



Exploring the Link Between Green Brand Attitude and Purchasing Behavior: The Moderated-Mediating Effect of Environmental Self-Identity and Green Skepticism

Lexuan Chen¹, Chan Wang^{2,*}, Huixu Yang²

¹ International Energy College, Jinan University, Guangdong, China

² School of Humanities, Jinan University, Guangdong, China

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Abstract

In recent years, consumer awareness of environmentally friendly products has significantly increased, driving a growing trend in green marketing strategies. Based on the theory of planned behavior (TPB), this study utilized a questionnaire survey, yielding a valid sample of 376 respondents. The results reveal positive relationships among green brand attitude, green purchasing intention, and green purchasing behavior. Moreover, environmental self-identity and green skepticism exhibit significant moderating effects. The findings highlight that enhancing environmental awareness and promoting green consumption not only benefit individual consumer choices but also strengthen the adaptive capacity of organizational and service systems toward sustainability.

1. Introduction

Green purchasing behavior (GPB) is a critical factor in shaping sustainable consumption and driving global business transformation (Essiz et al., 2023). It reflects consumers' growing environmental awareness and directly influences corporate innovation, supply chain management, and brand strategies (Martey, 2024; Miao et al., 2022). GPB fosters responsible production, reduces ecological footprints, and provides firms that align with the Sustainable Development Goals (SDGs) with a competitive advantage (Duque Oliva et al., 2024). As global consumers increasingly prioritize eco-friendly products, GPB has emerged as a key driver of sustainability and corporate responsibility (Yusoff et al., 2023).

According to the Theory of Planned Behavior (TPB), attitudes toward a behavior significantly shape behavioral intentions, which in turn predict actual behavior (Hagger et al., 2022). In this context, green brand attitude (GBA)—defined as consumers' favorable evaluations of environmentally friendly brands—plays a critical role in shaping green purchase intentions and behaviors (Lavuri & Susandy, 2020). Empirical research has consistently confirmed this relationship. For instance, Zhuang et al. (2021) demonstrated that positive attitudes toward

*corresponding author. Email: mschanw@163.com

green brands significantly enhance green purchase intentions (GPI), which subsequently translate into purchasing behavior. Similarly, Afifa et al. (2025) found that GBA serves as a mediating factor in the relationship between emotional attachment and purchase intention. Collectively, these findings underscore the importance of GBA as a key predictor within the TPB framework and highlight its central role for marketers seeking to develop branding strategies that emphasize sustainable values. Thus, in line with TPB, consumers' GBA may influence GPB indirectly through its mediating effect on GPI.

However, although prior studies consistently suggest that GBA is an important predictor of green purchasing outcomes, the mechanisms that may strengthen or weaken this relationship remain insufficiently explored. Consequently, several scholars have argued that further empirical investigation is necessary to clarify the interplay among these variables (Afifa et al., 2025; Chen et al., 2020). While some studies have confirmed a positive influence of GBA on GPB (e.g., Goriparthi & Tallapally, 2017; Ahmed et al., 2022), others have reported that attitudes toward green products are weak predictors of actual green purchasing behavior (Chaihanchai & Anantachart, 2023; Le et al., 2026), or that attitudes play a weaker and less consistent role (Suki, 2016). A possible explanation for these mixed findings is that consumers may remain skeptical about green consumption, particularly due to concerns over greenwashing and brand credibility (Javed et al., 2024; Rehman et al., 2025). In other words, widespread skepticism regarding greenwashing has led consumers to question the authenticity of corporate motives and their genuine commitment to supporting sustainable consumption (Rehman et al., 2025; Shojaei et al., 2024). Accordingly, scholars have emphasized the need for further empirical research to elucidate the antecedents of GPB from the consumer's perspective (Goriparthi & Tallapally, 2017; Hoang et al., 2026; Kazmi et al., 2021).

