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Playing the blame game: how attribution of responsibility impacts consumer attitudes toward plastic waste

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Manufacturers often blame environmental issues on consumer behaviors. Plastic manufactures provide a classic example, engaging in marketing campaigns attributing responsibility for plastic waste to consumers and deflecting attention from the role of industry. Drawing on attribution theory, we conducted an experiment (n = 113) to test how messaging blaming consumers for plastic waste might influence attitudes, behavioral intentions, and policy support, compared to messaging blaming manufacturers. Compared with the manufacturer-blaming frame, the consumer-blaming frame resulted in less support for regulations increasing consumer accountability for plastic waste. We did not find a significant influence of the message frame on support for regulations holding manufacturers accountable for plastic waste. Based on these results, we suggest that practitioners consider framing messages surrounding plastic waste so as to minimize consumer blame in order to maximize potential support for plastic waste reduction initiatives.

KEYWORDS

attribution of responsibility, plastic waste, consumer blaming, defense mechanisms, plastic communication

Introduction

Consumers are regularly shamed for driving, flying, eating meat, and using plastics, among other environmental sins. In one of the most infamous consumer-shaming environmental campaigns in American history, for example, a 1971 campaign ad known as the "Crying Indian" admonished individuals as responsible for an environment polluted with litter (Dunaway, 2017). "People start pollution. People can stop it," the ad's narrator says in a baritone voice, as a tear falls down the face of a buckskinned, black-braided Indian pondering his polluted landscape. The campaign advertisement was produced by Keep America Beautiful, an organization founded in 1953 and led primarily by beverage and packaging corporations. The organization has been a pioneer in consumer shaming—using innocent beings such as children, Native Americans, and squirrels to lay the burden of environmental guilt at our feet (Dunaway, 2017; Keep America Beautiful, 2021). Similarly, the fossil fuel industry often frames responsibility for reducing carbon emissions as a consumer issue by highlighting the need for consumers to "be smart about electricity use," and reduce their personal "carbon footprint" (Ferguson et al., 2016; Supran and Oreskes, 2021).

Promoting narratives that pin responsibility and blame on consumers rather than producers and manufacturers has become a well-worn tactic among industries that create products that pollute the environment or are linked to other social ills (Hawkins and Holden, 2013; Friedman et al., 2015). In the food industry, for example, messaging tends to emphasize exercise and healthier food choices as means to address obesity, deflecting attention away from the role of corporations in promoting non-nutritious food options and portion sizes (Kwan, 2009). Similarly, the tobacco industry has emphasized personal responsibility in an attempt to shift the responsibility to make healthy decisions on consumers (Brownell and Warner, 2009; Dorfman et al., 2012).

In the environmental domain, some opinion leaders within the activist community have tried to refocus these environmental narratives (Wilkins, 2018; Heglar, 2019; 350.org, n.d.)—pushing back against an "overemphasis on individual action," that "shames people for their everyday activities" (Heglar, 2019). On 350.org, for example, Bill McKibben promotes a narrative that relocates responsibility for addressing climate change in the decisions made by fossil fuel industries (350.org, n.d.). But by and large, environmental advocates also tend to focus on what consumers are doing wrong or what individuals can do to minimize the issue, sometimes adopting industry-promoted messaging (e.g., Lerner, 2019; 4ocean, 2023; The Nature Conservancy, n.d.). In a 2023 ad campaign, for example, the ocean cleanup company 4ocean promoted its cause on social media with an image of a beach covered in plastic waste and the tagline "We bet you did not think your plastic would end up here…" (4ocean, 2023). Meanwhile, The Nature Conservancy encourages consumers to use the organization's online calculator to estimate their personal "carbon footprint" (The Nature Conservancy, n.d.)—a concept first popularized by the fossil fuel company BP in the early 2000s (Supran and Oreskes, 2021).

While the use of awareness campaigns focused on consumer behavior may have intuitive appeal as an approach for creating environmental change, it may also have unintended consequences. In addition to deflecting attention away from the role of industry in environmental problems, environmental messages that focus blame on individuals or their in-group may also result in counterproductive attitudes or behaviors (e.g., Jang, 2013; Birau and Faure, 2018).

