Hikers' pro-environmental behavior in national park: Integrating theory of planned behavior and norm activation theory

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Hikers' intention for pro-environmental behavior (PEB) directly affects the sustainable development of protected areas, but few studies have been conducted from the perspective of theoretical integration. This study explores the intention of hikers' PEB from the perspective of individual hikers, based on the theory of planned behavior and norm activation theory. Researchers surveyed 456 hikers in Wuyishan National Park, and the data analysis method employed was structural equation modeling. The results demonstrate that the model integrating TPB and NAM was accepted of hikers' PEB in national park, and for the hiker, internal demand was found to precede external stimulus for their behavior. The study sheds light on how to better comprehend and advocate for PEB in national parks.

KEYWORDS

pro-environmental behavior, theory of planned behavior, norm activation theory, national park, integrating theory

Introduction

The most rapidly developing outdoor activities are associated with trail use, resulting in many natural areas providing outdoor recreational opportunities such as hiking trails in the mountains (Rodrigues et al., 2010; Kim et al., 2021; Venter et al., 2021). Studies have shown that hiking in mountainous areas of different altitudes, can bring benefits to participants (Junot et al., 2017). It can improve people's quality of life, and health, reduce the risk of heart disease, high blood pressure, diabetes, depression and anxiety, so an increasing number of people have begun participating in hiking (Pate et al., 1995; Bedimo-Rung et al., 2005; Coventry et al., 2021; Garvanova et al., 2021; Puhakka, 2021; Xue et al., 2022). As scenic mountain area attracts large numbers of tourists and hikers, the problem of environmental damage in these areas is becoming more serious, bringing issues such as tourists littering, breaking trees, and feeding small animals at will. Especially for mountain-type national parks with rugged mountain roads and large areas, the impact of irresponsible environmental behavior is more difficult to resolve (Line et al., 2018; Hu et al., 2019; Han, 2021; Esfandiar et al., 2022). China is an emerging

and vast tourism destination, mountainous regions account for two thirds of China's, which is also facing various environmental issues (Chen et al., 2006; Hu et al., 2019; Li and Wu, 2019). Therefore, enhancing PEB of Chinese hiker has become an important issue that needs to be solved urgently (Kaseva and Moirana, 2010; Hu et al., 2018, 2019; Zhang et al., 2022).

Protected areas are "Clearly defined geographical spaces recognized, dedicated, and managed, through legal, or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values," it includes national parks, nature reserves, and marine parks [International Union for Conservation of Nature (IUCN), 2008]. As of July 2022, China has a total of five national parks, Sanjiangyuan, Panda, Northeast Tiger and Leopard, Hainan Tropical Rainforest, Wuyishan National Parks. The management of national parks must be sustainable and successful in order to improve human connectivity with nature; establishing PEB programs for visitors is one of the national parks' functions (Esfandiar et al., 2020; Esfandiar et al., 2022). Hiking is one of the most basic and important activities in national parks and other outdoor recreation areas, and has become a popular outdoor sport from the niche (Rogowski, 2017), it is popular among outdoor sports enthusiasts because of its function to promote hikers' integration into nature, physical exercise, and healthy mood (Rodrigues et al., 2010; Hartig et al., 2014; Larson et al., 2016). According to statistics, the number of hikers in China has reached 60 million one year, poses a number of environmental problems (Han et al., 2018; Høyem, 2020; Zhang et al., 2020). Based on these concerns, one goal of this study is to identify strategies for encouraging hikers to China's national parks to adopt environmentally friendly practices.

To achieve a more sustainable society, encouraging hikers to participate in a variety of PEB can subsequently increase favorable environmental outcomes and lessen the severity of global environmental challenges (Goh, 2020; Udall et al., 2020; Choi and Kim, 2021; Esfandiar et al., 2022). Previous studies about PEB have generally focused on personal factors regarding tourists, such as their attitude (ATT), subjective norm (SN), and perceived behavioral control (PBC) mechanisms as well as the environmental behavioral intention of theory of planned behavior (TPB) (De Leeuw et al., 2015; Han, 2020; Meng et al., 2020; Yuriev et al., 2020; Alzubaidi et al., 2021; Aziz et al., 2021; Fenitra et al., 2021; Panwanitdumrong and Chen, 2021; Singh and Kaur, 2021; Zhang et al., 2021; Loureiro et al., 2022; Zheng et al., 2022); awareness of consequences (AC), ascription of responsibility (AR), and personal norm (PN) of the norm activation theory (NAM) (Meng et al., 2020; Alzaidi and Iyanna, 2021; Bai and Zhang, 2021; O'Connor and Assaker, 2021; Han et al., 2021; Cao et al., 2022; Jeon et al., 2022; Kang, 2022; Long et al., 2022; Loureiro et al., 2022; Song et al., 2022; Zhang et al., 2022). However, there are many influencing factors of personal PEB, and there are complex interrelationships, there are both have direct and indirect effects (Han, 2021). Despite

being a noteworthy segment in terms of size and spending, the existing literature has focused very little on Chinese hikers' behavior, and few studies have looked at hikers' PEB, particularly in popular locations in China (Li et al., 2017; Witte, 2021; Zhang et al., 2022). The majority of earlier studies used conventional tourists as their research subjects, but hikers have special qualities (Ng and Cheng, 2022). For instance, hikers tend to be more intelligent and concerned about the environment (Collins-Kreiner and Kliot, 2017; Lin and Lee, 2020). They promote nature conservation and cherish the surroundings' natural beauty and landscape (Lin and Lee, 2020; Zhang et al., 2022). Moreover, less research pay attention into hikers' PEB, particularly in regions that are protected, such national parks, nature reserves, and marine parks, and there were few articles take Chinese hikers as research objects (Esfandiar et al., 2022), as most of the research investigating PEBs in protected areas has been undertaken in Western cultures such as the USA, Australia, and Canada (Esfandiar et al., 2022).

To fill these research gaps, the TPB and NAM were used to study the influencing factors of hikers' PEB. The study used Wuyishan national park as a case study. The main aims and objectives of the study were the following: (1) What are the main factors impacts on hikers' PEB? (2) How much do they predict hikers' PEB? (3) What are the relationships between these factors? The study attempted to propose an effective theoretical framework to explain the factors affecting hikers' PEB and propose useful management suggestions to achieve environmentally friendly development in protected areas.

Materials and methods

Theory of planned behavior

The scholar Ajzen added the "perceived behavior control" variable to the rational behavior theory (TRA) in 1985 to form the TPB (Ajzen, 1991). Behavioral intention include three aspects, in particular, SN refers to the perceived social pressure from referents (such as friends, leaders, and family) to do or not do something. ATT refers to the attitudes people have about an action, whether they are favorable or unfavorable the action, PBC is the perceived difficulty or ease of performing the action.

Because the TPB has good predictive and explanatory capabilities in behavior research, it is widely used in various aspects, There have been many studies used the TPB model in the research area of environmental behaviors (Yuriev et al., 2020; Alzubaidi et al., 2021; Aziz et al., 2021; Fenitra et al., 2021; Han, 2021; Zhang et al., 2021; Zheng et al., 2022), green purchase (Emekci, 2019; Han, 2020; Liu et al., 2020), revisit behaviors (Manosuthi et al., 2020; Meng et al., 2020; Abbasi et al., 2021; Deng et al., 2021; Soliman, 2021), food delivery services (Troise et al., 2020; Choe et al., 2021), destination choose (Juschten et al., 2019b; Liu et al., 2021; Azhar et al., 2022; Mohamad et al., 2022),

digital currency (Radic et al., 2022) these studies have shown that ATT, SN, and PBC positively affected the behavioral intention. Accordingly, this research proposes the hypothesis as follows:

> Hypothesis 1 (H1). Attitude (ATT) has a positive influence on behavioral intention (BI).

> Hypothesis 2 (H2). Perceived behavior control (PBC) has a positive influence on behavioral intention (BI).

> Hypothesis 3 (H3). Subjective norm (SN) has a positive influence on behavioral intention (BI).

One of the changes believed by academics to have a favorable effect on attitude is the subjective norm (Ryu and Jang, 2006; Wu and Lin, 2007). The subjective norm can be defined as the social cohesion that binds an individual to society; this connection captures a person's attitude (Joynt and Warner, 2002). The subjective norm directly affects attitude and perceived behavior control (Quintal et al., 2010; López-Mosquera et al., 2014; Park and Ha, 2014; Zhou et al., 2014; Manosuthi et al., 2020). Research projects have used Xixi Wetland as an example to verify that subjective norm are an effective influencing factor driving behavior and attitudes (Zhou et al., 2014), volunteer tourists' subjective norm influences their attitude on revisit intention (Manosuthi et al., 2020), and other also confirmed this point (Li et al., 2013). The environmental complaints of Chinese residents have also verified that subjective norm have a positive impact on attitude and perceived behavior control (Zhang and Wang, 2018). Accordingly, this research proposes the hypothesis as follows:

> Hypothesis 4 (H4). Subjective norm (SN) has a positive influence on attitude (ATT).

