

Original Research

Talking to Nature: The Role of Nature Anthropomorphism and Spatial Distance in Enhancing Sustainable Consumption through the Formation of Global Identity

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ABSTRACT

This research explores how nature anthropomorphism in advertising messages cultivates favorable attitudes toward sustainability and purchase intentions toward environmentally friendly products. Employing a 2 (nature anthropomorphism: presence vs. absence) x 2 (spatial distance: distant vs. close) between-subjects experiment, this study finds that messages with anthropomorphized (vs. non-anthropomorphized) nature foster more positive attitudes toward sustainability through the mediation of a shared global identity among consumers. Moreover, this mediation effect becomes more prominent when anthropomorphized nature messages are paired with spatially distant (vs. close) messages. The study further emphasizes that favorable attitudes toward sustainability predict purchase intentions. These findings suggest that integrating nature personas and spatial distance framing into advertising messages enhances purchase intentions for environmentally friendly products, and this effect occurs through sequential mediation involving global identity and sustainability attitudes. Theoretical and practical implications are discussed.

KEYWORDS

anthropomorphism, nature, global identity, spatial distance, sustainability

The urgent call for environmental sustainability has intensified as climate change increasingly impacts daily life. In response, both businesses and consumers have placed a greater emphasis on environmental sustainability, broadly defined as reducing environmental harm to meet present needs without compromising the ability of future generations to meet their own needs (United Nations Brundtland Commission, 1987). Corporations are implementing initiatives to promote sustainable consumer choices and foster a more environmentally responsible society in the long term. Notably,

nearly 5,200 corporations across 52 countries, representing approximately 80% of the global business community, have taken significant steps toward sustainability initiatives (KPMG, 2020). Corporate sustainability commitments are widely communicated to stakeholders, with approximately 90% of the top 100 global brands explicitly addressing environmental sustainability on their websites (Salnikova et al., 2022). On the consumer side, there is a clear shift toward sustainable consumption habits (Casalegno et al., 2022; Chao, 2022). Nearly 80% to 90% of global consumers expect corporations to embrace environmental sustainability, a trend that has persisted over the past four decades (Casalegno et al., 2022; Nielsen, 2018).

Despite this growing interest in sustainability, limited research has explored the dynamic role of nature-related descriptions in advertising within the context of sustainability. In particular, little attention has been given to how nature anthropomorphism — the attribution of human-like characteristics to nature — serves as a precursor to sustainable consumption. Previous research has provided valuable insights, showing that nature anthropomorphism, when inherently embedded as an individual trait, increases sustainable decision-making (e.g., Jeong & Kim, 2024; Letheren et al., 2016; Tam et al., 2013). However, relatively little is known about how framing nature as a human-like entity enhances the persuasiveness of sustainability messages. Consumers are often skeptical and distrustful of green advertising, which can decrease green consumption (Matthes & Wonneberger, 2014). This highlights the need for further research to refine advertising message strategies for sustainability communication (Rathee & Milfeld, 2023). In response, we propose that advertising messages can strategically employ nature anthropomorphism to cultivate sustainable attitudes and behaviors among consumers. This approach underscores the unique role of advertising in reshaping perceptions of nature

from a passive, static entity into a dynamic, human-like presence, thereby addressing a gap in sustainability communication research.

To empirically address these claims, we conducted an experiment investigating the effectiveness of nature anthropomorphism in advertising on sustainable consumption. First, we examine *whether* advertisements featuring (*vs.* not featuring) nature anthropomorphism promote more favorable attitudes toward environmental sustainability (hereinafter sustainable attitudes) and greater purchase intentions for environmentally sustainable products (hereinafter sustainable purchase intentions). Second, to determine *when* the effectiveness of nature anthropomorphism is optimized, we examine spatial distance as a boundary condition, where anthropomorphized nature messages are paired with geographically distant (*vs.* close) messages. Finally, to explore the psychological mechanism underlying *how* the proposed main and interaction effects occur, we propose the mediating role of global identity perceptions, which consumers develop in response to such messages.

The findings of this study offer theoretical and practical contributions. By integrating the concepts of nature anthropomorphism and spatial distance, this research advances existing scholarship by demonstrating how advertising dynamically shapes consumer perceptions of both nature and self to promote sustainable consumption. Furthermore, we provide businesses with insights into crafting nature-related advertising messages that foster a sense of global citizenship, ultimately enhancing consumer attitudes and purchase intentions toward sustainability.

Nature Anthropomorphism

Anthropomorphism has been a focal point in consumer studies. As defined by Guido and Peluso (2015), anthropomorphism refers to the

extent to which individuals perceive nonhuman entities as possessing human-like qualities. This phenomenon can be observed in the way consumers personify brands, such as assigning names (e.g., “Ms. Green” for M&M’s chocolate candy) or describing them with human traits (e.g., describing a car as “smiling”). Empirical research has explored various anthropomorphized strategies, primarily in brand communication, including first-person (*vs.* third-person) references (Grétry et al., 2017), profile (*vs.* logo) visuals (Barcelos et al., 2018), informal (*vs.* formal) linguistic features (Sung & Kim, 2021), paralinguistic expressions (Grétry et al., 2017; J. L. Hayes et al., 2020), and typefaces in advertising (Jeong, 2024). Similarly, anthropomorphism bridges the gap between humans and technology by improving consumer attitudes toward AI-generated assistants (e.g., smart speakers) (Li & Sung, 2021). These studies underscore anthropomorphism as a key brand strategy that strengthens consumer-brand relationships (Aggarwal & McGill, 2007; MacInnis & Folkes, 2017).

While anthropomorphism is commonly studied in the context of branding, it also applies to natural entities. Although nature is often viewed as a resource for human use and exploitation, it can also be processed as possessing symbolic personas, such as a nurturing “mother” that provides for human needs (Kunchambo et al., 2017). This form of anthropomorphism, known as nature anthropomorphism, is defined as attributing human qualities to the natural environment (e.g., Letheren et al., 2016; Tam et al., 2013). Unlike brand anthropomorphism, which fosters consumer engagement with brand communications, nature anthropomorphism is rooted in ecological relationships with the environment (e.g., Jeong & Kim, 2024; Williams et al., 2021). It is known to evoke ethical sensitivity toward the protection of nature and influence individuals’ sustainability attitudes and behaviors (see Williams et al., 2021, for a

review). Scholars suggest that anthropomorphic perceptions are shaped by life experiences, including exposure to and interaction with humanized non-human messages and entities. For example, Tam et al. (2013) argue that reading news articles or viewing visuals portraying Earth with human-like features fosters psychological closeness with nature, consequently encouraging environmental conservation behaviors among college students. Similarly, Wang and Basso (2019) find that messages emphasizing human-like relationships, whether among animals or between humans and animals, can alter attitudes and reduce meat consumption intentions. Jeong and Kim (2024) further suggest that Gen Z’s tendency toward nature anthropomorphism enhances psychological connections with nature and promotes sustainable consumption, which positively influences their overall psychological well-being.