A wide body of research explores how attributions of responsibility may shape attitudes and behavioral intentions, but this body of literature has focused primarily on domains outside environmental contexts, such as health and welfare related issues (Kim et al., 2010; Zhang et al., 2015; Hoyt et al., 2017). A limited body of research suggests attributions of responsibility in messages can, in at least some circumstances, influence attitudes and behavioral intentions in the context of issues like food waste (Birau and Faure, 2018), climate change (Jang, 2013; Yang et al., 2015), and water quality issues (O'Donnell and Guidry, 2022). Despite the magnitude of the problem and considerable messaging surrounding it, there has been little attention given to how attributing responsibility for the plastics crisis might influence people's attitudes toward the issue. People's attitudes toward plastic waste may differ from their attitudes toward other environmental issues, given the ubiquity of plastic in our daily lives and the lack of alternative options available, creating barriers to curbing consumption (Jacobsen et al., 2022).

What is now often referred to as the plastic waste crisis is growing at an accelerating rate. In early 2022, a United Nations Environmental Programme (UNEP) website reported that we produce 300 million metric tons (330 million tons) per year, which it has now updated to 400 million tons (UNEP, n.d.). In an ocean plastics study published in 2019 (Lebreton et al., 2019) and publicized by environmental organizations (e.g., World Wildlife Fund, 2022), researchers reported that under a business-as-usual scenario, ocean plastics could quadruple by 2050. Plastic waste threatens wildlife and human health Marine species have been found to ingest plastics, causing severe injury or death through entanglement, suffocation, or ingestion (Müller et al., 2012). Plastics contain chemicals toxic to humans and have been found in the seafoods we eat (Halden, 2010; Smithsonian, 2018).

In light of the growing plastics crisis and evidence that attributing responsibility for environmental problems to consumers may have competing productive and counterproductive influences, we explore how messaging attributing causal responsibility for plastic waste to consumers as opposed to industry actors influences beliefs regarding efficacy, behavioral intentions, risk perceptions, and policy support. To address these questions, we conducted a message framing experiment exploring people's reactions to being blamed for plastic waste, drawing on attribution theory.

Attribution of responsibility

Attribution theory addresses how people explain the causes of their own behavior, other people's behaviors, or events in the world around them (Heider, 1958; Weiner, 1985; Fiske and Taylor, 2008). Attribution theory was initially applied in the domain of achievement, but it has since been applied to other domains, including blame (Weiner, 1985; Cheng et al., 2017). A key premise in attribution theory is that we can better understand people's causal reasoning by categorizing causal explanations according to several underlying dimensions. Weiner (1985) has proposed three causal dimensions of attribution: locus, stability, and controllability. The locus of causality for an event (or behavior) can be attributed to an internal (personal traits) or external (situational factors) source. Stability refers to the constancy of the causes of an outcome (stable or unstable). Controllability refers to the degree to which the actor can control the cause (controllable or uncontrollable). In the environmental context, locus of causality and controllability may be the most important dimensions.

When it comes to attribution of responsibility or blame, in relation to oneself versus others, people may engage in various forms of self-serving attributional biases. Prior research has found individuals tend to attribute their successes to internal factors and failures to external factors (Weiner, 2000; Genç, 2016). In a survey of U.S. national park visitors, for example, respondents were more likely to attribute hiking accidents to park characteristics or park management rather than victims, when they had experienced a similar hiking accident (Rickard, 2014). And in a survey of South African taxi drivers, the more accidents the driver had been involved in, the more they tended to attribute accidents to superstitious factors (Peltzer and Renner, 2003).

Individuals also tend to be less generous in interpreting others' behaviors. For example, people attribute their own littering to external factors, such as infrastructure, while attributing others' littering to negative internal traits (Hansmann and Steimer, 2017). Self-serving

biases extend beyond reasoning about one's own behavior to perceptions of the behaviors of friends and groups. People tend to attribute positive in-group outcomes and negative out-group outcomes to internal, stable, controllable factors, while they attribute negative in-group outcomes and positive out-group outcomes to external, unstable, uncontrollable factors (Hewstone, 1990). Prior research evidence for this "in-group bias" has been found in the context of some environmental risks, including smog and climate change (Jang, 2013; Cheng et al., 2017).

