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Article

Consumers' green attitude and behavior in China and Singapore: The role of altruistic value and perceived consumer effectiveness, economic motive

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Abstract: Consumers' interest in green consumption has increased rapidly in recent years with heightening concerns for environmental, social, and health risks. However, increased concerns and interest of consumers may not translate to their behavioral outcome which may be attributed to socio-economic and consumers' internal stimuli. Furthermore, contextual differences in the marketplace may influence how consumers form their green attitudes and behavior. The purpose of this study is to assess the role of consumers' intrinsic traits such as consumers' personal values, their self-motivation for sustainable consumption (i.e., perceived consumer effectiveness), green skepticism, and environmental involvement in their green attitude and behavior, and to see if the country-specific contextual condition may influence consumers' behavior. In addition, price sensitivity and environmental protection emotions are considered moderating constructs to explain the gap between green attitude and green behavior. Findings from this study provide insights into understanding Chinese and Singaporean consumers' green behavior which is driven by their intrinsic traits and by extrinsic conditions. This understanding can help companies to develop effective green marketing communication strategies and to enhance consumer engagement in sustainable activities and consumption.

Keywords: green attitude; green purchase intention; altruistic value; perceived consumer effectiveness; price sensitivity

1. Introduction

Consumers' interest in green consumption has increased rapidly in recent years with heightening concerns for environmental, social, and health risks. Consumers increasingly recognize that the environmental and social considerations of products and services are critical new values in consumption situations. Companies are capitalizing on this interest by offering numerous green products in the marketplace (Nafees et al., 2022) yet consumers are being cautious in actual consumption behavior (De Silva et al., 2021; Isaac and Grayson, 2020; Khan et al., 2020; Loebnitz and Grunert, 2022). There is a gap between consumers' awareness and concerns for the environment, society, and their actual behavior which can be attributed to socio-economic and individual-related reasons.

Several studies claim that consumers' positive attitude toward green products (i.e., Green Attitude) can play a significant role in drawing consumers' green consumption (Lavuri et al., 2022). Consumers' green attitude is affected by multiple factors which have been extensively reported by researchers (Ashraf et al., 2023; He et al., 2021; Lavuri, 2022a; Mansoor and Paul, 2022; Zhuang et al., 2021; Zou and Chan, 2019). Consumers' internal factors such as environmental consciousness and concerns (i.e., environmental awareness) and level of cognitive understanding of environmental issues can affect green attitude, thereby motivating green consumption behavior

(Gabler et al., 2023; Liu et al., 2020; Nekmahmud and Fekete-Farkas, 2020; Van Tonder et al., 2023; Zhao et al., 2021). In addition, consumers' self-image, lifestyle, and ethical values are claimed to have an impact on green attitude which can be influenced by contextual conditions (He et al., 2021). In other words, individual-consumer-specific attributes are closely associated with the socio-economic condition in which consumers reside. Thus, contextual conditions of a particular marketplace need to be considered in predicting consumers' green behavior, and this is particularly important when consumers cross borders and are compared. Green attitude may not necessarily lead to actual buying behavior due to contextual factors such as the level of trust, perceived value, economic motives, and interest (Verma et al., 2019). In this study, we propose that socio-economic constructs such as price sensitivity and consumers' affection towards the environment may moderate the relationship between green attitude and behavior.

Previous studies on consumers' green behavior have widely applied ABC theory, and identified various factors, affecting consumers' green behavior (Liao et al., 2020; Mangafić et al., 2017). ABC theory, as defined by Guagnano et al. (1995), connects behaviors (B) to attitudes (A) and contextual elements (C) (Guagnano et al., 1995), which Stern (2000) refers to as the contextual paradigm (Stern, 2000). ABC theory operates on a standard means-ends approach where consumers act based on the functions and benefits, they expect (Eide and Toft, 2013), thus, offering a framework for understanding consumers' attitudes and behaviors (Zepeda and Deal, 2009).

ABC theory emphasizes the importance of contextual factors in explaining consumers' green behavior in addition to consumers' attitudes. Contextual factors such as socio-economic and personal constructs can play a significant role in explaining consumers' green attitudes and behavior. In this study, we develop an empirical model to explore consumers' intrinsic trait factors that affect consumers' green attitudes, while assessing the reason for the gap between green attitudes and behavioral outcomes based on Attitude Behavior Context (ABC) theory. The ABC framework can be effectively utilized in a cross-national assessment as the effects of contextual factors may vary in different nations. In this study, we propose to compare consumers' green attitudes and behavior in China and Singapore by assessing the impact of selected contextual factors. These are two major Asian markets in which the government has substantial initiatives on sustainable consumption and a green environment.

Intrinsic factors such as consumers' personal values, their self-motivation for sustainable consumption (i.e., perceived consumer effectiveness), green skepticism, and environmental involvement are selected as the main determinants for green attitude and behavior. In addition, price sensitivity and environmental protection emotions are considered contextual factors that moderate the relationship between consumers' green attitude and their purchase intentions. We selected China and Singapore as the focus of the study as these two countries are significantly different in their socio-economic conditions. The two countries have different political regimes and economic developmental stages which may significantly influence their motivation for green consumption. Furthermore, governmental policies on sustainability may differ between these two countries which also affects consumers'

interests and concerns for the environment. These contextual factors may explain the gap between green attitude and green behavior.

Findings from this study provide insights for understanding Chinese and Singaporean consumers' green behavior which is driven by consumers' intrinsic traits and by different extrinsic contextual factors. This understanding can help companies to develop effective green marketing communication strategies and to enhance consumer engagement in sustainable activities and consumption. The paper is divided into five sections as follows. Firstly, the research background, the purpose of the study, and the structure of the paper are presented. Then followed by a section on literature review and hypotheses. The third section has the research method, which is followed by results, discussion, and implications in the proceeding sections.

2. Literature review and hypotheses

This study assesses the impact of intrinsic traits on their green attitudes and purchase intentions, and to see if contextual factors such as price sensitivity and environmental protection emotion can play as moderating factors on consumers' green attitudes and behavior (see **Figure 1**).

2.1. Attitude behavior context (ABC) theory

In this study, we use the ABC theory to examine the impact of consumers' green attitudes on their intentions to purchase green products. The ABC theory, as defined by Guagnano et al. (1995), connects behaviors (B) to attitudes (A) and contextual elements (C) (Guagnano et al., 1995), which Stern (2000) refers to as the contextual paradigm (Stern, 2000). ABC theory operates on a standard means-ends approach where consumers act based on the functions and benefits, they expect (Eide and Toft, 2013). This theory suggests that contextual factors influence or limit consumer's ability to act on their goals, thus explaining the gap between consumers' attitudes and behavior. Hence, the ABC theory offers a framework for understanding attitudes and behaviors (Zepeda and Deal, 2009).

Researchers have shown that various factors, such as attitudes toward green products, positively influence the intentions of green purchasing (Bhardwaj et al., 2023; Jaiswal and Kant, 2018). Other studies expound on the process of green buying intentions of consumers through self-identity and address the process of attribution (Sharma et al., 2022). Previous studies on green purchasing have frequently utilized the ABC theory. According to the ABC theory, consumers' intrinsic value and interests in environmental issues increase pro-environmental behavior and have a certain impact on individual behavior (Kumar et al., 2022). In some cases, however, extrinsic factors can interfere with an individual's ability to act according to their intentions, thus, environmental attitudes and values alone may not explain environmental behavior (He et al., 2021). For instance, socio-economic conditions in which consumers carry out their activities may interfere with their attitudes, thus resulting in different behavioral outcomes. Consumers with high income may be less price-sensitive while ones with low income may be more sensitive to price level. Thus, price-sensitive consumers may not necessarily purchase green products despite their high interest and concern for green issues. Therefore, contextual factors that prevent

consumers from acting must be considered. This study examines the effects of various consumer intrinsic traits, including green skepticism and altruistic values (environmental concerns) on their green attitude, while exploring the moderating effects of contextual factors such as price sensitivity and environment protection emotion, using ABC theory as a basis.