> Hypothesis 5 (H5). Subjective norm (SN) has a positive influence on perceived behavior control (PBC).

Norm activation theory

Schwartz (1977) proposed the norm activation theory (NAM) with individual norms as the core factor, which is mainly used to predict and understand pro-social and altruistic behaviors. Norm activation theory is mainly composed of three variables, AC, AR, and PN. Personal norm represents a moral duty to engage in a particular conduct or refrain from doing so, AC is defined as people's understanding of how pro-social behavior benefits others or their estimations of other things, and the AR shows how responsible people

feel about the effects of their pro-social behavior. NAM is regarded as the most influential theory in explanation of pro-environmental decision-making process and behavior (Steg and Nordlund, 2018; Esfandiar et al., 2019, 2022; Han, 2021; Mikuła et al., 2021; O'Connor and Assaker, 2021; Gao et al., 2022), households' waste separation (Goh et al., 2022), purchase food (Faletar et al., 2021; Lafontaine et al., 2021; Yang et al., 2021; Le and Nguyen, 2022), waste separation behavior (Esfandiar et al., 2021; Setiawan et al., 2021; Shen et al., 2022), these studies have shown that AR, AC positively affected PN, and AR can be triggered by AC. Accordingly, this research proposes the hypothesis as follows:

> Hypothesis 6 (H6). Ascription of responsibility (AR) has a positive influence on personal norm (PN).

> Hypothesis 7 (H7). Awareness of consequences (AC) has a positive influence on personal norm (PN).

> Hypothesis 8 (H8). Awareness of consequences (AC) has a positive influence on ascription of responsibility (AR).

Personal norm is closely integrated with ethics in environmental protection, which has a direct impact on behavioral intention (Shin et al., 2018; Wang et al., 2018). Research has shown that personal norm has an impact on behavior intention in rural tourism (Li et al., 2013). A theory of green purchase behavior displayed that customers' personal norm influence environmentally responsible buying behavior for green hospitality products (Han, 2020). When combined with the TPB framework, personal norm is thought to increase the exploratory potential to predict pro-social behavioral intention (Manosuthi et al., 2020). The outcomes of numerous meta-analytic studies also confirm this (Bamberg and Möser, 2007; Klöckner, 2013; Han and Stoel, 2017; Morren and Grinstein, 2021). Accordingly, this research proposes the hypothesis as follows:

> Hypothesis 9 (H9). Personal norm (PN) has a positive influence on behavioral intention (BI).

Integrating theory of planned behavior and norm activation model

In the literature on environmental responsibility behavior, The TPB was widely used in the field of tourists' environmental behaviors, but the adequacy of model explanatory power has been questioned (Han, 2021). TPB ignores the irrational and altruistic motivations of role-building behavior

FIGURE 1
Conceptual model.
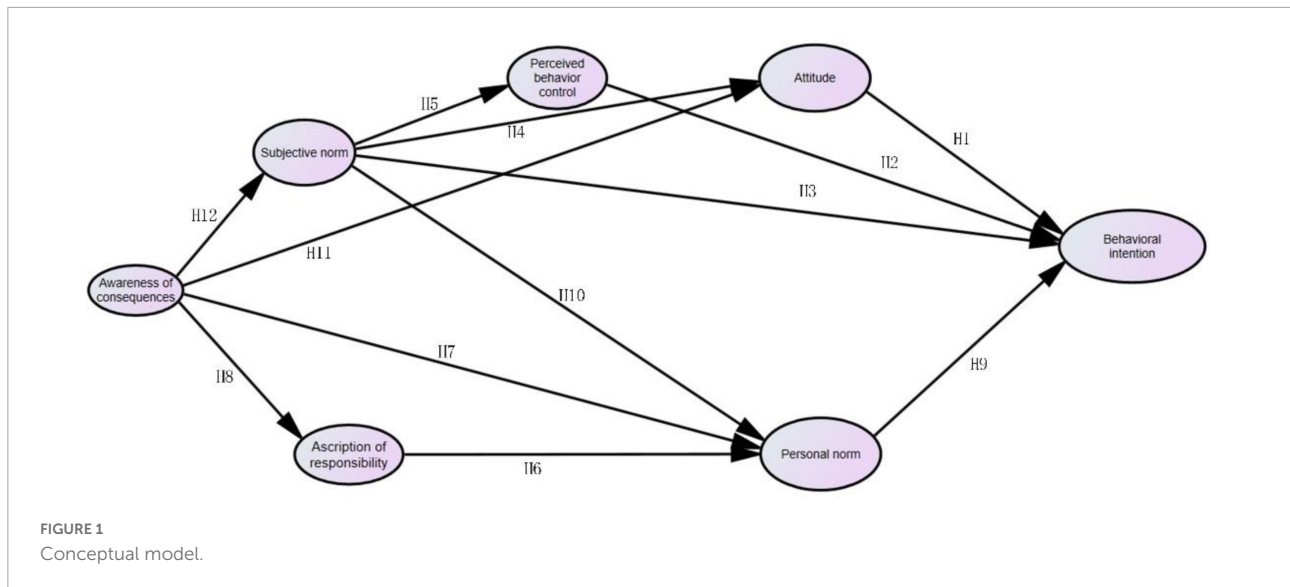
(Kaiser et al., 1999; Sparks and Shepherd, 2002). Therefore, this model has certain flaws in the study of environmental responsibility behavior (Bamberg et al., 2007; Bamberg and Möser, 2007; Han and Hyun, 2017). NAM is a reliable model for explaining environmental behaviors, but it ignores voluntary and involuntary processes, which are the basic dimensions of rational choice models (i.e., TRA and TPB), and its sufficiency is often questioned (Onwezen et al., 2013; Han, 2015; Shin et al., 2018). There maybe have a moderating effect of environmental responsibility behaviors. Therefore, the integrated model of TPB-NAM includes rational choice, morality, and altruistic behavior, which helps to clarify the interaction between the two models and increase the model's predictive power (Han, 2021).

Subjective norm have an impact on PN (Quintal et al., 2010; López-Mosquera et al., 2014; Park and Ha, 2014), a high level of AC will help highly SN and more positive attitude and intention (Park and Ha, 2014; Han and Hwang, 2016; Zhang et al., 2016; Han et al., 2019). Personal norm is socially constrained, rather than socially free. Due to social dependence, travelers frequently value the places they travel to differently based on the opinions of their peers. Therefore, the personal norm might develop progressively from the subjective norm. Meta-analytic investigations have supported this assumption in empirical research (Klöckner, 2013; Manosuthi et al., 2020). The finding of Meng et al. (2020) also showed that travelers' awareness of consequences influence the attitude and subjective norm in volunteer tourism. Some research also confirmed that the AC will positively affect attitudes and SN by studying residents' participation in environmental governance (Wang et al., 2021). Studies with the theory of green purchase behavior found that if awareness of consequences was high, the attitude toward green purchase also high (Han, 2020). Accordingly, this research proposes the hypothesis as follows:

Hypothesis 10 (H10). Subjective norm (SN) has a positive influence on personal norm (PN).

Hypothesis 11 (H11). Awareness of consequences (AC) has a positive influence on attitude (ATT).

Hypothesis 12 (H12). Awareness of consequences (AC) has a positive influence on subjective norm (SN).

Propose research model

In this study, integrating TPB and NAM, a model of influencing factors of hikers' PEB intention was constructed (Figure 1). It mainly analyzes the influence of hikers' PEB attitude, subjective norm, perceived behavior control, AC, AR, PN on hikers' PEB intention in Wuyishan National Park.

Methodology

Study sites

Wuyishan National Park is in Nanping City, Fujian Province, China. The total area of the southeast foot of the northern section of the Wuyishan range is 999.75 square kilometers. It is a famous scenic hiker area and summer resort in China. It is a typical Danxia landform and is one of the first batch of national key scenic spots and one of four World Heritage of Nature and Culture in China.

Survey design

All variables were measured with previously validated scales that have been widely employed in environmental research. Some items were slightly modified according to the research context to make them easier for the respondents to understand. By using the back-translation method, the English scales were converted into Chinese versions and then translated back into English with a team that consisted of three professors (two Chinese and one English) to ensure content validity. The questionnaire used a five-point Likert scale for measurement, "Strongly disagree" (1) to "Strongly agree" (5).

