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Colour effects in green advertising

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Abstract

Marketers often use green in marketing communications to signal sustainability, despite the lack of supportive data. This article is a report of two experiments to observe consumer reactions to advertisements that use colour to indicate the environmental friendliness. The pretest and Study 1 confirm that consumers associate green with environmental friendliness and grey with environmental unfriendliness. Thus green (grey) is more (less) effective for producing positive ad attitudes and purchase intentions. Consumer perceptions regarding colour appropriateness mediate the effects. Study 2 shows that persuasion knowledge moderates the effects: when consumers have high persuasive knowledge, green has a less positive effect; grey has a less negative effect; blue remains neutral. The study concludes that green functions as a peripheral cue signalling an eco-friendly brand image, but the use of green may backfire when consumers are aware that green is used to bias responses.

KEYWORDS

colour, green advertising, persuasion knowledge, sustainability

1 | INTRODUCTION

Marketing communications use colours to shape the consumer behavior (Bellizzi, Crowley, & Hasty, 1983; Singh, 2006). For example, Starbucks and Whole Foods Market, known for eco-friendliness, signal their sustainability using a green logo as a particularly strong signal indicating socially desirable business practices (e.g., Mazar & Zhong, 2010; Yoon & Oh, 2016). Ironically, however, BP, infamous for the deadly and destructive Deepwater Horizon oil spill in the Gulf of Mexico, adopted a green label to counter the damage to the brand.

Does the use of green to advertise environmental friendliness actually enhance advertising effectiveness? Do green strategies work if they are perceived to inappropriate? In contrast, does the use of grey—a colour that often symbolizes environmental destruction—damage brand images? Might success or failure of colour strategies depend on consumer scepticism about marketing persuasion? How do colours and words jointly shape consumer thought and action in response to sustainable marketing? Surprisingly, those questions have been rarely studied empirically. This research aims to fill the gap.

Many advertising campaigns use visual elements as cues to enhance brand perceptions (Parguel, Benoit-Moreau, & Russell, 2015). Green is the ubiquitous visual cue used to trigger implicit ecological inferences in *green advertising*, but green can be abused through greenwashing practices intended to mislead consumers (Schmuck, Matthes, & Naderer, 2018). In response, the U.S. Patent and Trademark Office established guidelines to prevent environmentally destructive companies from using the word *green* in their trademarks (Collen, 2012).

Theoretically, the current research proposes that marketing communications may be persuasive when colours are appropriate for the message, but inappropriate colour themes may cause resistance (Seo & Scammon, 2017). Accordingly, the persuasion knowledge model (Friestad & Wright, 1994) warns that if message recipients are explicitly aware that companies are using colour inappropriately to manipulate them, the persuasive intent may backfire.

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For example, green may be persuasive in environmental advertising, but not if consumers are aware that green is being used to bias their responses.

The primary goal of this article is to empirically test the rarely researched but common practice of using green to strengthen the environmental persuasion. First, the studies reported here compare the effects of eco-friendly green, eco-unfriendly grey and eco-neutral blue to show that consumers associate green with eco-friendliness and grey with environmental destruction, but have neutral perceptions about blue. The results also demonstrate that when consumers know about persuasion techniques, they are more scrutinizing so that green loses its positive effect and grey loses its negative effect.

Two experimental studies make two major contributions to the study of colour appropriateness in environmental advertising. First, the work provides empirical evidence that green is associated with environmental friendliness and is effective for environmental messages, but grey is associated with eco-unfriendliness and is incongruent with environmental messaging. Second, the studies show that consumer knowledge about persuasion techniques merges colour effects. Psychology and marketing research are utilized to show how visual and semantic aspects interact to influence advertising effectiveness.

2 | THEORETICAL BACKGROUND

2.1 | The colour green in advertising

Aesthetic theorists have shown that colours have two coexisting yet distinct meanings that can alter perceptions: embodied and referential meaning (Meyers-Levy & Zhu, 2010). *Embodied meaning* is intrinsic, context-independent, driven by hedonic or valenced biological aspects. For example, the colour red has a long wavelength that increases stimulation and activates arousal (Labrecque, Patrick, & Milne, 2013; Meyers-Levy & Zhu, 2010).

More relevant to the current research is *referential meaning*, which emanates from psychological networks of semantic associations and real-world concepts established by previous exposure to visual stimuli. Referential meaning is learned and depends on contextual cues. During everyday life, individuals construct learned networks of colour associations as they encounter colour pairings with meaningful messages, concepts, objects and experiences (Labrecque et al., 2013). For example, everyday experience causes individuals to associate yellow with lemons. Consequently, a fragrance packaged in yellow can evoke associations with lemon scents.

Marketing communications heavily use green colour schemes to project environmental friendliness. The term *green advertising* indicates marketing promotions of eco-friendly products and actions (Hartmann & Apaolaza-Ibáñez, 2009). Consumers tend to see green brand images as being "linked to environmental commitments and environmental concerns" (Chen, 2010, p. 312). Similarly, they clearly associate the word and colour *green* with eco-friendliness for evaluating recyclable packaging, natural/organic ingredients, and production standards (Kim, Oh, Yoon, & Shin, 2016; Taufique, Polonsky, Vocino, & Siwar, 2019; Yoon & Oh, 2016). Environmentally conscious consumers tend to recycle, purchase sustainable goods, support fair work treatment, and are called *green* (Brochado, Teiga, & Oliveira-Brochado, 2017). The term "green energy" represents alternative, environmentally friendly energy sources (Sunstein & Reisch, 2013). In contrast, the term "gray energy" represents traditional environmentally destructive energy sources. That is, grey tends to be associated, although less strongly, with industrialization and war, ashes, concrete and cement (Zuffi, 2012).

Marketing communications use green because its referential associations will activate associated networks of environmental practices, products, and customers (Mazar & Zhong, 2010; Yoon, Choi, & Song, 2011). In particular, when consumers encounter an ad for an unfamiliar brand, they tend to process and use the available information to make inferences about the missing or unobserved attributes (Asch, 1946; Nisbett & Wilson, 1977). Such generalizations affect their subsequent judgements about unrelated attributes. For instance, when consumers encounter a new brand, they are likely to strongly rely on colour information for making evaluations. Green logos are particularly likely to evoke impressions of eco-friendliness and ethical practices (Sundar & Kellaris, 2017).

Following the logic, an ad that features a green colour theme should enhance environmental persuasion (Sundar & Kellaris, 2017; Yoon & Oh, 2016). For a similar reason, an ad that features a grey colour theme should weaken environmental persuasion. Therefore:

Hypothesis 1 *Environmental advertisements that use green (grey) will be effective (ineffective) for shaping attitudes towards advertising and purchase intentions.*

2.2 | Colour appropriateness

Environmental advertising that uses green should evoke more favourable attitudinal and behavioural outcomes (Hypothesis 1) because consumers expect marketing communications to use appropriate colours (Grossman & Wisenblit, 1999). Colour preference simply indicates personal taste, but colour appropriateness indicates perceptions regarding how well colours match with specific causes and product categories; indeed, mismatched colours and messages can cause consumers to reject or misinterpret ad messages (Hanss, Böhm, & Pfister, 2012; Solomon, Bamossy, & Askegaard, 2002).

