Misleading Consumers with Green Advertising?
An Affect–Reason–Involvement Account of Greenwashing Effects in Environmental Advertising

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Drawing from the affect–reason–involvement model, we examine how misleading advertising about the environmental features of products, or greenwashing, affects how consumers perceive ads and brands. Using data from two experimental studies with quota-based samples in the United States (N = 486) and Germany (N = 300), we compare nondeceptive claims with two types of claims often used in greenwashing: vague claims and false claims. We also identify the presence of pleasant nature-evoking images and test for interaction effects with two types of environmental involvement: environmental concern and environmental knowledge. Results indicate that while vague claims do not enhance consumers’ perceived greenwashing regardless of their environmental knowledge or concern, false claims do, which consequently harms consumers’ attitudes toward those ads and brands. In the United States, consumers’ environmental knowledge moderates that effect, whereas all consumers in Germany could identify false claims as attempts at greenwashing. Moreover, associating greenwashing claims with nature-evoking images activates an affective persuasive mechanism that appeals to consumers’ affinity for nature, which not only positively influences their evaluations of ads and brands but also influences their attitudes toward ads and brands more strongly than perceived greenwashing. In closing, we discuss the theoretical and practical implications of these findings.

As consumers become increasingly aware of the potential environmental impacts of their purchases, products labeled as “eco-friendly,” “organic,” or “sustainable” have become more popular than ever (Baum 2012; Parguel, Benoit-Moreau, and Russell 2015). In response to growing demand among consumers for environmentally friendly products, green advertising claims have become an important component of advertisements for many products (European Commission 2014; Segev, Fernandes, and Hong 2016); consequently, addressing that trend in academic research has become a priority (Taylor 2015). Environmental claims are often used for products that are not inherently environmentally friendly, including airline flights, plastic bottles, and (nonhybrid) cars. At the same time, many green advertisements present confusing truths that lack substantive information about the real environmental attributes of their products (Baum 2012). This phenomenon is known as greenwashing (Carlson, Grove, and Kangun 1993; Kangun, Carlson, and Grove 1991; Parguel, Benoit-Moreau, and Russell 2015), which refers to “the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service” (TerraChoice 2009, p. 1).

Institutional stakeholders who address matters of misleading advertising, including the European Commission (Directive 2005/29/EC on Unfair Commercial Practices [UCPD]) and the U.S. Federal Trade Commission (FTC), have advised marketers to use “clear and prominent qualifying language to convey that a general environmental claim refers only to a specific and limited environmental benefit” (Federal Trade Commission 2012, p. 62122). However, the regulatory attempts of such organizations vary greatly among countries, and their enforcement is generally lax (Delmas and Burbano 2011). In response, scholars and environmentalists have argued that such nonbinding regulatory guidelines inadequately protect consumers from the harmful effects of greenwashing (Feinstein 2013).

For consumers, it is worrying that many environmental attributes of products—for instance, sustainability—cannot be verified, even after consumers use products claiming to possess those attributes (Carlson, Grove, and Kangun 1993; Lyon and Maxwell 2011). As a result, the dishonest attempts of companies to promote the environmental qualities of their...
products can undermine consumers’ confidence in green advertising (Chen and Chang 2013; Parguel, Benoit-Moreau, and Russell 2015). Indeed, perceptions of greenwashing, as previous research has indicated, are associated with more negative evaluations of ads and brands (Newell, Goldsmith, and Banzhaf 1998; Nyilasy, Gangadharbatla, and Paladino 2014), and evidence also suggests that even consumers with high expertise in environmental matters are not entirely resistant to greenwashing in advertisements (Parguel, Benoit-Moreau, and Russell 2015).

Despite increased efforts of researchers to investigate the effects of greenwashing in advertisements, their studies largely lack any theoretical approach that considers the underlying mechanisms and boundary conditions of effects of misleading green advertising on consumers’ evaluations of ads and brands. To address that gap in the literature, we applied the affect–reason–involvement (ARI) model to greenwashing effects as a means to identify their underlying rational and affective mechanisms. Whereas greenwashing claims in advertising can induce a rational mechanism by which consumers can perceive the greenwashing intentions of ads, visual greenwashing cues can appeal to consumers’ affinity toward nature in what constitutes an affective mechanism (Schmuck et al. 2017). Because both mediating mechanisms can prompt different outcomes, we needed to model them simultaneously in empirical research. In an associated part of our research, we compared for the first time the influence of two major characteristics of consumers that can moderate those effects: environmental knowledge (EK) and environmental concern (EC). We needed to understand what roles those moderators play to understand who is susceptible to greenwashing claims and who is not (Johar 1995; Parguel, Benoit-Moreau, and Russell 2015).

We developed and tested our theoretical model during two experiments in two cultural contexts: Germany and the United States. Given the importance of replication (e.g., Kerr, Schultz, and Lings 2016), we designed our second study to replicate the first for an investigation of different products and brands. Furthermore, unlike many studies with samples of students (e.g., do Paço and Reis 2012; Newell, Goldsmith, and Banzhaf 1998; Nyilasy, Gangadharbatla, and Paladino 2014), we used comprehensive quota-based samples that are generalizable to a broader population of green consumers. Ultimately, our cross-national approach aimed to highlight differences in consumers’ susceptibility to greenwashed advertising in different cultural and marketing contexts.

THEORETICAL MODEL AND HYPOTHESES

In this section, we describe a theory-driven model of greenwashing effects that takes into account key characteristics of advertising messages and consumers, as well as their interaction effects, to explain the underlying rational and affective mechanisms of greenwashing effects. The model is based on the ARI model, which postulates that attitude formation emerges from two qualitatively different but simultaneous mechanisms of persuasion: rational cognition and affect (Buck et al. 2004; Buck and Chaudhuri 1994). Contingent upon characteristics of the messages to which consumers are exposed, attitude formation is based on a dominant influence of rational cognition, a dominant influence of affect, or the influences of both mechanisms. The ARI model also assumes that consumers’ involvement moderates the depth and quality of consumers’ responses to advertising messages and thus interacts with those messages. As such, similar to dual-process models, such as the elaboration likelihood model (ELM; Petty and Cacioppo 1986) and the heuristic-systematic model (HSM; Chen and Chaiken 1999), the ARI model distinguishes two conceptually different types of persuasion mechanisms. However, whereas dual-process models assume attitude formation is based on either central persuasion or peripheral persuasion, the ARI model postulates that the influences of rational persuasion and affective persuasion on attitude formation occur simultaneously and interactively. In addition, dual-process models consider emotions as heuristic or peripheral mechanisms as being inferior to systematic cognitive persuasion (Buck et al. 2004), whereas the ARI model considers the subjective experience of emotion, or affect, as a type of cognition—specifically, as a type of knowledge—which is not inferior to rational cognition. By extension, if emotional persuasion is based on holistic syncretic cognition, then rational persuasion is based on linear and sequential analytic cognition (Buck et al. 2004).

Drawing upon those considerations, in what follows we first describe key characteristics of messages in greenwashing ads and their effects on consumers’ attitude formation. Next, we introduce two characteristics of consumers that can moderate those effects: EC and EK. Figure 1 presents the theoretical model and all hypotheses, including the proposed mediation and moderation mechanisms.

Message Characteristics: Types of Claims in Greenwashing Ads

Using deceptive claims is a common practice in different fields of advertising (e.g., Shaibb and Thwaites 2007) and marketing (e.g., Pracejus, Olsen, and Brown 2003). In the context of environmental advertising, scholars have distinguished two major types of deceptive claims that can deceive consumers: false appeals—that is, demonstrably false claims based on objective evidence—and vague appeals—that is, overly broad or poorly defined claims that create an incorrect impression (Olson and Dover 1978; Jacoby and Small 1975). Those claims also appear in Kangun, Carlson, and Grove’s (1991) typology, which includes false claims that represent inaccurate or fabricated claims—for instance, an oil company’s advertising claiming that its unleaded gas causes no pollution—and vague or ambiguous claims that contain a phrase or statement...
that is too broad to have a clear meaning—for example, “all natural.”

