Exploring the pathways to tourists' pro-environmental behavior at Vietnamese tourism destinations

Hien Thi Thu Pham[1], Son Bao Doan[1*]

[1]Ho Chi Minh City Open University, Ho Chi Minh City, Vietnam
[*]Corresponding author: son.db@ou.edu.vn

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ABSTRACT

The sustainable growth of tourism depends on travelers' Pro-Environmental Behavior (PEB). This study investigates the nexus between Perceived Severity (PS), Perceived Vulnerability (PV), altruism (AL), and PEB, examining the mediating role of Environmental Attitude (EA), and the moderating effect of Personal Norms (PN). Based on Norm Activation Model (NAM) and Protection Motivation Theory (PMT), the research employs a questionnaire survey, collecting data from 306 tourists who visited Vietnam locations chosen through a convenience approach. Structural Equation Modeling (SEM) found a significant association between PS, PV, and PEB. EA mediates the interplay between PS, PV, and PEB. According to the findings, EA has no substantial mediating role in the relationship between AL and PEB. Also, PN plays a positive moderator in the PV-PEB relationship. This is the first study focusing on Vietnamese tourists and the variables influencing their PEB. These insights offer valuable theoretical contributions to understanding tourists' PEB. Tourism agencies should make visitors' PS, PV, PN, and EA more prominent to enhance PEB.

1. Introduction

New trends like green tourism are growing and will be essential. In 2023, Vietnam welcomed 12.6 million international visitors and expects further growth. As part of the plan for developing the tourism industry, Vietnam intends to rank among the top 30 most popular tourist spots globally by 2030. This goal requires sustainable tourism (Ministry of Culture, Sports and Tourism [MOCST], 2024). While tourism supports economic growth, it also harms the environment (Loureiro et al., 2022). Tourists, as primary actors, impact destinations' environments (Jiao & Wang, 2024). They are increasingly environmentally conscious and prefer green destinations and eco-friendly products (Kim & Koo, 2020). Sustainable tourism growth depends on the PEB of tourists, including actions that improve environmental quality while minimizing environmental damage. Despite growing interest, researchers have debated what factors influence PEB and its complexities (Esfandiar et al., 2020). PEB is crucial for destination sustainability (Wang, Wang, et al., 2020), but encouraging environmental consciousness in tourists is difficult (Sharma & Gupta, 2020). This study investigates the psychological mechanisms of positive PEB. With increased academic interest, researchers are focusing on the factors that contribute to it (Li et al., 2019).

A review of PEB mapping (Kothe et al., 2019) reveals that both coping and threat perception influence the intention to engage in PEB. PMT assumes that "individuals' decision to participate in the risk preventative behaviors depends on their motivation to protect themselves from threats" (Janmaimool, 2017, p. 04). The ability to evaluate the seriousness and probability of a situation is known as threat appraisal (Subedi & Kubickova, 2023). Perceptions of environmental pollution, i.e., Perceived Severity (PS) and Perceived Vulnerability (PV), markedly predict tourists' PEB (Ruan et al., 2020). This study focuses on PS and PV within PMT to explain how they affect travelers' PEB. Moreover, morality - not reason - is the initial motivator for PEB (Sharma & Gupta, 2020), thus "PEB is an altruistic action" (Li & Wu, 2019). A combination of self-interest and altruistic goals characterizes PEB (Bamberg & Möser, 2007), where behavior is guided by altruistic value (AL) (Rahman & Reynolds, 2019). Since the environment is a public good, people must act responsibly beyond AL (Stern, 2000). Modern environmental research shows that AL is a widely held trait. AL distinguishes PEB among tourists, but the prior study has not explained how (Ali et al., 2020). Therefore, we have included AL in the current research to account for the affective impact on PEB among tourists.

The majority of research also indicates that EA is the primary factor influencing PEB (Li et al., 2019). Research on the "attitude-behavior gap" is still lacking, despite the abundance of literature on PEB. To address environmental concerns, researchers look into the attitudes, intentions, and actions of consumers (Ahmad et al., 2022). Understanding the mediating role of EA influencing travelers' PEB is crucial to bridging this "attitude-behavior gap". The NAM (Schwartz, 1977; Schwartz & Howard, 1981) has been implemented to explain why individuals participate in PEB (Thøgersen, 1996). Effective application of this model in tourism has deepened the understanding of sustainable tourism behavior (Han et al., 2021). While PEB is often regarded as prosocial behavior benefiting others, it may not always provide direct benefits to the individual (Steg & de Groot, 2010). Therefore, this study also investigates the impact of PN. Although PN is crucial in environmentally conscious settings, its moderating effect on tourists' PEB has not been examined in prior studies. It aims to directly examine how PS and PV affect PEB, along with the mediating and moderating roles of EA and PN in the relationships among PS, PV, AL, and PEB within the framework of Vietnamese tourism.