2.2. Green skepticism

The tendency of individuals to distrust others is known as skepticism (Farooq and Wicaksono, 2021). Defining "green skepticism" as the tendency for consumers to doubt the benefits of green products for the environment (Obermiller et al., 2005), refers to consumers' ambiguous or skeptical attitudes toward green products' environmental claims (Li and Cui, 2021). According to some scholars, green skepticism results from consumer's doubt about environmental claims rather than a deep-seated distrust of green products (Coleman et al., 2024). Green skepticism is also claimed to be associated with context-specific negative attitudes, expressed as distrust or doubt in the environmental claims of green products (Sreen et al., 2021).

Previous studies argued that greenwashing is an important reason for consumers' green skepticism. For example, Copeland et al. (2020) demonstrated that consumers' intentions to purchase from an environmentally friendly brand were influenced by knowledge and skepticism (Copeland and Bhaduri, 2020). Nguyen et al. (2019) showed that greenwashing is the main cause of skepticism and it was found that greenwash negatively influenced green purchase intentions and that green skepticism mediated this effect (Nguyen et al., 2019). Furthermore, research indicates that compared to smaller companies, consumers are more skeptical of large companies, and a company's skepticism depends on its industry, with the oil industry having the lowest level of trust. Demographics also play a role, with women being more skeptical (Farooq and Wicaksono, 2021). Zhang et al. (2021) found that when food companies with a low green reputation use green marketing to promote environmental benefits, consumers show similar or even higher levels of skepticism (Zhang et al., 2021). Therefore, the following hypotheses are proposed:

Hypothesis 1a: Green skepticism will have a negative impact on green attitudes.

Hypothesis 1b: Green skepticism will have a negative impact on the intention to purchase green products.

2.3. Altruistic values

An individual's environmental concern can be characterized as their awareness of environmental issues and their willingness to support efforts to address them (Dunlap and Jones, 2002). It is an emotional attribute reflecting a person's attitudes, sympathies, likes, and dislikes regarding the environment (Yeung, 2004). Recently, researchers have been paying more attention to how altruistic values can determine consumer behavior (Rodríguez et al., 2022). Previous studies have shown that sustainable collections enhance consumers' altruistic motivations, and consumers' altruistic motives positively influence corporate legitimacy, corporate social responsibility perception, brand trust, and purchase intention (Miotto and Youn, 2020). Tewari et al. (2022) support this view, suggesting that consumers' altruism

indirectly affects purchase intention through attitude (Tewari et al., 2022). Zou and Chan (2019) found that a growing number of consumers are concerned about the environment and motivated by altruistic values, their efforts to address environmental issues through green purchasing reflect this (Zou and Chan, 2019). Mansoor et al. (2022) found that the effect of green altruism, combined with expected well-being (self-acceptance, social contribution), enhances consumers' choice of green products (Mansoor and Paul, 2022). Costa Pinto et al. (2019) demonstrated that pure altruistic goals lead to higher recycling (green buying) intentions (Costa Pinto et al., 2019). Based on the above, we formulate hypotheses 2a and 2b as follows:

Hypothesis 2a: Altruistic values have a positive impact on green attitudes.

Hypothesis 2b: Altruistic values have a positive impact on the purchase intention of green products.

2.4. Egoistic Values (EV)

Health is widely recognized as a crucial factor in food purchasing decisions, with many consumers considering it an important criterion and quality parameter (Wandel and Bugge, 1997). At the same time, individual health care can be seen as an expression of self-interest, or egoistic values (Magnusson et al., 2003). It has also been found that egoistic values such as physical health and enhanced quality of life can motivate individuals to engage in environmentally friendly behavior as well (Verma et al., 2019). In fact, many consumers choose green products because they believe these products are beneficial to their health (Prakash et al., 2019).

Building on previous studies, recent research has identified health concerns as a key consideration in green consumption (Lavuri, 2022a). Specifically, studies on green consumption have shown that green purchase intentions and attitudes are heavily influenced by personal health concerns. For instance, Rahman and Reynolds found that egoistic values strongly influence consumers' intentions to purchase drinks, as they are more concerned about the personal health benefits of the product (Rahman PhD and Reynolds PhD, 2017). Similarly, Kim et al. (2022) showed that individuals who prioritize their health are more likely to engage in environmental activities (Kim et al., 2022). However, Lagomarsino et al. (2020) found that individuals with egoistic tendencies may be less receptive to prevention-focused environmental messages and less likely to take action (Lagomarsino et al., 2020). In contrast, Rodríguez et al. (2022) found that both egoistic and altruistic values can influence the intentions of consumers to choose green products, with egoistic values being more influential (Rodríguez et al., 2022). Following these findings, we propose the following hypotheses:

Hypothesis 3a: Egoistic values have a positive impact on green attitudes.

Hypothesis 3b: Egoistic values have a positive impact on the intention to purchase green products.

2.5. Perceived Consumer Effectiveness (PCE)

PCE is defined as "an individual's beliefs and judgments about the effectiveness of their actions in responding to environmental problems" (Ellen et al., 1991). In recent research, Hanss and Doran (2022) define PCE as the consumer's estimate of their contribution to a particular sustainability-related outcome (Hanss and Doran, 2020).

Thus, when consumers feel that each cautious action they take will contribute to the environment and solve all environmental problems, they become more attentive and take initiative (Moisander, 2007).

Consumer engagement in socially responsible behaviors has been demonstrated to be facilitated by PCE (Higueras-Castillo et al., 2019). Lavuri (2022b) found PCE is a psychological factor influencing environmental awareness and environmentally sustainable purchases (Lavuri, 2022b). According to Jaiswal and Kant (2018), PCE is a significant predictor of green purchase intent and a positive predictor of fair-trade purchase intent (Jaiswal and Kant, 2018; Wang et al., 2019). In their study, Zhao et al. (2018) found that a consumer's perception and behavior towards carbon-labeled products depend on PCE (Zhao et al., 2018). PCE was found to significantly increase the purchase intention of eco-friendly apparel by researchers (Kumar et al., 2022). Considering PCE is a concept that derives from attitude, this paper hypothesizes that PCE will affect green attitudes and green purchase intentions. and thus, proposes hypotheses 4a and 4b as follows:

Hypothesis 4a: Perceived consumer effectiveness will have a positive impact on green attitude.

Hypothesis 4b: Perceived consumer effectiveness will have a positive impact on green purchase intention.

2.6. Environmental Involvement (EI)

According to Petty and Cacioppo (1990), involvement is crucial in determining individuals' motivation when processing incoming information or messages (Petty and Cacioppo, 1990). Scholars indicate that environmental involvement refers to the level of commitment to the environment and individual differences in processing messages about green products. Specifically, consumers who are highly involved in the environment are intrinsically motivated to consider the environmental attributes of the product (Schuhwerk and Lefkoff-Hagius, 1995). Environmental involvement has also been associated with emotions and beliefs associated with environmental protection (Schultz et al., 2004).

Research shows that individuals with high levels of environmental involvement consider environmental protection to be important and personally relevant (Stanley and Lasonde, 1996). Previous studies have also demonstrated that environmental involvement is closely related to consumers' green purchasing decisions. For example, Chen et al. (2022) found that environmental involvement is significantly positively correlated with green consumption (Chen et al., 2022) and may affect consumers' green attitudes (Lavuri, 2022b). Cheng et al. (2020) showed that consumer skepticism toward green advertising is negatively correlated with environmental involvement (Cheng et al., 2020). Among groups with high education and income levels, scores for involvement in eco-friendly food, purchase empowerment, and frequency of purchasing eco-friendly food were higher (Nam, 2020). Wang et al. (2021) stated that green products contain attributes related to low carbon, energy savings, and environmental protection, which meet the intrinsic environmental protection aspirations of consumers who are concerned about the environment (Wang et al.,

2021). To further understand how EI affects green attitudes and green purchase intentions, we propose Hypotheses 5a and 5b as follows:

Hypothesis 5a: Environmental involvement will have a positive impact on green attitudes.

