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Article

The Mediation Effects of Fear on the Relationship between Gain/Loss Message Frames and Cognitive/Conative Responses

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Abstract: This study investigates the underlying mechanism of fear appeal effects on behavioral changes applying the emotions-as-frame model and protection motivation theory to the green advertising context. The results indicate that a loss-framed message arises fear increasing severity, vulnerability, response efficacy, and self-efficacy, which in turn affect the intention to purchase a green product. Furthermore, this study results that a gain frame is more effective to lead green behavior than a loss frame.

Keywords: fear appeal; gain/loss framing; emotions-as-frame model; protection motivation theory; green advertising

1. Introduction

Fear is an emotion that an individual can feel when he/she perceives himself/herself in physical, societal, or economic danger. Communicators use fear-arousing messages to get people's attention [1]. Visual and verbal messages provoking fear lead audiences to engage in the message itself. Besides, a fear-appeal message is helpful to change audiences' behaviors instantly [2]. The effectiveness of fear appeals has been tested in various contexts; for example, studies investigated preventive COVID-19 infection behaviors, breast self-examination, and doing exercise [3–5]. Previous research primarily focused on the issues directly related to personal health. However, studies applying fear appeals to pro-environmental behaviors are still embryonic, although climate change, environmental pollution, and eco-friendly energy sources became critical social agendas. This research fulfills the research gap.

The goal of this study examines the effect of gain/loss message framing on environmental behavior through fear arousal and threat and coping cognitive appraisals. The emotions-as-frames model and extended parallel process model explain the proposed research claims. The claims were tested with a path analysis through an online survey experiment.

2. Literature Review

2.1. Environmental Message Framing: Gain and Loss

Scholars have argued message framing is a critical factor to influence environmental decisions. Davis tried testing the impacts of message framing on audiences' responses [6]. Davis suggested three types of frames: gain/loss, current/future generation, and taking less/doing more. The study indicated the loss frame was more effective to increase attitude toward the message than the gain frame, but there were no main effects of other two framing types on audiences. Scholars also have actively studied on gain/ loss framing among the three framings. A loss-framed message emphasizes possible negative consequences caused by action or inaction, while a gain-framed message describes possible benefits as a result of action or inaction. However, the effectiveness of gain and loss frames on audiences' perceptions and actual behaviors has been controversial. A recent review study, Homar and Cvelbar, investigated 61 practical studies focused on the effectiveness of gain and loss frames and revealed that respectively 49% and 30% of individual studies argued the loss frame and gain frame is more effective than the counterpart or only the frame is effective to change behaviors or perceptions [7]. However, 21% of exclusive studies showed each frame are effective more than another only if being with a

moderator or there is no difference of outcomes between the two frames. Considering the review study, it seems that the effectiveness of gain and loss frames to influence audiences is still debating and necessary for more scholars to engage in this research area to reach a common agreement. Previous review studies investigated also indicated that the relative effectiveness of gain and loss frames are inconsistent [8,9].

The gain and loss frames tend to be mediated by emotions; however, it is still unclear to explain how and why a gain or loss frame is mediated by emotions such as fear, hope, guilt, sadness, and shame [7]. For example, a loss frame—called as negative frame by the authors—increases intention to donate to a pro-environmental project, which is mediated by shame [10]. As another example, a negative emotion (sadness) increases information seeking, policy support, and pro-environmental behaviors than a positive emotion (hope) when the message is gain-framed [11]. So far, studies on how emotions mediate the gain and loss framing effects are not prevalent.

2.2. Emotions-As-Frame Model

The emotions-as-frame model proposed by Nabi indicates that a message provokes an emotion (e.g., fear) which is used again as a frame to interpret and comprehend the message, which ultimately influences a behavior. This study applies this model to the relationships among gain/loss frames and fear, threat/coping cognitive appraisals, and green product purchase [12]. A loss-framed message emphasizes possible negative consequences caused by action or inaction, while a gain-framed message describes possible benefits as a result of action or inaction. Thus, a loss frame is more likely to increase fear than a gain frame. Nabi, Gustafson, and Jensen argued that a loss frame yields more fear than a gain frame [13].

