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Tourists' Intention of Undertaking Environmentally Responsible Behavior in National Forest Trails: A Comparative Study

Qing Zhang [1,2], Arporn Popa [2], Huazhen Sun [1,3], Weifeng Guo [1] and Fang Meng [4,*]

1 College of Tourism, Wuyi University, Nanping 354300, China; zhangqing@wuyiu.edu.cn (Q.Z.); sunhuazhen0302@wuyiu.edu.cn (H.S.); wfguo@wuyiu.edu.cn (W.G.)
2 Educational Faculty, Mahasarakham University, Mahasarakham 44150, Thailand; arporn.p@msu.ac.th
3 Graduate School of Business, SEGi University, Kuala Lumpur 47810, Malaysia
4 School of Hotel, Restaurant and Tourism Management, College of Hospitality, Retail and Sport Management, University of South Carolina, Columbia, SC 29208, USA
* Correspondence: fmeng@hrsm.sc.edu

Abstract: The Theory of Planned Behavior (TPB) and the Norm Activation Model (NAM) are often employed to examine behavioral intention, but the perspective and attribute differences of these two models have been largely neglected. This study applies TPB and NAM to analyze and compare the intention of trail tourists to undertake environmentally responsible behavior (ERB), which may directly affect the sustainability of the trail system and the surrounding areas. A survey research approach was employed, and 452 responses were collected from tourists in three national forest trails in China. Beginners and experienced trail tourists were also categorized in the study for comparison purposes. Structural equation modeling was utilized in data analysis. The results demonstrate that the TPB model and the NAM model, which represent rationality and morality perspective respectively, are both suitable in explaining the intention of trail tourists to undertake ERB. Comparatively, the TPB model's rationality perspective shows applicability in explaining both beginner and experienced trail tourists' intention of undertaking ERB, whereas the NAM morality model only applies to experienced trail tourists. The study provides insights into better understanding and promotion recommendations of ERB in national forest trails.

Keywords: environmentally responsible behavior; intention; theory of planned behavior; norm activation model; trail tourist

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1. Introduction

In recent decades, tourism has been developing rapidly and causing various effects on ecological environment around the world [1–7]. The impact of forest hiking trails is of particular importance, as they pass through natural areas with greater ecosystem diversity, such as mountains and forests. The mountain terrain is particularly precarious with a more fragile ecological environment, where it is more difficult to collect and transfer litter [8–13]. Prior research has reported that tourist hiking activities in trails can cause irreversible environmental damage to the surrounding areas [8,14–18]. Therefore, enhancing tourists' environmentally responsible behavior (ERB) on forest trails has become an important issue to be addressed [14,15,18–22].

Scholars have applied different theories to study ERB, including the theory of planned behavior (TPB) [14,15,23–28], attitude behavior context theory [29,30], the norm activation model (NAM) [3,28,31–34], and value belief norm theory (VBN) [14,35,36]. The extant literature on ERB can be categorized into two primary perspectives, namely, rationality- and morality-based approaches [21,32,37]. Researchers use the rational-choice model to analyze ERB, represented by TPB [22,38,39]. In contrast, other scholars argue that ERB is

primarily influenced by morality, and they typically adopt NAM as the theoretical foundation [22,40–42]. Despite the different approaches, limited research has been conducted to examine the rationality and morality models comparatively regarding tourists' ERB.

In addition to the theoretical inconsistency, little research has examined trail tourists' ERB, particularly in major destinations such as China [43]. Although China's trail tourists belong to a remarkable segment in terms of size and expenditure, this group has been rarely studied in previous literature [17,43]. Hiking is a popular tourist activity that combines the elements of nature tourism, ecotourism, and adventure tourism. It helps people reduce stress, enhance mental health, and improve quality of life through walking on trails and observing wildlife and sceneries [44–47]. Most prior studies used traditional tourists as the research object, but trail tourists present unique characteristics. For example, trail tourists are better educated and more environmentally conscious [48]. They value the natural environment and landscape of destinations and support nature conservation [49,50]. Prior research revealed that tourists' past experience predicts their future behavioral intention [28,51,52]; however, trail tourists' ERB, particularly the differences between the beginners and experienced trail tourists, are yet to be explored.

