a combination between these factors, did not have a positive effect on the Summated NEP scale responses, as seen in Table 14. The null of H6 is accepted: high intensity, animation-present group D did not report the most positive NEP scale responses, compared to groups A-C.

Table 14: Relationship of whale viewing experience + animation presence and Summated New Ecological Paradigm Scale (6 measures) Scale: 6 anthropocentric 42 ecocentric			
Whale viewing experiences (measured, naturally occurring)			
Receive information manipulation animation (Random assignment)	Less intense (long distance from whales, 100 yards away or more)	More intense (close distance from whales, less than 100 yards away)	Combined means
No	Group A 29.38 N=47	Group B 30.16 N=66	29.77
Yes	Group C 29.46 N=56	Group D 30.70 N=58	30.08
Combined means	29.42	30.43	29.93 Total N= 227

$p > .05$

covariates: sex, age, education

Table 15: GLM ANOVA data Relationship of whale viewing experience, animation presence, and whale viewing experience + animation presence with Summated new ecological paradigm scale				
Fixed factors	F	df	Sig.	Eta ²
Whale viewing experience intensity	1.85	1, 220	.176	.008
Animation presence	.171	1, 220	.680	.001
Whale viewing experience + animation presence	.095	1, 220	.759	.000

CHAPTER V: DISCUSSION

The primary goals of this study were to apply the TPB in an environmental context, and determine whether both experience in nature and a communication animation influenced behavioral intentions to recycle. The results indicated little significant difference between groups of varying levels of whale experience intensity, and no positive significant difference between groups with or without a communication animation. Positive correlations between TPB variables supported the model, indicating that behavioral beliefs and past behaviors were the strongest predictors of attitude toward the act of recycling. Further AAct, SN, and PBC, as well as reported past behaviors, all correlated positively with behavioral intentions to recycle.

The following subchapters discuss each research question, the corresponding hypotheses, results, and future research questions inspired by this study.

a. *Research question 1*

Can the intensity level of experience of watching whales directly in the wild from whale watching vessels ("whale watching experience") influence behavioral beliefs, attitudes, and behavioral intentions toward recycling?

This question asked whether the direct experience of watching whales, and differing experience intensities, influenced dependent variables relating to recycling. ANOVA test results displayed in Table 5 indicated that mean cognitive structure, or summated behavioral beliefs * evaluations, was not significantly

different ($p > .05$, not significant for whale intensity alone) amongst groups A-D. Results also indicated that there was no significant difference between whale experience intensities, as indicated by $p > .05$. As a result we accept null hypothesis 1a, contending that the level of intensity of whale watching experience does not correlate positively with behavioral beliefs, outcome beliefs and evaluations, about recycling behaviors.

ANOVA test results displayed in Table 7 indicate that for the summated attitude toward the act of recycling ($p = .053$ for whale intensity alone) there was no statistically significant, positive correlation with whale intensity. As a result the null of H1b is accepted, so the intensity of the whale watching experience did not correlate positively with attitude toward the act of recycling; a higher intensity of experience did not correlate with a greater positive attitude toward the act of recycling.

ANOVA test results displayed in Table 9 indicate that for behavioral intentions there was a statistically significant difference between groups A-D (although $p > .05$ for whale intensity alone, which is not significant). While there were statistically significant differences between groups, the difference did not follow the hypothesis. Table 9 demonstrates that group A had a higher, statistically significant mean than groups C-D; these results reflect the opposite of what the hypothesis predicted (that groups B and D would have higher, statistically significant means). As revealed by patterns in the data, the null of H1c must be accepted: whale watching intensity did not correlate positively with behavioral intentions toward recycling. It should be noted that there was only one item

measuring behavioral intentions on the questionnaire, as compared with six targeting behavioral beliefs and five targeting attitude toward the act, so this could have skewed the results.

Overall hypothesis 1a-c was rejected, and rather all three nulls were accepted. Behavioral beliefs (outcome beliefs and evaluations), attitude toward the act, and behavioral intentions were not significantly affected by whale experience intensity, according to results of this study.

Overall, questionnaire responses involving behavioral beliefs, attitude toward the act, and behavioral intentions were scored high. The mean summated behavioral belief score was 43.49 (with a score range of -63 to +63), the mean summated attitude toward the act score was 29.48 (with a score range of 5 to 35), and the mean behavioral intention score was 6.18 (with a score range of 1 to 7). All of these high response means indicate environmentally positive views in all three categories. All of the participants in this study had a nature experience with a whale (or several whales). One possibility as to why such high means were reported is that the whale experience itself, rather than the intensity of whale experience, inspired heightened responses. Future studies could compare groups who spent time in nature, and experienced whales, with control groups that did not spend time in nature and experience whales, to see if differences are reported.

Another possible explanation for the high, environmentally positive responses is that participants chose to come to Alaska, and on a research-oriented whale-watching trip, because they already had high ecological values. To better

comprehend this hypothesis, before and after questionnaires could be administered to participants.

b. *Research question 2*

After experiencing a whale, does an animation suggesting that individuals' recycling behaviors can benefit whales, have the ability to induce more positive changes toward behavioral intentions to recycle?

This research question asked about the effect of animation presence on questionnaire responses. For outcome beliefs*evaluations and attitude toward the act of recycling, $p > .05$, so animation presence had no apparent effect on mean responses, and the null hypotheses a, b and c were accepted. So, according to the results, the communication manipulation did not positively affect outcome beliefs, behavioral beliefs or attitude toward the act of recycling.