Although recent evidence suggests that greenwashing practices have generally declined since the end of the 1990s (Segev, Fernandes, and Hong 2016), greenwashing remains prevalent in advertising (e.g., Baum 2012). For example, in her study of magazine advertisements from the United Kingdom and the United States, Baum (2012) found that three-fourths of ads contained at least one aspect of greenwashing, most of which appear in the form of vague or ambiguous claims. However, despite the continued prevalence of greenwashing claims in advertising, studies on how such claims affect the way in which consumers perceive greenwashing and its consequences on their attitudinal outcomes remain scarce. The few studies available on the topic have used diverse outcome measures, either ones related to broad conceptualizations, such as ad credibility (Tucker et al. 2012) and skepticism about green advertising (do Paço and Reis 2012), or more specific measures, such as perceived deception (Newell, Goldsmith, and Banzhaf 1998). Thus far, very few studies (e.g., Chen and Chang 2013) have specifically measured the construct of perceived greenwashing among consumers.

Perceived greenwashing refers to consumers’ ability to unmask greenwashing intentions in ads (Chen and Chang 2013). According to the ARI model, consumers’ detection of greenwashing in advertisements, the results of which are called greenwashing perceptions, stems from a mechanism of rational cognitive persuasion because unmasking advertising claims as greenwashing requires analytic cognition. Despite evidence suggesting that false claims in greenwashing sharpen consumers’ perceptions of deception in ads, which negatively affects their perceptions of the ads and the brands advertised (Newell, Goldsmith, and Banzhaf 1998), researchers have neglected to examine how vague appeals, despite their prevalence in green advertising practices, affect attitudinal outcomes (Baum 2012; Carlson, Grove, and Kangun 1993; Kangun, Carlson, and Grove 1991; Segev, Fernandes, and Hong 2016). In response to that oversight, by drawing from the ARI model, we assumed that the detection of both vague and false claims as greenwashing attempts requires cognitive effort. Accordingly, we hypothesized that both vague and false greenwashing claims induce a mechanism of rational cognitive persuasion regarding the critical evaluation of the claims presented (Johar 1995; Olson and Dover 1978)—namely, perceptions of greenwashing.

Although we assumed that both vague and false greenwashing claims induce perceptions of greenwashing among consumers, we also hypothesized that false claims result in such perceptions to a stronger degree than vague ones do. In contrast to vague claims in green advertisements, false ones represent outright lies (Kangun, Carlson, and Grove 1991; Carlson, Grove, and Kangun 1993) and can be considered to constitute a more explicit form of deception (Chaouachi and Rachid 2012; Olson and Dover 1978; Russo, Metcalf, and Stephens 1981). In advertising, an outright lie represents an explicit claim that is demonstrably false in light of objective evidence that can be verified by comparing the actual characteristics of the product advertised and the message content of the ad. Conversely, in containing information that cannot be easily verified, vague claims—that is, broad or poorly defined claims—represent a more implicit form of deception that can
nevertheless prompt consumers to draw erroneous inferences about products advertised. Vague claims therefore require consumers to compare their beliefs about products under the influence of advertising messages and the actual products advertised (Chauwachi and Rachid 2012; Olson and Dover 1978). Therefore, vague claims, which can create an incorrect impression of products advertised, are more difficult to identify as greenwashing than false claims, which can be verified on an objective basis (Xie, Madrigal, and Boush 2015). Based on that rationale, we suggest that though both vague and false claims induce perceived greenwashing, false claims have that effect to a stronger degree than vague ones. More formally, we propose the following hypotheses:

**H1:** (a) Vague claims and (b) false claims in green advertising enhance consumers’ perceived greenwashing more than nondeceptive claims do.

**H2:** False claims induce perceived greenwashing among consumers to a stronger degree than vague claims do.

Perceived greenwashing in response to deceptive claims can guide consumers’ attitude formation and negatively influence their perceptions of ads and the brands that such ads advertise (Buck and Chaudhuri 1994; Buck et al. 2004; Newell, Goldsmith, and Banzhaf 1998). Strong empirical evidence suggests that, by extension, perceived greenwashing negatively influences consumers’ evaluations of ads and brands as well (Newell, Goldsmith, and Banzhaf 1998; Nyilasy, Gangadharbatla, and Paladin 2014), for consumers clearly perceive greenwashing as an attempt to deceive them, which negatively affects their attitudes to the ads and their brands (Olson and Dover 1978). Because attitudes toward ads has emerged as an essential predictor of the formation of attitudes toward brands (e.g., Matthes, Wonneberger, and Schmuck 2014; Hartmann and Apaolaza-Ibáñez 2012; Tucker et al. 2012), we also hypothesized that attitudes toward ads mediate attitudes toward brands.

**H3:** Perceived greenwashing in green advertising negatively influences consumers’ attitudes toward brands mediated by their attitudes toward ads.

**Message Characteristics: Greenwashing Ads with Verbal and Image-Based Claims**

Green advertising often applies affect-laden images of pleasant natural scenery along with verbal appeals to communicate a product’s ecological attributes (Matthes, Wonneberger, and Schmuck 2014; Hartmann and Apaolaza-Ibáñez 2008, 2009; Segev, Fernandes, and Hong 2016). Research suggests that images can have a powerful impact on attitudinal responses (e.g., Chowdhury, Olsen, and Pracejus 2008; Phillips 1997). However, images of pleasant natural scenery can also be misused in green advertising to induce false perceptions of a brand’s greenness without referring to the actual environmental features of advertised products in what is known as **executonal greenwashing** (Parguel, Benoit-Moreau, and Russell 2015, p. 108). Recent research indicates that the mere presence of a nature-evoking picture in advertising positively affects consumers’ perceptions of the advertised brand’s ecological image, which in turn prompts more favorable attitudes toward the brand than attitudes prompted by the same advertising without imagery of nature (Parguel, Benoit-Moreau, and Russell 2015). To date, however, the underlying mechanisms of the effects of verbal and visual greenwashing claims on consumers’ attitudinal outcomes have been insufficiently addressed.

The ARI model suggests that affect and cognition simultaneously influence a consumer’s overall reaction to a persuasive message—that is, a consumer’s attitudes toward ads and brands (Buck and Chaudhuri 1994; Buck et al. 2004). Research has demonstrated that images of nature in green ads can influence consumers’ evaluations of ads and brands by evoking an emotional response similar to feelings experienced from actual contact with nature (Hartmann and Apaolaza-Ibáñez 2008, 2009). Such “virtual nature experiences” (Hartmann and Apaolaza-Ibáñez 2008, p. 821) can be considered an affective persuasion process (Hartmann, Apaolaza, and Eisend 2016) because they positively affect consumers’ evaluations of ads and brands beyond what verbal claims in green advertising can accomplish (Schmuck et al. 2017; Hartmann and Apaolaza-Ibáñez 2009). Based on those assumptions, we theorized that green ads employing verbal greenwashing claims as well as nature-evoking imagery can prompt two simultaneous mechanisms. On one hand, as explained, such advertisements often evoke perceptions of greenwashing due to false or vague verbal elements in the ads. Accordingly, we can expect such ads to influence perceptions of greenwashing, as explained in hypotheses 1 and 2. On the other hand, the ads can also induce a parallel positive affective persuasion mechanism by appealing to consumers’ emotional affinity toward nature, which in turn positively influences their attitudes toward ads and brands (Hartmann and Apaolaza-Ibáñez 2008, 2009, 2012).

In sum, greenwashing ads that combine verbal and image-based claims—what we refer to as combined ads—can contain two cues: verbal cues, which initiate a rational evaluation of the ads, and visual cues, which are likely to evoke an affective persuasion mechanism. As assumed by the ARI model, although both mechanisms can be induced independently of each other, they simultaneously influence the subsequent formation of attitudes toward ads and brands (Buck and Chaudhuri 1994; Buck, Chaudhuri, and Ray 2004). Whereas greenwashing perceptions can damage such attitudes, so-called virtual nature experiences can produce the opposite effect. Thus, combined ads can simultaneously weaken and strengthen consumers’ attitudes toward ads and brands. If combined ads better achieve greenwashing than virtual nature experiences, then they are likely to negatively affect consumers’ attitudes toward ads and brands. Conversely,
if combined ads induce virtual nature experiences more than greenwashing, then they can positively influence those same attitudes. By extension, if both mechanisms are equally strong, then combined ads may not affect those attitudes whatsoever. We thus hypothesized the following:

H4: Green advertisements featuring pleasant nature imagery and either (a) vague or (b) false greenwashing claims enhance consumers’ perceived greenwashing (rational persuasion mechanism) compared to ads featuring nondeceptive claims.