H1: A loss frame will arise fear more than a gain frame.

Studies on environmental messages argue that a gain frame is more effective in leading environmental behaviors than a loss frame [14,15]. The reason that fear-arousing loss frame is not effective to change environmental behaviors could be the high knowledge- to - action gap between the cause (non-environmental behavior) and the negative outcome (degraded environment). People may consider the environment a public goods and do not believe that their actions significantly benefit the environment and finally themselves. Thus, gain frames with hope appeals will lead people to have a positive attitude toward the recommended action.

H2: Again-framed message, compared to a loss-framed message, will increase purchase intention.

2.3. Extended Parallel Process Model

Guided by the emotions-as-frame model, a message evokes an emotion; and the emotion affects the audience's cognitive responses to the message. For example, Nabi et al. showed fear aroused by a news article about climate change policy increased unfavorable attitudes toward the issues [13]. To investigate the underlying mechanism how fear generated by a message influence the audience's psycho- logical responses, this study adopted the extended parallel process model [16,17].

The extended parallel process model (EPPM) explains how perceived threats and efficacy motivate an individual to react [16,17]. This model consists of two components: threats and efficacy [16]. This model posits a message can be a trigger to think about the expected threat. Briefly, the model describe show that a message leads an audience to appraise perceived threats for expected negative consequences (e.g., air pollution and a respiratory disease) and the efficacy of an appropriate action (e.g., using pro-environmental products) to decrease the negative consequences.

The threat appraisals, including severity and vulnerability, and the coping appraisals involving response efficacy and self-efficacy increase intention to follow the recommended behavior in a message [18]. Severity refers to the perceived degree of the seriousness of the threat; vulnerability means the perceived probability of the occurrence of the threat. Meanwhile, in the coping appraisal process, response efficacy and self-efficacy increase the response probability. Response efficacy describes the expected positive effects that will result from the recommended protective behavior on the threat (e.g., Using a LED bulb is a very effective way to prevent environmental pollution caused by excessive energy consumption and use of fossil fuel). Self-efficacy refers to the belief of one's ability to conduct the recommended action to cope with the threat (e.g., I can reduce my energy consumption). Finally, the threat and coping appraisals lead to actual behavior or behavioral intention.

The significant proposition of the EPPM is that fear appeal messages can influence individuals' attitudes, intentions, and behavioral change when four variables are evoked by the fear appeal. Furthermore, this model posits a message can be a trigger to think about the expected threat. Briefly, the model describe show that a message leads an audience to appraise perceived threats for expected negative consequences (e.g., air pollution and a respiratory disease) and the efficacy of an appropriate action (e.g., using pro-environmental products) to decrease the negative consequences.

When people perceived high threats and high efficacy, they cognitively process information, manage the threats, and accept recommended behaviors in a danger control process. This cognitive process can affect attitude, intention, or behavior change to control the danger. On the other hand, when people perceived high threat but low efficacy, they feel the threat, but they do not want to accept recommended behaviors in a fear control process. They refuse the threat and deny

recommended behaviors [16,17].

The fear appeal motivates individuals to perceive greater severity and vulnerability [19]. In addition, the fear appeal results in greater threat and efficacy and interacts between threat and efficacy [19]. That is, fear appeal messages stimulate individuals to perceive greater vulnerability, severity, self-efficacy, and response efficacy [20]. Also, severity, vulnerability, response efficacy, and self-efficacy can influence a greater level of attitude, intentions, and behavior change [19]. The EPPM research indicated that fear appeal messages impact the level of perceived threat and efficacy [19–21]. Therefore, this research proposes that fear will be positively associated with four variables (severity, vulnerability, response efficacy, and self-efficacy) of EPPM, and threat and efficacy will be positively associated with an intention.

