NEAR AND DEAR: A STUDY ON PRO-ENVIRONMENTAL BEHAVIORS

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ABSTRACT

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In a time of environmental crisis, it's crucial for individuals to transition from expressing concern to exhibiting pro-environmental behavior. Before tangible actions are achieved, we must first understand how pro-environmental behavior is effectively promoted and inspired. In this study we use an experimental approach to measure and analyze seven pro-environmental behaviors in the context of individuals' values, beliefs, and norms; and social and physical distance to the issue of plastic pollution in water bodies. The issue of plastic pollution is presented as two video interventions – global and local. Through a unique intervention-based methodology this study attempted to connect an individual's geographical distance from an environmental resource (water body) to their values beliefs and norms towards that resource. By incorporating the Values Beliefs, Norms (VBN) theory and Construal Level theory of psychological distance I have developed a framework to understand how local and global framing of environmental messages might moderate the effect that values, beliefs, and norms have on individual pro-environmental behavior. The findings from this research further supports the VBN theory on self-reported behavior, and highlights the need of integrating psychological distance with VBN to explore actual human behavior.

The hardest thing in life is to match what you believe with what you do.

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INTRODUCTION

Scientists, activists and politicians are faced with various environmental issues that originate and have effects on a multitude of scales—such as climate change, water scarcity, ocean acidification, and water pollution amongst others. The corresponding impact(s) of environmental issues also have an effect at multiple geographical scales –e.g., the local, regional, national, international, and global. The scale(s) of the problem(s) and the corresponding effect(s) require scientists to address and promote the issues at scaffolding scales. The primary question for scientists, activists and politicians becomes: At what scale should environmental issues be framed?

In response to these current environmental crises, scholars and policy makers have sought ways to explain and inspire pro-environmental behavior for the general public; and while issues can vary from local to global, individual actions influencing larger global issues occurs almost exclusively at the local level. This raises questions about whether local actions can influence global phenomenon related to environmental crises. In this context, the relevance of geographic scale by which to address environmental problems remains a conundrum. This leads researchers to consider the extent to which local, regional, national, international, or global nature and/or framing of environmental problems influence how individual's express concern and—most importantly—adopt pro-environmental behaviors to counteract current and imminent environmental challenges.

To approach the questions surrounding pro-environmental behavior, researchers have utilized self-reported behaviors and/or behavioral intentions as a proxy for pro-environmental behavior (Clements, McCright, Dietz, & Marquart-Pyatt, 2015; de Groot & Steg, 2008; Jakovcevic & Steg, 2013; Wynveen, Wynveen, & Sutton, 2015). For this study, I use the intent definition of

environmentally significant behavior as a "behavior that is undertaken with the intention to change (normally, to benefit) the environment" (Stern, 2000, p. 408) to define pro-environmental behavior. However, a gap exists between the individuals' intended behavior/ self-reported behavior and the way they actually behave. In response, some studies have resorted to measuring particular pro-environmental behaviors like recycling or donation (Grebitus, Steiner, & Veeman, 2013; Guagnano, Stern, & Dietz, 1995; Ibtissem, 2010). Despite these measures, studies continuously fail to understand pro-environmental behavior in a realistic setting that includes an array of observable tasks that individuals may or may not engage with some, all, or none of. Several disciplines have developed theories to explain and understand pro-environmental behavior. From the perspective of social psychology Steg & Nordlund (2018) discuss the five main theories used to explain pro-environmental behavior. These theories include the Theory of Planned Behavior, Protection Motivation Theory, Goal Framing Theory, Norm Activation Model, and Values, Beliefs and Norms Theory. Of these theories, Values, Beliefs and Norms has been a leading theory in explaining pro-environmental behavior. It is considered the leading theory because it incorporates the most important aspects of all previous theories as will be discussed ahead in the background section.

It must be noted that the theories described in social psychology assume pro-environmental behavior as a result of reasoned behavior. However, as stated earlier, there are questions regarding the scale of problems related to the environment and the levels of abstraction required to address environmental problems such as climate change. To study this phenomenon, the psychology field has developed the Construal Level Theory of psychological distance. In this theory psychological distance is a powerful variable in the construction of the world around us as well as a way to explain behavior. Psychological distance is found in four dimensions: temporal,

spatial, social and hypotheticality (plausible or not). The various distances are related to each other as they influence and are influenced by the level of mental construal. The distances also affect prediction, preference, and action in similar ways.

This study makes the following contributions to the literature. Firstly, it directly examines the influence of geographic scale on individual pro-environmental behavior in a controlled experiment rather than via observation. Secondly, this study measures multiple types of behavior (recycling, energy, conservation, and donation) instead of examining just one behavior. Thirdly, in addition to investigating the effect of geographic scale of a problem, this study simultaneously investigates the influence of values, beliefs, and norms on pro-environmental behavior. This design allowed me to observe the extent to which values, beliefs, and/or norms interact with the geographic scale and social distance in a concrete, rather than abstract, presentation of an environmental issue. This experiment importantly connects Construal Level Theory of psychological distance to Values, Beliefs and Norms Theory.

In the next section, I begin by describing Construal Level Theory and discuss the effects of scale on pro-environmental behavior. Next, I discuss the major theories used to explain pro-environmental behavior, particularly Values, Beliefs and Norms Theory, including a discussion on measures of behavioral intentions and self-reported behaviors. Then, I make a case for incorporating Construal Level Theory to the Values, Beliefs, and Norms Theory. While explaining my experimental design, I also describe the sample, key variables, and analytical techniques. After presenting the results and discussion, I end with a conclusion and suggestions for future research.

Background

In the search to understand how humans relate to the abstract and concrete and the various distances natural to the human experience, the psychology field has developed the Construal Level Theory to approach both psychological distance and construal levels (abstractness). This theory has been used to understand how humans relate to environmental problems such as climate change. In particular, this theory has explored the effect of framing an environmental issue at different distances, including physical and social. Therefore, in this study, I use this theory in the context of framing environmental issues (in this case plastic pollution of oceans and the Great Lakes) to understand its effect on measured pro-environmental behaviors in the context of the Values, Beliefs, and Norms Theory (herein, referred to as VBN). I propose that by controlling for physical distance and social distance of environmental issues, I will find that these factors moderate the relationship originally described between VBN on pro-environmental behavior at more stable levels. While I will focus on VBN, I also briefly discuss other theories that have explained aspects of pro-environmental behavior. Studies of pro-environmental behavior include different types of behavior (i.e. recycling, conserving energy, car use), as well as different scales at which issues are described or observed. The characteristics of the issues discussed vary from hypothetical-concrete, global-local, and far-near, among others.

I argue that part of the variation in behavior is explained by the psychological distance of the issues. In this study I am specifically focusing on spatial and social distance.

Theoretical Approaches to Distance and Scale

Construal Level Theory argues that psychological distance is navigated by individuals through mental construal processes (Trope & Liberman, 2010). The theory defines construal as a mental interpretation, and distance as the experience of an individual in regard to identifying something

as close or far away in reference to the self, here and now (Trope & Liberman, 2010). This theory incorporates the physical (spatial) scale as one dimension of psychological distance. Psychological distance includes various dimensions of distance, including space, time, social distance, and hypotheticality. All these dimensions of distance are perceived in reference to the self in the here and now. In other words:

> "psychological distance refers to the perception of when an event occurs, where it occurs, to whom it occurs, and whether it occurs. Construal levels refer to the perception of what will occur: the processes that give rise to the representation of the event itself." (Trope & Liberman, 2010 p. 442)

These various dimensions of psychological distance are related to each other since they influence and are influenced by the level of mental construal and affect preference, action, and prediction in similar ways.

The Construal Level Theory asserts that when a common dimension of psychological distance underlies the other dimensions, then these dimensions should be mentally associated. Trope & Liberman (2010) offer an example where "remote locations should bring to mind distant, rather than near future, other people rather than oneself, and unlikely rather than likely events" (p. 442). In this context, the theory predicts that as psychological distance increases the construal, becomes more abstract, and as level of construal increases, so too do the perceptions of psychological distance. This means that objects that are perceived as far are more abstract (have higher construal levels) and objects that are perceived as close are more concrete (lower construal levels). This has also been related to physical scale as one of the dimensions of distance. In this study, when we discuss a larger scale, we are discussing a global scale, while a smaller scale will be a local/regional scale.

Different situations and experiences provide different combinations of psychological distances. This means that while spatial distance might be high, social distance could be short. Therefore, some issues may have a disconnect in the distances associated with them due to the nature of the issues and the way they are presented. This can be the case for environmental issues, as Construal Level Theory has inspired research on pro-environmental behavior. Schill and Shaw (2016) explain how recycling can be framed as concrete construal, such as the nature of the waste and when it will be collected. In contrast, this same behavior may be framed as an abstract construal where it is described as a behavior to preserve the environment for future generations (Schill & Shaw, 2016). Schill and Shaw (2016) used Construal Level Theory to understand the effect of psychological distance on explaining sustainable behavior in the context of recycling. They used a qualitative approach based on semi-directive interviews to explore the meaning underlying individual actions while observing recycling behaviors. They found that individuals engaging in sustainable and recycling behaviors "experienced consistency between mental construal and all dimensions of psychological distance" (Schill & Shaw, 2016, p. 357). Individuals performed recycling behaviors following concrete construal levels and near psychological distances. In other words, when they knew how to recycle in the context of residential recycling programs, particularly in their own home.

Rabinovich et al. (2009) used Construal Level Theory to study willingness to donate to an environmental organization. They found that individuals' need an abstract understanding of why they are taking an action while also having a concrete understanding of what they need to do in order to achieve change. This is particularly true when dealing with issues that have an initial gap between the abstract and specific, such as environmental and political action issues (Rabinovich, Morton, Postmes, & Verplanken, 2009).

Climate change is a clear example of an environmental issue that is discussed at various scales simultaneously. There tend to be gaps between the abstract and specific characteristics of this issue. This makes climate change an interesting and timely case study. Spence & Pidgeon (2010) explored how the framing of climate change in terms of local or global distance and gains or losses may affect perceptions of climate change. They found that the most effective way to promote climate change mitigation is by discussing gains rather than losses and by focusing on social impacts of climate change mitigation. In terms of distance, they found that while making the effects personally relevant might situate the issue in individuals' everyday lives, it can also decrease the perceived severity of the issue and thus decrease the perception of necessary action. However, this effect did not translate into a change in attitudes towards climate change (Spence & Pidgeon, 2010).

Hart & Nisbet (2012) use climate change "as a context for examining how message exposure within a politically polarized issue environment may have unintended consequences on audience attitudes" (p. 702). Hart & Nisbet (2012) study how the identity of victims portrayed in environmental communication influences audience polarization regarding, climate change. They found that the influence of identification with potential victims can increase polarization of environmental issues.

In order to understand the effect of message framing on environmental engagement, researchers have also engaged with local and global scales. Scannell & Gifford (2013) approached this question by using written messaging that framed climate change as a local or global condition. They found that local framing was more effective than no messaging at all. However, the difference between global framing and the control (no messaging) was not significant. One

observation made by the authors is that the framing effect needs to be tested through a variety of media, including video (Scannell & Gifford, 2013).

It is therefore recognized that individual intentions regarding pro-environmental behavior can be influenced by local versus global centric messaging. However, a body of literature has sought to explain the nature of individual pro-environmental behaviors and intentions. The theories of pro-environmental behavior are described in the next section.

Theories of Pro-Environmental Behavior

In response to the current environmental crisis, scholars and policy makers have sought to explain and inspire pro-environmental behavior. Stern (2000) states that an impact-oriented definition is important when research seeks to identify and/or target behaviors related to the environment. This definition requires a focus on individual motives and their corresponding beliefs to understand and alter the needed behaviors for better environmental outcomes (Stern, 2000).

Several theories have been developed. The Theory of Planned Behavior described the performed behavior as a function of individual intentions and perceived behavioral control (Ajzen, 1991). Rogers (1975) developed the Protection Motivation Theory, arguing that pro-environmental behavior arises from the motivation to protect, which is triggered by the understanding of an event as dangerous. Additionally, Schwartz (1977) developed the Norm Activation Model, in which pro-environmental behavior stems from a moral obligation to perform or refrain from actions. Finally, Stern et al. (1999) developed the Values Beliefs and Norms theory.

The Theory of VBN originates from the Norm Activation Model. In this theory of personal values, the New Ecological Paradigm (NEP) and the norm activation model were linked to explain pro-environmentalism (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). The theory of

personal values originated to define values and specify the motivational domains of values (Schwartz & Bilsky, 1987). In the theory of personal values, Schwartz & Bilsky (1987) argue that the structure of values would be reflected in the prioritization of principles in individuals' lives. The NEP was a response to the Dominant Social Paradigm. The Dominant Social Paradigm argued that the social paradigm of Americans focused on "beliefs in progress, material abundance and the goodness of growth; faith in the efficacy of science and technology; and a view of nature as something to be subdued" (Dunlap, 2008, p. 5). The NEP is a response in the changes of the social paradigms of its time and was developed and used as a "measure of ecological beliefs or worldview" (Dunlap, 2008, p. 10). The NEP focuses on "beliefs about humanity's ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity's right to rule over the rest of nature" (Dunlap, Riley E; Van Liere, Kent D; Mertig, Angela G; Jones, 2000, p. 427).

The VBN theory then argues that pro-environmental behavior is the result of individuals values, beliefs, and norms. The most superficial level of the model involves the social norms within which an individual lives and interacts. The moral obligation is shaped in part from what one understands the behavior "ought" to be. The activation of this norm, as explained in the previous section on the Norm Activation Model, is correlated to the awareness of the problem, ascription of responsibility, outcome efficacy, and self-efficacy. Therefore, the next level in the model is the beliefs. Within VBN, the most common measure of beliefs has been the NEP, which measures individual adherence to "a view that human actions have substantial adverse effects on a fragile biosphere" (Stern et al., 1999, p. 85). The literature has determined that individuals who adhere closest to this world view have corresponding pro-environmental behaviors.

Stern et al. (1999) argue that of these characteristics, values are the most stable. Based on the value structures described by Schwartz & Bilsky (1987), the most relevant pro-environmental behaviors are: Altruistic, Self-interest (egoistic), Traditional, and Openness to Change. Stern et al. (1999) renamed the original structure of conservationism as traditionalism to avoid any confusion when working at the intersections of environmental, psychological and sociological literature.

The VBN theory has been used to explain various antecedents of pro-environmental behaviors in the context of marine protected areas (Wynveen et al., 2015), energy conservation (Ibtissem, 2010), car reduction policy acceptability (Jakovcevic & Steg, 2013), intention to adopt residential photovoltaics (Wolske, Stern, & Dietz, 2017), as well as ecological risk perception (Slimak & Dietz, 2006).

In this study, I explore how values, beliefs and norms might be moderated by the social and physical distance of the framing of a message focused on environmental issues. This study ultimately incorporates the Construal Level Theory with VBN theory.

