

Article

“I Will Start Saving Natural Resources, Only When You Show Me the Planet as a Person in Danger”: The Effects of Message Framing and Anthropomorphism on Pro-Environmental Behaviors that are Viewed as Effortful

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Abstract: Little is known on how to encourage effortful (rather than effortless) conservation behaviors, and prior research investigated only single (rather than multiple) message appeals in terms of their persuasive power in promoting pro-environmental intentions. The current study uses a framework from evolutionary psychology to propose and test a blend of message appeals that is most likely to drive green behaviors perceived as effortful. An experiment with a 2 (yes versus no anthropomorphic cue) × 2 (negative versus positive message frame) between-subjects design was run, and effort was included as a measured factor. The findings reveal that negatively framed messages are most effective in prompting effortful (but not effortless) pro-environmental intentions only when they are coupled with anthropomorphic cues (no differences between loss and gain messages were found when no anthropomorphism was used). These effects were replicated across two types of behaviors: water conservation and waste reduction.

Keywords: message framing; loss/gain frame; anthropomorphism; conservation behavior; effort; low-cost hypothesis

1. Introduction

In 2016 each EU inhabitant generated 5 tons of waste, but only 37% was recycled [1]. In 2017 Portugal and Poland generated around 150–170 kg of packaging waste per person and recycled just 50% of it, while Hungary and Iceland’s recycling rates were well below 50% [2]. At the same time nearly 268 million tons of municipal solid waste were produced in the US (approximately 2 kg per person per day), but only 94 million tons (35%) were recycled or composted. Yet, annual plastic generation in the US has grown by four million tons from 2010 to 2017 [3]. Excessive water waste is another problematic issue. More than 40,000 million m³ of wastewater is treated in the EU every year, but only 964 million m³ of it is actually reused. In Australia, Japan, or the US wastewater reuse rates were lower than 10% in the early 2000s [4]. This (and other factors) has led to increasing water scarcity and water-related disasters. For example, numerous episodes of severe droughts can be encountered in many regions worldwide (particularly in China and the US [5]); 20% of people living in the Mediterranean region suffer constant water shortages—but this rises to 50% in the summer [6]. Water stress affects most continents, and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) even predicts that the global water deficit might rise to 40% by 2030 [5]. Given all these figures, there is still much to do in the area of recycling and conservation habits.

The moderate level of pro-environmental behavior is usually explained by its costliness. Behavioral costs are associated with perceived control (i.e., a perception of how easy or difficult it is to execute certain behavior [7]), and they are defined as the subjective effort required to perform a task [8] or as the degree of difficulty [9], inconvenience [10], or the seriousness of personal consequences stemming from a particular behavior [11,12]. According to the “low-cost hypothesis” [10] people are more likely to do something, if it is not costly for them in terms of money, time or any other psychological, social, and cultural factors that may imply effort. For example, cycling is more environment-friendly than driving, but it requires significantly higher input, such as physical strength, time, and persistence to capricious weather conditions. Cycling, therefore, generates high behavioral costs, which may explain why people are less willing to resign from cars, regardless of their environmental concern or normative considerations [13,14] (the similar pattern of results was found with regard to energy saving [15,16] and recycling [9,17]).

While much scholarly attention has been dedicated to the phenomena of costs and effort (e.g., [9,13,14,17]), little is still known on how to promote pro-environmental, albeit effortful, behaviors. Given the challenges related to global warming, air pollution, water shortage, or waste management, people at some point will have to face adopting inconvenient and difficult behaviors, such as the considerable reduction of water usage or more rigid strategies in waste management and energy consumption. It is, therefore, necessary to investigate conservation practices that are perceived as more cost-full (rather than cost-less), and to search for the factors behind them.

In the quest to prompt effortful pro-environmental behaviors, governments and businesses may adopt various policies that reduce financial and/or non-financial costs of, for example, recycling or water reuse (by providing proper infrastructure or incentives). Such policies, however, need to be accompanied with proper information campaigns that promote behavioral change on an individual level, as otherwise people will have little or no internal motivation to conserve natural resources. Dissemination of persuasive advertisements that educate and drive green responses often, therefore, becomes an important factor in supporting pro-environmental transformation. Nevertheless, given the variety of visual and verbal cues that one can exploit in such communication, it is hard to tell how it should be structured in order to bring the most effective results. The current investigation was thus designed to uncover what types of promotional messages can encourage environment-friendly behaviors that are regarded as time-consuming, effortful, or uncomfortable.