In order to fill these research gaps, this study focuses on the trail tourists' intention of undertaking ERB in national forest hiking trails and attempts to answer the following two research questions: (1) Of the TPB (rationality) and NAM (morality) models, which is more suitable to explain trail tourists' ERB in national forest trails? (2) Do the TPB and NAM models have different capacity to explain beginners and experienced trail tourists' intention of undertaking ERB? The study attempts to propose a holistic theoretical framework to explain the influencing factors on trail tourists' ERB and to provide management implications on sustainable development in national forest hiking trails. This study extends the current literature by comparing two theoretical frameworks (i.e., TPB and NAM) in explaining capacity on trail tourists' ERB intention. In addition, this research explores the understudied Chinese trail tourists' ERB and provides practical insights into promoting and managing tourists' ERB in forest hiking trails in nature-based destinations.

2. Literature Review and Hypotheses Development

2.1. Rationality and ERB

The Theory of Reasoned Action (TRA), proposed by Ajzen (1985), explains an individual's motivation in his/her cognizant plan/decision to exert efforts in performing a specific behavior. TRA was further extended by Ajzen by adding the "perceived behavior control" variable to form the theory of planned behavior (TPB) [51,53]. TPB proposes that in normal life, an individual's behavior is immediately determined by behavioral intentions, which are influenced by a combination of three factors: attitude toward the behavior, subjective norm, and perceived behavioral control. First, attitude (ATT) refers to the degree of personal preference for a certain behavior, that is, the individual's feelings about the behavior, including positive and negative feelings. In TPB, attitude is an important factor that affects behavioral intention. Second, subjective norm (SN) refers to the social pressure that an individual feels when he or she behaves in a certain way. In other words, the individual perceives the attitude and opinion of the reference object (e.g., parents, friends, or colleagues) towards a certain type of behavior, which would influence his/her decision to undertake the type of behavior or not. Third, perceived behavioral control (PBC) refers to the degree to which individuals perceive the ease or difficulty when undertaking a certain type of behavior. As TPB has good predictive and explanatory capability in behavioral research, it is widely used in various research contexts across disciplines, including consumers' choice on green hotels [54], pro-environmental behavior [55], tourism behavior [56], residents' environmental complaints [57], and environmental protection behavior [14,15,23–28,58,59]. These studies on TPB support that attitude, subjective norm, and perceived behavioral control have positive impacts on behavioral intention. For instance, Hu et al. (2018) [15], Zarei et al. (2020) [14], and Han et al. (2017) [28] revealed the

same findings that tourists' attitude, subjective norm, and perceived behavioral control significantly affect their behavioral intention.

TPB adopts a rational decision-making framework; the basic principle of TPB is that an individual, as an economic person, is likely to choose the rational choice with the least effort and the highest benefit [58]. Based on the TPB model, when an action is evaluated as important and valuable by him-/herself or the people around, the individual develops an intention to engage in that action. In this study, we propose that trail tourists tend to participate in ERB when the benefits outweigh the costs, it is easy to do, or they are being affected by their reference group [36,58,60,61]. Therefore, based on TPB, the following hypotheses are proposed (Figure 1):

Hypothesis 1 (H1). *Trail tourists' attitude (ATT) has a positive influence on their behavioral intention (BI) of undertaking environmental responsibility in national forest hiking.*

Hypothesis 2 (H2). *Trail tourists' subjective norm (SN) has a positive influence on their behavioral intention (BI) of undertaking environmental responsibility in national forest hiking.*

Hypothesis 3 (H3). *Trail tourists' perceived behavior control (PBC) has a positive influence on their behavioral intention (BI) of undertaking environmental responsibility in national forest hiking.*

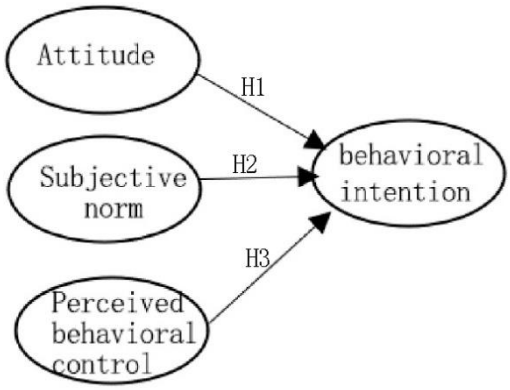

Figure 1. The theory of planned behavior framework. Source: Ajzen, I. (1991).

