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## The Framing of Recycling Information Toward Behavioral Intention

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THE FRAMING OF RECYCLING INFORMATION TOWARD BEHAVIORAL INTENTION

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THE FRAMING OF RECYCLING INFORMATION TOWARD BEHAVIORAL INTENTION

by

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THESIS

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## **Abstract**

Most studies have measured the relationship between self-reported recycling behavior and attitudes. Very little research has focused on how the framing of recycling information moderates this relationship. Moreover, even less research has examined how communication messages directly impacts self-efficacy of recycling. Thus, the aim of this study is to further understand factors that influence self-reported recycling behavioral intention and information framing. We predicted that pro-environmental behavior would be positively associated with climate change beliefs and recycling efficacy. We also predicted that individuals that read a positive recycling article would be more likely to intend to recycle than individuals who read a negative article about recycling. Results indicate a positive relationship between pro-environmental behavior, climate change beliefs, and recycling efficacy. Conversely, recycling efficacy and signing up for information about recycling were negatively correlated with certain environmental attitudes. After controlling for covariates, positive framing of recycling information predicted recycling efficacy. Implications for future studies are discussed.

**Keywords:** Pro-environmental Behavior, Framing, Recycling Efficacy, Environmental Attitudes

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## **Chapter 1: Introduction**

### **The Framing of Recycling Information Toward Behavioral Intention**

The scientific community has urged immediate action toward climate change—a worldwide threat to humanity. According to the United Nations’ Intergovernmental Panel on Climate Change (2018; IPCC), it is estimated that between the years 2030 and 2050, temperature will likely reach a 1.5°C increase due to carbon dioxide (CO<sub>2</sub>) emissions if we continue with our current trajectory (2018). If temperatures continue to rise higher than 1.5°C, it is estimated that sea water levels would rise between .26 to .77 meters by 2100, which would damage and destroy human and animal ecosystems (IPCC, 2018). Global warming of 1.5° C would increase the risk of extinction of biodiversity in ecosystems (IPCC, 2018). Additionally, these climate and environmental changes can lead to adverse health outcomes including an increase of waterborne diseases and nutritional diseases from crop yields. Despite extensive scientific evidence supporting the existence of climate change, the acknowledgement of global warming as a worldwide threat to humanity is still relatively low. According to a Pew Research Center survey of 10,957 U.S. adult respondents (2020), only 60% were concerned about climate change as major threat to the U.S. Even if individuals acknowledge the current climate and ecological crisis, many fail to participate in mitigating climate change.

The gap between environmental attitudes/beliefs and pro-environmental behavior has been studied by social psychologists in order to identify factors that influence the engagement of such behaviors and minimize one’s negative impact on the environment (e.g., reduction of carbon dioxide footprint) (Kollmus & Agyeman, 2002). For example, one’s understanding and perceptions about climate change are associated with mitigating behaviors of climate change. Frantz & Mayer (2009) argue that climate change effects, such as rising CO<sub>2</sub> levels, are not

noticeable, thus, making it difficult for individuals to believe climate change is happening. Likewise, emphasizing the size of climate change as having dire consequences worldwide reduces personal responsibility to take action against climate change (Frantz & Mayer, 2009). As a result, individuals may view their actions as having little to no impact, and therefore, choose to not engage in behaviors that mitigate effects of climate change (Frantz & Mayer, 2009).

Psychological barriers may also impede environmental behavioral change. One such barrier may involve ignorance, which can be displayed through: (1) not acknowledging climate change as a problem or (2) not having knowledge about the causes of climate change, which can be a barrier to act towards the mitigation and adaptation of climate change (Gifford, 2011). The perceived uncertainty about climate change also reduces engagement of pro-environmental behavior. When climate change is presented as an ambiguous event, this ambiguity can function as a justification for inaction (Gifford, 2011). Another barrier that can mitigate the adoption of pro-environmental behaviors is the presence of habitual behaviors (Gifford, 2011). Habits involve an automatic cognitive processes, thus, information that is not aligned with a habitual behavior may be ignored (Steg & Vlek, 2009). For example, if an individual has a habit of throwing all their trash in the waste bin, then the individual will continue to throw recyclable material in the waste bin even when a recycling bin is present. Clearly, psychological research has and will be crucial in understanding the mechanisms underlying the engagement of environmentally friendly behavior. Similarly, several theories of behavioral change have been proposed to further explain the engagement of environmental behavior.

### ***The Value-Belief-Norm Theory of Environmentalism***

The Value-Belief-Norm (VBN) theory of environmentalism proposes that social cues, as well as personal norms, and values determine an individual's involvement in the environmental

movement (Stern et al., 1999). Social cues provide information about how to interpret messages and form impressions. Theories focusing on social cues suggest that behaviors are learned by observing how others are punished or rewarded when performing such behavior (Bandura, 1989). Personal norms reflect an individual's belief about how they should behave in a variety of situations (Schwartz, 1977). Personal values refers to an individual's ideals or principles such that they define what is important in one's life (Schwartz, 2012). A value can serve as a motivational factor toward a behavior and is prioritized based on importance (Schwartz, 2012). Beliefs can be defined as one's perceptions and cognition that are held to be true of a concept or event (Connors & Halligan, 2015). According to the VBN theory, there is a relationship between behavior and an individual's values, beliefs, and personal norms (Ghazali, et.al., 2019; Stern et al., 1999).

One of the values associated with environmental concern is self-interest (Stern et al., 1999). When a pro-environmental behaviors is made salient to one's self-interest values then the likelihood of a spillover effect increases, in which individuals are more likely to adopt additional pro-environmental stances in the future (Evans et al., 2012). For example, Evans et al., (2012) found that information given to a sample of college students about the benefits of carpooling subsequently impacted their recycling behavior, such that positive information received about carpooling increased the likelihood of recycling (Evans et al., 2012). Thus, this spillover effect suggests that pro-environmental behavior in one area may promote or encourage other pro-environmental behavior responses in another area (Poortinga et al., 2013).

Unlike individual personal values, which usually remain constant throughout one's lifespan, beliefs can be easily changed or updated after exposure to new information (Collins et al., 2007). Individuals who demonstrate pro-environmental behaviors (e.g., recycling, waste

reduction) typically hold positive environmental beliefs and attitudes (Markowitz et al., 2012). For instance, individuals who report environmental concerns are usually intrinsically motivated to purchase green products (Davari & Strutton, 2014). Thus, these beliefs generate intentions to purchase environmentally friendly options (Davari & Strutton, 2014). Past literature suggests that the relationship between environmental behaviors and values is mediated by beliefs (Collins et al., 2007). Moreover, environmental beliefs generate environmental attitudes and, thus, influence environmental behavioral intentions (Davari & Strutton, 2014).

Such beliefs and ideals about environmental preservation lead to the development of personal norms regarding environmental behavior. Moreover, such personal norms are often experienced through the feeling of moral obligation. Thus, environmental behavior can be driven by personal norms which are tied to an internal sense of moral obligation to behave a certain way (Zhang et al., 2020). Personal norms are self-expectations of how one should behave in particular situation (Schwartz, 1977). Personal norms can also be described as an internal type of motivation. Research has suggested that personal norms predict conservation intentions such as recycling and purchasing organic foods (Bertoldo and Castro, 2016). Altogether, an individual's values, beliefs, and personal norms have been used in predicting behavioral intentions. Likewise, the theory of plan behavior has also be used to explain pro-environmental behavioral intention.

### ***Theory of Planned Behavior and Pro-Environmental Behavior***

According to the theory of planned behavior (Ajzen, 1991), behavioral intentions can be predicted by attitudes toward a target behavior, subjective norms, and perceived behavior control (Figure 1). Attitudes are referred to a favorable or unfavorable appraisal toward a behavior (Ajzen, 1991). Subjective norms refers to the perception of societal approval or disapproval toward any particular behavior (Ajzen, 1991). Lastly, perceived behavior control is referred as

the degree to which an individual perceives the ability to perform a given behavior (Ajzen, 1991).