2. Literature review and hypotheses development

2.1. Theoretical foundation

Protection Motivation Theory (PMT)

Risk-reduction practices or intentions to engage in protective behaviors are explained by PMT, incorporating social and individual factors in decision-making (Rainear & Christensen, 2017). According to Rogers (1975, p. 100), "People appraise the severity and likelihood of being exposed to a depicted noxious event, evaluate their ability to cope with the event, and alter their attitudes accordingly", which forms the base of PMT (Ruan et al., 2020). PMT that people use two primary cognitive processes - threat appraisal and coping appraisal - to react to threats (Rogers & Prentice-Dunn, 1997). Theat appraisal embraces evaluating risks depending on vulnerability and severity. Vulnerability is the probability of harm, and severity refers to the seriousness of potential outcomes (Rogers, 1975). PMT proposes a positive association between severity, vulnerability, and protection motivation (Rainear & Christensen, 2017). As noted by Gardner and Stern (2002, p. 244), "It shows how several

psychological processes and mechanisms can interact, reminds us that all of these processes and mechanisms can contribute to misestimation and inaction at the same time, and suggests multicomponent programs that are likely to be effective in efforts to increase people's estimation of environmental threats and/or their actions toward those threats," which makes the PMT particularly useful for PEB overall (Bockarjova & Steg, 2014).

Norm Activation Model (NAM)

The NAM was originally proposed by Schwartz (1977) in the context of altruistic behavior. According to Schwartz (1977), individuals perceive PN as strong moral obligations rather than mere intentions (Onwezen et al., 2013). The NAM forecasts individual behavior by using PN. The NAM was used to inspect pro-environmental actions (Thøgersen, 1996). Practicing environmental behavior is viewed as prosocial, as it benefits others without instant personal gain (De Groot & Steg, 2009). NAM theory proposes that moral obligation drives behavior, often ignoring the public welfare aspect in self-interest studies (Arkorful et al., 2023). Since PNs are the main of NAM, this study concentrates on them (Manosuthi et al., 2020). The framework lacks volitional and non-volitional aspects of behavior (Fornara et al., 2016; Manosuthi et al., 2020). This study demonstrates an integrated framework based on the PMT and NAM to improve the understanding of selfless pro-social conduct.

2.2. Threat appraisal and tourists' Pro-Environmental Behavior (PEB)

Augmented PMT was created to address behaviors that deviate from rational decision-making (Oakley et al., 2020). Individuals may act irrationally when threatened. According to the authors, the extent of personal responsibility for adaptive behavior is influenced by PS and PV. Emotions and social norms can also impact this cognitive stage (Marikyan & Papagiannidis, 2023). The threat appraisal process includes severity and vulnerability, which assess the danger of the current risk (Rainear & Christensen, 2017). The PS of the threat "reflects how serious an existing risk is perceived to be" (Bockarjova & Steg, 2014, p. 277). PV "reflects perceptions of how susceptible one is to the existing threat" (Bockarjova & Steg, 2014, p. 277). Increasing PS and PV is believed to enhance fear arousal and protection motivation (Rainear & Christensen, 2017). The PMT posits that there should be a positive correlation between protection motivation, PS, and PV, with vulnerability and severity comprising threat appraisal. Individuals assess threats by anticipating their impact and evaluating both PS and PV to that threat. So, when travelers realize they are susceptible to a perceived danger and judge it as serious, their fear increases, motivating them to take precautions (Chen, 2020). To forecast tourists' PEB in the face of environmental pollution, this study considers the threat appraisal components of PMT. Travelers' perceptions of risk are a prominent area of overlap between PMT and travel risk studies (Wang et al., 2019). Wang et al. (2019) found a positive interplay between the threat assessment process and the protective behavior of Australian travelers. Ruan et al. (2020) found that PS and PV significantly impact international tourists' intentions to adopt protective behaviors. The literature review supports the following hypotheses:

H1: PS significantly and positively affects tourists' PEB

H2: PV significantly and positively affects tourists' PEB

2.3. The mediating role of Environmental Attitude (EA)

The significance of attitude in comprehending human behavior has been acknowledged (Peter & Olson, 2010). EA commonly reflects tourists' emotional attachment

to and evaluation of environmental protection. It is consistently seen as a reliable indicator of behavior (Ahmad et al., 2022). The meta-analysis concludes that attitudes are significantly influenced by one's PS and PV (Zhao et al., 2018). Gao et al. (2015) found that travelers' attitudes toward healthcare technology are affected by their perceptions of PS and PV. From the PMT perspective, PS and PV significantly impact EA, highlighting the importance of threat assessments. It implies that one of the key preconditions of EA is threat assessment (Zhao et al., 2018). Threats to the environment can affect tourists' subsequent attitudes toward the environment by increasing their PS and PV (Tzeng & Ho, 2022). Law et al. (2017) note that tourists' EA is shaped by their values and understanding of environmental responsibilities. Having a positive EA is the first step toward adopting concrete environmental behaviors (Lin & Niu, 2018). Positive EAs were associated with a greater willingness to sacrifice for the environment (Jia et al., 2017). We propose the following hypotheses to address this issue:

H3: EA plays a mediating role in the connection between PS and PEB

H4: EA plays a mediating role in the connection between PV and PEB

Researchers have recently examined the effects of altruism (AL) among environmentally conscious tourists (Ali et al., 2020). The concept of consumer AL is expanding in environmental studies (Corbett, 2005). Stern et al. (1993) define AL as an affective concern for the welfare of others and society, involving selflessly helping others without seeking compensation. AL was used to explain PEB (Rahman & Reynolds, 2019). Schwartz's (1977) NAM theory states that altruistic responses are driven by moral standards that believe their actions can prevent harm to others. Altruistic values can directly influence behavioral intentions and shape attitudes (Rahman & Reynolds, 2019). Therefore, the present study proposes the following hypothesis:

H5: EA plays a mediating role in the connection between AL and PEB

2.4. The moderating role of Personal Norm (PN)

Schwartz (1977) created NAM to study how people forego their interests in favor of the welfare of others, including acts of altruism (Meng et al., 2020). PN in NAM refers to the "moral obligation to perform or refrain from specific actions" (Schwartz & Howard, 1981, p. 191). PN affects PMT (Lin et al., 2022). This indicates that eco-conscious tourists are more likely to feel compelled to participate in PEBs due to their environmental concerns. Individual needs, values, concerns, and goals result in varied emotional reactions to similar situations. The frequency and/or intensity of a person's emotional responses in pertinent circumstances, such as pride at successfully preserving the environment or outrage at witnessing another person pollute, should be predicted by their appraisal profile. Ultimately, tourists' intention to engage in PEB can be convincingly told in advance by their appraisal and emotional pattern in pertinent situations (Brosch et al., 2014). Tourists who feel a greater moral obligation to mitigate climate change are more likely to do so (Schwartz, 1977). This perception raises protection motivation, which fosters climate change mitigation (Chen, 2020). This study shows that an extended PMT model with moral obligation offers more insights into tourists' intentions than the original PMT model. Pro-environmental intentions and behaviors are strongly motivated by PN (de Groot et al., 2021). According to Schwartz and Howard (1981), PNs are convictions about moral duties to act in "the right" way. We contend that the correlation between PS, PV, and PEB is moderated by tourists' PN.

Those with strong PN to act PEB feel morally obligated to act environmentally (van der Werff et al., 2013). In this vein, Stern et al. (1999) asserted a connection between PN and PEB, suggesting that greater participation in PEB is associated with a stronger moral obligation to benefit the environment (Ateş, 2020). Visitors with a higher PN are more inclined to care about the planet and understand the emotional value of PEB in certain locations. Visitors with lower PN levels, on the other hand, may not see this emotional value and may be less concerned about environmental protection (Kim et al., 2022). Consequently, the following hypotheses are proposed:

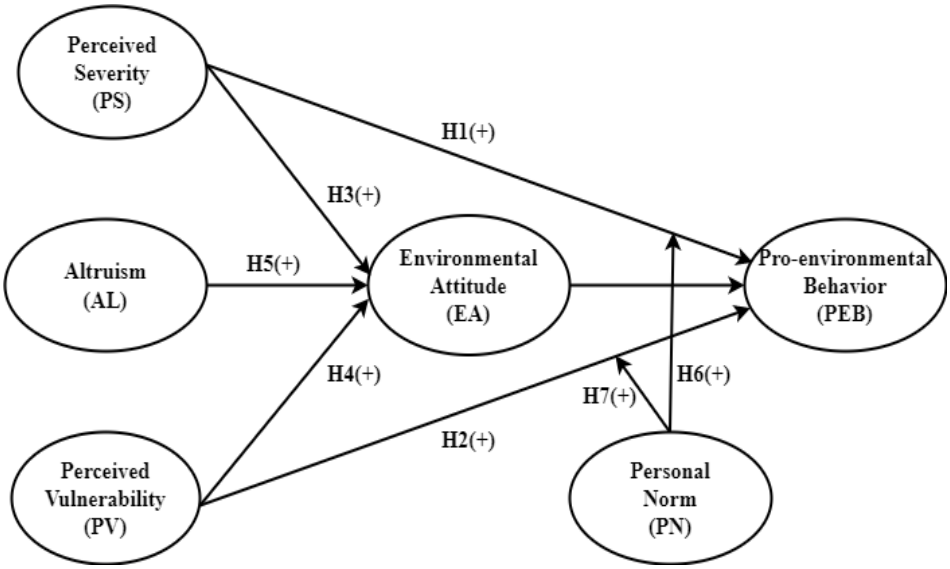
H6: PN serves as a moderator of the relationship between PS and PEB