The only $p < .05$ was for behavioral intentions to recycle, in which there was statistical significance between means as a result of animation presence ($p = .046$). Table 9 indicates that group A, low intensity, animation not present group had the highest mean responses on the questionnaire, compared with groups B-D. The data debunks that the communication manipulation had a positive effect on behavioral intentions toward recycling (in which groups C and D would have had the highest, statistically significant mean responses). H2d is refuted, and it can thus be assumed that animation presence did not correlate positively with behavioral intention to recycle. It should be noted that there was only one item measuring

behavioral intentions on the questionnaire, as opposed to six for beliefs and five for attitude toward the act.

None of the hypotheses created in response to research question two were supported by data results. Overall statistical tests indicate that animation presence alone had no effect on participants' responses. One hypothesis to explain this phenomenon is that the nature experience itself overpowered any message that could be communicated by the animation, and as a result there was little to no significant difference reported between groups who saw the animation and groups who did not see the animation. Another possibility is that while nearly half of participants had the ability to watch the animation, these participants may not have deeply processed this animation. Or perhaps participants had pre-existing views that completely determined their responses, deeming the tested variables insignificant. More research is needed to further understand this phenomenon. A study in which a control group had no nature/whale experience, compared with a group that did, could more strongly assess the effect nature, and then a communication animation, had on questionnaire responses.

c. *Research question 3*

Will the whale watching intensity and the communication variable interact to affect behavioral beliefs toward recycling behaviors that can help whales, attitude toward recycling, and behavioral intention to recycle?

This question investigates the interaction between whale watching intensity and the communication variable, and H3 predicts positive interactions between behavioral beliefs, attitude toward the act, and behavioral intentions to recycle, such that group D would report the highest, most ecocentric responses compared to the other three groups A-C. As expressed in the discussion of research questions two and three above, behavioral beliefs had no statistically significant difference between the means of groups A-D ($p > .05$), so the null of H3a and b, must be accepted: an interaction between variables did not produce a positive, significant difference in behavioral beliefs regarding whales and the environment, amongst groups A-D. Behavioral intentions had statistically significant differences amongst group means, but the differences did not support H3c, which predicted that group D would report the strongest behavioral intentions to recycle. Instead group A reported the highest mean behavioral intentions, so the null of H3d is accepted; an interaction between variables did not positively affect behavioral intentions to recycle.

H3d predicted that group D would have the highest response means for attitude toward the act of recycling, and this was supported in Table 7 ($p = .012$). The only H3 supported by results is that an interaction between whale intensity and communication animation presence would positively correlate with attitude toward the act of recycling. As predicted in this case, the high intensity, animation present group D reported statistical significance, and the most positive attitudes toward the act of recycling.

It is unclear why only H3d is supported by study results, whereas the other hypotheses cannot be supported. More research is needed to better understand the correlations, or lack thereof, between experiences in nature, human-mediated communication about it, and TPB.

d. *Research question 4*

What are the relationships between behavioral intention to recycle and the proximate predictors from TPB studied in this experiment?

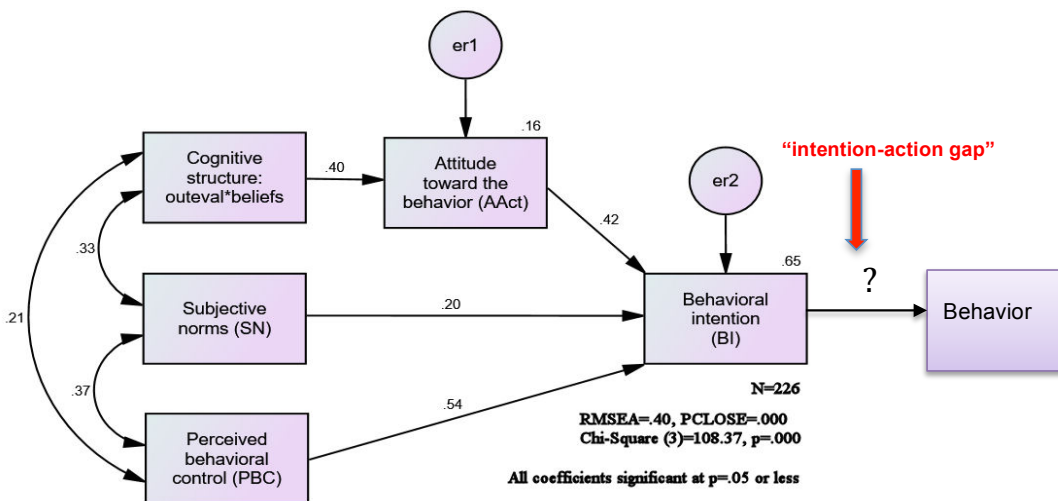
Research question four asked about the relationships between behavioral intentions to recycle and the three TPB predictors. Multiple hierarchical regression results documented in Table 11 indicate that SN ($\beta=.122$, $p<.005$), PBC ($\beta=.300$, $p<.005$) and attitude toward the act ($\beta=.246$, $p<.005$) were all positively associated with behavioral intention to recycle, as predicted by hypotheses 4a, 4b, and 4c. The regression results in Table 11 support the application of TPB in this study.

Further Table 11 indicates that the greatest predictor of behavioral intention was reported past behavior ($\beta=.395$, $p<.005$). It seems logical that reported past behavior would correlate highly with future behavioral intentions. Further research could investigate the significance of past behaviors as predictors of future behavioral intentions with regard to the environment.