First, this study posits that environmental self-identity (ESI) may serve as a moderating variable in the relationship between environmental attitudes and GPI, underscoring its role in reinforcing pro-environmental decision-making (Kumar et al., 2023; Arroyo-López et al., 2020). Within the framework of the TPB, attitudes toward green brands are considered a central determinant of consumers' GPI (Ajzen, 1991). However, the strength of this attitudinal influence is not uniform across individuals, as psychological identity factors play a critical role. ESI, defined as the extent to which individuals perceive themselves as environmentally friendly persons, has been identified as a powerful moderator that amplifies the relationship between GBA and purchase intention. Kumar et al. (2023) demonstrated that consumers with a stronger ESI are more likely to transform positive attitudes toward eco-friendly products into concrete purchasing intentions, thereby enhancing the predictive validity of attitudes. Similarly, Arroyo-López et al. (2020) found that self-identity strengthens the alignment between environmental values, brand-related attitudes, and purchase intentions, particularly among younger consumers. In addition, ESI reflects the extent to which individuals perceive environmentally responsible behavior as part of their self-concept, thereby increasing the consistency between pro-environmental intentions and actual purchasing behavior. These findings highlight that ESI functions as a motivational driver that magnifies the impact of GBA, thereby bridging the gap between favorable evaluations of sustainable brands and actual consumer purchasing decisions.

At the same time, green skepticism may represent a critical barrier that weakens the translation of positive attitudes into actual purchasing behavior (Goh & Balaji, 2016; Uddin et

al., 2023). While the TPB posits that behavioral intention is the most immediate antecedent of actual behavior (Ajzen, 1991), research in green marketing consistently reveals a gap between intention and behavior. A key psychological factor that exacerbates this gap is green skepticism, defined as consumers' doubt about the authenticity or credibility of firms' environmental claims (Leonidou & Skarmeas, 2015). Empirical studies indicate that skepticism reduces consumers' trust and confidence in green products and brands, thereby weakening the link between intention and behavior. For instance, Goh and Balaji (2016) found that skepticism diminishes consumers' environmental concern and knowledge, which in turn hampers the ability of purchase intentions to translate into green consumption behaviors. Similarly, Uddin et al. (2023) reported that skepticism exerts a negative moderating effect on the relationships among environmental attitudes, purchase intentions, and actual behavior, particularly among younger consumers. This evidence suggests that even when consumers express strong purchasing intentions, high levels of skepticism may obstruct behavioral enactment. In other words, green skepticism captures consumers' doubts regarding environmental claims and green marketing practices, which may weaken the translation of favorable intentions into actual green purchasing actions. Therefore, reducing skepticism through credible communication and organizational transparency is essential for narrowing the intention–behavior gap in green consumption.

By integrating these two contrasting psychological mechanisms, this study offers a novel contribution to the green marketing literature. Specifically, it advances the TPB (Ajzen, 1991) by extending the attitude–intention–behavior framework to incorporate dual moderating variables that either amplify or suppress the behavioral translation of consumers' green brand attitudes. This integrative perspective not only enriches theoretical understanding but also provides actionable insights for practitioners: strengthening consumers' ESI while reducing skepticism is essential for bridging the persistent attitude–behavior gap in sustainable consumption.

2. Literature Review

2-1. Green brand attitude, green purchasing intention, and green purchasing behavior

In recent years, the proliferation of environmental concerns has reshaped consumer decision-making, giving rise to green marketing and sustainable consumption. The TPB by Ajzen (1991) offers a foundational framework to understand the psychological mechanisms linking these constructs. TPB posits that behavior is a direct function of behavioral intention, which in turn is influenced by attitude, subjective norms, and perceived behavioral control.

GBA, defined as a consumer's overall evaluation of a brand based on its environmental performance and sustainability credentials, has consistently been found to positively influence green purchasing intention (Suki, 2016; Wang et al., 2024). Huang et al. (2014) empirically validated this relationship, showing that attitudes toward green brands significantly mediate the effect of brand knowledge and positioning on purchase intention. Similarly, Suki (2016) found that green brand knowledge reinforces favorable brand attitudes, which then lead to elevated purchase intentions for environmentally friendly products.