Although previous studies highlight the positive function of nature anthropomorphism in promoting environmentally responsible behaviors, there remains a gap in understanding its dynamic role in advertising, particularly the underlying mechanism of anthropomorphized nature messages and the boundary condition under which their positive effects are more pronounced. The present study seeks to address this gap by examining the potential of advertising with nature anthropomorphism to enhance sustainable attitude and purchase intention. Our approach is based on the premise that anthropomorphism encourages consumers to treat non-human objects with the same moral care concern they extend to fellow humans (Waytz et al., 2010). This perspective suggests that when consumers personify brands through anthropomorphism, they are more likely to experience human-like warmth and positive emotions, which can enhance brand attitudes, purchase intentions, and buying pleasure (MacInnis & Folkes, 2017) and reduce actions that may harm or replace these brands

(Chandler & Schwarz, 2010). Accordingly, anthropomorphizing nature in advertising messages can increase consumers' sustainable consumption by fostering a sense of responsibility and care toward the environment. Thus, we hypothesize the following main effect of nature anthropomorphism on two aspects of sustainable consumption: sustainable attitudes and purchase intentions (H1a and H1b):

H1a-b.

The presence (*vs.* absence) of anthropomorphized nature messages is more likely to yield (a) favorable sustainable attitudes and (b) sustainable purchase intentions.

Global Identity

To fully understand how anthropomorphized nature messages influence sustainable consumption, it is essential to investigate their role in shaping consumers' self-view within a broader environmental context. This study introduces the concept of global identity, which captures how consumers view themselves within the vast landscape of environmental sustainability. Global identity is defined as individuals' identification with all humans around the world and their concern for global well-being (Loy et al., 2022). Grounded in social identity theory (Tajfel & Turner, 1986), this concept extends beyond personal identity (which differentiates individuals from others) and social identity (which integrates them within a group). It represents the highest level of identification, emphasizing a shared human identity that transcends national and cultural boundaries (Loy et al., 2022).

In this study, we propose that anthropomorphized nature messages foster a sense of global identity among consumers. Exposure to globalization and foreign cultures facilitates the development of global identity (Alden et al., 2006; Steenkamp & De Jong, 2010). Additionally, global communication platforms

and pressing issues, such as environmental sustainability, shape consumer worldviews, reinforcing a sense of belonging to a global community. Since sustainability challenges largely require collective efforts that go beyond individual or national commitments (Frische et al., 2018; Loy et al., 2022), viewing nature through a human-like lens may heighten perceptions of the human-nature interconnectedness and well-being as core components of global identity. This premise is further supported by anthropomorphism literature, proposing that assigning human-like characteristics to non-human entities activates human-level schemas (Aggarwal & McGill 2007; Wimmer & Perner, 1983). Through these schemas, people tend to prefer entities perceived as similar to themselves and feel responsible for their well-being (Waytz et al., 2010).

Applying this framework to nature, we argue that when individuals humanize nature as a unified entity surrounding them, they may perceive the environment as an interconnected and relational system that transcends national and cultural boundaries. This, in turn, fosters a broader collective identity and a sense of shared belonging to a global community encompassing both humans and nature. The notion of nature as "the external world in its entirety," (Merriam-Webster, n.d.) aligns with this perspective, as it underscores a view of nature encompassing the entire planet beyond geographic boundaries. Furthermore, when nature becomes imbued with human-like relationships (e.g., Mother Nature), it reinforces a communal global identity that unifies individuals across diverse cultures (Kunchambo et al., 2017; MacInnis & Folkes, 2017). Empirical research further demonstrates how anthropomorphism unifies localized perspectives under the umbrella of human schemas. For instance, a study on tourism suggests that destination anthropomorphism (e.g., describing different scenic locations with human attributes) enhances psychological

ownership of these locations, even motivating environmentally friendly behaviors in these places (Lin et al., 2024). Similarly, in consumer studies, product anthropomorphism reduces reliance on country-of-origin labels (e.g., “Made in China”) by shifting consumers’ focus to personification as an intrinsic product attribute rather than national distinctions (Feng et al., 2020). These findings stress that anthropomorphized targets are processed through human schemas, which serve as a universal knowledge framework that transcends individual and national differences (Aggarwal & McGill 2007; MacInnis & Folkes, 2017; Wimmer & Perner, 1983). Thus, when consumers encounter environmental messages featuring nature anthropomorphism, they may perceive humanness as a central attribute of nature. This perspective encourages a global rather than an individualized or localized understanding of nature and environmental responsibility, ultimately fostering a sense of global citizenship. In this way, nature anthropomorphism highlights the unified global identity between nature and humanity, reinforcing a shared commitment to global well-being.

We further propose that global identity mediates the impact of nature anthropomorphism on sustainability. When nature is depicted in a human-like manner, consumers are more likely to experience a sense of environmental responsibility. This, in turn, enhances sustainable attitudes and purchase intentions through the formation of a global identity. Framing natural entities with human-like emotions, desires, and rights strengthens psychological connections to the environment, fostering a heightened moral duty to protect Earth – our shared home (e.g., Jeong & Kim, 2024; Tam et al., 2013). As individuals develop their identity as global citizens, their commitment to protecting the environment grows. By tapping into collective sensitivity toward the shared environment and emphasizing the universality of humanized natural entities, consumers are encouraged to

adopt a sustainable mindset and consumption patterns. Empirical studies support the claim, demonstrating that a strong global identity can drive sustainable behaviors, particularly in product consumption. Individuals with a high global identity perceive the world as a unified whole, recognizing the interconnectedness of all people (Buchan et al., 2011). As such, their global identity perception bolsters their preferences for and engagement with prosocial messages (e.g., Gao et al., 2017; Grinstein & Riefler, 2015; Strizhakova & Coulter, 2013). Similarly, individuals with a high (*vs.* low) global identity show a greater preference for environmentally friendly products and exhibit more pro-environmental behavior, underscoring a deeper commitment to sustainability (Ng & Basu, 2019). Furthermore, consumers with a strong global identity are more environmentally conscious and motivated to improve the state of the environment (Strizhakova & Coulter, 2013). These findings consistently highlight the role of global identity in shaping individuals’ perceptions of the world as a unified community, fostering a deeper connection to environmental sustainability.