Hypothesis 5b: Environmental involvement will have a positive impact on the green purchase intention.

2.7. Mediation effect of green attitude

Table 1. Summary of research on green attitudes and green purchase intention.

Authors	Journal	Method	Findings
(Ghazali et al., 2018)	International Journal of Consumer Studies	Theory of Reasoned Action	Green habit has a stronger impact on green behavior than intentions and can be a moderator between green attitudes and green intentions.
(Verma et al., 2019)	Journal of Business Research	Structural equation modeling	Attitude toward green hotels appears to be the strongest predictor of green hotel visit intention.
(Zaremohzzabieh et al., 2021)	Journal of Business Research	Theory of planned behavior (TPB)	Validation of the relationship between consumer attitude and purchasing intentions of green products.
(Lavuri, 2022b)	Journal of Cleaner Production	Structural equation modeling	Green attitude had a direct and positive mediating effect on purchase intention.
(Wang et al., 2022)	International Journal of Consumer Studies	Between-subjects factorial experiment	Highly ambivalent attitudes toward green products decrease green purchase intentions.
(Van Tonder et al., 2023)	Journal of Retailing and Consumer Services	The list of values (LOV)	Internal values influence green attitudes, which motivate green customer citizenship behaviors.
(He et al., 2019)	International Journal of Consumer Studies	Responsible Environmental Behavior (REB) theory	The personality factors (i.e., pro-environmental attitudes and personal responsibility) have positive effects on the consumers' eco-friendly food purchase intention.
(Confente et al., 2020)	Journal of Business Research	Self-congruity theory and the theory of consumption values	Green self-identity positively impacts perceived value, leading to higher behavioral intention
(Tezer and Bodur, 2020)	Journal of Consumer Research	Between-participants design	Consumers' perceived increase in social value to them is the main driver of their use of green products.
(Jaeger and Weber, 2020)	Journal of Cleaner Production	Between-subjects factorial experiment	Environmental benefits are more effective in increasing green purchase intentions than self-benefits.
(De Silva et al., 2021)	Journal of Business Research	Structural equation modeling	Consumers' awareness of green benefits and their purchase intention is found to have a positive and significant relationship.
(Han et al., 2022)	Journal of Retailing and Consumer Services	The model of stimulus-organism-response (SOR)	There is a positive relationship between consumer confidence and green purchase intention.

By integrating various theoretical frameworks and empirical findings from the latest green marketing literature (**Table 1**), we argue that green attitudes not only directly influence green purchasing intentions but also play a critical mediating role in translating environmental values and habits into concrete consumer actions.

As for the direct influence of green attitudes, Lavuri (2022b) and Zaremohzzabieh et al. (2021) both highlight the direct link between consumer attitudes and purchasing intentions of green products, underlining the Theory of Planned Behavior (Lavuri, 2022b; Zaremohzzabieh et al., 2021). When green attitudes play a mediating role, Ghazali, Mutum, and Ariswibowo (2018) propose that green habits can moderate the relationship between green attitudes and intentions, suggesting that

the habitual aspects of green behavior can strengthen the impact of attitudes on intentions (Ghazali et al., 2018). Verma, Chandra, and Kumar (2019) assert that attitudes toward green hotels are a strong predictor of visit intentions (Verma et al., 2019). When it comes to broader contextual influence, Van Tonder et al. (2023) and He et al. (2019) both emphasize the role of internal values and personality factors, such as pro-environmental attitudes and personal responsibility, in shaping green behaviors (Ghazali et al., 2018; He et al., 2019). However, some literature pointed out challenges and moderators, Wang et al. (2022) note that not all attitudes are uniformly positive or effective in promoting green behaviors (Wang et al., 2022). Tezer and Bodur (2020), Jaeger and Weber (2020), and De Silva, Wang, and Kuah (2021) show varying drivers of green product use, from social value enhancements to the effectiveness of environmental benefits, highlighting the complexity of consumer motivations (De Silva et al., 2021; Jaeger and Weber, 2020; Tezer and Bodur, 2020).

Given the variety of factors influencing green purchasing intentions—from the direct effects of green attitudes to their role in mediating the impact of internal values and habits—it is clear that fostering strong, unambiguous green attitudes is key to enhancing green consumer behavior. These attitudes not only reflect consumers' evaluations of green products but also prompt their broader environmental values and self-identity, which are instrumental in driving green purchasing decisions. Additionally, understanding consumer attitudes can help marketers better target their strategies to reinforce positive attitudes and convert them into consistent purchasing behaviors.

Positive attitudes toward green products can stimulate green purchasing and consumption behaviors since favorable attitudes often predict specific behavior (Park and Lin, 2020). Studies have shown that consumers' attitudes toward green benefits significantly influence their intentions to buy green products (De Silva et al., 2021; Jäger and Weber, 2020; Verma et al., 2019; Wang et al., 2022). Consumer perceived values stimulate green customer citizenship behavior by influencing green attitudes (Confente et al., 2020; Tezer and Bodur, 2020; Van Tonder et al., 2023). Other researchers have found there is a positive correlation between green attitudes and green product purchasing intentions (Zaremohzzabieh et al., 2021). Based on the mentioned above, we formulate the following hypotheses:

Hypothesis 6: Green attitude will have a positive impact on the green purchase intention of green products.

Consumer skepticism may lead to questioning the authenticity of "green" product labels, negatively impacting their attitudes and potentially deterring purchases due to doubts about product claims and benefits (Luo et al., 2020). The mediating role of green attitudes is supported by various psychological and marketing frameworks, including the theory of planned behavior (Liu et al., 2020), self-determination theory (Tian et al., 2020), and ABC theory (Dhir et al., 2021). Research indicates that attitudes significantly mediate the impact of skepticism on purchase intentions (Arachchi and Samarasinghe, 2023; Zhao et al., 2021). Therefore, this study hypothesizes that:

Hypothesis 6a: Green attitude will play a mediating role between green skepticism and green purchase intentions.

Altruistic values motivate individuals to address environmental issues, as they are concerned about the impact of their actions on others and the planet (Sharma and

Christopoulos, 2021). A positive green attitude reflects a tendency to support environmental sustainability through individual actions (Chwialkowska et al., 2020). For those who are altruistic, developing a green attitude aligns with their goal to positively impact others, leading to actions that benefit the environment (Gabler et al., 2023). Environmental psychology research indicates that personal values significantly influence environmental attitudes, which in turn predict environmental behaviors (Tamar et al., 2021). Based on these findings, this study proposes that:

Hypothesis 6b: Green attitude will mediate the relationship between altruistic values and the green purchase intention.

Individuals with egoistic values may participate in environmental actions for personal gains, such as cost savings, health improvements, or enhanced social status (Huang et al., 2022). Their engagement in such actions is motivated by self-interest rather than concern for the environment. Nonetheless, those with egoistic values can develop a positive green attitude if they perceive personal advantages aligned with environmental practices, thereby boosting their intention to purchase eco-friendly products (De Silva et al., 2021). For instance, someone who prioritizes health might favor organic foods due to perceived health benefits (Tandon et al., 2020), influencing their buying decisions. Based on this, we propose Hypothesis 6c:

Hypothesis 6c: Green attitude will mediate the relationship between egoistic values and the green purchase intention.