In our study we draw on evolutionary psychology and argue that effortful behaviors can be triggered by activating adaptive biases, namely: anthropomorphism and an innate tendency to respond to negatively framed signals, as they indicate potential threats to survival [18,19]. The idea behind our research was thus to examine how message framing (negative versus positive) and anthropomorphic appeals work together in prompting conservation practices that are perceived as effortful, rather than effortless. To the best of our knowledge, such a combination of promotional cues was never tested, as prior empirical endeavors mostly concentrated either exclusively on framing (e.g., [20]) or on anthropomorphism (e.g., [21,22]). Additionally, past studies were focused mainly on health rather than ecology (e.g., [23–26]). Our findings, therefore, provide important insights for scholars and green practitioners by showing the benefits of embedding human-like traits in pro-environmental messages, and by demonstrating how conditional the phenomenon of framing is.

1.1. Message Framing

Message framing is a common persuasive tactic in advertising, and it is frequently used to promote desirable health responses, such as exercising, vaccinations, dieting, or smoking cessation (see e.g., meta-analyses: [23–26]). Any promotional message can be framed either positively (as a gain) or negatively (as a loss). Specifically, positively framed messages present potential gains from incorporating particular behavior (e.g., “if you consume less sweets, you will have healthier teeth”), while negatively framed messages inform about potential losses from adopting harmful behaviors (e.g., “frequent consumption of sweets leads to cavities”).

Prior findings on message frames are somehow inconclusive. Many studies on smoking cessation, skin cancer, or alcohol consumption show that negatively framed ads work better than positively framed ones [27,28], but some research (including a meta-analysis by Gallagher and Updegraff [23]) demonstrates opposite results (e.g., [29–31]). There is also little consistency in scholarly findings with regard to dieting, obesity, or exercising. For instance, gain-framed messages were shown to be more persuasive than loss-framed messages in prompting positive intentions to exercise [32,33], particularly when combined with a credible source [34] or when emphasizing favorable consequences for individual self-esteem [35]. Nevertheless, some researchers did not arrive at the same results (e.g., no significant effects of framing were found on exercise intentions [36], attitudes towards exercise [37], or on actual physical activity [38]).

Little empirical evidence is there on message frames in promoting green behaviors. Out of a few available studies in this field, one concludes that loss-framed messages are more persuasive than gain-framed ones, with regard to green product consumption [20], but the other did not find support for this effect [39]. Obermiller [40] suggests that the effectiveness of either frame depends on the subject of the message (e.g., negative appeals worked better in encouraging solid waste reduction, while positive ones produced stronger recycling intents). Other scholars, however, observed that positive framing was likely to produce higher intentions to recycle [41] or to buy eco-friendly products [42], only when a more abstract (rather than concrete) mind-set was activated.

The overwhelming inconsistency in prior empirical results suggests that framing is a conditional phenomenon, and it hardly ever works in isolation. One may, therefore, conclude that most effects of frames are moderated by some other factors, and evidently gain versus loss appeals are likely to depend on other message components. In the following we forward a very specific type of message cue that most probably interacts with frames. Specifically, we argue that (particularly negative) framing should be regarded from an evolutionary perspective and as such it activates adaptive biases. If loss frames are combined with an additional cue that produces another adaptive bias (such as anthropomorphism), they should be more successful in driving behavioral change.

1.2. Anthropomorphic Cues and Anthropomorphism

Anthropomorphic cues form a type of appeal that is commonly exploited in advertising to persuade and encourage target behaviors. These are visual and/or verbal rhetorical figures that depict a non-living object as if it was human (e.g., products having human body and talking to one another, laughing or making jokes). Anthropomorphic cues are used to induce anthropomorphism—a cognitive process of perceiving inanimate items, abstract ideas or animals as humans. Anthropomorphism is a mode of thinking or an act of inference based on generalizing one's knowledge about humans to nonhuman objects, and it is determined by effectance and sociality motivations [43,44]. In other words, anthropomorphism much depends on one's desire to operate effectively as a social agent: to control, explain, and interpret one's environment (effectance motivation), or to connect and affiliate with other people (sociality motivation). As a consequence, humanizing an object increases its predictability and makes it more understandable [44]. For instance, people who feel lonely [45] or lack social bonds [46] are more likely to anthropomorphize non-human agents in order to compensate for their exclusion. People are also observed to be less willing to replace a product when they are prompted to think of it in anthropomorphic terms [47]. In the sustainability literature, anthropomorphic thinking about nature was found to produce connectedness [22], drive higher guilt for environmental degradation, and result in greater engagement in conservation behaviors [21].