Perceived colour appropriateness for various product categories has long been studied in the context of consumer choice, and researchers have shown that colour must be congruous with various affective qualities across product categories and situations (Bottomley & Doyle, 2006; Hanss et al., 2012; Marques da Rosa, Spence, & Miletto Tonetto, 2019; Schiller, 1935). For example, red and yellow evoke images of strength, ferocity and loudness, and are appropriate for advertising convertibles and sports cars. Red is also appropriate for advertising chocolates, nightclubs and perfumes. Blue is more appropriate for products such as frost-protection

agents, power tools and car tires. Combinations of silver and black are appropriate for advertising automobiles; yellow and black for advertising coffee; silver and green for perfume; yellow and green for soap (Bottomley & Doyle, 2006).

Given that green is strongly associated with environmental images, consumers are likely to consider green rather than grey to be appropriate for emphasizing eco-friendliness. Accordingly, colour appropriateness is expected to mediate the green-over-grey effect specified in Hypothesis 1.

Hypothesis 2 *Colour appropriateness will mediate the green-over-grey effect on attitudes towards advertising and purchase intentions.*

2.3 | Moderating role of persuasion knowledge

The persuasion knowledge model (PKM) recognizes that consumers learn from their everyday experiences with various persuasive messages. Consumers who have persuasion knowledge can "recognize, analyze, interpret, evaluate and remember persuasion attempts"; consequently, they can "select and execute coping tactics believed to be effective and appropriate" (Friestad & Wright, 1994, p. 3).

Consumers who have persuasion knowledge know how to glean useful, goal-relevant information from persuasion attempts, but remain sceptical about behavioural intent (Friestad & Wright, 1994). For example, salesperson flattery can be persuasive, but less so for customers armed with persuasion knowledge leading them to suspect that flattery is mercenary. Thus persuasion knowledge can evoke mistrust and resistance (Campbell & Kirmani, 2000) in a two-step process: phase one occurs when a consumer forms an initially positive response; phase two occurs when persuasion knowledge is activated and the positive response is adjusted downward (Gilbert & Malone, 1995; Gilbert, Pelham, & Krull, 1988).

Persuasion knowledge can be chronically or temporarily accessible. To highly sceptical individuals, persuasion knowledge is chronically, naturally available. To others, situational cues will trigger momentarily accessible persuasion knowledge. For example, in a shopping scenario study, persuasion knowledge was primed by altering the timing of a salesperson's manipulative intent: customers had activated persuasion knowledge when the salesperson flattered them before they made a purchase, but not when the flattery occurred after purchase (Campbell & Kirmani, 2000).

Accordingly, the current research contends that persuasion knowledge is a boundary condition for the green-over-grey effect (Hypothesis 1). That is, consumers are likely to judge environmental advertising according to their knowledge about persuasion techniques (Friestad & Wright, 1994). Specifically, highly accessible persuasion knowledge may cause the positive effects of green to backfire. Following the proposed two-stage process, individuals who lack persuasion knowledge will normally process green as a positive peripheral cue and will form positive ad attitudes and behavioural intentions. However, individuals primed with persuasion knowledge will be more sceptical and scrutinizing (Obermiller & Spangenberg, 1998). Once they recognize that a marketer intentionally but inappropriately used green to induce positive responses, they will adjust their responses downward (Meyers-Levy & Peracchio, 1995). A grey-themed ad will evoke a similar correction process in the opposite direction: when individuals recognize that grey has evoked unfair bias, they will adjust their responses upward.

Hypothesis 3a *Individuals with high (low) persuasion knowledge will respond more negatively (positively) to an environmental claim using a green theme.*

Hypothesis 3b *Individuals with high (low) persuasion knowledge will respond more positively (negatively) to an environmental claim using a grey theme.*

Hypothesis 3c *Persuasion knowledge will have no effects on responses to an environmental claim using a blue theme.*

To test the hypotheses, we conducted two experimental studies. In Study 1, we used *Volkswagen*, a real automobile brand. In Study 2, we used *Just Water*, a fictitious bottled water brand, following the rationale that the automobile is a high-involvement product (e.g., Park & Moon, 2003) and bottled water is a low-involvement product (e.g., Schmuck et al., 2018). Product involvement, as a key moderating factor of brand credibility (Baek & King, 2011) and advertising effectiveness (Youn & Kim, 2018), indicates how extensively a product category is more or less central to consumers' lives, their sense of identity and their relationship with the rest of the world (Traylor, 1981). Second, using both a real and a fictitious brand increases overall validity. On the one hand, prior experience with a stimulus brand may confound results and challenge internal validity (Kim, Park, et al., 2019). On the other hand, ecological validity may be lowered when participants question the reality of a fictitious brand. Consequently, researchers often use both real and fictitious brands (e.g., Baek, Yoo, & Yoon, 2018; Kim, Baek, & Yoon, 2020; Lee, Yoon, Lee, & Royne, 2018).

3 | PRETEST

Seventy undergraduate students (56% men, mean age = 20.7) from a northeastern U.S. university participated in a lab experiment in exchange for course credit. Participants rated one green square and one grey square for evoking impressions of environmental friendliness, on a 7-point scale ("The color above is…" 1 = *environmentally unfriendly*; 7 = *environmentally friendly*). Based on Hanss et al. (2012), we used the Munsell colour system to select two green and grey hues from ten possibilities. We controlled for brightness and saturation, which strongly determine whether colour evokes affect (Valdez & Mehrabian, 1994).

As anticipated, participants perceived the green square (M_{green} = 6.48; SD = 1.31) rather than the grey square to evoke greater impressions of environmental friendliness (M_{grey} = 2.68; SD = 1.49, $F(1, 69) = 299$, $p < .001$), confirming the baseline assumption that green evokes perceptions of environmental friendliness, while grey is generally perceived to indicate environmental unfriendliness.

4 | STUDY 1

Study 1 tested the attitudinal and behavioural responses suggested in Hypothesis 1 using green-coloured and grey-coloured ads for *Volkswagen*. Study 1 also tested Hypothesis 2 regarding whether perceived colour appropriateness mediated the effects.

4.1 | Participants and procedure

Study 1 used a one-factor between-subjects design (colour theme: green vs. grey) for a lab experiment using 155 undergraduate students (53% men, mean age = 19.8) from a northeastern U.S. university, participating in exchange for course credit. The undergraduate sample was deemed appropriate for the study: college students are sensitive to environmental issues (Baek, Yoon, & Kim, 2015; Zimmer, Stafford, & Stafford, 1994) and often initiate environmental practices (Han, Baek, Yoon, & Kim, 2019).