Goal of Study

The goal of this study is to further understand the relationship of physical and social distance to pro-environmental behaviors in the context of VBN theory.

Research Questions

Research question one: How does framing environmental issues in local and global scales and social distance impact pro-environmental behaviors?

Research question two: To what extent do values, beliefs and norms predict observed pro-environmental behavior?

In this study, the first research question will be addressed in an experimental manipulation with a video stimulus framing the issue of plastic pollution as local/global as well as measure of people's proximity of individuals to the nearest Great Lake (further described below). To answer the question we will use the individual responses from a post-intervention survey as well as the zip code from each individual's hometown and the observed behaviors (more detailed in the methodology section). For the second research question I will examine how answers to a pre-intervention survey on values, beliefs, and norms relate to the observed behaviors regardless of which video (local/global) was shown.

THEORETICAL FRAMEWORK OF STUDY

In this study, I integrated the Values Beliefs and Norms (VBN) theory with Construal Level Theory of psychological distance. It has been determined that behavior is also affected by the distance at which an environmental issue is presented. In this case, I use construal level to inform the use of both spatial and social distance to predict the outcome behavior as a moderator of the individual's values, beliefs and norms. If the issue discussed is both spatially and socially distant, then the event will be perceived as less likely and more abstract, which in turn will diminish the pro-environmental outcome behavior (Figure 1).

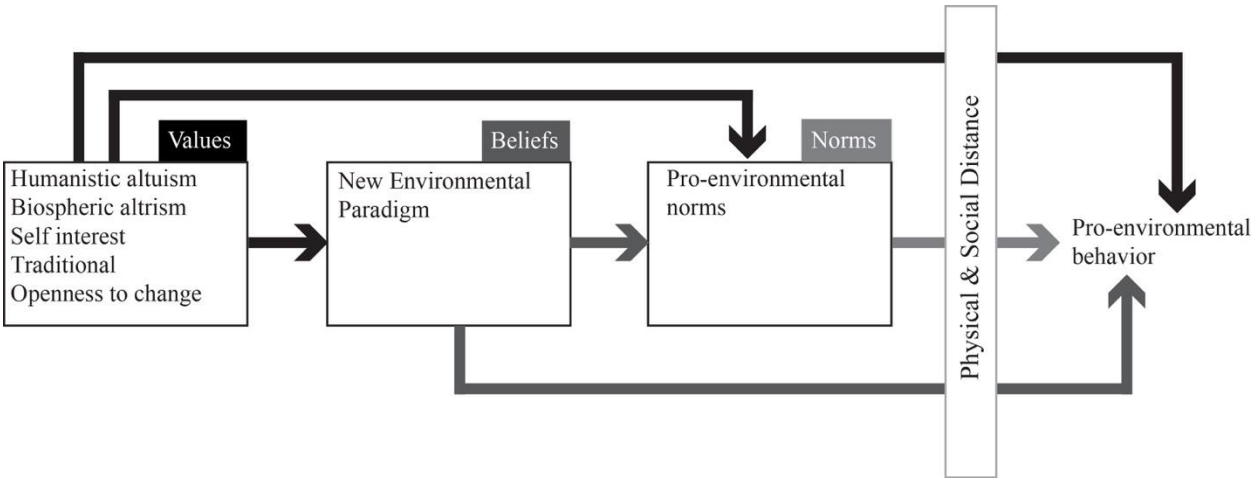


Figure 1. *Theoretical Framework*

STUDY DESIGN

This study utilized a between subjects' posttest only design divided into two stages called Time I and Time II. Time I, consisted of a pre-intervention survey (See APPENDIX 2). Time II consisted of an intervention followed by a post-intervention survey and measures of behaviors (Figure 2).

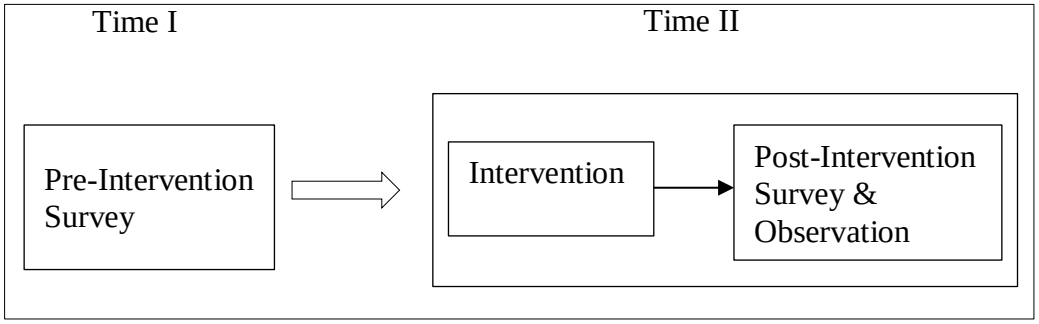


Figure 2. *Between Subjects Posttest Only Study Design*

The inclusion criteria for both Time I and Time II interventions was undergraduate students at Michigan State University (MSU) who have lived in Michigan their entire lives. Herein the inclusion undergraduate students are referred to as study participants or participants.

Recruitment: Participants were recruited through outreach to undergraduate academic advisors in all nine colleges, programs, and schools at MSU, student organizations, and instructors. The approach was intentionally broad in order to include a diverse group of participants. I also posted flyers in building areas with high student traffic. In the email to academic advisors I explained the background of the study and asked them to send a subsequent text as an e-mail to their undergraduate advisees (See APPENDIX 1). The email to the student organizations did not

include details on the objectives of the study in order to avoid bias in the sample, since the recipients were potential participants.

The email to students was signed by myself, the investigator, in order to avoid students feeling obligated to their advisors or campus leaders. The subject line of the e-mail to the students was: "Complete a Brief Survey for Science!" The e-mail was vague on the precise topic of the research, and only indicated that it was a study on "perceptions and behaviors". Students were informed that by completing this survey they would be invited to the second part of the study where they would be compensated $5 for watching a two-minute video (intervention) and answering a few follow-up questions at a campus location. The study was thus, divided into two time periods Times I (pre-intervention survey) and Time II (post-intervention via survey and observation) (Figure 2). A description of the two Time periods follows.

Time I

Implementation: The survey was administered to the participants via Qualtrics.

Time I consisted of the pre-intervention survey available between December 10, 2018 and April 4, 2019.

There were n=227 participants who started the survey. Of these, n=198 participants fully completed the survey and were used in subsequent analyses.

The pre-intervention survey measured values, beliefs, and norms through known indices as described above. For values, I used the short version of the Schwartz protocol as modified by Stern et al. (1998), including only values relevant to pro-environmental behavior. These values included openness to change, traditionalism (also known as conservationism, but due to the nature of pro-environmental work it is referred as traditionalism here), egoistic, human, and biospheric altruism.

For beliefs I used a short version on the New Ecological Paradigm (Dunlap, Riley E; Van Liere, Kent D; Mertig, Angela G; Jones, 2000). This protocol has been developed to measure environmental concern. For norms, with regard to pro-environmental behaviors, participants were asked about how often they saw behaviors such as the use of plastic bags, consumption of take-out food, and recycling. I also asked about self-reported pro-environmental behavior including donations to environmental causes, water conservation, recycling, and voting for candidates due to their pro-environmental positions. Those behaviors were related to the intervention video and the behaviors measured subsequently in the experiment, including the use of reusable plastic bottles, the agency of individuals on their environment and finally, the consumption of pre-packaged foods that increase waste.

In the pre-intervention survey, I also sought information on psychological distance to water, particularly to the Great Lakes. To address this, I asked about recreational activities that included swimming, boating, fishing, tubing, rafting, jet skiing, and snorkeling. I also asked for the Zip-Code of participant's family home. These measurements sought to respond to the first research question on the impact of scale and social distance on pro-environmental behaviors by measuring the distance from their homes to a Great Lake and gathering information on their recreational activities surrounding water. This was important to assess how intimate the person may feel to the issues presented in the video later during the second interaction in the intervention. A complete description of the measures of values, beliefs, norms, psychological distance to water and self-reported behaviors is provided under the Variables Section below.

After the 198 participants completed the survey I further recruited them with an invitation to participate in an Intervention during Time II. In this second interaction, n=123 participants gave their information in preparation for to be scheduled for the second part of the study, Time II, of

which n=40 students ultimately participated. These 40 students were compensated $5 for their participation and their responses comprise the results of the Time II post-intervention survey and behavioral measures.

Time II

The second interaction of the study consisted of a video experimental intervention followed by a post-intervention survey and the measurement of seven pro-environmental behaviors. The experiment intervention took place in a designated building on MSU's campus (see below). As explained above, there were two versions of a 2:02 minute video – global and local – outlining the issues of plastic contamination in water bodies relevant to the scale presented. Each version described the issue at different scales and using different language. One video had a global perspective, which presented the issue of water pollution at a global scale. This video outlined the issue of plastic debris in oceans, which creates trash patches along gyres. This global video used distant language like references to the planet, and the oceans (See APPENDIX 2).

The local video, on the other hand, discussed the issue of plastic in the Great Lakes. We chose the Great Lakes as they are prominent bodies of water around Michigan and are important to Michiganders, our primary study population. In the local video, we used familiar language such as our lakes, and our home (See APPENDIX 3). Both videos were professionally produced by a video production team and intentionally included messaging that resemble the slogans in MSU's marketing videos in order to inspire familiarity amongst the study population.

Both videos used language to reinforce the psychological distance represented in the video. The language difference sought to accentuate the social distance individuals may have toward the issue. Emphasizing global versus local scales allowed us to manipulate the spatial distance of the issue. The global or local intervention was selected randomly by assigning either a 1 or 0 to

participants. When the participants had a 0, they would watch the local video and when it was a 1, they would watch the global video. The level of construal was controlled in the videos. In both videos, the problem was presented in concrete terms and with punctual solutions that MSU is working on. Video comprehension is later examined in the post-intervention survey (see APPENDIX 4).

For the experiment, each participant arrived at a waiting area. They were then greeted by myself the investigator, and asked to read the consent form and verbally agree to participate. Then, they were guided one at a time to a room one floor up where they would watch the video assigned to them alone. Every individual was told that they were the last participants of the day (unless they accidentally saw another participant). They were also advised that due to the experimenter's partner traveling that day, their phone ringer was on. The experimenter apologized in advance if their phone rang during the experiment. At this point, the individual was read instructions introducing them to the study, given the compensation ($5) and reminded that once the video was over, they would be asked to complete a final (post-intervention) survey.

The participant was then instructed on how to access the survey on a computer once the video finished and asked to meet the experimenter in the hallway once they were done watching the video and completing the survey. Towards the end of the instructions, the investigator would indicate that the individuals featured in the video were asking for donations while showing the participants a donation box on the wall. Towards the end of that invitation to donate, the investigator's phone would intentionally ring, and the investigator excused herself to answer the phone in the room. Once the phone call was over, the investigator informed the participant that she had to leave immediately due to an emergency involving their partner and asked the participant to watch the video on their own and then complete the (post-intervention) survey.

Once the participant accepted, the investigator asked the participant to turn off the computer and screen and close the room on their way out and pointed to the instructions on how to turn both the screen and computer off. The investigator made it clear that the room would not be used again until the next day.

The room setup for each participant is diagrammed in Figure 3. The room setup was identical for each participant. The behaviors measured for each participant included:

- Turning off the room lights.
- Turning off the TV screen.
- Turning off the computer.
- Recycling the paper with instructions provided to them.
- Recycling a crumpled piece of paper lying on the floor.
- Recycling a plastic bottle left behind by the experimenter.
- Donating to the environmental cause in the donation box on the wall.

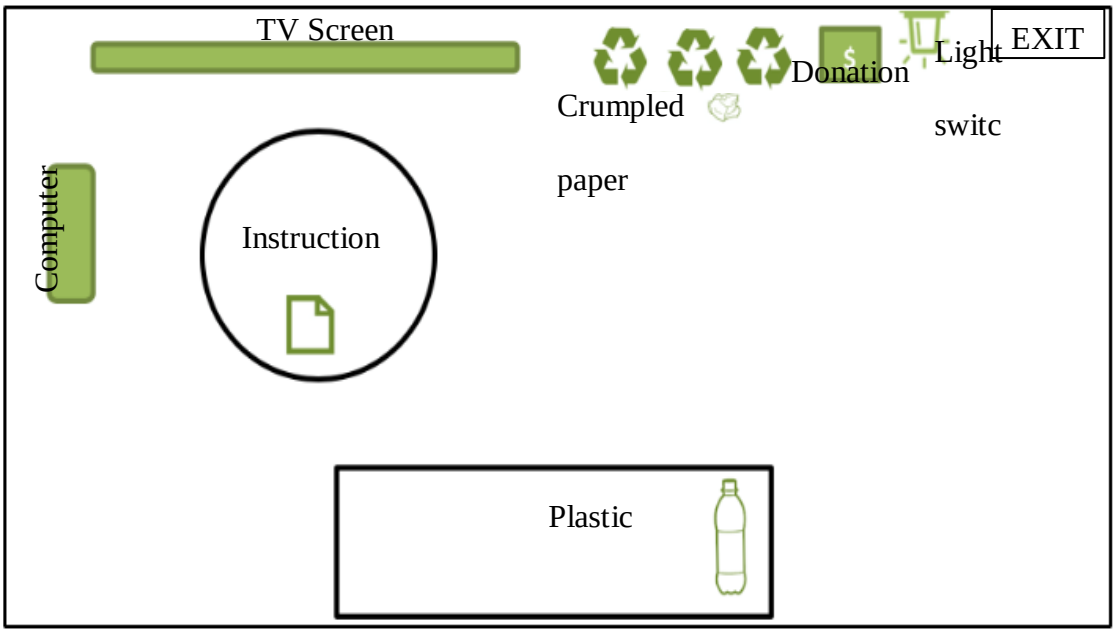


Figure 3. *Room Diagram*

Once the investigator left the room, each participant would either watch the local or global video randomly assigned by the investigator. After watching the video, the participants completed the post-intervention survey.

The post-intervention survey included six questions measuring comprehension of the video, followed by six questions on the effect(s) the video had on them as individuals. The survey also included one question on the target audience for the video (See APPENDIX 3).

Once the participant left the room, the investigator met with the individual to debrief them on the objectives of the experiment. (See Experimental Protocol in APPENDIX 3). In the meantime, a member of the experiment team recorded each of the seven behaviors. While I acknowledge that I did not know if all participants were actively behaving in certain ways for environmental purposes, I measured behaviors commonly linked to the benefit of the environment. Stern (2000) claims that an "impact-oriented definition is important when research seeks to identify and/or target behaviors related to the environment". A complete description of the measures of video relevance, comprehension, scale check and observed behaviors post-intervention is provided under the Variables Section below.