1.3. Message Framing, Anthropomorphism, and Adaptive Biases

From an evolutionary perspective, living organisms develop cognitive and behavioral mechanisms that help them maintain reproductive fitness and survival. Humans, for example, are attuned to perceptible cues that indicate potential threats, such as venomous animals, approaching sounds, poisonous food, or disease symptoms [18,19,48,49]. In other words, people evolved precautionary

systems (i.e., self-protection and disease avoidance systems) to reduce threats by efficiently responding to potentially hazardous signals, for example to angry facial expressions, darkness, loud noises, coughing, or sneezing of other persons [50]. Importantly, these systems need to be flexible enough to recognize and capture all possible risks and dangers, as the costs associated with disregarding a single threat are usually greater than the costs of responding to it [18,51–53]. For example, people have problems in ignoring a label that informs them about the toxicity of food (sodium cyanide), even if they know that the container is filled with a non-toxic product, such as sugar [54,55]. In other words, we tend to opt for a potentially less harmful choice, regardless of rational arguments about it. Self-protection and disease avoidance systems are therefore erred toward preemptive reactions and often produce various cognitive and behavioral biases. For instance, humans tend to misperceive objectively harmless or non-contagious features, such as deformed faces, obesity, or physical disabilities, as harmful and infectious [56–58].

From an evolutionary standpoint, loss-framed messages (unlike gain-framed ones) deliver potentially harmful signals that threaten survival. Consumers, therefore, should be more likely to react to a negative (rather than positive) advertisement, because of their adaptive predisposition to detect all potential risks and dangers in the environment. However, individual responses to a negative frame should be stronger if a message activates some additional adaptive biases, such as anthropomorphism.

The ability to anthropomorphize nonliving objects is commonly viewed as another adaptive bias that has evolved to effectively cope with environmental pressures [18,19,52]. Anthropomorphism helps familiarize what is unknown or uncertain, and it makes things approachable, attainable, and easier to understand. An innate tendency to perceive objects as alive is also present in our everyday lives across cultures, gender, nationalities, and age groups [59–61]. For example, it is less common for us to misidentify a real snake for a stick, while it is more likely to (mistakenly) think that a stick is a snake (a less harmful option rather than ignoring a venomous animal [62]).

In sum, negative frames and anthropomorphic cues should activate two adaptive biases: self-protection and anthropomorphism. As a consequence, a message that prompts two adaptive biases should work better in encouraging target behaviors than a message that produces one adaptive bias. Based on prior research findings, which demonstrated the high conditionality of framing [27–42] and the positive impact of anthropomorphism [21,22,47], we expect no main effect of frames and a significant main effect of anthropomorphic cues. These effects, however, should be qualified by the significant two-way interaction, as predicted in the following hypothesis:

Hypothesis 1 (H1). *Anthropomorphic cues will interact with message frames such that negatively (versus positively) framed messages will lead to higher conservation behaviors when they are coupled with anthropomorphic (versus non-anthropomorphic) cues.*

The effect of anthropomorphic cues and negative frames should be particularly evident when the behavioral costs of acting upon a message are high. When we perceive a given behavior as easy and effortless, no extra encouragement is really needed to prompt us to execute it. Costly behaviors, however, carry substantial risks and consequences. They therefore require stronger incentives, and messages with two sets of cues appealing to innate predispositions (such as anthropomorphism and self-protection) should be more likely to produce target behaviors. Given these arguments, we hypothesize as follows:

Hypothesis 2 (H2). *Anthropomorphic cues will interact with message frames (as predicted in hypothesis H1), particularly when target behaviors are perceived as effortful rather than effortless.*

2. Materials and Methods

2.1. Research Design and Stimuli

We tested our hypotheses in an experiment with a 2 (yes versus no anthropomorphic cue) × 2 (negative versus positive message frame) between-subjects factorial design. Anthropomorphic cues

and message frames were manipulated, while perceived effort of executing a given behavior was an additional—albeit measured—factor. To increase the generalizability of our findings, we examined two types of conservation behaviors (i.e., saving water and plastic usage reduction). We therefore developed two distinctive sets of advertisements that served as experimental stimuli: one promoted the idea of taking shorter showers, and the other encouraged resignation from plastic straws, bottles, and cutlery (see Appendix A).

As a next step, each advertisement was modified in a way to contain relevant frames, and this procedure was adopted from prior experiments on framing (e.g., [28–30]). Specifically, in loss-framed advertisements we informed about negative consequences (e.g., “Take shorter showers and save water or our planet will die!”; “If you use more plastic packaging, it will kill our planet Earth”), while gain-framed messages were visually the same but they indicated positive outcomes from adopting conservation behaviors (e.g., “Take shorter showers and save water. It will help our planet”; “If you use less plastic packaging, you will help rescue our planet Earth”). In sum, the loss-framed copy contained negative words and phrases (such as death), and the gain-framed copy included positive terms (such as help, rescue, and saving).