Individuals are more likely to adopt behaviors that address environmental issues when they believe their actions are effective. A positive attitude towards green products can enhance the impact of PCE. If people think their actions make a difference and they view green products favorably, they are more inclined to buy them. On the other hand, a negative attitude can reduce the motivational impact of PCE by lessening the perceived value and effectiveness of such actions (Zhuang et al., 2021). Studies indicate that PCE can create a sense of responsibility and empowerment, which, combined with a positive green attitude, greatly affects purchasing decisions (Ashraf et al., 2023). Based on these insights, the study hypothesizes that:

Hypothesis 6d: Green attitude will mediate the relationship between perceived consumer effectiveness and green purchase intentions.

Greater environmental involvement enhances an individual's knowledge and awareness of ecological issues, making these concerns more salient and personally impactful (Lee, 2010). This increased awareness can influence their attitudes and behaviors toward the environment (Ertz et al., 2016). A positive attitude towards green purchasing, fostered by ongoing environmental involvement, leads to a favorable perception of green products and increases the likelihood of purchasing them (Nekmahmud and Fekete-Farkas, 2020). While environmental involvement heightens awareness and concern, turning this awareness into actual purchasing behavior also requires a supportive attitude (Liu et al., 2020). Consequently, the study proposes that:

Hypothesis 6e: Green attitude will mediate the relationship between environmental involvement and the green purchase intention.

2.8. Moderation effect of Environmental Protection Emotion (EPE)

Emotions are cognitive and physical responses that have arisen during human evolution (Smith, 2015). They usually occur in specific situations and are considered one of the most important factors influencing behavior (Koenig-Lewis et al., 2014). Emotions are pervasive in marketing research (Bagozzi et al., 1999) and are crucial because they contribute to understanding the differences in customer decision-making (Ou and Verhoef, 2017). Consumer experiences and product usage can trigger emotional responses during and after consumption, which can determine customers' purchase decisions (Babin and Attaway, 2000).

Several previous studies related to emotions have shown that customers' emotional responses to the shop environment (Yi and Kang, 2019), e-shop design (Yi and Kang, 2019), and advertising (Kang et al., 2020) influence their subsequent purchase decisions. Researchers revealed that emotional value is important to green food consumption in some Asian markets, such as Pakistan (Kashif et al., 2023) and South Korea (Woo and Kim, 2019). Buying green food instead of conventional food has psychological benefits as it makes consumers feel like they are doing the right thing and improving their lives (Akbar et al., 2019). Taufique (2022) found that green consumer behavior is influenced substantially by consumers' emotional affinity with nature and environmental values (Taufique, 2022). Furthermore, the study by Joshi et al. (2021) confirmed that emotional values and attitudes are vital predictors that influence consumers' green purchase intentions (Joshi et al., 2021). In contrast, Pang et al. (2021) found that consumers who were highly positive or highly negative in their emotions were both inactive towards environmental protection issues (Pang et al., 2021).

Previous research suggests that emotion is an important factor in predicting consumers' green behavior, and more attention needs to be paid to environmental protection emotions as this construct describes consumers' emotions more clearly in the context of green behavior. In this regard, H7 is proposed as a critical moderating construct for consumers' attitudes and behavior in green consumption. While H7 is not new, the moderating effect of EPE is relevant and meaningful as two sets of data are selected for Singapore and China where consumers' affection regarding environmental protection may differ considerably due to different conditions in market and policy.

Hypothesis 7: Environmental protection emotion (EPE) will have a positive moderation relationship between green attitude and green purchase intention.

2.9. Moderation effect of price sensitivity

Price sensitivity is the degree of awareness and reaction that consumers exhibit when they perceive a difference in price for a given product or service (Monroe, 1973). It reflects the extent to which customers accept a price increase for a product in terms of its economic and psychological benefits (Anderson, 1996). Price sensitivity is related to the overall response of consumers to prices, such as the relative change in the quantity, likelihood of purchase, or intention to pay following a price increase (Goldsmith and Newell, 1997; Wakefield and Inman, 2003).

Previous research has shown that price increases can significantly affect consumers' purchase decisions (Jacobs and Hörisch, 2022). The relationship between perceived food quality and green food purchase intention was moderated by price sensitivity, indirectly influencing green food purchase intentions (Wang et al., 2020). Hsu et al. (2017) revealed that when consumers' purchase intention of green products was associated with antecedents like attitude, price sensitivity accentuated the positive effects, and positively moderated the effect of consumers' attitude towards green products on purchase intention (Hsu et al., 2017). According to a previous study, the relationship between environmental attitude and green purchasing behavior is positively moderated by price sensitivity (Erdil, 2018). Rajavi et al. (2019) demonstrated the positive effects of price and distribution intensity on consumers' trust in brands (Rajavi et al., 2019). According to Bhutto et al. (2022), a moderating effect exists between price sensitivity, attitude, and intention to purchase eco-friendly cars (Bhutto et al., 2022). On the basis of the preceding studies, we propose Hypothesis 8:

Hypothesis 8: Price sensitivity will have a positive moderation relationship between green attitude and green purchase intention

3. Research method

3.1. Sample collection

The survey questionnaire was first developed in English and back-translated into Chinese for China, while the English version was used in Singapore. In November 2022, data was collected from Chinese and Singaporean consumers with prior knowledge or experience of purchasing green products. Survey dissemination was delivered concurrently in both countries by local marketing companies. The survey yielded 692 valid responses, with 348 respondents from China and 344 from Singapore. The majority of respondents in both countries were employed, 78% and 60% in China and Singapore, respectively. The data showed a slightly higher proportion of females in China (51.15%) compared to Singapore (49.12%), while both Singapore and Chinese respondents predominantly fell within the 20s to 40s age range. Additionally, the respondents had an undergraduate degree on average, and the age groups were comparable across both countries (**Table 2**).

Table 2. Respondent profile for China and Singapore consumers.

		China		**Singapore**	
	Item	Freq. (*n* = 348)	%	Freq. (*n* = 344)	%
Gender	Male	170	48.85	174	50.58
	Female	178	51.15	170	49.12
Age	<20	7	2.01	13	3.78
	20–29	119	34.30	105	30.52
	30–39	108	31.03	113	32.85
	40–49	77	22.13	68	19.77
	50 or above	37	10.63	45	13.08

Table 2. (*Continued*).

		China		Singapore	
Education	High school or below	34	9.77	47	13.66
	College degree	82	23.56	85	24.71
	Bachelor's degree	150	43.10	133	38.66
	Post-Graduate degree	77	22.13	61	17.73
	Ph.D. or above	5	1.44	18	5.24
Employment	Student	73	20.98	28	8.15
	Civil servant	41	11.78	16	4.65
	Company employee	78	22.41	60	17.44
	Professional	57	16.38	85	24.71
	Self-employed	17	4.89	59	17.15
	Freelancer	39	11.21	46	13.37
	Others	43	12.36	50	14.53
Monthly Income (RMB/SGD)	<3,000	108	31.03	72	20.93
	3001~5000	78	22.41	108	31.40
	5001~7000	61	17.53	72	20.93
	7001~10,000/7001~9000	55	15.80	34	9.88
	10,001~20,000/9001~10,000	26	7.47	24	6.98
	Over 20,000/Over 10,000	20	5.75	34	9.88

3.2. Research measurement

The survey questionnaire comprised 36 items, selected from previous studies and regarded as measurement items (refer to **Table 3**). All responses were measured on a five-point Likert scale, with one representing "strongly disagree" and five representing "strongly agree".