H7: PN serves as a moderator of the relationship between PV and PEB

In Figure 1, we can see the interconnections between the relevant variables in this article's model.

Figure 1

Hypothesized Model



Note. Authors

3. Methodology

3.1. Data collection and sample

The researcher used a translation-back-translation method with two translators to ensure equivalence between the Vietnamese and English versions of the questionnaire (Esfandiar et al., 2020), leading to notable content revisions. To increase face validity, five academic experts assessed item clarity and phrasing, resulting in minor modifications. A pre-test with thirty tourists contributed to revisions of items and paraphrasing of statements with low internal consistency (Esfandiar et al., 2020). Data were obtained from self-reported questionnaires from local tourists in Ho Chi Minh City, one of Vietnam's most visited cities. In 2023, the city implemented policies to promote tourism recovery, attracting almost 05 million international and 35 million domestic visitors. However, it faces challenges such as waste, noise, air pollution, and climate change issues (Vneconomy, 2023). Research assistants use the convenience sampling technique at the exit gates of the destinations. Data for this study were gathered between June and July of 2024, concurring with Vietnam's peak travel

season. If a visitor declined to participate, the next one was invited due to difficulties and restrictions with random sampling in destinations, such as the difficulty of intercepting visitors at the exit gates. 306 valid questionnaires were kept for data analysis after 44 invalid responses and outliers were eliminated. Table 1 provides a detailed breakdown of the collected data's descriptive statistics.

3.2. Measurement of constructs

The measurement scales in this study have provided reliability and validity across various contexts. On a five-point Likert scale, 1 signifies "strongly disagree" and 5 means "strongly agree" for each question. Initially, Ruan et al.'s (2020) three-item Perceived Severity (PS) scale was employed for measurement. Second, Ruan et al. (2020) were adopted to measure the four-item Perceived Vulnerability (PV) scale. Third, Albayrak et al.'s (2013) three-item altruism (AL) scale was used for measurement. Fourth, Ahmad et al. (2022) were used to measure the three-item Environmental Attitude (EA) scale. Fifth, van der Werff et al. (2013) were used to measure the three-item Personal Norm (PN) scale. Lastly, Jiao and Wang (2024) employed the five-item tourists' Pro-Environmental Behavior (PEB) scale.

4. Empirical findings

4.1. Description of sample characteristics

Table 1

Characteristics of Sample Respondents

Characteristics	Frequency	Percent
Gender:		
- Female	149	48.7
- Male	157	51.3
Age (years old):		
- Below 18	28	9.1
- 18 - 38	99	32.4
- 39 - 58	123	40.2
- Over 58	56	18.3
Educational level:		
- High school	103	33.7
- University	192	62.7
- Master	6	2.0
- Other	5	1.6
Marital status:		
- Married	248	81.0
- Other	58	19.0
Number of trips per year:		
- 01 - 03	209	68.3
- 04 - 10	59	19.3
- Over 10	38	12.4
N = 306		

Note. Authors

4.2. Evaluation of measurement model

We removed items PEB4 and PEB5 due to cross-loading before assessing the measurement model (Hair et al., 2019). The data must first be assumed to be normally distributed, which is a crucial step (Collier, 2020; Ha et al., 2022). Normality is evaluated using kurtosis and skewness tests, with values below 3.0 for skewness and 7.0 for kurtosis indicating normality (Collier, 2020). The results show kurtosis between 0.180 (PEB3) and 4.042 (PN2) and skewness between -1.634 (PEB2) and -0.618 (EA2). The single factor only explains 44.145% of the variance among the 21 variables, indicating no significant common method variance (Podsakoff & Organ, 1986).