According to the theory of planned behavior, attitudes do not directly impact behavior, but rather shape behavioral intention, which then leads to the target behavior (Kollmus & Agyeman, 2002). Thus, an individual's favorable or unfavorable environmental attitudes influence predicted pro-environmental actions. For example, people with favorable attitudes toward recycling (e.g., recycling is beneficial for the environment) are more likely to engage in recycling (Geiger et al., 2019). There is also a positive relationship between pro-environmental attitudes and pro-environmental behaviors, such that people are more likely to engage in pro-environmental behaviors if they hold favorable environmental attitudes (Kollmus & Agyeman, 2002). The theory of planned behavior also suggests that if a dissociation exists between environmental values and attitudes, engagement in environmental actions is impacted. However, there are also other factors besides one's environmental attitudes that impact engagement of pro-environmental behaviors.

Perceived behavioral control refers to the extent to which an individual perceives an outcome as determined by one's behavior (e.g., I control my own fate) (Ajzen, 1991). If an individual perceives a lack of behavioral control, they are predicted to be less likely to attempt that behavior. One way to enhance perceived behavioral control is by learning how to perform such behavior (Ajzen, 1991). For example, individuals who are knowledgeable about where and how to recycle (i.e., strong behavioral control) are more likely to recycle (Rosenthal, 2018). Additionally, studies have found that behavioral control mediates the relationship between seeking procedural information about recycling and recycling behavior (Rosenthal, 2018). Thus, among the three determinants of behavioral intention in the theory of planned behavior,

perception of behavioral control is the most important predictor of recycling intentions (Botetzagias et al., 2015).

The last component of the theory of planned behavior, subjective norms, implies how one's perception of the approval or disapproval of others impacts engagement of a behavior (Ajzen, 1991). Subjective norms can be delineated into two components: descriptive and injunctive norms (Fornara et al., 2011). Descriptive norms refers to an individual's expectation of how other people should behave, while injunctive norms refer to the individual's perception on the approval or disapproval of a behaviors by others (Fornara et al., 2011). Studies have found that an individuals' perceptions about recycling engagement is related to spatial proximity, or perceived geographical distance, such that neighbors or significant others have a greater influence on their future recycling intentions in comparison to people living in a different city (Passafaro et al., 2019).

### ***Other Influences on Pro-Environmental Behavior***

There are other variables that influence pro-environmental concern and behavior. For instance, when individuals perceive environmentalist activists as militant and eccentric, they are more likely to be hesitant to be affiliated with 'typical' environmentalists and their associated behaviors; thus, reducing social support toward environmental behaviors (Bashir et al., 2013). Negative associations with these stereotypes decreases willingness to adopt pro-environmental behaviors (Bashi et al., 2013). Additionally, social identity can influence support of environmentally beneficial attitudes and behavior (Fielding & Homsey, 2016). For example, reminding individuals of their past pro-environmental behaviors can increase their environmental self-identity and, thus, increase future intentions of pro-environmental behaviors (Fielding & Homsey, 2016; Van der Wer et al., 2014).

Markowitz et al. (2012), examined how personality characteristics the performance of environmental relevant actions. Namely, findings show that increased openness to experience and increased agreeableness are strongly correlated with engaging in pro-environmental behaviors (Markowitz et al., 2012). Additionally, an association has been found between politically identifying as liberal and environmentalism (Hurst & Stern, 2020). There are also motivational factors such as the costs and benefits in terms of money, effort, and social approval that impact environmental behavior (Steg & Vlek, 2009). Individuals are more likely to choose alternatives with low costs and high benefits (e.g., purchasing less expensive inorganic vegetables versus expensive organic vegetables) (Steg & Vlek, 2009). However, personality and motivation are not the only factors that influence behavior; contextual factors such as the availability of facilities and products also influence environmental behavior (Steg & Vlek, 2009). For instance, if a recycling facility or recycling bin is not easily accessible to an individual, they are less likely to recycle (Geiger et al., 2019). As with most behaviors, engaging in recycling behavior has different precursors for participation.

### ***Why do people recycle?***

According to the United States Environmental Protection Agency 67.8 million tons of paper and paperboard were recycled in 2015 (National Overview, EPA). There is conflicting research about the demographics of people who recycle, as some studies suggest that people who recycle are generally wealthier, younger, and identify as liberal in their political ideology (Morgan & Hughes, 2006). Educated people are more likely to engage in pro-environmental behaviors; individuals that received more than a high school education reported more recycling compared to individuals with a high school degree or lower (Owens et al., 2000).



There are multiple factors that influence why an individual recycles. One factor is convenience (e.g., the amount and location of recycling bins), which has an influence in recycling behavior (DiGiacomo et al., 2018). An individual might perceive recycling to be time consuming and inconvenient and, thus, not recycle (Ebreo et al., 1999). DiGiacomo et al., (2018) suggest that the shorter the distance to a recycling center/bins increases recycling behavior, presumably because a short distance increases physical convenience. The information received about recycling also plays a role in influencing individuals to recycle (Nixon & Saphores, 2009). Compared to non-recyclers, people who recycle are also more informed about the recycling program (e.g., knowledgeable about recycling drop-off location and what materials that are recyclable) (Vining & Ebreo, 1990). Studies suggests that the intentions to recycle also differs between recyclers and nonrecyclers (Vining & Ebreo, 1990). Non-recyclers perceive monetary incentives and rewards as a contributing factor to recycle compared to recyclers (Vining & Ebreo, 1990). Furthermore, research findings suggest that individuals with weak recycling attitudes are more likely to be influenced by social influence (Huffman et al., 2014). Lastly, recycling behavior is also influenced by the accessibility to recycling bins and centers.

### **El Paso and its Recycling System.**

El Paso, Texas, is a binational city bordering Las Cruces, New Mexico and the international border of Ciudad Juárez, Mexico. According to the U.S. Census Bureau from July 1<sup>st</sup>, 2019 El Paso County's population was 681,728 with 81.4% of the county being Hispanic (U.S. Census Bureau, 2020). It is estimated that nearly 80.3% of the population has obtained a high school degree or higher (U.S. Census Bureau, 2020). The median household income for El Paso County is \$47,568 with a civilian labor force of 60.1% (U.S. Census Bureau, 2020). The City of El Paso offers a curbside recycling program to its residents.

The City of El Paso offers a recycling program to its residents. However, this service is offered only to households through a curbside program and residents must have an account with El Paso Water Utilities to receive a recycling bin. In addition, five drop-off sites available throughout the city drop-off sites for recyclables for no additional cost with an El Paso water utility bill (Collection Stations, 2020). Starting April 1<sup>st</sup>, 2020, recycling guidelines in El Paso were changed where recycling pickup was collected every other week (My Collection Day, 2020). By the time this thesis is written, the city of El Paso suspended the curbside recycling collection starting on December 1<sup>st</sup>, 2020 until further notice due to staffing shortages as a result of the COVID-19 situation (My Collection Day, 2020).

The City of El Paso promotes recycling through their official government website with information about what to recycle, recycling rules, and recycling tips (Recycle Right El Paso, 2020). Moreover, the City of El Paso offers recycling presentations through the El Paso Environmental Services Department to schools, organizations, and businesses (Recycle Right El Paso, 2020). Non-profit organizations such as Eco El Paso offer information that promote recycling in the city of El Paso. On the other hand, there is no curbside recycling collection for residents in rural communities of El Paso County. Rural residents are welcomed to bring their recyclables directly to the landfills located in Socorro and Clint (El Paso County Environmental Booklet, 2018). Such programs are important to increase awareness for recycling and environmental attitudes.

### **New Environmental Paradigm (Revised).**

The New Environmental Paradigm (NEP) scale was developed by Duplap and Van Liere in 1978 to include a wide range of ecological attitudes, beliefs, and values (1978). This scale has become a well-known measure of ecological beliefs and environmental orientation in the field of

environmental psychology (Dunlap et al., 2000). The scale was later revised to have a better representation of the environmental paradigm as well as to increase reliability and validity. The NEP scale consists of the following facets: the reality of limits to growth, antianthropocentrism, the fragility of nature's balance, rejection of exceptionalism, and the possibility of an ecocrisis.

The reality of limit to growth subscale refers to one's perception of ecological limits (e.g., "We are approaching the limit on the number of people earth can support") (Dunlap & Liere, 1978). The antianthropocentrism subscale refers to the rejection that humans are the most important being in the universe (Dunlap & Liere, 1978). The fragility of nature balance subscale contains items assessing the disruption of nature balance (e.g., "The balance of nature is very delicate and easily upset") (Dunlap & Liere, 1978). Items in the rejection of exceptionalism subscale refer to the rejection that humans are exempt from nature. Lastly, items in the possibility of an ecocrisis subscale are characterized by an individual's belief of a possible ecological catastrophe (e.g., "If things continue on their present course, we will soon experience a major ecological catastrophe") (Dunlap & Liere, 1978). Although the NEP has been used as a predictor for environmental behaviors, its relationship to environmental message framing and recycling behavior has yet to be examined.

