Journal of Sustainable Marketing

ISSN: 2766-0117 | Open Access
Vol. 4, No. 2 | DOI: 10.51300/JSM-2023-107

LUMINOUS INSIGHTS

Research Article

Educating Global Green Consumers: The Role of Online Education and Brand Communication in Promoting Green Buying Behavior

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ABSTRACT

This study first examines the influence of educational factors on a consumer's willingness to buy green products and on building a brand's green image. Second, it explores the effects of environmental concern and perceived consumer effectiveness in mediating the relationships between educational factors and green buying behavior. Third, it takes a cross-country perspective by investigating green buying behavior under distinct cultural contexts (collectivism versus individualism). The hypothesized model was tested with data collected in the United States and Brazil and using structural equation modeling analysis. Findings reveal that sustainability education, whether initiated by the consumer or by the organization, contributes positively to promote a brand's green image. Environmental concern and perceived consumer effectiveness both mediate the relationships between educational factors and green buying behavior. Lastly, the moderating effects of culture highlight the importance of environmental concern in a collectivist country and perceived consumer effectiveness in an individualist country.

KEYWORDS

Green marketing, green buying behavior, green brand image, green brand communication, consumer education, environmental concern, perceived consumer effectiveness, collectivism, individualism

ARTICLE HISTORY

Received: 1 April 2023
Accepted: 29 August 2023
Published: 7 September 2023

> The greatest threat to our planet is the belief that someone else will save it.
>
> *Robert Swan*

1. Introduction

As a matter of survival, commitment to sustainability has grown exponentially, to become a 'so-called' *megatrend* in all four sectors (*public, profit, nonprofit and social*) of society (Mcdonagh & Prothero, 2014). Nonprofit organizations, such as Greenpeace, have effectively alerted the world of environmental problems (Rootes, 1999), while governments around the world have enacted environmental policies to address sustainability issues and have signed treaties to encourage collaboration between themselves (Mcdonagh & Prothero, 2014). To support such initiatives, the United Nations (2021) has called for "urgent action" to address climate change, emphasizing the opportunities associated with the adoption of sustainable practices (e.g., job growth and prosperity). Without a doubt, sustainability initiatives represent opportunities. Although the Marketing field has undeniably contributed to the serious environmental problems we face today by promoting unsustainable

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consumptions of goods and services, sustainable business practices are on the rise in the field (Kumar & Polonsky, 2017). Today, a growing number of green consumers, especially millennials, expect businesses to solve the world's greatest challenges (Simon-Kucher and Partners, 2021) and these consumers represent a large segment of the ethical consumption market (Bucic et al., 2012). For marketers, this is an opportunity to be a part of the solution rather than the problem, to align their practices with current socio-cultural trends, and to gain a competitive advantage with consumers who support sustainability initiatives (Huang & Rust, 2011).

The first steps to adopt sustainability initiatives include identifying and applying strategies that address environmental problems. However, in order to integrate sustainability effectively, it is also important to communicate about these initiatives and build a strong brand image around sustainable values Hartmann et al. (2005); Kumar and Christodoulopoulou (2014). The number of companies that brand themselves as green is on the rise, so is the number of consumers who prefer to buy from companies known for their sustainability practices (Smith & Brower, 2012; Bedard & Tolmie, 2018; Heo & Muralidharan, 2019). Therefore, green brand communication and online education are increasingly playing a role in influencing consumers to select one green product over another . In addition, pro-environmental behavior has grown because consumers are increasingly concerned about environmental degradation , and a majority of consumers around the world have realized their ability to make a positive impact on the eco-system with their purchase choices . Consequently, the effectiveness of a brand's green education strategy depends on the degree that it contributes to highlight environmental problems, raise concerns about them, and educate consumers about their ability to mitigate these problems with their purchase choices (Hartmann & Apaolaza-Ibáñez, 2012; Heo & Muralidharan, 2019; Stojanova et al., 2021).

Furthermore, concerns about sustainability issues and movement towards responsible consumption are global in nature. Large emerging economies, such as those of the BRIC (*Brazil, Russia, India* and *China)* countries, are rapidly increasing their consumption and contributing to environmental degradation (Rocha et al., 2015). Consequently, buyers in these countries are also seeking ways to adopt more pro-environmental behavior. However, the motivators behind the purchase of green products differ based on a country's institutional factors. For example, contrary to more developed economies categorized as individualists, the BRIC countries are culturally collectivists (Hofstede, 2011) and a society's degree of collectivism has been found to affect pro-environmental behavior across cultures (Zhuang et al., 2021) . Therefore, companies must understand these cultural effects on a consumer's motivation to buy green products in order to design an effective global communication strategy. Nonetheless, cross-cultural comparative studies on the influence of sustainability educational factors (*online education* and *green brand communication*) on raising consumers' concern about the environment and perceived effectiveness about their green purchases are still rare. Additionally, the indirect influences of these factors on driving a consumer's green buying behavior and increasing a brand's green image positively have not been fully explored in the literature.

Therefore, this study aims to fill several gaps in the pro-environmental behavior literature by first examining the influence of educational factors on a consumer's intention and willingness to buy green products, and on developing a brand's green image. As explained by the action competence approach (ACA), consumers' positive attitude and ultimate action towards pro-environmental behavior are shaped by their level of education and competence. Second, we explore the mediating effects of environmental concern and perceived consumer effectiveness in the relationships between educational factors and green buying behavior. Third and last, we include a sample of U.S. and Brazilian consumers to compare the effects of environmental concern and perceived consumer effectiveness on green buying behavior under distinct cultural contexts (collectivist vs. individualist). The conceptual model for the study is depicted in Figure 1 .