In light of these discussions, we posit the following hypotheses for the main effect of nature anthropomorphism on global identity (H2) and the mediation of global identity (H3a and H3b):

H2.

The presence (*vs.* absence) of anthropomorphized nature messages is more likely to yield global identity.

H3a-b.

Global identity mediates the proposed main effect of nature anthropomorphism on (a) sustainable attitudes and (b) sustainable purchase intentions.

Moderating Role of Spatial Distance

We further identify the boundary conditions that amplify the effectiveness of nature

anthropomorphism on sustainable consumption. Specifically, we investigate the moderating role of spatial distance messages to determine when consumers are more likely to be influenced by anthropomorphized nature messages. This construct is grounded in construal level theory (hereinafter CLT), which posits that variability in responses is attributed to how individuals perceive psychological distance from an event or an object (Trope & Liberman, 2010). Psychological distance is defined as an individual's subjective perception of how distant an object appears (Trope & Liberman, 2010). From the perspective of psychological distance, individuals tend to construe events perceived as distant in a more generalized and abstract manner. By contrast, when events are perceived as proximal, they are interpreted with greater specificity and concreteness, embedded within a personally relevant context.

Psychological distance is primarily categorized into four dimensions: temporal, spatial, social, and hypothetical (or probabilistic) distance (Trope & Liberman, 2010). Among these, this study focuses on spatial distance due to its close relevance to environmental communications (McDonald et al., 2015). Spatial distance is considered the most fundamental since individuals develop an understanding of physical proximity early in life, perceive it more distinctly, and find it easier to communicate than other forms of psychological distance (Trope & Liberman, 2010). Research suggests that people tend to adopt a high-level, more abstract construal for events occurring in physically or spatially distant locations, whereas they use a low-level, more concrete construal for events occurring in closer proximity. For example, when participants watch a video purportedly recorded in a distant location, they use more abstract language to describe its content (Fujita et al., 2006). In the context of advertising, spatial distance has frequently been employed as a moderator (K. Kim et al., 2019; T. Kim & Kim, 2021; Lim & Hong, 2018; Park & Kim,

2021). For example, K. Kim et al. (2019) find a significant moderating role of spatial distance on the relationship between advertising appeals and brand evaluations. Specifically, when a brand image is spatially distant, it induces a high-level construal, leading to more favorable brand evaluations for emotional appeals compared to a spatially close brand image. In contrast, a spatially close brand image elicits a low-level construal, resulting in more favorable brand evaluations for rational appeals than a spatially distant brand image. Similarly, T. Kim and Kim (2021) demonstrate that spatially distant cause-related messages (*vs.* spatially close messages) lead to more favorable advertising evaluations for abstract messages. Lim and Hong (2018) also reveal that concrete messages are more effective for domestic donations than for global donations. These studies suggest that the effectiveness of advertising messages can be optimized when they are strategically paired with spatially distant or close messages.

In line with these discussions, we explore the strategic role of spatial distance in anthropomorphized nature messages. We expect that anthropomorphizing nature in a spatially distant message may be more effective in message evaluations than anthropomorphizing nature in a spatially close message. When nature is anthropomorphized, consumers perceive natural objects as if they were fellow humans, fostering a quasi-interpersonal relationship between humans and nature (Kunchambo et al., 2017; MacInnis & Folkes, 2017). This human-nature connection transcends national and cultural boundaries, reinforcing a global identity, as we hypothesized in the previous section. Given that sustainability challenges require collective efforts to address environmental issues on a global scale (Frische et al., 2018; Loy et al., 2022), the effect of nature anthropomorphism on global identity may be amplified when framed within a spatially distant (*vs.* close) message. Through the lens of psychological distance, individuals focus on an

object's central features rather than peripheral details when it is psychologically distant (Kivetz & Tyler, 2007; Trope & Liberman, 2010). Moreover, psychologically distant (*vs.* close) messages yield moral rather than hedonistic values (Schill & Shaw, 2016), reinforcing a broader, collective sense of responsibility. Consistent with this reasoning, we suggest that nature anthropomorphism, when combined with a spatially distant message, is more likely to evoke a generalized and collective identity rather than a localized one. Supporting this claim, Grinstein and Reifler (2015) find that consumers with a cosmopolitan mindset show stronger global identity and respond more favorably to cause-related marketing for spatially distant (*vs.* local) issues.

Furthermore, previous studies have shown that psychologically distant messages lead to greater engagement in sustainable choices compared to psychologically close messages (Giacomantonio et al., 2010), as distance prompts individuals to focus on core values (Kivetz & Tyler, 2007; Trope & Liberman, 2010). Building on these insights, we propose that nature anthropomorphism in spatially distant (*vs.* close) contexts is more likely to elicit favorable attitudes toward sustainability and increase purchase intentions for sustainable products.

Moreover, we posit the mediating role of global identity underlying the interaction effect of nature anthropomorphism and spatial distance on sustainable consumption (H5-b). This is further supported by the aforementioned positive relationship between global identity and sustainable consumption (e.g., Gao et al., 2017; Grinstein & Reifler, 2015; Strizhakova & Coulter, 2013). Thus, we propose the following hypotheses for the interaction of nature anthropomorphism and spatial distance (H4a-c) and the moderation mediation of global identity (H5a-b).

H4a-c.

The proposed effects of anthropomorphized nature messages on (a) favorable sustainable attitudes, (b) sustainable purchase intentions, and (c) global identity are more prominent when they are interplayed with spatially distant (*vs.* close) messages.

H5a-b.

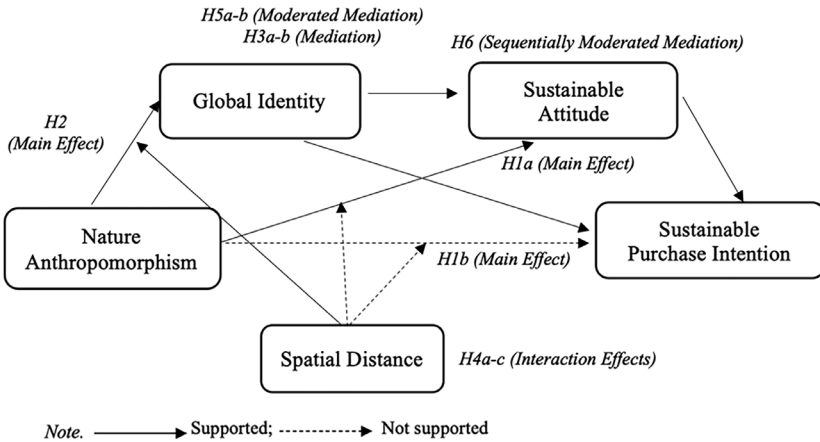
Global identity mediates the proposed interaction effect of nature anthropomorphism and spatial distance on (a) sustainable ss and (b) sustainable purchase intentions.