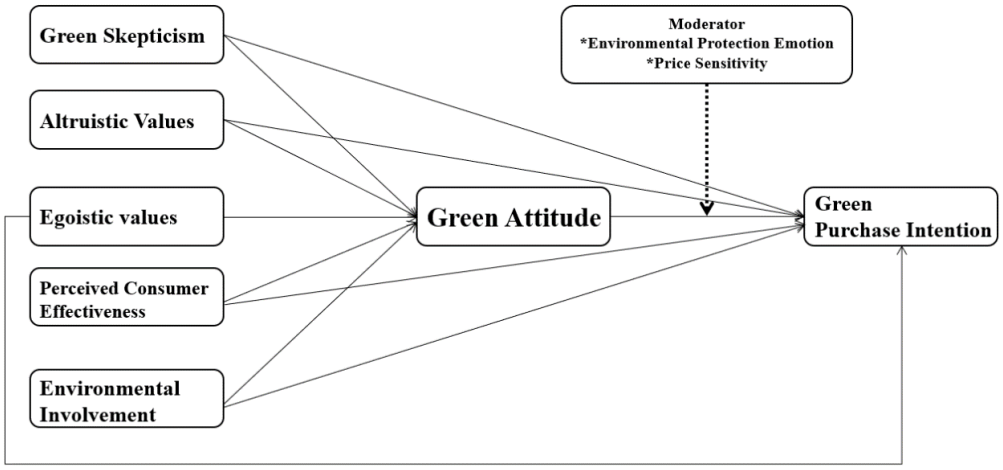

Figure 1. Research model.

Table 3. Measurement items.

Construct		Items	Reference(s)
Green Skepticism (GS)	GS1	The majority of environmental statements expressed on product labels or in advertisements are correct.	(Luo et al., 2020)
	GS2	Eliminate greenwashing on product labels and other marketing materials.	
	GS3	Ecological claims on packaging or in advertisements often mislead consumers.	
	GS4	I don't believe most of the environmental claims made on product labels or in advertisements.	
Altruistic Values (AV)	AV1	I am concerned about the environment.	(Goh and Balaji, 2016); (Prakash et al., 2019)
	AV2	I make extra efforts to buy products that are made from recycled material.	
	AV3	Due to ecological concerns, I have shifted to other products.	
	AV4	When I have need to choose between two equal products, I buy the one that is less harmful to other people and the environment.	
Egoistic Values (EV)	EV1	I think often about health-related issues.	(Yadav, 2016); (Prakash et al., 2019)
	EV2	I watch what I consume to maintain a healthy lifestyle.	
	EV3	I always think about the product's health benefits before making a purchase.	
	EV4	I thought of myself as a health-conscious consumer.	
Perceived Consumer Effectiveness (PCE)	PCE1	I feel I can help solve natural resource problems by conserving water and energy.	(Kim and Choi, 2005); (Wei et al., 2017)
	PCE2	I can protect the earth by buying eco-friendly products.	
	PCE3	When making a purchase, I try to consider the environmental and social implications of my actions.	
	PCE4	I believe I am competent in assisting in the resolution of environmental issues.	
Environmental Involvement (EI)	EI1	For me, environmental preservation is a primary concern.	(Wei et al., 2017)
	EI2	Environmental factors have a direct impact on the quality of living.	
	EI3	I'm willing to make efforts to protect the environment.	
	EI4	My activities have an impact on the ecological world.	
Green Attitude (GA)	GA1	Green products are safer, healthier, and better for the environment.	(Wang et al., 2013); (Lavuri et al., 2022)
	GA2	In my opinion, green products comprise eco-friendly packaging and labeling.	
	GA3	I think buying green products is a wise choice.	
	GA4	When I purchase or utilize green products, I feel good about myself.	
Green Purchase Intention (GPI)	PI1	I may purchase green products in the future since they are less polluting.	(Goh and Balaji, 2016); (Lavuri et al., 2022)
	PI2	I expect to purchase products in the future because of their environmental performance.	
	PI3	I prefer to spend more money on green products than normal.	
	PI4	I intend to purchase products packaged in biodegradable materials.	
Environmental Protection Emotion (EPE)	EPE1	Buying green products instead of conventional products will make me feel that I am making a personal contribution to something better.	(Lin and Huang, 2012)
	EPE2	Buying the green product instead of conventional products will feel like the morally right thing to do.	
	EPE3	Buying the green product instead of conventional products will make me feel like a better person.	
Price Sensitivity (PS)	PS1	I'm willing to make an extra effort to find a low price.	(Wakefield and Inman, 2003); (Goldsmith and Newell, 1997)
	PS2	I will change what I had planned to buy in order to take advantage of a lower price.	
	PS3	I am sensitive to differences in prices.	
	PS4	The price of the product is very important to me.	
	PS5	Good product is worth paying a lot of money for.	

3.3. Data analysis

This study employed the SPSS 29 program and Smart PLS 3.0 program to analyze the data. Initially, the SPSS program was used to conduct frequency analysis for sample characterization, followed by an exploratory factor analysis (EFA) and a reliability analysis. Subsequently, Smart PLS program was utilized for confirmatory factor analysis (CFA), correlation analysis, partial least squares (PLS) path modeling, and a multi-group analysis (MGA) was used to test the study's hypotheses (Fornell and Robinson, 1983; Reinartz et al., 2004). PLS, a variance-based SEM, was chosen for its ability to explain complex causal relationships between observed variables (Sarstedt, 2008), without limitations based on sample size or measurement scale (Vinzi et al., 2010). PLS is particularly advantageous in marketing and consumer behavior research (Acedo and Jones, 2007).

Table 4. Results of scale validity and reliability analysis for China.

Constructs		Factor Loading	Cronbach's α	AVE	CR
Green Skepticism	GS1	0.806	0.863	0.709	0.907
	GS2	0.849			
	GS3	0.791			
	GS4	0.783			
Altruistic Values	AV1	0.794	0.824	0.654	0.883
	AV2	0.777			
	AV3	0.798			
	AV4	0.771			
Egoistic Values	EV1	0.759	0.827	0.659	0.885
	EV2	0.794			
	EV3	0.754			
	EV4	0.765			
Perceived Consumer Effectiveness	PCE1	0.770	0.850	0.690	0.899
	PCE2	0.750			
	PCE3	0.722			
	PCE4	0.692			
Environmental Involvement	EI1	0.765	0.842	0.679	0.894
	EI2	0.776			
	EI3	0.757			
	EI4	0.792			
Green Attitude	GA1	0.673	0.839	0.675	0.892
	GA2	0.694			
	GA3	0.732			
	GA4	0.724			
Green Purchase Intention	OGPI1	0.678	0.823	0.653	0.883
	OGPI2	0.711			
	OGPI3	0.707			
	OGPI4	0.721			

Table 4. (*Continued*).

Constructs		Factor Loading	Cronbach's α	AVE	CR
Environmental Protection Emotion	EPE1	0.775	0.775	0.689	0.869
	EPE2	0.858			
	EPE3	0.780			
Price Sensitivity	PS1	0.835	0.872	0.661	0.907
	PS2	0.768			
	PS3	0.784			
	PS4	0.808			
	PS5	0.820			

Table 5. Results of scale validity and reliability analysis for Singapore.

Constructs		Factor Loading	Cronbach's α	AVE	CR
Green Skepticism	GS1	0.780	0.867	0.715	0.910
	GS2	0.820			
	GS3	0.786			
	GS4	0.813			
Altruistic Values	AV1	0.786	0.860	0.709	0.907
	AV2	0.795			
	AV3	0.805			
	AV4	0.795			
Egoistic Values	EV1	0.791	0.842	0.679	0.894
	EV2	0.778			
	EV3	0.792			
	EV4	0.765			
Perceived Consumer Effectiveness	PCE1	0.712	0.825	0.655	0.884
	PCE2	0.757			
	PCE3	0.750			
	PCE4	0.792			
Environmental Involvement	EI1	0.763	0.839	0.676	0.893
	EI2	0.763			
	EI3	0.821			
	EI4	0.780			
Green Attitude	GA1	0.742	0.835	0.670	0.890
	GA2	0.719			
	GA3	0.710			
	GA4	0.706			
Green Purchase Intention	OGPI1	0.667	0.811	0.640	0.877
	OGPI2	0.730			
	OGPI3	0.735			
	OGPI4	0.733			
Environmental Protection Emotion	EPE1	0.838	0.851	0.772	0.910
	EPE2	0.870			
	EPE3	0.824			

Table 5. (*Continued*).