The path analysis depicted in Figure 13 (RMSEA =.40, PCLOSE=.000) confirms the positive TPB correlations, and further supports hypotheses 4a-4c. Research results affirm the TPB, and support the theory's ability to predict

behavioral intentions to recycle. The question mark in Figure 14 on the arrow between behavioral intentions and behaviors represents the “intention-action gap,” described by Shroder, Stewart & Thaar (2014). The TPB does not create a measurable path between intention and behavior. Further research could attempt to fill in this gap in TPB, and attempt to measure the correlation between intentions and enacted behaviors in different contexts.

Figure 10: Missing path: “the intention-action gap”



The path analysis pictured in Figure 13a (RMSEA=.05, PCLOSE=.32) proposes another TPB path, and indicates that in this study, cognitive structure, subjective norms, and perceived behavioral control were predictors of attitude toward the act, which was then a direct predictor of behavioral intention. This skew of the traditional TPB model demonstrated in the data could be due to the fact that only one question was asked for both perceived behavioral control and subjective norms, whereas six were asked for cognitive structure and five for attitude toward the act.

More research is needed to investigate the proposed correlations of the revised TPB model in Figure 13a.

e. *Research question 5*

What are the relationships between behavioral beliefs and attitudes toward the act of recycling?

Research question five asked more about TPB relationships, and the correlation between behavioral beliefs and attitudes toward recycling. H5 contended that behavioral beliefs would be positively associated with attitudes toward recycling. Multiple hierarchical regressions run in SPSS determined that cognitive structure (summed outcome beliefs*evaluations) had a positive relationship with attitude toward the act of recycling ($\beta=.223, p<.005$), as demonstrated in Table 12. The only greater correlation with attitude toward the act than cognitive structure was reported past behavior ($\beta=.553, p<.005$). It should be noted that reported past behavior only constituted one question, while cognitive structure was composed of six summed, compounded items. More research could investigate past behavior relationships with attitude toward the act, especially in similar environmental contexts.

The path analysis in Figure 13 further supports H5, and indicates that behavioral beliefs toward recycling were positively associated with attitudes toward recycling, and further, behavioral beliefs were an indirect predictor of behavioral intention to recycle. H5 is supported by results, and further confirms the reliability of TPB.

f. *Research question 6*

Can the level of exposure to whales, and communication animation, acting separately and interacting, affect one's reported environmental beliefs via the NEP scale?

The last research question asked whether whale intensity, animation presence, and a combination of the two factors, affected NEP scale responses. Hypothesis 6 predicted that group D would have the highest, most positive reported NEP responses. ANOVA tests run in SPSS, and reported in Table 14, found no statistically significant difference ($p > .05$) amongst groups A-D, so the null can be accepted, and H6 can be rejected.

It is unknown why whale experience intensity, animation presence, and an interaction between the two factors had statistically significant, high means in group D for attitude toward the act, but not NEP scale responses, behavioral beliefs, or behavioral intentions. Results indicate that attitude toward recycling may have been more accessible in this experiment than beliefs and intentions, but further research is needed to better comprehend this phenomenon.

g. *Constraints of the study*

As with all research, this study had limitations. Some of these limitations involved the theory itself, others involved practicality, some involved time restrictions, and even more involved lack of previous research.

One great limitation of TPB, discussed by previous researchers, is the theory's inability to measure emotions as a factor in predicting behavioral intentions. It should be noted that this study's questionnaire responses could be biased by emotion, as participants could have been excited by the recent nature experience and thus reported heightened, emotional responses. For this reason, it is possible that participants' responses don't actually reflect lasting changes in attitudes, behavioral intentions or enacted recycling behaviors, but rather reflect emotional responses. This limitation will be discussed in greater detail in the Future research subchapter below.

Another limitation of this study was its inability to measure enacted behaviors, but rather measured more easily accessible reported behavioral intentions. Ajzen (2005) wrote that intentions are strong, yet imperfect predictors of actual behaviors. While Ajzen (2005), and other researchers, have indicated that behavioral intentions are typically consistent with behaviors, this is not always the case. The "intention-action gap" concept was conceived by Shroder, Stewart & Thaar (2014) to explain this TPB limitation. We will never know whether participants who indicated they had strong behavioral intentions to recycle will indeed recycle at all, but measuring behavioral intentions is better than no measurement at all. The possibility that intentions reported by participants in this study are inconsistent with actual recycling behaviors must be acknowledged. All TPB research is subject to this limitation.

Next, this study only had the ability to measure people's reactions to whales once. It can be difficult to affect attitudes and behaviors with one single nature

experience, making the research limited. It is possible that a single intervention (one experience with a whale) may not be heavy enough to influence behavioral intentions and enacted behaviors toward recycling. Because there was not an opportunity to offer repeated interactions with whales (outside of the 2-plus-hour whale watching trip), this experiment did the best it could with the options available. Future studies could connect people with nature on multiple occasions, and assess whether multiple experiences led to more positive behavioral changes toward the environment.

Obtaining accurate distance measurements between the boat (participants) and the whale(s) proved to be another limitation. Rather than always having access to accurate laser range finder measurements, estimates were made instead. There is a possibility of inaccuracies due to estimated distances, although using two different categories, 100 yards away or more, and less than 100 yards away, reduced some of this possible error in distance estimates.

Despite the limitations discussed above, results provide useful data to the communication field, and others alike. The method utilized for this study answered all of the research questions listed above, and either supported or refuted the hypotheses.

CHAPTER VI: CONCLUSION

a. *Summary of findings*

Ajzen's Theory of Planned Behavior was supported by the results of this unique environmental communication study, confirming the theory's ability to predict behavioral intentions when applied to the act of recycling. Statistical analyses revealed statistically significant ($p < .005$), positive correlations between subjective norms ($\beta = .122$), perceived behavioral control ($\beta = .300$), attitude toward the act ($\beta = .246$), past behaviors ($\beta = .395$) and behavioral intentions to recycle (See Table 11). Cognitive structure (summed outcome beliefs* evaluations) also had a statistically significant ($p < .005$), positive correlation with attitude toward the act of recycling ($\beta = .223$). The path analysis depicted in Figure 13 also supports the strength of the TPB applied in the context of this study. Most of the other hypotheses, though, could not be confirmed by the study's results.