We further examine the relationship between sustainable attitudes and sustainable behavior intentions. While the attitude-behavior gap can be filtered by other factors, such as habits, lifestyles, convenience, cost, and performance (e.g., Peattie, 2001), there is a general consensus that this relationship is well-documented in sustainability research. For example, favorable attitudes toward environmental sustainability predict consumer intention to buy green products (Lavuri et al., 2023; Vu et al., 2022), conserve energy (Mostafa, 2007), reduce plastic and food waste (Khan et al., 2020), and engage in environmentally responsible actions (Khan et al., 2020; Swaim et al., 2014). Extending this body of research, our study proposes the positive impact of sustainable attitudes on sustainable purchase intention within our designated context. Thus, we posit a serial mediation of global identity and sustainable attitude behind the interaction effect of nature anthropomorphism and spatial distance on sustainable purchase intention:

H6.

Favorable sustainable attitudes, which are processed by the interaction effects of nature anthropomorphism and spatial distant messages on global identity, will positively influence sustainable purchase intentions.

Figure 1. Study Model and Hypotheses



METHODS

We employed an online experiment with a 2 (nature anthropomorphism: presence *vs.* absence) × 2 (spatial distance: distant *vs.* close) between-subjects design. Both factors were manipulated through advertising messages. The current study was approved by the Institutional Review Board prior to data collection (IRB Number 77885).

Pre-test and Stimuli Development

The first pre-test was to identify advertising messages that could effectively induce nature anthropomorphism. We recruited a total of 109 Amazon MTurkers residing in the U.S. Two advertising messages were developed to manipulate nature anthropomorphism (i.e., presence *vs.* absence), following previous literature (Aggarwal & McGill, 2007; Tam et al., 2013). The presence of nature anthropomorphism was manipulated using first-person language (e.g., *I am a tree. ... Discover my story ...*), while the absence of nature anthropomorphism was manipulated through

third-person language (e.g., *This is a tree. ... Discover its story ...*). A tree was chosen as the target natural entity due to its gender-neutral characteristics in Western culture, where the data was collected. Participants rated their perception of nature anthropomorphism using two items (i.e., *to what extent do you feel the tree comes alive like a person in your mind? and does it remind you of some humanlike qualities?*) on a seven-point scale (1 = *strongly disagree*; 7 = *strongly agree*) (Puzakova & Kwak, 2018; $r = .72$). As a result, participants in the anthropomorphism condition reported a greater anthropomorphic perception toward nature ($M = 5.51, SD = .116$) than those in the control condition ($M = 4.66, SD = 1.67$) [$t(107) = 3.13, p < .01$]. Additionally, participants (100%) evaluated a tree as gender-neutral.

The second pre-test ($n = 102$ MTurkers) was to select messages that could effectively manipulate spatial distance (i.e., distant *vs.* close) regarding tree conservation. Following previous studies (e.g., McDonald et al., 2015), we manipulated advertising messages by framing the tree within a geographically distant (e.g., *rainforest, distant ecosystem*) *vs.* proximate environment from the perspective of study participants (e.g., *American*

forest, nearby ecosystem). Participants rated their perceived spatial distance using two semantic-differential items (i.e., 1 = *very close* to 7 = *very distant*; 1 = *nearby* to 7 = *faraway*) on a seven-point scale ($r = .70$). Results showed that participants in the distant condition evaluated the tree as significantly farther away ($M = 5.24$, $SD = 1.05$) than those in the close condition ($M = 4.56$, $SD = 1.31$) [$t(100) = 3.05$, $p < .01$]. Thus, two messages were selected to manipulate spatial distance in the main study.

Integrating these results, we developed four different advertising messages, representing the present *vs.* absent condition of nature anthropomorphism \times the distant *vs.* close condition of spatial distance. A fictitious corporation, Re-Cup Inc., was included in all conditions to promote reusable cup purchases. See Appendix for stimuli.

Sampling, Attention Check, and Procedure

To ensure data quality, we followed best practices for MTurk samples (e.g., Agle et al., 2022) by recruiting participants residing in the same country (i.e., the U.S.) with a HIT approval rating of 95% or higher. Additionally, we conducted attention checks through screening questions by asking them to identify the thumbnail of the manipulation exposed to them. In this procedure, we excluded seven participants who failed to be attentive to the manipulations with incorrect answers from the study sample. As a result, a total of 500 took part in the study, and 493 were included in the final sample.

Upon clicking the landing website, participants were randomly assigned to one of the four conditions and asked to assess their personal involvement in environmental issues. After reviewing one of the stimuli on the next page, they completed attention and manipulation checks, outcome variable measures, and demographic questions. The average age of participants was 35,

ranging from 21 to 71 years old ($SD = 10.49$), and male participants (56.4%) slightly outnumbered females. There were no significant differences across the four conditions in terms of age [$F(3, 489) = 1.23$, $p = .30$] and gender [$\chi^2 = 2.32$, $df = 3$, $p = .51$].

Measures

Sustainable attitude was assessed with five items reflecting an overall attitudinal stance toward safeguarding nature on a seven-point scale from *strongly disagree* (1) to *strongly agree* (7) (i.e., *important to protect nature*; *actively practice sustainability for nature*, *responsible for caring for nature*; *concerned about the long-term of nature*; *important to conserve natural resources*) ($\alpha = .79$, $M = 5.68$, $SD = .86$) (Swaim et al., 2014). Sustainable purchase intention was measured using four items about buying intention of eco-friendly products considering the environment's benefit on a seven-point scale from *strongly disagree* (1) to *strongly agree* (7) (i.e., *plan to buy environmentally sustainable products*; *intend to seek out more opportunities to be more environmentally-friendly purchases*; *plan to look into how I can play a greater role in buying pro-environmental products*; *expect to increase my pro-environmental purchases*) ($\alpha = .77$, $M = 5.61$, $SD = .92$) (Swaim et al., 2014). Global identity was measured with four items reflecting individuals' self-perception from a worldwide standpoint and identifying themselves with global citizenship on a seven-point scale from *strongly disagree* (1) to *strongly agree* (7) (i.e., *my heart mostly belongs to the whole world*; *I believe people should be made more aware of how connected we are to the rest of the world*; *I identify that I am a global citizen*; *I care about knowledge of a global event*) ($\alpha = .73$, $M = 5.58$, $SD = .90$) (Ng & Basu, 2019; Tu et al., 2012).