Variables

The VBN model (Stern et al., 1999) was measured in Time I in the pre-intervention survey. The model incorporates five key **values** related to pro-environmental behavior (self-interest, traditional, humanistic altruism, biospheric altruism and openness to change), and **beliefs** known to correlate with pro-environmental behavior (self-reported behavior, intentions, attitudes, and policy preferences) (Dietz, 2015). These variables were measured in the Time I survey. The VBN model predicts that the pro-environmental behavior measured in Time II of this study (turning lights off, turning computer off, recycling a plastic bottle, recycling a crumpled paper,

recycling paper and donating to an environmental cause), as well as the self-reported behaviors would be influenced by (values of self-interest, traditionalism, humanistic altruism, biospheric altruism and openness to change, and a general belief in the ability humans have to negatively impact the environment). The measurement of the **norms** was designed to ask about descriptive pro-environmental norms for other MSU students on campus. In the next part of this section a full description on how values beliefs and norms were measured is provided as well as other variables captured during both Time I and Time II of this study.

My measures of **values** were completed using the approach by Schwartz & Bilsky (1987), as modified by Stern et al. (1998). In this approach, participants used a seven-point Likert scale indicating the importance (from "not at all important" to "of supreme importance") of various value statements of guiding principles in their lives. With this data, I used a Principal Component Analysis (PCA) to observe how information collected on values was grouped in components and to make sure the correlation of the components corresponded to the designated values (Table 1). This and all statistical analysis in the study were done with SPSS v.26. Following the PCA I tested each of the elements that corresponded to each of the five values for the Cronbach's alpha (Table 3). These two tests confirmed that I could create scales based on the original components described in the Schwartz protocol. Based on these results, I created five value scales: self-interest, traditional, humanistic altruism, biospheric altruism, and openness to change. The scales where created by averaging the responses to the three items corresponding to each of the values.

Table 1. *Principal Component Analysis for Values*

Component Matrix[a]					
Component	1	2	3	4	5
Please indicate how important each of the following is as a guiding principle in your life. - being influential	0.391	0.467	-0.417	0.056	-0.132
Please indicate how important each of the following is as a guiding principle in your life. – wealth	-0.097	0.712	0.198	0.103	-0.224
Please indicate how important each of the following is as a guiding principle in your life. - social power	0.330	0.478	-0.193	0.171	-0.419
Please indicate how important each of the following is as a guiding principle in your life. - a world at peace	0.651	-0.041	0.197	0.221	-0.055
Please indicate how important each of the following is as a guiding principle in your life. - equality	0.695	-0.260	0.251	0.429	0.060
Please indicate how important each of the following is as a guiding principle in your life. - social justice	0.620	-0.271	0.188	0.526	0.088
Please indicate how important each of the following is as a guiding principle in your life. - unity with nature	0.578	-0.188	-0.132	-0.378	-0.359
Please indicate how important each of the following is as a guiding principle in your life. - respecting the earth	0.680	-0.280	0.061	-0.347	-0.174
Please indicate how important each of the following is as a guiding principle in your life. - preventing pollution	0.716	-0.261	0.078	-0.240	-0.237
Please indicate how important each of the following is as a guiding principle in your life. - family security	0.259	0.452	0.618	-0.079	0.116
Please indicate how important each of the following is as a guiding principle in your life. - self-discipline	0.404	0.412	0.258	-0.340	0.276
Please indicate how important each of the following is as a guiding principle in your life. - honoring parents and elders	0.249	0.543	0.315	-0.113	0.180
Please indicate how important each of the following is as a guiding principle in your life. - a varied life	0.433	0.148	-0.503	0.005	0.470
Please indicate how important each of the following is as a guiding principle in your life. - being curious	0.501	-0.078	-0.256	-0.180	0.456
Please indicate how important each of the following is as a guiding principle in your life. - an exciting life	0.357	0.410	-0.534	0.180	-0.042
[a] 5 components extracted.					

For the **beliefs**, I measured generalized environmental beliefs using the modified New Ecological Paradigm scale, a seven point Likert scale ranging from "strongly disagree" to "strongly agree." (Dunlap, Riley E; Van Liere, Kent D; Mertig, Angela G; Jones, 2000; Guagnano et al., 1995). In the case of the Beliefs we used a Cronbach's alpha test to measure the consistency of the scale (Table 3) and then similar to the values we created the scale based on the five questions using the average of the response.

For the **norms**, I asked questions in regard to describing what other MSU students do on campus. The analysis only consisted of the norms regarding environmental behaviors. In this study I focused on behaviors commonly performed by students to understand the environmental norms (including use of disposable plastic bottles, use of plastic grocery bags, take out, recycling of paper and plastic, use of reusable water bottles, and picking up paper or plastic seen on campus). To avoid disclosure of the study being about environmental behaviors, I added questions on participation at sporting events, exam behavior, and alcohol consumption. Similar to the values, I used PCA to observe how information collected on descriptive norms. I discovered two components, the first one related to reducing waste (1), the other one related to consuming behavior (2). I tested each scale but found no difference in using the two scales in comparison to the general scale therefore I used the general scale for all analysis. The PCA results are outlined in Table 2.

Table 2. *Principal Component Analysis for Pro-Environmental Descriptive Norms*

Component Matrix[a]		
	Component	
	1	2
drink a beverage out of a disposable plastic bottle	-0.493	0.611
carry their groceries in plastic bags	-0.384	0.655
eat take-out or delivery from a local restaurant	-0.309	0.552
always recycle paper and plastic waste that can be recycled	0.711	0.354
pick up paper and plastic waste they see on campus	0.675	0.384
use their own reusable water bottle	0.515	0.414
[a] 2 components extracted.		

I then proceeded to measure the reliability of the scale with a Cronbach's alpha test. In this scale, I used all six norms related to pro-environmental behavior by averaging the values from the six items in the survey. The findings on these survey items and alpha values are presented in Table 3.

Table 3. *Survey Items with Reliability Measure for Values, Beliefs and Norms*

Survey Item	**Scale and Cronbach's alpha**
Being influential Wealth Social power	Self-interest = 0.446
A world at peace Equality Social justice	Humanistic altruism = 0.763
Unity with nature Respecting the earth Preventing pollution	Biospheric altruism=0.716
Family security Self-discipline Honoring parents and elders	Traditional = 0.620
A varied life Being curious An exciting life	Openness to change = 0.575
The so-called "ecological crisis" facing humankind has been greatly exaggerated [*reverse-coded*] If things continue on their present course, we will soon experience a major ecological. Humans are severely abusing the environment. The balance of nature is strong enough to cope with the impacts of modern industrial nations. [*reverse-coded*] The earth is like a spaceship with very limited room and resources.	New Environmental Paradigm = 0.760
Drink a beverage out of a disposable plastic bottle [*reverse-coded*] Carry their groceries in plastic bags [*reverse-coded*] Eat take-out or delivery from a local restaurant [*reverse-coded*] Always recycle paper and plastic waste that can be recycled Pick up paper and plastic waste they see on campus Use their own reusable water bottle	Pro-environmental norms = 0.456

For the behavioral measures, in the pre-intervention survey Time I I asked about what the participants do, in other words I attempted to capture self-reported behavior including voting for a political candidate due to their environmental position, donating money to environmental causes, signing petitions for environmental causes, conserving water, recycling newspaper, glass, plastic or other items, and conserving energy. Again, through PCA testing, I created two scales

on self-reported behavior (Table 4). One component (2) is based on political engagement, which included the items on voting, donations, and signing petitions. The second component (1) regarding household conservation included the items on water conservation, energy conservation, and recycling. These two scales were tested for reliability with a Cronbach's alpha test (Table 5).

Table 4. *Principal Component Analysis with a Promax Rotation with Kaiser Normalization of Self-Reported Behavior*

Structure Matrix

	Component	
	1	2
Voted for a candidate because of their pro-environmental position	0.404	0.741
Donated money to an environmental cause	0.282	0.802
Signed a petition supporting an environmental cause	0.325	0.885
Tried to use less water where you live	0.856	0.363
Voluntarily recycled newspapers, glass, plastics, or other items	0.752	0.287
Tried to use less energy where you live	0.877	0.360

Table 5. *Survey Items with Reliability Measure for Self-Reported Behaviors*

Survey Item	Scale and Cronbach's alpha
Voted for a candidate because of their pro-environmental position Donated money to an environmental cause Signed a petition supporting an environmental cause	Political engagement = 0.711
Tried to use less water where you live Voluntarily recycled newspapers, glass, plastics, or other items Tried to use less energy where you live	Household conservation = 0.760

I then used the experiment to observe and record actual behavior including recycling a plastic bottle (left by the investigator), recycling instructions given to them, recycling crumpled paper from the floor, turning off the lights, computer, and TV screen, and donating to an environmental cause. To start the data analysis, I used PCA and found that the crumpled paper and donation

behaviors were grouped into one component (Table 6). However, since this grouping responded more to the spatial distribution of the activity rather than a theoretical grouping, I chose to create one additive scale of the behaviors and tested for internal reliability with a Cronbach's alpha (Table 7).

Table 6. *Principal Factor Analysis of Observed Behavior with a Promax Rotation with Kaiser Normalization*

Structure Matrix		
	Component	
	1	2
Lights	0.656	-0.189
Computer	0.797	-0.092
Screen	0.714	0.194
Bottle	0.709	0.366
Instructions	0.472	-0.593
Crumpled paper	0.027	0.802
Donate dummy variable	0.150	0.558
Extraction Method: Principal Component Analysis.		
Rotation Method: Promax with Kaiser Normalization.		

Table 7. *Survey Items with Reliability Measure for Measured Behaviors*

Survey Item	Scale and Cronbach's alpha
Turned off lights	
Turned off computer	
Turned off screen	
Recycled instructions	Pro-environmental behavior scale = 0.598
Recycled crumpled paper	
Recycled plastic bottle	
Donated money	

To address the construal levels and social distance for the experiment, I asked participants for the Zip Code of their family home to assess its distance from the Great Lakes. Using mapping software, ArcGIS v. 10.5, I measured the distance from the center of each participant's Zip Code to the coast of the nearest Great Lake. Participants were also asked about the frequency of

participation in water-related recreational activities such as swimming, boating, fishing, snorkeling or scuba diving, tubing, rafting, and jet skiing. In this water recreation variable, I found that on average participants swim in a river, lake or ocean several times a year. They went boating and fishing approximately, and a few times in their lives they had been tubing, rafting or jet skiing. In the PCA, I found scuba diving was not as strongly associated to the other water activities and therefore dropped that variable from the water recreation scale (Table 8). The scale showed a high reliability measure (Table 9). Participant's personal closeness to water measured in the water recreation scale, is hypothesized as directly related to greater concern for environmental problems that affect water, particularly the body of water closest to the individual.

Table 8. *Principal Component Analysis for Water Recreation Activities*

Component Matrix[a]	
	Component
	1
Went swimming in a river, lake, or ocean	0.798
Went boating	0.869
Went fishing	0.622
Went snorkeling or SCUBA diving	0.532
Went tubing, rafting, or jet skiing	0.844
[a] 1 components extracted.	

Table 9. *Survey Items of Recreational Use of Water with Reliability Measures for Water Recreation Scale*

Survey Item	Scale and Cronbach's alpha
Went swimming in a river, lake, or ocean	Water recreation scale = 0.760
Went boating	
Went fishing	
Went tubing, rafting, or jet skiing	

I also included measures of the socio-demographic characteristics of the group. The categories recorded were race, gender and political view. These three categories have explained pro-

environmental behavior in previous studies. First, I measured gender identity. In this variable I did not have much variability, therefore it was recoded as female = 1 and all others = 0. Second, I measured race. As explained above there was not a large representability of minorities in the sample. Therefore, I recoded the variable to be white = 1 and all others = 0. Third, I measured political view. In my original question individuals, were asked "Politically do you think of yourself as liberal or conservative?" with the responses on a scale from 1= "Very liberal" to 7 = "Very conservative." Due to little variability in this question I recoded this variable to a three-point scale: 1 = "Liberal", 2 = "middle of the road" and 3 = "Conservative".

With the Time I and Time II data, descriptive analyses were conducted including frequencies, and box and whisker graphs. Analytical analyses outside of the PCA outlined above included one-way ANOVA and linear regression. The findings from the Time I and II phases of this study are provided below.

RESULTS

In Time I study (n=198 students) the demographic makeup of the participants was female (47 percent), which is marginally lower than the 51.6 percent of females at MSU overall (Office for Inclusion and Intercultural Initiatives, 2018). In terms of race and ethnicity, approximately 80.3 percent were white. The remaining participants identified as African American, Hispanic, Multicultural, Asian/ Asian American, Native American, or Native Hawaiian/Pacific Islander. This demographic makeup is consistent with the MSU undergraduate student population overall where white students make up 76.1% of the undergraduate student enrollment (Office for Inclusion and Intercultural Initiatives, 2018).

This study was analyzed in two stages. The first stage analyzed the *self-reported behaviors* from the pre-intervention survey. The second stage analyzed *observed behaviors* post-intervention. Participant responses for values, beliefs, and norms are used during both stages of analysis. Based on the survey's measure of values (Figure 6), I found that individuals in this group had high humanistic altruism (mean = 4.20), biospheric altruism (mean = 4.10), openness to change (mean = 4.05), and traditional values (mean = 3.93), while the lowest average was found in the self-interest value scale (mean = 3.01), meaning this group presents low self-interest values (Figure 7).