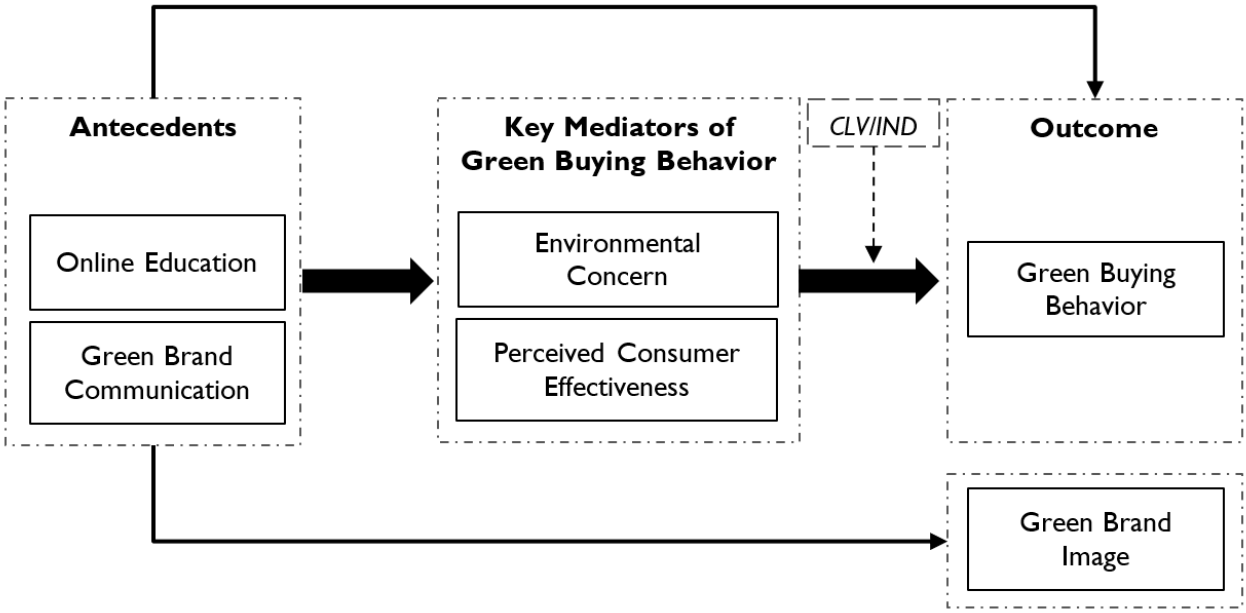

Figure 1. Conceptual Model

In the following sections, we develop the literature review and accompanying research hypotheses predicting how two factors of sustainability education (online education and green brand communication) indirectly, through environmental concern and perceived consumer effectiveness, affect consumer-buying behavior of green products in the U.S. and Brazil. We also investigate the antecedents' direct effects on green brand image. We further expand on the role of environmental concern and perceived consumer effectiveness as key mediators in the model, as well as on the cultural moderation of collectivism/individualism on the relationships between environmental concern and perceived consumer effectiveness and green buying behavior. Finally, we discuss the implications of our findings, limitations of the study, and recommendations for future research.

2. Literature Review and Hypotheses Development

2.1. Outcomes

2.1.1. Green Buying Behavior.

Green buying behavior is defined as a buyer's intention, willingness and real actions towards buying an environmentally friendly product or service (Hines et al., 1987; Bamberg & Möser, 2007; Klöckner, 2013; Zhuang et al., 2021). Earlier studies of green consumers focused on attitudes, behavior, and preferences, and their relationships with consumer characteristics (Mcdonagh & Prothero, 2014). One dominant theory frequently used to investigate green buying behavior is the Theory of Planned Behavior (TBP) developed by Ajzen (1991). TPB is a general model of deliberate behavior, which assumes that behavior is preceded by the intention to perform said behavior, and that intention is directly influenced by attitude, subjective social norms, and perceived behavioral control. Consequently, green consumers "perform a behavior with positive environmental outcomes if they hold a positive attitude to them, if other people expect them to act in that way and support them in doing so, and if they perceive themselves as being able to implement their intentions" (Klöckner, 2013, p. 1029). In addition, the fundamental assumption of ACA in promoting pro-environmental behavior lies in need "to find solutions to these problems through changes at both the societal and the individual level" (Jensen & Schnack, 1997). In the context

of buyer behavior, knowledge dissemination is essential to educate an increasingly digital consumer base about the positive impact of environmentally friendly actions (Varela-Candamio et al., 2018) and to change consumption patterns to reflect more green choices. Therefore, green buying behavior is a desired outcome that supports ACA.

Green buying behavior, in this study, is defined as the consumer's intention and willingness to purchase green products and services over non-green ones. It is examined as an outcome of traditional and new variables related to green education, environmental concern and perceived consumer effectiveness.

2.1.2. Green Brand Image

Green brand image is defined as "a set of perceptions of a brand in a customer's mind that is connected to environmental features and environmental concerns." (Chen, 2010, p. 309). As such, brands with strong green image are "regarded as the best benchmark of environmental commitments," perceived as "professional about environmental reputation" and **"**well established about environmental concern" (Chen, 2010, p. 312).

Developing a green brand image allows companies to target green consumers and to develop a competitive edge for their environmentally friendly products (Smith & Brower, 2012; Khalique et al., 2020). A green brand image has been found to lead to green buying behavior (Gonçalves et al., 2016) and to promote green satisfaction (Khalique et al., 2020). A green image can have a broad meaning, involving organic products, sustainability initiatives, and environmental issues, as well as social responsibility, fair trade, and equitable treatment of animals. Similarly to the results from research on green buying behavior, consumers have been found to be more likely to be interested in brands that possess a green image, pay a premium price for them (Smith & Brower, 2012), and increasingly give preference to green brands (Heo & Muralidharan, 2019).

The ability to recognize a brand as having a strong commitment to being green and a reputation for supporting a sustainable environment is effective in attracting consumers who desire to associate with this image. In the context of green products, the pro-social or pro-environmental image of a green brand will transfer to socially-conscious customers who purchase them (Smith & Brower, 2012). Therefore, green marketing messages that appeal to a customer's reputation or status have proven effective (Griskevicius et al., 2010). Green brand image is examined as an outcome of a brand's green educational factors and a consumer's own initiatives towards learning about the brand's pro-environmental behavior.