H5: Green advertisements featuring pleasant nature imagery and either (a) vague or (b) false greenwashing claims enhance consumers’ perceived virtual nature experiences (affective persuasion mechanism) compared to ads featuring nondeceptive claims.

H6: Perceived virtual nature experiences positively influence consumers’ attitudes toward brands mediated by their attitudes toward ads.

Consumer Characteristics: Environmental Involvement

To understand consumers’ responses to deceptive advertising messages, we needed to consider that consumers differ in their responses to persuasive appeals according to their level of involvement (Parguel, Benoit-Moreau, and Russell 2015; Matthes et al. 2012; Schemer, Matthes, and Wirth 2008). The ARI model attributes an important role to consumers’ involvement by postulating that their involvement determines the effect of mechanisms of rational and affective persuasion (Buck et al. 2004). Hence, in contrast to dual-process models (e.g., ELM and HSM), which consider the affective mechanism to be part of peripheral processing without involvement, the ARI model assumes that the depth and quality of both rational and affective mechanisms increase as consumers’ involvement increases, albeit depending on the specific advertising claim.

In terms of rational cognition, research has suggested that consumers with high environmental involvement are more inclined to penalize brands that make poorer efforts toward being environmentally friendly (Newell, Goldsmith, and Banzhaf 1998; do Paço and Reis 2012). Studies have also demonstrated that consumers with higher involvement are more likely to recognize misleading intentions in advertising, in a mechanism attributed to their greater engagement in the detailed processing of advertising claims (Johar 1995). However, depending on the claims, greater involvement may also increase affective persuasion (Buck et al. 2004). Initial evidence indicates that more environmentally involved consumers respond more favorably to image-based green advertisements (Schmuck et al. 2017; Hartmann, Apaolaza, and Eisend 2016), perhaps due to their greater emotional affinity toward nature (Hartmann, Apaolaza, and Alija 2013). Put differently, more highly environmentally involved consumers may have more positive associations with imagery of nature in advertising. Consequently, when presented with nature-evoking images in green advertising, they are more likely to perceive virtual nature experiences.

In green advertising, two key characteristics of environmental involvement can influence consumers’ ability to detect misleading claims: EC and EK.

Environmental concern (EC). Numerous studies have characterized environmentally involved consumers as consumers who are highly concerned about the environment, have exceptional awareness of environmental problems, and perceive the necessity of protecting the environment (e.g., Bickart and Ruth 2012; do Paço and Reis 2012; Grimmer and Bingham 2013; Hartmann and Apaolaza-Ibáñez 2012; Matthes, Wonneberger, and Schmuck 2014; Mohr, Eroğlu, and Ellen 1998; Newell, Goldsmith, and Banzhaf 1998; Schmuck et al. 2017; Schuhwerk and Lefkoff-Hagiú 1995; Tucker et al. 2012). Several studies have also indicated that environmental claims more strongly affect consumers with higher levels of EC (e.g., Grimmer and Bingham 2013).

Environmental knowledge (EK). Another important indicator of consumers’ environmental involvement is their objective knowledge about environmental issues (Ellen 1994; Mohr, Eroğlu, and Ellen 1998; Parguel, Benoit-Moreau, and Russell 2015). Research from different fields of advertising has generally found issue-related knowledge to be a crucial moderator of advertising effects and an important factor in assessing the credibility of advertising claims, particularly when such claims are ambiguous (Andrews, Burton, and Netzmeier 2000; Hoch and Ha 1986). The results of Ellen’s (1994) study indicate that objective EK needs to be distinguished from more subjective indicators of environmental involvement, such as EC. Those findings reveal that objective EK about environmental issues is relatively low among consumers even if they possess high levels of EC. Because EC alone might prevent consumers from detecting misleading or false claims, EK might be a better indicator of their ability to perceive greenwashing in advertising (Newell, Goldsmith, and Banzhaf 1998). Therefore, it is important to consider not only EC but also EK as an indicator of environmental involvement among consumers.

Based on such thinking, we investigated the interaction effects of both dimensions of environmental involvement, EC and EK, in vague and false green advertising claims on consumers’ perceptions of greenwashing as well as virtual nature experiences. Drawing from the ARI model, we assumed that environmental involvement, in terms of EC and EK, increases rational and affective persuasion mechanisms. Rephrased, we expected interaction effects between the type of environmental claim and consumer involvement—namely, that the effects of vague, false, and combined claims on perceived greenwashing and virtual nature experiences are stronger for consumers with higher EC or higher EK:

H7: The effects hypothesized in hypotheses 1, 4, and 5 are stronger for consumers with either (a) higher EC or (b) higher EK.
We conducted two experiments using comprehensive quota-based samples in the United States (N = 486) and in Germany (N = 300). Study 2 was an exact replication of Study 1 but used different product categories to increase the robustness and generalizability of the findings.

STUDY 1

Method

In Study 1, we employed a 2 (ad appeal: vague versus false claim) × 2 (image: pleasant nature-evoking image versus no image) between-subjects design with a control condition. We established five conditions: a control claim (i.e., nondeceptive claim), a false claim, a false claim presented in combination with a nature-evoking image (i.e., combined false claim), a vague claim, and a vague claim presented with a nature-evoking image (i.e., combined vague claim). Because the purpose of the study was to examine how an image contributes to the effects of verbal claims, we did not study an image-only condition without any verbal claim.

Stimulus

We used five versions of a print ad for bottled water packaged in plastic (see Appendix 1), a low-involvement product easily accessible to consumers. The bottle advertised is not an inherently green product, and more environmentally friendly alternatives are available for consuming water. Participants assigned to the control condition viewed the bottled water of a fictitious brand (“ALSE”) and a brief verbal text about the water quality of its contents (“100% Pure Spring Water”). By contrast, participants assigned to the false claim condition viewed the same ad with an additional slogan presenting a false claim (“Drink ALSE bottled water. The most environmentally responsible consumer product in the world”). The claim’s obvious falsehood was based on an actual Nestlé campaign slogan described by environmental organizations as “a false and misleading statement” (Anderson 2008).

Meanwhile, participants assigned to the vague claim condition viewed a vague claim about the green attributes of the bottled water product (“Drink ALSE bottled water to help the environment. Together we can save our nature”) similar to claims used in the advertising campaigns of Fiji Water and BirdWatch Ireland. In the combined false claim condition and the combined vague claim condition, participants viewed an ad depicting the same product and respectively false or vague claim presented in combination with a nature-evoking image. As in previous studies (Matthes, Wonneberger, and Schmuck 2014), the image presented depicted a lake surrounded by mountains and forests.

Pretest of Stimulus Material

We pretested the stimulus material using a two-step procedure. First, the stimulus material was evaluated by advertising and marketing scholars (N = 17) from various European universities whom we provided with a definition of vague claim and false claim following Kangun, Carlson, and Grove’s (1991) typology. Those experts evaluated all ads in a random order on 7-point Likert scales. The experts perceived a greater correspondence between Kangun, Carlson, and Grove’s (1991) definition of vague claim and the vague claim (M = 5.53, SE = 1.74) than that of false claim and the false claim (M = 2.35, SE = 1.62, p < .001), as well as a greater correspondence between the definition for false claim and the false claim (M = 5.88, SE = 1.73) than that of the definition of vague claim and the vague claim (M = 3.82, SE = 2.53, p < .05). The experts also rated the nature-evoking images in the combined ads as better suited to enhance feelings associated with nature (M = 6.82, SE = 1.20) than the neutral images (M = 2.97, SE = 1.35, p < .001).

Second, a student sample (N = 68) rated the two ads, shown in a random order, in terms of the statements “This statement is vague and not verifiable” and “This claim is factually wrong” on a 7-point Likert scale (1 = I do not agree at all, 7 = I totally agree). Results of a t test revealed that participants rated the vague ad as “vague” and “not verifiable” (M = 5.19, SD = 2.15) to a higher degree than the false ad (M = 4.43, SD = 2.39, p < .05). Similarly, the false ad was more strongly perceived as “factually wrong” (M = 5.01, SD = 2.37) than the vague green ad (M = 3.54, SD = 2.18, p < .001).