### ***The importance of environmental framing***

Message framing is defined as how words, images, and phrases are presented for the purpose of conveying certain information about an event or situation (Chong & Druckman, 2007). Thus, the framing of environmental messages has been used to predict the engagement of pro-environmental behaviors. There are different types of frames such as outcome framing, which highlights a behavior or event in terms of gains or losses (Spence & Pidgeon, 2010). Individuals respond to the framing of gains or losses for environmental policies based on their

perceived risks (DeGolia et al., 2019). When people expect significant losses, they tend to engage in more risk-seeking choices. When people expect to receive significant gains, individual decision making tends to be more cautious (DeGolia et al., 2019). Policies for mitigating climate change are perceived as risk aversion because they are perceived as a cautious action; this suggests that gain framing would lead to policy action toward climate change (DeGolia et al., 2019).

Furthermore, negatively framing messages as a loss (e.g., if we do not take action there will be environmental problems) increases inaction of pro-environmental behavior as opposed to positively framing messages as a gain (Baxter & Gram-Hanssen, 2016). In a study investigating environmental message framing, it was found that framing environmental situations as gains (e.g., recycling will conserve natural resources) and highlighting that environmental problems will impact future generations predicted recycling intention (Davis, 1995). Additionally, frames that highlight the perceived distance of climate change demonstrated that locally framing climate change impacts is related to higher environmental concern (Spence & Pidgeon, 2012).

Other frames, such as motivational and sacrifice oriented messages, have been studied in relation with climate-related engagement. Sacrifice message framing highlights climate change solutions as requiring individual sacrifices, whereas motivational-oriented framing focuses on the “solutions, values, and visions” of engaging in climate actions (Gifford & Comeau, 2011). The priming of motivational framed messages resulted in stronger reported climate change engagement than the sacrifice framed messages (Gifford & Comeau, 2011).

Studies have also looked at how prior research can be used to frame environmental messages that are congruent to the values of people from the United States (Schultz & Zelezny, 2003). Americans tend to hold self-enhancing values, which are incongruent with the key values

that are associated with collective environmental action (Schultz & Zelezny, 2003). However, when environmental messages are framed to emphasize personal gain (e.g., I would save money by switching to solar energy), messages are then congruent with these self-interest values (Schultz & Zelezny, 2003). Research has found that when personal benefits are promoted self-interested individuals are more likely to engage in pro-environmental behaviors but not when environmental benefits are highlighted (De Dominicis et al., 2017). More than ever, an importance for studies has been place on environmental communication and framing to enhance engagement in mitigation efforts on climate change. Thus, research on how the framing of recycling information impacts recycling behavioral intention will contribute to the literature on environmental message framing.

### **Aims and Hypothesis**

The current aim of this study is to examine whether environmental attitudes and the framing of recycling information influence recycling behavior and their recycling efficacy. Moreover, this study will further examine whether an individual's self-reported environmental attitudes and beliefs contribute to their recycling behavioral intention. The primary aim of this study is to investigate how conflicting messages about recycling (e.g., recycling does more harms than benefits) influences an individual's engagement in recycling. The following hypotheses have been postulated for the study:

**Hypothesis 1:** Recycling behavior, measured through recycling efficacy and signing up for Eco El Paso, will be positively correlated with pro-environmental attitudes, climate change beliefs, and self-reported recycling behavior.

**Hypothesis 2:** An individual's pro-environmental attitudes and beliefs will be predictive of: a) signing up to receive information about recycling at Eco El Paso and b) having

higher recycling efficacy. Individual difference variables such as openness to experience and agreeableness as well political ideology and changes in El Paso's recycling system will be included as covariates in this model.

**Hypothesis 3:** Individuals randomized to a positive article about recycling will be more likely to a) sign up to receive information about recycling at Eco El Paso and b) have higher recycling efficacy than participants randomly assigned to the negative article manipulation after controlling for political ideology, personality factors, and recycling changes when environmental attitudes and behaviors is added to the model.

**Hypothesis 4:** An interaction between self-reported pro-environmental behavior and experimental condition will be predictive of recycling behavior above and beyond the conditional effects of attitudes, experimental condition and self-reported behavior, when controlling for covariates.

## Chapter 2: Research Design and Methods

### Participants

A power analysis was conducted to determine sample size based on the guidelines of Lipsey and Wilson (2011) using the current version of G\*Power 3.1.7 (Faul et al., 2013). This power analysis was conducted for a two-tailed logistic regression using an alpha of .05, a power of .80, and a medium effect size which was found transforming a Cohen  $d$  of .298 into an odds ratio of 1.72 (Borenstein et al., 2009). The Cohen  $d$  of .298 was used as past studies have found this effect size for self-reported and observed recycling studies (Huffman et al., 2012). The desired sample size using Lipsey and Wilson's (2011) power analysis guidelines was 177. These participants were recruited at the University of Texas at El Paso (UTEP) using SONA systems- an online system for managing and collecting participants. Enrolled students at UTEP could reside either in the city or in the rural areas of the county of El Paso, Texas. Participants were students registered for Introduction to Psychology (PSYC 1301). The UTEP's IRB committee approved this project. Responses were recorded anonymously in the study where participants provided not easily identifiable information to ensure confidentiality. Participants read and signed a consent form before participation of this study.

### Design

This was an experimental design where the type of recycling information read was manipulated. In the beginning of the study, participants were asked to complete a pre-manipulation assessments which consisted of demographics and environmental attitudes. After completion of the pre-manipulation assessment through Qualtrics, participants were randomly assigned to one of three manipulated conditions. Participants either read a positive article about recycling, a negative article about recycling, or a neutral article that contained no information

about recycling. Participants were then asked to complete a post-manipulation assessment which comprised of the dependent variable measures (See Survey on Appendix B and D).

## **Materials**

### ***Pre-Manipulation Assessment***

The survey consisted of two parts, each of which required different materials. The pre-manipulation assessment measured the following variables (see Appendix B):

*Demographic Questionnaire.* Participants were asked socio-demographics questions such as age, gender, and ethnicity.

*Political Identification Questionnaire.* The political identification questionnaire is a previously drafted measure that was used to assess an individual's perception of themselves as being liberal (1) to conservative (6). This questionnaire also assessed if respondents identified as Republican, Democrat, or a third party.

*Climate Change Belief.* This questionnaire consists of three questions assessing one's beliefs about climate change: 'I am quite sure that climate change is occurring now', 'Climate change is merely a natural fluctuation', and 'The consequences of climate change will be harmful for the environment not caused by human activity' (Guy et al., 2014). These questions were adopted and modified from studies done by Heath and Gifford (2006) and Guy et al., (2014). Participants used a 7-point rating when responding to each of the three questions, 1 = *strongly disagree* to 7 = *strongly agree*. These three questions about climate change beliefs were found to have acceptable reliability in this study with a Cronbach alpha of  $\alpha = .79$ .

*Ten Item Personality Measure (TIPI).* This short ten-item questionnaire is derived from the Big Five or Five-Factor Model that measures the five personality domains of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability (Gosling et



al., 2003). This measure uses a 7-point rating scale: strongly disagree (1), disagree moderately (2), disagree a little (3), neither agree nor disagree (4), agree a little (5), agree moderately (6), and strongly agree (7) (Markowitz et al., 2012). Adequate levels of test-retest reliability ( $r = .72$ ) have been reported for the TIPI for over an intervals of 2 weeks (Gosling et al., 2003). In addition, a Cronbach alpha of .45, .50, .68, .40, and .73 have been found for each of the following scales: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability (Gosling et al., 2003). This study found the following Cronbach alphas for Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability: .42, .48, .67, .25, and .65 (see Table 1 for reliability comparison).