4.2 | Stimulus ads

Participants viewed one of two identical stimulus ads for *Volkswagen*, differing only in being green or grey (Appendix A), based on Munsell Colour Company (1994) specifications for using green (2.5G 2/6) and grey (N 6/0) (Hanss et al., 2012). The ad featured the silhouette of a car placed on the image of a large leaf. The head copy and text acknowledged and apologized for the infamous emissions scandal, often called *Dieselgate* or *Emissionsgate* that occurred after revelations that *Volkswagen* illegally altered its emissions controls to meet the U.S. Environmental Protection Agency (EPA) standards. To redeem itself and to appear eco-friendly, *Volkswagen* promised to plant trees in response to auto sales.

4.3 | Measures

Participants responded to questions about perceived colour appropriateness with four items on a 7-point semantic differential scale (Cronbach's α = .96; *not compatible/compatible*, *bad fit/good fit*, *bad match/good match*, and *irrelevant/relevant*; Kamins & Gupta, 1994; Till & Busler, 2000). Ad attitude was measured using three items on a 7-point semantic differential scale (Cronbach's α = .95; *bad/good*, *unfavourable/favourable* and *positive/negative*; Baek & Yoon, 2017). To assess purchase intentions, participants indicated their likelihood of purchasing the product using three items on a 7-point semantic differential scale (Cronbach's α = .96; *very unlikely/likely*, *definitely would not/definitely would* and *improbable/probable*; Baek & Yoon, 2017). For all items, a higher score indicated more positive attitudes/intentions. Finally, participants answered demographic questions regarding age, gender and ethnicity.

4.4 | Results

We conducted an independent samples *t*-test in SPSS 25 to assess the green-over-grey effect on attitudes towards advertising and purchase intentions. Participants who viewed the green-coloured ad (M = 5.58; SD = 1.22) had more favourable attitudes towards the ad than those who viewed the grey-coloured ad (M = 4.52; SD = 1.52, t = (153) = 4.82, p < .001). Similarly, a significant effect emerged for purchase intentions (t = (153) = 2.68, p < .01): participants who viewed the green-coloured ad (M = 4.69; SD = 1.58) reported stronger purchase intentions than those who viewed the grey-coloured ad (M = 4.01; SD = 1.67).

The PROCESS model 4 (Hayes, 2013) was used to carry out a mediation analysis using 5,000 bootstrap samples. To estimate an indirect effect, the colour factor (1 = green, 0 = grey) was entered as the independent variable, ad attitude as the dependent variable, and perceived colour appropriateness as the mediator. An independent samples *t*-test confirmed that participants who viewed the green-coloured ad (M = 5.65; SD = 1.32) perceived greater colour appropriateness, in contrast with those who viewed the grey-coloured ad (M = 3.35; SD = 1.98, t (153) = 8.56, p < .001). As Figure 1 shows, the 95% confidence interval (CI) did not include zero, indicating that colour had a significant indirect effect on ad attitude through perceived colour appropriateness (B = 1.23, SE = .21; 95% CI from 0.84 to 1.66). A separate mediation analysis with purchase intention as the dependent variable showed similar results. A significant indirect effect with the 95% CI excluding zero was observed (B = 1.02, SE = .20; 95% CI from 0.66 to 1.42).

Overall, participants formed more positive attitudes and purchase intentions towards the ad that used the colour green to highlight eco-friendliness. Furthermore, perceived colour appropriateness mediated the effect of colour on ad attitudes and purchase intentions.

4.5 | Discussion

The pretest showed that participants perceived that green (grey) symbolizes eco-(un)friendliness. Study 1 further showed that a green-coloured environmental ad versus a grey-coloured ad engenders more favourable attitudinal and behavioural evaluations, supporting Hypothesis 1. Participants also perceived green-coloured ads to be appropriate for an environmental message, but grey-coloured ads to be inappropriate. Thus, perceived colour appropriateness was a mediator determining responses to eco-friendly colour signals, supporting Hypothesis 2.

The findings suggest that colour is a peripheral cue and draws the most positive responses if the colour is associated with eco-friendliness. Will participants adjust their responses if they are made aware that green can evoke inappropriately positive responses? Similarly, will they respond differently if they recognize that grey evoked unfair impressions? Study 2 tests those questions by altering the degree of persuasion knowledge.

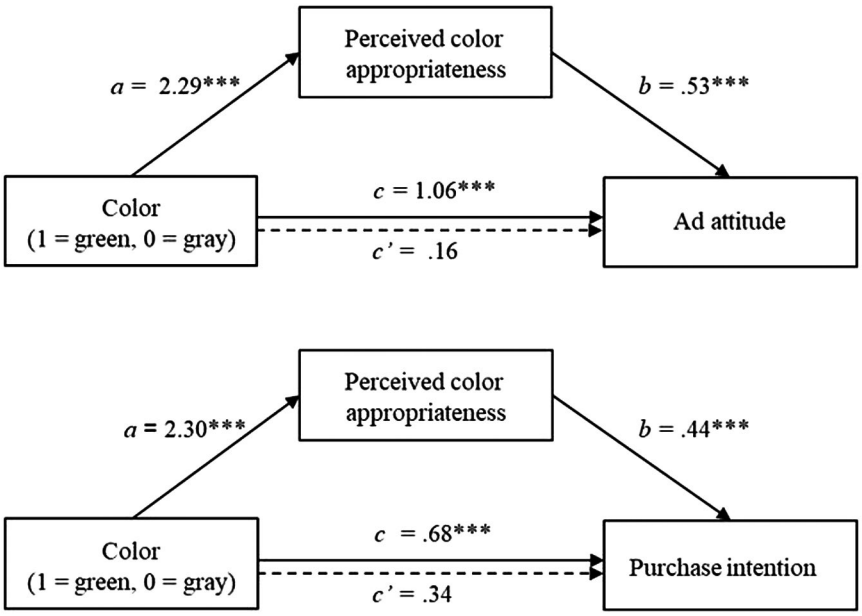

FIGURE 1 Effects of color on ad attitude and purchase intention through perceived color appropriateness. Path coefficients are unstandardized; ***$p < .001$

5 | STUDY 2

Study 2 tests the moderation hypotheses, Hypothesis 3a, 3b, and 3c. Persuasion knowledge is expected to moderate the effects observed in Study 1. That is, consumers who have low persuasion knowledge are expected to be susceptible to the green-over-grey effect, but consumers who have high persuasion knowledge are expected to resist it. To broaden the validity of the findings, two modifications were made to the stimulus ads. Whereas Study 1 used a real automobile brand and compared only green and grey conditions, Study 2 used a fictitious drinking water brand, *Just Water*, and added blue as a control condition.