Statistical tests like Cronbach's Alpha (α), AVE, CR, and standardized regression weights (Hair et al., 2019) were used to check the study instrument for convergent validity. As shown in Table 2, all α values exceed the threshold level of 0.7; all measures had AVEs greater than 0.50 (AL = 0.629 to PS = 0.819); all CRs exceed 0.70 (AL = 0.835 to PS = 0.931); and all items had standardized regression weights above the recommended 0.5 (Hair et al., 2019).

Table 2

Constructs and their Responding Measures

Construct	Code	Item	Loading	AVE	CR
Perceived Severity (PS)	PS1	"Environmental pollution is harmful to human health"	0.846***	0.819	0.931
	PS2	"Environmental pollution ruins mood in daily life"	0.931***		
	PS3	"Environmental pollution reduces humans' quality of life"	0.936***		
Perceived Vulnerability (PV)	PV1	"Environmental pollution will affect tourists' travel itinerary"	0.795***	0.725	0.913
	PV2	"Environmental pollution will affect the quality of tourism activities"	0.867***		
	PV3	"Environmental pollution will affect tourists' tourism mood"	0.849***		
	PV4	"Environmental pollution will affect the quality of photos at tourist destinations"	0.893***		
Altruism (AL)	AL1	"Environmental protection in the tourist destination will help people have a better quality of life"	0.743***	0.629	0.835
	AL2	"Environmental protection benefits everyone living near the tourist destination"	0.838***		
	AL3	"Environmental protection in tourist destinations benefits the whole ecosystem"	0.796***		

Construct	Code	Item	Loading	AVE	CR
Environmental Attitude (EA)	EA1	"It is essential to promote green living in Vietnam"	0.850***	0.688	0.868
	EA2	"I strongly agree that environmental protection works are needed in Vietnam"	0.871***		
	EA3	"It is important to raise environmental awareness among the Vietnamese people"	0.763***		
Personal Norm (PN)	PN1	"I feel morally obliged to act in an environmentally friendly manner"	0.834***	0.740	0.895
	PN2	"I would feel guilty if I did not act in an environmentally friendly manner"	0.871***		
	PN3	"I would be a better person if I would act in an environmentally-friendly manner"	0.874***		
Pro-Environmental Behavior (PEB)	PEB1	"During my tour, I properly managed waste"	0.889***	0.788	0.917
	PEB2	"During my tour, I adhered to the principles of environmental conservation"	0.944***		
	PEB3	"I purchase the green products offered by my tour"	0.826***		
	PEB4	"I make every effort to protect the destination and the surrounding environment" (d)	-		
	PEB5	"I persuade my fellow companions to take environmentally friendly actions" (d)	-		

Note. (d) indicates that measures fail the validity and reliability tests; *** indicates significance at $p < 0.001$. Authors

To evaluate the scale's discriminant validity, we employed Henseler et al.'s (2015) HTMT ratio of correlations. The HTMT ratio measures the correlation between similar constructs. A discriminant validity violation occurs when the value exceeds 0.85. The constructs' discriminant validity was confirmed by the fact that the HTMT values were less than 0.85, as revealed by our research. The HTMT values from our analysis are in Table 3.

Table 3

HTMT Analysis

	PV	PS	PEB	EA	PN	AL
PV						
PS	0.611					
PEB	0.539	0.568				
EA	0.480	0.519	0.572			
PN	0.539	0.570	0.419	0.334		
AL	0.544	0.510	0.411	0.419	0.473	

Note. Authors

The model fit statistics were very good with the following values reported: $\chi2$ = 314.599 (df = 136, p = 0.000), CMIN/df = 2.313, SRMR = 0.0393, CFI = 0.959, TLI = 0.949, and RMSEA = 0.066. Therefore, it can be concluded that the constructs are both valid and reliable.

4.3. Evaluation of the structural model

According to the model fit measures, with 166 degrees of freedom, $\chi2$ = 392.365 and p = 0.000. According to Hu and Bentler (1999), the model is parsimoniously acceptable because the $\chi2$/df value of 2.364 falls within the 2 and 5 thresholds. Several metrics were measured, including the SRMR (0.0416), CFI (0.954), TLI (0.942), and RMSEA (0.057). Generally, following all fit indices, the model achieves a satisfactory to outstanding degree of goodness of fit. The results of the hypothesis testing for the structural model assessment can be observed in Table 4. According to H1, PS and tourists' PEB would be positively correlated. The results of the path analysis demonstrated that there was a positive and significant regression coefficient between PS and PEB (β = 0.233, p < 0.001). Thus, H1 was validated. Besides, PEB was positively affected by the PV of travelers with β = 0.248 and p < 0.001. Hence, H2 was supported.

