

Article

I Can Feel Your Pain: Investigating the Role of Empathy and Guilt on Sustainable Behavioral Intentions to Reduce, Reuse, and Recycle Plastic Bags among College Students

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Abstract: Plastic bag pollution in the marine environment is an urgent issue that has negatively impacted the sustainability of marine biodiversity. Studying effective ways to design advocacy messages that can promote individuals' intentions to reduce, reuse, and recycle plastic bags in order to mitigate plastic bag pollution in the effort to help restore marine biodiversity is necessary. Utilizing emotional appeal messages, such as messages that are designed to elicit audiences' feelings of empathy, can promote a variety of pro-environmental behaviors. To investigate an effective way to generate empathy, this online experiment study conducted with 257 college students in the U.S. examined whether messages that encourage perspective-taking can successfully elicit empathy among participants. Additionally, the study explored whether messages that encourage perspective-taking can promote viewers' behavioral intentions to engage in the 3Rs (reduce, reuse, and recycle plastic bags) via the mediating roles of empathy and guilt. Results indicated that perspective-taking messages can increase viewers' empathy, which was positively associated with feelings of guilt, which in turn was positively associated with viewers' 3Rs behavioral intentions. The study also investigated the influence of self-efficacy on guilt as well as the interaction of self-efficacy and perspective-taking on guilt. Results suggested that self-efficacy did not have an effect on guilt, and the effects of self-efficacy and perspective-taking on guilt were independent of each other. These findings demonstrate that messages encouraging perspective-taking can positively affect individuals' 3Rs behavioral intentions to reduce plastic waste as a means to restore marine biodiversity.

Keywords: perspective-taking messages; empathy; guilt; self-efficacy; reduce, reuse, and recycle plastic bags; marine sustainability



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1. Introduction

Overconsumption of natural resources and energy has become a crucial social issue that negatively impacts biodiversity in the modern world [1,2]. As a result, restoring environmental sustainability has become extremely important in order to ensure the healthy development of the natural environment and to maintain the wellbeing of the global ecosystem so that humans and all species can survive and prosper long into the future. Among the various environmental issues, including global warming, air pollution, and deforestation, plastics pollution is one of the emerging issues that has been threatening the sustainable development of society [3].

Plastics are ubiquitous materials in our everyday life, meanwhile they also bring numerous environmental challenges to society. Every year, more than 10 million plastics end up in the marine environment, such as in oceans and along seashores [4]. Plastic waste in the marine environment has been found to negatively affect the function of the marine ecosystem and marine organisms. For example, plastic ingested by marine invertebrates, which are important prey for many predators in the ocean, can destroy marine biodiversity given that they may potentially transfer toxic substances from the plastic up the food

chain [5]. Moreover, the toxic chemicals from plastic waste can contaminate the habitats of various marine organisms, such as in coral reefs, which has one of the highest biodiverse ecosystems in the ocean [6]. Furthermore, the use of harmful chemical additives in the process of producing plastics also poses potential threats to human health. For instance, harmful microplastic residuals from plastic waste in the ocean might be consumed by humans from food and water sources [7]. In addition, plastic bag pollution in the marine environment can directly affect a variety of marine species in the oceans. Evidence has shown that vulnerable marine animals in remote environments that were rarely impacted by anthropogenic pollution in the past are now facing unavoidable threats from human plastic pollution [8–10]. For example, plastic debris, such as plastic bags that humans discard, can threaten marine animals, such as dolphins and sea turtles, through ingestion. Even ingesting small quantities of plastic bags can result in serious health damage to marine animals, leading to internal and external wounds, intestinal blockage, impairment of feeding capacity, or even death [11]. Additionally, animals suffering from entanglement in plastic bag waste is another common occurrence in the ocean. Discarded plastic products, such as plastic bags, can prevent marine animals from diving deep into the ocean, which can severely reduce their mobility. In extreme cases, discarded plastic bags can wrap around the neck of a marine animal, causing them to drown or suffocate [12].

Among the coastal states in the United States, Florida is one of the states that has been encountering marine plastic pollution issues. The state is located in the southeastern region of the United States. Its unique peninsula geography and extensive shoreline create a natural environment with a diversity of marine habitats. The state is also home to a variety of marine animals, such as sea turtles and dolphins [13]. However, a scientific report from the International Oceanic Advocacy Group has found that marine animals on the coast of Florida are being harmed by plastics more than other marine animals on the coasts of other states in the U.S. The organization discovered that among the total percentage of injuries or deaths among marine animals as a result of plastic pollution in the U.S., 55% of those were marine life off the coast of Florida [14]. The environmental and societal impacts resulting from the “ocean emergency” demand immediate and enduring changes to human behavior regarding single-use plastics [15,16]. Scholars have suggested encouraging individuals’ behavioral change to prevent littering plastics in public, especially in places that are accessible to the marine environment, such as river basins, beaches, and at-sea hot spots [17]. An effective way to prevent individuals’ littering behaviors that may negatively impact the marine environment is to persuade them to practice the 3Rs of eco-friendly behavior (reduce, reuse, and recycle) in daily life.

To date, plastic bag production has tripled, yet there is a lack of scientific understanding of the factors that can contribute to effective advocacy to encourage the public’s ecological behavior to mitigate marine plastic pollution [18–20]. Communication can play a significant role in promoting individuals’ intentions to reduce plastic bag use in the effort to help protect marine sustainability [21]. Particularly, studying effective ways to design advocacy messages that can promote individuals’ pro-environmental behavior is worth investigating, as altering human behavior that causes harm to the environment can help mitigate environmental problems worldwide. However, the majority of studies have explored the impact of visual imagery on encouraging individuals to behave in an environmentally friendly manner to protect marine animals [22,23]. More studies are needed to examine whether or not persuasive emotional-appeal messages (e.g., empathy & guilt) are effective in motivating audiences’ intentions to practice the 3Rs as they relate to plastic bag use behaviors. Among various persuasive messages, emotional appeals, such as anticipated negative emotions, including guilt or fear appeals, are often studied by communication scholars to advocate for pro-environmental behaviors [24,25]. Nonetheless, some argue that although negative appeals can lead to behavioral intention changes, if the messages are not designed carefully, they might backfire and result in failed persuasion [26,27].

Studies have found that messages designed to elicit empathy can lead to anticipated negative emotions, such as feelings of guilt, while leading to acceptance of the recom-

mended actions in persuasive messages [28]. A possible way to elicit feelings of empathy that may lead to guilt would be asking audiences to take the perspective of another individual or non-human (i.e., animals) [29–31]. Although the majority of the studies have demonstrated that taking the perspective of a vulnerable human subject would significantly elicit recipients' feelings of empathy, it remains to be seen whether taking the perspective of non-human subjects (e.g., animals) would affect humans' feelings of empathy in a similar manner. For example, whether or not portraying advocacy messages that feature marine animals, such as dolphins and sea turtles, harmed by plastic waste in the ocean and encouraging audiences to take the perspective of these suffering animals would generate their feelings of empathy. Investigating whether or not empathy can be elicited by taking the perspective of marine animals is important because some studies have shown that individuals might feel greater levels of empathy when they notice that someone who is more vulnerable than themselves is in need of their help [32]. Given that animals are generally considered as vulnerable groups because they do not have the capability to protect themselves from marine plastic pollution, humans might feel empathy when seeing them suffering from human plastic waste.

When working in the field of social science in promoting pro-environmental behavior, following theories that relate to behavioral change would guide communication practitioners in their design of effective messages in promoting the public's behavioral intentions to practice 3R ecological behavior. Within the variety of behavioral change theories, social cognitive theory and the extended parallel process model (EPPM) are found to play crucial roles in explaining and determining individuals' prosocial and pro-environmental behaviors. Drawing from the literature of the two theories, it has been suggested that self-efficacy, or one's belief that they have the capability to follow the recommended behaviors, suggested in a message can play a major role in influencing audiences' behavior and emotional responses to the message [33,34]. Nonetheless, limited studies have examined whether self-efficacy will influence audiences' feelings of guilt while viewing a message that encourages viewers to take the perspective of a marine animal in peril. Therefore, the current study examined the potential influence of exposure to perspective-taking messages on behavioral intentions toward the 3Rs via the mediating roles of empathy and guilt. It also explored the possible influence of self-efficacy and perspective-taking on guilt. This study is necessary because examining the potential effects of empathy, guilt, and self-efficacy on the eco-friendly behavioral intentions of the 3Rs can offer message designers valuable guidance on how to construct effective advocacy messages in reducing the public use of plastic bags, and thus, protecting marine animals and the environment.