Next, we needed to edit our stimuli and properly manipulate anthropomorphism. In this procedure we drew on prior experiments that mostly used human-face features to induce anthropomorphic thinking (e.g., [63–66]). Accordingly, facial morphology (i.e., smiling or frowning eyes and mouths) works as a sufficient cue to make one attribute humanlike qualities to inanimate objects (in evolutionary terms, faces and face-like images constitute one of the strongest visual stimuli that captures attention and conveys significant information about the “humanness” of an object [67]). We therefore portrayed the planet (see Figure A1) and water (see Figure A2) as having human facial expressions (i.e., a smile and a frown) in anthropomorphic conditions, and no eyes or mouth in non-anthropomorphic conditions. No other (or more sophisticated) cues were needed to activate anthropomorphism (see e.g., experiments run by Kim and McGill [64] who demonstrated that the proper arrangement of rectangular bars might be enough to make people anthropomorphize a gaming machine).

Importantly, to maintain the appropriate external validity of our study, we designed the stimuli in a way to make it look like professional green advertisements. Nevertheless, to safeguard satisfactory internal validity and reduce potential confounds, we also needed to keep the ads as simple (and even crude) as possible. Balancing between proper internal and external validity always creates a dilemma for any researcher, thus we developed two distinctive sets of stimuli (see Appendix A). In case of messages about plastic reduction, we used blue and green colors (associated with freshness and ecology), and we added a plain image of the planet Earth. Similarly to real-market ads, we varied the size of fonts across the captions to emphasize keywords (i.e., “more/less plastic” and “kill/rescue”). However, in the second set of stimuli (i.e., about water conservation) we used black-and-white colors, different fonts and no environmentally-oriented pictures. We also diversified styles of speech in our ads, and we applied first conditional (“If you use . . . ”—see Figure A1) versus imperative sentences (“Take . . . ”—see Figure A2). All these solutions allowed us to rule out potentially confounding effects which might have stemmed from creative design and language.

2.2. Procedure and Measures

Over 400 US-based English-speaking subjects were recruited via Amazon’s mTurk to take part in our experiment online. They were randomly assigned to one out of eight groups. First, they were asked to watch the stimuli (exposure time was equalized across all conditions to a forced minimum of 15 s). Second, they were required to answer to a battery of items measuring our dependent variables, manipulation, and quality check questions. Specifically, personal conservation behaviors were measured with a 6-item subscale adapted from Millfont and Duckitt [68]. In the adaptation process, we followed the same steps as Tam, Lee, and Chao [22], and we modified the items in a way to reflect individual intentions rather than past behaviors (e.g. “Whenever possible, I will take a shorter shower in order to conserve water”). We also dropped four items from the original 10-item inventory

because they were too remotely related to the subject of our study (i.e., water conservation and waste reduction). Despite these modifications, however, the scale achieved satisfactory reliability results ($\alpha = 0.89$).

To measure anthropomorphism we borrowed an item from Aggarwal and McGill [69]: “To what extent do you perceive the Earth/water in this ad as a person?” anchored by “not at all” and “very much”. Message framing was checked with a question taken from van’t Riet et al. [70]: “How do you perceive the tone of the message?” with endpoints “The tone of the message is negative” and “The tone of the message is positive”. The perceived effort of executing conservation behaviors was captured with two items: “How hard would it be for you to use less plastic packaging/take shorter showers”; “How much effort would it cost you to use less plastic packaging/take shorter showers” ($r = 0.56$, $p < 0.01$). They were anchored by, respectively, “very hard” versus “very easy” and “high effort” versus “low effort”, so the lower value of an averaged score indicated high effort, while a higher value was equivalent for the lower perceived effort. Additionally, various quality checks were included across the questionnaire to track careless mTurk respondents, and to test their attentiveness and reliability (as advised by Kees, Berry, Burton, and Sheehan [71], and Meade and Craig [72]). We used 7-point scales to measure all constructs.

Eventually, 388 people (age range was between 23 and 75 with a mean age equal to 39.88 years old; 49% females) finished the study and passed all the quality checks. The final sample comprised 297 subjects with either a Bachelor, Master’s or Doctorate degree, while 91 individuals declared to have completed only high or secondary school. 70% of respondents reported to have had their annual income below USD 70,000.