*New Environmental Paradigm Scale (Revised NEP; Dunlap & Liere, 1978).* This questionnaire is composed of 15 items assessing environmental attitudes on a 5-point rating scale (strongly agree to strongly disagree). The NEP is comprised of five subscales assessing: 1) the reality of limits to growth, 2) antianthropocentrism, 3) the fragility of nature's balance, 4) rejection of exceptionalism, and 5) the possibility of an ecocrisis (Dunlap & Liere, 1978). Studies support that the NEP has good internal consistency ( $\alpha = .81$ ) and strong discriminant validity between people that identify as environmentalist and the general public (Dunlap & Liere, 1978). A Cronbach's alpha of  $\alpha = .84$  was calculated in this study, suggesting good test score reliability of the items in the NEP. Cronbach alpha's for subscales were not reported by author, however, we have reported alphas from study in Table 1.

*Student Environmental Behavior Scale.* This 24-item assessment measures the frequency to which college students participate in environmental behaviors. This measure uses a four-point scale, from never (1), sometimes (2), sometimes (3), to always (4) (Markowitz et al., 2012). It includes items such as "Consolidate your errands to minimize driving" and "Use a reusable water

bottle” (Markowitz et al., 2012). Past studies have found a Cronbach alpha of .76 for the Student Environmental Behavior Scale suggesting adequate reliability (Markowitz et al., 2012). In this study, the scale had an acceptable reliability of  $\alpha = .675$ .

### ***Post-Manipulation Assessment***

Following the experimental manipulation, which will be described later, participants completed the following measures (see Appendix D).

*Article manipulation.* Participants indicated article agreement for their experimental manipulation from 1 = strongly disagree to 5 = strongly agree.

*Environmental Policy Support.* This question measured support of the Green New Deal, an environmental policy, where participants indicated they were (1) strongly against to (5) strongly supporting this environmental policy.

*Voting Registration.* A single item assessed each participant’s voting registration status (0 = No, 1 = Yes).

*Policy Support Variable.* To measure policy support about the city’s government tax policy, the following question was asked: “I receive good value for my city government tax dollars” (Herian et al., 2012). Item was scored on 5-point Likert scale where higher scores indicated stronger levels of agreement.

*Recycling Perception.* This item measured the extent to which participants perceive that what is being recycled is actually getting recycled. This item was scored from 1 (Nothing is being recycled) to 5 (Everything recycled is being).

*Pollution Contributor Variable.* This consisted of single item in which participants indicated what city/area they perceived to be the largest pollution contributor in the El Paso area. Choices included the following cities and areas: El Paso, TX., and Las Cruces, NM in the U.S.,

and Ciudad Juárez, Chihuahua in México., and other nearby towns. Participants that selected “other” were given the choice to fill-in a different area/city of their choice.

**Recycling behavior intention was measured through two measures:**

*Efficacy of Recycling.* In the Recycling Efficacy Scale, participants rated the extent to which they perceive in their capacity to engage in recycling behaviors (White et al., 2011). This 3-item questionnaire was rated on a 7-point Likert scale, where higher scores indicated higher levels of perceived efficacy of recycling (White et al., 2011). This measure of perceived efficacy has been found to have an  $\alpha = .84$  (White et al., 2011). A Cronbach’s alpha of  $\alpha = .77$  was found in this sample.

*Recycling Intention- Eco El Paso.* A single item was used to assess if participants were interested in signing up for membership to the local non-profit sustainability organization Eco El Paso (Eco El Paso (2020): <https://www.ecoelpaso.org/> to receive recycling information (0 = No, 1 = Yes). Participants were provided with the following link if they were interested in receiving more information: [https://www.ecoelpaso.org.](https://www.ecoelpaso.org/)

**Procedure**

Information about the study was posted on SONA systems with the following description: “Participants will be asked to read a news article and complete a survey based on their opinions”. If participants wished to part of this study, they were asked to complete a consent form, indicating that they are 18 years or older and agree to participate in this study. After completing the consent form, participants were asked to complete an online questionnaire consisting of the pre-manipulation assessment. This questionnaire consisted of the following assessments: demographics, political identification questionnaire, Climate Change Belief,

Students Environmental Behavior Scale, and New Ecological Paradigm (NEP) Scale. With the exceptions of the demographic questionnaire, the assessments were counterbalanced.

Next, participants were randomly assigned to one of three conditions: 1) participants were asked to read a short article containing a positive message on recycling 2) participants were asked to read an article containing a negative message on recycling (e.g., how recycling hurts the environment) 3) participants were asked to read a neutral article that did not pertain to recycling (see Appendix B). These articles were selected from various websites and modified to convey either a neutral, positive, or negative message about recycling. All three articles were limited to approximately 600 words and standardized to 12-point Times New Roman font. Reading level was assessed using Word, where all articles had a Flesch reading ease ranging from 37-48 points and a Flesch-Kincaid grade level of 12-13. To ensure uniformity, both recycling articles focused specifically on the recycling of paper. The post-manipulation assessment was administered after the article readings' conditions. Pre and post-assessments were conducted in English only. After completing this study, participants were thanked and given research credit.

### Chapter 3: Results

Overall, 177 participants were included in the statistical analysis. There were 59 participants in the positive article condition, 59 in the negative article condition, and 59 the control condition. The majority of participants consisted of females (75.5%) between the ages of 18 to 24, Hispanics of Mexican ancestry (60.2%), living at home (82.4%), and never married (93.8%) (see Table 2). A one-way ANOVA showed a significant difference between article manipulations,  $F(2, 172) = 4.397, p = .014, MS_{error} = .702, R^2 = .12$ . Participants on average reported stronger agreement toward the positive article  $M = 4.07 (SD = .85)$  versus the negative article  $M = 3.61 (SD = .96)$ . Tukey's post-hoc tests showed that participants in the negative article manipulation were less likely to agree with the article than those in the positive article manipulation (mean difference =  $-.45, p = .012$ ). Table 3 shows the number of people in each condition who signed up to the Eco El Paso website for recycling information. Moreover, mean differences across the three condition groups were assessed across demographic and political identification variables found homogeneity across groups (Table 4).

#### *Testing of Hypothesis 1*

Hypothesis 1 predicted that recycling efficacy and recycling intention (Eco El Paso) would be positively correlated with environmental attitudes, climate change beliefs, and pro-environmental behaviors. Correlations between variables are presented in Table 5. Effect size interpretation for correlations was based on Cohen's guidelines (1988) where a small to medium effect size are equivalent to a  $r = .10$  to  $.36$ . Data demonstrated a relationship between perceived efficacy of recycling and self-reported environmental behavior of  $r = .183$  at the  $p < .05$  level ( $p = .016$ ; see Table 5), thus, supporting Hypothesis 1. A positive correlation was also found between perceived efficacy of recycling and climate change belief, which also provided support

for Hypothesis 1 ( $r = .212, p = .005$ ). The relationships between subscales of the NEP (fragility of nature's balance and the possibility of an ecocrisis) and recycling efficacy did not support Hypothesis 1. Perceived recycling efficacy was negatively correlated with both fragility of nature's balance ( $r = -.20, p = .008$ ) and the possibility of an ecocrisis ( $r = -.166, p = .028$ ). Among the variables related to signing up to Eco El Paso for recycling information, pro-environmental behaviors were positively correlated with signing up to Eco El Paso ( $r = .206, p = .006$ ), in support of Hypothesis 1. However, both antianthropocentrism ( $r = -.192, p = .011$ ) and the possibility of an ecocrisis ( $r = -.166, p = .029$ ) were negatively correlated with signing up to Eco El Paso.

#### *Testing of Hypothesis 2.*

Hypothesis 2 proposed that an individual's pro-environmental attitudes, beliefs, and behaviors would predict interest in receiving information about Eco El Paso and increase recycling efficacy. In step 1 of Table 6, we regressed recycling efficacy on climate change beliefs, the reality of limits to growth, antianthropocentrism, the fragility of nature's balance, rejection of exceptionalism, the possibility of an ecocrisis, and environmental behavior.