2. Literature Review

2.1. Empathy as an Other-Orientated Emotion

Empathy is a fundamental and essential way in which individuals comprehend and develop effective communication with others [35]. The concept of empathy came from the German aesthetical term *Einfühlung* in the late nineteenth century. Although it was originally referred to as the tendency of an observer to project him/herself "into" another aesthetical body or environment, the contemporary definition of empathy emphasizes the psychological understanding of other individuals' experiences and emotions instead of the beauty of a physical object. To be specific, empathy is defined as an other-oriented feeling of "showing understanding, concern, or compassion when witnessing vulnerable others' suffering" [29]. It must be noted that empathy is distinct from sympathy. Feelings of empathy require individuals to actively put themselves into another's shoes to experience and understand others' feelings, whereas sympathy is a passive emotion and does not require individuals to get "inside" others' minds to understand their feelings [36]. Therefore, a feeling of empathy emphasizes the active cognitive and emotional process of placing the observers themselves in others' situations. More importantly, feelings of empathy have been demonstrated to be associated with various prosocial and pro-environmental benefits. For example, a study demonstrated that empathy could facilitate individuals'

capacity to understand or feel what others are experiencing and motivate their desire to perform helping behaviors toward vulnerable others [37]. Cho et al. (2022) also found that empathy was positively related to greater prosociality during the COVID-19 pandemic [38]. Finally, results from a survey study indicated that empathy is an important predictor of increasing pro-environmental values and the feelings of being connected to nature and the environment [39].

2.2. State Empathy and Perspective-Taking

Nonetheless, the majority of the existing studies have characterized empathy as a dispositional personality trait and limited studies have examined empathy as a state emotion that can be temporally changed through exposure to stimuli. For instance, recent studies have found that exposure to situation-specific stimuli (e.g., narrative writing tasks, immersed in vitality reality scenarios, or economic games) can enhance individuals' feelings of empathy toward others [40–42].

However, writing tasks, interacting with VR, or playing economic games can be time-consuming or not always readily available to every individual. Researchers suggested that taking the perspective of others is a necessary prerequisite for eliciting feelings of empathy [43,44]. Perspective-taking refers to the active consideration of attempting to comprehend another individual's mental state, such as their thoughts and feelings and their subjective experiences [45]. One potential way to facilitate audiences' perspective-taking is to encourage them to imagine being the victim in an article they are asked to read. For example, Basil et al. (2008) and Wee et al. (2021) found that asking participants to imagine or take the role of a starving or bullied child can enhance their feelings of empathy toward that child [28,46]. Additionally, participants were asked to imagine how suffering from HIV has affected a young woman interviewee's feelings and her life while listening to an audio recording of the interview. This study found that this exercise elicited higher levels of empathy than asking participants to stay objective when listening to the young women's interview [47].

However, little is known about whether taking the perspective of non-human subjects (e.g., animals) would affect humans' feelings of empathy, given that biological differences between species (e.g., humans vs. animals) might influence humans' levels of empathy toward the non-human character portrayed in the message and their intentions to offer help to the victim. Some scholars suggested that empathy toward others can facilitate pro-environmental behaviors even if the "other" groups are individual animals or non-human species [48]. For example, nature learning facilities, such as zoos, aquariums, and nature museums, provide unique opportunities for visitors to gain educational experience with wildlife and learn about ways to practice sustainable behaviors to protect animals in nature by facilitating visitors' emotional connection with animals, sometimes through telling visitors about animals' experiences from an animal's point of view or perspective. Therefore, to bridge the gap in the existing empathy literature of the study of the human-animal relationship, the current study aimed to investigate how asking individuals to take the perspective of suffering marine animals featured in a short article might influence their feelings of empathy and ultimately, their behavioral intentions to practice eco-friendly 3Rs behavior in order to protect the suffering marine animals. Based on the literature reviewed, we thus proposed that:

H1. *Compared to the participants who viewed an objective-focus message that presented factual information regarding the negative impact of plastic bag pollution on marine animals, participants who viewed a message that involved the perspective-taking of suffering animals harmed by plastic bag pollution will report greater levels of empathy.*

2.3. Empathy and Guilt

Feelings of empathy allow individuals to evaluate other individuals' negative situations as if they were affected themselves and this can lead them to perceive the issue

as more personally relevant. For instance, many intergroup relations programs utilize empathy-oriented techniques (e.g., imagine how people in other groups would feel about the conflict) to foster mutual understanding and resolve group conflicts between in-group and out-group members [49]. Therefore, messages that attempt to elicit feelings of empathy can elicit audiences' feelings of guilt toward others who are suffering if audiences themselves fail to follow the messages' recommendations in order to resolve the issue. Specifically, guilt is an aversive-conscious emotion that occurs when individuals note, with remorse, that they failed to do what they "ought to" or "should do." In other words, people feel guilty when they fail to adhere to certain social or personal standards, values, or beliefs [50].

Studying the emotion of guilt is important given that it is a moral emotion that can motivate positive human behaviors that are beneficial to social wellbeing [28]. For example, studies have shown that inducing guilt in persuasive messages can promote various prosocial behaviors, such as charitable donations and healthy behaviors, such as smoking cessation [50,51]. Many pro-environmental messages that are designed to elicit feelings of guilt are found to promote audiences' pro-environmental behaviors, such as saving resources, bringing reusable grocery bags to stores, and donating to an environmental organization [52–54]. Given that feelings of empathy can enhance the personal relevance felt by message receivers toward the victims portrayed in messages, using messages that are designed to elicit audiences' feelings of empathy might narrow the psychological distance between human viewers and marine animals. This might then effectively increase feelings of guilt among viewers if they fail to practice the 3Rs eco-friendly behaviors suggested in the messages in order to help suffering marine animals to survive.

Furthermore, empathy can lead to increased feelings of guilt, especially when individuals perceive someone as less fortunate and vulnerable than themselves [32,55]. For example, Basil et al. (2006) found that messages that attempt to elicit empathy toward a starving and needy child increased audience members' feelings of guilt and facilitated their intentions to donate money to charities that aim to reduce hunger and food insecurity issues among children [56]. Given that animals are generally considered to be more vulnerable than humans, as they are more at risk of harm by plastic pollution, which they have no control over [57,58], messages that are designed to elicit feelings of empathy might lead to audiences to feel guilt toward the marine animals that are harmed by plastic pollution if they fail to help them by not practicing the 3Rs eco-friendly behaviors. According to the literature review above, we proposed the following hypotheses:

H2. *Higher levels of empathy will lead to higher feelings of guilt.*

H3. *Higher feelings of guilt will lead to greater plastic bag recycling and reusing intentions.*

It is noted that although feelings of guilt can be elicited temporarily after exposure to messages that are designed to evoke such feelings, individuals have a different tendency toward feelings of guilt, which refers to predispositional guilt [59]. Previous studies also suggested that predisposition guilt influences various individuals' prosocial behaviors, such as donating to charity and volunteering [28,59]. Therefore, predispositional guilt was used as a control variable in hypothesis testing.

Given the predicted relationships specified above in H1, H2, and H3, we predicted a serial mediation process for the effects of exposure to messages that attempt to elicit feelings of empathy on practicing the 3Rs eco-friendly behavioral intentions.

H4. *There will be a serial mediation effect of empathy, guilt, and the 3Rs behavioral intentions, such that a message that involves perspective-taking (versus a non-perspective-taking message) will be positively associated with intentions to practice the 3Rs eco-friendly behaviors through feelings of empathy and guilt.*

2.4. Self-Efficacy and Guilt

Self-efficacy is a major determinant of motivation to engage in behavioral recommendations expressed through messages [60]. Self-efficacy refers to one's own perceived ability to successfully follow the recommended behaviors in advocacy messages [61]. In pervasive environmental messages, self-efficacy is the belief that individuals have that they are capable and strong enough to successfully execute the pro-environmental behaviors suggested in the message. Whether the recommended behavior in the message is perceived as low or high self-efficacy primarily determines how the receivers will respond to the message [61]. For instance, messages that advocate behavior that is easy to perform would generate greater perceived self-efficacy (e.g., donate \$1 to an environmental organization), whereas messages that advocate a behavior that is more difficult to comply with would generate lower perceived self-efficacy (e.g., donate \$100 to an environmental organization). According to Bandura's Self-Efficacy Theory [60], individuals are more likely to take action and engage in tasks for which they believe they have the ability to perform (high self-efficacy), whereas individuals are less likely to delve into action if they believe they do not have the ability to perform the behavior (low self-efficacy). For example, Tabernero and Hernández (2010) found that participants who think they are capable of recycling cardboard and glass reported a higher likelihood to act in an environmentally responsible way [62]. Moreover, another study found that participants were more willing to make donations to help needy children when they were asked to donate \$2 (high self-efficacy) than when they were asked to donate \$200 (low self-efficacy) [28].