3. Results

3.1. Manipulation Checks

First we needed to check whether our independent variables were properly manipulated. We therefore ran a 2 (yes versus no anthropomorphic cue) \times 2 (negative versus positive message frame) analysis of variance (ANOVA) for each type of conservation behavior separately. We found the main effects of anthropomorphic cues on anthropomorphism (plastic reduction: $M_{\text{anthropomorphic cue}} = 4.76$ versus $M_{\text{no anthropomorphic cue}} = 3.96$, $F(1,186) = 7.68$, $p < 0.01$; saving water: $M_{\text{anthropomorphic cue}} = 4.41$ versus $M_{\text{no anthropomorphic cue}} = 3.50$; $F(1,192) = 8.31$, $p < 0.01$; no other effects were significant: $F_s < 2.59$, $p_s > 0.10$). We also observed the main effects of frames on the perceived tone of the message (plastic reduction: $M_{\text{negative frame}} = 4.11$ versus $M_{\text{positive frame}} = 5.61$, $F(1,186) = 31.64$, $p < 0.01$; saving water: $M_{\text{negative frame}} = 3.84$ versus $M_{\text{positive frame}} = 5.81$, $F(1,193) = 47.05$, $p < 0.01$; no other effects were significant: $F_s < 3.41$, $p_s > 0.06$). Such results indicate successful manipulation. Importantly, when we conducted our analysis for two types of conservation behaviors together, no significant differences were observed between them (particularly, no interaction effects: $F_s < 3.48$, $p_s > 0.06$). We could have thus generalized the results across various domains of pro-environmental activities, and our further analysis, therefore, pertains to both types of behaviors combined.

3.2. Hypotheses Testing

Hypothesis H1 predicted that negative message frames with anthropomorphic cues would work better in inducing conservation behaviors than any other combination of appeals. A 2 (yes versus no anthropomorphic cue) \times 2 (negative versus positive message frame) ANOVA was therefore run, and it revealed a significant two-way interaction between anthropomorphic cues and message frames ($F(1,384) = 4.93$, $p = 0.02$). Specifically, when the advertisement was negatively framed, anthropomorphic cues led to higher conservation intentions than no anthropomorphic cues ($M_{\text{anthropomorphic cue}} = 5.90$ versus $M_{\text{no anthropomorphic cue}} = 5.57$; $F(1,384) = 4.12$, $p = 0.04$), while in case of anthropomorphic cues, negative frames produced higher intentions to conserve water or reduce plastic usage than positive frames ($M_{\text{negative frame}} = 5.90$ versus $M_{\text{positive frame}} = 5.53$; $F(1,384) = 5.08$,

$p = 0.02$). Interestingly, no main effects of anthropomorphic cues and frames were observed ($F_s < 1.01$, $p_s > 0.31$). Such results provide support for hypothesis H1.

In H2 we hypothesized that the effects of anthropomorphic cues and message frames would be particularly evident when a given conservation behavior was effortful rather than effortless. As perceived effort was a continuous variable, we used a PROCESS macro (model 3) [73] to test our hypothesis. Anthropomorphic cues (yes versus no) were included as an independent variable, while message frames (negative versus positive) and perceived effort served as moderators. Intentions to conserve water and reduce plastic were inserted as a dependent variable in our model.

A moderation analysis showed a significant positive effect of anthropomorphic cues ($B = 3.55$, $SE = 1.31$, $t = 2.70$, $p < 0.01$) and perceived effort ($B = 0.55$, $SE = 0.15$, $t = 3.47$, $p < 0.01$) and no main effect of frames ($B = 0.60$, $SE = 0.53$, $t = 1.13$, $p = 0.25$). Again, there was observed a significant interaction effect between anthropomorphic cues and framing ($B = -1.98$, $SE = 0.81$, $t = -2.42$, $p = 0.01$). In line with H2 we also found a significant three-way interaction between anthropomorphic cues, frames, and the perceived effort of a given conservation behavior ($B = 0.30$, $SE = 0.15$, $t = 1.98$, $p = 0.04$).

Next, we ran a Johnson and Neyman's test [74] to inspect the nature of the relationships between variables. When a message was framed as a loss, there was found a significant interaction between anthropomorphic cues and perceived effort ($B = -0.24$, $SE = 0.10$, $t = -2.36$, $p = 0.01$). Specifically, the higher the effort associated with a given conservation behavior, the stronger the effect of anthropomorphic cues (the Johnson–Neyman significance region was identified as below point 5.38 on a 7-point scale, where 7 indicated low effort and 1 signified high effort; see Figure 1). Nevertheless, when a message was framed as a gain, there was no interaction between anthropomorphic cues and perceived effort ($B = 0.06$, $SE = 0.11$, $t = 0.53$, $p = 0.59$; see Figure 2), and there was only found a significant effect of perceived effort i.e., the lower the effort, the higher probability for one to engage in a particular behavior ($B = 0.36$, $SE = 0.07$, $t = 4.67$, $p < 0.01$). Hypothesis H2 is, therefore, supported.