Self-serving attributional biases help protect one's self-esteem and self-image, enabling individuals present themselves (or their in-group) in a favorable light. When consumers are blamed, they may also be more likely to seek out excuses for not performing a pro-social or pro-environmental behavior, such as inability to perform the task (Hewstone, 1990; Pieters et al., 1998). In a survey of consumers in the Netherlands, researchers found respondents tended to believe their own household was more motivated but less able to perform pro-environmental behaviors than other actors (Pieters et al., 1998). The relationship between attribution of responsibility and beliefs about abilities may have important implications for behavior. In the next section, we review previous findings on the relationship between attribution of responsibility and behaviors, and whether efficacy beliefs might play a mediating role in this relationship.

Behavior and self-efficacy

Attribution theory focuses on how people use attribution to explain behavior and behavioral outcomes (successes and failures) (Weiner, 1985), rather than how attribution influences behaviors. However, a growing body of research provides some evidence suggesting attributions of responsibility can play a role in influencing behavior, or relatedly, behavioral intentions. In the environmental domain, most evidence suggests focusing individuals on their role in causing environmental problems increases pro-environmental behaviors (e.g., Bradford and McIntyre, 2007; Rees et al., 2015; Jang et al., 2023), but at least one study has found the opposite (Birau and Faure, 2018). In an experimental study, participants who read a stimulus focusing on human-caused, versus naturally occurring, environmental damages were more likely to sign a "Stop plastics in the sea" petition (Rees et al., 2015). And in a study testing signage in a Canadian national park, researchers found a sign with the attribution message "Your feet have trampled the vegetation on this island" reduced hiking off official trails, more than a sign that simply asked people to "Please stay on the wood-chipped trail," without an attribution message (Bradford and McIntyre, 2007). Finally, Korean restaurant owners were more likely to indicate intentions to adopt mitigation practices after reading a message blaming air pollution on local emission sources, including commercial cooking, than if they read a message blaming emissions from China (Jang et al., 2023). On the other hand, in an experiment testing attribution messaging in the context of food waste, focusing blame on impersonal "people" for food waste, versus "we" resulted in higher intentions to reduce food waste (Birau and Faure, 2018).

The relationship between attribution of responsibility for environmental problems and behavior and underlying mechanisms remains underexplored. One factor that might play an important role in the relationship between attribution and behaviors is individuals' beliefs about their ability to take meaningful action to address the issue—also known as efficacy beliefs. In other words, we propose that attributions of responsibility might influence efficacy beliefs, which in turn may influence pro-environmental behaviors. Previous research findings suggest that there may be a reciprocal relationship between the attributions of responsibility and efficacy beliefs (Stajkovic and Sommer, 2000). Moreover, there is an abundance of research showing that efficacy beliefs have a positive influence on pro-environmental behaviors (Lindsay and Strathman, 1997; Liang et al., 2018). Efficacy beliefs have been found to predict various environmental behaviors, including recycling, energy saving activities, ecologically responsible purchasing, and donating money to environmental organizations (Axelrod and Lehman, 1993; Attari et al., 2011; Tabernero and Hernández, 2011).

There is some evidence that focusing on consumer actions and individual lifestyle choices to reduce carbon emissions may increase feelings of self-efficacy, such as energy, food, and traveling decisions (O'Neill et al., 2013; Metag et al., 2016). In two messaging experiments focusing on food waste and meat-eating, however, blaming consumers for contributing to food waste and animal suffering resulted in lower efficacy beliefs. Birau and Faure (2018) found that participants exposed to a message blaming consumers for food waste, rather than grocery stores, indicated less confidence in their ability to prevent food waste. Similarly, Shulman et al. (2021) found study participants (all meat eaters) indicated lower beliefs about their ability to reduce their meat and dairy consumption if exposed to a message blaming consumers for animal suffering, compared to a message blaming industry. Meanwhile, attribution focusing on other actors could have the opposite effect. In an experiment testing attribution messaging, researchers found a message attributing responsibility for addressing water quality issues in Chesapeake Bay to government increased efficacy beliefs (that their actions could make a difference), and thereby increased behavioral intentions (O'Donnell and Guidry, 2022); however, they only found these relationships if the message also included an image of dirty water.

Given ample research showing that self-efficacy is positively related to pro-environmental behavior (e.g., Lindsay and Strathman, 1997; Liang et al., 2018), research finding messages attributing blame to individuals (or their in-group) decreased efficacy (Birau and Faure, 2018; Shulman et al., 2021) does not square with research finding the same types of messages increased pro-environmental behavior (e.g., Bradford and McIntyre, 2007; Rees et al., 2015; Jang et al., 2023). Given the link between self-efficacy and pro-environmental behavior, one might reasonably expect a message decreasing efficacy would also result in a decrease in the corresponding environmental behavior.