Results indicated there was little significant difference amongst the four experimental groups A-D based on intensity of nature experience and animation presence (or lack of animation). The only exception, which supported the original hypotheses made, was for attitude toward the act of recycling, which had statistically significant differences between means in groups A-D. An interaction between intensity level and animation presence ($p = .012$) had statistical significance for attitude toward the act, with group D reporting the highest mean responses. Results indicate that overall, intensity of nature experience and animation presence

had little to no statistically significant effect on participants' responses regarding the environment, whales, and behavioral intention to recycle.

Results of this study indicated that overall participants had rather positive beliefs toward the environment (when compared to the entire scaling system), and positive intentions to recycle, with little to no significant correlation with the experimental variables discussed above.

One possibility for the overall high means reported by participants, and little variance between study groups A-D, is that most participants were emotionally excited after spending time on the ocean and observing whales. It is possible that the differing levels of intensity of experience, and animation presence (or lack thereof), were insignificant because all of the nature experiences had significant effects on participants' responses. I hypothesize that the nature experience itself evoked emotional excitement, and enough excitement to mask the impact of both interventions applied to TPB.

Another possible explanation for the overall high reported means is that the targeted group of participants was already very environmentally conscious. Individuals with high ecological values might choose to go to Alaska, and then go on a research-oriented whale-watching excursion. If this were the case, the nature experience may not have had a significant impact on reported responses, but rather the environmental awareness may have been pre-existing. More research is needed to better understand this possibility.

Despite a lack of statistical significance between experimental variable groups A-D, this study's results support the TPB, and its application to

environmental behaviors. The results indicated that interventions had little impact with regard to dependent variables, but more research is needed to better understand these experimental variables and their correlations.

Instead of clear answers to research questions involving the effects of nature experiences and communication messages on behavioral intentions, this study inspired more questions and hypotheses. Future research should investigate the power of nature immersion experiences, the possibility that direct experience in nature could inspire environmentally friendly decisions, what kinds of nature interpretation messages are successful, and reapply the TPB in unique situations.

The most significant thing that has resulted from this thesis research is deep thinking, scrupulous questioning, and continued pondering by the student researcher.

b. *Future research*

This study's results stimulate further research questions regarding the impact emotional elicitation may have on behavioral intentions, and TPB itself. Some researchers have suggested that the TPB, and TRA, do not account for the effects of emotions in their predictive models, and that this hampers the model's predictive power (ul-Haque, Azhar & ur-Rehman, 2014). Further studies could investigate nature's ability to impact people's emotions, and further question how these spurred emotions affect TPB, and reported behavioral intentions.

Recent research, including a study by Bratman et al. (2015), suggests that nature has the ability to inspire positive emotions. Findings by Bratman et al.

(2015) indicated that a focus group that went on a 90-minute walk in a natural setting reported greater mental well-being, compared to a group who walked for the same period of time in an urban setting. The Bratman et al. study, and others, indicate that nature may have the ability to elicit positive emotions in people. Future research could question how long these positive feelings last after nature immersion terminates, and whether these results would be supported when applied to TPB.

Further research questions stemming from this study are whether participants were strongly affected by emotions after their experience in nature, so much that experimental variables were masked, and whether emotions impacted questionnaire responses. A future study could test for emotions in the questionnaire, perhaps comparing emotions before and after experiences in nature. The next research question stimulated is whether this hypothesized emotional elicitation subsided after a period of time, and whether reported behavioral intentions to recycle also decreased with time. A pre or follow-up questionnaire in future research studies could measure these concerns.

A group of researchers in Pakistan hypothesized that emotions could be such strong predictors of behavioral intentions that not accounting for these emotions could cause errors in predicting behavioral intentions in the TRA (ul-Haque, Azhar & ur-Rehman, 2014). These researchers wrote that, “antecedent emotions may be so strong that they will directly create behavior” (p.45), or a reported behavioral intention. Due to the limitations of this study, and inability to conduct a follow-up questionnaire, there is no way to determine whether the reported ecocentric views

and positive behavioral intentions to recycle are emotionally stimulated and short-term, or are rather long lasting and will lead to enacted behaviors. It is possible that the ecocentric responses did not last after participants returned home from their trip to Alaska, and that after the emotional elicitation of spending time with whales subsided, reported ecocentric views subsided, too. Future research studies could use a “no nature immersion” control group to see if participants who didn’t spend time in nature would report similarly heightened ecocentric views and behavioral intentions to recycle.

Future studies could also measure ecological values before and after nature immersion, to determine if high ecological values were a result of the immersion itself, or emotion, or whether the high reported ecological values were pre-existing. It could also be useful to investigate correlations amongst income, education level, ability to access whale-watching experiences (or other wilderness immersion options), and reported ecological values.

Another TPB limitation, the “behavior-intention gap” (Shroder, Stewart & Thaar, 2014), should be addressed by future studies. A second, follow-up questionnaire would help resolve this limitation, by asking about behavioral intentions once the participant is no longer in Alaska. This follow-up questionnaire would decrease the time period between the reported intention and enacted behavior itself. Ajzen (1985) wrote that shorter time periods between reported intentions and enacted behaviors were more successful predictors of true behaviors. Future studies could conduct a second round of questionnaires after participants return to their homes, are back to their normal routines, have access to

recycling, and when the time period between intention and enactment of the behavior is shortened.