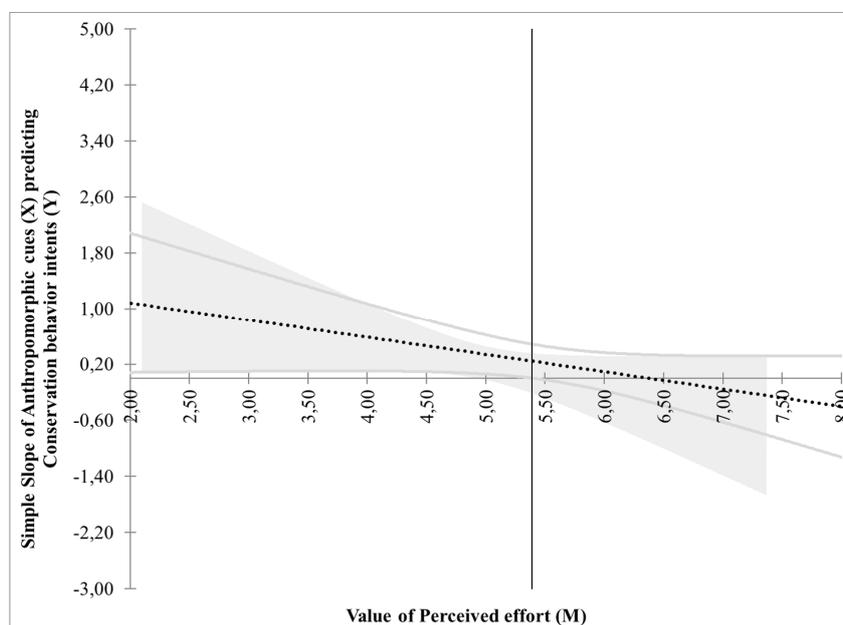


Figure 1. Interaction effect between anthropomorphic cues and perceived effort when a message is framed as a loss. Note: Perceived effort was measured on a 7-point scale, where 7 = low effort, while 1 = high effort. For individuals who scored below point 5.38 on this scale (i.e., they perceived saving water and waste reduction as moderately to highly effortful), intentions to conservation behaviors were higher when anthropomorphic cues were used and a message was framed as a loss. For individuals who scored above point 5.38 on this scale (i.e. they perceived saving water and waste reduction as rather effortless) intentions to conservation behaviors were not influenced by anthropomorphic cues and negative frames.

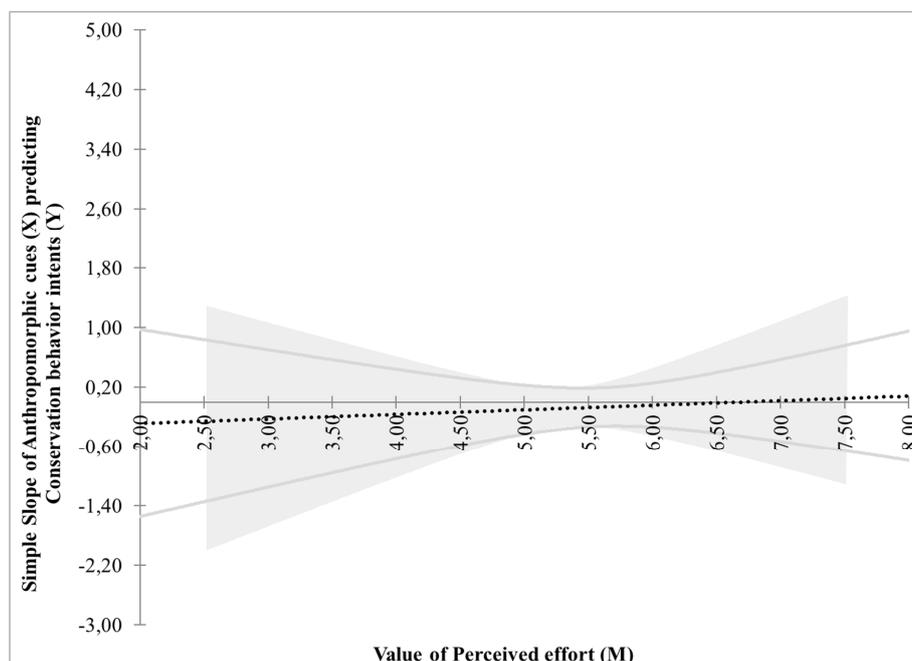


Figure 2. The interaction effect between anthropomorphic cues and perceived effort when a message is framed as a gain. Note: Perceived effort was measured on a 7-point scale, where 7 = low effort, while 1 = high effort. No effect of anthropomorphic cues was found across the whole spectrum of perceived effort when a message was framed as a gain.