Table 4

Hypothesis Testing of Structural Model

Hypothesized relationships	Proposed effects	SRW	Results
H1: PS → PEB	Positive	0.233***	Supported
H2: PV → PEB	Positive	0.248***	Supported
H3: PS → EA → PEB	Positive	0.100**	Supported
H4: PV → EA → PEB	Positive	0.060*	Supported
H5: AL → EA → PEB	Positive	**0.041**	**Not Supported**
H6: PSxPN → PEB	Positive	**- 0.052**	**Not Supported**
H7: PVxPN → PEB	Positive	0.259***	Supported

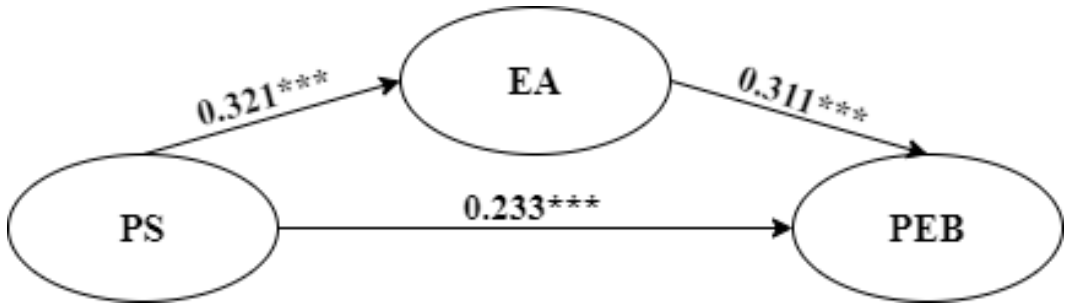
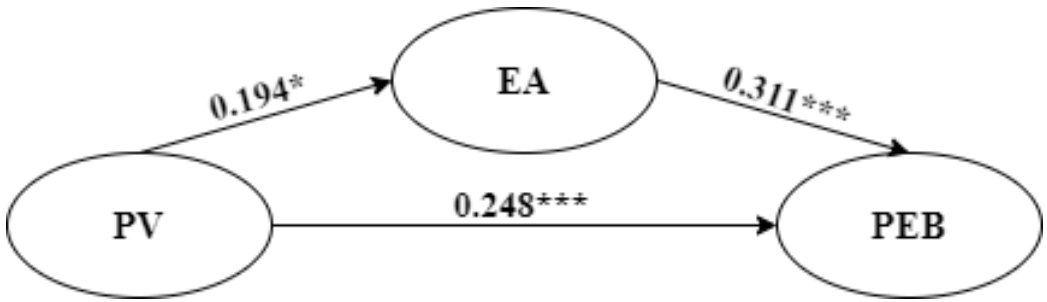
Note. *** p < 0.001; ** p < 0.010; * p < 0.050. Authors

4.4. Mediation analysis

A bootstrapping mediation analysis revealed the relationships between PS, PV, AL, EA, and PEB. Using roughly 1,999 permuted samples, including the original, unpermuted data, 2,000 bootstrap samples were drawn (Taylor & MacKinnon, 2012). The analysis was executed with a 95% confidence level for the bias-corrected confidence interval. The data indicate that the links PS-PEB and PV-PEB are partly mediated through EA, with the corresponding regression weights being 0.1 (p < 0.01) and 0.06 (p < 0.05). Furthermore, the mediating role of EA in the relationship between AL and PEB is insignificant. The mediation test results are summarized in Table 5.

Table 5

Results of Mediation Analysis

Relationship	Mediation Effect	Estimate	Probability	Conclusion
H3: PS - EA - PEB		0.100	< 0.010	Partial mediation
H4: PV - EA - PEB		0.060	< 0.050	Partial mediation