Additionally, we controlled for political ideology, openness to experience, and changes in El Paso's recycling system in all of the models. The City of El Paso implemented changes to the recycling system by collecting recyclables biweekly, therefore changes were control for in all models. The overall regression model was significant,  $F(11, 147) = 1.997, p = .032, R^2 = .13$ . However, there were no significant predictors although openness to experience was marginally significant ( $p = .055$ )

A logistic regression model was also conducted with climate change belief, the facets of the NEP, and the pro-environmental behaviors as predictors of interest in the first step of a

regression model, where we sought to predict interest in receiving information from Eco El Paso. This model was statistically significant with the Student Environmental Behavior Scale being a statistical predictor,  $\chi^2(11, N=159) = 19.938, p = .046$  (see step 1 of Table 7). That is, for each one unit increase on the Student Environmental Behavior Scale, the odds of signing up for information Eco El Paso increased by 4.33, holding all things constant,  $b = 1.466, p = .043, = e^{4.33}$  (95% CI: 1.044, 17.98).

### *Testing of Hypothesis 3*

Hypothesis 3 proposed that receiving a positive article about recycling would predict recycling efficacy and signing up for Eco El Paso newsletter, after controlling for the variables entered in Hypothesis 1 and 2. Two indicator variables representing group membership (negative frame was the referent condition) were added to the model. After controlling for political ideology, agreeableness, openness to experience, and changes to El Paso's recycling system- the overall regression model remained statistically significant,  $F(2, 145) = 2.349, p = .009, R^2 = .174$ .

Table 6 shows a hierarchical multiple regression analysis to examine the unique contributors of recycling efficacy at each step in the model. Recall, step 1 tested Hypothesis 1, which regressed recycling efficacy on the following independent variables: climate change beliefs, the reality of limits to growth, antianthropocentrism, the fragility of nature's balance, rejection of exceptionalism, the possibility of an ecocrisis, and environmental behavior. In step 2, article manipulations were entered into the regression equation. In this step, the only statistical predictors of recycling efficacy were openness to experience, the fragility of nature's balance, and the positive article manipulation. Adding article manipulations accounted an additional 4.4% of variability in recycling efficacy ( $\Delta R^2 = .044$ ), which was statistically significant,  $F(2, 145) =$

3.86,  $p = .023$ . Note that individuals randomized to the positive frame condition had more recycling efficacy than individuals randomized to the negative condition ( $\beta_{\text{positive}} = .187$ ). For completeness, step 3 added interactions interaction between pro-environmental behaviors and article condition to test Hypothesis 4, described in the next section.

In Table 7, a hierarchical logistic regression analysis was also performed to predict willingness to sign up to the Eco El Paso. As before, step 1 included analysis for the logistic regression for Hypothesis 1: signing up for Eco El Paso regressed on climate change beliefs, NEP facets, and student environmental behavior scale. In step 2, article manipulations were added to logistic regression model. The results for step 2 indicated that article condition was not significant predictor of signing up for recycling information, after controlling for covariates,  $\chi^2(13, N=159) = 20.833, p = .081$ . In step 3, interactions between article conditions and pro-environmental behaviors were entered (Hypothesis 4), which will be discussed in the following section.

#### *Testing of Hypothesis 4*

Hypothesis 4 predicted that an interaction between pro-environmental behaviors and article condition would be predictive of recycling efficacy and signing up for recycling information from Eco El Paso. When testing step 3 in the model that includes an interaction between article condition and environmental behavior, results show no significant increase in  $R^2$ ,  $F(2, 143) = .196, p = .822, R^2 = .176$  (Table 6). Additionally, there was no significant predictor for signing up for recycling information even after controlling for covariates,  $\chi^2(15, N=159) = 20.866, p = .141$  (see Table 7).

#### *Additional Analysis*



Although environmental policy support was not part of the any of the original hypothesis, a post hoc analysis was conducted to test on the predictors of environmental policy support . Environmental policy support was regressed on political ideology, climate change belief, the reality of limits to growth, antianthropocentrism, the fragility of nature's balance, rejection of exceptionalism, the possibility of an ecocrisis, and environmental behavior. The overall model was statistically significant, however, only political identification, climate change belief, and rejection of exceptionalism where significant predictors of environmental policy support  $F(8, 151) = 5.02, p < .001, R^2 = .21$  (Table 8).

Additionally, to further examine constructs and structure of the NEP, an Exploratory Factor Analysis (EFA) was conducted using Maximum Likelihood and Direct Oblimin. The Kaiser-Meyer-Olkin measure (KMO) values where the individual items of the NEP ( $>.90$ ) were above the cutoff point of  $.5$  with a suitable score of  $.88$  in KMO of Sampling Adequacy, thus suggesting that data is sufficient for the Principal Component Analysis (Yong & Pearce, 2013). The Barlett's test of sphericity,  $\chi^2(105) = 1200.77, p < .001$  indicated that items had a patterned relationships. With a  $1.0$  eigenvalue cut-off, there were 3 components that explained  $51.45\%$  of the cumulative variance. Additionally, a scree plot confirmed these 3 component loadings. Table 9 shows the component loadings after rotation with a criterion cut-off of  $.4$ .

The component loadings did not follow the same pattern as the original scale designed by Dunlap et al. (2000). The first component loading included items 1 and 11 and was renamed Limited Source as both discussed limited recourses/space ( $\alpha = .71$ ). The second component was renamed Protecting Nature ( $\alpha = .89$ ) as items discussed nature or the natural environment protection. Lastly, the third component was renamed Optimistic Denial ( $\alpha = .66$ ) as item were reversed coded and delt with the optimism that human intuition will solve climate change

impacts. Correlations between component factors and recycling behavior intentions only found a significant negative correlation between protecting nature and recycling effectiveness ( $r = -.17, p < .001$ ).

Lastly, to examine the relationship between pro-environmental behaviors and demographic factors an ANOVA and correlations were conducted. The one-way ANOVA found no significant differences between group means of marital status, ethnicity, gender, or living at home [ $F(1, 172) = .002, p = 0.97$ ]. Moreover, the correlation between pro-environmental behaviors and income was not statistically significant ( $r = .03, p = .70$ ).

## Chapter 4: Discussion

Consistent with the literature, climate change beliefs and student environmental behaviors were positively correlated with perceived recycling efficacy. Interestingly, recycling efficacy was only negatively associated with two subsets of the NEP: fragility of nature's balance and possibility of an ecocrisis. Antianthropocentrism and possibility of an ecocrisis were negatively related to signing up for information about recycling from the Eco El Paso website. In addition, correlations between component factors from the Proximal Component Analysis, only found a negative correlation between protecting nature and recycling effective. Although these component factors had adequate reliability (Limited Source  $\alpha = .71$ , Protecting Nature  $\alpha = .89$ , and Optimistic Denial  $\alpha = .66$ ) no other significant correlations were found. A possible explanation for these finding is that a pessimistic anticipation of the future reduces the relationship of signing up for recycling information as it might be viewed as pointless. Another explanation for this finding is that anthropocentrism values- the view that humans are the important and can use the natural environment to satisfy one's human needs- do not align with pro-environmental intentions. There was no association between recycling efficacy/recycling behavior and the following facets of the NEP: limit of growth and rejection of exceptionalism.

It is important to note that the majority of our sample consisted of females. Although the association represent small to moderate effects, women tend to have higher levels of environmental concern and pro-environmental behaviors compared to men (Hunter et al., & 2004). Data from a cross-national survey has demonstrated that women's engagement to pro-environmental behaviors is related to social economic status (Kennedy & Kmec, 2018). Additionally, a large effect size has been found between behavioral beliefs and attitudes in a model of recycling behavior in females (Oztekin et al., 2017).

Of the covariates in the models in this study, only openness to experience was predictive of recycling efficacy. Despite the poor reliability of the scores on this measure, this finding replicates prior findings between certain personality characteristics and pro-environmental behaviors. Openness to experience has been a significant contributor to both environmental concern and pro-environmental behaviors (Markowitz et al., 2012). Past literature has also found a positive correlation between attitudes toward recycling and openness to experience (Poškus & Žukauskienė, 2017). Thus, these findings further support of the relationship between openness to experiences and environmentalism.

The model including recycling articles added to our ability to predict recycling intentions after controlling for pro-environmental attitudes and behavior. Adding the article manipulations into the regression contributed to 4.4% of the variance for predicting recycling efficacy. This finding suggests that highlighting the benefits versus the disadvantages of recycling predicts recycling efficacy. Thus, recycling programs should focus on promoting information about the benefits of recycling, and reduce negative misperceptions about recycling to increase the self-perceived efficacy of making a difference by recycling. Future studies should examine how positively framing information about recycling impacts observed recycling behavior.