4. Discussion

The objective of the current study was to examine how message frames and anthropomorphic appeals interact together in prompting pro-environmental intentions to adopt—particularly effortful—behaviors. Thus, we ran an experiment with a 2 (yes versus no anthropomorphic cue) \times 2 (negative versus positive message frame) between-subjects design, and we included effort as a measured factor. We found that negatively framed messages were more effective in driving green intentions when they were coupled with anthropomorphic cues. These effects pertained to conservation activities that were regarded by respondents as more difficult rather than easy. Our investigation, therefore, offers several important contributions to both sustainability literature and practice.

Firstly, prior research on sustainable behaviors focused mostly on examining the role of effort in promoting green intentions (and some even questioned the explanatory power of the low-cost hypothesis—see e.g. a discussion forwarded by Keuschnigg and Kratz [17]). Nevertheless, these investigations did not solve the puzzle on how to encourage costly responses, and the general pattern of findings even suggested that the chances to make people perform difficult pro-environmental actions are rather low. The current study is the first step to explore this issue more. It uses evolutionary psychology to forward a combination of message appeals that would be more persuasive in driving effortful, rather than effortless, behaviors. We find that behavior intentions were more likely to be prompted when two adaptive biases were activated instead of one (we observed no differences between loss and gain messages when no anthropomorphism was used). These results were replicated across two domains of sustainable behaviors (i.e., water conservation and waste reduction – two issues that were identified by Obermiller [40] as contrasting in terms of importance and severity of the need for action).

Secondly, the framing literature pertains mostly to health (rather than conservationism) behavior and it produces many mixed findings, thus indicating how conditional the phenomenon of frames is. Nevertheless, prior research mostly focused on one type of message appeals and did not search for other potential advertising cues that would moderate the effects of framing. The current study

is the first one to test loss and gain appeals combined with anthropomorphic cues in the context of sustainable responses. It therefore extends our knowledge on what strengthens the effects of frames, particularly in the field of green advertising.

The third contribution lies in offering practical insights on how to create an advertisement that would successfully promote effortful behaviors. Prior empirical findings on this subject were scarce and not entirely conclusive. For example, some scholars observed that information-based messages were ineffective in driving behavioral change in energy use [75], while others concluded otherwise [76]. The current study forwards specific and viable solutions in this field, and it shows how advertisements should be designed to make people respond in a desirable way.

Further Research

There is room for further investigations, and future empirical endeavors might focus on exploring the various aspects of message framing, anthropomorphism, and interaction thereof. For example, the current study used rather extreme phrasing in manipulating loss versus gain appeals, and one may wonder whether a more balanced choice of words (e.g., indicating hurt instead of death) would bring the same results. Anthropomorphism was manipulated with images of a smile and frown, and scholars might further experiment with a more neutral facial morphology (although this would more likely activate animism i.e., a cognitive process of perceiving objects as alive but not necessarily human [77]). It would be also interesting to examine additional adaptive biases (such as biases in self-judgment or interpersonal perception [19]) and inspect whether and how they interact with framing. Eventually, even though evolutionary psychology is useful in explaining cognitive mechanisms regardless of culture or nationality, future studies might further replicate our findings on subjects with a more diversified cultural background.

5. Conclusions

The current study was the first empirical attempt to examine interaction effects between anthropomorphism and message framing on conservationism. It used an experimental design and uncovered that negatively framed messages encouraged higher behavioral change when they contained anthropomorphic cues. These effects were replicated across two types of pro-environmental behaviors (namely: water saving and waste reduction), which enhances the generalizability of our findings. Evolutionary psychology helped us to explain these results: both loss and anthropomorphic appeals activate adaptive biases, and two adaptive biases lead to stronger effects than one. Our investigation thus provides practical information on how to promote effortful conservation habits.

Author Contributions: M.K.-K., L.S. and L.I. developed conceptualization of this project. M.K.-K. was responsible for research design and she ran the experiments. M.K.-K. and L.I. analyzed the data. M.K.-K. and L.S. conceived and designed the paper, and they wrote and revised the paper. L.I. wrote and revised the paper. All of the authors contributed to read and approved the final manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