2.2. Antecedents

The action competence approach (ACA) suggests that both greater education about environmental issues and exposure to greater solutions to environmental problems contribute to pro-environmental action (Varela-Candamio et al., 2018). There are two approaches to consumer environmental education. The first is initiated by the consumer, while the second is initiated by the organization. Therefore, we explore one antecedent related to consumers' initiatives to learn about sustainability issues online and one antecedent related to organizations' communication strategies designed to educate consumers about their environmentally friendly brands.

2.2.1. Online Education

Online education refers to the degree to which consumers use the Internet and social media to educate themselves about environmental issues, and to gain knowledge about green products and services (Bedard & Tolmie, 2018). Rooted in the literature on information seeking behavior, which contends that consumers seek information about an issue or product to inform themselves before buying, online education is central to green buying behavior today. As noted in the seminal work by Newman and Staelin (1972), "the purchase decision process has been regarded as a learning experience" (p. 252). Therefore, the more buyers learn about a product, the more they are likely to act on their knowledge. Furthermore, current information-seeking behavior is characterized by low-cost search and evaluation of alternative products online (Childers et al., 2001). In today's widely connected world, consumers rely heavily on the Internet, especially younger consumers seeking

to learn more about brands and their sustainable practices as mentioned previously (Smith & Brower, 2012). Traditional media, such as television, used to be the main form of green education (Varela-Candamio et al., 2018); however, the Internet now plays a major role for those consumers who take the initiative to search and learn about organizations' sustainable practices (Smith & Brower, 2012). Universally, consumers who actively seek information about green products and services online become more aware of brands with strong environmentally friendly image. Therefore, we formulate the following hypotheses:

H_1: Online education directly and positively affects green buying behavior in Brazil and the U.S.

H_2: Online education directly and positively affects green brand image in Brazil and the U.S.

2.2.2. Green Brand Communication

As mentioned previously, developing a green brand image can lead to green customer behavior. However, a company must communicate its green initiatives to customers to increase their awareness of them, a challenge especially trying when a brand adopts a green marketing strategy for the first time (Smith & Brower, 2012). Green brand communication encompasses message framing in green advertising and other promotional tools used by companies to communicate their environmentally friendly products to potential buyers. For instance, Smith (2010) discusses words and package features that are most effective to use in green brand communication, based on customer perceptions. Companies may also choose to communicate general messages about their green initiatives rather than specific products (Bedard & Tolmie, 2018). Environmentally conscious customers are generally interested in learning about green products due to their concern for the health of the planet (Varela-Candamio et al., 2018). Green brand communication can help educate these conscientious consumers about the benefits of their choosing a green product over a non-green product, therefore increasing their perceived effectiveness of making a difference Kusmantini et al. (2021). Brands that actively advertise and communicate their green products and services with recognizable green symbols or messages help consumers distinguish their brands as environmentally friendly from other alternatives and create incentives for green consumers to buy their products. Therefore, we expect the following:

H_3: Green brand communication directly and positively affects green buying behavior in Brazil and the U.S.

H_4: Green brand communication directly and positively affects green brand image in Brazil and the U.S.

There are demonstrated theoretical and empirical evidence supporting the direct effects of online education and green brand communication on a brand's green image; however, their ability to elicit an actual purchase needs further examination. Next, we discuss their effects on green buying behavior through two key mediators: environmental concern and perceived consumer effectiveness.

2.3. Key Mediators of Green Buying Behavior

Environmental concern refers to the degree to which consumers are disturbed by the state of the natural environment and the quality of the world's ecosystem (Zheng et al., 2020) . Individuals who demonstrate high concern for the environment are more likely to become conscientious consumers and purchase more eco-friendly products. Numerous studies have demonstrated that higher degrees of environmental concern contribute to greater green purchase behavior (Sinnappan & Rahman, 2011; Heo & Muralidharan, 2019).

Perceived consumer effectiveness refers to "the degree to which consumers think their individual actions contribute to solving problems" (Zhuang et al., 2021, p. 4). Consumers are more likely to take action if they believe their behavior will make a positive difference in helping to mitigate environmental degradation. Both early research in pro-environmental behavior (Bamberg & Möser, 2007; Hines et al., 1987) and recent ones support this relationship (Heo & Muralidharan, 2019; Zheng et al., 2020; Stojanova et al., 2021) and confirm the important role of perceived consumer effectiveness in green buying behavior models.

The direct effects of *environmental concern* and *perceived consumer effectiveness* on pro-environmental behavior have been established in previous studies. Missing in the literature is a more robust examination

of their mediating effects in green buying behavior models. In particular, few studies examine their role in supporting environmental education objectives "to build up students' abilities to act—their action competence—with reference to environmental concerns" (Jensen and Schnack, 1997, p. 163). These mediators are key to ACA as they promote behavior change by raising: 1) concern for the environment, and 2) an individual's confidence in their ability to provide solutions to environmental problems.

Heo and Muralidharan (2019) tested the mediating roles of environmental concern and perceived consumer effectiveness in the relationship between environmental knowledge and ecologically conscious buying behavior and found that "knowledge is related to behavior partially through concern" only (p. 431). Bucic et al. (2012) tested ethical consumerism among millennials in Australia and Indonesia and concluded that greater knowledge of environmental issues does not necessarily lead to ethical consumption decisions, especially in a developing country such as Indonesia. This does not imply that education about environmental issues does not have an effect on buying behavior. Consumers who are more knowledgeable about environmental issues are more likely to act in a pro-environmental manner. However, we contend that a mediating factor or a combination of mediating factors must influence the relationship between education and pro-environmental behavior. More specifically, environmental education's effectiveness in eliciting an action will depend on the degree to which the content and message contribute to raise a consumer's concern for the environment and to demonstrate a consumer's opportunity to make a positive difference with more eco-friendly purchases. However, we did find support for the role of environmental concern and perceived consumer effectiveness in mediating the relationships between antecedents and green brand image as outcome.