2.2. Morality and ERB

Schwartz proposed the norm activation theory (NAM) [40], in which personal norm is the core factor to form a behavioral intention. NAM has been utilized to explain altruistic environmental protection behavior [28,31,33]. NAM is mainly composed of three elements, including awareness of consequences (AC), ascription of responsibility (AR), and personal norm (PN). First, AC refers to an individual's awareness of certain negative consequences caused by undertaking (or not undertaking) a behavior. Second, AR refers to the individual's sense of responsibility for the negative consequences. Third, PN represents people's fulfillment of moral obligation by taking or avoiding certain actions [36,62]. In environmental behavior studies, when people are aware that not performing environmental behavior would cause negative impact on the environment or on others (AC), and they attribute the negative consequences to their own responsibility (AR), they tend to feel the personal moral obligation of conduct, which leads to the individuals' environmental behavioral intention [63].

NAM has been widely adopted to support the link between morality and ERB. NAM is derived from the study of moral decision-making [32], which mainly explains the prosocial and pro-environmental behavior of altruism [37]. NAM proposes that individuals' norms or a sense of moral obligation are essential to encourage individuals' environmental responsibility behavior [59,64], which establishes the close connection between people's moral reasoning and altruistic behavior [65,66]. Recent research analyzes tourists' sense

of responsibility and ethical norms of participating in environmental protection behavior [31–33,67,68], willingness to pay for carbon [69], and energy-saving behavior [70–72]. In the NAM model, the relationships between AC, AR, PN, and BI have been evidenced from previous literature. For instance, the study of Zhang et al. (2016) [31] on predicting Chinses citizens' pro-environmental behaviors revealed that awareness of consequences has a positive influence on citizens' ascription of responsibility and personal norm. Moreover, Wu et al. (2022) [34] also revealed that ascription of responsibility positively affects personal norm, and personal norm positively affects behavioral intention in examining Chinese tourists' environmental behavior at a lake destination.

Therefore, based on the NAM literature, the following hypotheses are proposed (Figure 2):

Hypothesis 4 (H4). *Trail tourists' awareness of consequences (AC) has a positive influence on their ascription of responsibility (AR) in undertaking ERB in national forest hiking.*

Hypothesis 5 (H5). Trail *tourists' awareness of consequences (AC) has a positive influence on their personal norm (PN) in undertaking ERB in national forest hiking.*

Hypothesis 6 (H6). *Trail tourists' ascription of responsibility (AR) has a positive influence on their personal norm (PN) in undertaking ERB in national forest hiking.*

Hypothesis 7 (H7). *Trail tourists' personal norm (PN) has a positive influence on their behavioral intention (BI) of undertaking environmental responsibility in national forest hiking.*

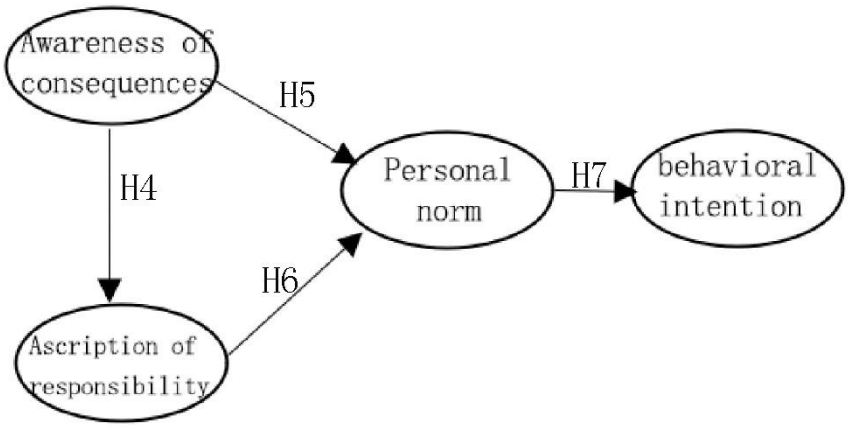

Figure 2. The norm activation theory framework. Source: Schwartz, S.H. (1977).

2.3. Comparison of TPB and NAM in Visitors' ERB

Previous studies commonly use rationality or morality models to examine tourists' behavior; however, it is largely unknown which model provides a better explanation in different types of destinations or tourists [58]. TPB has been criticized in that more specific factors need to be considered for behavior research in different situations [73], and that TPB ignores the irrational and altruistic motivations of role-building behavior [74,75]. Similarly, NAM seems to ignore the voluntary and involuntary processes, which are the basic dimensions of rational choice models (i.e., TRA and TPB) [28,36]. Nevertheless, in some cases, both TPB and NAM are more rigorous in explaining environmental responsibility behavior than other theories [58], calling for more research on the comparison of these two models.