As is likely often the case, this thesis research inspired more questions than it did resolve research questions posed in this study. More research is needed to better understand how TPB is impacted by experiences in nature, and how the theory is impacted by human-mediated communication about these experiences.

The most significant result of this thesis study was probably the further questioning it inspired involving TPB, the psychological effects of time spent in wilderness settings, and human-ecology interactions.

BIBLIOGRAPHY

- Ajzen, I. (2010). *TPB Questionnaire Construction*. Retrieved from Ajzen's Theory of Planned Behavior online website:
<http://people.umass.edu/aizen/pdf/tpb.measurement.pdf>
- Ajzen, I. (2006). *Behavioral Interventions Based on the Theory of Planned Behavior*. Retrieved from Ajzen's Theory of Planned Behavior online website:
<http://people.umass.edu/aizen/>
- Ajzen, I. (2005). *Attitudes, Personality and Behavior: Second Edition*. New York, NY: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. New York, NY: Springer Berlin Heidelberg.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Anderson, M.W. (2012). New Ecological Paradigm (NEP) Scale. *The Berkshire Encyclopedia of Sustainability: Measurements, Indicators, and Research Methods for Sustainability*. Berkshire Publishing Group.
- Asociación RUVID. (2016). Noisy neighbours: Measuring the impact of human-generated noise pollution on sea mammals in the Mediterranean. *ScienceDaily*. Retrieved from
www.sciencedaily.com/releases/2016/08/160808091107.htm
- Barua, M. (2011). Mobilizing metaphors: the popular use of keystone, flagship and umbrella concepts. *Biodiversity and Conservation*, 20:1427-1440.
- Best, H. & Mayerl, J. (2013). Values, Beliefs, Attitudes: An Empirical Study of Environmental Concern and Recycling Participation. *Social Science Quarterly*, 94:3, 691-714.
- Bratman, B.N., Hamilton P.J., Hahn, K.S., Daily, G.C., & Gross, J.J. (2015). Nature experience reduces rumination and subgenual prefrontal cortex activation. *Proceedings of the National Academy of Sciences of the United States of America*, 111: 28, 8567-8572.
- Chenung, S.F., Chan, D.K.S., & Wong, S.Y.Z. (1999). Reexamining the

theory of planned behavior in understanding wastepaper recycling. *Environment and Behavior*, 31:5, 587-612.

Corbett, J.B. (2006). *Communicating Nature*. Washington, DC: Island Press.

Cordano, M. & Frieze, I.H. (2000). Pollution Reduction Preferences of U.S. Environmental Managers: Applying Ajzen's Theory of Planned Behavior. *Academy of Management Journal*, 43:6, 627-641.

Ducarme, F., Luque, G.M. & Courchamp, F. (2013). What are "charismatic species" for conservation biologists? *BioSciences Master Reviews*. Retrieved from <http://biologie.ens-lyon.fr/ressources/bibliographies/pdf/m1-11-12-biosci-reviews-ducarme-f-2c-m.pdf?lang=en>

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

Dutcher, D.D., Finley, J.C., Luloff A.e. & Johnson, J.B. (2007). Connectivity With Nature as a Measure of Environmental Values. *Environment and Behavior*, 39:4, 474-93.

Florida Department of Environmental Protection. (2000). Purpose and Scope Plan: Outdoor recreation defined. *Outdoor Recreation In Florida*. Retrieved from <http://www.dep.state.fl.us/parks/planning/forms/OutdoorRecreationinFlorida2000.pdf>

GfK Roper Consulting (2011). The Environment: Public Attitudes and Individual Behavior—A Twenty-Year Evolution. SC Johnson A Family Company. Retrieved from http://www.scjohnson.com/Libraries/Download_Documents/SCJ_and_GfK_Roper_Green_Gauge.sflb.ashx

Google Maps. (2016). *Google Map with a Marker*. <https://developers.google.com/maps/documentation/javascript/adding-a-google-map>

Hansen, A. & Machin, D. (2013). Researching Visual Environmental Communication. *Environmental Communication*, 7:2, 151-168.

Harms, M., Asmutis-Silvia, R., & Rosner, A. (2013). *Whale Watching: More Than Meets The Eyes*. Whale and Dolphin Conservation. Retrieved from http://uk.whales.org/sites/default/files/whale_watching_more_than_meets_the_eyes.pdf