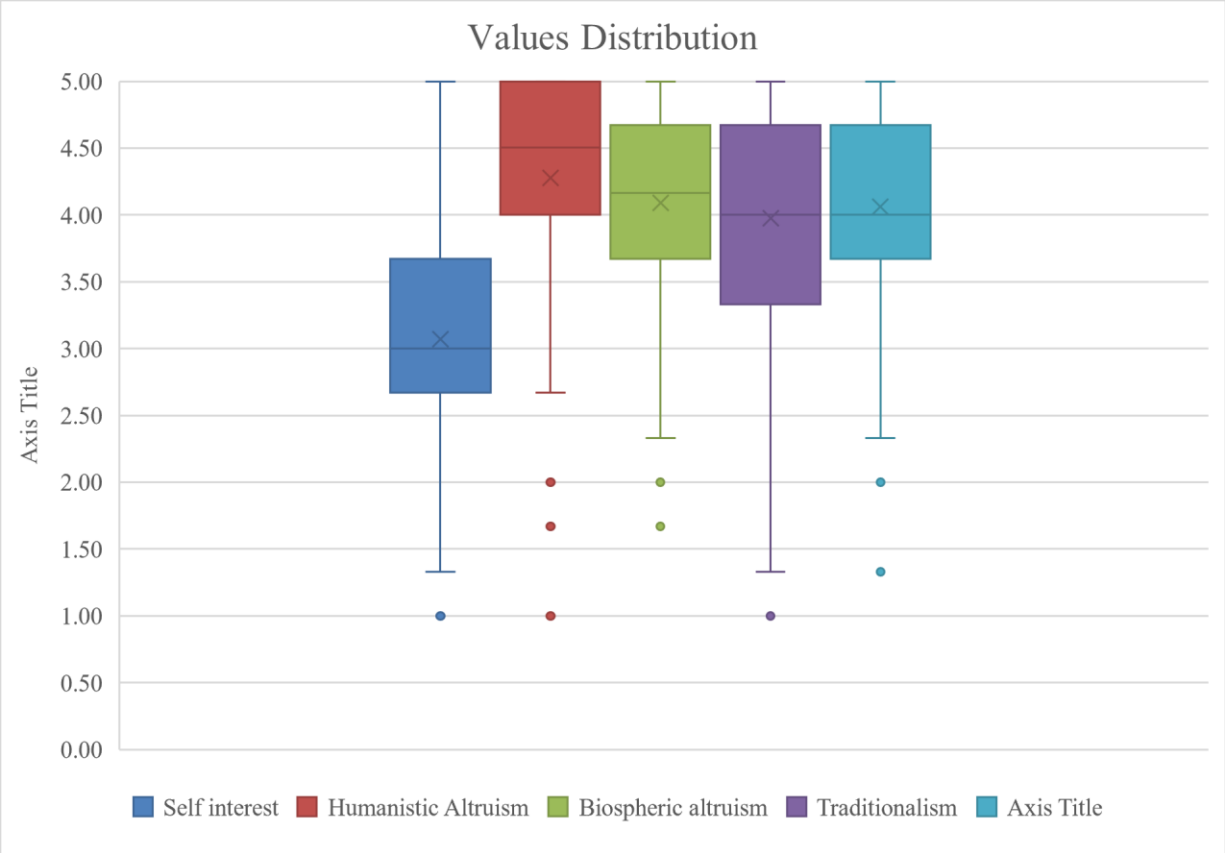


Figure 4. *Values Distribution (Mean Responses and 95% Confidence Intervals) in Time I*

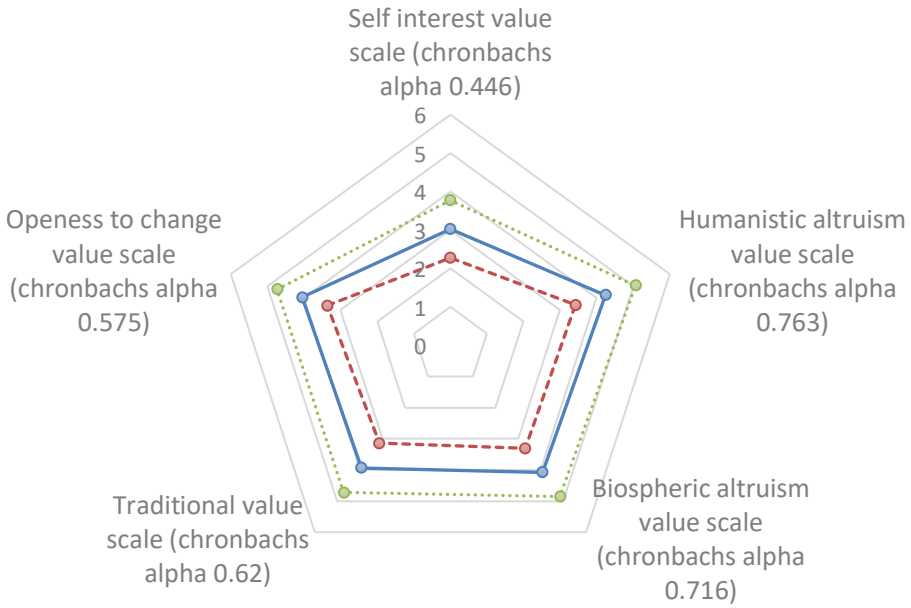


Figure 5. *Value Structure (Radar Graph)*

Based on the survey's measure of beliefs, I found an average 5.9 (SD 1.04) score for the NEP scale (ranging from one to seven), which means that beliefs among the participants were consistent with the New Environmental Paradigm (Figure 8). These results indicate that in this group, individuals ascribed to the belief that there is an ecological crisis caused by humans.

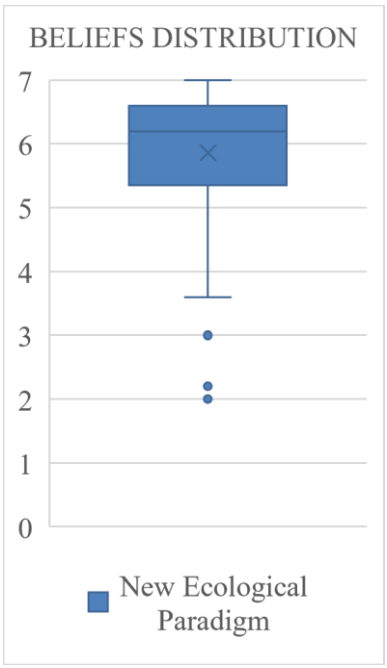


Figure 6. *Distribution of Beliefs Variable*

In terms of norms, I found that many participants (34.5 percent) perceived that 80-90 percent of their student peers drank beverages out of a disposable plastic bottle, carry their groceries in plastic bags (35.9 percent) and eat takeout or delivery from a local restaurant (42.4 percent). Many participants (38.9 percent) believed that 30-40 percent of their peers always recycled paper and plastic waste that can be recycled, 0-20 percent picked up paper and plastic

waste they see on campus and (64.6 percent) and 60-70 percent use their own reusable water bottle (27.3 percent) (Table 5). These norms describe a community that behaves mostly in a pro-environmental manner, which is reflective of the previously stated results of values and consistent with VBN theory.

Table 10. *Social Norms at Michigan State University*

Please indicate approximately what percentage of MSU students you think perform each of the following behaviors AT LEAST ONCE A MONTH[1].

	Drink a beverage out of a disposable plastic bottle	Carry their groceries in plastic bags	Eat take-out or delivery from a local restaurant	Always recycle paper and plastic waste that can be recycled	Pick up paper and plastic waste they see on campus	Use their own reusable water bottle
0-20%	4.5	3.5	2.5	26.8	64.6	5.1
30-40%	7.6	6.1	5.1	38.9	21.7	24.2
50%	12.6	11.1	9.1	16.7	8.6	25.3
60-70%	21.2	34.3	24.7	13.1	3.0	27.3
80-90%	35.4	35.9	42.4	3.5	1.5	14.6
100%	18.7	9.1	16.2	1.0	0.5	3.5

[1]Percentage of participants responding to each level for each norm. In bold are the highest values discussed in the paragraph above.

Next, I used two scales of self-reported behavior based on a factor analysis as explained previously. The self-reported behaviors matched five of the measured behaviors after intervention. Specifically, turning off the lights, computer, and TV screen matched the item "Tried to use less energy where you live"; recycling instructions, crumpled paper and plastic bottle matched "Voluntarily recycled newspapers, glass, plastics, or other items"; and donation matched "Donated money to an environmental cause." The other behaviors –voting for a political candidate based on their pro-environmental position, signing a petition supporting an environmental cause, and trying to use less water– while not included in the experimental design, are nonetheless relevant to understanding what individuals self-report in terms of their political

engagements and home-based pro-environmental efforts. These pro-environmental behavior measures explored an array of behaviors confronting the participants with daily decisions that they may or may not be performing consistently with their values.

For the first part of the analysis, I examined self-reported behaviors and found that participants reported “Not at all” for “vote for a candidate because of their pro-environmental position, donate money to an environmental cause, or sign a petition supporting an environmental cause”. However, they “regularly” tried to use less water where they live, recycle newspaper (all the time), glass, plastics, or other items voluntarily, and try to use less energy where they live (Table 6).

Table 11. *Self-Reported Behavior Response Percentages*

Self-reported behavior items	Not at all	Rarely	Sometimes	Regularly	All the time	No response
Voted for a candidate because of their pro-environmental position	32.8	8.6	17.7	20.7	18.7	1.5
Donated money to an environmental cause	60.6	19.7	14.1	4.5	0.0	1
Signed a petition supporting an environmental cause	40.4	22.2	19.2	12.1	5.1	1
Tried to use less water where you live	5.1	16.2	26.3	29.8	20.7	2
Voluntarily recycled newspapers, glass, plastics, or other items	3.0	4.0	11.6	32.3	48.0	1
Tried to use less energy where you live	2.5	10.1	22.2	34.8	28.3	2

On Self-Reported Behavior

The first hypothesis states that values, beliefs, and norms help describe self-reported behavior. To test this hypothesis[1], I estimated linear regression models expecting to see higher scores in the scales of political engagement and resource conservation of the self-reported behavior would be explained by low self-interest, high humanistic altruism, and high biospheric altruism. In preliminary tests of bivariate correlation, I found that Traditional and Openness to Change values did not help explain the behaviors which is consistent with the findings in related studies (Dietz, Fitzgerald, & Shwom, 2005; Jakovcevic & Steg, 2013). Therefore, I opted to leave these two values – Traditional and Openness to Change – out of the regression model.

Next, I tested the two scales. For the scale on political engagement, self-interest was significantly negatively related to political engagement and biospheric altruism had a significant positive effect (Table 7). The NEP also had a significant positive effect on the political engagement scale of self-reported behavior. In terms of norms there were no significant results. In preliminary analyses I performed factor analysis on the norms and found that they loaded into two groups (those reverse coded and not). I then created scales for each of the components, however it made no difference. Finally, I found that political ideology also had a significant negative effect as the more conservative leaning participants exhibited lower performance on the political engagement scale. In the case of the resource conservation scale of self-reported behaviors, I found the NEP was positively significant, just like self-interest (negative) and biospheric altruism (positive).

[1] As part of the preliminary analysis we performed linear regressions to test VBN. We found that Beliefs are explained by Biospheric altruism, being white and political ideology. We found that an increase in conservative political views has a negative effect on the NEP. In the case of race being white has a positive effect on the NEP. Finally, from the values, biospheric altruism was the only significant value (see APPENDIX 8 for regression table).

However, in the case of resource conservation, being female was positively significant on the scale rather than the political ideology (Table 7).

We also used individual behaviors to determine that political ideology (conservativism) was significant for voting behavior (Table 7). The less politically conservative an individual is, the more likely they are to take into account a candidate's pro-environmental position when voting. Also, as expected, biospheric altruism was positively significant in explaining this voting behavior. This means that the individuals with higher biospheric values were more likely to choose a candidate due to their pro-environmental agenda. On the other hand, self-interest values were also significant. The higher scores in self-interest values, the less likely the individual would be to take into account a candidate's pro-environmental position to support them. The NEP was also positively significant for voting for a candidate due to their pro-environmental position. Conversely, political ideology had a negative effect, meaning more conservative leaning individuals were less likely to choose a candidate due to their pro-environmental agenda. In the case of donations for environmental causes (Table 7), biospheric altruism was the only value significant for the behavior. For signing petitions or supporting an environmental cause, we once again found that leaning politically conservative has a negative effect on this behavior. For the values, only biospheric altruism was significant. In the case of self-reported water conservation, we found that self-interest (negative effect) and biospheric altruism (positive effect) were significant for the water conservation behavior. In the case of recycling, we found a negative effect from the self-interest value, and a positive significant effect of the NEP. Females were significantly more likely than others to self-report their recycling behavior. In energy conservation, we only found the biospheric values to be significant (Table 7).

Table 12. *Standardized Coefficients from Linear Regression Model Predicting Self-Reported Behavior (n=197)*

Selected Predictors	Scale of self-reported political engagement	Scale of self-reported household conservation	Vote	Donate	Sign Petition	Water Conservation	Recycling	Energy Conservation
Value Orientations								
Self-interest	-0.12*	-0.23***	-0.13*	-0.04	-0.11	-0.20**	-0.22***	-0.13
Humanistic altruism	-0.09	0.04	-0.08	-0.12	-0.03	-0.01	0.09	0.02
Biospheric altruism	0.35***	0.23**	0.28***	0.32***	0.26***	0.25**	0.07	0.24**
Beliefs								
NEP	0.19*	0.19*	0.17*	0.16	0.12	0.08	0.23**	0.15
Norms								
Pro-environmental norm scale	0.05	0.05	0.03	0.10	0.02	0.02	0.12	-0.01
Demographic, Social and political indicators								
White	0.03	-0.06	0.012	0.00	0.04	-0.04	-0.08	-0.03
Female	-0.04	0.14*	-0.02	0.02	-0.10	0.09	0.23***	0.03
Ideology (conservative)	-0.28***	-0.02	-0.34***	-0.07	-0.21**	0.03	-0.08	0.00
Adjusted R^2	0.34	0.19	0.36	0.13	0.18	0.09	0.23	0.10

*p<0.05. **p<0.01. ***p<0.001

The self-reported behavior results are consistent with the literature on pro-environmental behaviors and are conducive to the next stage of analysis where we seek to understand the actual behaviors. However, we will first explore the results on psychological distance.

Understanding Distance

In this study we discuss distance in two main dimensions. Firstly, it is a physical dimension represented in scale. Local scale indicates close proximity to a water body, while global scale means the individual is further away from a water body. Secondly, we explore social distance. How close is the participant to the issue and how familiar is the participant with the issue? As we discuss plastic pollution with individuals, we use two variables to determine the social distance to the resource. The first variable is the participants' frequency and access to recreational water and the second variable is the location of their family home in relation to the body of water. On the scale of water recreation, we find that, on average, individuals experience recreational activities in the water at least once a year (mean=3.96). This scale was used as a proxy of close social distance to water.

For physical distance, we calculated the distance from the zip code of their self-reported family home to the nearest Great Lake coast. For the participants in Time I, the distribution of their home town zip codes include zip codes all around the lower peninsula, particularly of

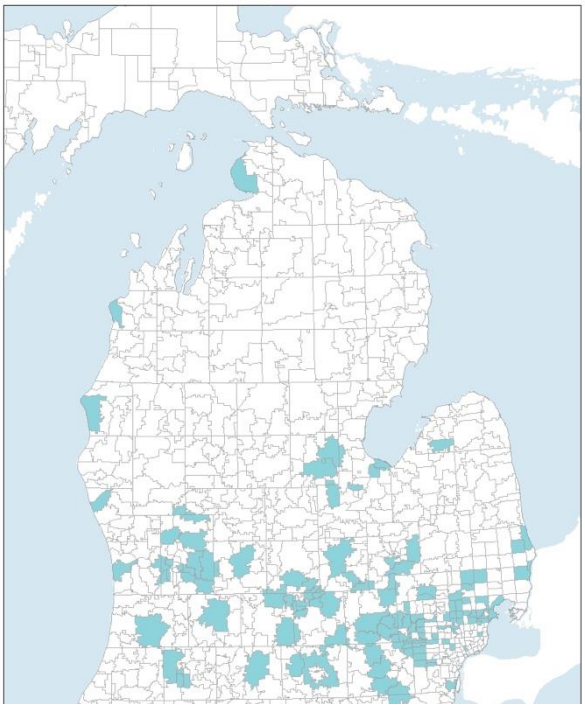


Figure 7. *Distribution of Hometown Zip Codes of Participants*

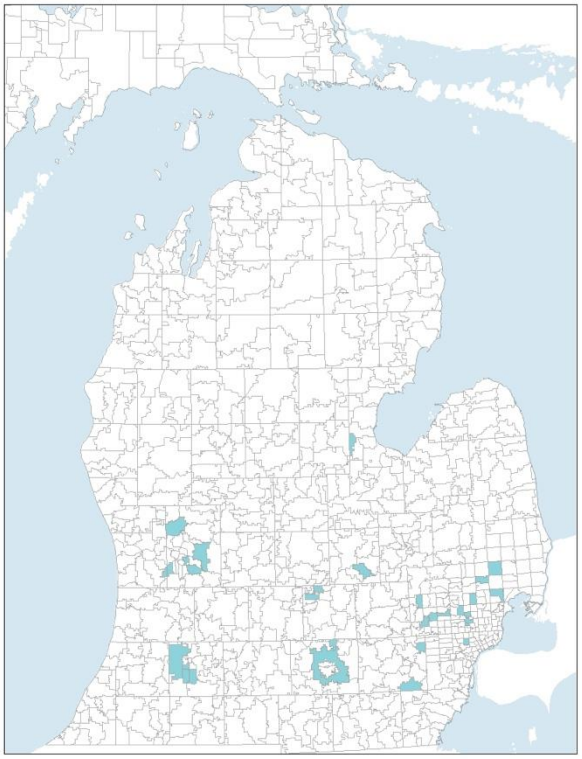


Figure 8. *Distribution of Hometown Zip Codes of Time II Participants*

Grand Rapids, Muskegon, Holland, Lansing East, Lansing, Owosso, Saginaw, Bay City, Detroit, Warren and Flint (Figure 6).