5.1 | Participants and procedure

Study 2 was a 3 (colour theme: green vs. grey vs. blue) × 2 (persuasion knowledge: high vs. low) between-subjects design. In exchange for course credit, 200 undergraduate students (57% men; average age = 19.5) recruited from a northeastern U.S. university participated. When participants arrived at the lab, they read one of two scenarios adopted from Isaac and Grayson (2017) to induce high or low persuasion knowledge. Participants in both conditions read a shopping scenario in which they imagined choosing between two jackets and encountering a salesclerk who recommended the more expensive jackets. Participants in the high persuasion knowledge condition were told to focus on the salesclerk's motives: "Think about why the salesclerk is recommending the more expensive jacket. Consider that some salesclerks try to truthfully communicate information about products and promotions, while others try to trick or mislead shoppers". Participants in the low persuasion knowledge condition were asked to focus on the product attributes: "Think about the considerations you might have when buying a jacket".

Next, participants were randomly assigned to view stimulus ads using green, grey or blue colour themes. We created three print ads touting green efforts of a fictitious bottled water brand, *Just Water* (Appendix B). The ads were similar to ads used in Study 1, but we supplemented the green and grey ads with a blue ad as an additional control condition. The head copy read, "Taking steps toward a greener planet". The copy highlighted that the company now uses less packaging material and invested $6 million to build recycling plants.

Then participants completed manipulation checks and dependent measures. For the persuasion knowledge manipulation check, participants rated the salesperson on a 4-item, 7-point scale (Cronbach's α = .80). One end was anchored with negative adjectives: *insincere*, *dishonest*, *manipulative* and *pushy*; the other end was anchored with positive descriptions: *sincere*, *honest*, *not manipulative* and *not pushy* (Campbell & Kirmani, 2000). Similar to Study 1, we measured *perceived colour appropriateness* with four items (Cronbach's α = .91; Kamins & Gupta, 1994; Till & Busler, 2000), *ad attitude* with three items (Cronbach's α = .94; Baek & Yoon, 2017) and *purchase intentions* with three items (Cronbach's α = .95; Baek & Yoon, 2017). For all items, a higher score on the 7-point scale indicated more positive attitudes/intentions. Demographics were measured at the end of the experiment.

5.2 | Results

5.2.1 | Manipulation check

An independent samples *t*-test revealed that participants in the high persuasion knowledge condition rated the salesperson more negatively (M = 3.11, SD = 1.04) than did those in the low persuasion knowledge (M = 3.52, SD = 1.13, t (278) = 3.10, $p < .01$).

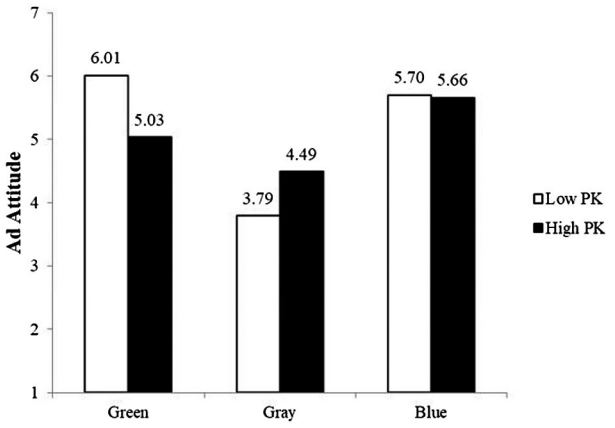

FIGURE 2 Effect of color and persuasion knowledge on ad attitude

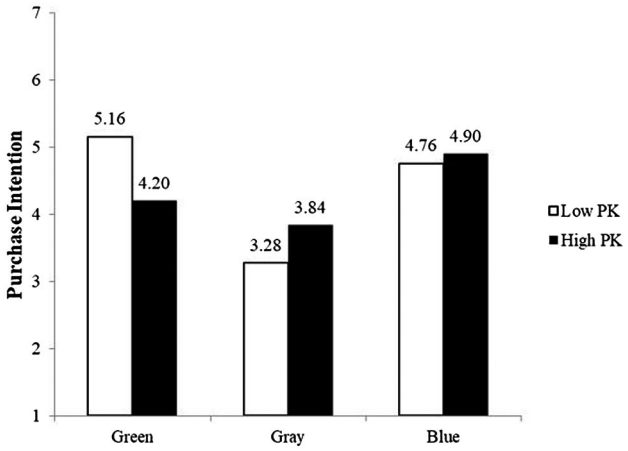

FIGURE 3 Effect of color and persuasion knowledge on purchase intention

5.2.2 | Ad attitude

A 3 (colour theme) × 2 (persuasion knowledge) ANOVA revealed a significant main effect of colour type (F (2, 247) = 35.17, p < .001), but no main effect of persuasion knowledge (F (1, 247) = 0.43, p = .51). An important significant interaction effect emerged for ad attitude (F (2, 247) = 8.51, p < .001). As Figure 2 shows, planned contrasts demonstrated that when participants who had low persuasion knowledge viewed the green-themed ad (M = 6.01; SD = 1.21), they had more favourable ad attitudes than did those with high persuasion knowledge (M = 5.03, SD = 1.31, t = 3.51, p < .001). In contrast, when participants with high persuasion knowledge viewed the grey-themed ad (M = 4.49; SD = 1.48), they reported more favourable ad attitudes than did those with low persuasion knowledge (M = 3.79; SD = 1.52, t = 2.14, p < .05). For the blue-themed ad, no difference was observed between those with low (M = 5.70; SD = 1.11) or high (M = 5.65; SD = 1.19; t = 0.18, p = .86) persuasion knowledge.

5.2.3 | Purchase intention

A 3 (colour type) × 2 (persuasion knowledge) ANOVA was performed on purchase intention and revealed a significant main effect of colour type (F (2, 247) = 21.61, p < .001), but no main effect of persuasion knowledge (F (1, 247) = 0.24, p = .62). As expected, a significant interaction effect occurred (F (2, 247) = 6.69, p < .001). Planned contrasts demonstrated that when participants with low persuasion knowledge were exposed to the green-themed ad (M = 5.16; SD = 1.34), they reported stronger purchase intentions than did those with high persuasion knowledge (M = 4.20, SD = 1.22, t = 3.34, p < .001). In contrast, although the effect was not statistically significant, the directional opposite emerged for the grey-themed ad for participants with low (M = 3.28; SD = 1.56) and high persuasion knowledge (M = 3.84; SD = 1.61; t = 1.64, p = .11). The blue-coloured ad indicated no difference between participants with low (M = 4.76; SD = 1.25) or high (M = 4.90; SD = 1.32; t = 0.51, p = .61) persuasion knowledge (See Figure 3).