Only one model was significant for signing up for more information about recycling. However, no predictor in this model was statistically significant. There are several reasons why the experimental manipulation was able to predict recycling efficacy, but not to predict interest in joining the Eco El Paso organization. It is possible that the information presented about the description about Eco El Paso was not enough to influence interest in registering to the membership program of this organization. Additionally, it is also possible that participants were not interested or felt no need in learning more about recycling information or any other

environmental information offered by Eco El Paso. Lastly, it is acknowledged that signing up for additional information about recycling does not directly measure recycling behavior. Therefore, future studies should measure observed recycling behavior as well past recycling behavior.

### **Limitations**

It is important to note that countries, states, and even cities have different recycling standards and availability to recycling programs which might explain the discrepancies in recycling efficacy/behaviors. Recycling rates may also differ depending on community type. For example, communities located in El Paso County, such as Canutillo and Fabens, do not offer curbside collection in some areas but have drop-off locations available for recycling. The American Community Project reported recycling habits based on different communities (Jula, 2019). For example according to American Community Project, El Paso's community type, which is comprised of a Hispanic population, is less likely to report the recycling of plastic beverage containers compared to suburban communities (Jula, 2019). Future studies should assess how the framing of other recycling materials like plastic influences recycling efficacy and behavior in within communities.

Another limitation of this study is that recycling behavior was self-reported rather than objectively measured. Additionally, the effect of the framing of recycling information examined in this research is not generalizable, as it was assessed through the perspective of participants who are mainly young, female, Mexican American and single college students. It is also acknowledged that some measurements had low reliability, therefore, findings should be taken with caution as poor reliability can attenuate the magnitude of relationships between variables. Lastly, it is possible that participants reported the engagement of environmental behaviors and

attitudes in a socially desirable way. Future studies should control for the effects of these demand characteristics.

### **Future Direction and Implications**

Future studies should examine frames designed for target populations such as age, gender, and ethnicity in reference to climate change mitigation behaviors. Future studies should also replicate study with the consideration of such variables. Studies should also examine how framing messages can be used in a college population for effective engagement of recycling behavior. In addition, future studies should examine any variation between White, African American, Mexican nationals, and Mexican Americans and tailoring environmental messages according to these populations. Mexican immigrants living in the U.S. tend to have higher environmental concern and engagement in sustainable practices (i.e., saving water, reducing energy consumption, driving less) than U.S. born Mexican Americans (Macias, 2016). On the other hand, minorities such as African Americans and Latinos tend to be affected by environmental injustices. Hence, studies should further examine how the framing of environmental concern can be tailored to the health and environmental risks of climate change directed to communities and individuals of these population groups.

Findings of this study provides a deeper understanding between disparities of recycling information framing and factors that influence recycling efficacy by experimentally manipulating information received about recycling. It might be that by highlighting the benefits of recycling, environmental concern was activated thus leading to the belief that by recycling correctly one can make a difference. However, more research is needed to explore this link. Still, studies that emphasize effective communications about environmental issues toward public decision making of pro-environmental behaviors are at most importance.

Future studies should also explore other common means of information communication as well as messages from trustable sources to understand its influences on recycling behavior. For example, future studies can focus on how information received about recycling through social media or the news impacts recycling behavior. Moreover other mediums of communication, such as posters and websites, should be further examined.

Framing of information impacts the engagement on observed recycling behavior, and future studies could examine more in depth the framing of the variety of recycling messages available in the media and in the government informational venues. The effects of positive versus negative framing of recycling information should be examined on actual observed recycling behavior. As literature suggests, there are discrepancies between self-report and observed environmental behavior, where individuals tend to overestimate behavior (Huffman et al., 2014). Thus future studies should examine consistency or inconsistency between overt action and reported behavioral intention of recycling.

## **Conclusion**

The current study contributed to the literature on environmental psychology. Although some of the hypotheses were partially supported, findings suggest that openness to experience and the positive frame of recycling is a predictor to recycling efficacy. Taken together, these findings highlight the relationships between climate change beliefs, pro-environmental attitudes, and recycling efficacy. The findings of this study open new avenues for potential future studies looking at disparities on pro-environmental attitudes and behaviors. It is at utmost importance to promote strategies that encourage environmental action to adhere to climate change reduction policies. Ultimately, this study has highlighted the importance of message framing about recycling information toward recycling efficacy.

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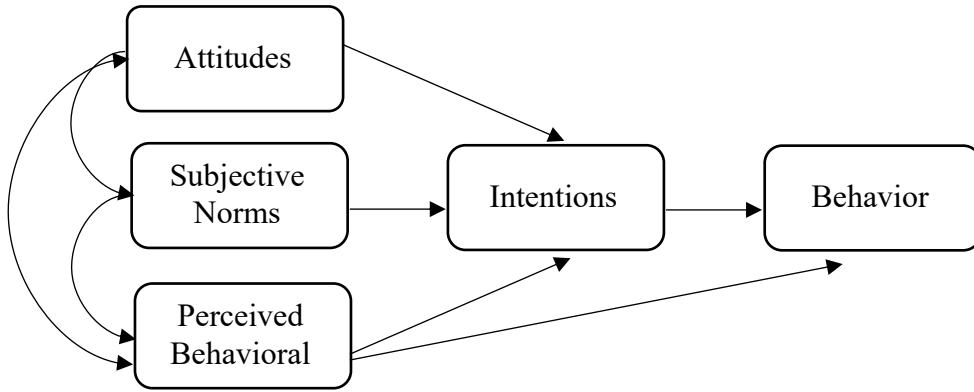
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**Appendix A: Tables & Figures**



*Figure 1. Theory of Planned Behavior.*

**Table 1.** Reported Cronbach's  $\alpha$ .

Scale	Author's Reported Cronbach's $\alpha$	Reported Cronbach's $\alpha$
<i>Ten Item Personality Measure</i>		
	.42	.61
Openness to Experience	.45	.42
Consciousness	.50	.48
Extraversion	.68	.67
Agreeableness	.40	.25
Emotional Stability	.73	.65
<i>New Environmental Paradigm Scale</i>		
	.81	.84
Reality of limits to growth		.30
Antianthropocentrism		.64
Fragility of nature's balance		.48
Rejection of exceptionalism		.23
Possibility of an ecocrisis		.83
<i>Student Environmental Behavior Scale</i>		
	.76	.68
<i>Efficacy of Recycling</i>		
	.84	.77

**Table 2.** Demographic characteristics of survey sample (N=177).

	%		%
<i>Gender</i>		<i>Living at Home</i>	
Female	75.6	Yes	82.4
Male	23.3	No	17.6
Transgender	1.1	<i>Household Income</i>	
<i>Age</i>		Under \$29,999	29.9
18-24	93.2	\$30,000-\$49,999	31.0
25-44	5.6	\$50,000-\$74,999	15.5
45 and over	0.6	\$75,000- \$99,999	12.1
<i>Political Ideology</i>		\$100,000- \$149,999	8.6
Liberal (1)	19.3	\$150,000 or More	2.9
(2)	18.1	<i>Marital Status</i>	
(3)	33.9	Never Married	93.8
(4)	21.6	Married	3.4
(5)	4.7	Divorced	0.6
Conservative (6)	2.3	Engaged	2.3
<i>Ethnicity/Nationality</i>		<i>Household Size</i>	
Mexican National	4.5	1	3.4
Mexican American	60.2	2	9.6
Other Hispanic/Latin ethnic group	8.5	3	26.6
White	7.4	4	32.2
African American	1.7	5	16.9
Asian American	3.4	6	6.8
Native American	0.6	7	2.3
Multiple ethnicities	11.4	8	0.6
Other	2.3		

**Table 3.** Percentage of people in each condition who signed up for Eco El Paso.

Condition	<i>M</i>	<i>SD</i>	% of total N
Positive Article	.24	.43	33.7
Negative Article	.32	.47	32.6
Control Article	.25	.44	33.7

*Note.*  $N = 175$ ,  $n = 59$  for the Positive Article Condition,  $n = 57$  for the Negative article condition, and  $n = 59$  for the Control Article Condition.