Researchers suggest that past experience is a good predictor of behavioral intention [28,51,52,76]. People's past experience positively affects their intention to engage in ERB such as recycling household waste [77]. Tourists' experience positively influences their intention to join bicycle tourism [28]. Ouellette and Wood [76] revealed that people's past daily habit predicts their future behavior. Likewise, previous research on pro-environmental decision-making has suggested the important influence of past behavior on ERB [63,78–80].

Furthermore, tourism and hospitality studies indicate that frequent pro-environmental behavior could turn into habitual actions [80,81]. For example, people's green daily activities encourage their involvement in ERB when staying in hotels [82]. A tourist who feels strongly connected to the natural environment is more likely to be involved in ERB [83]. Indeed, academics have asserted that if people feel linked to nature, they are more inclined to act in an environmentally responsible manner [21,84–86]. When an individual's feeling of connection to nature grows, his/her willingness to preserve the natural environment increases [21,86–88]. Consistently, people's closeness to nature enhances their attachment to environmentally friendly products/services and leads to ERB in the consumption context [85,87]. Accordingly, morality seems plausible in explaining the ERB of individuals when they are closer to nature than others. The beginner trail tourists are comparatively new to this connection to nature; their ERB is more derived from the subjective norm (SN) in TPB. The experienced trail tourists ERB, owing to their past hiking experiences and the connection to the natural environment, as well as their psychological attachment to nature, will be more likely to relate to intrinsic motives of "oughts" and "shoulds", a personal norm (PN) component in the NAM theory [60,61,68].

The "usual–unusual environment" division can be applied to tourists who visit nature-based destinations such as national forest trails [68]. In this study, national forest destinations attract both beginner trail tourists and experienced trail tourists. For repeated trail tourists, the trails and surrounding areas are their "usual environment" like their home, leading to more consciousness to undertake ERB. Therefore, NAM (i.e., morality) is more credible in explaining the trail tourists' ERB in the "usual environment". By contrast, beginner trail tourists in national forest destinations are exposed to the "unusual environment" totally unrelated to their habitual lives. Thus, their ERB may be enforced by their own attitude, subjective norm, and perceived behavioral control, indicating that rational considerations would be more important in their intention to participate in ERB.

This study focuses on comparing the intention of undertaking ERB between beginner trail tourists and experienced trail tourists. Based on the above discussion, we propose that the differences between these two groups demonstrate the effect of TPB (rationality) and NAM (morality) in influencing their ERB intentions. Therefore, we propose the following hypotheses:

Hypothesis 8 (H8). *TPB (rationality) has more explaining capacity than NAM (morality) in explaining beginner trail tourists' intention of undertaking ERB in national forest hiking trails.*

Hypothesis 9 (H9). *NAM (morality) has more explaining capacity than TPB (rationality) in explaining experienced trail tourists' intention of undertaking ERB in national forest hiking trails.*

3. Method

3.1. Research Sites

In 2020, 12 national forest hiking trails were developed in China, passing through 20 provinces with the accumulated length of over 22,000 km and attracting millions of trail tourists. Three national forest trails were used as the study sites for data collection. Qinling Mountain, located in the central area of China, is the watershed between the Yellow River and the Yangtze River, and the geographical landmark dividing China's north and south. The Qinling National Forest Trail has a total length of 2202 km across Henan Province in the east and Gansu Province in the west. The forest accounts for 80% of the trails, and the main sections are composed of dirt roads and ancient roads.

Wuyi Mountain is one of China's four world cultural and natural heritage sites. The Wuyi Mountain National Forest Trail is in the southeast of China, starting from Fujian Province in the south to Jiangxi Province and Zhejiang Province in the northwest. The total length of the stretch is about 1160 km, of which 930 km are in Fujian, 138 km in Jiangxi, and 92 km in Zhejiang. The trail connects many historical trails and passes, with over 90% of

the areas covered by forests. The main sections are composed of ancient roads, dirt roads, slate roads, and gravel roads.

Taihang Mountain is in the north of China. The Taihang Mountain National Forest Trail, 2200 km in length, starts from Henan province, passing through Shanxi, Hebei, to Beijing in the north. The east of Taihang Mountain is the "North China Plain", and the west of Taihang Mountain is the "Loess Plateau".