H3: Fear will be positively associated with a) severity, b) vulnerability, c) response efficacy, and d) self-efficacy. Previous studies explained pro-environmental behavioral changes using the four key fear appeal variables. Kim, Jeong, and Hwang [22] tested the message effectiveness using the variables for the prevention of climate change issue. Their results indicated that severity, response efficacy and self-efficacy were significant predictors affecting intention to behave in environmentally friendly ways. A year after the Fukushima accident, Hartmann, Apaolaza, D'Souza, Echebarria, and Barrutia [23] surveyed consumers about their intentions to use nuclear power and green electricity generated by wind, solar, hydro-energy, and biomass. The survey indicated that severity, coping efficacy, and fear response had a significant influence on intentions to use green electricity and to avoid nuclear power. Therefore, this study proposes high severity, vulnerability, response efficacy, and self-efficacy lead consumers to purchase environmentally friendly products with the following hypothesis.

H4: a) Severity, b) vulnerability, c) response efficacy, and d) self-efficacy will be positively associated with green product purchase intention.

The EPPM's outcomes are related to the level of perceived threat and efficacy. When fear evokes a threat, individuals determine efficacy. If efficacy is low, people perceive fear more and adopt the maladaptive recommendation. When high efficacy arouses fear, the fear affects the threat. Then the threat encourages individuals to accept recommended behaviors. However, when the perceived threat is low, there is no processing of the message [16]. This current study presumes a loss-framed message promoting a green behavior elicits fear, which in turn strengthens threat/coping appraisals relevant to the given message. A gain-framed message focuses on the positive consequences of the message. That is, the loss-framed message includes fear appeals, whereas the gain-framed message engages in avoiding fear due to adopting protective behavior. Previous research did not focus on the effects of gain-framed messages through EPPM. Thus, this research proposes what type of framing messages might be effective on four components of EPPM.

RQ1: How to gain and loss framing influence severity, vulnerability, response efficacy, and self-efficacy?

3. Materials and Methods

An online experiment was used to test the proposed hypotheses and research question. The experiment was designed with one manipulated 2-level categorical independent variable and measured six outcome variables. Specifically, the experiment tested how gain- vs. loss-framed ad messages influence purchase intention while focusing on the mediation process: the message framing fear arousal threat/coping appraisals purchase intention. Threat appraisals includes severity and vulnerability and coping appraisals involved response efficacy and self-efficacy.

3.1. Sampling

After the study protocol was approved by the organization IRB, researchers recruited 255 college students from a university in the Southeast region of the United States. They participated in an online experiment via Qualtrics and received extra credit from their course instructors as participation compensation. The mean age of subjects was 19.67 (*SD* = 1.60, min. = 18, max. = 25). Females were 178 (69.8%) and males were 77 (30.2%). The distribution of participants' ethnic information was the following: 217 Caucasians (85.1%), 14 African-Americans (5.5%), 5 Asians (2.7%), 9 Hispanic (3.5%), and 3 Native-Americans (1.2%). For school years, they were 96 freshmen (37.6%), 68 sophomores (26.7%), 43 juniors (16.9%), and46 seniors (18.0%).

The subjects were recruited through a survey participation pool which a system operated by the college. Students accessed the system and select individual studies to participate after reading the title and brief research description of the study. A student who went into this study automatically moved to an online questionnaire managed by Qualtrics. The first page of the questionnaire was the informed consent form. If the student agreed on the consent, he or she started to answer the questions and look at the given advertising stimulus with the following order: advertising stimulus exposure, the degree of fear arousal, severity, vulnerability, response efficacy, self-efficacy, purchase intention, and demographic information.

3.2. Stimuli

During the experiment, participants were randomly exposed to one of the two message types: a loss-framed message (n = 125) and a gain-framed message (n = 130). The messages were delivered through an advertisement promoting LED bulb use. Detailed messages are described in Appendix A. Note that the advertising stimuli are the same as those used by Shin, Ki, and Griffin [24]. Originally, Shin et al. [24] divided each message frame into two based on types of the advertiser (a profit organization and non-profit organization); however, this study ignored the difference of the advertiser types because the advertiser types did not make any statistical significant differences to the outcome variables that were used in this experiment design. Figure 2 shows the example advertisements that used in the experiment.