We controlled for individual involvement in environmental issues, which was assessed with the short version of the personal involvement

measure with four items on a seven-point scale (i.e., *unimportant/important, on no concern/of concern, means nothing/a lot to me; insignificant/significant*) ($\alpha = .82, M = 5.78, SD = .93$) (Mittal, 1995).

RESULTS

Manipulation Checks

We checked the manipulation of nature anthropomorphism with the two items we used in the 1st pre-test on a seven-point scale ($r = .73$). Results showed that participants in the anthropomorphic condition perceived nature as significantly more anthropomorphic ($M = 5.30, SD = .08$) than in the control condition ($M = 4.33, SD = .09$) [$F(1, 489) = 66.75, p < .001$], without further interaction with the spatial-distance conditions [$F(1, 489) = 3.80, p = .06$]. Thus, we confirmed the successful manipulations of nature anthropomorphism.

Furthermore, we checked the manipulation of spatial distance with the same two items used in the 2nd pre-test on a seven-point scale ($r = .80$). Results showed those in the close condition ($M = 5.33, SD = .10$) evaluated the tree to be addressed in a geographically more proximate location compared to those in the distant condition ($M = 5.04, SD = .09$) [$F(1, 489) = 4.85, p < .05$]. There was no significant interaction with the anthropomorphism conditions [$F(1, 489) = 1.97, p = .16$]. Similarly, participants in the distant condition ($M = 5.79, SD = .09$) perceived the tree as being in a spatially more distant location rather than those in the close condition ($M = 5.02, SD = .10$) [$F(1, 489) = 33.05, p < .001$] without interaction with the anthropomorphism conditions [$F(1, 489) = 2.51, p = .11$]. These results confirmed the successful manipulation of spatially distant levels.

Hypothesis Testing

As the homogeneity assumption was violated for MANCOVA (Box's $M = 79.82, F = 4.37$, for three dependent variables, $p < .001$), three sets of ANCOVA were alternatively chosen to test the main (H1a-b and H2) and interaction effects (H4a-c). We controlled for environmental-issue involvement as a covariate, based on previous findings that individuals' involvement in environmental issues influences their responses to anthropomorphism (e.g., Cooremans & Geuens, 2019), as well as their sustainable attitudes and purchases (e.g., Jeong & Kim, 2024). Additionally, we controlled for participants' gender and age as covariates, given their documented effects on consumer reactions to anthropomorphic cues (e.g., Ahn et al., 2022; Letheren et al., 2016).

The first ANCOVA showed a significant main effect of nature anthropomorphism on sustainable attitude [$F(1, 486) = 7.09, p < .01$]. Supporting H1a, the presence of nature anthropomorphism ($M = 5.74, SE = .04$) generated a higher degree of sustainable attitude than the absence of nature anthropomorphism ($M = 5.61, SE = .04$). However, the interaction effect of nature anthropomorphism and spatial distance on sustainable attitude was not significant [$F(1, 486) = .35, p = .56$]. Thus, H4a was not supported. The second ANCOVA revealed the main effect of nature anthropomorphism on sustainable purchase intention was not significant [$F(1, 486) = 2.36, p = .13$], showing an insignificant mean difference between the presence ($M = 5.64, SE = .04$) and absence ($M = 5.60, SE = .04$) of nature anthropomorphism. Thus, H1b was not supported. The interaction effect with spatial distance was not significant [$F(1, 486) = .23, p = .63$]. Thus, H4b did not receive support. The third ANCOVA showed a significant main effect of nature anthropomorphism on perceived global identity [$F(1, 486) = 4.20, p < .05$]. Specifically, the presence of nature anthropomorphism (M

= 5.65, $SE = .05$) yielded a higher perception of global identity than the absence of nature anthropomorphism ($M = 5.51$, $SE = .05$), thus supporting H2. The interaction effect with spatial distance was also significant [$F(1, 489) = 5.05$, $p < .05$]: in the distant condition, the presence of nature anthropomorphism ($M = 5.74$, $SE = .06$) was more effective than the absence of nature anthropomorphism ($M = 5.46$, $SE = .06$) ($p < .01$); in the close condition, there was an insignificant difference between the presence of nature anthropomorphism ($M = 5.55$, $SE = .07$) and the absence of nature anthropomorphism ($M = 5.56$, $SE = .07$) ($p = .85$). Thus, H4c was supported. See Table 1 and Figure 2 for more information.

We employed the PROCESS macro (model 4) with 5000 bootstrap samples (A. F. Hayes, 2022) to examine our mediation models. The PROCESS provides several benefits when handling experimental data, such as enabling accurate statistical inferences for indirect effects and model estimates for mediation analyses and moderated mediation analyses and offering bootstrap confidence intervals (CIs) (A. F. Hayes, 2022). To test the simple mediation of global identity (H3a-b), controlling for three covariates, we entered nature anthropomorphism (presence = 1; absence = 0) as the independent variable, global identity as the mediating variable, and sustainable attitude as the dependent variable in the first regression model. Results revealed that

Table 1. Main and Interaction Effects (ANCOVA)

	<i>M (SE)</i>	<i>F</i>	<i>DF</i>
<i>Dependent Variable: Sustainable Attitude</i>			
Main Effect: Nature Anthropomorphism			
Presence	5.74 (.04)	7.09**	1, 486
Absence	5.61 (.04)		
Interaction Effect: Nature Anthropomorphism X Spatial Distance			
		.35	1, 486
Covariate: Age			
Gender		10.26***	
Issue Involvement		618.96***	
<i>Dependent Variable: Sustainable Purchase Intention</i>			
Main Effect: Nature Anthropomorphism			
Presence	5.64 (.04)	2.36	1, 486
Absence	5.60 (.04)		
Interaction Effect: Nature Anthropomorphism X Spatial Distance			
		.23	1, 486
Covariate: Age			
Gender		3.10	
Issue Involvement		2.42	
		593.16***	
<i>Dependent Variable: Global Identity</i>			
Main Effect: Nature Anthropomorphism			
Presence	5.65 (.05)	4.20*	1, 486
Absence	5.51 (.05)		
Interaction Effect: Nature Anthropomorphism X Spatial Distance			
		5.05*	1, 486
Covariate: Age			
Gender		7.14**	
Issue Involvement		.82	
		238.02***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2. Interaction Effect on Global Identity