- Hoot, R.E. & Harris, F. (2011). Connectness and Environmental Behavior: Sense of Interconnectness and Pro-Environmental Behavior. *International Journal of Transpersonal Studies*, 30:1-2, 89-100.
- Howell, A.J., Dopko, R.L., Passmore, H.A. & Karen B. (2011). Nature Connectedness: Associations with well-being and mindfulness. *Personality and Individual Differences*, 51, 166-171.
- International Fund for Animal Welfare (IFAW) Australia (2013). *Breaking the Silence*. Retrieved from www.ifaw.org.
- Kals, E., Schumacher, D., & Montada, L. (1999). Emotional Affinity toward Nature as a Motivational Basis to Protect Nature. *Environment and Behavior*, 31:2, 178– 202.
- Krause, K. (2016). A Framework for visual communication at Nature. *Public Understanding of Science*, 26:1, 15-24. DOI: 10.1177/0963662516640966
- Largo-Wight, E., Bian, H. & Lange, L. (2012). An Empirical Test of an Expanded Version of the Theory of Planned Behavior in Predicting Recycling Behaviors on Campus. *American Journal of Health Education*, 43:2, 66-73.
- Leader-Williams, N. & Dublin, Holly T. (2000). Charismatic megafauna as a 'flagship species.' In A. Entwistle & N. Dunstone (Eds.), *Priorities for the conservation of mammalian diversity: has the panda had its day?* (53-81). New York: Cambridge University Press.
- Marris, E. (2013). Charismatic mammals can help guide conservation. *Nature News*. doi:10.1038/nature.2013.14396
- Mancha, R.M. and Yoder, C.Y. (2015). Cultural antecedents of green behavioral intent: An environmental theory of planned behavior. *Journal of Environmental Psychology*, 43, 145-154.
- Mannetti, L., Pierro, A. & Livi, S. (2004). Recycling: Planned and self-expressive behavior. *Journal of Environmental Psychology*, 24, 227-236.
- Mayer, S.F., Frantz, McPherson, C., Bruehlman-Sececal, E. & Dolliver, K. (2009). Why Is Nature Beneficial? The Role of Connectedness to Nature. *Environment and Behavior*, 41:5, 607-643.
- Mayer, S.F. & Frantz, C.M. (2004). The Connectedness to Nature Scale: A Measure of Individuals' Feeling in Community with Nature. *Journal of Environmental Psychology*, 24:4, 503–515.
- Milstein, T. (2008). When Whales “Speak for Themselves”: Communication as

- Mediating force in Wildlife Tourism. *Environmental Communication*, 2:2, 173-192.
- National Marine Fisheries Service (2014). *Marine Mammal and Monitoring Mitigation Plan*. SAExploration Colville 3D Seismic Survey Operations. Retrieved from http://www.nmfs.noaa.gov/pr/pdfs/permits/sae_monitoring_mitigation_plan2014.pdf
- National Oceanic and Atmospheric Administration (2016). *Feeding or Harassing Marine Mammals in the Wild is Illegal and Harmful to the Animals*. Fisheries, Protected Resources. Retrieved from <http://www.nmfs.noaa.gov/pr/dontfeedorharass.htm>.
- O'Connor, S., Campbell, R., Cortez, H., & Knowles, T. (2009). *Whale Watching Worldwide: tourism numbers, expenditures and expanding economic benefits*. International Fund for Animal Welfare. Yarmouth, MA. Retrieved from http://www.ifaw.org/sites/default/files/whale_watching_worldwide.pdf
- Oreg, S. & Katz-Gerro, T. (2006). Predicting Proenvironmental behavior cross-nationally Values, the Theory of Planned Behavior, and Value-Belief-Norm Theory. *Environment and Behavior*, 38:4, 462-483.
- Shroder, T., Stewart, T.C. & Thagard, P. (2014). Intention, Emotion, and Action: A Neural Theory Based on Semantic Pointers. *Cognitive Science*, 38:5, 851-880.
- Smith, R.J., Diogo V., Nicholas J.b.I., & Jones, K.E. (2012). Identifying Cinderella Species: Uncovering Mammals with Conservation Flagship Appeal. *Conservation Letters*, 5:3, 205-212.
- Surfrider Foundation. (2010) *Rise above Plastics-Plastics Kill*. Retrieved from https://www.youtube.com/watch?v=R6IP3_aRFtA
- Trumbo, J. (2000). Essay: Seeing Science. *Science Communication*, 21.4: 379-391.
- van Dijk, T.A. (1998). Ideology and society. In *Ideology A Multidisciplinary Approach*. London: Sage Publications. p. 135. Retrieved from <http://www.discourses.org/OldBooks/Teun%20A%20van%20Dijk%20-%20Ideology.pdf>
- Weinstein, N., Przybylski, A.K. & Richard M.R. (2009). Can Nature Make Us More Caring? Effects of Immersion in Nature on Intrinsic Aspirations and Generosity. *Society for Personality and Social Psychology, Inc.*, 35:10, 1315-1329.
- Wrench, J.S., Thomas-Maddox, C., Richmond, V.P., & McCroskey, J.C. (2013). *Quantitative Research Methods for Communication*. New York: Oxford University Press