In the case of participants who participated in Time II, we find their distribution to be focused on the areas of southern Michigan in what is described as the lower peninsula (Figure 5).

We found an average distance of 30 miles (of the 35 participants who shared their zip code), a minimum distance of 5.7 miles, and a maximum distance of 73.27 miles. To further understand the information gathered, we displayed the distance to water both social (from the water recreation scale) and physical distances overlapped with the individual's values and observed behaviors (Figure 7).

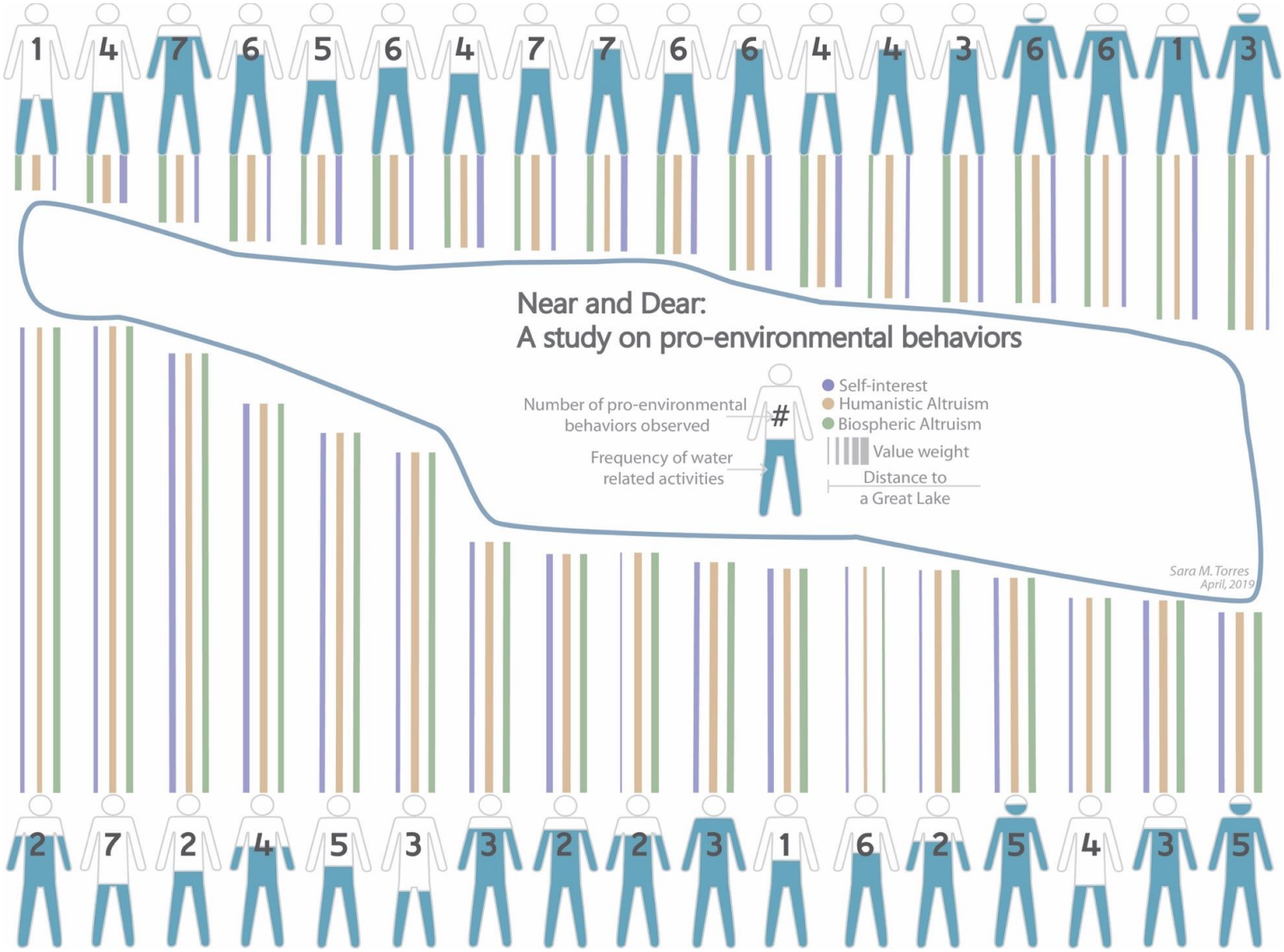


Figure 9. *Pro-Environmental Behavior in the Context of Values and Distance*

In the display, we observe that individuals who came to the second interaction had low self-interest values. We also found that as individuals get closer to the lake, the humanistic altruism increases. In terms of the behaviors we did not find a clear relationship between either physical distance or social distance to the water. However, we did find that in general, individuals are more likely to have high levels of recreational water activities when they are in the middle ranges of distance, rather than the extremes. With this first approach to our data we are finding little impact from distance on the measured pro-environmental behaviors. In the next section we explore the statistically significant relations and the experimental manipulation.

On Actual Behavior

For the second part of the analysis, we used the intervention and the measures of actual behavior, as well as the measures of distance described above. We found that the most common post-intervention behavior was recycling the instructions provided (75 percent) and turning off the lights (67 percent). The least common behavior was recycling the crumpled paper from the floor (32.5 percent) (Table 8). These results are consistent with the experimental environment. The instructions were intentionally useless to the participants, and it put them in a position to make a choice about what to do with the piece of paper. Conversely, turning off the lights, computer and the TV screen – all of which over 60 percent of the participants turned off – were behaviors prompted by the experimenter (APPENDIX 4).

Table 13. *Percentage of Participants Performing Pro-Environmental Behaviors Post-Intervention*

Post-intervention behavior items	**Percentage**
Turned off lights	67.0
Turned off computer	65.0
Turned off TV screen	62.0
Recycled instructions	75.0*
Recycled crumpled paper	32.5
Recycled plastic bottle	57.5
Donated money	42.5
*Two participants took the instructions with them	

The donation behavior was more common than expected (42 percent). In a college student community that is traditionally considered to be limited in economic resources it was interesting to see such high participation in the donation behavior. Of the participants who donated, most donated one dollar (nine participants). Furthermore, when analyzing the donation behavior, we found that some participants were willing to donate all of what was given to them (four participants) and one of them donated a total of seven dollars, two dollars more than the incentive offered for their participation, this will be furthered explored in the discussion section (Figure 10).

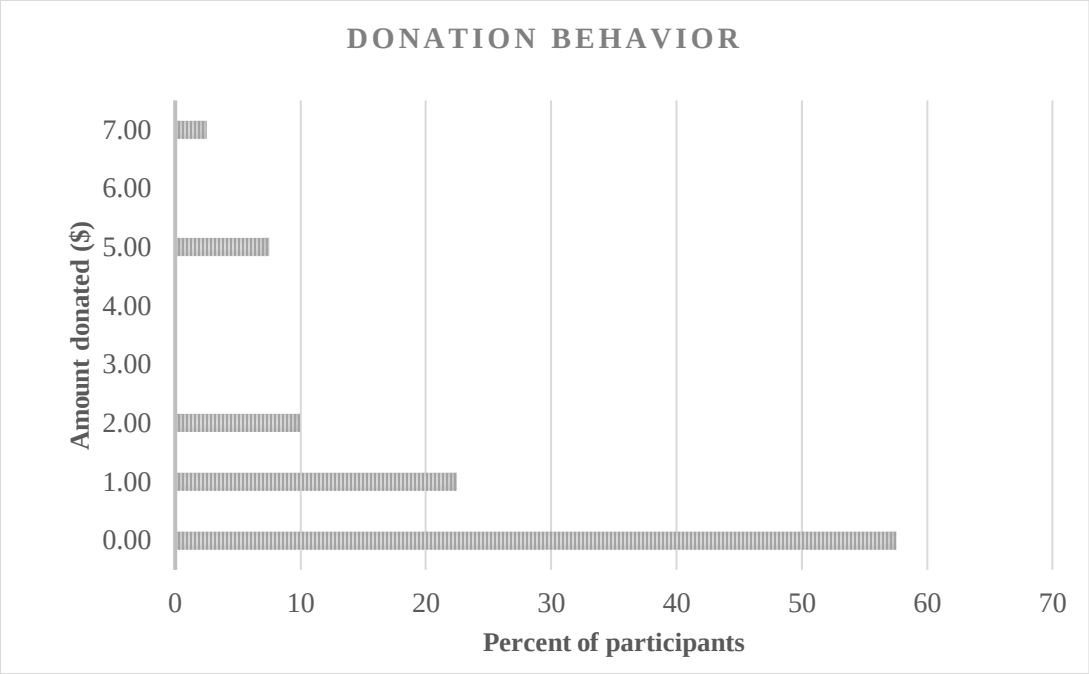


Figure 10. *Distribution of Donation Behavior: Total Donated $39 Dollars*

I used One-way ANOVA testing for each of the behaviors observed and found that the self-interest value is significant in the donation behavior. However, none of the other behaviors were explained by any the Values, Beliefs and Norms (see APPENDIX 6 for all ANOVA tests). For the analysis, I used the scale of measured pro-environmental behaviors and tested the comprehension of the video intervention. I found that comprehension of the video was not satisfactory as measured by the post-intervention survey, as only half of the participants answered all three post-intervention survey questions correctly. In the first question, when asked about the actions MSU is taking to respond to plastic pollution, I found that nine out of the 22 participants who watched the local video recognized the three things MSU researchers are doing to address the problem of plastic pollution and five out of the 16 individuals who watched the local video recognized all three strategies (Table 14).

Table 14. *Cross Tab of Intervention and Number of Correct Responses on what MSU Researchers Do about the Issue of Plastic Pollution, Percentage Responses (n=38)*

Number of correct responses on what MSU researchers do		0	1	2	3	Total
Video played	Local	0.00	27.27	31.81	40.91	100
	Global	6.26	43.75	18.75	31.25	100
	Total	2.63	34.21	26.32	36.84	100

On the questions specific to the global or local intervention, I found that 14 out of the 22 participants who watched the local video and seven out of the 15 who watched the global video, responded correctly to the question about the average pounds of plastic a person wastes a year. For the last question, "According to the video, about how many pounds of plastic debris end up getting into the water?" 12 out of 22 who watched the local video and 11 out of 15 who watched the global video responded correctly to this question.

I also tested the reliability of the perception of the video as "global" or "local" depending on the video presented to each participant. The findings were inconsistent. Most students who saw the global video intervention indicated that the required approach to the problem of plastic pollution requires a global approach. However, of those who had the local video intervention, less than half (10 out of 22) chose the need for a local approach. The other participants chose either a neutral value, or a global approach (Table 15). When asked whether the problem was a global one or a local one, most participants indicated it was a global problem (Table 15).

Table 15. *Cross Tab Intervention and Best Approach and Intervention and Problem Scale (n=37)*

Video Intervention	Does the issue require a local or global approach?		
	Local	Neutral	Global
Local *(n=22)*	45.45	31.82	22.73
Global *(n=15)*	6.67	6.67	86.67
	Is plastic pollution a local or global problem?		
	Local	Neutral	Global
Local	22.73	13.64	63.64
Global	0.00	6.67	93.33

*37 out of 40 participants responded to this question

The results of these comprehension tests indicate that the local video was not perceived by participants as such while the global video provided a clear message exemplifying the global nature of this issue. The manipulation of the local intervention may not have been strong enough to have participants perceive the issue as a truly local one, which could be partially affected by information outside the study.

For the second part of the analysis I sought to continue responding to our first research question on how framing environmental issue as local or global impact individual pro-environmental behavior as well as our second research question on the effect that VBN has on observed pro-environmental behavior. For the first question I hypothesize that *distance will have an effect on pro-environmental behaviors which will be moderated by the experimental manipulation*. For the second question my hypothesis was that *values, beliefs and norms will predict measures of environmental behavior*.

I then predicted that when individuals who watched the local video, and lived closer to a Great Lake would be more likely to perform the pro-environmental behavior. I also predicted that individuals with high biospheric and humanistic Altruism as well as low self-interest values would be more likely to perform the pro-environmental behaviors in the experimental setting. I

used the created additive scale to estimate a linear regression using the same values, beliefs, and norms. A second model included the intervention and distance to the nearest Great Lake from the Zip Code of their family home. For the third and final model, I used the scales on political engagement and resource conservation of the self-reported behaviors. None of the models had any significance above or below 95 percent (Table 16). Due to the small sample size, I did not perform a full model with all variables as a precaution from overcrowding the model of variables.

Table 16. *Standardized Coefficients from Linear Regression Model on Observed Pro-Environmental Behaviors Scale (n=39)*

Selected Predictors	Scale of measured pro-environmental behavior		
	Model I	Model II	Model III
Value Orientations			
Self-interest	-0.06	-0.01	0.00
Humanistic altruism	-0.07	-0.25	-0.01
Biospheric altruism	-0.03	0.10	-0.17
Beliefs			
NEP	0.19	0.11	0.17
Norms			
Pro-environmental norm scale	-0.02	0.03	-0.01
Distance			
Distance to closest Great Lake	--	-0.29	--
Water recreation scale	--	-0.17	--
Self-Reported Behavior			
Political engagement	--	--	-0.09
Resource conservation	--	--	0.28
Demographic, Social and political indicators			
White	-0.03	-0.04	-0.00
Female	0.36	0.32	0.27
Ideology (conservative)	0.18	0.13	0.16
Adjusted R^2	-0.72	-0.14	-0.88

*p<0.05. **p<0.01. ***p<0.001

I also performed bivariate logistic regressions on each of the measured behaviors using the variables that were significant for the scales on self-reported behavior –Self-interest value, biospheric value, NEP, norms scale, race (white), gender (female), and political view (conservative). In this analysis I found that for donation behavior, the self-interest value was negatively significant (p-value=0.04). This finding indicated that individuals with low levels in the self-interest value scale would be more likely to donate in the experiment (see APPENDIX 6 & APPENDIX 7). Although not statistically significant, being female had a positive effect on turning off the screen (p-value=0.065), and the lights (p-value = 0.063) (for a table with all the bivariate logistic regressions used, see APPENDIX 7).