Constructs		Factor Loading	Cronbach's α	AVE	CR
	PS1	0.798			
	PS2	0.758			
Price Sensitivity	PS3	0.797	0.854	0.632	0.896
	PS4	0.778			
	PS5	0.790			

The study found the reliability of the nine constructs to be sufficient, as indicated by the value of Cronbach's Alpha (**Tables 4** and **5**), a confirmatory analysis showed satisfactory composite reliability (CR) and average variance extracted (AVE) scores. The convergent validity of the constructs was excellent, as demonstrated by factor loading (> 0.70), AVE (> 0.5), Cronbach Alpha (> 0.70), and CR (> 0.6) values above the threshold. AVE values greater than 0.50 are indicative of discriminant validity **(Tables 4–7).**

Table 6. Results of Average Variance Extracted (AVE) discriminant validity for China.

	1	2	3	4	5	6	7	8	9
1. GS	0.842								
2. AV	−0.124	0.809							
3. EV	−0.224	0.325	0.812						
4. PCE	−0.346	0.312	0.428	0.831					
5. EI	−0.275	0.216	0.287	0.458	0.824				
6. GA	−0.420	0.289	0.388	0.544	0.489	0.822			
7.GPI	−0.402	0.264	0.405	0.501	0.448	0.602	0.808		
8. EPE	−0.141	0.153	0.058	0.257	0.105	0.204	0.265	0.830	
9.PS	−0.011	0.071	0.073	0.188	0.074	0.173	0.237	0.254	0.813
AVE	0.709	0.654	0.659	0.690	0.679	0.675	0.653	0.689	0.661

Table 7. Results of Average Variance Extracted (AVE) discriminant validity for Singapore.

	1	2	3	4	5	6	7	8	9
1. GS	0.846								
2. AV	−0.308	0.842							
3. EV	−0.278	0.261	0.824						
4. PCE	−0.320	0.322	0.357	0.810					
5. EI	−0.280	0.241	0.308	0.316	0.822				
6. GA	−0.418	0.494	0.379	0.447	0.375	0.818			
7. GPI	−0.393	0.348	0.397	0.425	0.319	0.521	0.800		
8. EPE	−0.229	0.216	0.194	0.288	0.300	0.277	0.308	0.879	
9. PS	−0.186	0.187	0.147	0.120	0.144	0.163	0.276	0.142	0.795
AVE	0.715	0.709	0.679	0.655	0.676	0.670	0.640	0.772	0.632

Note(s): The AVE value was found to be greater than 0.5, while the composite reliability (CR) between variables exceeded the squared value of the other correlation coefficients.

4. Results

The goodness of fit statistics shows that the empirical model had a reasonable fit with the data, as suggested by SRMR, and ADFI scores. For example, the SRMR values were 0.04 and 0.05 for the China and Singapore models, respectively which are less than the suggested maximum value of 0.08 (Hu and Bentler, 1998). **Table 8** reports the estimated path coefficients of China and Singapore models, and **Table 9** presents the multi-group analysis of Chinese and Singaporean models, showing the significance of the difference in the estimated parameters of the two groups.

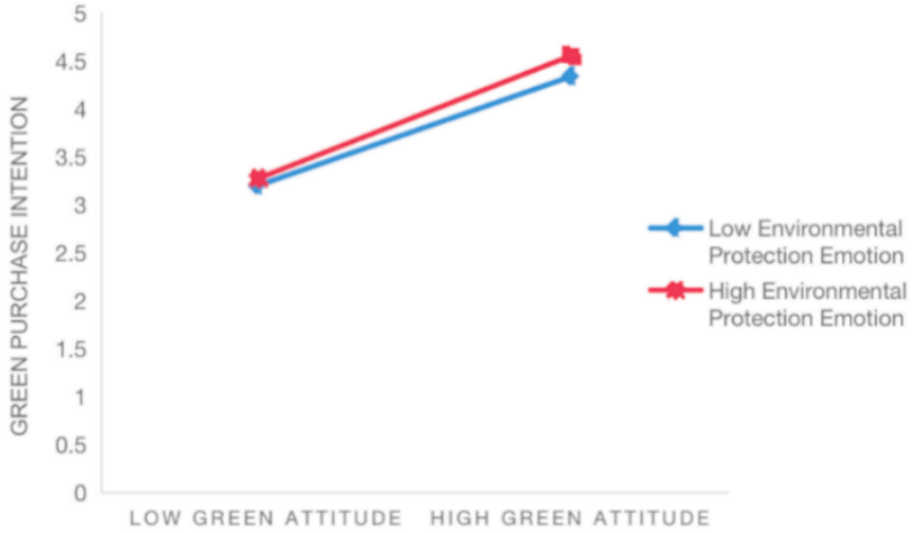

Figure 2. The moderating effect of EPE on the association of GA with GPI in China.

Table 8. Results of hypothesis testing in China and Singapore.

Hypothesis	Model 1. China				Model 2. Singapore			
	Std Coeff.	*t*-value	*p*-value	95%CI	Std Coeff.	*t*-value	*p*-value	95%CI
GS→GA	−0.218***	5.503	0.000	(−0.296, −0.140)	−0.183***	4.098	0.000	(−0.256, −0.110)
AV→GA	0.082	1.795	0.073	(−0.008, 0.172)	0.305***	7.162	0.000	(0.221, 0.389)
EV→GA	0.122**	2.641	0.008	(0.031, 0.213)	0.133**	2.872	0.004	(0.042, 0.224)
PCE→GA	0.277***	5.515	0.000	(0.178, 0.376)	0.196***	4.100	0.000	(0.102, 0.290)
EI→GA	0.249***	5.472	0.000	(0.160, 0.338)	0.147**	3.440	0.001	(0.063, 0.231)
GS→GPI	−0.149**	3.062	0.002	(−0.245, −0.053)	−0.146***	2.973	0.000	(−0.256, −0.110)
AV→GPI	0.032	0.747	0.455	(−0.052, 0.116)	0.058	1.122	0.262	(−0.035, 0.151)
EV→GPI	0.134**	2.866	0.004	(0.042, 0.226)	0.161**	3.241	0.001	(0.063, 0.259)
PCE→GPI	0.138*	2.419	0.016	(0.178, 0.376)	0.159**	2.958	0.003	(0.053, 0.265)
EI→GPI	0.134*	2.451	0.014	(0.026, 0.242)	0.061	1.262	0.207	(−0.034, 0.156)
GA→GPI	0.341***	5.516	0.000	(0.219, 0.463)	0.277***	4.650	0.000	(0.160, 0.394)

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 9. Results of multi-group analysis of China and Singapore.

Hypothesis	Path Coeff. diff (China-Singapore)	*t*-value (China-Singapore)	*p*-value (China-Singapore)
GS→GA	−0.035	0.586	0.558

Table 9. (*Continued*).

Hypothesis	**Path Coeff. diff (China-Singapore)**	***t*-value (China-Singapore)**	***p*-value (China-Singapore)**
GS→GA	−0.035	0.586	0.558
AV→GA	−0.223	3.589	0.000
EV→GA	−0.010	0.157	0.875
PCE→GA	0.081	1.166	0.244
EI→GA	0.102	1.619	0.106
GS→GPI	−0.003	0.092	0.926
AV→GPI	−0.026	0.381	0.703
EV→GPI	−0.027	0.389	0.697
PCE→GPI	−0.021	0.267	0.790
EI→GPI	0.073	0.997	0.319
GA→GPI	0.064	0.742	0.459

Table 8 shows that contrasting results can be drawn from China vs. Singaporean models. For China, perceived consumer effectiveness (PCE) was found to be the most influencing construct affecting green attitude (GA) (β = 0.277, p < 0.001), while Altruistic Value (AV) was the most pronounced determinant for GA in Singapore (β = 0.305, p < 0.001). Altruistic Value (AV) did not have a statistically significant effect on the GA of Chinese consumers (β = 0.082, p > 0.05). Green Skepticism (GS) appears to have similar negative effects for both China and Singapore (China: β = –0.218, p < 0.001/Singapore: β = –0.183, p < 0.001), and Environmental Involvement (EI) had a greater impact in China while showing much smaller effect in Singapore (China: β = 0.249, p < 0.001/Singapore: β = 0.147, p < 0.001).