5.3 | Discussion

Building on the PKM (Friestad & Wright, 1994), Study 2 showed that participants who gained knowledge about persuasion techniques were able to see beyond implicit assumptions that green necessarily indicates eco-friendliness or that grey necessarily indicates eco-unfriendliness. Persuasion knowledge had no effect on impressions regarding the neutral colour blue.

6 | GENERAL DISCUSSION

The current research examines how consumers respond to advertisements that use colours to persuade consumers that a brand is devoted to environmental causes. The pretest and Study 1 confirm that green (grey) symbolizes eco-(un)friendliness. Thus, green (grey) is more (less) effective in producing positive attitudes towards the ad and purchase intentions, supporting Hypothesis 1. Perceived colour appropriateness is identified as an underlying mechanism explaining why green encourages eco-friendly consumption. Hypothesis 2 was supported.

Study 2 extends the findings by introducing persuasion knowledge as a moderating variable that neutralizes the colour effects. That is, when participants are primed to be wary of advertisers' persuasive techniques, green becomes less persuasive (Hypothesis 3a); grey has a less negative effect on persuasion (Hypothesis 3b); and blue retains its neutral effect (Hypothesis 3c). Thus, the hypotheses 3a, 3b and 3c were supported.

The findings contribute to understandings of how colours play key roles in advertising effectiveness. The results align with the match-up hypothesis (Baek & Yoon, 2017; Choi, Yoon, Kim, &

Kim, 2019; Till & Busler, 2000), which predicts that endorsements are more effective when advertising components such as spokesperson and ad messages are thematically consistent. Consequently, when consumers visually process the colour green and semantically process the *word* green, the colour harmonizes with the message and evokes psychological congruency. The Elaboration Likelihood Model literature (Kareklas, Muheling, & King, 2019; Petty, Cacioppo, & Schumann, 1983) suggests that congruency between the central route (explicit claims in the ad) and the peripheral route of persuasion (colour themes) can create synergy in persuasion. We extend that work by showing that colour cues peripheral to the central advertising message can enhance overall persuasiveness.

We add to the persuasion knowledge literature and give new insights for marketing and psychology researchers regarding how persuasion knowledge affects interactive dynamics between visual and semantic perceptions and clarifying that persuasion knowledge can change the presence and magnitude of green colour effects. Relatedly, a test using a modified version of the Stroop (1935) task to create a clash between meaning and colour, such as printing the word *blue* in a *red* font, found that the visual-semantic clash increases cognitive loads, slows information processing, and affects subsequent brand judgements (Oh, Yoon, & Vargas, 2019).

Analogous to those findings, our research shows that congruency between visual and semantic stimuli enhances judgements about advertising messages. Consumers use visual heuristics to judge the quality of products (Kim, Gravier, Yoon, & Oh, 2019) or advertising claims regarding nutrition (Gomez, 2013), sports sponsorship (Henderson, Mazodier, & Sundar, 2019), and packaging designs (Herbes, Beuthner, & Ramme, 2020; Marques da Rosa et al., 2019). Our findings suggest that readily accessible persuasion knowledge could allow consumers to detect and adjust colour-induced biases.

Excessive downward corrections might damage brands, but our data failed to indicate that persuasion knowledge always discounts the value of green or enhances the value of grey in environmental advertising. However, in some cases, persuasion knowledge has been shown to overcorrect rather than accurately adjust initial judgements (e.g., Meyers-Levy & Peracchio, 1995). If overcorrection indeed occurs, the consumer adjusts downward too strongly, which then ironically might damage the brand's environmental image. Thus, future research should investigate whether overcorrections occur particularly when consumers recognize that colours are potentially biasing their perceptions.

The current research provides clear managerial implications. Unfortunately, companies occasionally face crises requiring them to take action to counter anti-environmental images. For example, after BP was responsible for the worst oil spill in U.S. history, the company redesigned its logo with a cheerful green in an attempt to restore its damaged image. However, the change was criticized as a greenwashing campaign, a superficial and cynical display of fake environmentalism. Consequently, using green to signal eco-friendliness might actually have a boomerang effect when the public has been exposed to widespread news coverage and will have heightened awareness of a company's persuasive intent. The current findings indicate that a company under heightened scrutiny might increase resistance to persuasion if they inappropriately use green in their logo and ad campaigns.

6.1 | Limitations and directions for future research

The limitations of our research suggest interesting opportunities for future study. First, we studied how consumers associate only green, grey and blue with environment-related dimensions. However, future research should observe whether consumers perceive turquoise or black, for example, to be more or less relevant to environmental issues. In addition, we selected one green colour attribute (2.5G 2/6) from the Munsell colour system. To broaden applicability, future research should replicate our findings with greens of varied hue, lightness, and saturation.

Another caveat is that we did not check for impaired colour vision, although the National Eye Institute (NIE) indicates that about 8% of the male population and 0.5% of the female population have difficulties distinguishing between red and green (National Eye Institute, 2019). Future research should screen participants for colour vision deficiencies.

When researchers study colour effects, they should consider both embodied and referential meanings (Meyers-Levy & Zhu, 2010), but we considered only referential meanings. Moreover, hue, saturation, and value influence colour perceptions (Gorn, Chattopadhyay, Yi, & Dahl, 1997; Labrecque & Milne, 2013), but we focused on hue only, while controlling for colour saturation and value. Future research might explore how saturation and value components may be used to enhance environmental persuasion. We contend that colour meanings and associations depend on context and culture (Elliot, Maier, Binser, Friedman, & Pekrun, 2009; Kareklas et al., 2019). For example, *green* means *beautiful* in Brazil (Madden, Hewett, & Roth, 2000). It would be interesting to examine other cultural factors that might reshape green's environmental meanings.

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REFERENCES

Asch, S. E. (1946). Forming impressions of personality. *Journal of Abnormal and Social Psychology*, *41*(3), 258–290. https://doi.org/10.1037/h0055756

Baek, T. H., & King, K. W. (2011). Exploring the consequences of brand credibility in services. *Journal of Services Marketing*, *25*(4), 260–272. https://doi.org/10.1108/08876041111143096

Baek, T. H., Yoo, C., & Yoon, S. (2018). Augment yourself through virtual mirror: The impact of self-viewing and narcissism on consumer responses. *International Journal of Advertising*, *37*(3), 421–439. https://doi.org/10.1080/02650487.2016.1244887

Baek, T. H., & Yoon, S. (2017). Guilt and shame: Environmental message framing effects. *Journal of Advertising*, *46*(3), 440–453. https://doi.org/10.1080/00913367.2017.1321069

Baek, T. H., Yoon, S., & Kim, S. (2015). When environmental messages should be assertive: Examining the moderating role of effort investment. *International Journal of Advertising*, *34*(1), 135–157. https://doi.org/10.1080/02650487.2014.993513

Bellizzi, J. A., Crowley, A. E., & Hasty, R. W. (1983). The effects of color in store design. *Journal of Retailing*, *59*(1), 21–24.