**Table 4.** Mean differences across conditions.

Condition	Age	Gender	Ethnicity	Household Income	Marital Status	Household Size	Political Identification
Positive Article							
<i>Mean</i>	19.97	1.31	3.36	2.44	1.27	3.59	2.89
<i>SD</i>	2.22	.46	2.46	1.36	.99	1.32	1.29
Negative Article							
<i>Mean</i>	20.59	1.27	3.19	2.49	1.10	4.02	2.84
<i>SD</i>	4.49	.64	2.24	1.43	.66	1.27	1.32
Control Article							
<i>Mean</i>	20.37	1.22	3.47	2.48	1.12	3.88	2.7
<i>SD</i>	2.88	.42	2.61	1.43	.67	1.31	1.11

*Note.*  $N = 175$ ,  $n = 59$  for the Positive Article Condition,  $n = 57$  for the Negative article condition, and  $n = 59$  for the Control Article Condition.

**Table 5.** Correlations between key variables.

	1	2	3	4	5	6	7	8
<b>1. Recycling Efficacy</b>								
2. Climate Change Belief	.212**							
3. Student Environmental Behavior	.183*	.47						
4. Limit of Growth	-.044	-.157*	-.051					
5. Antianthropocentrism	-.132	-.242*	-.212**	.200**				
6. Fragility of Nature Balance	-.202**	-.253*	-.159*	.316**	.593**			
7. Rejection of Exceptionalism	-.037	-.062	-.037	.185*	.493**	.555**		
8. Possibility of an Ecocrisis	-.166*	-.280**	-.269**	.248**	.725**	.717**	.568**	
<b>9. Recycling Intention- Eco El Paso</b>	.078	-.056	.206**	-.001	-.192*	-.064	-.023	-.166*

*Notes.* Recycling Intention: 1 = Yes and 0 = No. \*\* $p < .01$ , \* $p < .05$

**Table 6.** Hierarchal regression of recycling efficacy on article condition.

Variable	$\Delta R^2$	B	95% CI		$\beta$	<i>p</i> -value
			LLCI	ULCI		
<b>Step 1</b>	.13*					
El Paso Recycling Change		-.06	-.42	.31	-.03	.765
Political Ideology		-.004	-.14	.13	-.01	.956
Agreeableness		-.09	-.25	.08	-.08	.326
Openness to Experiences		.15	-.004	.31	.16	.055
Climate Change Belief		.10	-.09	.29	.09	.295
Reality of limits to growth		.02	-.21	.25	.02	.848
Antianthropocentrism		.06	-.18	.29	.05	.643
Fragility of nature's balance		-.28	-.57	.01	-.23	.061
Rejection of exceptionalism		.04	-.26	.33	.02	.813
Possibility of an ecocrisis		-.04	-.30	.22	-.04	.777
Student Environmental Behavior		.37	-.17	.91	.11	.183
<b>Step 2</b>	.044*					
<b>Positive Article</b>		.41	.02	.79	.19	.04
Control Article		-.10	-.49	.29	-.05	.602
<b>Step 3</b>	.002					
Student Environmental Behavior × Positive Article		.11	-1.21	1.42	.12	.875
Student Environmental Behavior × Control Article		.38	-.90	1.67	.42	.555

Note. \*  $p < .05$

**Table 7.** Hierarchal logistic regression of signing up for Eco El Paso on manipulation.

Variable	$R^2$	B	95% CI		$e^{\beta}$ (odds ratio)	$p$ -value
			LLCI	ULCI		
<b>Step 1</b>	.175*					
El Paso Recycling Change		.64	.72	4.92	1.89	.194
Political Ideology		-.29	.52	1.06	.75	.104
Agreeableness		.08	.73	1.62	1.09	.692
Openness to Experiences		-.12	.60	1.30	.88	.532
Climate Change Belief		.03	.63	1.70	1.03	.898
Reality of limits to growth		.02	.58	1.79	1.02	.953
Antianthropocentrism		-.56	.30	1.08	.57	.087
Fragility of nature's balance		.57	.83	3.77	1.76	.143
Rejection of exceptionalism		.13	.57	2.30	1.14	.713
Possibility of an ecocrisis		-.33	.36	1.44	.72	.351
<b>Student Environmental Behavior</b>		1.47	1.04	17.98	4.33	.043
<b>Step 2</b>	.181					
Positive Article		-.25	.30	2.00	.78	.60
Control Article		-.41	.25	1.78	.66	.42
<b>Step 3</b>	.183					
Student Environmental Behavior $\times$ Positive Article		.33	.05	38.96	1.39	.85
Student Environmental Behavior $\times$ Control Article		.84	.08	70.92	2.31	.63

Note. \*  $p < .05$ , **Step 1:**  $R^2 = 0.118$  (Cox and Snell), 0.175 (Nagelkerke).  $\chi^2(8) = 10.753$ ,  $p = 0.261$  (Hosmer and Lemeshow). Model  $\chi^2(11, N=159) = 19.938$ ,  $p = .046$ . **Step 2:**  $R^2 = 0.122$  (Cox and Snell), 0.181 (Nagelkerke).  $\chi^2(8) = 12.042$ ,  $p = 0.149$  (Hosmer and Lemeshow). Model  $\chi^2(13, N=159) = 20.833$ ,  $p = 0.081$ . **Step 3:**  $R^2 = 0.123$  (Cox and Snell), 0.183 (Nagelkerke).  $\chi^2(8) = 11.53$ ,  $p = 0.173$  (Hosmer and Lemeshow). Model  $\chi^2(15, N=159) = 20.866$ ,  $p = 0.141$ .



**Table 8.** Predictors of environmental policy support.

	$\beta$ (95% CI)
Political Ideology	-.13* (-.25, -.002)
Climate Change Belief	.32** (.15, .49)
Reality of limits to growth	.07 (-.14, .28)
Antianthropocentrism	-.17 (-.39, .05)
Fragility of nature's balance	-.03 (-.30, .24)
Rejection of exceptionalism	-.28* (-.54, -.01)
Possibility of an ecocrisis	.17 (-.06, .4)
Student Environmental Behavior	.30 (-.19, .79)
Constant	2.00 (.09, 3.92)
$R^2$	.21

*Note.* \*\* $p < .01$ , \* $p < .05$

**Table 9.** Principal Component Analysis of the New Ecological Paradigm Constructs.

<b>Item</b>	<b>Component Loading</b>		
	<b>1</b>	<b>2</b>	<b>3</b>
<b>New Environmental Paradigm (Revised)</b>			
11. The earth is like a spaceship with very limited room and resources	1.03		
1. We are approaching the limit of the number of people the earth can support	.51		
15. If things continue on their present course, we will soon experience a major ecological catastrophe		.84	
7. Plants and animals have as much right as humans to exist		.79	
3. When humans interfere with nature it often produces disastrous consequences		.77	
5. Humans are severely abusing the environment		.76	
9. Despite our special abilities humans are still subject to the laws of nature		.76	
6. The earth has plenty of natural resources if we just learn how to develop them		.58	
13. The balance of nature is very delicate and easily upset		.52	
12. Humans were meant to rule over the rest of nature (R)		.42	
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations (R)			.60
14. Humans will eventually learn enough about how nature works to be able to control it (R)			.53
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated (R)			.49
2. Humans have the right to modify the natural environment to suit their needs (R)			.49
4. Human ingenuity will insure that we do NOT make the earth unlivable (R)			.43
Eigenvalues	2.52	3.84	1.36
% of variance	16.78	25.57	9.09

## Appendix B: Pre-Manipulation Assessment

### Demographics

1. How old are you?
2. What is your gender?
  - Male (1)
  - Female (2)
  - Non-binary / third gender (3)
  - Transgender (4)
  - Other (5)
3. Please indicate the ethnic or national origin group(s) to which you belong:
  - Mexican National (1)
  - Mexican American (2)
  - Other Hispanic/Latin ethnic group (please specify): (3)
  - White (4)
  - African American (5)
  - Asian American (6)
  - Native American (7)
  - Other (please specify): (8)
4. What is your household income?
  - Under \$29,999 (1)
  - \$30,000 - \$49,999 (2)
  - \$50,000 - \$74,999 (3)
  - \$75,000 - \$99,999 (4)
  - \$100,000 - \$149,999 (5)
  - \$150,000 or More (6)
5. What is your marital status?
  - Never Married (1)
  - Married (2)
  - Widowed (3)
  - Divorce (4)
  - Separated (5)
  - Engaged (6)
6. How many people live in your current household? \_\_\_\_\_
7. Do you still live at home with a parent(s) or legal guardian(s)?
  - Yes (1)
  - No (2)

8. Where were you born (city/country)?  
9. Where did you grow up (city/country)?  
10. What is your primary language?
- English
  - Spanish
  - Other \_\_\_\_\_

11. Please list any other languages spoken in your home.
- English
  - Spanish
  - Other \_\_\_\_\_

### **Political identification**

1. Where would you place YOURSELF on this scale?

- Liberal (1)
- (2)
- (3)
- (4)
- (5)
- Conservative (6)

2. With which party do you mostly identify?

- Republican (1)
- Democratic (2)
- Third Party (3)

### **Ten-Item Personality Inventory-(TIPI)**

I see myself as:

1. Extraverted, enthusiastic.
2. Critical, quarrelsome.
3. Dependable, self-disciplined.
4. Anxious, easily upset.
5. Open to new experiences, complex.
6. Reserved, quiet.
7. Sympathetic, warm.
8. Disorganized, careless.
9. Calm, emotionally stable.
10. Conventional, uncreative.