More recent research has continued to support the mediating role of green purchasing intention. Wang et al. (2024), through structural equation modeling, demonstrated that green

brand positioning and customer value significantly influence purchase intention via attitude toward the green brand. Their findings align with the TPB structure, in which intention acts as the most immediate antecedent of behavior. Likewise, Vania and Ruslim (2023) confirmed that GPI serves as a full mediator between green attitudes and GPB, particularly in the context of beauty products.

Importantly, the relationship between GPI and actual GPB is reinforced by both affective and cognitive components. Afifa et al. (2025) explored this pathway using TPB and identified that while green brand affect alone may not directly predict behavior, its influence is effectively channeled through GBA and purchasing intention. This supports the notion that intention mediates both emotional (brand effect) and rational (brand knowledge) stimuli, driving actual behavior.

Furthermore, in emerging markets, contextual factors such as consumer frugality and value orientation have also been shown to affect this triadic relationship. In the green restaurant sector in Ecuador, brand attitude and purchase intention significantly mediated the influence of consumer frugality on GPB (Rodas & Díaz, 2023).

Thus, literature overwhelmingly supports the sequential relationship wherein GBA positively affects GPI, which in turn significantly predicts GPB. The TPB serves as a robust theoretical lens, and intention operates as a critical mediator translating consumer attitudes into sustainable consumption actions. These insights offer both academic and managerial value for advancing green branding strategies in environmentally conscious markets.

Hypothesis 1: GPI mediates the relationship between GBA and GPB

2-2. Positive moderating effect of environmental self-identity

Within green marketing literature, attitude toward green brands has consistently emerged as a critical predictor of GPI based on TPB (Ajzen, 1991). ESI defined as the extent to which individuals perceive themselves as environmentally responsible people, serves as a self-concept mechanism that guides behavior consistent with environmental values (Van der Werff et al., 2013). Kumar et al. (2023) found that green self-identity positively moderates the relationship between environmental attitudes and GPI, suggesting that individuals with a stronger environmental identity are more likely to translate positive green brand attitudes into purchase intentions. Similarly, Arroyo-López et al. (2020) observed that green self-identity significantly enhances consumers' intention to purchase green products, acting both as a direct predictor and as a mediator of environmental values. These findings highlight that individuals who internalize environmental concerns into their self-concept are more likely to act on positive brand perceptions, thereby reinforcing the TPB framework by incorporating identity-based moderators. Therefore, ESI strengthens the attitudinal influence of green brand perception on GPI. This underscores its importance as a moderating variable within the TPB framework and as a strategic leverage point for marketers seeking to activate pro-environmental intentions through identity-driven messaging.

Hypothesis 2: ESI moderates the relationship between GBA and GPI, such that the relationship is stronger when ESI is higher.

2-3. Moderating and moderated-mediating effects of green skepticism

Green skepticism, defined as consumers' tendency to doubt the authenticity of environmental claims made by brands or products, and higher levels of skepticism suppress the translation of green intentions into actual behavior by reducing environmental concern and knowledge, two critical enablers of action (Goh & Balaji, 2016). Uddin et al. (2023) also demonstrated that skepticism significantly weakens the influence of positive environmental attitudes on green behavior among young consumers, suggesting that even when intention is high, skepticism can inhibit follow-through. This moderating effect is consistent with the TPB's emphasis on perceived behavioral control and contextual influences, as skepticism introduces psychological barriers that disrupt the path from intention to action. The implication is that consumers may internally support sustainable behavior, but external doubts about product claims inhibit behavioral execution. Therefore, green skepticism functions as a psychological barrier that disrupts the intention-behavior pathway in green consumption. Addressing skepticism through transparency and credible environmental communication is therefore crucial for converting consumer intentions into sustainable behaviors.

Hypothesis 3: green skepticism moderates the relationship between GPI and GPB, such that the relationship is weaker when green skepticism is higher.

Hypothesis 4: green skepticism influences the positive effects of GBA on GPB through GPI, the higher the green skepticism, the weaker the indirect positive effect.