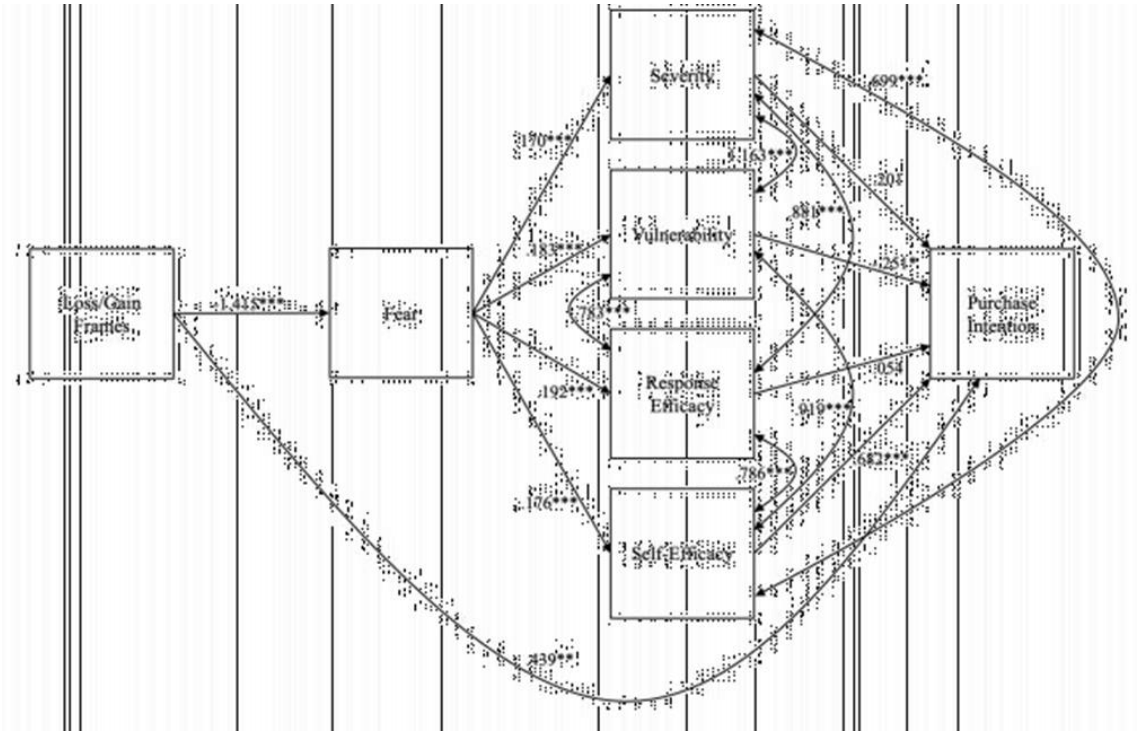

Figure 1. Path Model with Standardized Coefficients.
Notes: CFI = .998; RMSEA = .036; SRMR = .328; NFI = .993; X2 = 6.643; df = 5; n = 255. ***p < .001, **p < .01, *p < .05.

3.3. Measurements

To measure all variables excluding control variables associated with protection motivation theory and involvement with the environment, this study uses a 7-point Likert scale ranging from "strongly disagree (1)" to "strongly agree (7)." Items used to measure the cognitive process in protection motivation are adopted from Kim et al. and are partially revised [22].

3.3.1. Perceived Severity

This variable refers to subjects' perception of the degree of physical and psychological harms and threats resulting from global climate change. Three items are used to measure this variable: "Climate change is a serious problem," "Global climate change poses a threat to me," and "Climate change will have a negative impact on me" (" = .914).

3.3.2. Perceived Vulnerability

This variable is defined as the perceived probability that negative effects of climate change will occur without adaptive behavior. Three items measure this variable as follows: "My chances of being affected by global climate change in my lifetime are high," "If I don't participate in prevention activities for climate change, I may face some problems in the future," and "I think that global climate change is likely to be worse in the future" (" = .822).

3.3.3. Response Efficacy

This variable is operationalized as subjects' belief that adaptive behavior will help prevent global climate change. This study uses three items to measure this variable as follows: "Participating in global climate change prevention is effective in preventing global climate change," "Participating in global climate change prevention will help pre- vent global climate change," and "Using LED lights will help prevent global climate change" (" = .818).