These three mountains are China's first batch of national forest trails with commonalities. They are the best national forest trails in China, all of which have abundant ecological resources, rare plants, and animal diversity. Each of these three trails attracts millions of tourists each year, including beginner trail tourists and experienced trail tourists.

3.2. Instrument Measure in Survey

The measurements of the survey instruments were mainly adopted from the prior literature and were slightly modified to fit in the context of this study. The survey was originally developed based on the English language and was translated into Chinese for this study. Two bi-lingual researchers in Chinese and English in the research team also conducted the back-translation to ensure the equivalence of the survey scales.

The questionnaire included the following sections. The first section introduced the research background and purpose. The second section listed the measurement items of seven constructs, including three constructs in the TPB model and three constructs in the NAM model, plus behavioral intention (BI) as the dependent variable. The measurement items in the present study were mainly from previous tourists' environmental behavior studies. Specifically, for the TPB model, four items were used to measure attitude (ATT1–ATT4); three items were used to measure subjective norms (SN1–SN3) and three items were used to measure perceived behavior control (PBC1–PBC3) [27,28,39,51,52]. For the NAM model, three items were used to measure awareness of consequences (AC1–AC3), three items were used to measure ascription of responsibility (AR1–AR3), and three items were used to measure personal norm (PN1–PN3) [32,36,40]. The questionnaire used Bollen's [89] suggestion and adopted a 7-point Likert scale (1 = strongly disagree, and 7 = strongly agree) as it is a more accurate and sensitive measurement. In addition, basic demographic information and past trail experiences were also collected from the participants.

3.3. Data Collection

A pilot survey was conducted through trail tourist clubs and online travel communities to test the readability of the questions and the reliability of the measurement instruments. Adult respondents who had travelled to Wuyi Mountain National Forest Trail in the past two years were recruited. A total of 50 questionnaires were distributed for the pilot test; 47 responses were collected, and 6 unqualified questionnaires were excluded, which generated an effective response rate of 82%. Based on participants' feedback, the questionnaire wording was further modified to make the questions easier to read and understand. The reliability of the measurement scales was tested using Cronbach's alpha coefficient and the item-total statistics. The results displayed appropriate reliability values (alpha > 0.70).

The data collection of the formal questionnaire was performed by six research assistants, who were trained and informed about the background and goal of the survey. They distributed the survey questionnaires to trail tourists visiting the national forest trails of the Qinling Mountain, Wuyi Mountain, and Taihang Mountain from early July to the end of October 2020. The data collection was conducted on-site using a systematic random sampling method. Questionnaires were distributed to every tenth trail tourist at the rest points of the national forest trails. The research purpose was first introduced to the trail tourists, along with the anonymous and voluntary nature of the survey. If the trail tourists declined to answer the questions, the researchers just repeated the selection process for the next tenth visitor. Following the recommendations of Krejcie and Morgan [90], a total of 500 questionnaires were distributed and 478 were returned, including 112 from Qinling Mountain, 232 from Wuyi Mountain, and 108 from Taihang Mountain, respectively.

After screening and excluding invalid questionnaires with incomplete or straightlining answers, 452 valid questionnaires were used for the analysis, with the effective response rate of 90.4%.

3.4. Data Analysis

In this study, the proposed hypothesized model was based on the TPB, NAM, and previous literature. Therefore, confirmatory factor analysis (CFA) was used to test the applicability of the data, and structural equation modeling (SEM) with the software of AMOS 24.0 and SPSS 21.0 was employed for data analysis. A two-step process was carried out. First, the entire sample of trail tourists was analyzed to test the explanatory capability of the TPB (rationality) and NAM (morality) models in explaining the trail tourists' intention of undertaking ERB. Second, the sample was divided into two groups: beginner trail tourists and experienced trail tourists. The model fit indices of TPB and NAM were examined on both groups. Through this comparative analysis, two models which respectively explain the beginners and experienced trail tourists' intention of undertaking ERB was revealed.

4. Results

4.1. Sample Demographics

The demographic profile of the results of 452 participants showed that majority of the respondents were male (55.1%), between 18–34 years old (58.4%), with college degrees or above (51.1%) and monthly income of 3000–9000 RMB (about $500–1500 USD) (56.2%).

4.2. Reliability and Validity Test

The reliability test of all measurement scales (Table 1) showed that the Cronbach's alpha coefficients were 0.794–0.914, which indicated that the scales all met the required reliability criteria. In addition, the KMO measure, Bartlett's test of sphericity and significance test indicated that the data were suitable for factor analysis (KMO = 0.899, Bartlett's test of sphericity = 5305.710, $p < 0.001$).