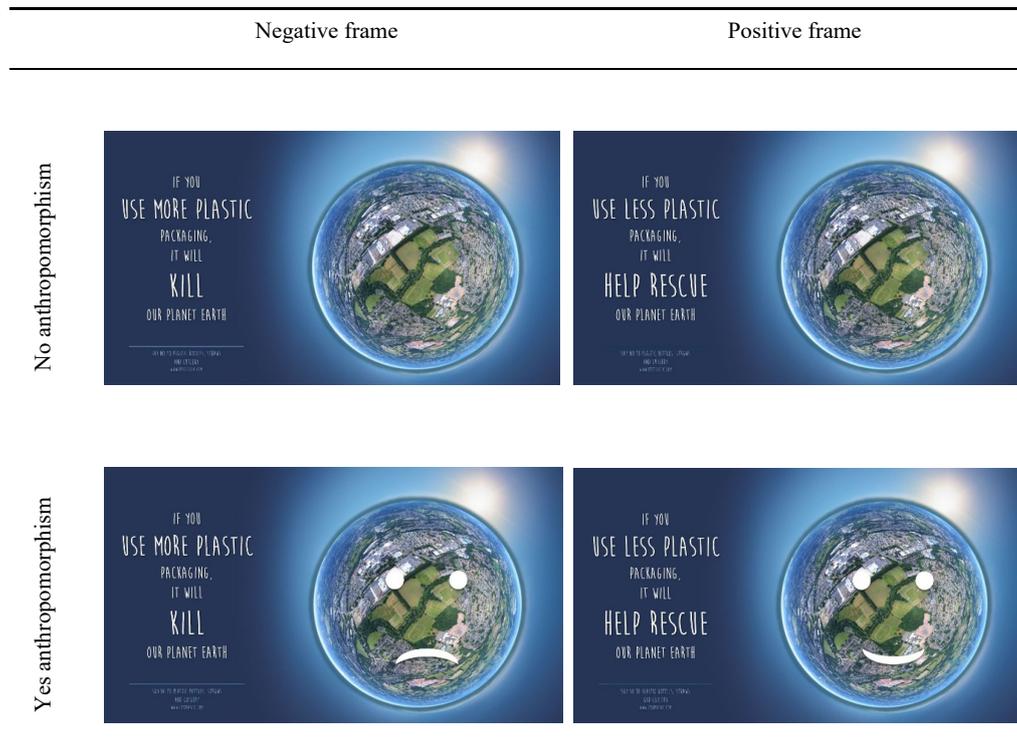


Figure A1. Funding: Waste reduction. (The picture used in these ads was retrieved from here: https://unsplash.com/photos/hzp_aT02R48; These are sample stimuli; Original experimental manipulation is available upon request from mkarpinska@uni.lodz.pl.).

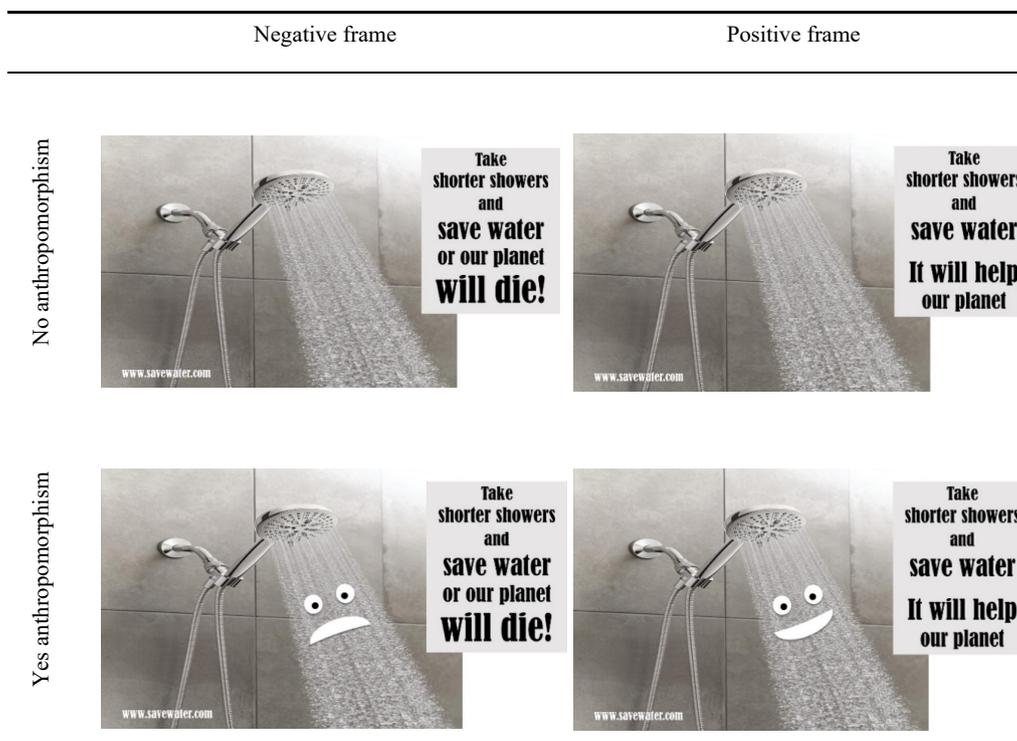


Figure A2. Water conservation.

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