Based on the above discussion and previous research findings, we propose the following mediating hypotheses to clarify the roles of environmental concern and perceived consumer behavior in the model:

H_5: Environmental concern will mediate the relationships between (a) online education and green buying behavior and (b) green brand communication and green buying behavior in Brazil and the U.S.

H_6: Perceived consumer effectiveness will mediate the relationships between (a) online education and green buying behavior and (b) green brand communication and green buying behavior in Brazil and the U.S.

2.4. Moderating Role of Culture

Furthermore, cross-cultural research on pro-environmental behavior suggests that cultural differences will play a role in determining the individual motivators or "guidance on appropriate or beneficial behaviors in society" (Zhuang et al., 2021). In particular, Hofstede (2001)'s cultural dimension of Collectivism/Individualism – the degree to which a society is characterized as group-oriented and values group interests over more individual needs and desires (Hofstede, 2001)– can influence environmentalism.

Hofstede's Collectivism/Individualist index scores range from zero to one hundred with the U.S. having the highest individualist index score of 91, Brazil is considered a collectivist country with an index score of 38Collectivist people tend to act in concert, motivated by a desire to benefit society as a whole, while individualist people are more motivated by personal factors. Hofstede (2011) note that collectivist people focus more on the "We" –consciousness and stress values of belonging and group harmony. Given that environmental issues affect every society in the world, we anticipate that Brazilian consumers will act in a pro-environmental manner out of concern for the collective well-being of the planet and the world population in general. For example, Muralidharan et al. (2016) demonstrated how in India, a collectivist country, environmental concern affected green buyer behavior more than in the U.S. In addition, collectivist societies are more affected by social and emotional factors. Watanabe et al. (2020) established how emotional values, instead of functional values, motivated Brazilian consumers to purchase organic food. We expect that in Brazil, a collectivist country, consumers

will be more motivated to buy green products because of their concern for the environment. Damage to the ecosystem is now a collective problem and, since environmental protection is seen more as a social need (Zhuang et al., 2021), we expect Brazilians to act out of concern for the environment.

Individualist societies, on the other hand, focus more on the "I" – consciousness and stress values of personal autonomy, power and independence (Hofstede, 2011). According to Hofstede, "[…] individualist cultures encourage an independent self, while collectivist cultures encourage an interdependent self." (Hofstede, 2011 , p. 113) In his measurement of IND and CLV, he explains that individualistic people value personal time, freedom, and personal challenge and that such individuals desire a personal sense of accomplishment as they grow up learning how to look after themselves (Hofstede, 2011) . Given the strong focus of the dimension of *consumer effectiveness* on the power that a single individual has to make a difference, we anticipate that American consumers will act in a pro-environmental manner out of a desire to do their part as individuals. In addition, individualist people are more motivated by functional factors and the desire to fulfill personal goals (Zhuang et al., 2021). We expect that in the U.S., an individualist country, consumers' motivations will reflect functional and personal values. As such, a consumer's individual ability to make a difference will be more important in such an individualistic society. Cognitive and functional in nature, perceived consumer effectiveness relates to a consumer's individual characteristics (Zhuang et al., 2021). It has been found to affect green behavior in various countries, but, given the discussion above, we expect its effect to be greater in the U.S. than in Brazil. Therefore, we propose the following moderation hypotheses:

H_7: The impact of environmental concern on green buying behavior will be greater in a collectivist country.

H_8: The impact of perceived consumer effectiveness on green buying behavior will be greater in an individualist country.

3. Data and Methods

3.1. Research Methodology

We followed standard procedures in developing the measures and assessing the reliability and validity of the measurement model (Churchill, 1979; Anderson & Gerbing, 1988). We used the recommended methodology to address cross-cultural sampling, measure development, validity, and data analysis (Malhotra et al., 1996; Steenkamp & Baumgartner, 1998; Reynolds et al., 2003) in order to assure an acceptable level of structural equivalence that allowed for cross-cultural sample comparisons (Hair et al., 2010).

3.2. Population and Sampling Procedure

We collected the data via a self-administered electronic survey using Amazon's Mechanical Turk (MTurk). Generally, MTurk respondents have been found to be better representatives of the general population than participants from convenient samples, such as college student samples (Buhrmester et al., 2011; Berinsky et al., 2012) or professional panels (Kees et al., 2017; Zhang & Gearhart, 2020; Berry et al., 2022). However, recent studies have found that data quality from respondents on MTurk and other crowdsourcing platforms has decreased since 2015 (Chmielewski & Kucker, 2020; Kennedy et al., 2020; Peer et al., 2022). While MTurk participants are more attentive to instructions and in answering survey questions than college students , it is therefore crucial to vet respondents and to include screening criteria to improve data quality (Kees et al., 2017; Chmielewski & Kucker, 2020; Agley et al., 2022; Berry et al., 2022). We consequently required our study's participants to sign an informed consent question, to answer an attention check question, and to provide a unique code at the end of the survey (Aguinis et al., 2021; Agley et al., 2022). Additional precautions included restricting the country location was restricted to assure that only U.S. or Brazilian respondents had access to the survey in their corresponding languages (English and Portuguese). Finally, participants were required to be classified as MTurk Master Workers, i.e., respondents who have traditionally performed well with a 95% approval rating (Jia et al., 2017), in order to assure high quality responses.

We cleaned the dataset and removed incomplete and low quality responses that did not pass the attentive test. To assist participants in answering the survey in a similar manner, and to help reduce invariance and method biases (Podsakoff et al., 2003), all respondents received the same instructions. Respondents were instructed to continue only if they had purchased a green/eco-friendly product or service in the past year. The following brief description of what constitutes green products and services was provided:

"Green products are those that cause no or minimum harm to the environment, people or animals. Examples include, but are not limited to organic, non-GMO, recycled, energy efficient and/or free from toxic products. Green services are those provided by companies with sustainable practices such as companies that save energy, practice fair trade; attain their natural resources from environmentally friendly farms and producers, etc. in order to minimize their environmental impact."