First, the results showed that the standardized factor loadings of the 22 observed variables were 0.716–0.869, all above the standard of 0.5 [91], indicating appropriate correlation coefficients between the observed variables and the latent variables. Second, composite reliability (CR) values of the seven latent variables were 0.867–0.968, all above the standard of 0.7 [92], indicating a high degree of internal consistency of all latent variables. Third, standardized factor loading and average variance extracted (AVE) were used to test the convergent validity of the measurement model. The AVE values of all the latent variables were between 0.783 and 0.873, all above the standard of 0.5 [92,93]. Fourth, discriminant validity was tested by comparing the square roots of the AVE with the correlation coefficients among the factors. As shown in Table 2, the square roots of all latent variables were larger than the correlation coefficient between them and other latent variables. Therefore, the discriminant validity was achieved [92]. Therefore, the tests of reliability and validity of the measurement model all showed satisfactory results.

Table 1. Confirmative factor analysis results.

Constructs and Variable Items	Factor Loading	CR	AVE
Attitude (ATT)			
Participating in ERB in national forest hiking trails is wise (ATT1)	0.782		
Participating in ERB in national forest hiking trails is good (ATT2)	0.786	0.962	0.873
Participating in ERB in national forest hiking trails is worthwhile (ATT3)	0.807		
Participating in ERB in national forest hiking trails is beneficial (ATT4)	0.804		

Table 1. *Cont.*

Constructs and Variable Items	Factor Loading	CR	AVE
Subjective norm (SN)			
My friend's support for my ERB (SN1)	0.819	0.945	0.829
People who are important to me think I should participate in ERB (SN2)	0.802		
People who are important to me would want me to participate in ERB (SN3)	0.734		
Perceived behavioral control (PBC)			
I have enough physical strength to participate in protecting the environment (PBC1)	0.819	0.968	0.869
I am confident that I can do something helpful to protect the environment (PBC2)	0.833		
I have sufficient time to participate in protecting the environment (PBC3)	0.839		
Awareness of consequences (AC)			
Trail tourists' activities have negative impacts on natural environment (AC1)	0.812	0.916	0.870
Trail tourists' activities have negative impacts on wild animals and plants (AC2)	0.815		
Trail tourists' activities lead to water pollution (AC3)	0.865		
Ascription of responsibility (AR)			
I believe that every trail tourist is partially responsible for environmental problems in this trail (AR1)	0.835	0.867	0.869
I feel that all trail tourists are jointly responsible for environmental problems in this trail (AR2)	0.869		
Every trail tourist must take responsibility for environmental problems in this trail (AR3)	0.783		
Personal norm (PN)			
I feel guilty for not doing ERB (PN1)	0.771	0.874	0.857
I think ERB is a moral obligation (PN2)	0.853		
ERB is part of my ethics (PN3)	0.824		
Behavioral intention (BI)			
I am willing to participate in ERB (BI1)	0.764	0.952	0.783
I plan to participate in ERB (BI2)	0.736		
I am willing to ask my relatives and friends to participate in ERB (BI3)	0.716		

Table 2. Discriminant validity of TPB and NAM constructs.

TPB Constructs	1	2	3	4	NAM Constructs	1	2	3	4
ATT	0.795				AC	0.831			
SN	0.704 **	0.786			AR	0.481 **	0.829		
PBC	0.645 **	0.697 **	0.831		PN	0.521 **	0.428 **	0.816	
BI	0.695 **	0.667 **	0.664 **	0.739	BI	0.393 **	0.361 **	0.383 **	0.739

Note: ** $p < 0.01$.

4.3. Total Sample Test on TPB and NAM Models

For H1–H7 testing, data of the total sample ($N = 452$) were analyzed to examine the TPB and NAM models regarding trail tourists' intention of undertaking ERB. In the TPB model, the overall fit index results of the measurement model were: $\chi^2/df = 2.642$ (<3), RMSEA = 0.060 (<0.08), GFI = 0.950, AGFI = 0.923, TLI = 0.984, NFI = 0.981, IFI = 0.988, CFI = 0.988. In the NAM model, the overall fit index results of the measurement model were: $\chi^2/df = 3.801$ (<3), RMSEA = 0.079 (<0.08), GFI = 0.937, AGFI = 0.902, TLI = 0.957, NFI = 0.956, IFI = 0.967, CFI = 0.967. Both of the goodness-of-fit statistics indicated that the two models fit the data. Path analysis results also showed that the standardized path coefficients among the variables in both models were all positive and significant ($p < 0.001$) (see Figure 3). Therefore, H1–H7 were all supported.