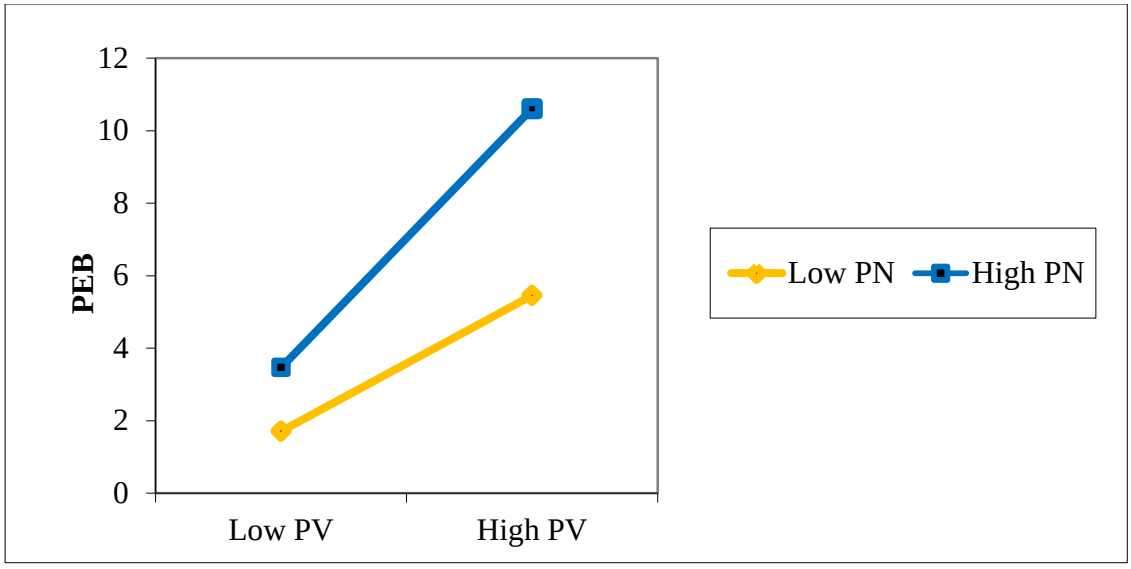
Note. ***p < 0.001; **p < 0.010; * p < 0.05. Authors

4.5. Moderation analysis

Models developed for the examination process included all variables, including the independent, dependent, moderating, and interaction terms (Collier, 2020). There is no moderating influence of PN on the connection between PS and PEB. H6 is therefore not supported. Figure 2 confirms that PN moderates the relationship between PV and PEB effectively, indicating that PV's positive effect on PEB was stronger ($\beta = 0.259$, $p < 0.001$), supporting H7. This study linked the two moderator degrees to identify high and low PV, demarcating the moderating effects of PN (Dawson, 2014). The role of PN in moderation is depicted in Figure 2. It also emphasizes how PN, particularly high PN levels, enhances the positive correlation between PV and PEB.

Figure 2

The Moderating Effect of PN on the Positive Relationship between PV-PEB



Note. Authors

5. Discussion

Based on the PMT and NAM, a causal model was created to determine what motivates guests to act PEB. Except for H5 and H6, the data supported the hypothesized links. The SEM analysis showed that PV and PS significantly and positively affect tourists' PEB. Bockarjova and Steg (2014) note that PMT provides a useful theoretical framework for understanding the factors that influence people's behavior change. These findings align with studies by Shafiei and Maleksaeidi (2020), Chen (2020). If visitors view environmental pollution as serious and believe they are susceptible to its effects, threat appraisal happens, raising their motivation to protect the environment (Chen, 2020). Therefore, if travelers believe that climate change is serious and poses a risk to them, they will engage in a threat assessment. This threat assessment prompts travelers to reduce the impact of climate change.

A mediating role for EA in the connection between PS, PV, AL, and PEB was considered in H4, H5, and H6. There was evidence that EA mediated the relationship between PS, PV, and PEB, but no such evidence between AL and PBE. Previous studies have shown that visitors' positive attitudes toward the local environments influence their intentions to engage in PEB (Shafiei & Maleksaeidi, 2020) and environmental behavioral intentions (Wang, Qin, et al., 2020). Overall, EA plays a crucial role as a mediator in the link between

PS-PEB and PV-PEB. Understanding the EA and the factors that impact the PEB of Vietnamese tourists is crucial for marketers. From the PMT perspective, PS and PV remarkably impact attitudes and highlight the importance of threat assessments as crucial precursors of EA (Zhao et al., 2018).

The moderating effect tests indicated that PN positively moderated the impact of PV on PEB. However, PN did not moderate the relationship between PS and PEB, which runs counter to PMT and NAM's historical context. PN is thought key variable in determining engagement in prosocial behaviors (Kim et al., 2022). Visitors with stronger PN are more likely to participate in PEB. A stronger PN among tourists increases the likelihood of engaging in the desired behavior, irrespective of their perceptions of vulnerability (de Groot et al., 2021).

6. Implications and conclusion

6.1. Theoretical implications

First, this study clarifies factors impacting PEB using the PMT and NAM models as a theoretical framework. Within the Vietnamese tourism context, it combined these models to produce a strong conceptual model. Although the complexity of social and psychological influences on PEB has shifted focus, there is still a lack of analysis on environmental behavior formation mechanisms. Unfortunately, attitude and moral norms affect each other, but their relationship is ignored. In conclusion, we add to the literature on PEB, its impact mechanisms, and environmental behavior boundaries (Li et al., 2019).