While it is surprising that there were no significant variables, I must point out the limitations of this study and the need to expand its work. It is possible that while these variables are important, the individuals who participated in the experiment had little variance, meaning the participants were demographically similar and therefore differences were undetectable. By looking at the variance of the variables, it is apparent that the study population is a homogenous group. To solve these homogeneity issues, the sample must be increased.

Overall, I discovered that Time I of this study –values, beliefs and norms and self-reported behaviors – is consistent with the general literature. The grouping of self-reported behaviors as political engagement and resource conservation is consistent with the types of pro-environmental behavior found in the literature. It is also consistent that being female has a positive effect in pro-environmental behaviors. Females have often been found to be more engaged with environmental causes such as climate change (Scannell & Gifford, 2013).

DISCUSSION

The results in this study were consistent with previous research on the effects of values, beliefs and norms on self-reported behavior. In a time when scientific and mass media reports on the environmental crisis are a constant reminder of the need for action, I found that individuals were very likely to conform to the New Environmental Paradigm where they acknowledged the negative effect humans are having on the environment. I also found through self-reporting that there is an expectation that individuals at MSU "ought to" behave in a pro-environmental manner, which is reflective of the results on values and consistent with the VBN theory. However, there was not much variation when I used the 198 responses from the pre-intervention survey to look into the distribution of each value scale. Due to my regional focus I found that there was little variance in values and beliefs. As described in the previous section, my participant sample had high levels for both humanistic and biospheric, and low self-interest values. This combination of values according to VBN theory will result in higher levels of environmentalism as discussed by Dietz et al. (2005). In the literature of values developed to understand environmentalism the measurement of self-interest, humanistic altruism, and biospheric altruism values has been emphasized. Consistent with related research, the effect of traditional values and openness to change remain not significant and ambiguous (Corner, Markowitz, & Pidgeon, 2014). I considered that the effects these two values had on behaviors might be cancelling each other out by opposing one another. Another consideration is based on the fact that highly traditional individuals tend to have low openness to change and vice versa. In this study I find that for both political engagement and resource conservation self-interest had a negative but significant effect, meaning the higher the levels of self-interest, the lower the levels of political engagement and resource conservation. These results highlight the need to emphasize

the benefits of pro-environmental behavior to individuals. In other words, what do individuals gain from acting pro-environmentally, especially when behavior usually implies some level of self-sacrifice? I also found that biospheric altruism had a positive and significant effect on both scales. In this case it appears that individual's biospheric altruism matters more than humanistic altruism. For both, the political engagement and household conservation scales, the New Environmental Paradigm also had a positive and significant effect suggesting that the understanding of the current environmental crisis is creating expectations of higher pro-environmental behavior. Surprisingly, the norms did not have an effect on either political engagement or household conservation. Norms were only significant for the recycling self-reported behavior, which indicated that there was a gap between what students believed "ought to be" and what they reported they are doing.

The intervention did not have a significant enough effect to create differences between participants in the two treatments (global and local). In the case of individuals who watched the local video, as pointed out earlier, it is possible that due to information outside the intervention, individuals did not characterize the issue of plastics as a local issue in spite of the video. This explains why 75.7 percent of the participants responded that the issue of plastic pollution was a global problem, while 13.5 percent responded it was a local problem. It is also possible that the problem of plastic has rarely been discussed as a problem in the Great Lakes, and for those individuals who know the Great Lakes plastic is not a pressing issue.

In the experiment I found that the unprompted behaviors were less frequent. The one exemption were the instructions. As explained above, the fact that individuals had been given the piece of paper (purposely useless) created a situation where individuals had to decide what to do with it. However, the crumpled paper and the plastic water bottle presented opportunities to do

something that is not necessarily seen as their responsibility on campus. It's possible that students were accustomed to janitorial duties being performed by other members of the campus community, so they did not feel a sense of ownership in a foreign room on campus. For the prompted behaviors I asked participants to turn off the lights, screen and computer as a means to help protect the environment. Messaging for turning lights off are common on campus buildings in bathrooms and conference rooms. The prompted behavior created expectations from the participants. Since, the investigator is explicit on her coming back to the room the next morning, the participants understand that they were solely responsible for how the room appeared overnight. Their response might be an emotional one as they were attempting to help the investigator during her family emergency.

The donation behavior however was the most surprising considering the perceived poor financial standing of undergraduate students. During the research design I established the five dollars as an incentive for participation and were not expecting significant donations. Despite my expectations I found that 32 percent of participants were willing to donate one or two dollars, and 10 percent donated the full five dollars provided to them as an incentive. While five dollars in the general population might not be a significant incentive, five dollars for an undergraduate student might be a luxury considering their tight budgets.

The current experimental design allows researchers to observe several pro-environmental behaviors in a very natural context. To my knowledge, there has only been one other study that includes various measurements of environmental behavior (Linda Steg, Perlaviciute, van der Werff, & Lurvink, 2014). The lack of significance in the regression models estimating pro-environmental behaviors signals the need to continue the research on the gap between self-reported behavior and actual behavior. Since behaviors do not happen in a vacuum, it is

important to further the understanding of in-situ pro-environmental behaviors rather than in experimental settings. Understanding behaviors in the context that they happen will further our ability to increase pro-environmental actions beyond awareness.

This result also pointed out to a possible measure of pro-social behavior. When the investigator left the room, the participant had the option of leaving, given that they believed the investigator had left for good. However, most participants stayed, watched the video and filled out the survey (38 participants stayed). The two who did not fill out the survey, donated all the five dollars that were given as an incentive for their participation (one of them donated seven dollars). This response is in essence a return of the incentive given by the experimenter for their participation. Which could mean that when participants do not perform the indicated activity (watch the video and fill out the survey) they felt obligated to return their incentive.

Interestingly, I did not find either of the distance variables to be significant for the measured behaviors. While attempting to understand the effects of distance on the individual's pro-environmental behaviors, I found that these results are ambiguous. As suggested by Brügger et al. (2015) proximizing environmental issues -- in their case Climate Change and in the case of this study plastic pollution -- is proven to be a complex phenomenon that requires further study. It is possible that since the video presented on plastic pollution as a environmental problem from a perspective of the environment and not in relation to humans, or human health, The video was not strong enough to activate the values, beliefs or even norms.

Finally, in terms of the socio-demographic characteristics used in the models, I found that females had a positive and significant effect on resource conservation, while ideology had a negative and significant effect on political engagement. These findings are consistent with my expectations to describe self-reported behavior and further the concern of politicizing

environmental issues. In the current political climate, I find partisan lines in science, are turning the public away from science and towards a more populist view of nature. Understanding how political leanings affect the approach to environmental issues will be key in achieving non-partisan efforts to affront the current environmental crisis.

Study Limitations

This study was limited by the small sample size of the experiment, which is in part due to the methodology and difficulty recruiting participants. The methodology of this study required individuals to hold the same "locality" – undergraduate students from MSU. This requirement attracted similar groups of individuals with a similar geographical upbringing. This issue could be solved by running the study on multiple higher education campuses. However, this study did not have the resources for such expansion. The sample was also limited by my timeframe. The study was limited to one semester—in the spring when winter was still underway leading into spring. This short time frame minimized bias from outside events, however, it also minimized the number of participant's managed to recruit. For future research increasing the experimental sites, might enrich our understanding of the relationships.

The effect of the video was also a limiting factor in this study. The nuance of the local and global scales at which we presented the issues was apparently not translated into the perceptions of the individual observers. Future examinations of scale and pro-environmental behavior should take this limitation into consideration when designing the intervention components of the research study.

CONCLUSION

Overall, these results continue to support the Values, Beliefs, Norms (VBN) theory. However, it is necessary to continue efforts to test VBN in the context of observed pro-environmental behaviors, rather than self-reported ones. It is particularly important to address the gap between self-reported behaviors and actual behaviors in order to potentially scale this research methodology to inform environmental campaigns and policies.

In this study, distance from the water body was not a significant factor in the explanation of pro-environmental behaviors. Therefore, proximity to and frequency of recreation in a water body did not predict their behavior towards it. The scales of the video – global and local – intervention did not have a significant effect on the measured behaviors. This study was one of the first of its kind to attempt to measure several environmental behaviors in a real-world setting. The study design was time and resource intensive while attempting to bridge the gap between self-reported behavior and observed pro-environmental behaviors. Future research should continue to expand upon this research methodology in order to measure actual pro-environmental behaviors that can be tied to an individual's values, beliefs, and norms.

APPENDICES

APPENDIX 1. Recruitment e-mail

Subject: Complete a Brief Survey for Science!

Dear Students,

Sara Torres is a Master's student in the Department of Geography, and she would like you to participate in an important study.

Your participation would involve completing a short (~10 minute) survey about how you view some important issues, how you think other MSU students view the same issues, and how often you perform some selected behaviors.

If you would like to participate in this study, please click on this link to the survey (or paste it into a new browser): https://bit.ly/2DUs2Zf

At the end of this survey, you may indicate your interest in participating in a brief follow-up study. In the follow-up study, you will be asked to watch a short (~2 minute) promotional video about MSU research in a Berkey Hall conference room and then answer a few questions about the video. Students participating in this follow-up study will be compensated $5 for their time.

Thanks in advance for your contribution to science! We appreciate your help!

Sara M. Torres

APPENDIX 2. Pre-intervention survey

5. CONSENT TO PARTICIPATE

By clicking on the button below, you indicate your voluntary agreement to participate in this online survey.

□ I agree to participate.

□ I affirm that I have lived in Michigan my entire life.

Page 2 Title: Your General Beliefs and Attitudes

Please indicate how important each of the following is AS GUIDING PRINCIPLES IN YOUR LIFE.

	not at all important						of supreme importance
[item order is randomized]							
being influential [self-interest]	□	□	□	□	□	□	□
wealth [self-interest]	□	□	□	□	□	□	□

social power [self-interest] □ □ □ □ □ □ □

a world at peace [humanistic altruism] □ □ □ □ □ □ □

equality [humanistic altruism] □ □ □ □ □ □ □

social justice [humanistic altruism] □ □ □ □ □ □ □

unity with nature [biospheric altruism] □ □ □ □ □ □ □

respecting the earth [biospheric altruism] □ □ □ □ □ □ □

preventing pollution [biospheric altruism] □ □ □ □ □ □ □

family security [traditional] □ □ □ □ □ □ □

self-discipline [traditional] □ □ □ □ □ □ □

honoring parents and elders [traditional] □ □ □ □ □ □ □

a varied life [openness to change] □ □ □ □ □ □ □

being curious [openness to change] □ □ □ □ □ □ □

an exciting life [openness to change] □ □ □ □ □ □ □

Please indicate whether you disagree or agree with each of the following statements about different topics.

	strongly disagree	moderately disagree	slightly disagree	I'm not sure	slightly agree	moderately agree	strongly agree
[item order is randomized]							
The so-called "ecological crisis" facing humankind has been greatly exaggerated. [reverse-coded]	□	□	□	□	□	□	□
If things continue on their present course, we will soon experience a major ecological catastrophe.	□	□	□	□	□	□	□
Humans are severely abusing the environment.	□	□	□	□	□	□	□
The balance of nature is strong enough to cope with the impacts of modern industrial nations. [reverse-coded]	□	□	□	□	□	□	□
The earth is like a spaceship with very limited room and resources.	□	□	□	□	□	□	□
The United States truly is a post-racial society.	□	□	□	□	□	□	□
A college education is an important key to success in our country.	□	□	□	□	□	□	□

In general, Americans do a pretty good job of

addressing problems before they get too bad. □ □ □ □ □ □ □

The #MeToo movement has gone too far. □ □ □ □ □ □ □

Americans have it within us to defeat terrorism. □ □ □ □ □ □ □

Page 3 Title: Your Perceptions of Other MSU Students

We would like to know about your perceptions of other MSU students on campus. Please indicate approximately what percentage of MSU students you think perform each of the following behaviors at least ONCE A MONTH.

[item order is randomized]	0%	10-20%	30-40%	50%	60-70%	80-90%	100%
drink a beverage out of a disposable plastic bottle [reverse-coded]	□	□	□	□	□	□	□
carry their groceries in plastic bags [reverse-coded]	□	□	□	□	□	□	□
eat take-out or delivery from a local restaurant							

[reverse-coded] □ □ □ □ □ □ □

always recycle paper and plastic waste that can be recycled □ □ □ □ □ □ □

pick up paper and plastic waste they see on campus □ □ □ □ □ □ □

use their own reusable water bottle □ □ □ □ □ □ □

drink alcohol to excess □ □ □ □ □ □ □

work in a part-time job □ □ □ □ □ □ □

cheat in any way on a course quiz or exam □ □ □ □ □ □ □

ride on a Lime or Bird scooter □ □ □ □ □ □ □

attend an varsity sporting event (e.g., football game, basketball game, volleyball match) □ □ □ □ □ □ □

participate in a study group for a course □ □ □ □ □ □ □

Page 4 Title: Your Own Behaviors

How often in your life, if at all, have you participated in the following outdoor recreational activities?

[item order is randomized]	never	only once in my life	a few times in my life	about a year	several times a year	many times a year
went swimming in a river, lake, or ocean	□	□	□	□	□	□
went boating	□	□	□	□	□	□
went fishing	□	□	□	□	□	□
went snorkeling or SCUBA diving	□	□	□	□	□	□
went tubing, rafting, or jet skiing	□	□	□	□	□	□
went mountain climbing	□	□	□	□	□	□
went hiking in a state or national park	□	□	□	□	□	□
went bungee jumping	□	□	□	□	□	□
went skydiving or parachuting	□	□	□	□	□	□
went spelunking or caving	□	□	□	□	□	□

How often, if at all, have you performed each of the following behaviors IN THE PAST 12 MONTHS?

[item order is randomized]	not at all	rarely	sometimes	regularly	all the time
voted for a candidate because of their pro-environmental position	□	□	□	□	□
donated money to an environmental cause	□	□	□	□	□
signed a petition supporting an environmental cause	□	□	□	□	□
tried to use less water where you live	□	□	□	□	□
voluntarily recycled newspapers, glass, plastics, or other items	□	□	□	□	□
tried to use less energy where you live	□	□	□	□	□
boycotted a business because its owner supported radical causes	□	□	□	□	□
posted a message or image on social media supporting police officers	□	□	□	□	□
attended a talk about the benefits of the free market	□	□	□	□	□
donated money to a religious organization that shares your values	□	□	□	□	□
volunteered to help people register to vote	□	□	□	□	□
signed a petition supporting religious liberty	□	□	□	□	□

Page 5 Title: Please tell us about yourself.