The Extended Parallel Process Model (EPPM) has further extended the concept of self-efficacy to negative emotional appeals (e.g., fear appeals). The model suggested that self-efficacy determines the response that message receivers will choose [63]. The model proposes that a high level of self-efficacy would most likely result in an adaptive response and conformity to the advocated behavior in fear appeals. On the contrary, a low level of self-efficacy would lead audiences to reject fear appeal messages containing requested behaviors that they feel they cannot perform. Guilt as a negative emotion might function in a similar manner as fear appeals. It is possible that high levels of self-efficacy in messages (e.g., recycle and reuse plastic bags) would lead to adaptive responses among audience members and thus increase their feelings of guilt toward the suffering marine animals portrayed in the messages if they fail to practice the eco-friendly behavior that they are able to perform. On the contrary, messages with low self-efficacy recommendations (stop using plastic bags today) might result in failed persuasion and thus inhibit generated feelings of guilt among audience members because they believe that the recommended behavior in the messages are out of their capability. Therefore, if self-efficacy is lacking, individuals experience lower levels of guilt as they may find protective ways to avoid such aversive feelings (e.g., find excuses that the suggested behavior is difficult for them to perform). Therefore, we proposed that:

H5. *Self-efficacy will have an effect on participants' feelings of guilt in that participants who view a message that recommends a high self-efficacy behavior compared to a low self-efficacy behavior will lead to greater feelings of guilt.*

Nonetheless, it remains to be seen whether self-efficacy and perspective-taking will have an interactive effect on feelings of guilt. It might be possible that when individuals take the perspective of vulnerable marine animals and feel psychologically relevant to them, they might feel guilty if they fail to help the animals by practicing the 3Rs eco-friendly behaviors, regardless of whether or not the behaviors suggested in the message are perceived to be easy (high self-efficacy) or difficult (low self-efficacy) for them to perform. On the other hand, perspective-taking and self-efficacy might not have an effect on feelings of guilt if individuals feel empathy toward the marine animal, but they believe that the behaviors recommended in the message are beyond their capability to perform, and then it might lead to failure of eliciting feelings of guilt. To investigate this question, we asked:

RQ1: Will there be an interaction effect between perspective-taking and self-efficacy on feelings of guilt?

2.5. Response Efficacy in Environmental Messages

Although self-efficacy is a key element that drives environmental behavior, the function of response efficacy should also be taken into account when designing environmental advocacy messages [64]. While self-efficacy refers to an individual's perception that they are capable of performing the behavior advocated in the message, response-efficacy relates to individuals' beliefs about how efficacious their performance of the advocated behavior would be to lead to the desired outcomes [65]. For example, if one is capable of donating a dollar to a charity organization that helps starving children, but they think that donating a dollar would not actually resolve children's starvation issues, the individual would eventually become less likely to engage in the advocated behavior in the message. Several environmental studies found that a stronger sense of response efficacy is associated with a greater tendency to engage in pro-environmental behavior that fosters sustainable development. For instance, Hanss et al. (2016) found that people's strong beliefs in purchasing ecological and fair-trade groceries contributed to environmental sustainability and led to higher sustainable grocery purchasing intentions [66]. Additionally, another study found that participants who believe that paying an ecological tax (a tax levied on activities that are considered to be harmful to the environment) would help to protect the environment were more willing to pay the ecological tax [67]. Therefore, it is necessary to take individuals' levels of response efficacy into account in the current experimental study.

3. Method

3.1. Participants

Participants for this study ($n = 257$) were recruited from undergraduate classes at a large southeastern university in the U.S. They received extra course credit for their participation in the research study. The average age of people in this sample was 20 years old (ranging in age from 18 to 51; $SD = 2.67$). In terms of gender identification, 212 (82.8%) identified themselves as female, 41 (16%) identified themselves as male, 1 (0.4%) participant chose not to answer, and 3 participants (0.8%) chose "other". The majority of the sample reported their ethnicity as White/Caucasian ($n = 178$, 69.3%), followed by Hispanic or Latino ($n = 44$, 16.7%), then Black or African American ($n = 18$, 7%), and Asian ($n = 11$, 4.3%). The three remaining categories each had one person identified with that ethnicity (Native Hawaiian or Pacific Islander, Arab or Middle-Eastern, and Native American; $n = 1$, 0.4% for each). Of the remaining three people, two indicated that their ethnicity wasn't listed (1.2%) and the final case was missing.

3.2. Procedure and Measures

The study used an online experimental design. Participants were randomly assigned to read one of the four message conditions in which perspective-taking conditions (perspective-taking vs. non-perspective-taking) and level of self-efficacy (high vs. low) were manipulated (see Table 1). Perspective conditions were manipulated in a mock Facebook post from a fictitious Save Marine Animals Foundation that asks audiences to reduce plastic bag use in order to save marine animals and protect their living environment. An objective statement of fact was used in the non-perspective-taking conditions. In the perspective-taking condition, the statement of fact was altered to encourage participants to take the perspective of suffering marine animals by imagining themselves being the animals hurt by a plastic bag (see Supplementary Materials for message manipulations). Self-efficacy was manipulated by the amount of effort that the message asked participants to comply with in changing their behavior. In the high-efficacy condition, participants were asked to perform an easy way to reduce plastic bag use (recycle plastic bags and use reusable bags). In the low self-efficacy condition, participants were asked to perform a difficult way to reduce plastic bag use (stop using plastic bags today). Before the experiment, a separate pilot test

with 93 college students from the same U.S. university as in the experiment was conducted to ensure that the message that suggests “recycle plastic bags and use reusable bags” would generate higher levels of self-efficacy than the message that suggests participants should “stop using plastic bags today”. An independent *t*-test showed that participants who were assigned to view the former message reported a higher perceived self-efficacy ($M = 5.54$, $SD = 1.55$) than those participants who were assigned to view the latter message ($M = 4.33$, $SD = 1.29$), $t(91) = 4.78$, $p < 0.001$.

Table 1. Stimulus conditions.

Condition	n	%
1: Perspective-taking + High SE	42	16.3
2: Perspective-taking + Low SE	43	16.7
3: Non-perspective-taking + High SE	44	17.1
4: Non-perspective-taking + Low SE	41	16.0
5: Perspective-taking only	45	17.5
6: Control	42	16.3
Total	257	100

SE = Self Efficacy.

Guilt ($\alpha = 0.94$) was measured with three items (e.g., “I would feel guilty if I did not reduce plastic bag use after seeing this post” and “I would feel regretful if I did not reduce plastic bag use after seeing this post”) adapted from Basil et al. (2008) [28]. Responses were measured on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) ($M = 4.39$, $SD = 1.56$).

Empathy ($\alpha = 0.94$) was measured using three items (e.g., “When viewing this post, I imagined what it would feel like to be a helpless marine animal” and “When viewing this post, I empathize with helpless marine animals”) and was adapted from Basil et al. (2008) [28]. Responses were obtained on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) ($M = 4.50$, $SD = 1.96$).

Self-efficacy ($\alpha = 0.82$) was assessed using three items (e.g., “Reducing plastic bag use is easy to do.” and “I am able to reduce my plastic bag use.”) adapted from the Self-efficacy Scale [28]. Responses were obtained on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) ($M = 4.56$, $SD = 1.46$).

Response-efficacy ($\alpha = 0.82$) was assessed using three items (e.g., “Reducing plastic bag use can prevent causing harm to marine animals” and “Reducing plastic bag use is effective in protecting marine animals”) adapted from Nabi and Myrick (2017) [68]. Responses were obtained on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) ($M = 6.00$, $SD = 0.94$).

3Rs behavioral intentions ($\alpha = 0.88$) were assessed using eight items (e.g., “Reduce my plastic bag uses” and “Use reusable shopping bags”). Response options ranged from 1 (very unlikely) to 5 (very likely) ($M = 3.42$, $SD = 0.89$).

Hope ($\alpha = 0.86$) and fear ($\alpha = 0.93$) were each measured using the following items: hopeful, optimistic, and encouraged; fearful, afraid, scared, and anxious, adapted from Nabi and Myrick (2017) [68]. Responses were obtained on a 7-point Likert scale from 1 (not at all) to 7 (very much) ($M = 3.34$, $SD = 1.59$; $M = 3.58$, $SD = 1.71$). The measures were used as control variables.