APPENDIX A
Demographics charts

Figure 11: Pie chart, sex of participants

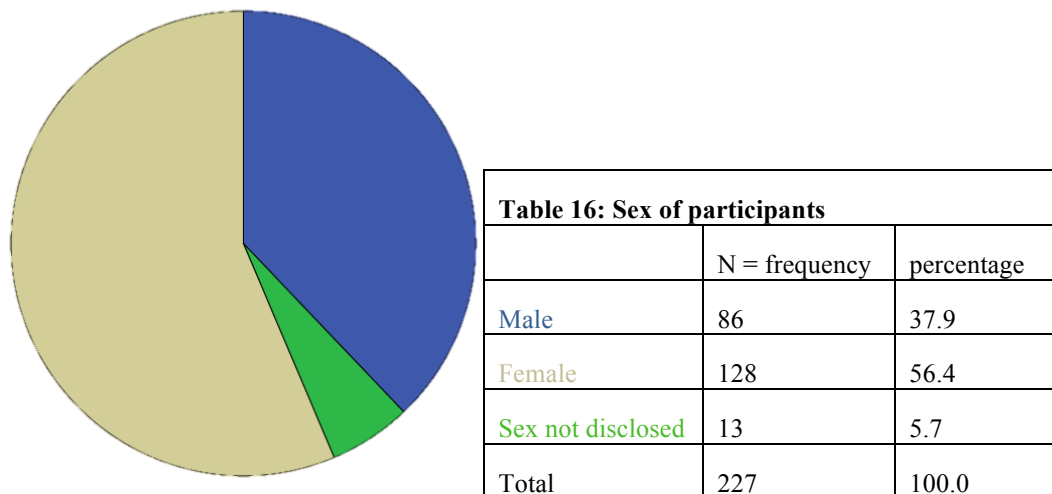


Figure 12: Pie chart, age of participants

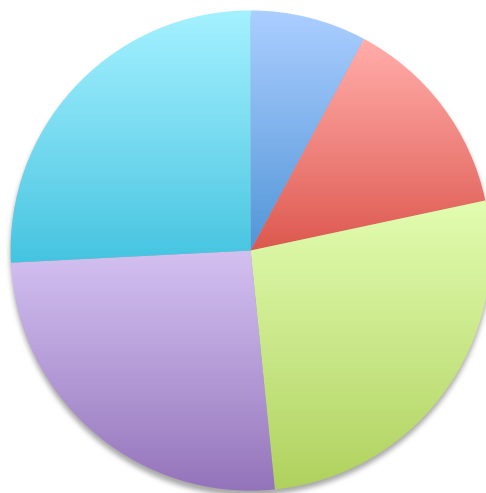


Table 17: Age of participants		
Age range of participants	N = frequency	percentage
18-29	17	7.5
30-41	30	13.2
42-53	58	25.6
54-65	56	24.7
66+	56	24.7
Age not disclosed	10	4.0
Total	227	99.7

Figure 13: Pie chart, years of education of participants

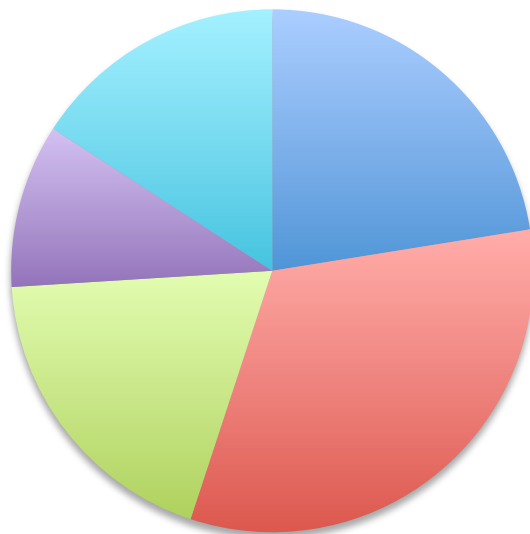


Table 18: Years of education of participants		
Years of education	N = frequency	percentage
High school (12 years or less)	51	22.4
Post high school degree, undergraduate degree (13-16 years)	74	32.5
42-53 Master's degree or equivalent (17-18 years)	43	18.9
PhD or equivalent (18+ years)	23	10.1
Not disclosed	36	15.9
Total	227	99.8

APPENDIX B
Descriptive statistics

Table 19: Descriptive statistics: Dependent variable means			
Dependent variable	N	Mean	Standard deviation
Cognitive structure (Outcome evaluations* beliefs)	226	43.85(range= -63 to +63)	15.05
Outcome evaluation 1: For me, improving the general health of ecosystems and oceans would be: Very bad 1 2 3 4 5 6 7 Very good	227	6.74 (range = 1 to 7)	.695
Outcome evaluation 2: For me, improving whales' well-being would be: Very bad 1 2 3 4 5 6 7 Very good	227	6.74 (range = 1 to 7)	.607
Outcome evaluation 3: For me, whale survival into future generations would be: Very bad 1 2 3 4 5 6 7 Very good	227	6.80 (range = 1 to 7)	.578
Outcome belief 4: My recycling at home regularly for the next three months would help improve the general health of ecosystems and oceans: Very unlikely 1 2 3 4 5 6 7 Very likely	227	4.96 (range = 1 to 7)	1.80
Outcome belief 5: My recycling at home regularly for the next three months would help improve the well-being of whales: Very unlikely 1 2 3 4 5 6 7 Very likely	226	5.72 (range = 1 to 7)	1.48
Outcome belief 6: My recycling at home regularly for the next three months would help maintain whale survival into future generations: Strongly disagree 1 2 3 4 5 6 7 Strong agree	226	5.32 (range = 1 to 7)	1.71
Summated attitude toward the act	226	29.48 (range= 5 to 35)	5.58
Attitude toward the act 1: My recycling at home regularly over the next few months would be: Very bad 1 2 3 4 5 6 7 Very good	227	6.00 (range = 1 to 7)	1.37
Attitude toward the act 2: My recycling at home regularly over the next few months would be: Very unrewarding 1 2 3 4 5 6 7 Very rewarding	226	5.69 (range = 1 to 7)	1.40
Attitude toward the act 3: My recycling regularly at home over the next few months would be: Very low priority 1 2 3 4 5 6 7 Very high priority	226	5.71 (range = 1 to 7)	1.37
Attitude toward the act 4: My recycling regularly at home over the next few months would be: Very ineffective 1 2 3 4 5 6 7 Very effective	226	5.84 (range = 1 to 7)	1.32
Attitude toward the act 5: My recycling regularly at home over the next few months would be:	226	6.22 (range = 1 to 7)	1.16