What is your gender?

□ male

□ female

□ non-binary/third gender

□ prefer to self-describe: _____

□ prefer not to say

How old are you as of today?

□ 18

□ 19

□ 20

□ 21

□ 22

□ 23 or older

What is your major?

_____

What is your current class standing in total credits?

□ freshman

□ sophomore

□ junior

□ senior

Are you Hispanic, Latino, or Chicano?

□ no

□ yes

What race/ethnicity do you identify with MOST?

□ White

□ Black or African-American

□ Native Hawaiian or Other Pacific Islander

□ Native American/American Indian or Alaska Native

□ Asian or Asian-American

□ Arab-American or Middle Eastern

□ other (please specify): _____

Politically do you think of yourself as liberal or conservative?

□ very liberal

□ liberal

□ slightly liberal

□ middle-of-the-road

□ slightly conservative

□ conservative

□ very conservative

In what Zip Code is your family's home located?

_____

Page 6 Title: Thank You!

APPENDIX 3. Video script

Local	Global
Plastic seem to be everywhere in Michigan. It secures our shipments, carries the goods we purchase, safeguards our homes and vehicles, and even protects the food we eat. Without a doubt, plastic brings convenience to fast-paced lives of people in Michigan.	Plastic seem to be everywhere around the world. It secures our shipments, carries the goods we purchase, safeguards our homes and vehicles, and even protects the food we eat. Without a doubt, plastic brings convenience to fast-paced lives of people around the world.
But at what cost? In Michigan, each person wastes an average of 273 pounds of plastic a year. With over 9.9 million people in Michigan, that's a lot of plastic waste in our state that won't decompose in our lifetimes.	But at what cost? Around the world, each person wastes an average of 158 pounds of plastic a year. With over 6.9 billion people on the planet, that's a lot of plastic waste around the world that won't decompose in our lifetimes.
Some of this waste is going where you would expect. But, far too much of it is going where you wouldn't expect. And this has become a serious problem for our state.	Some of this waste is going where you would expect. But, far too much of it is going where you wouldn't expect. And this has become a serious problem for the planet.

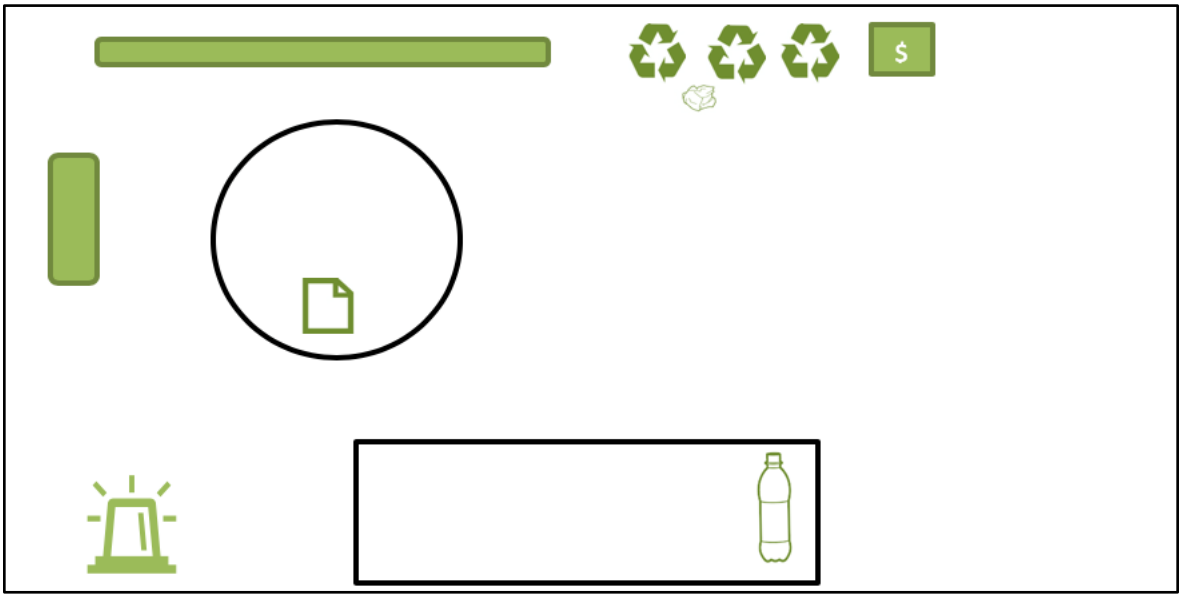
Every year, about 22 million pounds of plastic debris ends up getting into our own Great Lakes. Rivers running through our communities in Michigan carry this plastic to our Great Lakes.	Every year, about 1.4 billion pounds of plastic debris ends up getting into [the world's oceans. Rivers running through countries on major continents carry this plastic to the world's oceans.
There it accumulates along the lakes' shores and on their surfaces. The most well-known accumulation of plastic pollution in the Great Lakes is in Lake Erie.	There it accumulates in surface-level ocean currents called gyres. The most well-known accumulation of plastic pollution in the so-called Pacific Garbage Patch.
This plastic pollution in the Great Lakes is a local problem requiring a local approach.	This plastic pollution in the world's oceans is a global problem requiring a global approach.
At MSU, we work hard to solve the problems that threaten our state—and this includes the Great Lakes. We're educating people about the ecological impacts of plastic waste in the Great Lakes. And we're designing campaigns to promote plastic recycling in our state.	At MSU, we work hard to solve the problems that threaten the planet—and this includes the world's oceans. We're educating people about the ecological impacts of plastic waste in the world's oceans. And we're designing campaigns to promote plastic recycling around the world.

We're also developing new packaging materials to reduce the use of plastic when shipping goods in our state. And we're experimenting with ways of creating biodegradable plastic from plant-based materials. Finally, we're exploring new strategies for removing existing plastic waste from the Great Lakes.	We're also developing new packaging materials to reduce the use of plastic when shipping goods around the world. And we're experimenting with ways of creating biodegradable plastic from plant-based materials. Finally, we're exploring new strategies for removing existing plastic waste from the world's oceans.
We do all of this not because it is easy, but because it is challenging. Because Spartans will . . . protect our Great Lakes.	We do all of this not because it is easy, but because it is challenging. Because Spartans will . . . protect the world's oceans.

APPENDIX 4. Experimental protocol

1. set-up of experimental space in study room

Dylan Hall (DH) sets up the experimental space in the study room as illustrated below. DH also opens two tabs in a web browser on the computer: one for the video and one for the Qualtrics survey. We will have already used a random number generator to randomly assign all subjects into one of two video conditions. So, DH will know in advance which of the two videos to cue up.



2. preparation for participation

Subject (S) arrives in the waiting area in 318 Berkey Hall prior to their scheduled participation. Sara Torres (ST) greets S, lets them know that they are her last participant of the day, and tells them that she is almost ready for them to begin. ST gives S a written consent form to read and then asks S for verbal consent to participate.

DH texts ST indicating that the experimental space in the study room is properly set up and ready for the next S. DH then goes into the storage room inside of 457 Berkey and waits quietly.

ST [carrying a nearly empty disposable plastic water bottle and a clipboard in her hands] guides S into the stairwell and up the stairs to 457 Berkey (study room), making small talk (e.g., *Thanks for completing our survey back in December. Is your semester going well? How many courses are you taking? You have a good day today?*) and casually **reminding them that they are her last participant of the day**. The door to 457 Berkey has a large white sign that reads "Study in Progress." ST opens the door and guides S into the room.

3. directions for participation

ST has S sit at the study table while she tells them the directions. The video is cued up and ready to start. Also open in another window is the survey cued up to the consent form page.

Please sit on that chair, you can put your stuff on the table behind you [ST puts water bottle on table]

ST: [Read the following statement to make sure each S gets the same set of instructions. Stand by the recycling bins.] Thanks again for participating in our study about your reaction to a promotional video about MSU research. The video you will watch highlights how and why MSU scientists are trying to reduce plastic pollution. We've asked you to sit here and watch the video on this screen, so we can be sure that all participants have the same viewing experience and are not distracted by anything. So, please do not use your phone during this session. Because we've asked you to take time out of your schedule, here is $5 for your time. [Put 5 $1 bills on the table and hand S the clipboard.] Please record your MSU NetID, your initials, the amount I've given you, and today's date here.

ST: *Okay, the video is all ready for you to watch*. [Move in front of the table to stand near the computer cart.] *We have it cued up on the computer here.* [ST shows S the computer screen,

which is also displayed on the wall screen.] *We want you to pay close attention and watch the entire video very carefully. Once the video is over, then please come over to the computer cart. The window right behind the video* [ST reduces the video window to reveal the survey window to S] *contains the brief survey that you will complete after you've finished watching the entire video. The first page of the survey contains the same consent form that you read in the waiting room. The rest of the survey only contains a few questions about the video*. [ST maximizes the video window so it again is displayed on the screen.] *But, some of them are short answer questions.* [ST moves in front of the table to stand near the recycling bins again. ST puts a 1/2 sheet of paper with some of the survey prompts on it on the table in front of S.] *This paper here can help you prepare for answering these questions on the computer. Then once you've completed the survey, make sure you've got your stuff and come out into the hallway*.

ST: *The people featured in this video are asking for donations to help support awareness of their work.* [ST steps back to point to or touch the lock-box on the wall; She pats it a few times, so S can hear that it has money in it.] *Don't feel* ***obligated***, [DH calls ST.] *but, you know, every little bit helps us Be Spartan Green.*

4. emergency cover story

ST: [setting/moving her disposable water bottle on a nearby table and answering her phone] *Hey* [name], *are you home?* [pause for 5 seconds while listening and looking increasingly concerned] *Oh my, ok, well, I'm coming. I'll leave right now, and I'll be there as soon as I can. Okay, bye*.

ST: [turning back to address S] I'm sorry, that was my husband; his car broke down [if asked: I96], and I've got to go get him before he freezes. Is it okay that I let you finish up on your own?

If S IS NOT okay with ST leaving, then ST will clearly state that she will wait in the hallway for S to complete their survey. [In this case, we will observe all behaviors but the three energy conservation behaviors.]

If S IS okay with ST leaving, then we continue.

ST: Okay, you know how to start the video and then complete the survey. Once you've finished the survey, could you turn off the screen and shut down the computer? [ST points to a set of directions taped to the top of the computer cart.] I think there are directions for doing this on that piece of paper. Nobody else is using this room for the rest of the night. [ST turns around to walk toward the door.] So, please, turn off the lights and make sure you close the door behind you when you leave, okay?

ST: [opening the door to leave and turning back to look at S] *Okay, thanks for finishing this up on your own. Bye!* [leaves rushed]

5. S participation

S watches the video and completes the survey.

S then makes the following decisions on their way out of the study room:

whether or not S turns off the overhead projector [energy conservation]

whether or not S turns off the computer [energy conservation]

whether or not S turns off the overhead lights [energy conservation]

whether or not S puts his/her directions handout in the recycling bin [recycling]

whether or not S puts someone else's crumpled paper in the recycling bin [recycling]

whether or not S puts the investigator's water bottle in the recycling bin [recycling]

whether or not S donates money to an environmental campaign [public activism: donation to environmental campaign]

Several seconds after the door closes when S leaves the study room, then DH quietly comes out of the storage room. DH first restarts the computer and screen (if necessary) and then sets up the video and survey for the next participant. DH then observes which behaviors were performed, and notes them on a laptop/tablet. DH then finishes preparing the experimental space for the next S.

6. Debriefing S

ST meets S once they leave experiment area and starts the debriefing:

ST: Thank you so much for participating in our study. I wanted to let you know that I didn't really have an emergency. It was a cover story to help you believe that you were responsible for shutting down the room when you finished. We wanted to see how watching a specific video may influence whether or not you performed certain environmental behaviors, such as turning off the screen, shutting down the computer, turning off the lights, and recycling.

ST: You were randomly assigned to watch one of two videos that we created. One frames plastic pollution as a global problem that is distant from you, and the other frames plastic pollution as a more local problem that is closer to you. We hypothesize that individuals who watched the global video will be less likely to perform the environmental behaviors than those who watched the local video.

ST: Please know that we are not judging you for what you did or did not do in the room. Your actions during this research study do not represent good or bad behavior. They just represent your behavior in this very specific experimental context.

ST: Once we match the data from today with the data from the survey you completed earlier, we will remove any of your identifying information from our dataset. When we analyze the data, we will be comparing groups, like those who watched the local video and those who watched the

global video. We will not be reporting any individual's survey responses or behaviors. Still, you can ask for your data not to be included in our study if you wish.

ST: Again, thank you for being part of this study. We kindly request that you not share our methodology with anyone else, since it may affect other potential participants. And this would undermine our experimental design and data quality. Again, thank you for your participation and cooperation.

APPENDIX 5. Post-intervention survey

Post-Intervention Survey Title: Your Reaction to the Promotional Video

Page 1 Title: Research Participant Information and Consent Form

1. EXPLANATION OF THE RESEARCH and WHAT YOU WILL DO

You are being asked to participate in a research project that is intended to ask you a few questions about a promotional video on MSU research. After watching a short (~2-minute) video, you will answer a few questions about your reactions to the video. Your participation will take about 10 minutes. To participate in this research, you must be at least 18 years old, and you must have lived in Michigan your entire life.

2. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW

Participation in this research project is completely voluntary. You have the right to say no. You may also change your mind at any time and stop answering questions or skip a question if you are uncomfortable with any question.

3. COSTS AND COMPENSATION FOR BEING IN THE STUDY

You will not incur any costs for participation in this research. For answering a few questions about the video, you will earn $5 to compensate you for your time. There are no foreseeable risks associated with participation in this study. We will match your answers to questions about this short video to your answers on the survey you completed for us in December. Your survey

responses will be kept confidential and will only be accessible by the research team of Dr. Aaron McCright, Sara M. Torres, and Dylan J. Hall.

4. CONTACT INFORMATION FOR QUESTIONS AND CONCERNS

If you have concerns or questions about this study, such as scientific issues or how to do any part of it, please contact the researchers: Sara M. Torres (torress9@msu.edu) or Aaron M. McCright (mccright@msu.edu). If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact—anonymously if you wish—the Michigan State University's Human Research Protection Program at 517-355-2180, or e-mail irb@msu.edu, or regular mail at 4000 Collins Rd, Suite 136, Lansing, MI 48910.

5. CONSENT TO PARTICIPATE

By clicking on the button below, you indicate your voluntary agreement to participate in this online survey.

[insert a button here that says "I agree to participate."]

Page 2 Title: Your Reaction to the Promotional Video

In your own words, what is the MAIN message of the video?

_____

According to the video, each person wastes an average of how many pounds of plastic a year?