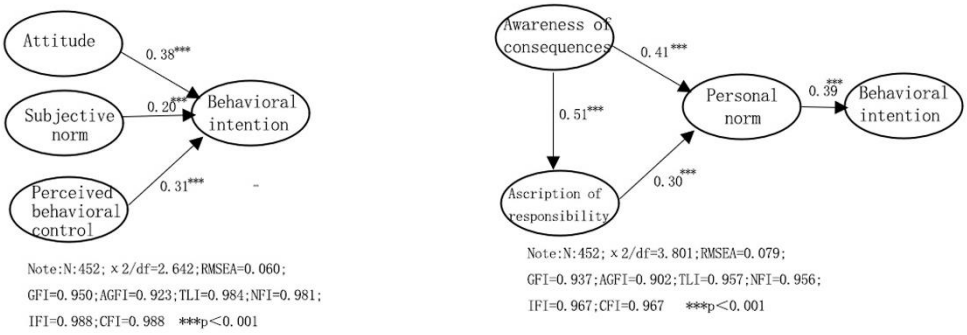

Figure 3. Output of model fit indices for the whole sample.

4.4. Comparison of TPB and NAM Models between Beginners and Experienced Trail Tourists

To test H8 and H9, the study used two years of trail experience as the dividing line between beginners and experienced trail tourists. The total sample was divided into two groups, with 194 beginners and 258 experienced trail tourists. The TPB model and NAM model were tested on both the beginners and experienced groups for comparison. For the sample of beginner trail tourists, the goodness-of-fit indices of the TPB model were: $\chi^2/df = 1.428$ (<3), RMSEA = 0.047 (<0.08), GFI = 0.938, AGFI = 0.905, TLI = 0.990, NFI = 0.976, IFI = 0.993, CFI = 0.993, indicating that the model fits the data satisfactorily except for the SN-BI link ($\beta = 0.16$, $p = 0.05$). In contrast, the goodness-of-fit indices of the NAM model were: $\chi^2/df = 2.379$, RMSEA = 0.085, GFI = 0.916, AGFI = 0.868, TLI = 0.947, NFI = 0.934, IFI = 0.960, CFI = 0.960, where RMSEA exceeded the threshold value of 0.08, and AGFI was less than the threshold value of 0.9, indicating a poor fit of the model. Path analysis results also showed that three links were insignificant, the AC-PN link ($\beta = 0.10$, $p = 0.30$), the AR-PN link ($\beta = 0.19$, $p = 0.06$), and the PN-BI link ($\beta = 0.14$, $p = 0.08$) in NAM. Therefore, comparatively the TPB model demonstrated better explaining capacity than the NAM model in explaining beginner trail tourists' ERB. Thus, H8 was supported (see Figure 4).

For the experienced trail tourist sample, the goodness-of-fit statistics suggest that the data fitted both the TPB model and NAM model (see Figure 5). For the TPB model, $\chi^2/df = 1.779$ (<3), RMSEA = 0.055 (<0.08), GFI = 0.941, AGFI = 0.909, TLI = 0.987, NFI = 0.978, IFI= 0.990, CFI = 0.990. For the NAM model, $\chi^2/df = 2.228$ (<3), RMSEA = 0.069 (<0.08), GFI = 0.936, AGFI = 0.901, TLI = 0.967, NFI = 0.956, IFI = 0.975, CFI = 0.975. Path analysis results also showed that the standardized path coefficients among the variables in both models were all positive and significant ($p < 0.01$). All indices met the threshold and indicated good model fit, thus the NAM model did not demonstrate superior explaining capacity than the TPB model, and the two models were equally significant. Therefore, H9 was not supported.