The questionnaire comprised two parts: the first included demographic characteristics of residents (gender, age, education, and monthly incomes); and the second was the scales for seven variables. The measurement items in present study were mainly from previous environmental behavior studies, measures of behavior attitude, SN and perceived behavior control, followed by ATT1–ATT4 to measure attitude, SN1–SN3 measure subjective norm, and PBC1–PBC3 measure perceived behavior control, and BI1–BI3 measure PEB intention (Ajzen, 2011; Zhou et al., 2014; Li and Wu, 2019). AC1–AC3 measurement AC, AR1–AR3 Attribution of measurement AR, PN1–PN3 measurement PN (Schwartz, 1977; Zhang et al., 2016, 2017, 2022; Li and Wu, 2019).

Data collection

Before the questionnaire was officially released, A pilot survey was conducted to further test the rationality and scientific of the questionnaire. In total, 50 questionnaires were issued, 45 questionnaires were collected, and 5 unqualified questionnaires were excluded. The effective response rate was 80%. Based on some feedback information on the content of the questionnaire design, the questionnaire was revised, so that the questionnaire filled in the questionnaire would have a better understanding of the questionnaire information and the questionnaire language was more accessible. Next, ambiguous items were revised, and then the reliability of the survey was measured using Cronbach's alpha coefficient (alpha > 0.70) and the item-total statistics, the results indicated that the reliability was acceptable.

The questionnaire was distributed to hikers in the Wuyishan national park. A three-research assistant team gathered questionnaires in-person for the offline survey. The team received training on how to use anonymity protections, select respondents, and understand the goal of the study. If the survey results in the sample are extended to a population of more than one million, then the study needs 384 samples (Krejcie and Morgan, 1970), So a total of 500 questionnaires were distributed and 482 were collected. After screening and excluding some invalid questionnaires with inconsistent

answers, incompleteness, and the same score, there are 456 valid questionnaires, and the effective response rate of the questionnaire is 91.2%.

Before analyzing the original data collected by the questionnaire, we first conducted descriptive statistics on hiker information. The results of 456 sample surveys showed that the gender distribution of respondents was 60.7% males, 39.3% females, and slightly more males; age is concentrated between 25 and 54 years old (70.4%); monthly income is mainly 3000–9000 RMB (78.9%); most of the hikers have college degree or above (63.1%).

Results

Measurement model testing

In this study, structural equation model (SEM) was used for analysis. Confirmatory Factor Analysis (CFA) was used as part of SEM analysis. Before SEM analysis, CFA analysis measurement model should be applied. The reduction of the measurement model variables in this study is based on the two-stage model correction of Kline (Kline, 2005). The measurement model is tested before the SEM analysis. If the fit of the measurement model was found to be acceptable, then the second step was performed. Perform a complete SEM model evaluation. Through the application of SPSS24.0 and AMOS21.0 software for analysis, the Cronbach's α coefficient of the total measurement scale in this study is 0.879 and the Cronbach's α value of each latent variable is between 0.820 and 0.859, which indicates that the scale has better reliability and internal consistency.

Structural model testing

The results of the overall fit index of the measurement model (**Figure 2**) show that χ^2/df = 2.238 (<3), RMSEA = 0.052 (<0.08), GFI = 0.924, AGFI = 0.902, TLI = 0.939, NFI = 0.910, IFI = 0.948, CFI = 0.948, all reaching the criterion is greater than 0.9, indicating that the overall model fits well (Hu and Bentler, 1999). The standard loading value corresponding to each latent variable is 0.704∼0.866 and above the limitation of 0.6, all composite reliability (CR) is between 0.775 and 0.868 and greater than 0.6, average variance extracted (AVE) is between 0.625 and 0.709 (**Table 1**) and the upper limit of 0.5, which shows that the convergence validity is good (Fornell and Larcker, 1981; Hair, 2009), the results showed that the reliability and the convergent validity was sufficient. Path analysis (**Table 2**) shows that there is a significant influence among the latent variables. The discriminative validity table (**Table 3**) also shows that the AVE root sign values of latent variables are all greater
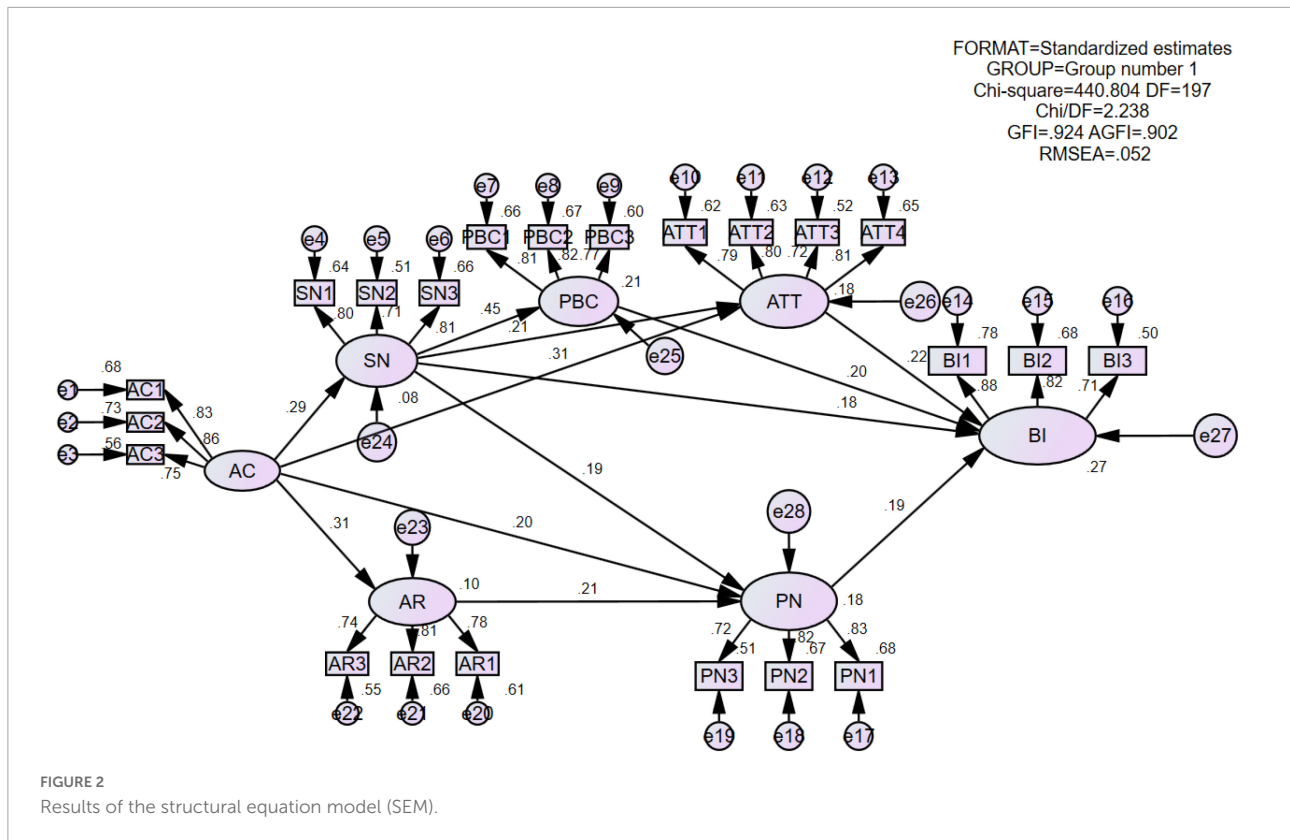
FIGURE 2
Results of the structural equation model (SEM).

TABLE 1 Results of the confirmative factor analysis (CFA).

Constructs and scale items	Factor loading	CR	AVE
I think do pro-environmental behavior in national park hiking trails is wise (ATT1)	0.781	0.869	0.625
I think do pro-environmental behavior in national park hiking trails is good (ATT2)	0.790		
I think do pro-environmental behavior in national park hiking trails is worthwhile (ATT3)	0.775		
I think do pro-environmental behavior in national park hiking trails is beneficial (ATT4)	0.815		
My friend's support for my pro-environmental behavior (SN1)	0.833	0.871	0.693
People who are important to me think I should do pro-environmental behavior (SN2)	0.808		
People who are important to me would want me to do pro-environmental behavior (SN3)	0.855		
I have enough physical strength to participate in pro-environmental behavior (PBC1)	0.855	0.865	0.682
I am confident that I can do something helpful to protect the environment (PBC2)	0.816		
It's easy for me to take actions to protect environment in this national park (PBC3)	0.805		
Hikers' activities have negative impacts on natural environment (AC1)	0.844	0.880	0.709
Hikers' activities have negative impacts on wild animals and plants (AC2)	0.868		
Hikers' activities lead to water pollution (AC3)	0.814		
Every hiker is jointly responsible for environmental deteriorations in this national park (AR1)	0.830	0.868	0.686
Every hiker is partly responsible for environmental problems in this national park (AR2)	0.844		
Every hiker must take responsibility for environmental problems in this national park (AR3)	0.811		
I feel guilty for not doing pro-environmental behavior (PN1)	0.818	0.852	0.657
I think pro-environmental behavior is a moral obligation (PN2)	0.834		
Pro-environmental behavior is part of my ethics (PN3)	0.779		
I am willing to participate in pro-environmental behavior currently (BI1)	0.820	0.844	0.643
I am plan to participate in pro-environmental behavior currently (BI2)	0.801		
I am willing to ask my relatives and friends to participate in pro-environmental behavior currently (BI3)	0.785		

TABLE 2 Test of discriminant validity of the study constructs.