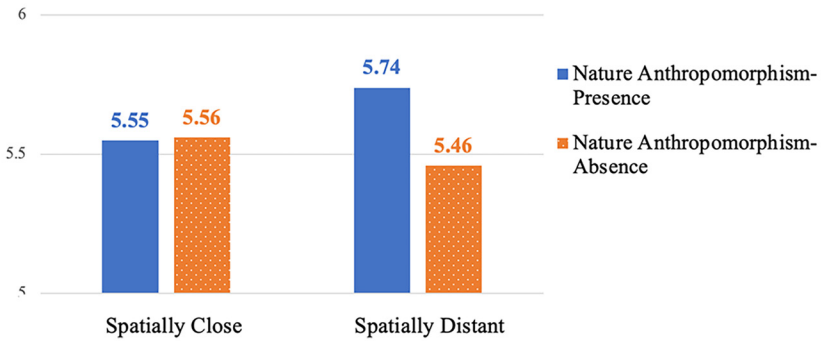
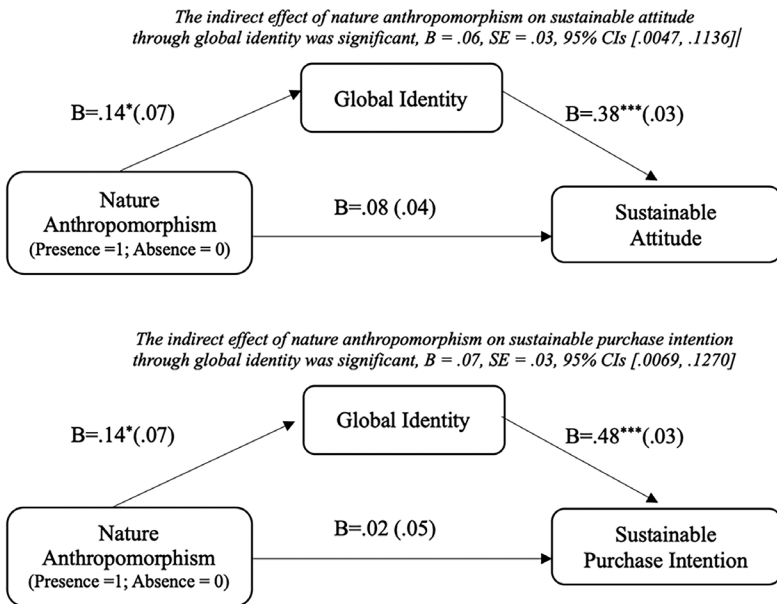


Figure 3. Simple Mediation



Note. * $p < .05$, ** $p < .01$, *** $p < .001$

global identity positively influenced sustainable attitude [$B = .38$, $SE = .03$, $p < .001$], further demonstrating global identities as a significant mediator behind the main effect of nature

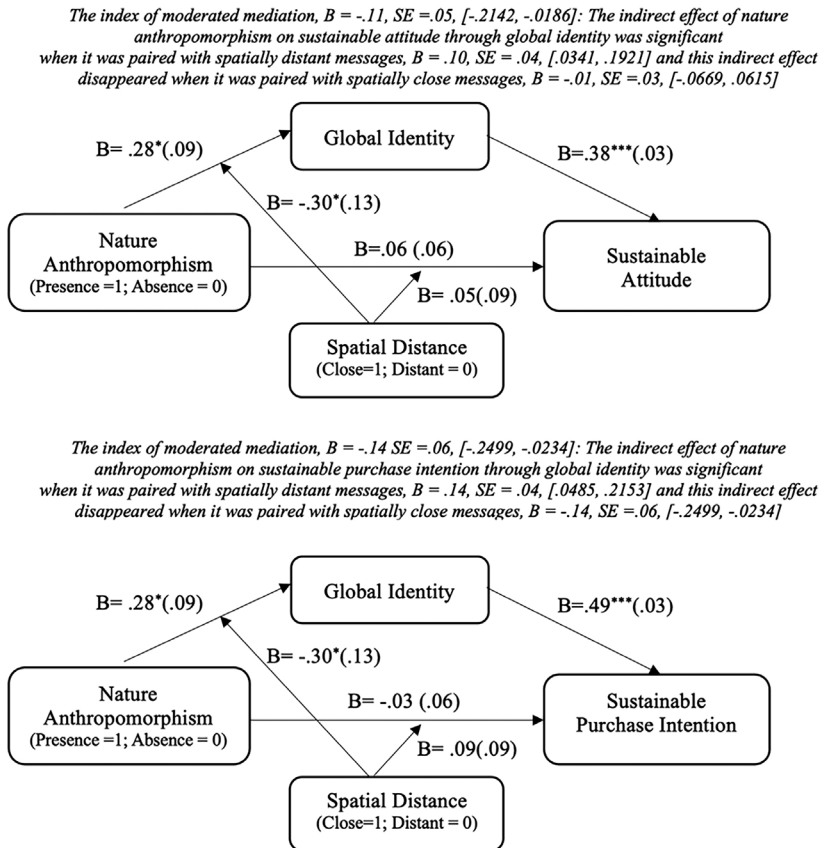
anthropomorphism on sustainable attitude [mediation: $B = .06$, $SE = .03$, 95% CIs [.0047, .1136]]. Thus, H3a was supported. In the second regression model, we followed the same

procedure but substituted the dependent variable with sustainable purchase intention. Results showed the positive impact of global identity on sustainable purchase intention [$B = .48, SE = .03, p < .001$], supporting H3b with the significant mediation of global identity underlying the main effect of nature anthropomorphism on sustainable purchase intention [mediation: $B = .07, SE = .03, 95\% CIs [.0069, .1270]$]. See Figure 3 for more information.