3. Research Method

3-1. Research Sample and Data Collection

This study chose consumers in China as participants because the intention of green marketing has grown, and customers are willing to express their interest in eco-friendliness as consumption to save the planet and practice consumption by considering environmental and ethical aspects such as carbon footprint reduction, recycling, and vegan rather than economic feasibility. Questionnaire was used to measure the five variables of this study. The data collection period lasted six months, from March 2025 to August 2025. We conducted Mplus, SPSS, and PROCESS to test the research framework. This study adopted a two-step analytical approach. First, we conducted a Confirmatory Factor Analysis (CFA) using Mplus to rigorously establish the reliability, convergent validity, and discriminant validity of the measurement model. After confirming the robustness of the latent constructs, we calculated the composite scores (mean values) for each construct. Second, we employed the regression analysis and PROCESS macro in SPSS (Hayes, 2022) to test the moderating effect and moderated-mediation model. Therefore, following established practices in behavioral research, we utilized PROCESS for its robust bootstrapping capabilities in testing conditional indirect effects and probing complex interactions (Hayes, 2022).

This study executes telephone interview to confirm the research subjects (customers) have conducted green purchasing behavior. 376 samples were collected in this study. In terms of customers, nearly half were male (53%) or female (47%). Most of the sample were 21-30 years old (48%) and married in terms of marital status (58%). Regarding education level, most of the customers in the sampling were undergraduate or college (52%).

We collected data at two time points and did so to avoid common method variance. In May 2025 (time 1), we asked participants to provide responses on the scale of GBA, GPI, and ESI, as well as personal information. Then, in August 2025 (time 2), participants were asked to evaluate green skepticism and GPB. To ensure accurate matching across the two survey waves while maintaining respondent anonymity, participants were asked to provide a unique identification code that was used solely for response matching purposes. Only questionnaires with successfully matched responses across both waves were retained for the final analysis. This research design helped reduce the potential influence of common method variance and improved the procedural rigor of the study.

Furthermore, to assess the potential issue of common method variance (CMV) due to the use of single-source data, this study conducted Harman's one-factor analysis. The results revealed that the first unrotated factor accounted for less than 50% of the total variance, indicating that CMV is not a serious concern. This, combined with the two-wave data collection design, enhances the validity of the findings.

3-2. Measurement

GBA components in this measure were modified from Huang et al. (2014) study, which focused on gauging attitudes about the green brand. Participants responded on a 5-point Likert scale. Sample item is "I believe that the environmental reputation of green products is typically trustworthy." (Cronbach's $\alpha > .87$).

GPI was measured in this study using three items that were adapted from Huang et al. (2014). These items were specifically chosen to assess the respondents' agreement levels with statements to engage in environmentally friendly purchasing behaviors. Sample item is "Because of my environmental consciousness, I aim to purchase green products." (Cronbach's $\alpha > .83$).

These items of GPB were selected to gauge the respondents' agreement levels with statements related to their engagement in environmentally friendly purchasing actions. This study using four items that were adapted from do Paço et al. (2014), and the sample item is "I switched goods for environmental concerns." (Cronbach's $\alpha > .85$).

ESI is defined as the extent to which individuals perceive themselves as a person who acts in an environmentally friendly way. It reflects a self-concept that guides consistent pro-environmental behaviors (Whitmarsh & O'Neill, 2010). We used three items that were adapted from Van der Werff et al. (2013), and the sample item is "Acting pro-environmentally is an important part of who I am." (Cronbach's $\alpha > .81$).

Green skepticism refers to the tendency of consumers to doubt the authenticity, truthfulness, or credibility of firms' environmental claims (Leonidou & Skarmas, 2015). We used five items that were adapted from Leonidou & Skarmas (2015), and the sample item is "I do not trust most eco-friendly product claims made by companies." Cronbach's α typically $> .80$ across studies, showing high internal consistency.

Control variables. This research aimed to account for several factors that could potentially impact individuals' purchasing behavior. Firstly, education and tenure was considered as a control variable to gain insights into consumer behavior. According to Hofstede's cultural dimension theory, behaviors can vary based on cultural differences (Hofstede & Usunier, 2003).