Predisposition guilt was adapted from the Test of Self-Conscious Affect-3 (TOSCA-3) by Tangney et al. (2000) [69]. Studies showed that individuals have different tendencies toward feeling guilty, therefore, it would be important to control predisposition guilt (e.g., Carpenter et al., 2016; Leith et al., 1998) [70,71]. Participants were asked to rate the extent to which they would agree with eight statements (e.g., “You break something at work and then hide it, you would think”, “this is making me anxious. I need to either fix it or get someone else to fix it” and “While playing around, you throw a ball and it hits your friend in the face, you would apologize and make sure your friend feels better.”) on a

5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The reliability score for this measure is a bit low, so results must be approached with caution ($\alpha = 0.61$; $M = 4.27$, $SD = 0.46$).

4. Results

4.1. Manipulation Check

We checked the effectiveness of the manipulation of perspective-taking by using a single item that asked, "When viewing this post, I imagined what it would feel like to be a marine animal" on a 7-point Likert scale (Basil et al., 2008) [23]. Responses were used to compare if the message in the control condition differed from the messages that intended to encourage viewers to take the perspective of a suffering animal. The message in the control condition featured a brief factual tourism message about the Tokyo Tower in Japan, along with a picture of the Tokyo Tower. In the three perspective-taking conditions (message condition 1, 2, and 5, see Table 1 for condition labels), the messages encouraged the audience to imagine being a suffering marine animal. These messages were accompanied by pictures of marine animals, including a dolphin and a sea turtle swimming toward a dumped plastic bag and chewing on it. We chose to feature a dolphin in the messages because the geographic demographics of most of the participants recruited for the study indicated that they were from coastal states, which are home to thousands of wild dolphins [64]. However, these messages also stated that human-dumped plastic bags harm many other marine animals. The message also featured another marine animal, a sea turtle about to digest a plastic bag. Therefore, participants may have been able to take the perspective of various types of marine animals suffering from human-waste plastic bags. The only difference between the perspective-taking conditions was the recommended behaviors (high self-efficacy: recycle plastic bags & use reusable bags; low self-efficacy: never use plastic bags starting today; and a no self-efficacy control condition containing no recommended behavior) to protect marine animals. Other information and content in the messages remained the same. By utilizing three different messages in the perspective-taking conditions, generalizability of the results might be achieved.

Results from an independent *t*-test indicated that the manipulation was successful. The messages that intended to encourage viewers to imagine being a suffering marine animal were significantly different from the control message on levels of perspective-taking, $t(170) = -12.90$, $p < 0.001$. Participants who viewed a message that encouraged taking the perspective of a marine animal reported greater levels of perspective-taking ($M = 5.12$, $SD = 1.58$) than the participants who viewed a control message ($M = 1.62$, $SD = 1.38$). Moreover, we ran another *t*-test to test the effectiveness of the manipulation of the focal message condition (perspective taking vs. non-perspective taking) by using the same single item. Results showed that the manipulation was successful as well. Participants in the perspective-taking conditions reported greater agreement with the statement ($M = 5.12$, $SD = 1.58$) than the ones in the non-perspective-taking conditions ($M = 4.07$, $SD = 1.88$), $t(213) = -4.43$, $p < 0.001$.

We ran a *t*-test again to ensure the effectiveness of the experimental manipulation on low vs. high self-efficacy for the recommended behavior in the messages. We compared two messages that recommend a low self-efficacy behavior (never use plastic bags starting today) with two messages that recommend a high self-efficacy behavior (recycle plastic bags & use reusable bags). The result showed that these two conditions differed from each other on levels of self-efficacy, $t(168) = -3.45$, $p < 0.001$. Messages that suggested high self-efficacy behaviors ($M = 5.16$, $SD = 1.12$) were able to elicit high self-efficacy beliefs among viewers compared with messages that suggested low self-efficacy behaviors ($M = 4.53$, $SD = 1.26$). Therefore, the manipulation of low vs. high self-efficacy of the recommended behaviors in the messages was successful.

4.2. Equivalence of Conditions

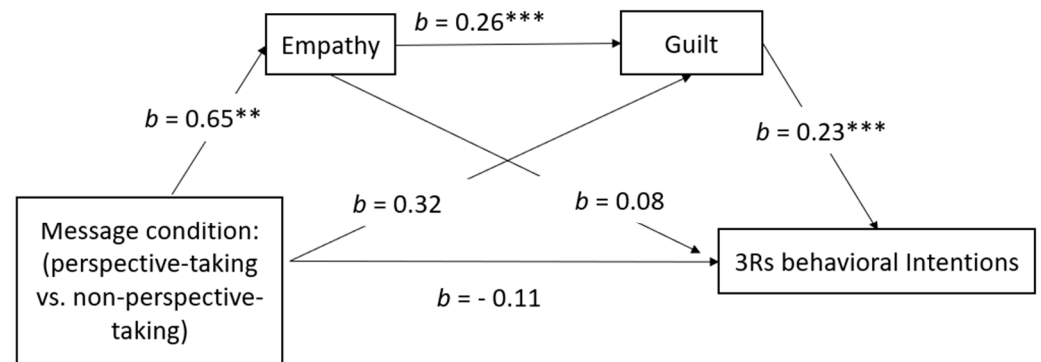
Prior to hypothesis testing, a one-way ANOVA was conducted to see if trait guilt differed across message conditions. The results showed that participants' trait guilt did not differ across conditions, $X^2(15, N = 257) = 18.49, p = 0.24$. Moreover, previous studies found that feelings of hope and fear might influence viewers' pro-environmental intentions (Ettinger et al., 2021; Stern, 2012). As a result, we conducted a one-way ANOVA to see if participants' feelings of hope and fear after viewing the message differed by each condition. The result indicated that feelings of hope had significant effects across message conditions, $F(5, 251) = 30.63, p < 0.001$, as well as fear, $F(5, 251) = 26.70, p < 0.001$. Accordingly, hope and fear were included as control variables in the subsequent hypothesis testing. Moreover, response efficacy, which is defined as the extent to which individuals believe that their mitigation actions will be effective in reducing environmental threats, was found to be an important predictor in predicting climate change adaptive behavior, such as reducing and reusing plastic grocery bags [64]. Therefore, we ran a one-way ANOVA to see if participants' self-reported levels of response efficacy significantly differed across message conditions. The test results revealed that participants' response efficacy did not differ across conditions, $F(5, 251) = 1.30, p = 0.40$.

4.3. Hypothesis Testing

H1 predicted that participants who viewed a message that included perspective-taking would report greater levels of feelings of empathy than participants who viewed a factual message (non-perspective-taking condition) about how human-dumped plastic bags can harm marine animals. To test this hypothesis, a one-way ANCOVA was conducted to compare the level of empathy between the two conditions while controlling for feelings of hope and fear. The results indicated that there was a significant difference between the perspective-taking and non-perspective-taking conditions on viewers' feelings of empathy, $F(3, 211) = 9.89, p = 0.002, R^2 = 0.05$. Participants who viewed a perspective-taking message explaining that plastic bags hurt marine animals reported higher levels of empathy ($M = 5.39, SD = 1.41$) than participants who read a non-perspective-taking message that provided factual information indicating that dumped plastic bags in the ocean hurt marine animals ($M = 4.54, SD = 1.57$). Therefore, H1 was supported.

H2, H3, and H4 were analyzed using serial mediation analysis. H2 predicted that feelings of empathy would be positively associated with feelings of guilt. H3 predicted that feelings of guilt would be positively associated with intentions to reuse and recycle plastic bags. H4 predicted a serial mediation process by which viewers viewing messages that encouraged perspective-taking (compared with viewing a message that featured non-perspective-taking factual information) would lead to greater intentions to reduce, reuse, and recycle plastic bags via audiences' feelings of empathy and via greater feelings of guilt. Given that perspective-taking and self-efficacy did not have an interactive effect on guilt (demonstrated from RQ1 below), we collapsed the two self-efficacy conditions (high vs. low) within the perspective and non-perspective message into two dummy-coded message conditions, perspective-taking vs. non-perspective-taking conditions, for further analysis. In order to test H2, H3, and H4, we performed a serial mediation analysis using Hayes's PROCESS in SPSS v4.1 (Model 6, Hayes, 2022) [72], using bootstrap estimates with 10,000 samples. The predictor variable—message feature (perspective-taking vs. non-perspective-taking) was coded binary as 0 = perspective-taking, 1 = non-perspective-taking. Empathy was entered as the first mediator, guilt was entered as the second mediator, and plastic bags' reuse and recycling behavioral intentions were entered as the outcome variable. Hope and fear were included as covariates. The unstandardized path coefficients (β) were used to test the association between the variables. Bivariate correlations and the serial mediation analysis model are included in Table A1 and Figure 1. Model results indicated that reading a message that encouraged viewers to take the perspective of a suffering marine animal was associated with greater levels of empathy compared with reading a non-perspective-taking message that presented factual information that plastic