In the present study, we try to shed light on the relationship between attribution of responsibility messaging and behavior by testing the relationship between messaging that blames consumers versus manufacturers and behavioral intentions in the context of plastics, while also exploring the mediating role of self-efficacy beliefs. Specifically, we employ a concept of efficacy known as "self-efficacy of cooperation" (Kerr, 1992). The original concept of self-efficacy reflects an individuals' beliefs about their ability to perform a particular behavior (Bandura, 1977). Building on this original concept, Kerr (1992) developed the concept of self-efficacy of cooperation to capture the belief that one's cooperative actions will meaningfully contribute to achieving a collective goal. Self-efficacy of cooperation has been proposed as a useful measure in the context of seemingly distant and

diffuse environmental problems and has been found to predict behavioral intentions in the context of environmental issues such as climate change (Heath and Gifford, 2006).

Based on our review of the above research and its mixed results, we propose the following research questions to explore the main effects of attribution messages on behavioral intentions in the context of the plastic waste crisis, and possible mediating role of self-efficacy of cooperation (henceforth, self-efficacy):

> *RQ1*: Is there a main effect for exposure to consumer-blaming (versus manufacturer-blaming) attribution messages on behavioral intentions?
>
> *RQ2*: Does exposure to consumer-blaming (versus manufacturer-blaming) attribution messages influence behavioral intentions through self-efficacy?

Risk perception

When individuals or members of their in-group are identified as playing a role in a problem, individuals may diminish its associated risks as a form of defensiveness or self protection (Jang, 2013; Shulman et al., 2021). Research examining the relationships between attribution of responsibility for environmental problems and risk perceptions is limited, and mostly based on correlational survey data, but findings reveal a generally consistent pattern. When individuals attribute responsibility for environmental problems to external factors (e.g., government, corporations), they tend to perceive greater risk, compared to when individuals make internal responsibility attributions (Chang et al., 2016; Cheng et al., 2017; Han et al., 2022). A Chinese survey on smog (Cheng et al., 2017) and a Korean survey on climate change (Chang et al., 2016), for example, found respondents who attributed responsibility to government or large corporations perceived the associated risks as more severe, compared with respondents who attributed responsibility to themselves or individuals more generally.

Results have not been entirely consistent, however. Sometimes researchers do not find evidence for a relationship between attribution and risk perceptions or only find limited evidence. In a survey about a water disease outbreak in Milwaukee, for example, Kahlor et al. (2002) did not find a significant relationship between respondents' risk estimates and their attributions of responsibility to external or internal factors. A Taiwanese survey on natural disasters found significant results, but with a narrowly limited scope (Han et al., 2022). Compared to respondents who attributed responsibility for natural disaster losses to households, individuals who attributed external factors (e.g., government) perceived higher likelihood of earthquakes, but not typhoons, and the researchers did not find a link between attribution and perception of consequences for either.

Experimental evidence demonstrating a causal link between attribution of responsibility for environmental problems and related risk perceptions is more limited. In a messaging experiment in the U.S., participants were more likely to be concerned about climate change after reading a news story blaming China, than if they read a news story blaming the U.S. (Jang, 2013). And in a messaging experiment not explicitly focused on the environment but addressing a topic with environmental implications (eating meat), researchers found a similar relationship between attribution and perceived outcomes (Shulman et al., 2021). In the study, participants who read a message blaming consumers for animal suffering were less likely to view veganism as a moral issue than participants who read a message blaming the meat industry. As in the experimental study conducted by Shulman et al. (2021), we experimentally test the influence of a message blaming consumers versus industry (plastic manufacturers) and measure risk in terms of perceived severity, similar to the measures used in Chang et al. (2016) and Cheng et al. (2017).

Given the research findings reviewed above, we hypothesize:

> *H1*: Participants who read an article attributing responsibility for plastic waste to consumers will tend to view the threat as less severe than participants who read an article blaming manufacturers.

Policy support

Research suggests attributions of responsibility influence support for related policies. In general, it seems that placing treatment responsibility for problems (e.g., racial inequality and obesity) on external forces/outside the realm of the individual is associated with greater support for government policies addressing the issue (Iyengar, 1989; Barry et al., 2009; Temmann et al., 2021). In a systematic review of research on responsibility framing in the health context, for example, researchers found individual responsibility frames resulted in lower levels of policy support (Temmann et al., 2021).