Second, this study improves our knowledge of PEB among tourists by resolving some issues with the PMT. Evidence suggests that the cognitive mediating processes proposed by the PMT model can effectively motivate individuals to take protective measures (Rogers & Prentice-Dunn, 1997). Results indicate that EA plays a crucial mediating function between tourists' PS, PV, and PEB, with threat-appraisal components showing a stronger correlation with tourists' protection motivation (Ruan et al., 2020). This study expands and refines the variables of PMT by applying them to Vietnamese tourism, improving the applicability of PMT in the field of PEB and enhancing its explanatory components.

Third, this research builds on PMT by incorporating the tourist's social-altruistic viewpoint (AL) to promote PEB. While EA may be a statistically insignificant mediator between the AL and PEB, the processes forming PEB in the tourism sector and the impact of AL require more investigation. Researchers can use this study as a springboard to empirically test the suggested conceptual model in diverse settings.

Lastly, confirming the significance of PN on tourists' PEB, this study adds to current knowledge. We explored PN's moderating function by successfully applying PMT and NAM theory. Our research is the first to demonstrate that PN significantly moderates the relationship between PV and PEB in a tourist setting. PMT holds that thought processes are universal, regardless of individual personality or circumstances. While there have been some efforts to expand PMT to include individual factors (Marikyan & Papagiannidis, 2023), the significance of psychological traits and personality has largely gone unexplored. Researchers have broadened PMT's application to behaviors beyond health protection, for instance, by adding the moral obligation construct to help understand PEB (Chen, 2020).

6.2. Practical implications

The tourist industry constantly outpaces the global economy, posing a formidable challenge in combating environmental degradation. Tourists' antisocial behavior often contributes to the negative effects on communities, and promoting responsible tourism among visitors is effective for making popular tourist spots more eco-friendly. Efforts have emphasized encouraging tourists to adopt eco-conscious behaviors and become responsible citizens. The tourism sector has utilized behavioral change theories, especially PMT, to encourage adaptive behaviors. Tourism practitioners and managers should consider these variables, as PS and PV were strong predictors of PEB. Fear appeal highlighting the gravity of climate change could effectively encourage behavior change, given the importance of perceived severity in forming intentions. Many view climate change as a minor which may decrease their initiative to act. Therefore, integrating relevant environmental threats into social media can be a successful strategy. The work's results indicate that EA is a critical mediator. It would be prudent to implement measures to increase awareness of the significance of environmental protection, and the detrimental effects of environmental degradation on human health and social welfare. Environmental principles are becoming increasingly important for the tourist industry to follow.

When threat messages are coupled with PN, they are more likely to succeed. This suggests that personal norms-based messaging could convincingly encourage environmentally friendly tourist behaviors. Travelers with high PN have an innate moral need to practice PEB and are likely to perceive eco-friendly tourism favorably because they are more acutely affected by environmental pollution. To increase tourists' awareness of environmental issues, managers should emphasize the eco-friendly features of their products. Highlighting tourists' ethical responsibilities should be prioritized in marketing campaigns. For instance, travelers may receive eco-friendly travel products as a reminder of their moral duty to engage in environmentally friendly activities.

6.3. Conclusion

This study expands on existing conceptual models by presenting a novel and robust framework that integrates PMT and NAM within the Vietnamese tourism context, focusing on visitors' PEB. The causal links in the suggested model, which include direct, indirect, and moderating relationships, were valid. In particular, PS and PV directly influence PEB, while EA is an effective mediator. Nevertheless, AL did not indirectly affect PEB. Notably, PN fortified the bond between PV and PEB. Despite limited efforts to combine PMT and the NAM into a single theoretical framework, this study provides valuable insights into this new topic and draws concrete conclusions.

6.4. Limitations and future research suggestions

The work's generalizability may be limited due to several factors, notwithstanding its findings. First, it is difficult to generalize the results to other countries because this study only collected data from travelers in Vietnam. Future researchers should aim to include a broader international sample. Second, while PMT proposes two processes - coping and threat appraisal- that govern participation in PEB (Kothe et al., 2019), this study solely examined the role of threat appraisal. To enhance the model's comprehensiveness, future research should include additional components of coping appraisal. Lastly, given the complexity of social and

psychological factors influencing PEB, the present research has shifted its focus (Li et al., 2019). Further investigations into mechanisms, including the identification of additional mediating and moderating variables, are warranted.

NO CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflict of interest.

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