Bottomley, P. A., & Doyle, J. R. (2006). The interactive effects of colors and products on perceptions of brand logo appropriateness. *Marketing Theory*, *6*(1), 63–83. https://doi.org/10.1177/1470593106061263

Brochado, A., Teiga, N., & Oliveira-Brochado, F. (2017). The ecological conscious consumer behaviour: Are the activists different?*International Journal of Consumer Studies*, *41*(2), 138–146. https://doi.org/10.1111/ijcs.12321

Campbell, M. C., & Kirmani, A. (2000). Consumers' use of persuasion knowledge: The effects of accessibility and cognitive capacity on perceptions of an influence agent. *Journal of Consumer Research*, *27*(1), 69–83. https://doi.org/10.1086/314309

Chen, Y. S. (2010). The drivers of green brand equity: Green brand image, green satisfaction, and green trust. *Journal of Business Ethics*, *93*(2), 307–319. https://doi.org/10.1007/s10551-009-0223-9

Choi, Y. K., Yoon, S., Kim, K., & Kim, Y. (2019). Text versus pictures in advertising: Effects of psychological distance and product type. *International Journal of Advertising*, *38*(4), 1–16. https://doi.org/10.1080/02650487.2019.1607649

Collen, J. (2012, October 4). Gang green: Rules are tightening. Don't say green if you don't mean green. *Forbes*. Retrieved from http://www.forbes.com/sites/jesscollen/2012/10/04/theres-no-debate-about-this-you-cant-call-your-pesticide-greenand-ask-the-trademark-office-to-help-you/

Elliot, A. J., Maier, M. A., Binser, M. J., Friedman, R., & Pekrun, R. (2009). The effect of red on avoidance behavior in achievement contexts. *Personality and Social Psychology Bulletin*, *35*(3), 365–375. https://doi.org/10.1177/0146167208328330

Friestad, M., & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts. *Journal of Consumer Research*, *21*(1), 1–31. https://doi.org/10.1086/209380

Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin*, *117*(1), 21–38. https://doi.org/10.1037/0033-2909.117.1.21

Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive busyness: When person perceivers meet persons perceived. *Journal of Personality and Social Psychology*, *54*(5), 733–740. https://doi.org/10.1037/0022-3514.54.5.733

Gomez, P. (2013). Common biases and heuristics in nutritional quality judgments: A qualitative exploration. *International Journal of Consumer Studies*, *37*(2), 152–158. https://doi.org/10.1111/j.1470-6431.2012.01098.x

Gorn, G. J., Chattopadhyay, A., Yi, T., & Dahl, D. W. (1997). Effects of color as an executional cue in advertising: They're in the shade. *Management Science*, *43*(10), 1387–1400. https://doi.org/10.1287/mnsc.43.10.1387

Grossman, P. R., & Wisenblit, J. Z. (1999). What we know about consumers' color choices. *Journal of Marketing Practice: Applied Marketing Science*, *5*(3), 78–88. https://doi.org/10.1108/EUM0000000004565

Han, N. R., Baek, T. H., Yoon, S., & Kim, Y. (2019). Is that coffee mug smiling at me? How anthropomorphism impacts the effectiveness of desirability vs. feasibility appeals in sustainability advertising. *Journal of Retailing and Consumer Services*, *51*, 352–361. https://doi.org/10.1016/j.jretconser.2019.06.020

Hanss, D., Böhm, G., & Pfister, H. R. (2012). Active red sports car and relaxed purple–blue van: Affective qualities predict color appropriateness for car types. *Journal of Consumer Behaviour*, *11*(5), 368–380. https://doi.org/10.1002/cb.1380

Hartmann, P., & Apaolaza-Ibáñez, V. (2009). Green advertising revisited: Conditioning virtual nature experiences. *International Journal of Advertising*, *28*(4), 715–739. https://doi.org/10.2501/S0265048709200837

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. NewYork, NY: The Guilford Press.

Henderson, C. M., Mazodier, M., & Sundar, A. (2019). The color of support: The effect of sponsor–team visual congruence on sponsorship performance. *Journal of Marketing*, *83*(3), 50–71. https://doi.org/10.1177/0022242919831672

Herbes, C., Beuthner, C., & Ramme, I. (2020). How green is your packaging: A comparative international study of cues consumers use to recognize environmentally friendly packaging. *International Journal of Consumer Studies*, *44*(3), 258–271. https://doi.org/10.1111/ijcs.12560

Isaac, M. S., & Grayson, K. (2017). Beyond skepticism: Can accessing persuasion knowledge bolster credibility?*Journal of Consumer Research*, *43*(6), 895–912. https://doi.org/10.1093/jcr/ucw063

Kamins, M. A., & Gupta, K. (1994). Congruence between spokesperson and product type: A matchup hypothesis perspective. *Psychology & Marketing*, *11*(6), 569–586. https://doi.org/10.1002/mar.4220110605

Kareklas, I., Muehling, D. D., & King, S. (2019). The effect of color and self-view priming in persuasive communications. *Journal of Business Research*, *98*, 33–49. https://doi.org/10.1016/j.jbusres.2019.01.022

Kim, K., Gravier, M., Yoon, S., & Oh, S. (2019). Active bidders versus smart bidders: Do participation intensity and shopping goals affect the winner's joy in online bidding?*European Journal of Marketing*, *53*(4), 585–606. https://doi.org/10.1108/EJM-09-2016-0492

Kim, K., Park, C., Yoon, S., Choi, Y., Oh, S., & Lee, J. (2019). Branded entertainment: Gender differences in reactions to star ratings. *Journal of Consumer Behavior*, *18*(2), 166–176. https://doi.org/10.1002/cb.1755

Kim, S., Baek, T. H., & Yoon, S. (2020). The effect of 360-degree rotatable product images on purchase intention. *Journal of Retailing and Consumer Services*, *55*, 102062. https://doi.org/10.1016/j.jretconser.2020.102062

Kim, Y., Oh, S., Yoon, S., & Shin, H. H. (2016). Closing the green gap: The impact of environmental commitment and advertising believability. *Social Behavior and Personality: An International Journal*, *44*(2), 339–351. https://doi.org/10.2224/sbp.2016.44.2.339

Labrecque, L. I., & Milne, G. R. (2013). To be or not to be different: Exploration of norms and benefits of color differentiation in the marketplace. *Marketing Letters*, *24*(2), 165–176. https://doi.org/10.1007/s11002-012-9210-5

Labrecque, L. I., Patrick, V. M., & Milne, G. R. (2013). The marketers' prismatic palette: A review of color research and future directions. *Psychology & Marketing*, *30*(2), 187–202. https://doi.org/10.1002/mar.20597

Lee, Y., Yoon, S., Lee, Y., & Royne, M. (2018). How liberals and conservatives respond to equality-based and proportionality-based rewards in charity advertising. *Journal of Public Policy and Marketing*, *37*(1), 108–118. https://doi.org/10.1509/jppm.16.180