pollution in the ocean harms marine animals, $b = 0.65$, $SE = 0.21$, $t(211) = 3.14$, $p < 0.01$, 95% CI [0.24, 1.06]. Greater feelings of empathy were, in turn, associated with greater feelings of guilt, $b = 0.26$, $SE = 0.06$, $t(210) = 4.13$, $p < 0.001$, 95% CI [0.14, 0.39]. Greater feelings of guilt subsequently lead to greater intentions to reuse and recycle plastic bags, $b = 0.23$, $SE = 0.04$, $t(209) = 5.47$, $p < 0.001$, 95% CI [0.14, 0.31]. The direct effect of the message condition (perspective-taking vs. non-perspective-taking) on plastic bag reuse and recycling intentions was not significant, $b = -0.11$, $SE = 0.12$, $t(209) = -0.94$, $p = 0.35$, 95% CI [-0.34, 0.12]. The direct effect of empathy on plastic bag reuse and recycling intentions was also not significant, $b = 0.08$, $SE = 0.04$, $t(209) = 1.96$, $p = 0.05$, 95% CI [-0.004, 0.15]. Moreover, the direct effect of message condition on feelings of guilt was not significant, $b = 0.32$, $SE = 0.19$, $t(210) = 1.67$, $p = 0.10$, 95% CI [-0.06, 0.71]. Finally, the indirect effect of message condition on plastic bag reuse and recycling intentions through empathy and then guilt was significant (indirect $b = 0.16$, $SE = 0.06$, 95% CI [0.05, 0.28]) (see Table A2. for the results for all the indirect paths). Therefore, hypotheses H2, H3, and H4 were supported.



*** $p < 0.001$, ** $p < 0.01$

3Rs behavioral intentions: reduce, reuse, and recycle plastic bags.

Figure 1. Serial mediation analyses for proposed model using model 6 in PROCESS (Hayes, 2017) [72].

H5 predicted that self-efficacy would have an effect on participants' feelings of guilt in that participants who viewed a message that recommended a high-efficacy behavior would report greater feelings of guilt. RQ1 asked whether there would be an interaction between perspective-taking and self-efficacy on feelings of guilt. To test the hypothesis and research question, we conducted a one-way ANCOVA while controlling for hope and fear. However, the test results indicated that self-efficacy did not have an effect on feelings of guilt, $F(1, 164) = 0.14$, $p = 0.71$. The self-reported guilt scores for the participants who viewed a message that recommended a high self-efficacy behavior ($M = 4.62$, $SD = 1.25$) were not significantly different from the participants who viewed a message that recommended a low self-efficacy ($M = 4.55$, $SD = 1.38$). Therefore, H5 was not supported. The results also showed that the interaction between the effects of perspective-taking and self-efficacy on levels of guilt was not significant, $F(1, 164) = 2.70$, $p = 0.10$. RQ1 was answered.

5. Discussion

Studying effective message design strategies to reduce individuals' plastic bag disposal and encourage recycling behavior that can help mitigate plastic pollution in the marine environment is crucial, given that the environmental issue has been negatively affecting the function of the marine ecosystem and marine animals [73]. Utilizing moral emotional appeals, such as empathy and guilt, is one of the persuasive strategies that have been demonstrated to successfully promote individuals' various prosocial and pro-environmental behaviors [50,53,54]. It has been suggested that encouraging message recipients to take the perspective of a vulnerable subject who is in need can elicit recipients' feelings of empathy. Therefore, the current study investigated the impact of guilt,

empathy, perspective-taking, and self-efficacy on prosocial behavioral intentions related to plastic bag use. Particularly, the study employed a 2×2 factorial experimental design in which perspective-taking (perspective-taking vs. non-perspective-taking) and self-efficacy (high vs. low) were manipulated. Feelings of empathy and guilt were measured as well. Manipulation check analyses indicated that both the perspective-taking and self-efficacy manipulations were successful. Preliminary analyses revealed that trait guilt did not differ across conditions, supported the use of hope and fear as control variables in the study, and indicated that response efficacy did not differ across conditions.

As predicted by Hypothesis 1, those who were asked to put themselves in the place of a helpless marine animal falling ill from ingesting a plastic bag (perspective-taking condition) reported greater feelings of empathy than those who were presented with factual information on how plastic bag waste can lead to the harm of marine animals (non-perspective-taking condition). The results from a one-way ANCOVA indicated that viewing perspective-taking messages elicited a significantly higher mean score of 5.39 compared with viewing non-perspective-taking messages, which elicited a lower mean score of 4.54, both on a 7-point Likert scale. The findings were consistent with the previous literature [45,58], which suggested that empathy as a moral emotion can be elicited by exposure to message stimuli, such as taking the perspective of others. Our results show that having individuals take the perspective of a character portrayed in a message, such as by asking viewers to imagine the feelings and suffering of the character, can generate feelings of empathy toward the portrayed character. More importantly, while the majority of the previous studies on empathy utilized message stimuli that featured humans as the characters (e.g., starving children or bullied children), our study demonstrated that asking viewers to take the perspective of an animal character suffering from a harmful situation (in this case, a marine animal who has ingested a plastic bag) can also lead to increased empathy for that victim, even when the victim is not a person. This may indicate that messages that depict the harmful impact of climate change on animals should consider encouraging audiences to take the perspective of the animal victims rather than merely presenting factual information, such as statistics and scientific evidence on how climate change affects animals. Exposure to such perspective-taking messages can lead viewers to feel psychologically similar to the suffering non-human species and facilitate viewers' understanding of the negative impact that human activities can cause to animals, and therefore, viewers would feel greater empathy toward the animal in the message.

Results from the serial mediation analysis (H4) revealed a more comprehensive understanding of how empathy and guilt function as mediators in the process of how message condition (perspective-taking vs non-perspective-taking) would influence viewers' 3Rs behavioral intentions to reduce, reuse, and recycle plastic bags. Specifically, as evidenced by the positive coefficient beta values in the proposed path model (message condition \rightarrow empathy, $b = 0.65$; empathy \rightarrow guilt, $b = 0.26$; guilt \rightarrow 3Rs behavioral intentions, $b = 0.23$), the model results were in line with our hypotheses and the previous literature. It again indicated that the perspective-taking message led to greater feelings of empathy toward marine animals, as noted in the previous literature [45,58]. This greater sense of empathy then led to greater feelings of guilt toward harming marine animals (H2), which then led to greater intentions to reduce, reuse, and recycle plastic bags (H3). These findings were observed in the predicted direction based on the previous literature reviewed for this study [28,50,53,58]. Our results again have demonstrated that feelings of empathy can effectively lead to feelings of guilt. It is possible that when audiences feel empathy toward the animal in a message, they might feel more of a connection with the animal given that they were mentally stimulated by the events and feelings that the animal was suffering through. As a result, the increased connection and personal relevance between the viewers and animals elicit viewers' feelings of guilt if they fail to practice the 3Rs behaviors suggested in the messages in order to help suffering marine animals survive. Furthermore, the findings suggest that empathy can lead to increased feelings of guilt, especially when the character in the message is less fortunate and vulnerable than

the viewers themselves. Our participants might have considered animals to be vulnerable victims of plastic pollution given that animals are not as capable as humans in protecting themselves from environmental crisis. The results of the study implied that feelings of empathy toward animals in peril led the participants to feel guilty if they failed to help the vulnerable animals survive the plastic pollution crisis. Finally, the insignificant direct effect of the message condition on the 3Rs behavioral intentions again demonstrated the importance of empathy and guilt as mediators in the process.

In terms of the ethical concerns of utilizing guilt appeals in social advocacy messages, although feelings of guilt might cause slightly aversive feelings among message viewers, studies have shown that such minor aversion feelings induced by viewing messages that are designed to elicit empathy can lead to a “benign” type of guilt and can ultimately facilitate audiences’ prosocial behaviors and bring benefits to society [73]. Moreover, these feelings of guilt can help individuals regulate their moral conduct and are powerful predictors of their future prosocial behavioral intentions [74]. Additionally, feelings of guilt are noted to be distinct from feelings of shame. Although shame and guilt are both considered self-conscious emotions, feelings of guilt involve less painful and non-aggressive feelings than feelings of shame and can motivate individuals to amend their previous inappropriate behavior and guide appropriate decision-making that is conducive to the development of a harmonious society. On the contrary, feelings of shame are intense emotions that might attract one’s self-evaluation and can lead to self-denial and worthlessness [75]. A key predictor of eliciting feelings of guilt or shame is the focus of blame attribution. Attributing the cause of an issue to a behavior would elicit feelings of guilt whereas attributing the cause to a person themselves would make it more likely to evoke feelings of shame [76]. Our experimental stimuli were designed to attribute the plastic pollution crisis in the marine environment to a behavioral cause resulting from human plastic bag waste rather than attacking viewers’ self-evaluation (e.g., you are a horrible person who causes the issue). As a result, the findings from H5 have successfully demonstrated that feelings of empathy can effectively lead to feelings of guilt and ultimately promote audiences’ intentions to reduce and reuse plastic bags.