Secondly, Gender was added as a control variable due to gender differences in attitudes and motives for green consumption (McCright, 2010). The connection of green consumption with femininity as they may choose activities that accord with their male gender identity and separate themselves from those viewed as feminine (Brough et al., 2016). Finally, participant's age also was inserted. According to Markowitz & Felson (1998), socio-demographic characteristics such as age might influence people's values, attitudes, and actions. In summary, four variables, namely education, tenure, gender and age, were controlled for their potential effects on green purchasing behavior.

4. Results

4-1. Confirmatory Factor Analysis

Confirmatory factor analysis was conducted to assess the validity of the five variables in this study. The results indicated that the hypothesized five-factor model provided a good fit to the data and outperformed alternative models ($\chi^2 = 2410.37$, d.f. = 890, RMSEA = 0.065, CFI = 0.935, TLI = 0.923). These fit indices suggest acceptable model fit according to established criteria. Furthermore, the five-factor model demonstrated strong discriminant validity, supporting its suitability for further theoretical and empirical investigation.

The standardized factor loadings of all five variables are from .70~.91, the composite reliability (CR) of all variables are from .84~.93, and the average variance extracted (AVE) for all constructs are from .57~.76. Thus, all standardized factor loadings exceeded .70, CR values exceeded .80, and AVE values exceeded .50, exceeding the recommended thresholds (Fornell & Larcker, 1981). These findings indicate adequate measurement reliability and convergent validity for all constructs.

4-2. Correlation Analysis

Correlation analysis was performed for each variable. According to the analysis results, GPB had a significantly positive correlation with GBA ($r = 0.226$, $p < 0.01$), GPI ($r = 0.359$, $p < 0.01$), and ESI ($r = 0.421$, $p < 0.01$), while Green skepticism had a significantly negative correlation with GBA ($r = -0.21$, $p < 0.01$), GPI ($r = -0.258$, $p < 0.01$), GPB ($r = -0.242$, $p < 0.01$), and ESI ($r = -0.17$, $p < 0.05$). These results provide preliminary evidence for hypothesis verification.

4-3. Hypothesis Testing

To evaluate the proposed hypotheses, hierarchical regression analysis was conducted. The findings related to the mediating and moderating effects are presented in Table 1.

Table 1 *Regression Analysis Results of Mediating and Moderating Effect*

	Dependent Variable: GPI			Dependent Variable: GPB		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	-0.014	-0.017	0.061	-0.022	-0.017	0.048
Gender	0.024	0.007	-0.034	0.068	0.056	0.009
Education	0.024	0.018	-0.012	-0.012	-0.016	-0.051
Tenure	0.002	0.026	0.037	-0.014	-0.087	-0.085
GBA		0.278**	0.195*			
GPI					0.357***	0.253**
ESI			0.264**			
GS						-0.167*
GBA*ESI			0.153*			
GPI*GS						-0.141*
R ²	0.041	0.087	0.166	0.018	0.092	0.148
ΔR^2	—	0.046	0.079	—	0.074	0.056
F	1.380	6.313***	10.261***	1.450	6.908***	9.797***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. GBA: green brand attitude; GPI: green purchasing intention; GPB: green purchasing behavior; ESI: environmental self-identity; GS: green skepticism

Hypothesis 1 predicted the mediating role of GPI on the relationship between GBA and GPB, which was verified by $0.278 \times 0.357 = 0.099$ (see Table 1). The result of Sobel-test showed the significance of this mediation effect ($p < 0.05$); thus Hypothesis 1 was supported. The hierarchical regression analysis was used to verify the moderating effect. The results are shown in Table 1. Hypothesis 2 predicted that ESI would moderate the relationship between GBA and GPI. As shown in Table 1, Model 3, the interaction term was significant ($\beta = 0.153$, $p < 0.05$): This suggests that ESI plays a positive moderating role, thus Hypothesis 2 was supported. Hypothesis 3 predicted that green skepticism would moderate the relationship between GPI and GPB. As shown in Model 6, the interaction term was significant ($\beta = -0.141$, $p < 0.05$). This shows that green skepticism plays a negative moderating role, thus Hypothesis 3 was supported.