3.3.4. Self-Efficacy

This variable indicates the extent of subjects' belief that they can personally prevent global climate change. To measure this variable, three items are used: "I will take steps to participate in behaviors that help prevent global climate change, even if it causes inconveniences," "I can participate in behaviors that help prevent global climate change, if I really wanted to," and "I believe I am able to purchase a LED bulb to help prevent global climate change" (a = .759).

3.3.5. Purchase Intention

This variable explains subjects' intention to purchase the advertised product. In this study, the advertised product is an LED lightbulb. This variable is measured by the following three items, adopted from Bickart and Ruth: very unlikely/very likely, definitely would not/definitely would, and improbable/probable (a = .812) [25].

4. Results

The proposed path model shows the relationships among all variables described in the hypotheses and research question. The model depicts that the message framing influences fear arousal which turn to affect severity, vulnerability, response efficacy, and self-efficacy; and then the four appraisal factors change purchase intention; also, the message framing predicts purchase intention. A path analysis using the seven manifest variables resulted that the model has an acceptable level of fitness with the data: X2/df = 1.329, p = .249, CFI = .998, RMSEA = .036, SRMR = .328, and NFI = .993. Parameter estimates of each path on the model are detailed in Figure 1.

The first hypothesis explains the effect of gain-/loss- framed messages on the degree of fear arousal. The path analysis resulted that the loss frame compared to increases the degree of fear arousal, β = -1.415, p < .001,Mloss = 4.40, SDloss = 1.576, Mgain = 2.98, SDgain = 1.675. Thus, H1 was supported.

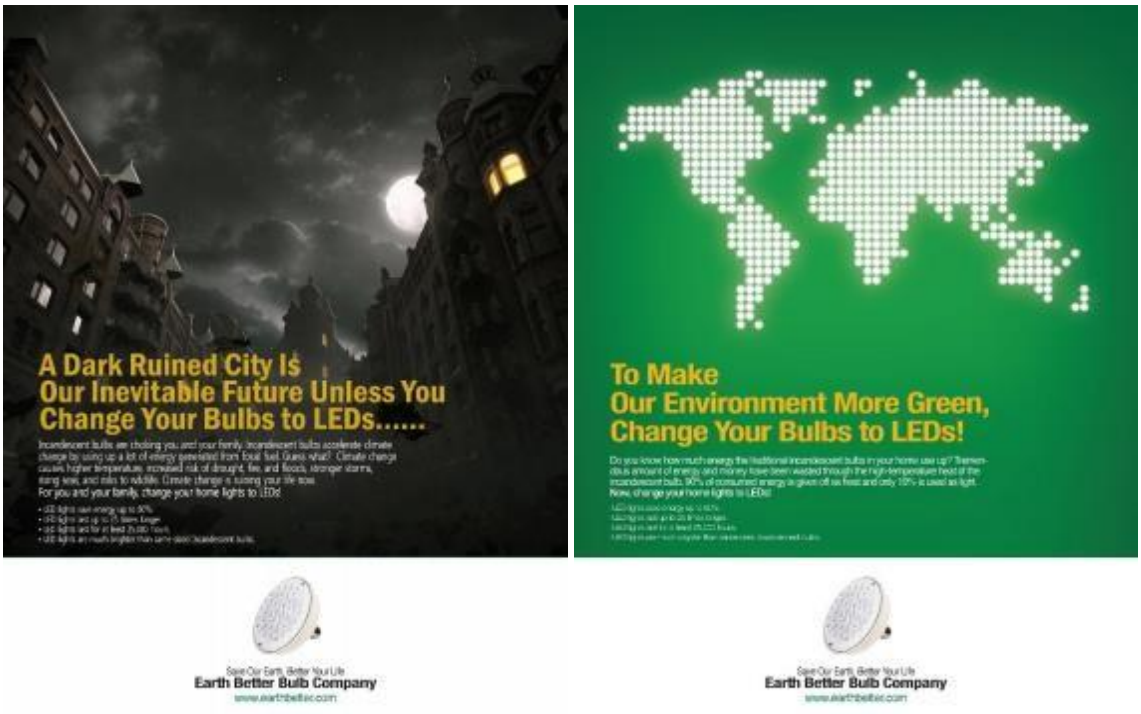

Figure 2. Example Stimuli Used in the Experiment.