□ 46

□ 158

□ 273

□ 28

According to the video, about how many pounds of plastic debris end up getting into the water?

□ 17 million

□ 1.4 billion

□ 22 million

□ 985 million

According to the video, where is the most well-known accumulation of plastic pollution?

_____

According to the video, what are MSU researchers doing to address the problem of plastic pollution? Select all that apply.

□ making biodegradable plastic from plants

□ designing recycling campaigns

□ advising elected officials

□ removing plastic waste from water

□ advocating for stricter regulations

On the continuum below, where would you place the problem of plastic pollution?

it is a local problem □ □ □ □ □ □ □ □ □ □

it is a global problem

it requires a local approach □ □ □ □ □ □ □ □ □

□ it requires a global approach

Who, if any, do you think would be a good target audience for the video? Select all that apply.

□ current undergraduate students

□ future/potential undergraduate students

□ current graduate students

□ future/potential graduate students

□ current donors

□ future/potential donors

The video seemed:

not at all informative □ □ □ □ □ □ □ very informative

not at all inspirational □ □ □ □ □ □ □ very inspirational

not at all interesting □ □ □ □ □ □ □ very interesting

not at all engaging	□	□	□	□	□	□	□	very engaging
not at all credible	□	□	□	□	□	□	□	very credible

In your own words, please describe how the video made you FEEL?

_____

How personally relevant to you is the topic of the video?

□ not at all

□ a little bit

□ somewhat

□ very

□ extremely

Page 3 Title: Thank You!

Thank you for participating in our study assessing reactions to an MSU promotional video. Your responses are valuable to us and will help improve our understanding of how MSU students perceive scientific research at MSU.

APPENDIX 6. ANOVA tests

ANOVA - Beh 1 Lights						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	1.92	1	1.92	2.87	0.10
	Within Groups	25.37	38	0.67		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	1.20	1	1.20	1.84	0.18
	Within Groups	24.78	38	0.65		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	1.23	1	1.23	2.13	0.15
	Within Groups	21.87	38	0.58		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	0.71	1	0.71	0.63	0.43
	Within Groups	43.04	38	1.13		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.06	1	0.06	0.12	0.73
	Within Groups	19.83	38	0.52		
	Total	19.89	39			
Self described as female	Between Groups	0.91	1	0.91	3.81	0.06
	Within Groups	9.07	38	0.24		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.29	1	0.29	1.82	0.19
	Within Groups	6.11	38	0.16		
	Total	6.40	39			
Political view	Between Groups	2.39	1	2.39	6.13	0.02
	Within Groups	14.85	38	0.39		
	Total	17.24	39			

ANOVA - Beh 2 Computer						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	0.50	1	0.50	0.71	0.41
	Within Groups	26.79	38	0.71		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.25	1	0.25	0.37	0.55
	Within Groups	25.72	38	0.68		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	0.49	1	0.49	0.81	0.37
	Within Groups	22.62	38	0.60		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	0.04	1	0.04	0.03	0.86
	Within Groups	43.71	38	1.15		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.38	1	0.38	0.74	0.40
	Within Groups	19.51	38	0.51		
	Total	19.89	39			
Self described as female	Between Groups	0.61	1	0.61	2.46	0.13
	Within Groups	9.37	38	0.25		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.00	1	0.00	0.03	0.87
	Within Groups	6.40	38	0.17		
	Total	6.40	39			
Political view	Between Groups	0.41	1	0.41	0.93	0.34
	Within Groups	16.83	38	0.44		
	Total	17.24	39			

ANOVA - Beh 3 TV Screen						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	0.03	1	0.03	0.04	0.85
	Within Groups	27.26	38	0.72		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.25	1	0.25	0.38	0.54
	Within Groups	25.72	38	0.68		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	0.02	1	0.02	0.03	0.86
	Within Groups	23.08	38	0.61		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	1.60	1	1.60	1.44	0.24
	Within Groups	42.15	38	1.11		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.23	1	0.23	0.45	0.51
	Within Groups	19.66	38	0.52		
	Total	19.89	39			
Self described as female	Between Groups	0.88	1	0.88	3.68	0.06
	Within Groups	9.09	38	0.24		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.00	1	0.00	0.00	1.00
	Within Groups	6.40	38	0.17		
	Total	6.40	39			
Political view	Between Groups	0.01	1	0.01	0.02	0.89
	Within Groups	17.23	38	0.45		
	Total	17.24	39			

ANOVA - Beh 4 Bottle						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	0.00	1	0.00	0.00	0.97
	Within Groups	27.29	38	0.72		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.55	1	0.55	0.83	0.37
	Within Groups	25.42	38	0.67		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	0.06	1	0.06	0.10	0.75
	Within Groups	23.04	38	0.61		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	2.60	1	2.60	2.41	0.13
	Within Groups	41.15	38	1.08		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.15	1	0.15	0.29	0.59
	Within Groups	19.74	38	0.52		
	Total	19.89	39			
Self described as female	Between Groups	0.88	1	0.88	3.66	0.06
	Within Groups	9.10	38	0.24		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.26	1	0.26	1.62	0.21
	Within Groups	6.14	38	0.16		
	Total	6.40	39			
Political view	Between Groups	0.41	1	0.41	0.93	0.34
	Within Groups	16.83	38	0.44		
	Total	17.24	39			

ANOVA - Beh 5 Instructions						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	0.54	2	0.27	0.38	0.69
	Within Groups	26.75	37	0.72		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.53	2	0.27	0.39	0.68
	Within Groups	25.44	37	0.69		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	0.63	2	0.32	0.52	0.60
	Within Groups	22.47	37	0.61		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	1.51	2	0.76	0.66	0.52
	Within Groups	42.24	37	1.14		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.94	2	0.47	0.92	0.41
	Within Groups	18.95	37	0.51		
	Total	19.89	39			
Self described as female	Between Groups	0.68	2	0.34	1.35	0.27
	Within Groups	9.30	37	0.25		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.18	2	0.09	0.52	0.60
	Within Groups	6.22	37	0.17		
	Total	6.40	39			
Political view	Between Groups	0.89	2	0.45	1.01	0.37
	Within Groups	16.35	37	0.44		
	Total	17.24	39			

ANOVA - Beh 6 Crumpled paper						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	0.36	1	0.36	0.50	0.48
	Within Groups	26.93	38	0.71		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.00	1	0.00	0.00	0.97
	Within Groups	25.97	38	0.68		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	1.23	1	1.23	2.13	0.15
	Within Groups	21.87	38	0.58		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	0.14	1	0.14	0.12	0.73
	Within Groups	43.61	38	1.15		
	Total	43.75	39			
environmental scale (Cronbach's alpha 0.456)	Between Groups	1.59	1	1.59	3.31	0.08
	Within Groups	18.30	38	0.48		
	Total	19.89	39			
Self-described as female	Between Groups	0.00	1	0.00	0.01	0.91
	Within Groups	9.97	38	0.26		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.04	1	0.04	0.25	0.62
	Within Groups	6.36	38	0.17		
	Total	6.40	39			
Political view	Between Groups	0.26	1	0.26	0.59	0.45
	Within Groups	16.98	38	0.45		
	Total	17.24	39			

ANOVA. - Beh 7 Donation						
		Sum of Squares	df	Mean Square	F	Sig.
Self interest value scale (chronbachs alpha 0.514)	Between Groups	3.17	1	3.17	5.00	**0.03**
	Within Groups	24.12	38	0.64		
	Total	27.29	39			
Humanistic altruism value scale (chronbachs alpha 0.751)	Between Groups	0.04	1	0.04	0.07	0.80
	Within Groups	25.93	38	0.68		
	Total	25.98	39			
Biospheric altruism value scale (chronbachs alpha 0.732)	Between Groups	0.00	1	0.00	0.00	0.96
	Within Groups	23.10	38	0.61		
	Total	23.10	39			
five item NEP scale (chronbachs alpha 0.76)	Between Groups	1.08	1	1.08	0.96	0.33
	Within Groups	42.67	38	1.12		
	Total	43.75	39			
environmental scale (chronbachs alpha 0.456)	Between Groups	0.11	1	0.11	0.22	0.64
	Within Groups	19.78	38	0.52		
	Total	19.89	39			
Self described as female	Between Groups	0.00	1	0.00	0.00	0.96
	Within Groups	9.97	38	0.26		
	Total	9.98	39			
White Race/ethnicity	Between Groups	0.20	1	0.20	1.23	0.28
	Within Groups	6.20	38	0.16		
	Total	6.40	39			
Political view	Between Groups	0.08	1	0.08	0.18	0.67
	Within Groups	17.16	38	0.45		
	Total	17.24	39			

APPENDIX 7. Binary Logistic regression with individual models for variables with each behavior

Binary logistic regression n= 40

	B	S.E.	Wald	df	Sig.	Exp(B)
Lights						
Self interest	0.718	0.443	2.624	1	0.105	2.05
constant	-1.389	1.325	1.1	1	0.294	0.249
Biospheric alt	-0.798	0.566	1.986	1	0.159	0.45
constant	4.137	2.488	2.766	1	0.096	62.631
NEP	-0.289	0.364	0.63	1	0.427	0.749
constant	2.449	2.213	1.224	1	0.269	11.574
Norm scale	0.176	0.5	0.124	1	0.725	1.192
constant	0.273	1.338	0.042	1	0.838	1.313
White	-1.435	1.13	1.614	1	0.204	0.238
Constant	1.946	1.069	3.313	1	0.069	7
Political view						
(conservative)	19.682	9451.276	0	1	0.998	353090004

Constant	-19.414	9451.276	0	1	0.998	0
Female	1.342	0.721	3.462	1	0.063	3.825
Constant	0.105	0.459	0.053	1	0.819	1.111
Computer						
Self interest	0.346	0.408	0.721	1	0.396	1.414
constant	-0.42	1.255	0.112	1	0.738	0.657
Biospheric alt	-0.439	0.487	0.813	1	0.367	0.645
constant	2.473	2.105	1.381	1	0.24	11.864
NEP	0.059	0.313	0.035	1	0.852	1.06
constant	0.275	1.868	0.022	1	0.883	1.316
Norm scale	0.461	0.537	0.737	1	0.391	1.585
constant	-0.571	1.407	0.165	1	0.685	0.565
White	0.136	0.82	0.027	1	0.868	1.145
Constant	0.511	0.73	0.489	1	0.484	1.667
Political view						
(conservative)	0.562	0.589	0.909	1	0.34	1.754

Constant	-0.116	0.816	0.02	1	0.886	0.89
Female	1.058	0.688	2.363	1	0.124	2.88
Constant	0.105	0.459	0.053	1	0.819	1.111
Screen						
Self interest	0.078	0.395	0.039	1	0.843	1.081
constant	0.274	1.238	0.049	1	0.825	1.316
Biospheric alt	0.076	0.427	0.032	1	0.858	1.079
constant	0.192	1.811	0.011	1	0.916	1.211
NEP	0.375	0.32	1.374	1	0.241	1.455
constant	-1.685	1.898	0.788	1	0.375	0.185
Norm scale	0.341	0.505	0.458	1	0.499	1.407
constant	-0.376	1.339	0.079	1	0.779	0.687
White	0	0.816	0	1	1	1
Constant	0.511	0.73	0.489	1	0.484	1.667
Political view						
(conservative)	0.072	0.503	0.02	1	0.886	1.075

Constant	0.414	0.751	0.304	1	0.581	1.513
Female	1.269	0.688	3.398	1	0.065	3.556
Constant	-0.105	0.459	0.053	1	0.819	0.9
Bottle						
Self interest	-0.015	0.387	0.001	1	0.969	0.985
constant	0.348	1.218	0.082	1	0.775	1.416
Biospheric alt	0.138	0.42	0.108	1	0.742	1.148
constant	-0.274	1.78	0.024	1	0.878	0.76
NEP	0.497	0.338	2.156	1	0.142	1.644
constant	-2.618	2.022	1.676	1	0.195	0.073
Norm scale	0.262	0.477	0.301	1	0.583	1.299
constant	-0.38	1.278	0.088	1	0.766	0.684
White	1.022	0.816	1.566	1	0.211	2.778
Constant	-0.511	0.73	0.489	1	0.484	0.6
Political view						
(conservative)	-0.474	0.493	0.925	1	0.336	0.622

Constant	0.947	0.744	1.621	1	0.203	2.579
Female	1.235	0.67	3.394	1	0.065	3.437
Constant	-0.318	0.465	0.47	1	0.493	0.727
Crumpled paper						
Self interest	-0.296	0.413	0.515	1	0.473	0.744
constant	0.157	1.27	0.015	1	0.902	1.17
Biospheric alt	0.798	0.566	1.986	1	0.159	2.221
constant	-4.137	2.488	2.766	1	0.096	0.016
NEP	-0.112	0.316	0.126	1	0.722	0.894
constant	-0.072	1.876	0.001	1	0.969	0.93
Norm scale	-1.203	0.685	3.08	1	0.079	0.3
constant	2.303	1.715	1.803	1	0.179	10
White	0.452	0.897	0.254	1	0.614	1.571
Constant	-1.099	0.816	1.81	1	0.178	0.333
Political view						
(conservative)	0.382	0.495	0.596	1	0.44	1.465

Constant	-1.257	0.77	2.662	1	0.103	0.285
Female	0.08	0.677	0.014	1	0.906	1.083
Constant	-0.773	0.494	2.454	1	0.117	0.462
Donation						
Self interest	-0.917	0.448	4.198	1	0.04	0.4
constant	2.445	1.37	3.185	1	0.074	11.529
Biospheric alt	-0.021	0.42	0.002	1	0.961	0.98
constant	-0.216	1.787	0.015	1	0.904	0.806
NEP	-0.306	0.315	0.944	1	0.331	0.736
constant	1.495	1.878	0.634	1	0.426	4.46
Norm scale	-0.224	0.472	0.225	1	0.635	0.799
constant	0.283	1.268	0.05	1	0.824	1.327
White	0.973	0.89	1.196	1	0.274	2.647
Constant	-1.099	0.816	1.81	1	0.178	0.333
Political view						
(conservative)	-0.217	0.501	0.188	1	0.665	0.805

Constant	-0.011	0.741	0	1	0.989	0.989
Female	0.031	0.641	0.002	1	0.962	1.031
Constant	-0.318	0.465	0.47	1	0.493	0.727

APPENDIX 8. Standardized coefficients in linear regression for VBN

	Beliefs	Norms
	NEP	Pro-environmental norm scale
Value Orientations		
Self-interest	0.07	0.03
Humanistic altruism	0.05	0.07
Biospheric altruism	0.39***	-0.07
Traditional value scale	-0.08	-0.02
Openness to change value scale	-0.09	-0.02
Beliefs		
NEP	--	-0.08
Socio demographic		
Female	-0.10	0.05
White	0.137*	-0.10
Political view (conservative)	-0.361***	0.02
Adjusted R2	0.373	-0.02

*p<0.05 **p<0.01

***p<0.001

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