To demonstrate the moderating effect of ESI and green skepticism more intuitively, we present this interaction graphically at two levels of ESI and green skepticism (i.e., +1 SD and −1 SD) in Figures 1 and 2. Simple slope tests indicated that GBA had a significant positive effect on GPI at higher levels of ESI ($\beta = 0.231$, $p < 0.01$) but this was not the case at lower levels of ESI ($\beta = 0.043$). In addition, GPI had a significant positive effect on GPB at lower levels of green skepticism ($\beta = 0.191$, $p < 0.05$), but that was not the case at higher levels of green skepticism ($\beta = 0.074$). Thus, Hypothesis 2 and Hypothesis 3 were further verified.

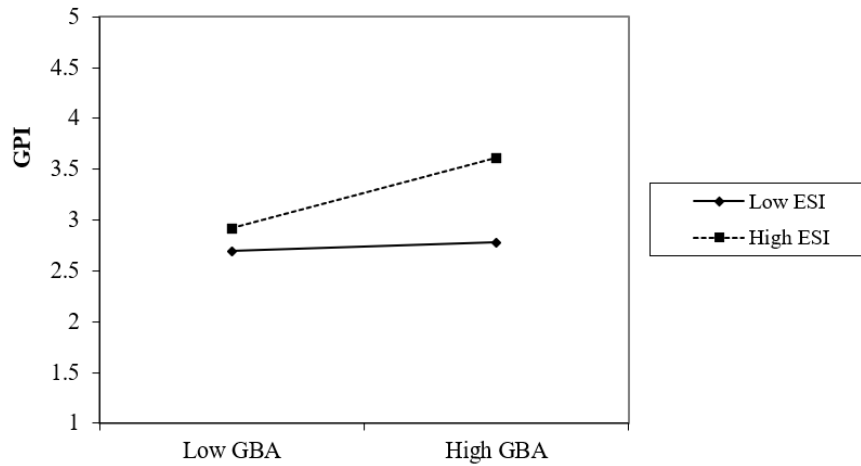


Figure 1 *the positive moderating effect of ESI*

(Note: GBA: green brand attitude; GPI: green purchasing intention; ESI: environmental self-identity)

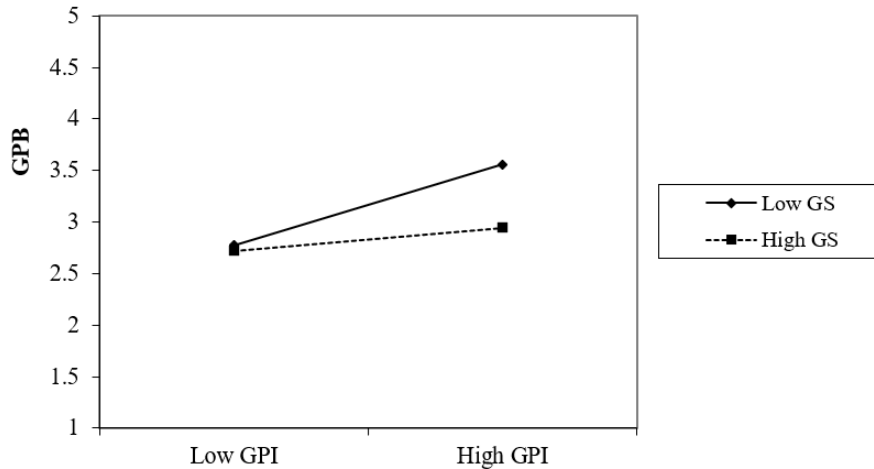


Figure 2 *the negative moderating effect of green skepticism*

(Note: GPB: green purchasing behavior; GPI: green purchasing intention; GS: green skepticism)