We also examined whether the layout of the verbal and visual components of the control ad was indeed perceived to be neutral and not associated with environmental benefits. Participants did not associate the claim “100% Pure Spring Water” with environmental benefits (M = 2.04, SD = 1.39) but with product benefits, such as product quality (M = 4.69, SD = 1.92, p < .001). Last, we measured whether the ads’ visual layout enhanced feelings related to nature among the participants. To that end, we compared our control ad with an ad that presented the same claim in addition to the nature-evoking image used in the combined conditions. Results of a t test revealed that the neutral image did not activate feelings related to nature (M = 2.57, SD = 1.48) in comparison to the nature-evoking image (M = 4.69, SD = 1.75, p < .001).

Participants

We purchased a quota-based sample from U.S. consumers based on the demographic characteristics of the general U.S. population. The experiment was part of a larger online survey (N = 1,017) conducted by Survey Sampling International from May to June 2015. A total of 486 respondents were randomly assigned to the experiment (age in years, M = 42, SD = 13.7; gender, 49.8% women; education level, 6.2% incomplete high school education, 30% complete high school
education, 29.4% some college or vocational education, 34.2% complete college education; race, 78.2% Caucasian, 9.5% African American, 5.8% Latino, 4.5% Asian, 2.1% other).

Measures
We tested all items on a 7-point scale (1 = Strongly disagree, 7 = Strongly agree; see Appendix 2). We assessed attitudes toward ads (i.e., ad attitudes) with four items and attitudes toward brands (i.e., brand attitudes) with five items based on available scales (Chang 2011; Matthes, Wonneberger, and Schmuck 2014; Schmuck et al. 2017). We employed five items taken from Chen and Chang (2013) to gauge perceived greenwashing and extended the existing scale by adding two items. We used a common factor analysis to test for the unidimensionality of perceived greenwashing, the results of which showed that a single factor explained 76.8% of the variance. We used three items for the one-dimensional measure of virtual nature experience (Hartmann and Apaolaza-Ibáñez 2012). Following Schuhwerk and Lefkoff-Hagius (1995), we measured EC with three items on a 7-point scale, and following Mohr, Ergul, and Ellen (1998), we measured EK by asking participants four multiple-choice questions with a total of seven correct answer options. By adding all of the correct answers, we created an 8-point scale (0 = Low EK, 7 = High EK; M = 2.02; SD = 1.18). The scale exhibited significant correlations with formal education level (r = .10, p < .05), which is usually highly correlated with EK (Science and Engineering Indicators 2014), perceived subjective EK (r = .31, p < .001, measured with the two items “I know more about recycling than the average person” and “I am very knowledgeable about environmental issues”), and EC (r = .28, p < .001). Such results demonstrated the sufficient congruency of the scale. In addition, because consumers tend to overestimate their green behaviors due to social desirability (Culiberg and Elgaaied-Gambier 2016), we assessed social desirability as a control variable using four items of the Marlowe–Crowne Social Desirability Scale (Crowne and Marlowe 1960).

Randomization Check
Participants were equally distributed among the five conditions (18.3% control, 18.1% false claim, 20.6% combined false claim, 22.6% vague claim, 20.4% combined vague claim). A randomization check for age, gender, education level, and race returned satisfactory results by showing no systematic differences for these variables across the experimental groups.

Data Analysis
We performed confirmatory factor analysis (CFA) with the software lavaan R using maximum likelihood estimation (MLE) to test the structure of the assumed mediators (i.e., perceived greenwashing and virtual nature experience; see Table 1). To test for discriminant validity, we compared the two-factor model with a single-factor model; because all variables loaded on one factor, a significant decline in model fit resulted (Δχ² (1, N = 486) = 157.47, p < .001). Thus, although the factors were related, they correlated too weakly to be merged into a one-dimensional scale. In addition, we ran a common method bias test using the common latent factor (CLF) method in Amos, which revealed that differences between the standardized regression weights from the CLF model and the standardized regression weights of a model without the CLF were all less than 0.20. Thus, common method bias did not affect the validity of our measures. Next, we conducted path analyses using lavaan R, for which the experimental conditions were dummy-coded using the control condition as the reference condition. We calculated the interaction effects by including multiplicative terms of the experimental conditions (i.e., the claim types) and indicators of environmental involvement (i.e., EC and EK), the latter of which we mean-centered prior to computing the interactions. All interaction terms were simultaneously entered into the analysis (see Table 2) with age, gender, education, race, and social desirability as covariates.

RESULTS
Message Characteristics: Types of Claims in Greenwashing Ads
Figure 2 presents an overview of all hypotheses. Hypothesis 1(a) assumed that vague claims in green advertising increase consumers’ perceived greenwashing compared to nondeceptive claims, which the results did not support. The vague claim condition (b = .33, n.s.) was unrelated to perceived greenwashing. However, false claims significantly increased perceived greenwashing (b = .85; p < .001), which strongly supported hypothesis 1(b) (see Table 2). That finding also provided support for hypothesis 2, thereby indicating that false claims induce more perceived greenwashing than vague ones do. We confirmed that finding by rerunning the analysis with the vague claim condition as a reference category to compare the vague and false claims (results not shown in Table 2). That analysis confirmed a significantly higher effect of the false claim than the vague claim on perceived greenwashing (b = .43, p < .05).

Regarding hypothesis 3, perceived greenwashing significantly decreased attitudes toward ads (b = −.14; p < .001) and brands (b = −.05; p < .05), which indicates that awareness of misleading persuasive practices such as greenwashing was negatively related to responses to ads and brands. Unsurprisingly, attitudes toward ads significantly influenced attitudes toward brands (b = .84, p < .001). Mediation tests involving 1,000 bootstrapping
samples confirmed the indirect effect of the false claim on attitudes toward ads via perceived greenwashing ($b = -12; LLCI = -23; ULCI = -05$) and the indirect effect of perceived greenwashing on attitudes toward brands via attitudes toward ads ($b = -12; LLCI = -18; ULCI = -06$). Thus, hypothesis 3 was supported.

**Message Characteristics: Greenwashing Ads with Verbal and Image-Based Claims**

Next, we investigated how the presence of a nature-evoking image in addition to verbal greenwashing claims affects attitudinal responses. We found partial support for hypothesis 4 in the combined false claim ($b = .62; p < .01$) but not the combined vague claim ($b = .34, n.s.$) enhanced consumers’ perceived greenwashing. Thus, while hypothesis 4(a) was rejected, hypothesis 4(b) was supported. However, both the combined vague ($b = .60, p < .01$) and combined false claims ($b = .73, p < .001$) positively affected virtual nature experiences. Thus, we found full support for hypothesis 5. Concerning hypothesis 6, virtual nature experiences exerted a strong positive effect on attitudes toward ads ($b = .53, p < .001$), which subsequently significantly increased attitudes toward brands ($b = .84, p < .001$). Mediation tests involving 1,000 bootstrapping samples confirmed the indirect effects of the combined false claim on ad attitudes toward ads via perceived greenwashing ($b = -.09; LLCI = -.17; ULCI = -.03$), the combined vague claim on ad attitude via virtual nature experiences ($b = .31, LLCI = .09, ULCI = .55$), and the combined false claim on ad attitude via virtual nature experiences ($b = .39, LLCI = .18, ULCI = .61$). In addition, we found a significant positive indirect effect of virtual nature experiences on attitudes toward brands via attitudes toward ads ($b = .44, LLCI = .38, ULCI = .51$). Thus, hypothesis 6 was fully supported.