Madden, T. J., Hewett, K., & Roth, M. S. (2000). Managing images in different cultures: A cross-national study of color meanings and preferences. *Journal of International Marketing*, *8*(4), 90–107. https://doi.org/10.1509/jimk.8.4.90.19795

Marques da Rosa, V., Spence, C., & Miletto Tonetto, L. (2019). Influences of visual attributes of food packaging on consumer preference and associations with taste and healthiness. *International Journal of Consumer Studies*, *43*(2), 210–217. https://doi.org/10.1111/ijcs.12500

Mazar, N., & Zhong, C. B. (2010). Do green products make us better people?*Psychological Science*, *21*(4), 494–498. https://doi.org/10.1177/0956797610363538

Meyers-Levy, J., & Peracchio, L. A. (1995). Understanding the effects of color: How the correspondence between available and required resources affects attitudes. *Journal of Consumer Research*, *22*(2), 121–138. https://doi.org/10.1086/209440

Meyers-Levy, J., & Zhu, R. (2010). Gender differences in the meanings consumers infer from music and other aesthetic stimuli. *Journal of Consumer Psychology*, *20*(4), 495–507. https://doi.org/10.1016/j.jcps.2010.06.006

Munsell Color Company. (1994). *Munsell soil color charts*. Baltimore, MD: Author.

National Eye Institute. (2019). *Color blindness*. Retrieved from https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/color-blindness

Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, *35*(4), 250–256. https://doi.org/10.1037/0022-3514.35.4.250

Obermiller, C., & Spangenberg, E. R. (1998). Development of a scale to measure consumer skepticism toward advertising. *Journal of Consumer Psychology*, *7*(2), 159–186. https://doi.org/10.1207/s15327663jcp0702_03

Oh, S., Yoon, S., & Vargas, P. (2019). "In-depth" incidental exposure: How processing difficulty and processing style affect evaluations of transparent overlay images. *European Journal of Marketing*, *53*(2), 279–298. https://doi.org/10.1108/EJM-06-2017-0364

Parguel, B., Benoit-Moreau, F., & Russell, C. A. (2015). Can evoking nature in advertising mislead consumers? The power of 'executional greenwashing'. *International Journal of Advertising*, *34*(1), 107–134. https://doi.org/10.1080/02650487.2014.996116

Park, C. W., & Moon, B.-J. (2003). The relationship between product involvement and product knowledge: Moderating roles of product type and product knowledge type. *Psychology & Marketing*, *20*(11), 977–997. https://doi.org/10.1002/mar.10105

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, *10*(2), 135–146. https://doi.org/10.1086/208954

Schiller, G. (1935). An experimental study of the appropriateness of color and type in advertising. *Journal of Applied Psychology*, *19*(6), 652–664. https://doi.org/10.1037/h0056090

Schmuck, D., Matthes, J., & Naderer, B. (2018). Misleading consumers with green advertising? An affect–reason–involvement account of greenwashing effects in environmental advertising. *Journal of Advertising*, *47*(2), 127–145. https://doi.org/10.1080/00913367.2018.1452652

Seo, J. Y., & Scammon, D. L. (2017). Do green packages lead to misperceptions? The influence of package colors on consumers' perceptions of brands with environmental claims. *Marketing Letters*, *28*(3), 357–369. https://doi.org/10.1007/s11002-017-9420-y

Singh, S. (2006). Impact of color on marketing. *Management Decision*, *44*(6), 783–789. https://doi.org/10.1108/00251740610673332

Solomon, M. R., Bamossy, G. J., & Askegaard, S. (2002). *Consumer behavior: A European perspective*. Upper Saddle River, NJ: Pearson Prentice Hall.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*, 643–662. https://doi.org/10.1037/h0054651

Sundar, A., & Kellaris, J. J. (2017). How logo colors influence shoppers' judgments of retailer ethicality: The mediating role of perceived eco-friendliness. *Journal of Business Ethics*, *146*(3), 685–701. https://doi.org/10.1007/s10551-015-2918-4

Sunstein, C. R., & Reisch, L. A. (2013). Green by default. *Kyklos*, *66*, 398–402. https://doi.org/10.1111/kykl.12028

Taufique, K. M. R., Polonsky, M. J., Vocino, A., & Siwar, C. (2019). Measuring consumer understanding and perception of eco-labelling: Item selection and scale validation. *International Journal of Consumer Studies*, *43*(3), 298–314. https://doi.org/10.1111/ijcs.12510

Till, B. D., & Busler, M. (2000). The match-up hypothesis: Physical attractiveness, expertise, and the role of fit on brand attitude, purchase intent and brand beliefs. *Journal of Advertising*, *29*(3), 1–13. https://doi.org/10.1080/00913367.2000.10673613

Traylor, M. B. (1981). Product involvement and brand commitment. *Journal of Advertising Research*, *21*(6), 51–56.

Valdez, P., & Mehrabian, A. (1994). Effects of color on emotions. *Journal of Experimental Psychology: General*, *123*(4), 394–409. https://doi.org/10.1037/0096-3445.123.4.394

Yoon, S., Choi, Y. K., & Song, S. (2011). When intrusive can be likable: Product placement effects on multitasking consumers. *Journal of Advertising*, *40*(2), 63–76. https://doi.org/10.2753/JOA0091-3367400205

Yoon, S., & Oh, S. (2016). Introduction to special issue on social and environmental issues in advertising. *International Journal of Advertising*, *35*(1), 1–3.

Youn, S., & Kim, H. (2018). Temporal duration and attribution process of cause-related marketing: Moderating roles of self-construal and product involvement. *International Journal of Advertising*, *37*(2), 217–235.

Zimmer, M. R., Stafford, T. F., & Stafford, M. R. (1994). Green issues: Dimensions of environmental concern. *Journal of Business Research*, *30*(1), 63–74. https://doi.org/10.1016/0148-2963(94)90069-8

Zuffi, S. (2012). *Color in art*. New York, NY: Abrams.