Contradictory to H5, we found that self-efficacy did not have an effect on feelings of guilt. Studies have demonstrated that self-efficacy plays an important role in promoting individuals’ behavioral intention changes. For example, some found that participants who viewed a message that contained a high self-efficacy behavioral recommendation (easier behavior) reported a greater willingness to follow the message recommendation than people who viewed a message that contained a low self-efficacy behavioral recommendation (difficult behavior) [66,67]. However, the current study did not find such an effect. Although the mean score (4.62) of feelings of guilt for participants who viewed a message that recommended a high self-efficacy behavior was higher than the mean score of guilt (4.55) for participants who viewed a message that recommended a low self-efficacy behavior, the mean scores from the two experimental conditions were not significantly different from each other. Therefore, the results suggested that a message that recommended a high self-efficacy behavior elicited comparable levels of guilt compared with the participants who viewed a message that recommended a low self-efficacy behavior. It indicated that the difficulties of the advocated behavior in the message (never use plastic bags vs. reduce, reuse, and recycle plastic bags) did not influence viewers’ feelings of guilt. Furthermore, the relatively high mean scores of guilt from both the low ($M = 4.55$) and high self-efficacy ($M = 4.62$) message conditions might suggest that viewers felt guilt after knowing that discarded plastic bags from humans can seriously harm or even cause death to marine animals regardless of the level of self-efficacy in the message. Regardless of the levels of self-efficacy that viewers perceived after viewing the message in either of the conditions, the relatively high levels of guilt would subsequently lead to viewer’s behavioral intentions to recycle and reuse plastic bags, as was confirmed in H3. Perhaps the photo depiction of a marine animal approaching and chewing on a plastic bag might, in both of the message conditions, have led viewers to feel guilty given that they know that plastic bags are not edible and will

cause the animal pain. Additionally, guilt as a moral emotion might function differently in the EPPM model than the emotion of fear, a negative-valence emotion. Feelings of guilt were found to be dependent on the morality of an advocated behavior instead of the difficulties of a behavior [74].

Finally, we found that there was no interaction effect between perspective-taking and self-efficacy on feelings of guilt in that the effect of perspective-taking on feelings of guilt is independent of self-efficacy (RQ1). This suggests that the influence of the message condition (perspective-taking vs. non-perspective-taking) on viewers' feelings of guilt did not change according to the perceived difficulty (self-efficacy) of the advocated behavior in the message. This might be because perspective-taking and individuals' evaluation of the difficulty of behavior lay on different cognitive processes as perspective-taking requires mental stimulation of characters and events whereas perceived self-efficacy demands subjective judgment of whether viewers themselves are able to perform a specific behavior [60,74].

Overall, the results of this study suggest that messages prompting recipients to take the perspective of a vulnerable marine animal will lead to greater intentions to reduce, reuse, and recycle plastic bags via viewers' increased feelings of empathy and guilt. Additionally, we found that feelings of empathy and guilt play crucial roles in the effect of perspective-taking messages (vs. non-perspective-taking messages) on 3Rs ecology behavioral intentions because message conditions did not directly lead to intentions to reduce, reuse, and recycle plastic bags. The current study also bridges the knowledge gap by investigating whether taking the perspective of non-human subjects (e.g., animals) would also affect humans' feelings of empathy. Our results have demonstrated that prompting humans to take the perspective of vulnerable marine animals can successfully generate human audiences' feelings of empathy. Our findings also indicate that self-efficacy did not play a role in enhancing feelings of guilt for not taking further steps to reduce plastic bag use, and the effect of perspective-taking on feelings of guilt was independent of self-efficacy. Based on the previous literature on moral appeals and behavioral theories, our findings provide insights and strategies for designing effective communication messages that can be utilized by practitioners to encourage individuals' behavioral intentions to reduce, reuse, and recycle plastic bags, which can promote the sustainable development of marine biodiversity.

6. Limitations and Future Research

As with any study, the findings presented here are subject to limitations. First, the study included only college students. College students might have greater pro-environmental attitudes, beliefs, or environmental concerns [77,78]. Therefore, participants recruited for this study might have a higher willingness to recycle plastic bags than the general population. Future studies should examine how perspective-taking messages will impact a more general population. Additionally, the study only investigated audiences' intentions to reduce, reuse, and recycle plastic bags as a way to reduce marine plastic pollution. Although studies have shown that plastic bag waste is one of the primary causes leading to degradation in the marine environment [7,8], there are other causes that harm the marine environment, such as residuals of plastic bottles, containers, and straws. Future studies should also examine whether and how perspective-taking messages could lead to other types of ecological behaviors. Furthermore, studies have found that plastic bag pollution has also negatively impacted the terrestrial ecosystem and harmed soil, plants, and animals [79,80]. Therefore, future studies should also investigate effective message design strategies that can be used to advocate to the public to reduce plastic bag waste in order to protect the soil and land animals. Finally, our experiment utilized a one-shot exposure to the message stimuli. Although we found that viewing perspective-taking messages can lead to greater intentions to reduce, reuse, and recycle plastic bags, it remains to be seen if the long-term effects of exposure to such messages will lead to changes in human behavior. Future research may consider utilizing a longitudinal experimental de-

sign to explore such messages' effects on viewers' long-term pro-environmental behavioral intentions and actual behaviors.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su15086572/s1>. Figure S1. Mock post stimuli for perspective-taking x high self-efficacy condition; Figure S2. Mock post stimuli for perspective-taking x low self-efficacy condition; Figure S3. Mock post stimuli for non-perspective-taking x low self-efficacy condition; Figure S4. Mock post stimuli for non-perspective-taking x high self-efficacy condition.

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Appendix A

Table A1. Bivariate correlations between modeled variables.

	1	2	3	4	5	6
1. Message Condition	-	0.27 **	0.19 **	0.12	−0.39 **	0.34 **
2. Empathy		-	0.57 **	0.41 **	0.20 **	0.65 **
3. Guilt			-	0.51 **	0.23 **	0.46 **
4. 3Rs behavioral Intentions				-	0.17 **	0.41 **
5. Hope					-	0.08
6. Fear						-

** $p < 0.01$.

Table A2. Coefficient, SE, and LLCI/ULCI of the total, direct, and indirect paths for serial mediation model.

Path: Video Condition → Grit	Coeff.	SE	LLCI/ULCI
Total Effect	0.05	0.12	−0.19/0.30
Direct Effect	−0.11	0.12	−0.34/0.12
Indirect Effect 1: (Message condition → empathy → intentions)	0.05	0.03	−0.01/0.12
Indirect Effect 2: (Message condition → guilt → intentions)	0.07	0.05	−0.02/0.17
Indirect Effect 3: (Message condition → empathy → guilt → intentions)	0.04	0.02	0.01/0.08

References

- United Nations. Sustainable Consumption and Production. 2022. Available online: <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/> (accessed on 5 April 2023).
- Dunlap, R.E.; Jorgenson, A.K. Environmental Problems. *Wiley-Blackwell Encycl. Glob.* **2012**, *1*, 1–8. [CrossRef]
- Iroegbu, A.O.; Ray, S.S.; Mbarane, V.; Bordado, J.C.; Sardinha, J.P. Plastic pollution: A perspective on matters arising: Challenges and opportunities. *ACS Omega* **2021**, *6*, 19343–19355. [CrossRef]
- Plastic Oceans International. The Facts. Plastic Pollution Facts. 21 July 2022. Available online: <https://plasticoceans.org/the-facts/> (accessed on 10 November 2022).