Betraying my values 1 2 3 4 5 6 7 Consistent with my values			
Summated New ecological paradigm scale	227	29.96 (range= 6 to 42)	5.59
NEP 1: Humans are negatively affecting the environment. Strongly disagree 1 2 3 4 5 6 7 Strongly agree	227	5.88 (range = 1 to 7)	1.37
NEP 2: The earth has plenty of natural resources if we just learn how to develop them (reverse coding): Strong disagree 1 2 3 4 5 6 7 Strongly agree	227	2.75 (range = 1 to 7)	1.75
NEP 3: Plants and animals have as much right as humans to exist. Strongly disagree 1 2 3 4 5 6 7 Strongly agree	227	6.11 (range = 1 to 7)	1.33
NEP 4: The so-called "ecological crisis" facing humankind has been greatly exaggerated (reverse coding): Strongly disagree 1 2 3 4 5 6 7 Strongly agree	227	5.01 (range = 1 to 7)	1.82
NEP 5: If things continue on their present course, we will soon experience a major ecological catastrophe. Strongly disagree 1 2 3 4 5 6 7 Strongly agree	227	5.30 (range = 1 to 7)	1.53
NEP 6: Humans were meant to rule over the rest of nature (reverse coding): Strongly disagree 1 2 3 4 5 6 7 Strongly agree	227	4.91 (range = 1 to 7)	1.92
Behavioral intention	227	6.18 (range= 1 to 7)	1.38
Subjective norms	227	5.53 (range= 1 to 7)	1.38
Past behavior	227	5.87 (range= 1 to 7)	1.72
Perceived behavioral control	227	6.43 (range= 1 to 7)	1.12

APPENDIX C
Correlations

Table 20: Pearson correlations of independent	Summated New ecological paradigm scale	Cognitive structure (outcome evaluations *beliefs)	Summated Attitude toward the act	Subjective norms	Perceived behavioral control	Past behavior	Behavioral intention	Animation presence	Intensity of experience	Educ.	Age	Sex
Sex	.038	.099	.076	.072	.041	.014	.041	.000	-.104	.190*	-.066	1.00
Age	-.131*	.019	.106	.056	.034	.114	.023	-.004	.014	-.141*	1.0	-.066
Educ.	.146*	-.040	.000	-.051	.124	.200**	.124	-.089	.000	1.00	-.141*	-.190*
Intensity of experience	.080	.062	.124	.042	-.004	.090	.062	-.076	1.00	.000	.014	-.104
Animation presence	.010	-.084	-.029	-.024	-.065	-.107	-.132*	1.00	-.076	-.089	-.004	.000
Behavioral intention	.260**	.345**	.734**	.556**	.767**	.812**	1.00	-.132*	.062	.124	.023	.041
Past behavior	.219**	.268**	.618**	.454**	.667**	1.00	.812**	-.107	.090	.200*	.114	.014
Perceived behavioral control	.191**	.208**	.567**	.385**	1.00	.667**	.767**	-.065	-.004	.124	.034	.041
Subjective norms	.199**	.325**	.522**	1.00	.385**	.454**	.556**	-.024	.042	-.051	.056	.072
Summated Attitude toward the act	.240**	.397**	1.00	.522**	.567**	.618**	.734**	-.029	.124	.000	.106	.076
Cognitive structure (outcome evaluations *beliefs)	.250**	1.00	.397**	.325**	.208**	.268**	.345**	-.084	.062	-.040	.019	.099
Summated New ecological paradigm scale	1.00	.250**	.240**	.199**	.191**	.219**	.260**	.010	.080	.146*	-.131*	.038

**correlation is significant at the .01 level
*correlation is significant at the .05 level

APPENDIX D Questionnaire

Written consent to participate in graduate student research

The purpose of this study, measured through questionnaire responses, is to assess environmental attitudes and behaviors. To voluntarily agree to take part in this study, which involves filling out a questionnaire, I need your personal consent. Filling out and returning the following questionnaire involves minimal risk to you and should take no more than 15 minutes. By returning the questionnaire you are giving consent to participation in the graduate student researcher's study. The questionnaires are anonymous. Please be as accurate as possible in your responses.

Thank you ☺

with further questions, please contact Theresa Soley, theresa.soley@marquette.edu, or the Institutional Review Board at Marquette University, (414) 288-7570.

1. For me, improving the general health of ecosystems and oceans would be:

Very bad: 1 2 3 4 5 6 7: Very good

2. For me, improving whales' well-being would be:

Very bad: 1 2 3 4 5 6 7: Very good

3. For me, whale survival into future generations would be:

Very bad: 1 2 3 4 5 6 7: Very good

4. My recycling at home regularly over the next few months would be:

a. Very bad: 1 2 3 4 5 6 7: Very good

b. Very unrewarding: 1 2 3 4 5 6 7: Very rewarding

c. Very low priority: 1 2 3 4 5 6 7: Very high priority

d. Very ineffective: 1 2 3 4 5 6 7: Very Effective

e. Betraying my values: 1 2 3 4 5 6 7: Consistent with my values

5. Humans are negatively affecting the environment.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

6. The earth has plenty of natural resources if we just learn how to develop them.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

7. Plants and animals have as much right as humans to exist.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

8. The so-called "ecological crisis" facing humankind has been greatly exaggerated.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

9. If things continue on their present course, we will soon experience a major ecological catastrophe.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

10. Humans were meant to rule over the rest of nature.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

11. I am confident that if I wanted to I could recycle at home over the next three months.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

12. In the past three months I have recycled materials regularly in my home.

Very rarely: 1 2 3 4 5 6 7: Extremely often

13. Most people who are important to me think I should recycle regularly.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

14. Over the next three months, I plan to recycle regularly at home.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

15. My recycling at home regularly for the next three months would:

a. Help improve the well-being of whales.

Very unlikely: 1 2 3 4 5 6 7: Very likely

b. Help improve the general health of ecosystems and oceans.

Very unlikely: 1 2 3 4 5 6 7: Very likely

c. Help maintain whale survival into future generations.

Strongly disagree: 1 2 3 4 5 6 7: Strongly agree

Sex: **Age:** **Country of residence:** **Zip**
code:

What is the highest year of school you have completed?