Constructs	ATT	SN	PBC	AC	AR	PN	BI
ATT	**0.791**						
SN	0.303***	**0.832**					
PBC	0.138***	0.454***	**0.826**				
AC	0.376***	0.287***	0.130***	**0.842**			
AR	0.117***	0.089***	0.040***	0.311***	**0.828**		
PN	0.160***	0.271***	0.123***	0.325***	0.295***	**0.811**	
BI	0.334***	0.388***	0.338***	0.223***	0.106***	0.300***	**0.802**

The numbers in the diagonal row (bold) are the average variance extracted by each latent construct. The numbers above diagonal are the squared correlation coefficients between the constructs.
***$p < 0.001$.

TABLE 3 Standardized path coefficients of the structural model and hypotheses testing.

Path	Standardized path coefficient	t-value	Results
ATT → BI	0.222***	4.237	Supported
PBC → BI	0.204***	3.545	Supported
SN → BI	0.176**	2.801	Supported
SN → ATT	0.213***	3.837	Supported
SN → PBC	0.454***	7.993	Supported
AR → PN	0.214***	3.756	Supported
AC → PN	0.202***	3.460	Supported
PN → BI	0.192***	3.680	Supported
AC → AR	0.311***	5.571	Supported
SN → PN	0.194***	3.467	Supported
AC → ATT	0.315***	5.658	Supported
AC → PN	0.202***	3.467	Supported

**$p < 0.01$, ***$p < 0.001$.

than the correlation coefficients between the various latent variables, and the discriminant degree is valid and conforms to the reference standard of Fornell and Larcker (1981). In general, the reliability, convergence validity and discriminative validity of the measurement model are acceptable, and the collected data are suitable for the measurement model.

Correlation analysis

The maximum likelihood method is used to estimate the parameters of the structural model, and the model fitting indexes all meet the criteria. Path analysis with significance $p < 0.05$ as the standard to obtain hypothesis test results (Table 3): ATT, PBC, SN have a positive effect on BI ($\beta 1 = 0.222$, $p < 0.001$; $\beta 2 = 0.204$, $p < 0.001$; $\beta 3 = 0.176$, $p < 0.05$), H1–H3 were all supported; SN has a positive effect on ATT and PBC ($\beta 4 = 0.213$, $p < 0.001$; $\beta 5 = 0.454$, $p < 0.001$), H4 and H5 were all supported; AR and AC have a positive impact on PN ($\beta 6 = 0.214$, $p < 0.001$; $\beta 7 = 0.202$, $p < 0.001$), H6 and H7 were all supported; AC has a positive influence on AR ($\beta 8 = 0.311$, $p < 0.001$), H8 was supported; PN has a positive influence on BI ($\beta 9 = 0.192$, $p < 0.001$), H9 was supported; SN has a positive

influence on PN ($\beta 10 = 0.194$, $p < 0.001$), H10 was supported; AC has a positive effect on ATT and SN ($\beta 11 = 0.315$, $p < 0.01$; $\beta 12 = 0.287$, $p < 0.001$), H11 and H12 were all supported.

Conclusion

The negative effects on the environment have gotten more attention as tourism has grown so quickly. Finding the variables that affect the environmental behavior of hikers is therefore becoming more and more important. From the perspective of the behavioral setting, this study examined the TPB and NAM that affect hikers' PEB and came up with some significant conclusion. After the analysis and model verification of this research, H1–H9 have been verified.

First, the results revealed that both the TPB model and NAM model displayed explanatory capacity on hikers' PEB in Wuyishan National Park in China. Scholars from a variety of disciplines have regularly evaluated the suitability of utilizing TPB or NAM models to explain PEB (Han, 2015, 2021; Alzubaidi et al., 2021; Aziz et al., 2021; Singh and Kaur, 2021; Cao et al., 2022; Kang, 2022; Long et al., 2022; Song et al., 2022; Zheng et al., 2022).

Second, attitude, subjective norm, PBC, AC, AR, and PN all influence hikers' PEB. AC directly affect SN and ATT, SN directly affect ATT, PBC, and PN. This conclusion is consistent with the original research.

Discussion

In the context of tourism, which includes places with a focus on nature, NAM and TPB are both traditional theories for analyzing people's PEB. This study displayed that for the hiker, attitude is most important (Han, 2015). Hikers frequently desire to act in a pro-environmental manner while they are hiking since one's pro-environmental attitude is favorably related to one's personal connection to nature (Tarrant and Green, 1999; Ng and Cheng, 2022). Strong connections to the natural world make hikers more likely to actively engage in environmentally

sustainable purchase patterns (Dutcher et al., 2007). Indeed, when customers feel connected to the natural world, they engage in more environmentally responsible behaviors (Mayer and Frantz, 2004; Poon et al., 2015; Han and Hyun, 2017). Compared to the tourist, hikers will have more perceived connection to nature, so their pro-environmental attitude will be stronger. This finding is different from other research, that holds attitude is an insignificant predictor for behavioral intention (Juschten et al., 2019a).

Subjective norm was found to be a minimal influencer to BI, which is consistent with previous research (Sheppard et al., 1988; Bamberg and Möser, 2007). This is probably due to the fact that SN means that friends or relatives must want to do this, and this is an external influence (Ming-Shen et al., 2007; Bang et al., 2014). Hikers' PEB comes mainly from internal demand, as they love nature and want to protect the natural environment. These findings were in accordance with previous tourism literature that indicated that internal demand was particularly important for behavior (Fluker and Turner, 2000; Park and Yoon, 2009; Buckley et al., 2014). The result is on the contrary with some research (Han and Stoel, 2017; Manosuthi et al., 2020).

Personal norm does not have a strong significant impact (Zhang et al., 2022), it is different from some research that thought PN offer the greatest potential in terms of activating pro-environmental behavior in tourism (Kiatkawsin and Han, 2017). Because PN differ from attitudes since they tend to be steady over time (Juvan and Dolnicar, 2016), it will be impact by information from social media (Han et al., 2021). Some hiker frequently seeks more hedonistic experiences, and as a result, their PN is not completely activated to undertake PEB in the context of tourism (Li and Wu, 2020; Gao et al., 2021; Zhang et al., 2022). Additionally, some novice trail users believe that it is the government's duty, not an individual's, to protect the environment (Zarei et al., 2020).

Perceived behavioral control plays a secondary role to BI (Han et al., 2010; Han, 2020; Zarei et al., 2020). With the limited supply of hiking destinations, the impact of PBC is strengthened (Han and Stoel, 2017). The significance of how people perceive their capacity to engage in PEB acts is shown by this link. Informing people of their prospective abilities that can have a substantial impact on nature conservation is one example of an approach that may boost people's perceptions of their capacities to engage in PEB. The hiker would then understand that it is simple to protect wildlife and clean up after themselves in the mountains (Zarei et al., 2020).

Awareness of consequences directly affects AR, PN, SN, and ATT; in the other words, internal demand was considered to precede external stimulus (Kim et al., 2003; Zoltan and Masiero, 2012). Awareness of environmental consequences can be viewed as people's general attitude toward preserving the environment, playing a crucial role in making attitudes toward the pro-environmental behavior and subjective norm of performance (Park and Ha, 2014; Zhang et al., 2017; Meng et al., 2020).

Behavioral beliefs, or beliefs about the consequences of engaging in a certain behavior, are one of the main constructs of individuals' attitude toward the behavior (Rezaei et al., 2019). From a different perspective, it can be argued that when people are highly aware of the effects on the environment, they become more perceptive to how other people perceive or evaluate environmental issues (Park and Ha, 2014; Meng et al., 2020).

Subjective norm directly affect ATT, PBC, and PN, it same with some research (Quintal et al., 2010; López-Mosquera et al., 2014; Zhang et al., 2017). Particularly, it may be argued that the absence of an ideal standard for the proper attitudes is what causes subjective norms to have a positive impact on attitudes (Festinger, 1954; Rezaei et al., 2019). Consequently, people's perceptions of what significant individuals believe they should do will influence how they feel about a specific behavior (Park and Ha, 2014; Zhang et al., 2017). Attitudes are influenced by the people and environment around us. When forming their own attitudes, people take into account the demands of others and their willingness to comply (Quintal et al., 2010).