5. Teuten, E.L.; Saquing, J.M.; Knappe, D.R.; Barlaz, M.A.; Jonsson, S.; Björn, A.; Rowland, S.J.; Thompson, R.C.; Galloway, T.S.; Yamashita, R.; et al. Transport and release of chemicals from plastics to the environment and to wildlife. *Philos. Trans. R. Soc. Biol. Sci.* **2009**, *364*, 2027–2045. [CrossRef] [PubMed]
6. National Oceanic and Atmospheric Administration (NOAA). *Habitat Damage*. Marine Debris Program. (17 September 2021). Available online: <https://marinedebris.noaa.gov/why-marine-debris-problem/habitat-damage> (accessed on 5 April 2023).
7. Carney Almoth, B.; Eggert, H. Marine Plastic Pollution: Sources, Impacts, and Policy Issues. *Rev. Environ. Econ. Policy* **2019**, *13*, 317–326. [CrossRef]
8. Burt, A.J.; Raguain, J.; Sanchez, C.; Brice, J.; Fleischer-Dogley, F.; Goldberg, R.; Talma, S.; Syposz, M.; Mahony, J.; Letori, J.; et al. The costs of removing the unsanctioned import of marine plastic litter to small island states. *Sci. Rep.* **2020**, *10*, 14458. [CrossRef]
9. Nelms, S.E.; Eyles, L.; Godley, B.J.; Richardson, P.B.; Selley, H.; Solandt, J.-L.; Witt, M.J. Investigating the distribution and regional occurrence of anthropogenic litter in English marine protected areas using 25 years of citizen-science beach clean data. *Environ. Pollut.* **2020**, *263*, 114365. [CrossRef]
10. Ryan, P.G.; Schofield, A. Low densities of macroplastic debris in the Pitcairn Islands Marine Reserve. *Mar. Pollut. Bull.* **2020**, *157*, 111373. [CrossRef]
11. Wabnitz, C.; Nichols, W.J. Plastic pollution: An ocean emergency. *Mar. Turt. Newsl.* **2010**, *129*, 1–4.
12. Laist, D.W. Impacts of marine debris: Entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. In *Marine Debris: Sources, Impacts, and Solutions*; Coe, J.M., Rogers, D.B., Eds.; Springer: New York, NY, USA, 1997; pp. 99–140.
13. Morey, S.; Koch, M.; Liu, Y.; Lee, S.-K. Florida's Oceans and Marine Habitats in a Changing Climate. Florida's Climate: Changes, Variations, & Impacts. 2017. Available online: http://purl.flvc.org/fsu/fd/FSU_libsubv1_scholarship_submission_1515510689_7_e3d1fb9 (accessed on 11 November 2022).
14. Oceana, U.S.A. Plastic Is a Growing Threat to Our Future. 2020. Available online: https://usa.oceana.org/wp-content/uploads/sites/4/263943_FactSheet_v2-1.pdf (accessed on 11 November 2022).
15. Mihai, F.-C.; Gündoğdu, S.; Khan, F.R.; Olivelli, A.; Markley, L.A.; van Emmerik, T. Plastic pollution in marine and freshwater environments: Abundance, sources, and mitigation. *Emerg. Contam. Environ.* **2022**, 241–274. [CrossRef]
16. Lavers, J.L.; Bond, A.L.; Rolsky, C. Far from a distraction: Plastic pollution and the planetary emergency. *Biol. Conserv.* **2022**, *272*, 109655. [CrossRef]
17. Rangel-Buitrago, N.; Williams, A.; Costa, M.F.; de Jonge, V. Curbing the inexorable rising in marine litter: An overview. *Ocean Coast. Manag.* **2020**, *188*, 105133. [CrossRef]
18. Nuojua, S.; Cracknell, D.; Pahl, S. Human behavior and marine plastic pollution. *Plast. Ocean.* **2022**, 429–454. [CrossRef]
19. Adam, I.; Walker, T.R.; Clayton, C.A.; Carlos Bezerra, J. Attitudinal and behavioural segments on single-use plastics in Ghana: Implications for reducing Marine Plastic Pollution. *Environ. Chall.* **2021**, *4*, 100185. [CrossRef]
20. Jia, L.; Evans, S.; Linden, S.V. Motivating actions to mitigate plastic pollution. *Nat. Commun.* **2019**, *10*, 4582. [CrossRef]
21. Walther, B.A.; Yen, N.; Hu, C.-S. Strategies, actions, and policies by Taiwan's NGOs, media, and government to reduce plastic use and marine plastic pollution. *Mar. Policy* **2021**, *126*, 104391. [CrossRef]
22. Salazar, G.; Monroe, M.C.; Ennes, M.; Jones, J.A.; Veríssimo, D. Testing the influence of visual framing on engagement and pro-environmental action. *Conserv. Sci. Pract.* **2022**, *4*, e12812. [CrossRef]
23. Thomas-Walters, L.; McNulty, C.; Veríssimo, D. A scoping review into the impact of animal imagery on pro-environmental outcomes. *Ambio* **2019**, *49*, 1135–1145. [CrossRef] [PubMed]
24. Manca, S.; Altoè, G.; Schultz, P.W.; Fornara, F. The persuasive route to sustainable mobility: Elaboration likelihood model and emotions predict implicit attitudes. *Environ. Behav.* **2020**, *52*, 830–860. [CrossRef]
25. Kolandai-Matchett; Armoudian, M. Message framing strategies for effective marine conservation communication. *Aquat. Conserv.* **2020**, *30*, 2441–2463. [CrossRef]
26. Coulter, R.H.; Pinto, M.B. Guilt appeals in advertising: What are their effects? *J. Appl. Psychol.* **1995**, *80*, 697–705. [CrossRef]
27. Pinto, M.B.; Worobetz, N.D. Note on guilt appeals in advertising: Covariate effects of self-esteem and locus of Control. *Psychol. Rep.* **1992**, *70*, 19–22. [CrossRef] [PubMed]
28. Basil, D.Z.; Ridgway, N.M.; Basil, M.D. Guilt and giving: A process model of empathy and efficacy. *Psychol. Mark.* **2008**, *25*, 1–23. [CrossRef]
29. Decety, J. Chapter 9: Perspective-taking as the royal avenue to empathy. In *Other Minds: How Humans Bridge the Divide Between Self and Others*; The Guilford Press: New York City, NY, USA, 2007; pp. 143–154.
30. Rios, F.; Trent, A.; Castañeda, L.V. Social perspective taking: Advancing empathy and advocating justice. *Equity Excell. Educ.* **2003**, *36*, 5–14. [CrossRef]
31. Alan, S.; Baysan, C.; Gumren, M.; Kubilay, E. Building Social Cohesion in Ethnically Mixed Schools: An Intervention on Perspective Taking. *Q. J. Econ.* **2021**, *136*, 2147–2194. [CrossRef]
32. Wei, C.; Yu, Z.; Li, Y. Empathy impairs virtue: The influence of empathy and vulnerability on charitable giving. *Internet Res.* **2021**, *31*, 1803–1822. [CrossRef]
33. Witte, K. Putting the fear back into Fear Appeals: The Extended Parallel Process Model. *Commun. Monogr.* **1992**, *59*, 329–349. [CrossRef]