Although there is limited research on responsibility framing and policy support within the environmental context, the research that does exist mostly lends support to the above findings. In an experiment among U.S. residents, Jang (2013) found a news story highlighting the U.S. role in causing climate change resulted in lower support for domestic and global climate change policies, compared with a news story highlighting China's role in causing climate change. Meanwhile, Birau and Faure (2018) found that participants exposed to a message blaming stores led participants to agree more that consumers should play a role in helping stores prevent waste compared to a consumer-blaming message. However, in comparing messaging attributing individual versus societal responsibility for climate change, Yang et al. (2015) did not find a significant difference in levels of policy support between message conditions.

Considering the dearth of research in the environmental domain along with the somewhat mixed evidence from related research, we pose the following research questions:

> *RQ3*: Will participants who read an article attributing responsibility for plastic waste to consumers be less supportive of holding manufacturers accountable for plastic waste through regulations than participants who read an article blaming manufacturers?
>
> *RQ4*: Will participants who read an article attributing responsibility for plastic waste to consumers be less supportive of holding individual consumers accountable for plastic waste through regulations than participants who read an article blaming manufacturers?

Message framing

To test our hypothesis and answer our research questions, we conduct an experiment exposing participants to messages framing the plastics crisis as either largely the responsibility of consumers or manufacturers. Framing can be used to refer to equivalency framing, rooted in psychology, or emphasis framing, rooted in sociology (Cacciatore et al., 2016). In this experiment we employ emphasis framing. Emphasis framing distinguishes between texts that highlight different subsets of relevant considerations (e.g., public safety or free speech) in relation to a topic (e.g., proposals to regulate social media) (Druckman, 2001). In making some aspects of a topic more salient, emphasis framing can be used to "promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" (Entman, 1993, p. 52). In our experiment, we use frames to emphasize either consumer or manufacturer responsibility in the plastics crisis. Communication scholars distinguish between two types of responsibility—responsibility for causing a problem (causal responsibility) and responsibility for resolving the problem (treatment responsibility) (Iyengar, 1989; Yang et al., 2015). Our message focuses on causal responsibility—specifically, who is to blame for the plastics crisis, consumers or manufacturers.

Materials and methods

In this study, we employed a between-subject message framing survey experiment hosted on Qualtrics and fielded from July 20, 2022, to August 6, 2022. Participants were randomly assigned to one of two experimental conditions and read one of two versions of a message about plastic waste issues (see Supplementary material for full text). For the experimental conditions, we manipulated whether the message attributed responsibility for plastic waste to consumers (consumer-blaming condition; word count = 187) or manufacturers (manufacturer-blaming condition; word count = 185). The two versions of the message were otherwise worded nearly identically. Each message also included three images. We used the first of the three images to help operationalize frames emphasizing consumer versus manufacturer responsibility in the consumer-blaming and manufacturer-blaming conditions. For the first image, we included a photo of a woman drinking from a water bottle in the consumer-blaming condition, and a photo of a plant producing plastic water bottles in the manufacturer-blaming condition. The other two images were identical across conditions (see Supplementary material for images descriptions and captions).

After reading the message, participants answered questions measuring perceived risk, self-efficacy, behavioral intentions, and policy support. We used a combination of forward-worded and reverse-worded items to reduce acquiescence bias (Zhang et al., 2019). We obtained ethical clearance for the survey procedure from the University of Central Florida (IRB Approval STUDY00004507). The final survey and frames were piloted to identify any problematic questions and ensure clarity of questions; feedback was incorporated into the final survey.

Sample

We administered the experiment to undergraduate students attending summer courses at a large public southeastern U.S. university ($n = 310$). To ensure that we only analyzed responses from participants who fully read the stimulus, we eliminated the responses from participants who failed an attention check question or read the stimulus (minus the image captions) at a rate faster than 500 words/min, based on previous research showing that the average reading speed of an above-average college student for general/non-technical materials is 500 words per minute (Shepherd University, 2017). While data cleaning eliminated a large number of speeders, literature on adequate sample sizes for experimental studies suggests that we had an acceptable number of participants per experimental condition ($n = 51$ for the consumer condition, $n = 62$ for the manufacturer condition) (Wilson Van Voorhis and Morgan, 2007; Bhattacherjee, 2012). Our final sample ($n = 113$) had an average age of 21.9 years (SD = 6.43), was primarily female (58.4%), and based on a seven-point scale measuring political affiliation (*Strong Democrat* = 1; *Strong Republican* = 7), leaned Democratic ($M = 3.54$).