We further examined moderated mediation models (H5a-b), controlling for three covariates,

using the PROCESS macro (model 8) with 5000 bootstrap samples (A. F. Hayes, 2022). We replicated the previous steps used for simple mediation, with the only difference being the introduction of spatial distance (close = 1; distant = 0) as the moderating variable. The result of the first regression found global identity as a significant mediator underlying the interaction effect of nature anthropomorphism and spatial distance on sustainable attitude [moderated mediation: $B = -.11, SE = .04, 95\% CIs [-.2141, -.0186]$]. Specifically, as confirmed from the third

Figure 4. Moderated Mediation



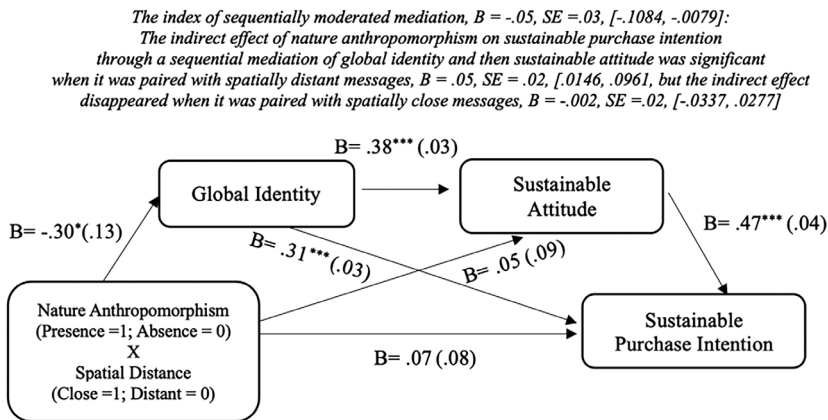
Note: * $p < .05$, ** $p < .01$, *** $p < .001$

ANCOVA results, the presence (*vs.* absence) of nature anthropomorphism had a greater effect on shaping global identity [$B = -.30, SE = .13, p < .05$], particularly when it was paired with distant messages [$B = .28, SE = .09, [.1064, .4565]$]. However, this effect disappeared with close messages [$B = -.01, SE = .10, [-.2019, .1756]$]. Further, global identity positively influenced sustainable attitude [$B = .38, SE = .03, p < .001$]. Thus, the significant mediation of global identity occurred behind the positive impact of nature anthropomorphism on sustainable attitude when paired with spatially distant messages [$B = .10, SE = .04, [.0341, .1921]$], but not with spatially close messages [$B = -.01, SE = .03, [-.0669, .0615]$]. Thus, H5a received support. The result of the second regression demonstrated the significant mediation of global identity [moderated mediation: $B = -.14, SE = .05, [-.2499, -.0234]$] behind the positive impact of anthropomorphized nature messages in shaping sustainable purchase intention, particularly when they were interplayed with spatially distant messages [$B = .14, SE = .04, [.0485, .2153]$], but not when they were compatible with spatially close messages [$B =$

$-.01, SE = .04, [-.0848, .0748]$]. Moreover, global identity positively influenced sustainable purchase intention [$B = .49, SE = .03, p < .001$]. Thus, H5b was supported. See Figure 4 for more information.

Furthermore, we employed the PROCESS macro (model 85) with 5000 bootstrap samples (A. F. Hayes, 2022) to examine sequentially moderated mediation, controlling for three covariates (H6). This model included moderated mediations and further contains additional results from the serial mediation where sustainable purchase intention was used as the dependent variable and both global identity and sustainable attitude were sequential mediators. Results confirmed the previous outcomes of moderated mediations; furthermore, the interaction effect of nature anthropomorphism and spatial distance on sustainable purchase intention occurred through a serial mediation of global identity and sustainable attitude [$B = -.05, SE = .03, 95\text{ CIs } [-.1084, -.0079]$]. That is, the indirect effect of nature anthropomorphism on sustainable attitude through global identity was significant only when paired with spatially distant messages [$B = .05, SE = .02, [.0146, .0961]$], as opposed to spatially close

Figure 5. *Sequentially Moderated Mediation*



Note: * $p < .05$, ** $p < .01$, *** $p < .001$

messages [$B = -.002, SE = .02, [-.0337, .0277]$]; further, sustainable attitude positively influenced sustainable purchase intention [$B = .47, SE = .04, p < .001$]. Thus, H6 received support. See Figure 5 for details.

DISCUSSION

Theoretical Implications

The present study offers insights into sustainability literature. Our findings suggest that when corporations describe nature using human-like characteristics in their advertising narratives, consumers develop more favorable attitudes toward sustainability. This aligns with previous research emphasizing the effectiveness of humanizing brands as a strategic approach to fostering favorable consumer responses to corporation-led pro-social initiatives (Wen & Song, 2017). By integrating brand anthropomorphism (e.g., Aggarwal & McGill, 2007; MacInnis & Folkes, 2017) with pro-environmental advertising, our findings highlight that attributing human characteristics to natural entities in advertising can effectively shift consumer orientations toward sustainability. Moreover, despite the limited number of empirical studies measuring nature anthropomorphism as an individual trait (e.g., Jeong & Kim, 2024; Letheren et al., 2016; Tam et al., 2013), there remains a lack of specific investigations into how advertising messages can nurture consumer perceptions of personified nature and lead to sustainability. Thus, our research serves as a preliminary empirical study validating the role of nature-centric personas as a compelling advertising strategy for promoting favorable sustainable attitudes among consumers.

Furthermore, our research posits that embedding nature anthropomorphism within pro-environmental advertising strengthens consumers' global identity. This finding indicates

that when consumers discern nature with an anthropomorphic lens, they can develop a self-perception resonating with global citizenship. This insight enriches the existing literature on self-identity (e.g., Tajfel & Turner, 1986) and global identity (e.g., Gao et al., 2017; Loy et al., 2022), further highlighting the substantial role of nature anthropomorphism in empowering consumers to embrace a worldview for addressing environmental issues on a global scale. While recent studies have explored the positive impact of global identity on sustainable behaviors (e.g., Ng & Basu, 2019; Strizhakova & Coulter, 2013), our study provides a novel perspective by underscoring the psychological mediation of global identity in the relationship between nature perception and sustainable consumption. Once consumers view natural entities as possessing human-like qualities, they tend to feel connected to a broader sense of self within the global environment. This self-view, rooted in a sense of global citizenship, subsequently enhances their attitudes toward sustainability and increases their intentions to purchase environment-friendly products. Through these findings, we aspire to advance scholarly discussions on the psychological mechanism through which advertising can contribute to a more sustainable society.