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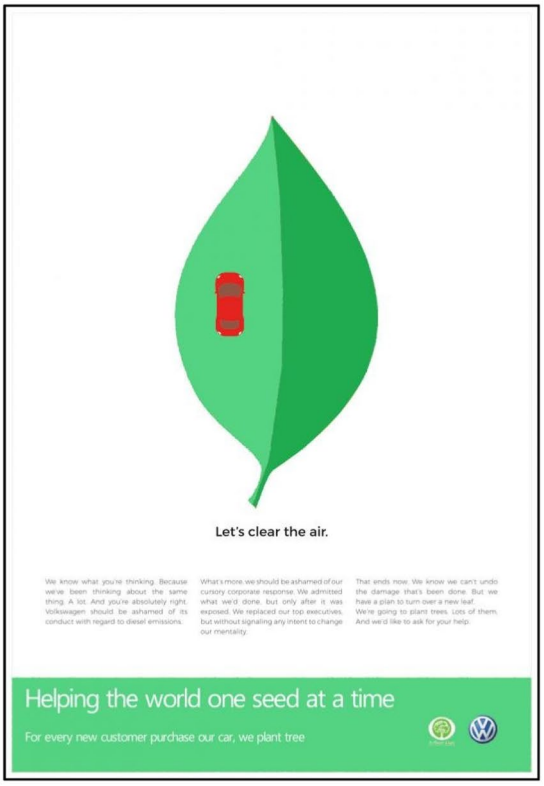
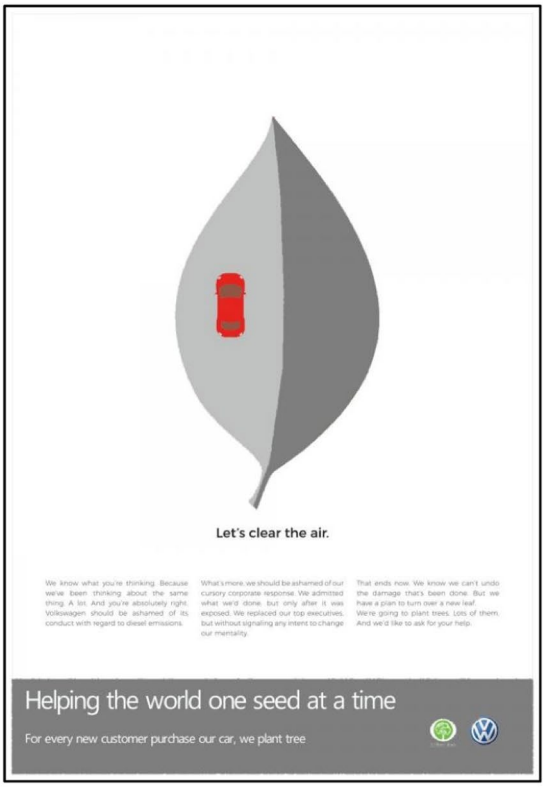
APPENDIX A. STIMULUS AD VISUALS FOR STUDY 1





Stimulus ad texts for Study 1

Helping the world one seed at a time.

For every Volkswagen purchase, we will plant a tree.

Let us clear the air.

We know what you are thinking because we have been thinking the same thing.

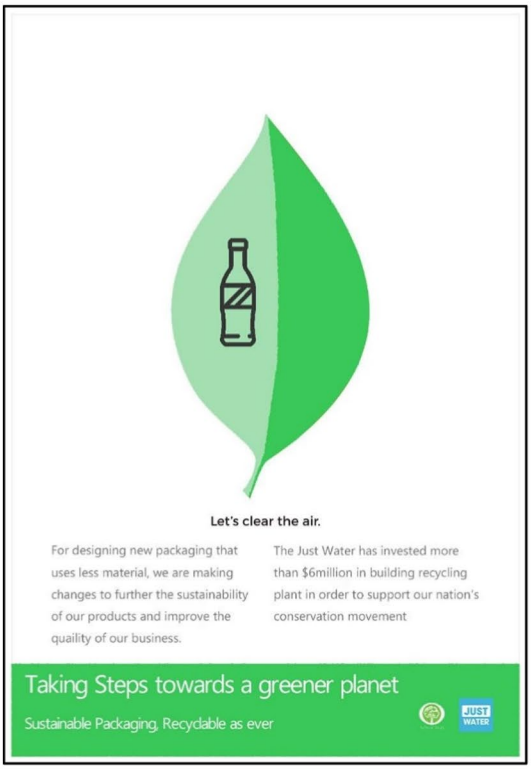
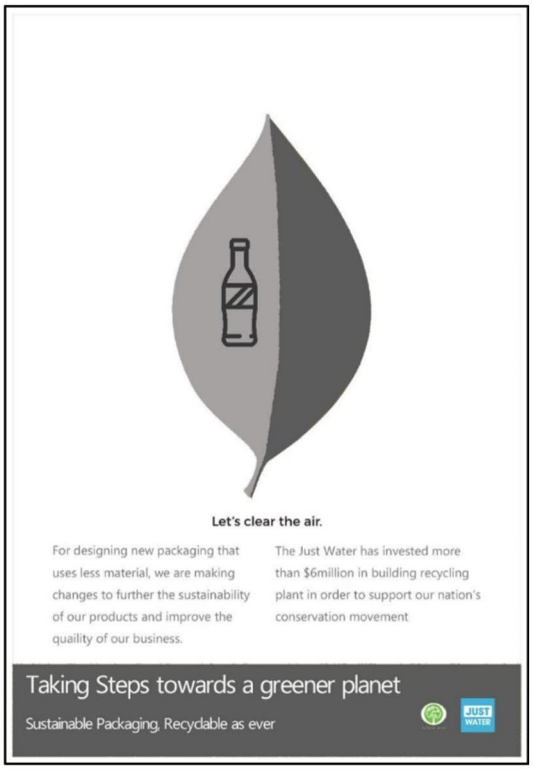
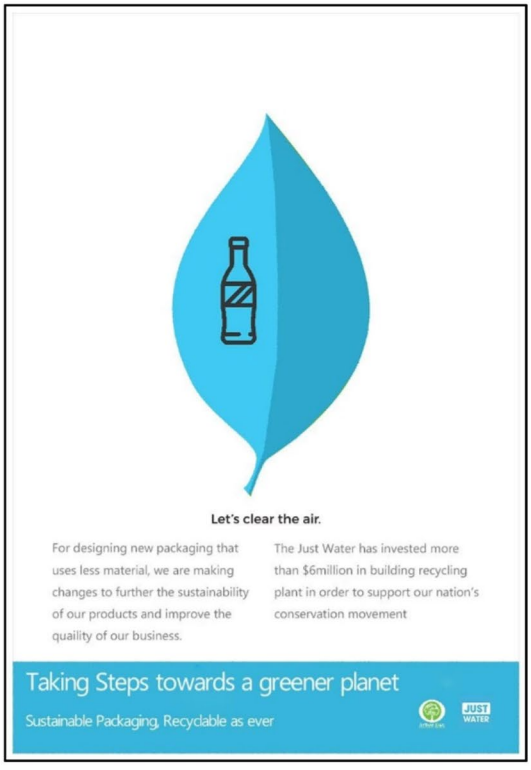
You are absolutely right. Volkswagen should be ashamed for misrepresenting its diesel emissions.

What is more, we should be ashamed of our cursory corporate responses.

We admitted what we did, but only after it was exposed.

We replaced our top executives but failed to signal our change of mentality.

We know we cannot undo the damage, but are turning over a new leaf.

We are going to plant trees, lots of them, and we need your help.

APPENDIX B. STIMULUS AD VISUALS FOR STUDY 2