Measures

Risk perception

Items for the risk perception variable were adapted from Yoon et al. (2021)'s scale assessing economic, social, physical, and environmental risk surrounding plastic waste. The modified scale includes four items measuring people's views of the threat posed by plastic waste (1 = *Extremely serious*, 5 = *Not at all serious*), such as "How serious of a threat do you think plastic waste is to the natural environment?" These items were found to be internally consistent ($\alpha = 0.76$; $M = 1.73$; SD = 0.63).

Self-efficacy

Self-efficacy was measured as the averaged response to four items adapted from Heath and Gifford (2006), who measure self-efficacy in the context of climate change. For each item, participants rated their agreement with a statement about whether the things one can do will make a significant difference in addressing plastic waste problems (1 = *Strongly disagree*, 5 = *Strongly agree*), such as "There are simple things I can do that will have a meaningful effect to alleviate the negative effects of plastic waste" ($\alpha = 0.85$; $M = 3.67$; SD = 0.97).

Behavioral intention

Items from the plastic waste behavioral intention scale were adapted from Van et al. (2021)'s plastic-reducing behavioral intention scale, with one question omitted that was specific to a Malaysian government initiative with no U.S. equivalent. The modified four-item scale measures people's behavioral intentions to reduce their use of single-use plastics (1 = *Strongly disagree*, 5 = *Strongly agree*). For example: "I am willing to switch to using plastic-free accessories and tools." These items were found to be internally consistent ($\alpha = 0.82$; $M = 3.96$; SD = 0.77).

Policy support

To assess participants' views toward plastic waste policies, two questions were asked to assess whether regulations on plastic waste

should be implemented (1 = *Strongly disagree*, 5 = *Strongly agree*). The first question asked whether the U.S. should adopt regulations to make manufacturers more accountable for plastic waste ($M = 4.68$, SD = 0.65), and the second question asked whether these regulations should be adopted for individual consumers ($M = 3.91$, SD = 1.19). These questions were treated separately and not as items within a scale.

Means and standard deviations of the variables tested are reported in Table 1.

Results

We tested our hypotheses and research questions using independent samples *t*-tests in SPSS. First, to check for randomization, a chi square test for independence between the two conditions (consumer responsibility vs. manufacturer responsibility) was conducted on gender [χ^2 (3, $n = 113$) = 2.87, $p = 0.41$], a two-tailed independent samples *t*-test was conducted on age [$t_{(111)} = 0.29$, $p = 0.77$] and political affiliation [$t_{(111)} = 0.75$, $p = 0.46$]; no significant differences between the two conditions were found for these variables. H1 predicted that risk perception would be lower among those exposed to the consumer responsibility message frame. Although participants exposed to the consumer message frame expressed lower levels of risk perception, the results were not significant [$t_{(111)} = 0.42$, $p = 0.34$]. With respect to RQ1, we did not find a main effect of attribution condition on behavioral intention [$t_{(110)} = 0.81$, $p = 0.21$]. The results also did not indicate the presence of an indirect effect. RQ2 asked whether self-efficacy would mediate the influence of attribution condition on behavioral intentions. Self-efficacy can be considered a mediator if the following criteria are met: the independent variable significantly predicts the dependent variable and mediator; and the mediator significantly predicts the dependent variable, while controlling for the independent variable (Preacher and Hayes, 2004). While self-efficacy significantly predicted behavioral intentions ($r = 0.35$, $p < 0.001$), we did not find a significant relationship between attribution condition and self-efficacy [$t_{(111)} = -0.88$, $p = 0.19$]. Furthermore, as the results of the analysis for RQ1 indicate, we also did not find a significant relationship between attribution condition and behavioral intention. Finally, we found significant results for one of our two policy support research questions. Attributing responsibility to manufacturers did not significantly influence support for plastic waste regulations targeting manufacturer behavior (RQ3) [$t_{(110)} = -0.57$, $p = 0.29$]. But in the results for RQ4, we found attributing responsibility to consumers significantly influenced support for plastic waste regulations aimed at consumer behavior [$t_{(91)} = -1.814$, $p = 0.036$]. An examination of means reveals that support was lower in the consumer-blaming condition ($M = 3.68$) than in the manufacturer-blaming condition ($M = 4.10$).