### **Climate Change Belief**

1. I am quite sure that climate change is occurring now
2. Climate change is merely a natural fluctuation, not caused by human activity
3. The consequences of climate change will be harmful for the environment

### **New Environmental Paradigm**

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

### **Student Environmental Behavior Scale**

1. Warm your car in the morning before driving (R)
2. Leave the lights on when you leave a room (R)
3. Leave the water running while brushing your teeth (R)
4. Throw recyclables (e.g., plastic bottle) in the trash can (R)
5. Recycle paper, plastic and metal
6. Avoid using public transportation (R)
7. Use a reusable water bottle
8. Study or work from home
9. Consolidate your errands to minimize driving
10. Carpool instead of driving your own car
11. Bike to school instead of driving
12. Wash your clothes on cold/cold setting
13. Use recycled paper
14. Leave your computer on or asleep at night (not fully turned off) (R)
15. Use reusable shopping bags
16. Avoid using paper towels to dry your hands in the bathroom
17. Leave electronics plugged in when not in use (R)

18. Talk with friends or strangers about environmental issues
19. Print documents single-sided (R)
20. Buy clothing at second hand stores
21. Replace incandescent light bulbs with CFLs
22. Take hot showers that are longer than 5 minutes (R)
23. Compost left over food scraps
24. Attend environmental rallies

## Appendix C: Recycling Article Manipulations

*Positive article on recycling: The Advantages of Recycling Paper*

### **The Advantages of Recycling Paper<sup>1</sup>**

**by Larry West**

June 26, 2019

Paper and paper products are recycled to a greater extent than any other waste product in the U.S., representing a 66 percent recycling rate. The advantages of recycling paper include saving energy, water and landfill space. Paper recycling reduces greenhouse gas emissions and the recycled fiber is a sustainable, cost-saving resource for making new paper products.

Making recycled paper pulp, compared to generating pulp from trees and other plants to make new paper products, consumes less energy and water. Recycling one ton of paper saves energy equivalent to the energy needed to power the average U.S. home for six months and saves about 7,000 gallons of water. Making recycled paper into new paper products saves energy and water because the number of energy-intensive steps and processes that use water are reduced.

If you don't recycle your used paper and instead throw it into the trash, it goes where all trash goes -- to the landfill. The EPA cites landfills as the single largest source of methane emissions to the atmosphere, and has identified the decomposition of paper as among the most significant sources of landfill methane. A potent gas with 21 times the heat-trapping power of CO<sub>2</sub>, methane is a major contributor to global climate change.

Recycling paper preserves trees and forests. Every ton of recycled paper saves about 17 trees. Recycled paper serves as an environmentally friendly resource for paper manufacturers, saving costs and energy. In addition, paper can only be recycled five to seven times before the paper fibers become too short.

<sup>1</sup> *Note:* Modified from article written by Blue.

*Negative article on recycling: Ways Recycling Hurts the Environment*

**Ways Recycling Hurts the Environment**

by **Larry West**<sup>2</sup>

June 26, 2019

People talk about recycling like it's some sort of superhero—just by throwing that plastic bottle in the green bin, you're doing your part to punch pollution in its oily kidneys and leave the world a greener, healthier place. But sometimes the theory is better than the practice. Here are some ways recycling actually hurts the environment.

The recycling process itself produces a lot of pollutants—from the exhaust billowing out of recycling trucks to energy used at recycling plants. The exhaust from each one of those vehicles contains over three dozen airborne toxins. In addition, burning plastic produces carbon emissions. And while many incineration facilities bill themselves as “waste to energy” plants, studies have found that they release more harmful chemicals, such as mercury and lead, into the air per unit of energy than do coal plants.

Furthermore, when paper is recycled, it's all mixed together into a pulp. That pulp is washed, cleaned, and then pressed into new paper sheets. During that process, wastes like paper fibers, inks, cleaning chemicals, and dyes are filtered out into one giant pudding known as paper sludge. The sludge is then either burned or sent to a landfill, where it can leach dozens of toxic chemicals and heavy metals into groundwater.

Lastly, about 25 percent of what ends up in the blue bins is contaminated, according to the National Waste & Recycling Association. Any contaminated items are then thrown into landfills as they cannot be recycled. In reality, we can try recycling products however we will never know if gets recycled or not.

<sup>2</sup> *Note:* Modified from article written by Handley (2013).



*Control article: How Many Steps per Day Do You Need to Improve Your Health?*

## **How Many Steps per Day Do You Need to Improve Your Health?**

by **Larry West**<sup>3</sup>

June 26, 2019

If 10,000 steps a day sounds like too lofty a goal, take heart: People who step less than half that amount may still see significant health benefits, according to a new study published in the journal *JAMA Internal Medicine*.

Researchers looked at the average daily step counts for 16,741 women with an average age of 72 for one week and found that those who walked just a moderate amount—an average of just under 4,400 steps per day—were 41 percent less likely to die over the next four years than women who walked approximately 2,700 steps per day.

Lee and colleagues found that the 25 percent of women who walked the least, averaging close to 2,700 steps, were most likely to die in the approximately 4.3-year follow-up period. Reaching about 4,400 steps was associated with significantly lower risk for death, and walking more was connected to even lower risks—though those benefits leveled off after about 7,500 daily steps. The speed or intensity that people walked at didn't seem to affect mortality rates.

U.S. fitness guidelines call for people to get at least 150 minutes of moderate exercise a week, or 75 minutes of vigorous exercise, with at least two sessions of strength training. This study should be encouraging for people who find the idea of starting exercise daunting, Lee says, because just a modest amount of exercise is so beneficial. But it shouldn't be taken as a reason to do less.

<sup>3</sup> *Note:* Modified from article written by Loria (2019)

## **Appendix D: Post-Manipulation Assessment**

### **Article Agreement Variable**

1. Overall, how much do you agree with the previous article?

### **Environmental Policy Support Variable**

1. Recently a proposal called the Green New Deal has been introduced to congress to address climate change. This proposal would increase taxes on fossil fuels, such as oil, gas and coal and thus, hopefully, would reduce their usage and adverse impacts on the environment. To what extent are you in favor or against this proposal to address climate change?

### **Voting Registration**

1. Are you currently registered to vote?

### **Policy Support Variable**

1. I receive good value for my city government tax dollars.

### **Recycling Variable**

1. To what extent do you believe that what you are recycling is actually getting recycled?

### **Pollution Contributor Variable**

1. What city or cities contribute to El Paso's pollution (please select as many that apply)?
  - El Paso
  - Juarez
  - Las Cruces
  - Other (please specify):

### **Feedback**

1. Please provide any feedback you might have about this experiment.

## **Curriculum Vita**

Perla Perez was born in El Paso, Texas. She graduated from Chapin High School in 2014 and was accepted to the University of Texas at El Paso (UTEP). In the spring of 2018 she graduated UTEP with Bachelor of Arts in Psychology. Perla was accepted into the Experimental Psychology Master's program at the University of Texas at El Paso on the Fall of 2018. While at UTEP, she has worked in various research laboratories: the Prevention and Treatment in Clinical Health (PATCH) laboratory, the Personality, Emotion, Attitudes, & Social Psychology (PEAS) Laboratory, and the Health and Judgment and Decision-Making Laboratory. She was mentored by Dr. Osvaldo F. Morera while examining factors of pro-environmental behaviors.

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