Theoretical and practical implications

This study is one of the first attempts to evaluate hikers' PEB in China's Wuyishan national park while using the TPB mode and NAM model together. The following theoretical additions to the existing literature are illustrated by this investigation. Firstly, the study found that both the TPB and NAM models demonstrate significant explaining capacity on hikers' PEB in the protected areas, which further validates the findings of previous studies PEB (Han, 2015, 2021; Alzubaidi et al., 2021; Aziz et al., 2021; Singh and Kaur, 2021; Cao et al., 2022; Kang, 2022; Long et al., 2022; Song et al., 2022; Zheng et al., 2022). Therefore, it is demonstrated that integrating TPB and NAM models is useful and effective for examining hikers' PEB in the protected areas and for understanding more fully the influence mechanism underlying such behavior.

Second, the result of this study demonstrate that there are many influencing factors on hikers' PEB in protected areas; additionally, there are intricate linkages that have both direct and indirect consequences within these factors (Han, 2021). In other words, to examine hikers' behavioral intention in national park, we need consider the irrational and altruistic factor, such as AC, AR, PN and the rational choice factor, like PBC, SN, and ATT.

Third, awareness of consequences is very important. In particular, the degree to which a person is aware of the need to assist others is shown by hikers who have a stronger sense of problem awareness, such as the awareness of consequence (Littlejohn et al., 2016). The ties to PEB intention, TPB and NAM are therefore logically related since awareness of consequences links to three predictors in TPB and the construct of the personal norm, which includes the sense of

obligation to altruistic action in the current study. Tourism or hiking researchers should pay more attention on awareness of consequence when conducting do pro-social research (Meng et al., 2020).

This study provides management implications to national park. The study constructs integrate two models based on TPB theory and NAM theory. A more systematic analysis explains the influencing factors on hikers' PEB in China. National park are created to protect the ecological environment and the protected areas of individual countries form an important part of the global ecological protection. First, hikers' attitude is important, to urge hikers to participate in PEB, we need to increase hikers' positive attitudes and help them to acquire social support from other hikers. Individuals' attitude toward a particular conduct will be influenced by their impressions of what influential others want them to do (Park and Ha, 2014; Zhang et al., 2017). In other words, people's attitudes are molded by their surroundings and the people in them, and while forming their own attitudes, individuals take into account other people's expectations and willingness to conform (Quintal et al., 2010; Rezaei et al., 2019). Second, awareness of consequences is a key factor. It connects the TPB and NAM, and it impacts many factors. Therefore, any feasible tactics that can raise problem awareness should be developed and used in order to achieve a trickle-down effect in order to cause a chain reaction (Meng et al., 2020). In addition to this, national park serve the function of national nature education, whereby visitors learn about the importance of biodiversity and the protection of the ecological environment, thus promoting the their PEB (Bushell and Bricker, 2017; Klein and Hilbig, 2018; Esfandiar et al., 2022). As more and more people enjoy hiking, national parks need to make the most of nature education to move people's PEB from external behavior to intrinsic behavior. In other words, this change from external to internal needs requires a process, and national parks need to play an important role in this process.

Limitations and future research

There are several limitations that call for additional research, despite the fact that this work offers a fresh viewpoint on the investigation of hikers' electroreceptor bands in China's Wuyishan national park. First off, there are a variety of elements that have direct or indirect effects on hikers' PEBs. This study didn't consider how all the variables interacted (López-Mosquera et al., 2014; Park and Ha, 2014). Secondly, this study is based on self-administered survey about environmental behavior. Therefore, there may be certain deviation of the self-reported behavior and real behavior due to respondents' social desirability bias. Alternative research approaches such as experimental research, qualitative interviews or focus groups should be employed to improve the validation and rigor of the study results. Thirdly, the environmental background of a protected area as a significant contextual factor needs to be considered along with the internal psychological process, such as emotion, environmental knowledge, habit needs to be taken into account as a crucial contextual aspect.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study was approved by the Laboratory Ethics Committee of the School of Tourism, Wuyi University (LY2020016, 14 May 2020). The patients/participants provided their written informed consent to participate in this study.

Author contributions

Funding

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Abbasi, G. A., Kumaravelu, J., Goh, Y.-N., and Singh, K. S. D. (2021). Understanding the intention to revisit a destination by expanding the theory of planned behaviour (TPB). *Span. J. Mark. ESIC* 25, 282–311. doi: 10.1108/SJME-12-2019-0109

Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Processes* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T

Ajzen, I. (2011). *The theory of planned behaviour: Reactions and reflections*, Vol. 26. Milton Park: Taylor & Francis, 1113–1127. doi: 10.1080/08870446.2011.613995

Alzaidi, S. M., and Iyanna, S. (2021). Developing a conceptual model for voluntary pro-environmental behavior of employees. *Soc. Responsib. J.* 18, 441–452. doi: 10.1108/SRJ-11-2020-0477

Alzubaidi, H., Slade, E. L., and Dwivedi, Y. K. (2021). Examining antecedents of consumers' pro-environmental behaviours: TPB extended with materialism and innovativeness. *J. Bus. Res.* 122, 685–699. doi: 10.1016/j.jbusres.2020.01.017

Azhar, M., Ali, R., Hamid, S., Akhtar, M. J., and Rahman, M. N. (2022). Demystifying the effect of social media eWOM on revisit intention post-COVID-19: An extension of theory of planned behavior. *Future Bus. J.* 8, 1–16.

Aziz, F., Md Rami, A. A., Zaremohzzabieh, Z., and Ahrari, S. (2021). Effects of emotions and ethics on pro-environmental behavior of university employees: A model based on the theory of planned behavior. *Sustainability* 13:7062. doi: 10.3390/su13137062

Bai, Z., and Zhang, Y. (2021). Sustainability of Ski tourism in China: An integrated model of skiing tourists' willingness to pay for environmental protection. *Sustainability* 13:8883. doi: 10.3390/su13168883

Bamberg, S., and Möser, G. (2007). Twenty years after hines, hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *J. Environ. Psychol.* 27, 14–25. doi: 10.1016/j.jenvp.2006.12.002

Bamberg, S., Hunecke, M., and Blöbaum, A. (2007). Social context, personal norms and the use of public transportation: Two field studies. *J. Environ. Psychol.* 27, 190–203. doi: 10.1016/j.jenvp.2007.04.001

Bang, H., Odio, M. A., and Reio, T. (2014). The moderating role of brand reputation and moral obligation: An application of the theory of planned behavior. *J. Manag. Dev.* 33, 282–298. doi: 10.1108/JMD-12-2010-0102

Bedimo-Rung, A. L., Mowen, A. J., and Cohen, D. A. (2005). The significance of parks to physical activity and public health: A conceptual model. *Am. J. Prev. Med.* 28, 159–168.

Buckley, R., McDonald, K., Duan, L., Sun, L., and Chen, L. X. J. T. m. (2014). Chinese model for mass adventure tourism. *Tour. Manag.* 44, 5–13. doi: 10.1016/j.tourman.2014.01.021

Bushell, R., and Bricker, K. (2017). Tourism in protected areas: Developing meaningful standards. *Tour. Hosp. Res.* 17, 106–120. doi: 10.1177/1467358416636173

Cao, X., Qiu, J., Wang, L., and Zhou, G. (2022). An integrative model of tourists' Pro-environmental behavior based on the dual path of rational planning and embodied emotion. *Int. J. Environ. Res. Public Health* 19:7910. doi: 10.3390/ijerph19137910

Chen, G. Q., Jiang, M. M., Chen, B., Yang, Z. F., and Lin, C. (2006). Emergy analysis of Chinese agriculture. *Agric. Ecosyst. Environ.* 115, 161–173. doi: 10.1016/j.agee.2006.01.005

Choe, J. Y., Kim, J. J., and Hwang, J. (2021). Innovative marketing strategies for the successful construction of drone food delivery services: Merging TAM with TPB. *J. Travel Tour. Mark.* 38, 16–30. doi: 10.1080/10548408.2020.1862023

Choi, S., and Kim, I. (2021). Sustainability of nature walking trails: Predicting walking tourists' engagement in pro-environmental behaviors. *Asia Pacific J. Tour. Res.* 26, 748–767.

Collins-Kreiner, N., and Kliot, N. (2017). Why do people hike? Hiking the Israel national trail. *Tijdschr. Econ. En Soc. Geogr.* 108, 669–687.

Coventry, P. A., Brown, J. E., Pervin, J., Brabyn, S., Pateman, R., Breedvelt, J., et al. (2021). Nature-based outdoor activities for mental and physical health: Systematic review and meta-analysis. *SSM Popul. Health* 16:100934.

De Leeuw, A., Valois, P., Ajzen, I., and Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *J. Environ. Psychol.* 42, 128–138. doi: 10.1016/j.jenvp.2015.03.005

Deng, C. D., Peng, K.-L., and Shen, J. H. (2021). Back to a post-pandemic city: The impact of media coverage on revisit intention of macau. *J. Qual. Assur. Hosp. Tour.* 1–23.