Lastly, our study suggests the interplay between nature anthropomorphism and spatial distance in shaping global identity, which consequently influences sustainable consumption. This finding enhances our understanding of the dynamic factors that drive consumers' sustainable decisions. Grounded in the psychological distance (Trope & Liberman, 2010), we find that the effect of anthropomorphized nature messages on global identity perception is contingent upon the spatial distance of nature entities. Notably, anthropomorphized narratives about nature are more likely to cultivate global identity when they are paired with a global (*vs.* local) environment. These results align with previous

findings that spatial distance develops an abstract construal (e.g., Trope & Liberman, 2010) and that individuals' moral considerations are more likely to influence their behaviors in an abstract mindset than in a concrete one (Eyal & Liberman, 2012). Anthropomorphized messages about distant nature encourage consumers to focus on the broader, global benefits of sustainability by strengthening their sense of global citizenship. These results also support the argument that a global environment, characterized by abstractness and distance, can often be accentuated by anthropomorphic perception (A. Y. Wu et al., 2023). Since a psychologically distant object enables consumers to focus on core rather than peripheral features (e.g., Trope & Liberman, 2010), our findings further highlight that consumers process a global environment setting as central to personifying nature, thereby fostering collective commitments to environmental issues. Conversely, a local environment, given its tangible and specific focus, may not be prominently highlighted within the human schema triggered by nature anthropomorphism. Our findings are also supported by recent reports that individuals perceive environmental issues in distant and global locations as more serious than those in proximate and local areas (McDonald et al., 2015; Uzzell, 2000). Moreover, they are more likely to engage in protective actions for distant environments than for their local environments (Spence et al., 2012). Extending upon these suggestions, we emphasize the strategic integration of spatial distance with nature anthropomorphism in the domain of sustainability advertising. While previous literature has extensively explored the separate effects of anthropomorphism (e.g., Aggarwal & McGill, 2007; Jeong & Kim, 2024; MacInnis & Folkes, 2017; Tam et al., 2013) and spatial distance (e.g., Trope & Liberman, 2010; B. Wu et al., 2018), their interactive effects on the global identity and consumer sustainability has remained relatively understudied. Scholars have stressed the

need for research that integrates separate strands of environmental communication to better understand how to effectively mobilize individuals in response to environmental challenges (Reysen & Hackett, 2019). Building on this, our research helps bridge this gap by shedding light on the synergistic impact of these factors and contributing to a deeper understanding of their interplay.

Practical Implications

The study provides practical implications for advertising practitioners and businesses. First, corporations can enhance consumer support by integrating nature anthropomorphism into their advertising narratives. Expanding on the persuasive power of narratives in influencing prosocial decisions (Chandler & Schwarz, 2010; Jeong, 2024), we emphasize the positive function of narrative persuasion in corporate communication and highlight the leading role of businesses in cultivating a sustainable culture within society. However, sustainable purchases may not be directly driven by anthropomorphized nature messages. Instead, they may be indirectly shaped through the development of favorable consumer attitudes toward corporate sustainability, which are intensified by personified nature messages and the reinforcement of global identity perceptions. Therefore, we recommend that corporations strategically employ nature anthropomorphism while also addressing consumers' global responsibility for sustainability in their environmental communications.

Similarly, nature anthropomorphism in advertising can play a significant role in shaping consumers' self-identity as global citizens. By encouraging individuals to view nature through an anthropomorphic lens, corporations can help individuals cultivate a self-identity that resonates with the interconnected global community, thereby promoting a shared sensitivity toward the global environment. Moreover, recognizing

the mediating role of global identity, corporations should consider that consumers develop a broader sense of self linked to global responsibility. This, in turn, can benefit businesses by fostering positive attitudes and purchase intentions for eco-friendly products.

Furthermore, corporations should recognize that anthropomorphized nature narratives, when paired with spatially distant messages, may be more effective in shaping positive consumer responses. Accordingly, businesses should note that advertising messages featuring localized natural entities, which are geographically proximate to their target markets, may not yield the same benefits from nature anthropomorphism despite their specificity. Instead, strategically coupling nature anthropomorphism with spatially distant messages, such as framing the global environment as a humanized entity, could encourage sustainable product choices and contribute to a more sustainable society on a broader scale. This implication is particularly relevant because sustainability efforts require collective commitments worldwide. Therefore, when crafting pro-environmental messages with nature anthropomorphism, corporations should consider the spatial distance associated with global environmental concerns that extend beyond local and national boundaries. Emphasizing corporate sustainable commitments in response to humanized global environmental challenges may enhance the effectiveness of sustainability messages in advertising.

Limitations and Future Studies

Despite the novelty of this study, several limitations should be acknowledged. First, this research represents a single experimental endeavor. While valuable insights have been gained, experimental findings benefit from replication across multiple studies. Future research can enhance generalizability by conducting multiple studies in different contexts

or with diverse populations to validate our findings. Second, our manipulation primarily relied on verbal components paired with spatial distance to represent psychological distance. Although our stimuli were selected based on relevant literature and pre-test results, future studies may benefit from exploring additional anthropomorphic cues accessible for corporate communication (e.g., visuals, consumer dialogues). Additionally, investigating alternative psychological distance dimensions (e.g., temporal distance) could offer deeper insights into the focal discussions. Similarly, applying anthropomorphism to different natural entities (e.g., clouds, rivers) could provide a more comprehensive understanding of how nature anthropomorphism influences sustainability. Expanding these manipulations would enhance the generalizability and applicability of our findings across different contexts. Third, we acknowledge that nature anthropomorphism and global identity function as individual differences. This study focused solely on message effectiveness and did not measure participants' pre-existing perceptions of these concepts. Future research should account for these individual variations, potentially by incorporating them into study models as covariates or moderators to further examine their influence in scholarly discussions. Lastly, due to the lack of available facilities, we measured purchase intention rather than directly measuring purchase behaviors as the dependent variable. Future studies may consider assessing real consumption behaviors in response to pro-environmental advertising messages (e.g., eye-tracking).

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Appendix

Study Manipulations


The presence of nature anthropomorphism with spatially distant (left) and close (right) messages

I am a Tree from the Rainforests.
Discover My Story.

Every time a single-use paper cup is chosen,
I risk being felled.

By choosing a reusable cup,
you protect me and combat deforestation
in my rainforest home.
You save the distant ecosystem
of rainforests.

Stand with me.
Stand for the rainforests.




RE-CUP.INC

I am a Tree from American Forests.
Discover My Story.

Every time a single-use paper cup is chosen,
I risk being felled.

By choosing a reusable cup,
you protect me and combat deforestation
in my American-forest home.
You save the nearby ecosystem
of American forests.

Stand with me.
Stand for American forests.



RE-CUP.INC


The absence of nature anthropomorphism with spatially distant (left) and close (right) messages

This is a Tree from the Rainforests.
Discover Its Story.

Every time a single-use paper cup is chosen,
a tree risks being felled.

By choosing a reusable cup,
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