TABLE 1 Means and standard deviations for each attribution group.

Variable	Consumer condition *M* (SD)	Manufacturer condition *M* (SD)
Risk perception	1.76 (0.68)	1.71 (0.59)
Behavioral intention	4.03 (0.66)	3.91 (0.85)
Self-efficacy	3.59 (1.10)	3.75 (0.84)
Policy support (manufacturer)	4.64 (0.75)	4.71 (0.56)
Policy support (consumer)	3.68 (1.33)	4.10 (1.04)

Discussion

While many previous studies have explored how attributions of responsibility relate to attitudes and behaviors, this body of research remains limited in two areas. First, few studies examine attribution of responsibility in the context of environmental issues. Second, most studies analyze correlational data—looking at how individuals' pre-existing beliefs about who or what is responsible predicts attitudes and behaviors or behavioral intentions. The present study contributes experimental evidence to findings that suggest messages attributing responsibility to consumers may generate defensiveness and resistance (Jang, 2013; Birau and Faure, 2018; Shulman et al., 2021). In particular, participants in our study who read a message blaming consumers for plastic waste were less supportive of regulations that would hold consumers accountable for their waste, compared with participants who read a message blaming manufacturers. This finding is consistent with Jang's (2013) finding that exposure to a message blaming Americans resulted in less support for climate policies than a message blaming China. Additionally, our results support Birau and Faure's (2018) conclusion that blaming distant actors for environmental problems as opposed to close actors (e.g., consumers) may increase support for consumers' role in addressing the issue. Our study contributes to the limited research on how responsibility attribution for environmental issues influences policy support and provides additional evidence for findings in the broader literature (e.g., Iyengar, 1989; Barry et al., 2009; Temmann et al., 2021) that attributing responsibility to external forces can increase support for policies addressing social problems.

We did not find any significant results for attribution framing on self-efficacy or behavioral intentions. As we note in our literature review, research evidence on whether highlighting consumer responsibility increases self-efficacy perceptions is mixed, with some studies finding a positive relationship (e.g., O'Neill et al., 2013; Metag et al., 2016) and others finding a negative relationship (e.g., Birau and Faure, 2018; Shulman et al., 2021). Perhaps these mixed results are dependent in part on whether researchers are examining causal responsibility or treatment responsibility. In a study that conducted a mediation model similar to the one we proposed, but failed to find support for, O'Donnell and Guidry (2022) found that messaging attributing responsibility for an environmental issue to an external force (government) increased efficacy beliefs and behavioral intentions through a mediation model. However, their study included an experimental manipulation focused on treatment responsibility rather than causal responsibility. Further examination of the relationship between responsibility attributions, efficacy beliefs, and behavioral intentions is needed, including comparing causal responsibility frames with treatment responsibility frames, and with special attention paid to the specific measures used—a topic we discuss more below.

We also did not find significant results for the influence of our experimental conditions on perceptions of risk. Previous research examining the relationship between attributions of responsibility and

risk perceptions in the context of climate change and smog have found external (versus internal) attributions predicted higher risk-related perceptions (e.g., Jang, 2013; Chang et al., 2016; Cheng et al., 2017). Two of these three studies, Chang et al. (2016) and Cheng et al. (2017) relied on correlational survey data and, therefore, do not establish causation. If respondents' risk perceptions biased their perceptions of who is responsible, rather than the other way around, then we might have lower expectations for the influence of an experimental attribution message on risk perceptions. Jang (2013) did establish causation with an experimental message blaming China or the U.S. for climate change emissions but measured climate change concern rather than a direct measure of perceived risk. A good next step in teasing out the relationship between these variables might be to design an experiment replicating the experimental manipulation used in Jang (2013), while including question items to provide a measure of perceived risk severity, similar to the outcome measures used in Chang et al. (2016) and Cheng et al. (2017)—which could better establish whether there is a causal relationship between attribution and perceived risk.