Dutcher, D. D., Finley, J. C., Luloff, A., and Johnson, J. B. (2007). Connectivity with nature as a measure of environmental values. *Environ. Behav.* 39, 474–493.

Emekci, S. (2019). Green consumption behaviours of consumers within the scope of TPB. *J. Consum. Mark.* 36, 410–417. doi: 10.1108/JCM-05-2018-2694

Esfandiar, K., Dowling, R., Pearce, J., and Goh, E. (2020). Personal norms and the adoption of pro-environmental binning behaviour in national parks: An integrated structural model approach. *J. Sustain. Tour.* 28, 10–32.

Esfandiar, K., Dowling, R., Pearce, J., and Goh, E. (2021). What a load of rubbish! The efficacy of theory of planned behaviour and norm activation model in predicting visitors' binning behaviour in national parks. *J. Hosp. Tour. Manag.* 46, 304–315. doi: 10.1016/j.jhtm.2021.01.001

Esfandiar, K., Pearce, J., and Dowling, R. (2019). Personal norms and pro-environmental binning behaviour of visitors in national parks: The development of a conceptual framework. *Tour. Recreation Res.* 44, 163–177. doi: 10.1080/02508281.2019.1580936

Esfandiar, K., Pearce, J., Dowling, R., and Goh, E. (2022). Pro-environmental behaviours in protected areas: A systematic literature review and future research directions. *Tour. Manag. Perspect.* 41:100943. doi: 10.1016/j.tmp.2022.100943

Faletar, I., Kovačić, D., and Cerjak, M. (2021). Purchase of organic vegetables as a form of pro-environmental behaviour: Application of norm activation theory. *J. Cent. Eur. Agric.* 22, 211–225. doi: 10.5513/JCEA01/22.1.3026

Fenitra, R. M., Tanti, H., Gancar, C. P., and Indrianawati, U. (2021). Understanding younger tourist'intention toward environmentally responsible behavior. *Geo J. Tour. Geosites* 36, 646–653. doi: 10.30892/gtg.362spl12-694

Festinger, L. (1954). A theory of social comparison processes. *Hum. Relat.* 7, 117–140. doi: 10.1177/001872675400700202

Fluker, M. R., and Turner, L. W. J. J. o. t. r (2000). Needs, motivations, and expectations of a commercial whitewater rafting experience. *J. Travel Res.* 38, 380–389. doi: 10.1177/004728750003800406

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* 18, 39–50. doi: 10.1177/002224378101800104

Gao, Y., Ma, Y., Bai, K., Li, Y., and Liu, X. (2021). Which factors influence individual pro-environmental behavior in the tourism context: Rationality, affect, or morality? *Asia Pacific J. Tour. Res.* 26, 516–538.

Gao, Y., Zhao, Z., Ma, Y., and Li, Y. (2022). A rational-affective-moral factor model for determining tourists' pro-environmental behaviour. *Curr. Issues Tour.* 25, 1–19. doi: 10.1080/13683500.2022.2078687

Garvanova, M., Staneva, K., and Garvanov, I. (2021). Wellness tourism approaches to improving quality of life of mobile users. *CroDiM* 4, 141–148.

Goh, E. (2020). Walking off-trail in national parks: Monkey see monkey do. *Leis. Sci.* 42, 1–23. doi: 10.1080/01490400.2020.1755750

Goh, E., Esfandiar, K., Jie, F., Brown, K., and Djajadikerta, H. (2022). Please sort out your rubbish! An integrated structural model approach to examine antecedents of residential households' waste separation behaviour. *J. Clean. Prod.* 355:131789. doi: 10.1016/j.jclepro.2022.131789

Hair, J. F. (2009). *Multivariate data analysis*. Kennesaw, GA: Kennesaw State University.

Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tour. Manag.* 47, 164–177. doi: 10.1016/j.tourman.2014.09.014

Han, H. (2020). Theory of green purchase behavior (TGPB): A new theory for sustainable consumption of green hotel and green restaurant products. *Bus. Strategy Environ.* 29, 2815–2828.

Han, H. (2021). Consumer behavior and environmental sustainability in tourism and hospitality: A review of theories, concepts, and latest research. *J. Sustain. Tour.* 29, 1021–1042. doi: 10.1080/09669582.2021.1903019

Han, H., Hsu, L.-T. J., and Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tour. Manage.* 31, 325–334.

Han, H., and Hwang, J. (2016). Cruise travelers' environmentally responsible decision-making: An integrative framework of goal-directed behavior and norm activation process. *Int. J. Hosp. Manag.* 53, 94–105. doi: 10.1016/j.ijhm.2015.12.005

Han, H., and Hyun, S. S. (2017). Drivers of customer decision to visit an environmentally responsible museum: Merging the theory of planned behavior and norm activation theory. *J. Travel Tour. Mark.* 34, 1155–1168. doi: 10.1080/10548408.2017.1304317

Han, H., Hwang, J., Lee, M. J., and Kim, J. (2019). Word-of-mouth, buying, and sacrifice intentions for eco-cruises: Exploring the function of norm activation and value-attitude-behavior. *Tour. Manag.* 70, 430–443. doi: 10.1016/j.tourman.2018.09.006

Han, T.-I., and Stoel, L. (2017). Explaining socially responsible consumer behavior: A meta-analytic review of theory of planned behavior. *J. Int. Consum. Mark.* 29, 91–103.

Han, W., McCabe, S., Wang, Y., and Chong, A. Y. L. (2018). Evaluating user-generated content in social media: An effective approach to encourage greater pro-environmental behavior in tourism? *J. Sustain. Tour.* 26, 600–614. doi: 10.1080/09669582.2017.1372442

Han, W., Wang, Y., and Scott, M. (2021). Social media activation of pro-environmental personal norms: An exploration of informational, normative and emotional linkages to personal norm activation. *J. Travel Tour. Mark.* 38, 568–581.

Hartig, T., Mitchell, R., De Vries, S., and Frumkin, H. (2014). Nature and health. *Ann. Rev. Public Health* 35, 207–228. doi: 10.1146/annurev-publhealth-032013-182443

Høyem, J. (2020). Outdoor recreation and environmentally responsible behavior. *J. Outdoor Recreation Tour.* 31:100317. doi: 10.1016/j.jort.2020.100317

Hu, H., Zhang, J., Chu, G., Yang, J., and Yu, P. (2018). Factors influencing tourists' litter management behavior in mountainous tourism areas in China. *Waste Manag.* 79, 273–286. doi: 10.1016/j.wasman.2018.07.047

Hu, H., Zhang, J., Wang, C., Yu, P., and Chu, G. (2019). What influences tourists' intention to participate in the zero litter initiative in mountainous tourism areas: A case study of Huangshan national park. *China Sci. Total Environ.* 657, 1127–1137. doi: 10.1016/j.scitotenv.2018.12.114

Hu, L. t, and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Modeling* 6, 1–55. doi: 10.1080/10705519909540118

International Union for Conservation of Nature (IUCN) (2008). *Guidelines for applying protected area management categories.* Gland: International Union for Conservation of Nature.

Jeon, C.-Y., Song, W.-G., and Yang, H.-w (2022). Process of forming tourists' pro-social tourism behavior intentions that affect willingness to pay for safety tourism during the COVID-19 pandemic: A comparative analysis of South Korea and China. *Asia Pac. J. Tour. Res.* 27, 357–373. doi: 10.1080/10941665.2022.2075774

Joynt, P., and Warner, M. (2002). *Managing across cultures: Issues and perspectives: Cengage Learning.* London: International Thomson Business Press.

Junot, A., Paquet, Y., and Martin-Krumm, C. (2017). Passion for outdoor activities and environmental behaviors: A look at emotions related to passionate activities. *J. Environ. Psychol.* 53, 177–184.

Juschten, M., Brandenburg, C., Hössinger, R., Liebl, U., Offenzeller, M., Prutsch, A., et al. (2019a). Out of the city heat—Way to less or more sustainable futures? *Sustainability* 11:214.

Juschten, M., Jiricka-Pürrer, A., Unbehaun, W., and Hössinger, R. (2019b). The mountains are calling! An extended TPB model for understanding metropolitan residents' intentions to visit nearby alpine destinations in summer. *Tour. Manag.* 75, 293–306. doi: 10.1016/j.tourman.2019.05.014

Juvan, E., and Dolnicar, S. (2016). Measuring environmentally sustainable tourist behaviour. *Ann. Tour. Res.* 59, 30–44.