34. Gallese, V. "Being Like Me": Self-Other Identity, Mirror Neurons, and Empathy. In *Perspectives on Imitation: From Neuroscience to Social Science; Mechanisms of imitation and imitation in animals*; Hurley, S., Chater, N., Eds.; MIT Press: Cambridge, MA, USA, 2005; Volume 1, pp. 101–118.
35. Davis, M.H. Empathy. In *Handbook of the Sociology of Emotions; Handbooks of Sociology and Social Research*; Stets, J.E., Turner, J.H., Eds.; Springer: Boston, MA, USA, 2006. [[CrossRef](#)]
36. Batson, C.D. How social an animal? The human capacity for caring. *Am. Psychol.* **1990**, *45*, 336–346. [[CrossRef](#)]
37. Barraza, J.A.; Zak, P.J. Empathy toward Strangers Triggers Oxytocin Release and Subsequent Generosity. *Ann. New York Acad. Sci.* **2009**, *1167*, 182–189. [[CrossRef](#)]
38. Cho, I.; Daley, R.T.; Cunningham, T.J.; Kensinger, E.A.; Gutchess, A. Aging, Empathy, and Prosocial Behaviors During the COVID-19 Pandemic. *J. Gerontol. Ser. B Psychol. Sci. Soc. Sci.* **2022**, *77*, e57–e63. [[CrossRef](#)]
39. Di, F.a.b.i.o.; Kenny, M.E. Connectedness to nature, personality traits and empathy from a sustainability perspective. *Curr. Psychol.* **2021**, *40*, 1095–1106. [[CrossRef](#)]
40. Bientzle, M.; Eggeling, M.; Kanzleiter, M.; Thieme, K.; Kimmerle, J. The impact of narrative writing on empathy, perspective-taking, and attitude: Two randomized controlled experiments on violations of COVID-19 protection regulations. *PLoS ONE* **2021**, *16*, e0254501. [[CrossRef](#)] [[PubMed](#)]
41. Klimecki, O.M.; Mayer, S.V.; Jusyte, A.; Scheeff, J.; Schönberg, M. Empathy promotes altruistic behavior in economic interactions. *Sci. Rep.* **2016**, *6*, 31961. [[CrossRef](#)] [[PubMed](#)]
42. Ventura, S.; Badenes-Ribera, L.; Herrero, R.; Cebolla, A.; Galiana, L.; Baños, R. Virtual reality as a medium to elicit empathy: A meta analysis. *Cyberpsychol. Behav. Soc. Netw.* **2020**, *23*, 667–676. [[CrossRef](#)] [[PubMed](#)]
43. Batson, C.D.; Polycarpou, M.P.; Harmon-Jones, E.; Imhoff, H.J.; Mitchener, E.C.; Bednar, L.L.; Klein, T.R.; Highberger, L. Empathy and attitudes: Can feeling for a member of a stigmatized group improve feelings toward the group? *J. Personal. Soc. Psychol.* **1997**, *72*, 105–118. [[CrossRef](#)]
44. Gompertz. The Relation of Empathy to Effective Communication. *Journal. Q.* **1960**, *37*, 533–546. [[CrossRef](#)]
45. Todd, A.R.; Galinsky, A.D. Perspective-taking as a strategy for improving intergroup relations: Evidence, mechanisms, and qualifications. *Soc. Personal. Psychol. Compass* **2014**, *8*, 374–387. [[CrossRef](#)]
46. Wee, S.J.; Kim, S.J.; Chung, K.; Kim, M. Development of Children's Perspective-Taking and Empathy through Bullying-Themed Books and Role-Playing. *J. Res. Child. Educ.* **2022**, *36*, 96–111. [[CrossRef](#)]
47. Stephan, W.G.; Finlay, K. The role of empathy in improving intergroup relations. *J. Soc. Issues* **1999**, *55*, 729–743. [[CrossRef](#)]
48. Young, A.; Khalil, K.A.; Wharton, J. Empathy for animals: A review of the existing literature. *Curator: Mus. J.* **2018**, *61*, 327–343. [[CrossRef](#)]
49. Izard, C.E. Differential Emotions Theory. *Hum. Emot.* **1977**, 43–66. [[CrossRef](#)]
50. Lee, H.; Paek, H.-J. Impact of norm perceptions and guilt on audience response to anti-smoking norm PSAs: The case of Korean male smokers. *Health Educ. J.* **2012**, *72*, 503–511. [[CrossRef](#)]
51. Nabi, R.L. Emotional Flow in Persuasive Health Messages. *Health Commun.* **2015**, *30*, 114–124. [[CrossRef](#)] [[PubMed](#)]
52. Lu, H. The effects of emotional appeals and gain versus loss framing in communicating sea star wasting disease. *Sci. Commun.* **2016**, *38*, 143–169. [[CrossRef](#)]
53. Muralidharan, S.; Sheehan, K. The Role of Guilt in Influencing Sustainable Pro-Environmental Behaviors among Shoppers: Differences in Response to Messaging about England's Plastic-Bag Levy. *J. Advert. Res.* **2018**, *58*, 349–362. [[CrossRef](#)]
54. Rees, J.H.; Klug, S.; Bamberg, S. Guilty conscience: Motivating pro-environmental behavior by inducing negative moral emotions. *Clim. Change* **2015**, *130*, 439–452. [[CrossRef](#)]
55. Mead, M. Guilt: The grey eminence behind character. In *History, and Culture*; Carroll, J., Ed.; Routledge & Kegan Paul: London, England, 1985; pp. 121–132.
56. Basil, D.Z.; Ridgway, N.M.; Basil, M.D. Guilt appeals: The mediating effect of responsibility. *Psychol. Mark.* **2006**, *23*, 1035–1054. [[CrossRef](#)]
57. Gardiner. Ethics and Global Climate Change. *Ethics* **2004**, *114*, 555–600. [[CrossRef](#)]
58. Swim, J.K.; Bloodhart, B. Portraying the perils to polar bears: The role of empathic and objective perspective-taking toward animals in climate change communication. *Environ. Commun.* **2014**, *9*, 446–468. [[CrossRef](#)]
59. Quiles, Z.N.; Bybee, J. Chronic and predispositional guilt: Relations to mental health, prosocial behavior, and religiosity. *J. Personal. Assess.* **1997**, *69*, 104–126. [[CrossRef](#)]
60. Bandura, A. Social Foundations of Thought and Action. *Health Psychol. Read.* **1986**, 94–106. [[CrossRef](#)]
61. Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol. Rev.* **1977**, *84*, 191–215. [[CrossRef](#)]
62. ATaberner, C.; Hernández, B. Self-Efficacy and Intrinsic Motivation Guiding Environmental Behavior. *Environ. Behav.* **2010**, *43*, 658–675. [[CrossRef](#)]
63. Popova, L. Extended parallel process model. *Int. Encycl. Media Psychol.* **2020**, 1–6. [[CrossRef](#)]
64. Ahn, S.J.; Fox, J.; Dale, K.R.; Avant, J.A. Framing Virtual Experiences. *Commun. Res.* **2015**, *42*, 839–863. [[CrossRef](#)]
65. Roberto, A.J.; Meyer, G.; Johnson, A.J.; Atkin, C.K. Using the Parallel Process Model to Prevent Firearm Injury and Death: Field Experiment Results of a Video-Based Intervention. *J. Commun.* **2000**, *50*, 157–175. [[CrossRef](#)]
66. Hanss, D.; Böhm, G.; Doran, R.; Homburg, A. Sustainable consumption of groceries: The importance of believing that one can contribute to sustainable development. *Sustain. Dev.* **2016**, *24*, 357–370. [[CrossRef](#)]

67. Doran, R.; Hanss, D.; Larsen, S. Attitudes, efficacy beliefs, and willingness to pay for environmental protection when travelling. *Tour. Hosp. Res.* **2015**, *15*, 281–292. [[CrossRef](#)]
68. Nabi, R.L.; Myrick, J.G. Uplifting Fear Appeals: Considering the Role of Hope in Fear-Based Persuasive Messages. *Health Commun.* **2019**, *34*, 463–474. [[CrossRef](#)]
69. Tangney, J.P.; Dearing, R.L.; Wagner, P.E.; Gramzow, R. Test of Self-Conscious Affect-3 (TOSCA-3). *APA PsycTests.* **2000**. [[CrossRef](#)]
70. Carpenter, T.P.; Tignor, S.M.; Tsang, J.-A.; Willett, A. Dispositional self-forgiveness, guilt- and shame-proneness, and the roles of motivational tendencies. *Personal. Individ. Differ.* **2016**, *98*, 53–61. [[CrossRef](#)]
71. Leith, K.P.; Baumeister, R.F. Empathy, shame, guilt, and narratives of interpersonal conflicts: Guilt-prone people are better at perspective taking. *J. Personal.* **1998**, *66*, 1–37. [[CrossRef](#)]
72. Hayes, A.F. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*; Guilford Press: New York, NY, USA, 2022.
73. Mellers, B.A.; McGraw, A.P. Anticipated emotions as guides to choice. *Curr. Dir. Psychol. Sci.* **2001**, *10*, 210–214. [[CrossRef](#)]
74. Jones, W.H.; Schratte, A.K.; Kugler, K. The guilt inventory. *Psychol. Rep.* **2000**, *87* (Suppl 3), 1039–1042. [[CrossRef](#)] [[PubMed](#)]
75. Velotti, P.; Garofalo, C.; Bottazzi, F.; Caretti, V. Faces of shame: Implications for self-esteem, emotion regulation, aggression, and well-being. *J. Psychol.* **2016**, *151*, 171–184. [[CrossRef](#)] [[PubMed](#)]
76. Tangney, J.P.; Dearing, R.L. *Shame and Guilt*; The Guilford Press: New York, NY, USA, 2002.
77. Ballew, M.T.; Leiserowitz, A.; Roser-Renouf, C.; Rosenthal, S.A.; Kotcher, J.E.; Marlon, J.R.; Lyon, E.; Goldberg, M.H.; Maibach, E.W. Climate Change in the American Mind: Data, Tools, and Trends. *Environ. Sci. Policy Sustain. Dev.* **2019**, *61*, 4–18. [[CrossRef](#)]
78. Fernández, M.; Cebrián, G.; Regadera, E.; Fernández, M.Y. Analysing the Relationship between University Students' Ecological Footprint and Their Connection with Nature and Pro-Environmental Attitude. *Int. J. Environ. Res. Public Health* **2020**, *17*, 8826. [[CrossRef](#)]
79. Chang, X.; Fang, Y.; Wang, Y.; Wang, F.; Shang, L.; Zhong, R. Microplastic pollution in soils, plants, and animals: A review of distributions, effects and potential mechanisms. *Sci. Total Environ.* **2022**, *850*, 157857. [[CrossRef](#)]
80. Allouzi, M.M.; Tang, D.Y.; Chew, K.W.; Rinklebe, J.; Bolan, N.; Allouzi, S.M.; Show, P.L. Micro (Nano) plastic pollution: The ecological influence on soil-plant system and human health. *Sci. Total Environ.* **2021**, *788*, 147815. [[CrossRef](#)]

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