Table 10. Mediation effect: China and Singapore.

China				
Hypothesis	Std Coeff.	*t*-value	*p*-value	95%CI
H6a: GS→GA→GPI	−0.075***	3.962	0.000	(−0.038, −0.112)
H6b: AV→GA→GPI	0.028	1.642	0.101	(−0.005, 0.061)
H6c: EV→GA→GPI	0.042*	2.279	0.023	(0.007, 0.077)
H6d: PCE→GA→GPI	0.094***	4.084	0.000	(0.049, 0.139)
H6e: EI→GA→GPI	0.085***	3.738	0.000	(0.040, 0.130)
Singapore				
Hypothesis	Std Coeff.	*t*-value	*p*-value	95%CI
H6a: GS→GA→GPI	−0.051**	3.250	0.001	(−0.020, −0.082)
H6b: AV→GA→GPI	0.084***	3.834	0.000	(0.041, 0.127)
H6c: EV→GA→GPI	0.037*	2.399	0.016	(0.008, 0.066)
H6d: PCE→GA→GPI	0.054**	2.970	0.003	(0.019, 0.089)
H6e: EI→GA→GPI	0.041**	2.763	0.006	(0.012, 0.070)

*p < 0.05, **p < 0.01, ***p < 0.001

Table 10 reports the mediating effects of Green Attitude (GA) on five antecedents for both China and Singapore models, and results show the significance of the mediation of GA between five antecedents and the outcome construct (i.e., green purchase intention) in both models except the hypothesis H6-2 (AV→GA→GPI, β = 0.028， p > 0.05) (**Table 10**). For China, the mediation between PCE→GA→GPI was found to have the highest value (β = 0.094, p < 0.001), while the mediation between AV→GA→GPI showed the highest value for the Singapore model (β = 0.084, p < 0.001) (See **Table 10**).

4.1. Moderation effect of Environmental Protection Emotion (EPE) and Price Sensitivity (PS)

We used bootstrap analysis of PLS to test the moderation effect of two constructs: Environmental Protection Emotion (EPE) and Price Sensitivity (PS). To address multicollinearity, we applied mean centering to the data on environmental protection emotion, price sensitivity, and green attitude. With the help of Smart PLS, we validated the structural model, and the interaction term values were obtained.

Findings show a significant interaction effect between Price Sensitivity (PS) and Green Attitude (GA) for both China and Singapore (β = 0.045, p < 0.001 and β = 0.246, p < 0.00, respectively) (See **Table 11**). However, the interaction term EPE*GA was not statistically significant in either China (β = 0.037, p > 0.05) or Singapore (β = 0.056, p > 0.05) models **(**See **Figures 2** and **4)**. **Figures 3** and **5** show that the PS construct positively influences the association between Green Attitude and consumers' green purchase intention.

Table 11. Moderation effect: China & Singapore.

China					
Hypothesis	Relationship	Sd coeff.	*t*-value	*p*-value	95%CI
H7	EPE × GA → GPI	0.037	0.268	0.789	(−0.233, 0.307)
H8	PS × GA → GPI	0.045***	5.489	0.000	(0.029, 0.061)
Singapore					
Hypothesis	Relationship	Sd Coeff.	*t*-value	*p*-value	95%CI
H7	EPE × GA → GPI	0.056	1.343	0.179	(−0.026, 0.138)
H8	PS × GA → GPI	0.246***	5.807	0.000	(−0.026, 0.328)

*p<0.05, **p<0.01, ***p<0.001

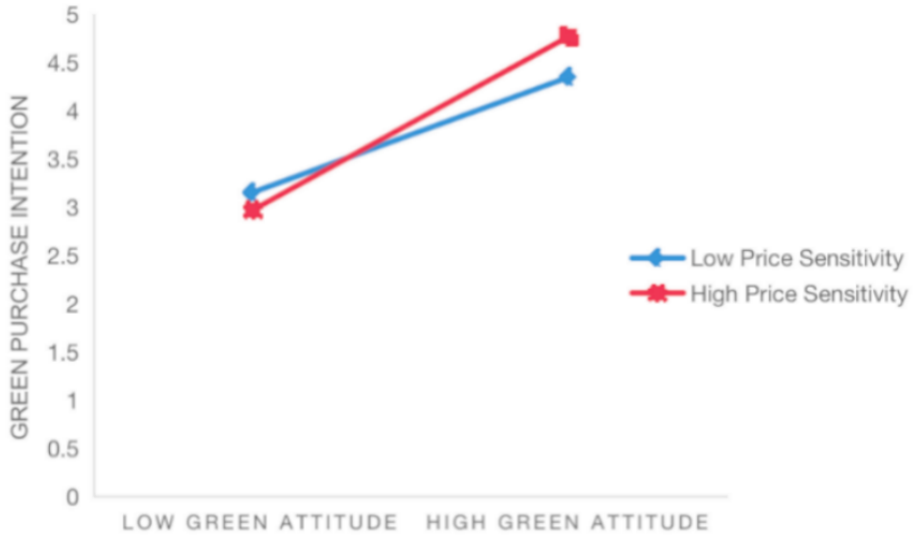

Figure 3. The moderating effect of PS on the association of GA with GPI in China.

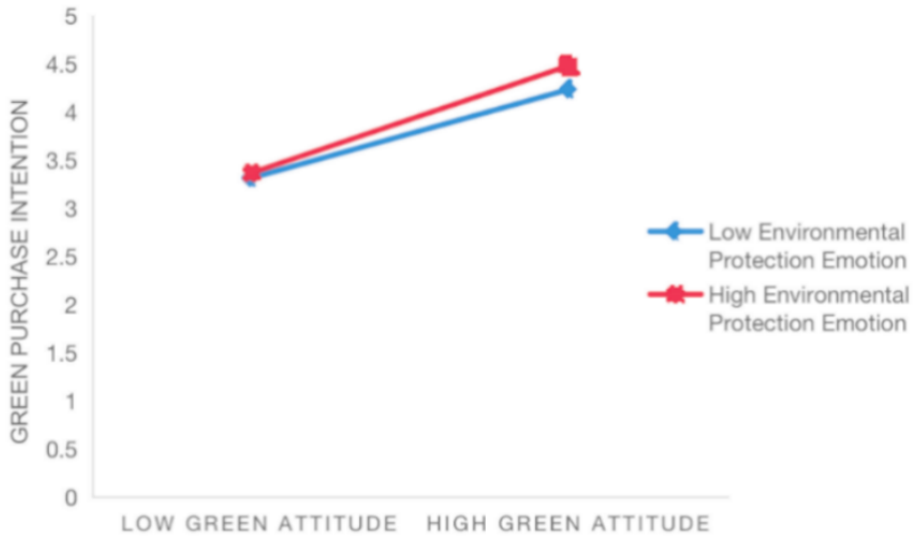

Figure 4. The moderating effect of EPE on the association of GA with GPI in Singapore.

5. Discussions and implications

In this study, the effects of consumers' values, concerns, and skepticism towards environmental issues and marketing on their green behavior are examined which are mediated by their green attitude. While Altruistic Value (AV) was found to have the greatest impact on Singaporean consumers' Green Attitude (GA), leading to green purchasing intention, Perceived Consumer Effectiveness (PCE) was found to be the most effective driver for Chinese consumers' GA and green purchase intention (**Table 9**).