Kaiser, F. G., Ranney, M., Hartig, T., and Bowler, P. A. (1999). Ecological behavior, environmental attitude, and feelings of responsibility for the environment. *Eur. Psychol.* 4:59. doi: 10.1027//1016-9040.4.2.59

Kang, S. E. (2022). Travelers' pro-environmental behaviors in the Hyperloop context: Integrating norm activation and AIDA models. *Int. J. Tour. Res.* 24, 813–826. doi: 10.1002/jtr.2547

Kaseva, M. E., and Moirana, J. L. (2010). Problems of solid waste management on Mount Kilimanjaro: A challenge to tourism. *Waste Manag. Res.* 28, 695–704. doi: 10.1177/0734242X09337655

Kiatkawsin, K., and Han, H. (2017). Young travelers; intention to behave pro-environmentally: Merging the value-belief-norm theory and the expectancy theory. *Tour. Manag.* 59, 76–88.

Kim, J., Shin, H. H., Jeong, M., and Lee, W. S. (2021). Impact of tourists' psychological ownership of an eco-friendly trail on their behavior intention: An empirical investigation of Jeju Olle Trail in South Korea. *Asia Pac. J. Tour. Res.* 26, 1097–1110. doi: 10.1080/10941665.2021.1942102

Kim, S. S., Lee, C.-K., and Klenosky, D. B. (2003). The influence of push and pull factors at Korean national parks. *Tour. Manag.* 24, 169–180. doi: 10.1016/S0261-5177(02)00059-6

Klein, S. A., and Hilbig, B. E. (2018). How virtual nature experiences can promote pro-environmental behavior. *J. Environ. Psychol.* 60, 41–47. doi: 10.1016/j.jenvp.2018.10.001

Kline, T. (2005). *Psychological testing: A practical approach to design and evaluation.* Thousand Oaks, CA: Sage.

Klöckner, C. A. (2013). A comprehensive model of the psychology of environmental behaviour—A meta-analysis. *Glob. Environ. Change* 23, 1028–1038.

Krejcie, R. V., and Morgan, D. W. (1970). Determining sample size for research activities. *Educ. Psychol. Meas.* 30, 607–610. doi: 10.1177/001316447003000308

Lafontaine, M. A., Nezakati, H., and Thwe, S. M. (2021). The predictors of organic food buying behaviour: An extension of applied norm activation model. *J. Mark. Manag. Consum. Behav.* 3, 41–58.

Larson, L. R., Jennings, V., and Cloutier, S. A. (2016). Public parks and wellbeing in urban areas of the United States. *PLoS One* 11:e0153211. doi: 10.1371/journal.pone.0153211

Le, M. H., and Nguyen, P. M. (2022). Integrating the theory of planned behavior and the norm activation model to investigate organic food purchase intention: Evidence from Vietnam. *Sustainability* 14:816. doi: 10.3390/su14020816

Li, Q., and Wu, M. (2020). Tourists' pro-environmental behaviour in travel destinations: Benchmarking the power of social interaction and individual attitude. *J. Sustain. Tour.* 28, 1371–1389.

Li, Q.-C., and Wu, M.-Y. (2019). Rationality or morality? A comparative study of pro-environmental intentions of local and nonlocal visitors in nature-based destinations. *J. Destination Mark. Manag.* 11, 130–139. doi: 10.1016/j.jdmm.2019.01.003

Li, P., Bin, Z., and Ryan, C. (2017). Hiking in China: A fuzzy model of satisfaction. *Tour. Manage. Perspect.* 22, 90–97.

Li, X., Jin, C., Ge, X., and Wang, Y. (2013). Study of influencing factors of household waste reduction behaviors in beijing. *Int. J. Appl. Environ. Sci.* 8, 615–624.

Lin, Y. H., and Lee, T. H. (2020). How do recreation experiences affect visitors' environmentally responsible behavior? Evidence from recreationists visiting ancient trails in Taiwan. *J. Sustain. Tour.* 28, 705–726.

Line, N. D., Hanks, L., and Miao, L. (2018). Image matters: Incentivizing green tourism behavior. *J. Travel Res.* 57, 296–309. doi: 10.1177/0047287517697848

Littlejohn, K., Needham, M. D., Szuster, B. W., and Jordan, E. J. (2016). Pre-trip expectations and post-trip satisfaction with marine tour interpretation in Hawaii: Applying the norm activation model. *J. Environ. Educ.* 47, 202–212.

Liu, M. T., Liu, Y., and Mo, Z. (2020). Moral norm is the key: An extension of the theory of planned behaviour (TPB) on Chinese consumers' green purchase intention. *Asia Pac. J. Mark. Logist.* 32, 1823–1841. doi: 10.1108/APJML-05-2019-0285

Liu, Y., Shi, H., Li, Y., and Amin, A. (2021). Factors influencing Chinese residents' post-pandemic outbound travel intentions: An extended theory of planned behavior model based on the perception of COVID-19. *Tour. Rev.*

Long, F., Ooi, C.-S., Gui, T., and Ngah, A. H. (2022). Examining young Chinese consumers' engagement in restaurant food waste mitigation from the perspective of cultural values and information publicity. *Appetite* 175:106021. doi: 10.1016/j.appet.2022.106021

López-Mosquera, N., García, T., and Barrena, R. (2014). An extension of the theory of planned behavior to predict willingness to pay for the conservation of an urban park. *J. Environ. Manag.* 135, 91–99. doi: 10.1016/j.jenvman.2014.01.019

Loureiro, S. M. C., Guerreiro, J., and Han, H. (2022). Past, present, and future of pro-environmental behavior in tourism and hospitality: A text-mining approach. *J. Sustain. Tour.* 30, 258–278.

Lynn, N. A., and Brown, R. D. (2003). Effects of recreational use impacts on hiking experiences in natural areas. *Landsc. Urban Plan.* 64, 77–87. doi: 10.1016/S0169-2046(02)00202-5

Manosuthi, N., Lee, J.-S., and Han, H. (2020). Predicting the revisit intention of volunteer tourists using the merged model between the theory of planned behavior and norm activation model. *J. Travel Tour. Mark.* 37, 510–532.

Mayer, F. S., and Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *J. Environ. Psychol.* 24, 503–515.

Meng, B., Chua, B.-L., Ryu, H. B., and Han, H. (2020). Volunteer tourism (VT) traveler behavior: Merging norm activation model and theory of planned behavior. *J. Sustain. Tour.* 28, 1947–1969.

Mikuła, A., Raczkowska, M., and Utzig, M. (2021). Pro-environmental behaviour in the European Union countries. *Energies* 14:5689. doi: 10.3390/en14185689

Ming-Shen, W., Chih-Chung, C., Su-Chao, C., and Yung-Her, Y. (2007). Effects of online shopping attitudes, subjective norms and control beliefs on online shopping intentions: A test of the theory of planned behaviour. *Int. J. Manag.* 24:296.

Mohamad, N., Vivien, T., and Pei, T. P. (2022). Travel experience on social media: The impact towards tourist destination choice. *Soc. Manage. Res. J.* 19, 21–52.

Morren, M., and Grinstein, A. (2021). The cross-cultural challenges of integrating personal norms into the theory of planned behavior: A meta-analytic structural equation modeling (MASEM) approach. *J. Environ. Psychol.* 75:101593.

Ng, S. L., and Cheng, V. Y. (2022). A multilevel analysis of "Leave No Litter"(LNL) intention of Hong Kong hikers. *Waste Manage.* 137, 158–167.

O'Connor, P., and Assaker, G. (2021). COVID-19's effects on future pro-environmental traveler behavior: An empirical examination using norm activation, economic sacrifices, and risk perception theories. *J. Sustain. Tour.* 30, 89–107. doi: 10.1080/09669582.2021.1879821

Onwezen, M. C., Antonides, G., and Bartels, J. (2013). The norm activation model: An exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. *J. Econ. Psychol.* 39, 141–153. doi: 10.1016/j.joep.2013.07.005

Panwanitdumrong, K., and Chen, C.-L. (2021). Investigating factors influencing tourists' environmentally responsible behavior with extended theory of planned behavior for coastal tourism in Thailand. *Marine Pollut. Bull.* 169:112507. doi: 10.1016/j.marpolbul.2021.112507

Park, D.-B., and Yoon, Y.-S. (2009). Segmentation by motivation in rural tourism: A Korean case study. *Tour. Manag.* 30, 99–108. doi: 10.1016/j.tourman.2008.03.011

Park, J., and Ha, S. (2014). Understanding consumer recycling behavior: Combining the theory of planned behavior and the norm activation model. *Fam. Consum. Sci. Res. J.* 42, 278–291. doi: 10.1111/fcsr.12061

Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., Macera, C. A., Bouchard, C., et al. (1995). Physical activity and public health: A recommendation from the centers for disease control and prevention and the american college of sports medicine. *JAMA* 273, 402–407.

Poon, K.-T., Teng, F., Chow, J. T., and Chen, Z. (2015). Desiring to connect to nature: The effect of ostracism on ecological behavior. *J. Environ. Psychol.* 42, 116–122.