We conducted nonresponse bias tests and found no statistically significant differences between the means of early and late respondents (Armstrong & Overton, 1977). The final samples sizes were as follows: U.S. (*n* = 195) and Brazil (*n* = 209). The distribution of the samples is summarized in Table 1.

3.3. Measurement Development, Validity, and Reliability

The scales were adapted from existing green buying behavior, green brand communication, pro-environmental and sustainability marketing studies (Smith & Brower, 2012; Chen & Deng, 2016; Varela-Candamio et al., 2018; Khalique et al., 2020; Zheng et al., 2020; Ali, 2021; Stojanova et al., 2021; Rivera-Camino, 2007). The original English version of the survey underwent translation and subsequent back-translation by professional translators well versed in Portuguese to ensure content validity, semantic and conceptual equivalence, and consistency of construct meaning among samples. Advice of bilingual experts was sought on the meaning of each item in both the original and the translated survey versions (Malhotra et al., 1996; Craig & Douglas, 2005) . We pre-tested the surveys with practitioners prior to administering them to participants. No concerns were raised in regard to the meaning of each survey item during the pilot tests, suggesting that the survey questions were equally understood and accepted in both countries. The final survey questions are listed in the Appendix.

To reduce the potential of measurement error due to the systematic nature of our questionnaire, the following procedural methods were performed in this study. First, participants were assured that the survey was confidential, voluntary, and conducted solely for academic purposes. Secondly, all items belonging to one variable were grouped together (Podsakoff et al., 2003; Mackenzie & Podsakoff, 2012). We also implemented the CFA approach recommended by Malhotra et al. (2006) by loading all items on one factor. "Method biases are assumed to be substantial if the model fits the data" . The U.S. (CFI = .79; IFI = .79; NFI = .75; RMSEA = .156; RMR = .154) and the Brazil (CFI = .78; IFI = .78; NFI = .974; RMSEA = .137; RMR = .143) poor model fit suggests a lack of common method variance in the study. Finally, we conducted a more rigorous CFA test by examining the model including a variable that is "theoretically unrelated to at least one variable in the study" in order to test for CMV using a partial correlation technique . We used measures of the local identity scale (i.e., My heart mostly belongs to the local community) which is conceptually unrelated and have low or nonsignificant correlations with all other variables in our study. Results of the partial correlation analyses showed that all bivariate correlations remained significant when controlling for the marker variable (Lindell & Whitney, 2001; Malhotra et al., 2006; Gaskin, 2017). Given the acceptable results of these tests, we do not expect common method variance to be a major concern in this study.

Next, we assessed the internal consistency and validity of the scales within each sample by analyzing the composite reliability for each scale. The Cronbach's Alpha for each scale for both groups exceeds 0.85, above the .70 threshold, demonstrating excellent properties (Hair et al., 2010). The average variance extracted (AVE) provides initial evidence of convergent validity as measures have an AVE exceeding the recommended threshold of 0.50 Fornell and Lacker (1981); Hair et al. (2010). Table 2 summarizes

Table 1. Sample Distribution

Demographic	U.S. $_{(n=195)}$ Percentage (%)	Brazil $_{(n=209)}$ Percentage (%)
Age[1]		
Baby-boomers	15.9	0.5
Gen X	35.9	9.6
Gen Y	45.1	60.3
Gen Z	3.1	29.7
Gender		
Male	50.3	65.1
Female	49.2	34.9
Income[2]		
Low	17.9	14.8
Upper-low	12.8	24.4
Low-Middle	14.9	17.7
Middle	21.0	13.9
Upper-Middle	14.4	7.7
High	8.7	10.0
Upper-High	10.3	11.5
Education		
No Degree	0.5	1.0
High School	25.6	23.4
Associates Degree	17.9	14.8
Bachelor's Degree	43.6	50.2
Master's Degree	9.2	9.1
Doctorate Degree	3.1	1.4

1 Baby-boomers born between 1946 and 1964; Gen X born between 1965 and 1980, Gen Y participants born between 1981 and 1996, and Gen Z born between 1997 and 2004. 2 Income distribution was commensurate to social class in each country.

descriptive statistics and the reliability and validity tests for the scales in the study's measures.

To further assess convergent validity, a confirmatory factor analysis was conducted and the overall fit of the measurement models are acceptable (for the U.S. sample: $\chi 2_{(195)}$ = 453.300, p<.01; CFI = .95; IFI = .95; NFI = .91; RMSEA = .083; SRMR = .0458 and for the Brazil sample: $\chi 2_{(209)}$ = 397.214, p<.01; CFI = .95; IFI = .95; NFI = .90; RMSEA = .071; SRMR = .0439) (Hair et al., 2010). All values are within acceptable range (Hu & Bentler, 1999). The data provided in the correlation matrix for the two groups (see Table 3), demonstrate evidence of discriminant validity as the square-roots of the constructs' AVEs exceed the correlations between distinct variables (Churchill, 1979).

In addition, the factor loadings of items onto each construct across both samples exceeded the recommended threshold of 0.70 (Hair et al., 2010), with the exception of one item for PCE in the Brazil sample, which has a loading of .63.