**Additional Analyses**

We also investigated whether perceived greenwashing or virtual nature experiences induce more powerful influences on attitudes toward ads and brands. Overall, explained variance indicated that virtual nature experiences explained more variance in attitudes toward brands (26%) than perceived greenwashing did (13%). By extension, to examine which persuasive mechanism exerts the strongest influence on

<table>
<thead>
<tr>
<th>Statements</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand X makes me feel close to nature</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Brand X makes me think of nature, fields, forests, and mountains</td>
<td>.95</td>
<td>.93</td>
</tr>
<tr>
<td>Brand X evokes the sensation of being in nature</td>
<td>.95</td>
<td>.96</td>
</tr>
<tr>
<td>This ad misleads with words in its environmental features</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>This ad misleads with visuals or graphics in its environmental features</td>
<td>1.01</td>
<td>.90</td>
</tr>
<tr>
<td>This ad possesses a green claim that is vague</td>
<td>.86</td>
<td>1.00</td>
</tr>
<tr>
<td>This ad exaggerates what the product’s green functionality actually is</td>
<td>.92</td>
<td>.85</td>
</tr>
<tr>
<td>This ad masks important information, which makes the green claim sound better than it is</td>
<td>.91</td>
<td>.82</td>
</tr>
<tr>
<td>This ad uses information about environmental features that is false</td>
<td>.91</td>
<td>1.01</td>
</tr>
<tr>
<td>This ad does not tell the truth about the product’s green functionality</td>
<td>.96</td>
<td>.87</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual nature experience</td>
<td>-.48</td>
<td>-.67</td>
</tr>
<tr>
<td>Average variance extracted</td>
<td>.73</td>
<td>.65</td>
</tr>
</tbody>
</table>

Note. Study 1: Model fit: CFI = .98, TLI = .98, SRMR = .03, RMSEA = .05; Study 2: Model fit: CFI = .97, TLI = .95, SRMR = .04, RMSEA = .07.
attitudes toward ads and brands, we conducted a nested model comparison involving a chi-square difference test. As a result, constraining the coefficients of perceived greenwashing and virtual nature experiences on attitudes toward ads ($\Delta \chi^2 = 224.76, df = 1, p < .001$) and brands ($\Delta \chi^2 = 4.62, df = 1, p < .05$) as equal prompted a significantly worse fit. We thus concluded that the path coefficients for virtual nature experiences on attitudes toward ads and brands are significantly higher than the same coefficients for perceived greenwashing. Thus, in the case of the combined false ad, the positive effect of virtual nature experiences overrides the negative effect of perceived greenwashing, which results in an overall positive effect on attitudes toward ads and brands.

### Consumer Characteristics

We additionally investigated the moderating effects of EC and EK. First, we examined the interaction effects of the claim types and EC on greenwashing perceptions and found no interaction effects of EC with the false claim, the combined false claim, the vague claim, or the combined vague claim. Similarly, we found no interaction effects of the experimental conditions (i.e., the different advertising claims) and EC on virtual nature experiences (see Table 2). Consequently, we fully rejected hypothesis 7(a).

Concerning EK, we found no significant interaction effect of EK and the vague claim, the combined vague claim, or the combined false claim on perceived greenwashing. However, we found a significant interaction effect of EK and the verbal false claim on perceived greenwashing ($b = .33, p < .05$). We also found no interaction effects of EK and the different claim types on virtual nature experiences (see Table 2). Altogether, we observed an interaction effect between only EK and the verbal false claim as greenwashing, which, in indicating that consumers with higher EK were more likely to detect the false claim as greenwashing, partially supported hypothesis 7(b).

Last, we detected positive effects of social desirability on perceived greenwashing ($b = .25, p < .001$), virtual nature experiences ($b = .46, p < .001$), and attitudes toward ads ($b = .12, p < .05$). Among the control variables, age negatively affected perceived greenwashing ($b = -.02, p < .001$), and education negatively affected attitudes toward ads ($b = -.10, p < .01$).

---

**TABLE 2**

Study 1: Path Analysis, Maximum Likelihood Estimation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Perceived Greenwashing</th>
<th>Virtual Nature Experience</th>
<th>Ad Attitude</th>
<th>Brand Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>SE</td>
<td>$b$</td>
<td>SE</td>
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<tr>
<td>Age</td>
<td>-.02***</td>
<td>.01</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td>Gender</td>
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<td>.14</td>
<td>.03</td>
<td>.14</td>
</tr>
<tr>
<td>Education</td>
<td>.01</td>
<td>.05</td>
<td>.03</td>
<td>.05</td>
</tr>
<tr>
<td>Race</td>
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<td>.07</td>
<td>.01</td>
<td>.10</td>
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<td>.20</td>
<td>.16</td>
</tr>
<tr>
<td>EK</td>
<td>-.01</td>
<td>.12</td>
<td>.16</td>
<td>.14</td>
</tr>
<tr>
<td>Social desirability</td>
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<td>.07</td>
<td>.46***</td>
<td>.07</td>
</tr>
<tr>
<td>False claim</td>
<td>.85***</td>
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<td>-.09</td>
<td>.22</td>
</tr>
<tr>
<td>Comb. false claim</td>
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<td>.73***</td>
<td>.22</td>
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<tr>
<td>Vague claim</td>
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<td>.22</td>
<td>-.07</td>
<td>.24</td>
</tr>
<tr>
<td>Comb. vague claim</td>
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<td>.22</td>
<td>.60**</td>
<td>.23</td>
</tr>
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<td>False claim $\times$ EC</td>
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<td>.18</td>
<td>-.21</td>
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<tr>
<td>Comb. false claim $\times$ EC</td>
<td>.24</td>
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<td>.03</td>
<td>.18</td>
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<tr>
<td>Vague claim $\times$ EC</td>
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<td>.15</td>
<td>.05</td>
<td>.20</td>
</tr>
<tr>
<td>Comb. vague claim $\times$ EC</td>
<td>-.01</td>
<td>.17</td>
<td>-.03</td>
<td>.21</td>
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<tr>
<td>False claim $\times$ EK</td>
<td>.33*</td>
<td>.16</td>
<td>-.08</td>
<td>.18</td>
</tr>
<tr>
<td>Comb. false claim $\times$ EK</td>
<td>-.29</td>
<td>.18</td>
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<td>.17</td>
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<tr>
<td>Vague claim $\times$ EK</td>
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<td>.20</td>
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<tr>
<td>Comb. vague claim $\times$ EK</td>
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<tr>
<td>Perceived greenwashing</td>
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<td>-.14***</td>
<td>.04</td>
</tr>
<tr>
<td>Virtual nature experience</td>
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<td>.53***</td>
<td>.04</td>
</tr>
<tr>
<td>Ad attitude</td>
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</tr>
<tr>
<td>Explained variance</td>
<td>.13</td>
<td>.26</td>
<td>.50</td>
<td></td>
</tr>
</tbody>
</table>

Note. EC = environmental concern; EK = environmental knowledge; comb. = combined. Model fit: $\chi^2 (16) = 13.81, p = .61; CFI = 1.00; TLI = 1.00; RMSEA = .00 [.00, .04], p = 1.00; SRMR = .01.

***p < .001; **p < .01; *p < .05.
DISCUSSION

The findings of Study 1 show that consumers do not recognize vague greenwashing ads, no matter how environmentally involved they are. Vague claims can even benefit consumers’ attitudes toward brands when such claims are combined with pleasant images of nature, due to an affective persuasion mechanism induced by beautiful images of nature that makes consumers virtually experience nature in a positive light. By contrast, greenwashing ads with false claims, which are generally less prevalent than ones with vague claims, can both benefit and harm attitudes toward brands, depending on the presence of nature imagery. When ads present false verbal claims, consumers with higher EK react by perceiving greenwashing due to a rational cognitive mechanism by which they critically scrutinize the presented claims. However, when ads use nature imagery along with false claims, consumers fall victim to the virtual nature experience, which exerts stronger effects on attitudes toward ads and brands than greenwashing perceptions. More specifically, that positive affective persuasion mechanism overrides the negative influence of critical scrutiny (perceived greenwashing) on attitudes toward ads and brands, which suggests that greenwashed claims in advertising are effective overall.

STUDY 2

Method

In Study 2, we aimed to replicate the findings of Study 1 regarding different consumer products in a European country (i.e., Germany) to ensure the generalizability of our findings. The experimental design was similar to that of Study 1 and also involved a 2 (ad appeal: vague versus false claim) × 2 (image: pleasant nature-evoking image versus no image) between-subjects design with a control condition (i.e., nondeceptive claim). In contrast to Study 1, participants in each condition were exposed to two green ads for different products from different product categories.

Stimulus Material

The stimulus ads were created specifically for Study 2 (see Appendix 3). The first ad featured a cleaning detergent marketed as Sunlight, a brand unknown in Germany, whereas the second ad featured the coffee brand Green Mountain Coffee, which is not sold in Germany. The ads for the detergent all included the slogan “Sunlight. Powerful cleaning,” which was additionally accompanied by the slogan “For the sake of the environment” in the vague claim conditions and by “Gentler on the environment than water itself” in the false claim conditions. Meanwhile, the ads for the coffee all included the brand name “Green Mountain Coffee,” followed by the claim “Do a good deed for the environment” in the vague claim conditions and by “More environmentally friendly than any other drink in the world” in the false claim conditions. As in Study 1, the claims were combined with a nature-evoking image in the combined vague and false claims conditions, whereas the other conditions featured neutral images with no visual cue related to the environment.