4-4 Moderated-Mediation Effect

To empirically evaluate the moderated-mediation mechanism, we applied the PROCESS macro for SPSS (Model 14; Hayes, 2022). The independent, dependent, mediating, and moderating variables were simultaneously entered into the model. Statistical significance was determined relying on a bias-corrected bootstrapping technique based on 5,000 resamples with 95% confidence intervals (CIs). Hypothesis 4 proposed that green skepticism moderates the indirect relationship between GBA and GPB through GPI. The results indicated a significant moderated-mediation effect, evidenced by an index of moderated mediation with a 95% CI of [0.0159, 0.0780] that did not contain zero. Therefore, Hypothesis 4 was empirically supported.

5. Conclusion

5-1 Theoretical Implication

This study extends the TPB by offering a nuanced examination of how psychological and contextual factors influence GPB to understand the psychological mechanisms underlying the intention–behavior gap in green consumption. While TPB traditionally posits that behavior is primarily driven by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991), our findings suggest that incorporating mediating and moderating variables, such as GPI, ESI, and green skepticism, provides a more comprehensive understanding of green consumer behavior.

First, our research reinforces the central tenet of TPB that attitude toward behavior is a critical determinant of intention and, subsequently, behavior. Specifically, we demonstrate that a positive GBA significantly enhances GPI, which serves as a vital conduit to actual GPB. This supports the assertion that favorable evaluations of green brands—rooted in environmental concern and perceived brand credibility—drive pro-environmental behavioral intentions (Vania & Ruslim, 2023; Mary, 2016).

Second, the study makes a theoretical contribution by confirming GPI as a robust mediating mechanism within the TPB framework. As demonstrated in prior research, intention is a proximal predictor of behavior, especially in green consumption contexts (Ndofirepi & Matema, 2019). Our findings reaffirm this pathway while highlighting the importance of strengthening consumer intention to bridge the well-documented attitude-behavior gap in sustainability research.

Third, this study addresses the limited examination of both facilitating and inhibiting boundary conditions affecting green purchasing behavior to integrate ESI as a positive moderator provides an important theoretical advancement. While TPB has been criticized for overlooking identity-based motivations, our study shows that individuals who perceive themselves as environmentally responsible are more likely to translate intention into action. This supports the extension of TPB with identity-based constructs and aligns with recent work suggesting that self-concept congruence strengthens pro-environmental behaviors (Nguyen et al., 2022; Arroyo-López et al., 2020).

Fourth, the study incorporates green skepticism as a negative moderator, shedding light on the role of cognitive dissonance and perceived greenwashing in weakening intention-behavior consistency. This addition reflects a growing body of literature that critiques TPB for assuming rational processing while ignoring consumer distrust and ambiguity in green marketing claims

(Goh & Balaji, 2016; Zaid et al., 2025). Our findings validate that higher skepticism erodes the effectiveness of green brand attitudes, indicating the need to refine TPB by incorporating trust-related dimensions.

5-2 Practical Implication

The findings of this study offer several valuable insights for practitioners, particularly marketing and ESG managers seeking to promote sustainable consumer behaviors through effective branding, communication, and identity alignment strategies. By unpacking the mechanisms through which GBA influences purchasing behavior—mediated by GPI and moderated by ESI and skepticism—this research delivers targeted guidance for enhancing both market effectiveness and ESG performance.

Firstly, building authentic and credible green brand narratives. Firms should invest in sustainability-oriented branding strategies that strengthen positive consumer perceptions toward environmentally responsible products and services. Marketing teams must prioritize authentic green brand positioning to cultivate favorable consumer attitudes. GBA is a foundational driver of purchase intention; thus, brands should go beyond superficial claims and clearly communicate their environmental commitments, certifications, and supply chain transparency. Incorporating third-party eco-labels (e.g., FSC, USDA Organic) and publishing ESG impact reports can enhance brand credibility and consumer trust. Companies must be proactive in countering greenwashing perceptions, as excessive skepticism diminishes the intention-behavior link.