Modification indices were also analyzed, and their low values, combined with the excellent goodness of fit of the measurement models reported above, demonstrate a lack of alternative factor structure, indicating further evidence of configural invariance. Measurement invariance was also investigated for both measurement models using multi-group analysis and analyzing the critical ratios for differences between parameters. Partial metric invariance was established, since at least one item per scale did not significantly differ between the

Table 2. Descriptive Statistics, Reliability and Validity Tests for Measures

Variables	U.S. (n = 195)				Brazil (n = 209)			
	Mean	SD	CR	AVE	Mean	SD	CR	AVE
Environmental Concern	5.56	1.37	.90	.75	5.81	1.16	.89	.74
Perceived Consumer Effectiveness	5.55	1.28	.95	.81	5.87	1.03	.87	.62
Online Education	4.79	1.57	.88	.71	5.14	1.37	.85	.66
Green Brand Communication	5.07	1.35	.95	.90	5.03	1.27	.91	.84
Green Brand Image	5.16	1.16	.87	.69	5.18	1.20	.86	.67
Green Buying Behavior	5.04	1.47	.96	.78	5.19	1.29	.95	.71

Notes: SD Standard Deviation; CR Composite Reliability measured using Cronbach's Alpha; AVE Average Variance Extracted

Table 3. Correlations and Discriminant Validity

Variables	GBB	EC	GBI	PCE	GBC	OE
Green Buying Behavior (GBB)	**0.88**					
	0.84					
Environmental Concern (EC)	0.82	**0.86**				
	0.81	**0.85**				
Green Brand Image (GBI)	0.61	0.57	**0.83**			
	0.68	0.58	**0.82**			
Perceived Consumer Effectiveness (PCE)	0.83	0.79	0.72	**0.90**		
	0.76	0.78	0.61	**0.79**		
Green Brand Communication (GBC)	0.87	0.75	0.65	0.76	**0.94**	
	0.83	0.69	0.68	0.72	**0.92**	
Online Education (OE)	0.83	0.70	0.55	0.68	0.76	**0.84**
	0.70	0.64	0.57	0.54	0.68	**0.81**

Notes: All correlations are significant at $p < .01$. Values in bold are square root of AVE. Top values = U.S.; Bottom values = Brazil

two groups. There was no evidence of sufficient differences in regards to how participants from each group responded to the survey and the measurement models demonstrated an adequate level of universal structure to allow for cross-cultural comparisons of the structural model (Mackenzie et al., 2011).

4. Results

4.1. Data Results

Both samples were diverse in terms of age, gender, income and education (see Table 1) as expected (Berinsky et al., 2012). There were, however, some differences and similarities between the U.S. and Brazilian samples. Brazilian respondents were younger with nearly 90 percent of participants belonging to generations Y and Z. Baby-boomers were almost not represented and Generation X accounted for about 10 percent of the Brazilian participants. American respondents were older, with slightly over 80 percent of the participants belonging to Generation X and Generation Y, and approximately 16 percent being Baby-boomers. The Brazilian sample also included a larger portion of males, while the U.S. sample was evenly distributed between males and females. Both samples were comparable in terms of income and educational backgrounds. Respondents with a Bachelor's degree were the largest groups in both U.S. and Brazil. Overall, the samples were adequate representations of each country's population.

4.2. Hypotheses Analyses

We simultaneously estimated the model for each group using multi-group analysis (Byrne, 2004; Hair et al., 2010). We analyzed and statistically compared the path coefficients for the two groups using AMOS 29 structural equation modeling software (Helmke & Levitsky, 2004) and pairwise parameter comparisons to examine significant differences and test the moderation effects on the hypothesized relationships. We tested the invariance in the parameter coefficients for each relationship by calculating the critical ratios for differences between parameters, to assess the *z*-scores for the difference in each parameter between groups (Byrne, 2004). To test for the mediating effects of *environmental concern* and *perceived consumer effectiveness* in the model, we performed bootstrapping (Preacher & Hayes, 2008) analyses with 5000 samples to calculate the indirect effects of the antecedents (*online education* and *green brand communication*) on the outcome (*green buying behavior*). As suggested by Zhao et al. (2010), we estimated all parameters simultaneously using structural equation modeling to determine the direct and total effects in order to classify the mediation. *Complementary mediation* is demonstrated when the indirect and direct effects of an antecedent on an outcome are significant and have the same sign. *Indirect-only mediation* is demonstrated when the indirect effect is significant, but there is no significant direct effect. We report the indirect effects with 95% confidence interval from the bootstrap analyses and the unstandardized regression coefficients for all effects (Zhao et al., 2010). Lastly, we used one-tail test to examine the moderation hypotheses and included age, gender, income and education, as control variables. We found no significant influence of the control variables on both outcomes. Table 4 summarizes the results of hypotheses H_1, H_2, H_3 and H_4 the results of the moderation hypotheses H_7 and H_8 and effects of the control variables and total variance explained for the two outcomes.

Table 5 summarizes the results of the mediation hypotheses ($H_{5a,b}$ and $H_{6a,b}$).

H_1,H_2, H_3 and H_4 test the direct effects of educational factors on green buying behavior and green brand image. As shown in Table 4, H_1 is fully supported. Online education has a positive, direct and significant effect on green buying behavior in the U.S. and in Brazil. Hypothesis $H_2$is not supported. The direct effect of online education on green brand image in both country samples is not statistically significant. H_3 and H_4 are fully supported, confirming the positive, direct and significant effects of green brand communication on green buying behavior and green brand image for both groups.

$H_{5a,b}$ and $H_{6a,b}$ test the mediating effects of environmental concern and perceived consumer effectiveness on the relationship between educational factors and green buying behavior. As shown in Table 5, we found support for the role of environmental concern in mediating the relationship between both education factors (online education and green brand communication) and green buying behavior in the U.S. and in Brazil, supporting H_{5a} and H_{5b}. Similarly, perceived consumer effectiveness mediates all relationships in the model with the exception of online education and green buying behavior in Brazil. Results show that, in that country, there is a direct-only relationship between the antecedent and outcome with perceived consumer effectiveness tested as mediator (H_{6a} was supported in the U.S., but not in Brazil, while $H_{6b}$was supported in both countries). It is worth noting that both antecedents have positive and significant total effects on green buying behavior; albeit, the total effect of green brand communication on green buying behavior is greater in both countries.

For the moderation hypotheses, H_7 and H_8were also supported, demonstrating that the effect of environmental concern on green buying behavior is statistically and significantly greater in Brazil, while the effect of perceived consumer effectiveness on green buying behavior is statistically and significantly greater in the U.S.