Pretest of Stimulus Material

After administering the same procedure used in Study 1, we found that experts (N = 17) perceived the two vague claims to correspond to Kangun, Carlson, and Grove’s (1991) definition of vague claim (vague: M = 5.73, SE = 1.43; false: M = 3.26, SE = 1.80) and the
false claims to correspond with the respective definition of *false claim* more than that of *vague claim* (false: \(M = 5.74, SE = 1.44\); vague: \(M = 2.09, SE = 1.38\)). The experts also found that the nature-evoking images included in the combined ads were better suited to enhance feelings associated with nature among consumers (\(M = 6.32, SE = 1.20\)) than the neutral images (\(M = 4.35, SE = 1.35, p < .001\)).

In addition, a student sample (\(N = 55\)) rated the vague ads as “vague” and “not verifiable” (\(M = 5.41, SD = 3.01\)) to a higher degree than the false ads (\(M = 4.25, SD = 2.13, p < .001\)). Similarly, the false ads were more strongly perceived to be “factually wrong” (\(M = 5.25, SD = 1.95\)) than the vague green ads (\(M = 3.01, SD = 1.79, p < .001\)). Furthermore, participants did not associate the claims in the control condition with environmental benefits (\(M = 1.75, SD = 1.19\)). Last, the neutral images did not activate feelings related to nature (\(M = 1.75, SD = 1.19\)) compared to the nature-evoking images (\(M = 4.33, SD = 1.72, p < .001\)).

**Participants**

We purchased a quota-based sample representing German consumers (\(N = 300\); age, \(M = 50.22, SD = 14.68\); gender, 49.3% women; education level, 1.6% incomplete lower-secondary education, 4.1% complete lower-secondary education, 41.0% vocational school education, 19.7% complete secondary education, 23% complete university education) in August 2017.

**Measures**

The dependent measures were the same as those used in Study 1, with two exceptions. First, we slightly adapted the measurement for EK for the German context (see Appendix 2). We asked participants to answer five multiple-choice questions based on Mohr, Eroğlu, and Ellen’s (1998) methods, with a total of six correct answer options. By adding all correct answers, we created a 7-point scale (0 = Low EK, 6 = High EK) (\(M = 3.05, SD = 1.26\)). As in Study 1, EK correlated significantly with both formal education (\(r = .12, p < .05\)) and EC (\(r = .17, p < .01\)), which indicated sufficient congruent validity. Second, in addition to the covariates used in Study 1, we assessed two items of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, and Tellegen 1988) as covariates to account for the influence of participants’ mood in the moment.

**Randomization Check**

Participants were equally distributed among the five conditions (20.7% control, 20.0% false claim, 18.7% combined false claim, 20.6% vague claim, 20.0% combined vague claim). A randomization check for age, gender, and education level returned satisfactory results by showing no systematic differences for these variables across the experimental groups.

**Data Analysis**

Data analysis was analogous to that of Study 1. A CFA revealed a good model fit (see Table 1) and sufficient discriminant validity (\(\Delta \chi^2 (1, N = 300) = 77.842, p < .001\)) for the two mediators. As in Study 1, results of the common latent factor method in Amos indicated that common method bias did not affect the validity of our measures. In the path analysis, age, gender, education, race, social desirability, and PANAS scores were included as covariates (see Table 3).

**RESULTS**

Figure 2 presents an overview of all hypotheses. Hypothesis 1 (a), which assumed that vague claims in green advertising increase consumers’ perceived greenwashing compared to non-deceptive claims, was not supported (\(b = .16, n.s.\)). However, false claims significantly increased perceived greenwashing (\(b = .67, p < .05\)), which supported hypothesis 1(b) (see Table 3). We also tested whether false claims prompted stronger effects on perceived greenwashing than vague claims (results not shown in Table 3). Because that effect was marginally not significant (\(b = .49, p = .06\)), hypothesis 2 was not supported; the false claim condition induced more perceived greenwashing than the control condition but not more than the vague claim condition.

In corroboration of the findings of Study 1, we found that perceived greenwashing significantly decreased attitudes toward ads (\(b = -.29, p < .001\)) and brands (\(b = -1.11, p < .05\)), which supported hypothesis 3. In turn, attitudes toward ads significantly increased attitudes toward brands (\(b = .56, p < .001\)). Mediation tests involving 1,000 bootstrapping samples confirmed the indirect effect of the false claim on attitudes toward ads via perceived greenwashing (\(b = -.19; LLCI = -.38; ULCI = -.04\)) and the indirect effect of perceived greenwashing on brand attitude via attitudes toward ads (\(b = -.16; LLCI = -.26; ULCI = -.09\)).

**Message Characteristics: Greenwashing Ads with Verbal and Image-Based Claims**

For ads with combined verbal and image-based text, we again found partial support for hypothesis 4. The combined false claim (\(b = .93, p < .01\)) but not the combined vague claim (\(b = .40, n.s.\)) enhanced perceived greenwashing. Hence, while hypothesis 4(a) was rejected, hypothesis 4(b) was supported. However, both the combined vague (\(b = 1.33, p < .001\)) and combined false claim (\(b = 1.36, p < .001\)) had a strong positive effect on virtual nature experiences. Thus, as in Study 1, hypothesis 5 found full support. Regarding hypothesis 6, virtual nature experiences had a strong positive affect on attitudes toward ads (\(b = .35, p < .001\)), which subsequently significantly increased attitudes toward brands (\(b = .56, p < .001\)). Mediation tests involving 1,000 bootstrapping samples confirmed the indirect effects of the combined false claim on attitudes toward ads via perceived greenwashing (\(b = -.27; LLCI = -.40; ULCI = -.05\)).
The combined vague claim on attitudes toward ads via virtual nature experiences \((b = .47, LLCI = .00, ULCI = .28)\), and the combined false claim on attitudes toward ads via virtual nature experiences \((b = .48, LLCI = .26, ULCI = .72)\). In addition, we found a significant and positive indirect effect of virtual nature experiences on attitudes toward brands via attitudes toward ads \((b = .20, LLCI = .13, ULCI = .27)\). Hence, hypothesis 6 was fully supported.

### Additional Analyses

Similar to the results of Study 1, virtual nature experiences explained more variance of attitudes toward brands (28%) than perceived greenwashing (15%) in Study 2. Moreover, a nested model comparison involving a chi-square difference test, which constrained the coefficients of perceived greenwashing and virtual nature experiences on attitudes toward ads \((\Delta \chi^2 = 110.32, df = 1, p < .001)\) and brands \((\Delta \chi^2 = 44.86, df = 1, p < .001)\) as equal, resulted in a significantly worse fit. That finding indicates that the path coefficients for virtual nature experiences on attitudes toward ads and brands are significantly higher than the same coefficients for perceived greenwashing. Overall, virtual nature experience therefore proved to be more powerful than perceived greenwashing, which again demonstrates an overall positive effect of the combined claim on attitudes toward ads and brands, for virtual nature experience exerts a stronger effect on attitudes toward ads and brands than perceived greenwashing.

### Receiver Characteristics

Analogous to Study 1, there were no interaction effects between environmental concern and the experimental conditions on perceived greenwashing or virtual nature experiences (see Table 3). Thus, hypothesis 7(a) was not supported. We also found no significant interaction effect between EK and the experimental conditions on perceived greenwashing or virtual nature experiences (hypothesis 7(b); see Table 3). Thus, hypothesis 7 found no support in Study 2.

Last, we found that, despite the inclusion of the mediators, strong negative direct effects of both the combined vague

---

### Table 3

<table>
<thead>
<tr>
<th>Variables</th>
<th>Perceived Greenwashing</th>
<th>Virtual Nature Experience</th>
<th>Ad Attitude</th>
<th>Brand Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(b)</td>
<td>(SE)</td>
<td>(b)</td>
<td>(SE)</td>
</tr>
<tr>
<td>Age</td>
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<tr>
<td>Gender</td>
<td>.18</td>
<td>.17</td>
<td>-.08</td>
<td>.19</td>
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<td>.16</td>
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<td>EK</td>
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<td>.27</td>
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<td>.05</td>
<td>.08</td>
<td>.04</td>
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<tr>
<td>Comb. vague claim × EK</td>
<td>-.29</td>
<td>.06</td>
<td>-.11</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note. EC = environmental concern; EK = environmental knowledge; comb. = combined. Model fit: \(\chi^2 (16) = 22.36, p = .13; CFI = .99; TLI = .94; RMSEA = .04 [.00, .07], p = .72; SRMR = .01.