3.4. Statistical Tests

This study developed a path model to test all proposed hypotheses and research question and tested the fitness of the data to the model using the lavaan package in R with 1000-times bootstrapping. Also, the researchers used hierarchical multiple regressions the mediation effect of fear on the relationships between gain-/loss-framed messages and threat/coping appraisals. The indirect effects from the messages to purchase intention were tested by using the lavaan package as well.

The second hypothesis indicates the positive impact of gain/loss frames on purchase intention. According to the path analysis, gain frames significantly increased purchase intention, β = .439, p < .001, Mloss = 4.63, SDloss = 1.31, Mgain = 4.87, SDgain = 1.49. Thus, H2 was supported.

The third hypothesis is about the relationships between fear and coping and threat appraisals. The path analysis revealed that fear significantly increases severity (β = .170, p < .001), vulnerability (β = .108, p < .001), response efficacy (β = .192, p < .001), and self-efficacy (β = .176, p < .001).

The first research question asks about the relationships between gain/loss frames and coping and threat appraisals. The researchers tested the relationships to see if fear mediates the relationships between gain/loss frames and coping and threat appraisals. Four simple linier regressions with a covariate (fear) indicated that loss/gain frames did not influence severity, vulnerability, response efficacy, and self-efficacy. Considering the four-step mediation tests by Baron and Kenny, the first step, the relationships between loss/gain frames and coping and threat appraisals in this study, was not significant [26]. Thus, the data showed that fear does not mediate the relationships between loss/gain frames and coping and threat appraisals.

The fourth hypothesis explains the effects of the coping and threat appraisals on purchase intention. The path analysis revealed the significant influences of vulnerability ($\beta = -.251$, $p < .05$) and self-efficacy ($\beta = .682$, $p < .001$) on purchase intention (PI). However, the direction of the impact of vulnerability on purchase intention was opposite of the expected as well as severity and response efficacy did not significantly affect purchase intention. Thus, H4d was supported, but H4a,b, and c were not supported.

In addition, the researchers analyzed all possible cases of individual indirect effects of message framing on purchase intention and all were significant: framing → fear → severity → PI ($\beta = -1.044$, $p < .001$, 95% CI: -1.515, -.559), framing → fear → vulnerability → PI ($\beta = -1.483$, $p < .001$, 95% CI: -1.945, -.934), framing → fear → response efficacy → PI ($\beta = -1.169$, $p < .001$, 95% CI: -1.665, -.679), and framing → fear → self-efficacy → PI ($\beta = -.558$, $p < .05$, 95% CI: -1.018, -.078). Total indirect effect ($\beta = -4.254$, $p < .001$, 95% CI: -5.986, -2.565) and total effect ($\beta = -3.815$, $p < .001$, 95% CI: -5.591, -2.131) were significant.

5. Discussion and Conclusions

This study examined the effect of gain/loss message framing through fear arousal and threat on environmental behavior toward green advertising. The findings indicated that fear significantly affected cognitive appraisals. More specifically, fear appeals in green advertising positively affected severity, vulnerability, response efficacy, and self-efficacy toward environmental behavior. Participants who received the gain-framed message had a higher intention to purchase the green product.

Unsurprisingly, the loss frame increased the degree of fear. It is a natural audience response to feel fear when he or she exposed to a message emphasizing negative consequences that may affect his or her life. This finding supported the first step of emotions-as-frame model which describe a message evokes an emotion. Also, this result is consistent with Nabi [12]. Communication practitioners should keep in mind that the messages they created (e.g., social media messages, newsletters, advertising, press release, statements on their websites) can create an emotion regardless they intended to evoke a emotion or thought or to lead an action. The emotion created by the message can affect the perception related to the organization. This study and previous studies focused on one emotion, fear. Thus, to generalize the emotions-as-frame model should be tested by using various emotions. Pollay could be a great study to figure out various emotions [27].