Puhakka, R. (2021). University students' participation in outdoor recreation and the perceived well-being effects of nature. *J. Outdoor Recreat. Tour.* 36:100425.

Quintal, V. A., Lee, J. A., and Soutar, G. N. (2010). Risk, uncertainty and the theory of planned behavior: A tourism example. *Tour. Manag.* 31, 797–805. doi: 10.1016/j.tourman.2009.08.006

Radic, A., Quan, W., Koo, B., Chua, B.-L., Kim, J. J., and Han, H. (2022). Central bank digital currency as a payment method for tourists: Application of the theory of planned behavior to digital Yuan/Won/Dollar choice. *J. Travel Tour. Mark.* 39, 152–172.

Rezaei, R., Safa, L., Damalas, C. A., and Ganjkhanloo, M. M. (2019). Drivers of farmers' intention to use integrated pest management: Integrating theory of planned behavior and norm activation model. *J. Environ. Manag.* 236, 328–339. doi: 10.1016/j.jenvman.2019.01.097

Rodrigues, Á, Kastenholz, E., and Rodrigues, A. (2010). Hiking as a relevant wellness activity-results of an exploratory study of hiking tourists in Portugal applied to a rural tourism project. *J. Vacation Mark.* 16, 331–343. doi: 10.1177/1356766710380886

Rogowski, M. (2017). Mountain hiking in the stołowe mountains national park. *Tour. Turyzm* 27, 89–97. doi: 10.1515/tour-2017-0017

Ryu, K., and Jang, S. (2006). Intention to experience local cuisine in a travel destination: The modified theory of reasoned action. *J. Hosp. Tour. Res.* 30, 507–516.

Schwartz, S. H. (1977). "Normative influences on altruism," in *Advances in experimental social psychology*, Vol. 10, (Amsterdam: Elsevier), 221–279. doi: 10.1016/S0065-2601(08)60358-5

Setiawan, B., Afiff, A. Z., and Heruwasto, I. (2021). The role of norms in predicting waste sorting behavior. *J. Soc. Mark.* 11, 224–239.

Shen, X., Chen, B., Leibrecht, M., and Du, H. (2022). The moderating effect of perceived policy effectiveness in residents' waste classification intentions: A study of Bengbu, China. *Sustainability* 14:801. doi: 10.3390/su14020801

Sheppard, B. H., Hartwick, J., and Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *J. Consum. Res.* 15, 325–343.

Shin, Y. H., Im, J., Jung, S. E., and Severt, K. (2018). The theory of planned behavior and the norm activation model approach to consumer behavior regarding organic menus. *Int. J. Hosp. Manag.* 69, 21–29. doi: 10.1016/j.ijhm.2017.10.011

Singh, J., and Kaur, R. (2021). Influencing the Intention to adopt anti-littering behavior: An approach with modified TPB model. *Soc. Mark. Q.* 27, 117–132.

Soliman, M. (2021). Extending the theory of planned behavior to predict tourism destination revisit intention. *Int. J. Hosp. Tour. Adm.* 22, 524–549.

Song, Y., Bao, H., and Shen, S. (2022). Understanding the influence of initial values of college students in shaping pro-environmental behavioral intention. *Int. J. Environ. Res. Public Health* 19:9730. doi: 10.3390/ijerph19159730

Sparks, P., and Shepherd, R. (2002). The role of moral judgments within expectancy-value-based attitude-behavior models. *Ethics Behav.* 12, 299–321.

Steg, L., and Nordlund, A. (2018). Theories to explain environmental behaviour. *Environ. Psycho. Intro.* 22, 217–227. doi: 10.1002/9781119241072.ch22

Tarrant, M. A., and Green, G. T. (1999). Outdoor recreation and the predictive validity of environmental attitudes. *Leis. Sci.* 21, 17–30. doi: 10.1016/j.socscimed.2014.10.033

Troise, C., O'Driscoll, A., Tani, M., and Prisco, A. (2020). Online food delivery services and behavioural intention–a test of an integrated TAM and TPB framework. *Br. Food J.* 123, 664–683. doi: 10.1108/BFJ-05-2020-0418

Udall, A. M., de Groot, J. I., de Jong, S. B., and Shankar, A. (2020). How do I see myself? A systematic review of identities in pro-environmental behaviour research. *J. Consum. Behav.* 19, 108–141. doi: 10.1002/cb.1798

Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., and Nowell, M. S. (2021). Back to nature: Norwegians sustain increased recreational use of urban green space months after the COVID-19 outbreak. *Landsc. Urban Plan.* 214:104175. doi: 10.1016/j.landurbplan.2021.104175

Wang, C., Zhang, J., Yu, P., and Hu, H. (2018). The theory of planned behavior as a model for understanding tourists' responsible environmental behaviors: The moderating role of environmental interpretations. *J. Clean. Prod.* 194, 425–434. doi: 10.1016/j.jclepro.2018.05.171

Wang, S., Ji, C., He, H., Zhang, Z., and Zhang, L. (2021). Tourists' waste reduction behavioral intentions at tourist destinations: An integrative research framework. *Sustain. Prod. Consum.* 25, 540–550. doi: 10.1016/j.spc.2020.12.010

Witte, A. (2021). "Chinese don't walk?"–The emergence of domestic walking tourism on China's Ancient Tea Horse Road. *J. Leisure Res.* 52, 424–445.

Wu, S., and Lin, T.-C. (2007). Exploring knowledge sharing behavior of IS personnel with theory of planned behavior. *J. Inf. Manage.* 14, 75–110.

Xue, K., Yu, K., Zhang, H., and Liang, X. (2022). Research on health promotion strategies of public recreation space in the coastal area of Qingdao City Center, China. *Sustain. Energy Technol. Assess.* 52:102144.

Yang, X., Tseng, Y., and Lee, B. (2021). Merging the social influence theory and the goal-framing theory to understand consumers' green purchasing behavior: Does the level of sensitivity to climate change really matter? *Front. Psychol.* 12:766754. doi: 10.3389/fpsyg.2021.766754

Yuriev, A., Dahmen, M., Paillé, P., Boiral, O., and Guillaumie, L. (2020). Pro-environmental behaviors through the lens of the theory of planned behavior: A scoping review. *Resour. Conserv. Recycl.* 155:104660. doi: 10.1016/j.resconrec.2019.104660

Zarei, I., Ehsani, M., Moghimehfar, F., and Aroufzad, S. (2020). Predicting mountain hikers' pro-environmental behavioral intention: An extension to the theory of planned behavior. *J. Park Recreat. Adm.* 39, 70–90. doi: 10.18666/jpra-2020-10347

Zhang, Q., and Wang, Z. (2018). Study on the driving factors of tourists' environmentally responsible behavior based on the theory of planned behavior: A case study of Beijing Bajia country park. *J. Arid Land Resour. Environ.* 32, 203–208.

Zhang, Q., Popa, A., Sun, H., Guo, W., and Meng, F. (2022). Tourists' intention of undertaking environmentally responsible behavior in national forest trails: A comparative study. *Sustainability* 14:5542. doi: 10.3390/su14095542

Zhang, S., Hu, D., Lin, T., Li, W., Zhao, R., Yang, H., et al. (2021). Determinants affecting residents' waste classification intention and behavior: A study based

on TPB and ABC methodology. *J. Environ. Manag.* 290:112591. doi: 10.1016/j. jenvman.2021.112591

Zhang, X., Geng, G., and Sun, P. (2017). Determinants and implications of citizens' environmental complaint in China: Integrating theory of planned behavior and norm activation model. *J. Clean. Prod.* 166, 148–156. doi: 10.1016/j. jclepro.2017.08.020

Zhang, X.-j., Jin, H.-r, and Lou, C.-w. (2016). Norm activation model: An effective theoretical model for predicting citizens' pro-environmental behaviors. *J. Northeast. Univ.* 18:610.

Zhang, Y., Xiao, X., Cao, R., Zheng, C., Guo, Y., Gong, W., et al. (2020). How important is community participation to eco-environmental conservation

in protected areas? From the perspective of predicting locals' pro-environmental behaviours. *Sci. Total Environ.* 739:139889. doi: 10.1016/j.scitotenv.2020.139889

Zheng, W., Qiu, H., Morrison, A. M., Wei, W., and Zhang, X. (2022). Landscape and unique fascination: A dual-case study on the antecedents of tourist pro-environmental behavioral intentions. *Land* 11:479. doi: 10.3390/land11040479

Zhou, L., Li, Q., and Zhu, L. (2014). Outcome efficacy, people-destination affect, and tourists environmentally responsible behavior intention: A revised model based on the theory of planned behavior. *J. Zhejiang Univ.* 44, 88–98.

Zoltan, J., and Masiero, L. (2012). The relation between push motivation and activity consumption at the destination within the framework of a destination card. *J. Destination Mark. Manag.* 1, 84–93. doi: 10.1016/j.jdmm.2012.09.002