***p < .001; **p < .01; *p < .05.
claim \((b = -0.58, p < .01)\) and the combined false claim \((b = -0.60, p < .01)\) remained on attitudes toward brands. Furthermore, PANAS scores had a positive effect on perceived greenwashing \((b = 0.21, p < .001)\), social desirability had a positive effect on virtual nature experiences \((b = 0.41, p < .001)\), and EK had a negative \((b = -0.11, p < .05)\) and EC a positive \((b = 0.20, p < .001)\) effect on attitudes toward brands.

DISCUSSION

Corroborating the findings of Study 1, the results of Study 2 showed that vague verbal claims are not perceived as greenwashing. When combined with a nature-evoking image, such claims can even benefit consumers’ attitudes toward ads and brands mediated by virtual nature experiences. False claims, by contrast, enhance greenwashing perceptions, which detract from attitudes toward ads and, in turn, attitudes toward brands. Contrary to the findings of Study 1, those of Study 2 showed that EK did not moderate that relationship, which indicates that all consumers could detect the outright lie in green advertising. That difference could be explained by the generally higher level of EK in Germany \((M = 3.05; SD = 1.26)\) than in the United States \((M = 2.02; SD = 1.18, p < .001)\).

In line with the findings of Study 1, we also found that two simultaneous mechanisms guide attitude formation in response to greenwashing ads with verbal claims combined with nature-evoking imagery: a rational persuasive mechanism of perceived greenwashing and an affective persuasive mechanism of virtual nature experiences. The affective persuasive mechanism exerts a stronger influence on attitudes toward ads and brands than the rational persuasive mechanism of greenwashing and can thus override the influence of perceived greenwashing on attitudes toward ads and brands. However, contrary to the results of Study 1, we found lingering direct negative effects of the combined ads on attitudes toward brands not explained by the mediators. That finding underscores an additional mediator not measured in either study. Perceived executional greenwashing (see Parguel, Benoit-Moreau, and Russell 2015), which captures perceptions of attempts at greenwashing that use nature-evoking imagery, could mediate that dynamic. Future studies should therefore further investigate different dimensions of greenwashing perceptions.

GENERAL DISCUSSION

Drawing from the ARI model (Buck and Chaudhuri 1994; Buck et al. 2004), we developed a theoretical model that is the first to consider both rational and affective persuasion mechanisms as mediators of the effects of greenwashing ads on consumers’ evaluations of ads and brands depending on the characteristics of consumers and the advertising messages. In two experiments, we found that although vague verbal claims do not enhance greenwashing perceptions, false verbal claims were perceived to be deceptive. That finding is striking given evidence that most deceptive green ads employ vague instead of false claims (Baum 2012; Carlson, Grove, and Kangun 1993; Kangun, Carlson, and Grove 1991; Segev, Fernandes, and Hong 2016). In line with previous findings (Newell, Goldsmith, and Banzhaf 1998), our results also indicate that being worried or concerned about the environment is not a sufficient precondition for a consumer’s ability to detect the misleading intentions of advertisements. Regarding EK, however, we found an interaction effect of EK and the false verbal claim, which suggests that objective knowledge about topics such as recycling or packaging can assist consumers in detecting false claims. In the U.S. sample, we found that consumers with higher EK were more likely to detect false claims that mobilize outright lies than their counterparts with lower EK. In the German sample, that finding could not be replicated. In Germany, all consumers could detect the false claim as greenwashing, which can be attributed to generally higher EK levels in Germany than in the United States. Internationally comparative data regarding the public’s factual knowledge about environmental issues show that Americans perform significantly worse on many dimensions than German consumers (Science and Engineering Indicators 2014), which was also clearly supported by our data.

Greenwashing Ads with Verbal and Image-Based Claims

Although the use of nature-evoking imagery is a key characteristic of many ads for purported environmentally friendly products (Segev, Fernandes, and Hong 2016), few studies have investigated how such imagery contributes to the deception of consumers with misleading claims. One exception is a study by Parguel, Benoit-Moreau, and Russell (2015), the results of which indicate that the mere presence of a nature-evoking image enhanced a brand’s ecological image among consumers. We scrutinized the underlying mechanisms of that effect and, in two studies, found that greenwashing using nature-evoking imagery activates a simultaneous affective mechanism—namely, virtual nature experiences—that can override rational greenwashing perceptions (Hartmann and Apaolaza-Ibáñez 2008). That emotional mechanism refers to feelings comparable to those experienced in real nature and has been identified as a powerful mechanism for enhancing consumers’ attitudes toward ads and brands (Schmuck et al. 2017; Hartmann and Apaolaza-Ibáñez 2008, 2009; Hartmann, Apaolaza, and Alija 2013). The results of two studies confirm those findings by showing that the association of a vague or false greenwashing claim with additional nature-evoking imagery induced the parallel affective persuasion mechanism of virtual nature experiences, which, in turn, significantly enhanced consumers’ evaluations of ads and brands. Remarkably, all consumers were equally drawn into the virtual nature experience irrespective of their environmental involvement.

However, combining a false greenwashing claim with nature-evoking imagery (i.e., combined false claims) not only enhanced the affective mechanism of virtual nature experiences but also induced the rational cognitive mechanism of
greenwashing perceptions. However, the influence of that rational mechanism on attitudes toward ads and brands was weaker than the affective mechanism of perceiving virtual nature experiences. In both studies, virtual nature experiences exerted a stronger effect than greenwashing perceptions on evaluations of ads and brands. Put differently, when images of nature appear in green advertising, the affective mechanism of virtual nature experiences exerts a greater influence than rational cognition (i.e., perception of greenwashing) during the process of attitude formation. That dynamic results not in a null but a positive effect on attitudes toward ads and brands, for virtual nature experiences exert a stronger total effect than perceived greenwashing on attitudes toward ads. Thus, a positive effect on attitudes toward ads and brands results when false claims are combined with pleasant imagery of nature. Those results were independent of both forms of environmental involvement—that is, no interaction effects occurred—which corroborates previous findings (Matthes, Wonneberger, and Schmuck 2014; Parguel, Benoit-Moreau, and Russell 2015; Schmuck et al. 2017) and again reveals that, contrary to popular belief, highly involved consumers are not inherently more skeptical of advertising for environmentally friendly products, especially when ads feature emotionally appealing images of nature (see Hartmann, Apaolaza, and Eisend 2016; Huddy and Gunnthorsdottir 2000; Matthes and Wonneberger 2014; Schmuck et al. 2017; Tucker et al. 2012). Although knowledge about environmental issues seems to enable consumers to recognize green claims that are simply false, an emotional advertising strategy embedding the same claim in pleasant imagery of nature seems to override the critical view of even highly knowledgeable consumers.

However, in contrast to combined false claims, combined vague claims did not foster greenwashing perceptions, which suggests that visually supporting a vague claim with images of nature not only goes undetected in terms of greenwashing but can even enhance attitudes toward ads and brands by way of virtual nature experiences. This effect is entirely independent of consumers’ EC or EK. In Study 2, however, we found lingering direct negative effects of combined ads on attitudes toward brands not explained by the mediators. This finding stresses an additional mechanism not investigated in our study, which might be perceived greenwashing by the use of imagery (see Parguel, Benoit-Moreau, and Russell 2015).

Last, our findings indicate that social desirability and participants’ mood according to PANAS scores significantly affected some mediators and dependent variables. Future studies should therefore always control for those variables when assessing the effects of greenwashing advertisements (see Culiberg and Elgaaied-Gambier 2016).

**Limitations**

First, all product categories in our studies were low-involvement products equally relevant to all consumers and did not require detailed background knowledge about product features. Future research should therefore extend our design to high-involvement products, such as cars and washing machines. In a similar vein, we found only weak support for our hypothesis that environmental involvement moderates the effects of greenwashing ads on perceived greenwashing and virtual nature experiences. Those effects might differ for high-involvement products and thus deserve future research attention as well. Second, we used unknown brands, because examining greenwashing in advertising required consumers to be unaware of a company’s actual environmental performance. Third, we employed quota-based samples from online panels, which pose notable advantages over convenience or student samples. However, experiments using online panels face increased risks for validity. Last, we did not take into account consumers’ different processing styles, including their need for cognition or preference for affect. Future research should include those concepts when investigating the cognitive and affective effects of greenwashing ads.