The overall fit of the structural model indicates the model has a good fit to the data: $\chi 2_{(195)}$ = 515.116, p<.01; CFI = .94; IFI = .94; NFI = .90; RMSEA = .089; SRMR = .0462 and for the Brazil sample: $\chi 2_{(209)}$ = 442.702, p<.01; CFI = .95; IFI = .95; NFI = .90; RMSEA = .077; SRMR = .0441). Sizable values of R^2 of the endogenous variable suggest sufficient

Table 4. Summary of the Results and Hypotheses Support

Hypotheses H_1 , H_2 , H3, H4, H_7 and H_8	**U.S. (β)**	**Brazil (β)**
H_1: Online Education → Green Buying Behavior **(S)**	.30***	.12**
H_2: Online Education → Green Brand Image **(US)**	.13	.16
H_3: Green Brand Communication → Green Buying Behavior **(S)**	.37***	.45***
H_4: Green Brand Communication → Green Brand Image **(S)**	.56***	.60***
H_7: Environmental Concern → Green Buying Behavior (CLV – greater in Brazil, z-scores = 1.814*) **(S)**	.15**	.31***
H_8: Perceived Consumer Effectiveness → Green Buying Behavior (IND – greater in the U.S., z-scores = 1.688*) **(S)**	.22***	.12
Total Variance Explained (R^2)		
Green Buying Behavior	.89	.82
Green Brand Image	.45	.52
Control Variables (R^2)		
Age → Buying Behavior	-.06	.01
Gender → Buying Behavior	.00	.05
Income → Buying Behavior	.02	.06
Education → Buying Behavior	-.02	-.02

Notes: *** p < 0.001; ** p < .01; * p < 0.05; β = standardized parameter estimates; z-score = critical ratio for differences between parameters S = Supported; PS = Partially Supported; US = Unsupported CLV = Collectivist; IND = Individualist

Table 5. Mediation Results

Hypotheses $H_{5a,b}$ and $H_{6a,b}$	**Indirect Effects (b)**	**Direct Effects (b)**	**Total Effects (b)**	**Type of Mediation**
Environmental Concern as Mediator				
H_{5a}: Online Education → Green Buying Behavior **(S)**	US = .09; p = .003 BR = .15; p = .032	US = .36; p = .000 BR = .15; p = **n/s**	US = .45; p = .000 BR = .30; p = .026	Complementary Indirect-only
H_{5b}: Green Brand Communication → Green Buying Behavior **(S)**	US = .16; p = .000 BR = .21; p = .001	US = .50; p = .000 BR = .52; p = .000	US = .66; p = .000 BR = .73; p = .000	Complementary Complementary
Perceived Consumer Effectiveness as Mediator				
H_{6a}: Online Education → Green Buying Behavior **(PS)**	US = .08; p = .012 BR = .03; p = **n/s**	US = .36; p = .000 BR = .28; p = .025	US = .44; p = .000 BR = .31; p = .027	Complementary Direct-only
H_{6b}: Green Brand Communication → Green Buying Behavior **(S)**	US = .20; p = .000 BR = .21; p = .003	US = .46; p = .000 BR = .53; p = .000	US = .66; p = .000 BR = .74; p = .000	Complementary Complementary

Notes: b = unstandardized parameter estimates S = Supported; PS = Partially Supported; US = Unsupported

explanatory and predictive power. Combined, the direct and indirect effects of both education factors and mediators explained 89% of variation in green buying behavior in the U.S. and 82% in Brazil. The direct effects of the sustainability education factors combined explained 45% of variation in green brand image in the U.S. and 52% in Brazil. Next, we discuss the implications of the study, theoretical and practical contributions, limitations and possible future research opportunities.

5. Discussion and Contributions

5.1. Discussion

A growing number of marketing scholars and practitioners now realize the detrimental effects of marketing practices that encourage unsustainable consumption and threaten the ability of the planet to survive for future generations to come. Therefore, sustainability marketing must become a '*pressing issue*' that guides marketing research and practice Mcdonagh and Prothero (2014) and that contributes to solve the world's biggest threats such as climate change, pollution and the depletion of Earth's natural resources. In addition, global attitude towards purchasing sustainable products has increased in general among individuals from all generations, especially in emerging markets (Muralidharan et al., 2016; Simon-Kucher and Partners, 2021). Individual consumers play a major role in driving sustainability, thus the need to understand green consumerism will continue to grow (Kumar & Polonsky, 2017). As the green market segment expands, so does the need for marketers to effectively "*integrate sustainability into branding*" to appeal to this growing market and gain competitive advantage (Kumar & Christodoulopoulou, 2014).

This study sheds light on how companies can design marketing communication strategies and educate a global audience about their sustainable practices, thus improving their green brand image and promoting the consumption of their green products and services. It has numerous theoretical and managerial contributions, which are discussed next.

5.2. Theoretical Contributions

The first contribution of this research relates to needed insight on the significance of ACA for green buyer behavior theory. The importance of sustainability education, whether initiated by the consumer or by the organization, in contributing to promote a brand's green image also lends support to the relevance of ACA in branding theory. In addition, the interplay of exogenous factors in influencing green behavior is complex. This study reveals that a combination of mediators (environmental concern and perceived consumer effectiveness) are essential factors in increasing the effectiveness of sustainability educational factors in promoting green buying behavior. Lastly, the moderating effects of culture (collectivism versus individualism) is found to be significant in this study, specifically in its role in enhancing the relationship between environmental concern and green buying behavior in a collectivist country and perceived consumer effectiveness and green buying behavior in an individualist country.

5.3. Managerial Contributions

First, *green brand communication* significantly contributes to build the brand's green image in the U.S. and Brazil alike. Companies should invest heavily in building a green brand image by designing communication to focus on overall green brand initiatives and green products or services offered. In addition, green brand communication is also the strongest determinant of green buying behavior in both countries. Together, these results suggest that consumers prefer to buy from brands that are advertised as environmentally friendly and that demonstrate their eco-friendliness with ecolabels. Brands can use, for example, reputable ecolabels such as "USDA Organic" in the U.S. and "Producto Orgânico Brasil" in Brazil. It is important to note that green brand communication needs to be done in a manner that is not perceived as '*greenwashing*' (Ali, 2021). Communication about a brand's products can have a positive impact on the brand's image, increase the consumer's perception of their ability to make a difference with their behavior, and directly contribute to green buying behavior.