As we predicted, the gain-framed message, compared to the loss-framed message, led strong intention to purchase the advertised product. This result is the same as the arguments of the previous studies [14,15]. This result can make communication practitioners disappointed because a loss-framed message appealing fear was one of the popular approaches in green advertising. Thus, if the goal of the advertising is to increase sales, a brand manager or account planner should pursue to use a gain frame evoking positive emotions in the ad. However, if the purpose of the green ad is to increase awareness of the serious environmental problems, fear-appealing messages can be effective to change audiences' awareness and knowledge because fear-appealing message is effective to attract audiences' attention. In addition, the use of gain-/loss-framed messages can be applied by the status of audiences. According to the hierarchy effect model, an individual's changes go through from cognitive to affective, and finally to conative aspects [28]. Thus, fear-appealing messages might be effective for people who does not recognize the seriousness of the environmental problems or detailed information about the problems; and hope-appealing messages could be effective for people who have not be attached to emotion toward environmental issues because positive emotions may lead to positive behavioral outcomes. These hypotheses should be tested by the future studies.

The results of this study support the EPPM model [17]. Based on the EPPM model, people in the high fear/threat will perceive great severity and vulnerability than individuals in the low fear/threat. Also, people with high self-efficacy will be willing to accept the recommended behaviors to prevent threats. For example, if people have high threat and efficacy, they believe that they can manage the threat by following green behavior. However, if individuals have a higher threat with lower self-efficacy, they avoid the recommended behavior. This research found that severity, vulnerability, and response efficacy did not affect the green product purchase intention. However, there is a positive association between self-efficacy and purchase intention. In other words, even if participations had higher severity, susceptibility, and response efficacy, if they had lower self-efficacy, they avoided participating in desired behaviors. On the other hand, participants with higher self-efficacy, who had higher severity, susceptibility, and response efficacy, are willing to follow the recommended behavior.

All in all, this study provides that fear can serve as a catalyst to process cognitive appraisals. Fear appeals

motivate people to avoid negative effects toward the environmental issue. Also, a gain-framed message using a fear appeal positively affected the purchase intention. Therefore, this research suggests that advertisers should consider a gain-framed message using fear appeal for the green products.

Author Contributions

Sumin Shin: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing (Original Draft); Sanghee Park: Conceptualization, Writing (Original Draft); Eyun-Jung Ki: Writing (Review/Edit).

Conflict of Interest

The authors have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Appendix A

Gain-/Loss-Framed Messages Used in the Advertising Stimuli

Gain-framed messages

To Make Our Environment More Green, Change Your Bulbs to LEDs!
Do you know how much energy the traditional incandescent bulbs in your home use up? Tremendous amount of energy and money have been wasted through the high-temperature heat of the incandescent bulb. 90% of consumed energy is given off as heat and only 10% is used as light.
Now, change your home lights to LEDs!

- LED lights save energy up to 80%.
- LED lights last up to 25 times longer.
- LED lights last for at least 25,000 hours.
- LED lights are much brighter than same-sized Incandescent bulbs.

Save Our Earth, Better Your Life
Earth Better Bulb Company
www.earthbetter.com

Loss-framed messages

A Dark Ruined City Is Our Inevitable Future Unless You Change Your Bulbs to LEDs …

Incandescent bulbs are choking you and your family. Incandescent bulbs accelerate climate change by using up alot of energy generated from fossil fuel. Guess what? Climate change causes higher temperature, increased risk of drought, fire, and floods, stronger storms, rising seas, and risks to wildlife. Climate change is ruining your life now.
For you and your family, change your home lights to LEDs!

- LED lights save energy up to 80%.
- LED lights last up to 25 times longer.
- LED lights last for at least 25,000 hours.
- LED lights are much brighter than same-sized Incandescent bulbs.

Save Our Earth, Better Your Life
Earth Better Bulb Company
www.earthbetter.com

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