Secondly, leveraging environmental self-identity in messaging. Organizations should develop marketing campaigns that encourage consumers to view green consumption as part of their personal identity and lifestyle. For example, firms may emphasize community belonging, environmental values, and personal contribution to sustainability goals in their communication strategies. Given the positive moderating role of ESI, marketing efforts should focus on helping consumers see themselves as part of a broader sustainability movement. Messaging should emphasize personal contribution to environmental protection and social good, appealing to values and identity rather than product attributes alone. ESG departments can collaborate with marketing to develop campaigns that allow consumers to express eco-conscious identities, e.g., "By choosing our brand, you're part of a greener future." Programs like eco-ambassador communities, sustainability challenges, and digital badges can further support self-identification with green behavior.

Third, reducing green skepticism through transparent communication. To address green skepticism, which was shown to weaken the intention-behavior link, managers must engage in transparent, consistent, and verifiable environmental communication. This includes publishing lifecycle analyses, carbon footprint disclosures, and third-party audits. ESG teams should also engage in proactive public education—via webinars, social media explainers, or infographics—to explain what "green" means in the context of their product offerings. An evidence-based storytelling approach can demystify eco-labels and build long-term trust. In addition, companies should strengthen brand credibility. Such practices may help narrow the intention-behavior gap commonly observed in green consumption contexts.

Fourth, strengthening the intention–behavior pathway with nudge marketing and post-purchase reinforcement. Even when consumers form green intentions, behavioral execution often falters. Marketing managers should incorporate behavioral nudges—e.g., default green options, in-app reminders, or gamification features that reward eco-friendly choices. Follow-up messages such as "Thank you for choosing sustainable" can reinforce the behavior and build habitual purchasing patterns. Integration with loyalty programs that reward sustainable choices (e.g., planting trees per purchase) may also be highly effective.

5-3 Limitations and Suggestions

While this study provides valuable insights into the mechanisms of GPB driving through the lens of the TPB, several limitations must be acknowledged. First, the use of a cross-sectional two-wave design restricts the ability to infer causal relationships among variables. Although regression analysis was employed to test mediating and moderating effects, future research should consider three-wave longitudinal or experimental designs to strengthen causal inference and observe behavioral changes over time.

Second, data were collected using a non-probability sampling method, which may limit the generalizability of the findings. The sample may not fully represent the broader population of green consumers, particularly across different demographic, cultural, or geographic contexts. Future studies are encouraged to adopt random sampling techniques and explore cross-cultural comparisons, as environmental attitudes and green skepticism may vary significantly across regions and socio-economic backgrounds.

Third, the study relied on self-reported measures, which are susceptible to common method bias and social desirability effects. While procedural remedies were applied, future research could incorporate behavioral tracking data or multi-source assessments (e.g., customer purchase records or third-party observations) to validate self-reported green behaviors.

Moreover, the model focused specifically on GBA, ESI, and green skepticism, omitting other potentially influential variables such as perceived behavioral control, subjective norms, or environmental knowledge. Future research should explore expanded models that integrate these additional constructs to offer a more holistic understanding of green consumer decision-making.

In addition, although this study employed CFA to establish construct validity, the moderated-mediation analysis was conducted using composite scores rather than latent-variable SEM. Consequently, potential measurement error may not have been fully accounted for, which could attenuate parameter estimates. Future research is encouraged to apply latent moderated structural equation modeling techniques to further validate the proposed relationships and enhance the robustness of the findings.

Finally, given the evolving landscape of sustainability communication, future work could investigate the role of digital media, eco-label trust, and AI-based personalization in shaping green brand perceptions and mitigating skepticism in real-time.

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Lexuan Chen

International Energy College, Jinan University, Guangdong, China

Email address: 2818861268@qq.com

Major Area(s): Management

Chan Wang

School of Humanities, Jinan University, Guangdong, China

Email address: mschanw@163.com

Major Area(s): Management, Law and Economics

Huixu Yang

School of Humanities, Jinan University, Guangdong, China

Email address: 350954057@qq.com

Major Area(s): Law and Economics

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