In considering our results, it is also important to address the limitations of our study. First, we caution readers not to over-generalize our findings, since our data were collected using a convenience sample. As university students are not representative of the larger population in many ways, this may have made our results less valid. Future research examining the influence of attribution messaging on attitudes and behavioral intentions toward plastic waste issues should consider conducting experimental surveys based on national probability samples. Furthermore, it is possible that our experimental conditions may have had small effects that we did not find significant results for due to our study's relatively modest sample size ($N = 113$). That said, the literature suggests our sample was more than sufficient detect at least medium effect sizes. To detect medium to large effects, statisticians recommend a sample size with at least 20–30 participants per cell (Wilson Van Voorhis and Morgan, 2007; Bhattacherjee, 2012). For our final sample, we had more than 50 participants per cell. Nonetheless, it is worth continuing to examine the relationship between similar attribution-based manipulations and the dependent variables examined in this study in future studies with larger, nationally representative samples of participants. An additional limitation is that we measured behavioral intentions as opposed to actual behaviors. While psychology and social science research often substitute behavioral intention for actual behavior due to the ability of intention to predict behavior (Sheeran, 2002). our study results may have differed somewhat had we used a measure of actual behavior. Another potential limitation related to our research design is that participants were exposed to the self-report survey questions in the same order after the message manipulation, which may have resulted in response order effects, which have been observed in other studies (e.g., Malhorta, 2008). Future studies should consider randomizing these items to mitigate the risk of order of survey items.

Another consideration is that our study focused on causal responsibility (who is responsible for the plastic waste crisis), adopting the approach used in other experimental messaging studies discussed in our literature review (Jang, 2013; Birau and Faure, 2018; Shulman et al., 2021). Another way to frame attribution is through treatment responsibility (who ought to fix the problem). This latter framing is common in plastics messaging, which often focuses on consumers' responsibility to address the issue (e.g., by recycling more). To that end, there may be value in testing a stimulus focusing on who is responsible for solving the crisis rather than (or in addition to) who caused it. Moreover, including more concrete solutions within the self-efficacy measure (e.g., There are simple things that I can do, like reducing my use of single-use plastic items such as water bottles and silverware, that will have a meaningful effect to alleviate the negative effects of plastic waste) may provide useful context to the participants and potentially yield different results. Also, investigating how guilt-inducing shame or other negative emotions might be triggered by attributing responsibility to consumers, versus inducing positive or neutral emotions when responsibility is attributed to manufacturers, may yield useful insights into how behavioral intentions and other variables might be impacted by the emotional elements of responsibility attribution. Additionally, future research should test these frames in other cultural contexts, as they may resonate differently with individuals raised in countries with different cultural values and ideologies. Individuals growing up in the U.S. may process messages individualizing responsibility, as such frames may resonate with cultural tendencies to value self-reliance and rugged individualism (Maniates, 2001; John, 2014). Moreover, conducting a field-based message framing experiment examining observable behavior (e.g., White et al., 2011; Nelson et al., 2021) may yield further insights into the factors influencing individuals' plastic reduction behaviors.

Despite reporting bleak figures of our ever-increasing plastic waste (now over 400 million tons per year), the recent UNEP (2023) report "Turning off the tap: How the world can end plastic pollution and create a circular economy" highlights a path forward, which involves curbing not just consumer demand for plastic, but also production. Plastic producers have been resistant to taking responsibility for their contribution to the problem, strategically using messaging to blame plastic pollution on consumers (Jorgensen et al., 2020; Mah, 2021). Blame continues to be shifted to consumers, even by well-meaning environmental advocates, despite their inability to address the problem alone. Furthermore, as Nenkov (2024) and others have noted, academic research continues to focus on individual behavioral changes and other consumer-level solutions as opposed to meso (business-level) or macro (policy-level) solutions, exacerbating the sense of consumer responsibility. Messaging focused on individual responsibility may distract from more systemic issues and the role of industry in contributing to contemporary environmental issues. As the results of this study, and other previous studies suggest, it may also result in counterproductive outcomes for policy support for confronting environmental issues (e.g., Jang, 2013).

Environmental advocates, including government organizations, non-profit organizations, and intergovernmental organizations, invest heavily in understanding public perceptions in an effort to develop better environmental messaging. This study and other studies examining the influence of responsibility attributions help environmental advocates working in real-world settings by offering predictive value to communication efforts.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by University of Central Florida Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MM: Conceptualization, Formal analysis, Methodology, Project administration, Writing – original draft, Writing – review & editing. PK: Conceptualization, Methodology, Project administration, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcomm.2024.1337332/full#supplementary-material

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