**Theoretical and Practical Implications**

Our studies and their results pose important theoretical implications. Based on the ARI model, our theoretical model of greenwashing effects considers for the first time that attitudes toward ads and brands in response to deceptive advertising emerge from a complex interplay of underlying rational and affective persuasion mechanisms. Thus, whereas previous research investigated only the primary effects of deceptive advertising on attitudes toward brands (e.g., Newell, Goldsmith, and Banzhaf 1998; Parguel, Benoit-Moreau, and Russell 2015), our findings clarify how attitudes toward ads and brands are formed in response to exposure to deceptive ads. Depending on the specific type of advertising appeal and EK among consumers, those underlying mechanisms can benefit and harm perceptions of brands. Future studies could extend our theoretical model by comparing claims for low- and high-involvement products. Additional mediators should also be taken in to account, which could afford a more nuanced, comprehensive account of the complex interplay among different types of messages, images, and greenwashing perceptions among consumers.

At the same time, our findings pose several implications for practitioners. For one, they indicate that particularly vague claims can mislead consumers. To counteract such influences, government initiatives and awareness campaigns could extend the knowledge base in their respective populations to ensure a better understanding of environmental claims in advertising throughout the European Union and the United States. To that end, additional information (e.g., via comparison tools or QR codes) and interactive tools (e.g., smartphone apps) that help consumers expand their capacity to identify misleading advertising claims could be useful (see also Naderer, Schmuck, and Matthes 2017). Such initiatives should target younger generations in particular (e.g., EU Consumer Classroom 2018; European Commission 2014).
Given our findings, we also believe that stronger regulations of green advertising claims are necessary in Europe and the United States. Enforceable green marketing laws at the state and national level should increasingly incorporate the FTC’s Green Guides as well as the UCPD guidelines (Feinstein 2013). Marketers and advertisers should be bound by law to provide consumers with better information about a company’s actual environmental performance by, for instance, adding a traffic light label (Parguel, Benoit-Moreau, and Russell 2015) or approved eco seals to green advertisements (e.g., EU Energy Label, Bickart and Ruth 2012; European Commission 2014). Easily understandable information about a product’s objective environmental performance can help consumers identify products that are truly environmentally friendly (Andrews, Burton, and Netemeyer 2000).

For advertisers and marketers, our findings indicate that using false green claims harms attitudes toward ads and brands and should generally be avoided. By contrast, vague claims in combination with nature-evoking images can benefit consumers’ attitudes, for they induce virtual nature experiences. However, we also found direct negative effects of such claims on attitudes toward brands in Study 2, which indicates that consumers penalize marketers for their attempts to dupe them. Accordingly, advertisers and marketers should exert additional efforts to qualify their claims. The FTC’s Green Guides and UCPD guidelines provide illustrative examples for advertisers and marketers of how to avoid misleading consumers in advertising.

Last, consumers should be provided with the resources and information needed to effectively voice their concerns about greenwashing. To date, the number of official complaints about greenwashing practices in advertising has been marginal (European Commission 2014). Our findings demonstrate that consumers can and will identify false claims in advertising about purported environmentally friendly products as greenwashing. Therefore, when confronted with such claims, they should exercise their right to lodge complaints about those practices in order to prevent a general decline in trust about green products in the future.

REFERENCES

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APPENDIX 1: STIMULUS MATERIAL STUDY 1

APPENDIX 2: Measures

Attitude toward the ad: bad – good; unpleasant – pleasant; unfavorable – favorable; unconvincing – convincing. (Study 1: Cronbach’s $\alpha = .99$; $M = 5.32, SD = 1.49$; Study 2: Cronbach’s $\alpha = .89$; $M = 4.40, SD = 1.43$)

Attitude toward the brand: bad – good; unattractive – attractive; negative – positive; not likable – likable; not recommendable – recommendable. (Study 1: Cronbach’s $\alpha = .99$; $M = 5.42, SD = 1.42$; Study 2: Cronbach’s $\alpha = .81$; $M = 4.49, SD = 1.36$)

Perception of greenwashing: This ad misleads with words in its environmental features; This ad misleads with visuals or graphics in its environmental features; This ad possesses a green claim that is vague; This ad exaggerates what the product’s green functionality actually is; This ad masks important information, which makes the green claim sound better than it is; This ad uses information about environmental features that is false; This ad does not tell the truth about the product’s green functionality. (Study 1: Cronbach’s $\alpha = .95$; $M = 4.04, SD = 1.64$; Study 2: Cronbach’s $\alpha = .93$; $M = 4.15, SD = 1.49$)

Virtual nature experience: [Product] makes me feel close to nature; [Product] evokes feelings related to forests, lakes, and mountains; [Product] evokes the sensation of being in nature. (Study 1: Cronbach’s $\alpha = .94$; $M = 4.59, SD = 1.7$; Study 2: Cronbach’s $\alpha = .92$; $M = 3.96, SD = 1.78$)

Environmental concern: I am concerned about the environment; The condition of the environment affects the quality of my life; I am willing to make sacrifices to protect the environment. (Study 1: Cronbach’s $\alpha = .88$; $M = 5.24, SD = 1.41$; Study 2: Cronbach’s $\alpha = .82$; $M = 4.85, SD = 1.33$)

Social Desirability: No matter who I’m talking to, I’m always a good listener; I have never deliberately said something that hurt someone’s feelings; I have almost never felt the urge to tell someone off; I never resent being asked to return a favor; When I don’t know something I don’t at all admit it. (Study 1: Cronbach’s $\alpha = .66$; $M = 4.54, SD = 1.19$; Study 2: $\alpha = .66$; $M = 4.96, SD = 0.96$)
Environmental Knowledge (Study 1): (M = 2.02; SD = 1.18)

Which symbol(s) represent(s) a certified eco-label for environmentally friendly products?

1. What does it mean if the following symbol [meaningless tree symbol] appears on packaging? (Check all that apply) The production of this product does not cause any harm to plants; This is an official seal to indicate environmentally friendly products; The production of this product is environmentally friendly; This is not an official sign to indicate environmentally friendly products; Don’t know

2. In the following, you see four seals for organic textiles. Which of them provides certification from an independent third party?

Environmental Knowledge (Study 2): (M = 3.05; SD = 1.26)

1. Which symbol(s) indicate(s) that a product is recyclable?

2. In the following, you see four seals for organic textiles. Which of them provides certification from an independent third party?

3. Under most recycling products, which of these items cannot be recycled? (Check all that apply) Magazines, catalogues, and books; Newspapers; Batteries; Plastic bottles; Energy-saving bulbs; Don’t know

4. Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human time-scale. Which of the following sources does not provide renewable energy? Landfill gas, gaseous biomass, natural gas, Don’t know

PANAS (Only Study 2): This scale consists of a number of words that describe different feelings and emotions. Indicate to what extent you feel this way right now, that is, at the present moment: Nervous, sad. (Cronbach’s α = .82, M = 2.02, SD = 1.31)
APPENDIX 3: STIMULUS MATERIAL STUDY 2

Control Claim 1

GREEN MOUNTAIN COFFEE.

Control Claim 2

Sunlight, Kraftvoll reinigen.

False Claim 1

GREEN MOUNTAIN COFFEE.
Umweltfreundlicher als alle anderen Getränke der Welt.

False Claim 2

Sunlight, Kraftvoll reinigen.
Sanifer zur Umwelt als Wasser allein.

Combined False Claim 1

GREEN MOUNTAIN COFFEE.
Umweltfreundlicher als alle anderen Getränke der Welt.

Combined False Claim 2

Sunlight, Kraftvoll reinigen.
Sanifer zur Umwelt als Wasser allein.

Vague Claim 1

GREEN MOUNTAIN COFFEE.
Tu der Umwelt etwas Gutes.

Vague Claim 2

Sunlight, Kraftvoll reinigen.
Der Umwelt zuliebe.

Combined Vague Claim 1

GREEN MOUNTAIN COFFEE.
Tu der Umwelt etwas Gutes.

Combined Vague Claim 2

Sunlight, Kraftvoll reinigen.
Der Umwelt zuliebe.