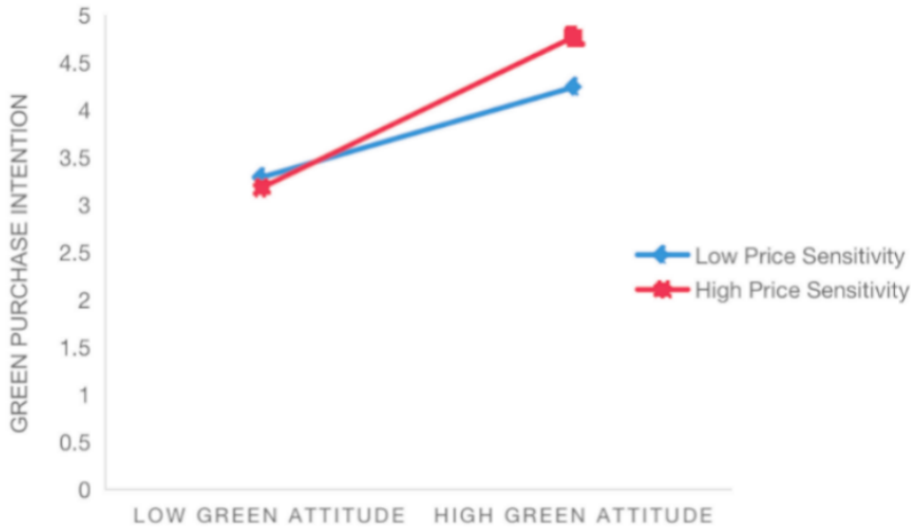

Figure 5. The moderating effect of PS on the association of GA with GPI in Singapore.

This paper extends previous research by Luchs and Kumar (2017) by adding variables AV, and EV, providing more information on the relationship between consumers' processing of sustainable products and other values (Luchs and Kumar, 2017). At the same time, our study also expands the literature of Sharma et al., (2022) by adding the mediation path of attitude, proving that PCE can have an impact on green intentions by affecting attitude (Sharma et al., 2022). In addition, our research conclusions are consistent with the results of Bhardwaj et al., (2023) which was based on the SOR model (Bhardwaj et al., 2023). These studies confirm that personal values can shape consumers' attitudes towards green products resulting in purchase intention in various markets. Our findings are also supported by the finding from Sheng et al., (2023), that pro-environmental consumer behavior adoption is influenced by attitude and personal relevance (Sheng et al., 2023).

According to our findings, Altruistic Value (AV) appears to be the most important driver for Singaporean consumers' GA, which may be associated with contextual conditions in Singapore. The Singaporean government developed the green policy in the 1960s and intended to make Singapore, the greenest city in Asia. With this policy, consumers' awareness of environmental issues and sustainability has increased significantly (Acero et al., 2020). A survey reports that Singaporean consumers are willing to consume sustainable products for the next generation (UOB, 2021).

In contrast, Chinese consumers' green behavior is largely driven by their self-belief, and they choose to purchase sustainable products because they think they can have a positive impact on the environment (i.e., PCE) (Sun et al., 2021). According to a survey, 90% of Chinese consumers recognize the importance of their behavioral effects on the environment, and several studies show that they believe their choices can make a difference in the environment (Lavuri et al., 2022; Wang et al., 2019; Zhu et al., 2019). Thus, Perceived Consumer Effectiveness (PCE) is found to have a major role in Chinese consumers' Green Attitude (GA) and their green behavior. This can be supported by previous studies (Higueras-Castillo et al., 2019; Kumar et al., 2022; Liang et al., 2020).

Consumers' Green Attitude (GA) in both countries are negatively affected by Green Skepticism (GS), suggesting the importance of carrying authenticity in green marketing communication. Wu et al. (2021) report that over 70% of Chinese consumers do not trust green food (Wu, 2021), while Quek (2021) shows that Singaporean consumers find sustainability labels to be confusing and they are interested in having more information about the effect of sustainable products on the environment (Quek, 2021). Several studies report the negative impact of green skepticism on consumers' sustainable behavior, confirming the results of this study (Hamzah and Tanwir, 2021; Khan et al., 2022; Luo et al., 2020; Syadzwina and Astuti, 2021).

In this study, we examined the moderating effects of consumers' economic concerns and emotions with two constructs: Environmental Protection Emotion (EPE) and Price Sensitivity (PS). Findings show that consumers' green behavior in both countries is not influenced by EPE while being significantly affected by PS (**Table 11**). This suggests that consumers' economic motives play a greater role in their consumption choices in both countries, and neither of them necessarily associates green consumption with their self-identity and emotional states (i.e., EPE). The moderating effect of PS was more pronounced in the case of Singapore, suggesting their price-consciousness in shopping. Singaporean consumers are reported to be one of the most price-conscious consumer groups in Asia, and they consider the relatively higher price of sustainable products to be a major barrier to pursuing a sustainable lifestyle (Subhani, 2021). This result confirms findings from other studies in which price sensitivity is recognized as a barrier to consumers' sustainable choices (Bhutto et al., 2022; Duque Pita, 2020; Yue et al., 2020).

5.1. Theoretical contributions

In this study, we developed an empirical model that explores the effects of consumers' values and characteristics on their green attitudes and consumption behavior for two important Asian countries. Consumers' green behavior is claimed to be primarily driven by their attitude toward the environment, which may be influenced by their values, interests, and perceptions toward green marketing based on ABC theory.

Our proposed model proposes consumers' personal values, their perception of green marketing, and their interest in environmental issues as the main antecedents for consumers' green attitudes and behavior. Selected constructs—PCE, green skepticism, altruistic and egoistic values, and environmental involvement are widely used in other green consumption research (Cheng et al., 2020; Coleman et al., 2024; Hanss and Doran, 2020; Li and Cui, 2021; Prakash et al., 2019; Rodríguez et al., 2022; Tewari et al., 2022; Wang et al., 2021). The relationship between consumers' traits, cognitive attributes, and their attitude and behavior, however, can be weakened by contextual factors that may differ in different countries. In our study, we propose that price sensitivity and environmental protection emotions as important additional factors that can moderate the aforementioned linkage between consumers' intrinsic attributes and their attitudes, and behaviors. Findings show that price sensitivity is an important factor that differentiates consumer behavior in two countries (Calderon-Monge et al.,

2020; Narwal and Rai, 2022). The moderating impact of PS was greater in Singapore compared to China. This suggests that economic motive needs to be considered as a critical factor in consumers' green consumption decisions, particularly when cross-border assessment is delivered.

5.2. Practical implications

Findings from this study suggest that marketers should develop differentiated communication strategies for consumers in different markets and need to consider market-specific conditions. For Singaporean consumers, altruistic value was found to be the main motivating factor for having green attitude and consumption behavior. Thus, marketing messages should be designed to appeal to these consumers' concerns for society, others, and the environment. On the other hand, perceived consumer effectiveness (PCE) plays a major role in driving Chinese consumers' green attitude and behavior, thus marketers need to elaborate on the importance of self-concept in promoting green marketing and policymakers can design campaigns that empower consumers with messages that underscore the impact of their self-actions. On the other hand, for altruistically oriented Singaporean consumers, the benefits of green consumption should be communicated in terms of community improvements and better for future generations. Green skepticism is another important factor that needs attention as consumers' attitudes and behavior in both countries are negatively influenced by this concept. Green marketing messages in the marketplace need to deliver transparency and authenticity in order to reduce their skeptical attitude toward companies' green marketing.

Price sensitivity which alters the relationship between consumers' traits and their attitude and behavior was found to carry significant meaning in understanding consumers' green behavior. Consumers in different markets have different degrees of price sensitivity which need to be carefully assessed in conjunction with other important individual consumer-related attributes in exploring consumers' green behavior. Unique characteristics of each market and consumer need to be examined carefully in designing effective green marketing programs (Dong et al., 2022; Lavuri et al., 2022; Riva et al., 2022; Sharma, 2021).

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