Second, online education contributes to increase a

buyer's green buying behavior indirectly via environmental concern in both countries and via perceived consumer effectiveness in the U.S. Since online education is initiated by consumers, managers can produce and publish online content that speaks to their green initiatives on various online media platform (e.g., website and social media sites). For example, companies can increase engagement and consumer knowledge about their green products and services via blogs, social media contests, and encouraging consumer reviews. Consumers who are seeking information about environmental issues and green products and services online represent a large segment of the market that can be directly targeted with messages that highlight both a brand's environmental initiatives and their ability as individuals to make a difference by purchasing the brand's green products and service.

Third, the role of culture in determining what triggers consumers to buy green is highlighted in this study. In the U.S., an individualist country, consumers are more likely to act if they know that their choices can effectively make a difference. In Brazil, a collectivist country, consumers are more likely to act out of concern for the natural environment. Consequently, marketers should design content that emphasizes consumer's effectiveness in individualist countries and environmental concern in more collectivist countries as strategies to promote pro-environmental behavior. Nonetheless, consumers in both countries want to know how precisely their behavior contributes to solving the world's biggest problems. Marketing campaigns that demonstrate how purchasing green products or services can make a positive difference on specific issues such as climate change and, concurrently, raise consumers' concern for the environment, can be more effective. Therefore, in communicating sustainable practices to consumers, marketers should design content that highlight the positive aspects of their sustainable products and their value and benefits. Advertising campaigns, for example, can include eco-friendly claims, labels, and promotional and educational environmental content suitable for online posting.

In summary, consumers are increasingly more concerned about the environment and want to make sustainable purchase choices. That is good news for practitioners that practice sustainability and focus on green branding. These findings, coupled with the importance of sustainability education to increase buyers' green buying behavior suggest that businesses and organizations would benefit from a robust sustainability campaign delivered via online platforms. Social media campaigns are effective tools to educate consumers about an organization's sustainable practices and are extremely suitable for sharing with others. Organizations that design online campaigns with incentives for sharing can benefit from all angles, directly and indirectly, through customers' increased knowledge, concern for the environment and attitude towards the purchase of green products.

6. Limitations and Future Research

Several limitations of this study serve as future research opportunities. First, the two-country sample and their non-representative nature limit the generalizability of the study results. Although Brazil is representative of an emerging market, the results can only be generalized to other emerging countries if the model is tested with samples from other countries. Brazil has traditionally been concerned with environmental issues due to the high-profile degradation practices in the Amazon forest, and more recently, Brazilians were found to greatly consider sustainability in their purchase decisions (Simon-Kucher and Partners, 2021). History and the geo-political contexts of the countries selected for future research should be considered as well.

Second, despite all the measures related to data collection to control for low data quality due to lack of attention, comprehension, honesty, and/or reliability, our study's results are constrained by the crowdsourcing nature of MTurk samples. Further research could replicate our study using probability sampling in additional countries.

Third, despite the rigor of the survey methodology that included expert review, translation and back-translation, pre-test, and rigorous scale purification process, misinterpretation of some survey questions cannot be ruled out since the original items were written in English and based on the interpretation

of North American buyers. Although careful CMV measures were taken, common method bias cannot be ruled out either. The nature of the common scale attributes in this study may have contributed to possible bias in the survey responses.

Several other theories of pro-environmental behavior can serve as foundation for other variables to be included in the model and to explain green buying behavior. The investigation of social norms and traditional factors such as price and quality can be explored in future research. Finally, the importance of a global orientation and consumer cosmopolitanism on green behavior can be further investigated to shed light on the importance of global citizenship education in encouraging sustainable purchase practices.

Acknowledgments

This research was supported by Eckerd College

Funding statement

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Cite as

Graça, S.S., & Kharé, V.P. (2023). Educating Global Green Consumers: The Role of Online Education and Brand Communication in Promoting Green Buying Behavior. *Journal of Sustainable Marketing*, 4(2), 246-264. https://doi.org/10.51300/JSM-2023-107

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Appendix. Measurments

Green Buying Behavior (Chen & Deng, 2016; Stojanova et al., 2021; Woo & Kim, 2018)
I have switched products and services for ecological reasons
I make a special effort to buy products and services that are environmentally friendly
I have avoided buying a product or a service because it had potentially harmful environmental effects
My willingness to repurchase green products and services is very high
I am more willing to buy green products and services than non-green ones
Next time that I buy, the possibility that I will choose green products or services is very high
Overall, I am glad to repurchase a green product because it is environmentally friendly
Green Brand Image (Chen et al., 2020)
I can distinguish green brands from other brands because of their environmental commitment
Green brands have a strong reputation towards a sustainable environment
I can easily recognize a green brand because of its environmental concern
Environmental Concern (Zheng et al., 2020)
The natural environment is a major concern of mine
I am disturbed by environmental and ecological issue
I often think about the quality of our environment and ecosystem
Perceived Consumer Effectiveness (Zheng et al., 2020; Stojanova et al., 2021)
I think that I can contribute to our world if I care about the environment in my daily life
Individuals can have an effect on environmental problems
It is worth it for an individual consumer to make efforts to preserve and improve the environment
By purchasing eco-friendly products and services, consumers can have a positive effect on the environment and society
Online Education (Varela-Candamio et al., 2018)
I use the internet to improve my knowledge about environmental issues
I seek information about green products/services online
I read reviews on social media about green products/services
Green Brand Communication (Smith and Brower, 2012)
I buy products or services from brands that are advertised as being environmentally friendly
I buy products or services from brands with environmentally friendly symbols or claims

Notes: Items have been adjusted to fit the context of the study and designed on seven-point Likert-scales anchored with "Strongly Disagree" and "Strongly Agree".