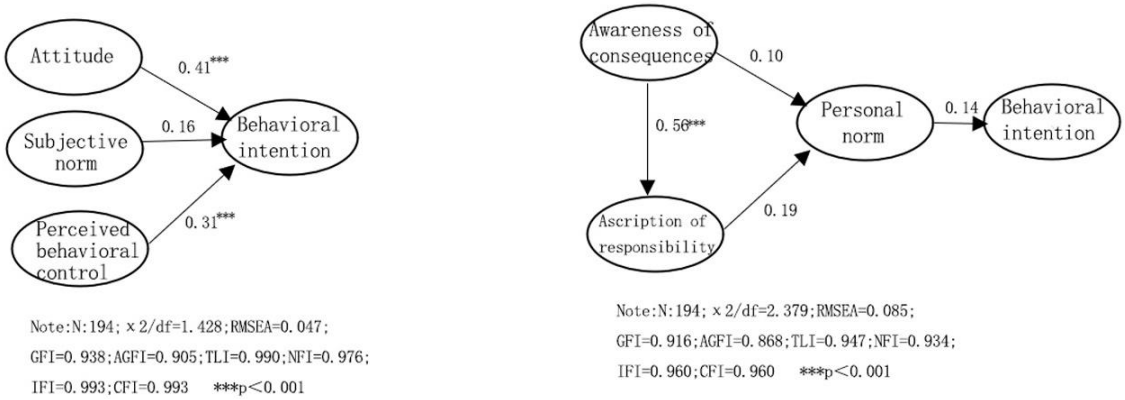

Figure 4. Output of model fit indices with the beginner trail tourists' sample.

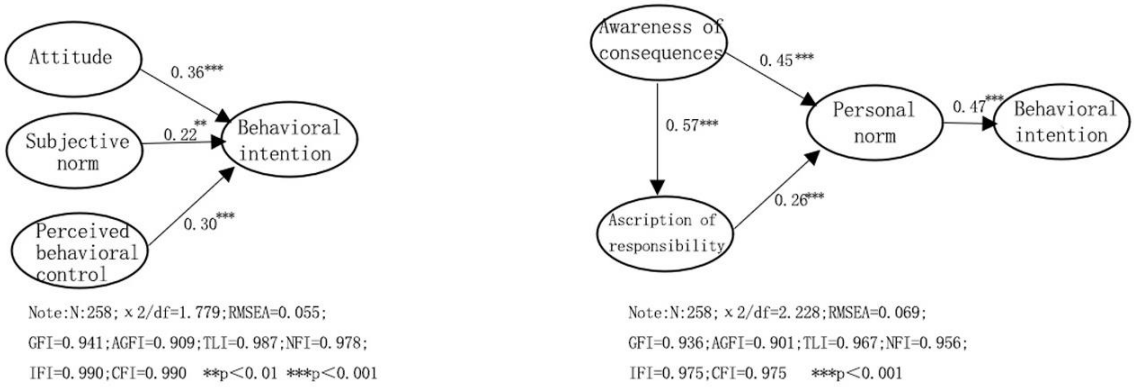

Figure 5. Output of model fit indices with the experienced trail tourists' sample.

5. Conclusions

5.1. Discussion of the Results

The applicability of TPB or NAM models to examine ERB has been examined separately in previous literature [23–28]. This study applied the TPB model and the NAM model on trail tourists' intention of undertaking ERB. The results show that using the entire sample of trail tourists in the Qinling Mountain, Wuyi Mountain, and Taihang Mountain National Forest Trails in China, both the TPB (rationality) model and NAM (morality) model demonstrated significant explaining capacity on trail tourists' intention of undertaking ERB. In other words, both rationality and morality affect trail tourists' intention of engaging in ERB. Therefore, in promoting trail tourists' ERB, various factors including attitude, subjective norm, perceived behavioral control, awareness of consequences, ascription of responsibility, and personal norm, all should be considered as each of these factors has a positive influence on behavioral intention.

In addition, comparative analysis was conducted between the TPB and NAM models on two separate samples, namely, beginner trail tourists and experienced trail tourists, regarding their intention of undertaking ERB. When considering the past experience of trail tourists, significant differences were exhibited between beginner trail tourists and experienced trail tourists. Specifically, when explaining the beginner trail tourists' intention of undertaking ERB, the TPB model was superior to the NAM model, whereas for experienced trail tourists' behavioral intention, both the TPB and NAM models were equally applicable. This result showed that among beginner trail tourists, rationality dominates their intention of undertaking ERB, while morality plays a secondary role.

NAM and TPB are both classical theories in explaining individuals' ERB intentions in the tourism context including nature-based destinations [12,21]. This study displayed that compared to the TPB model, the NAM model did not equally apply to the beginner trail tourists' intention of undertaking ERB in national forest hiking trails. This finding is different from previous research which revealed that morality was superior to rationality in explaining tourists' pro-environmental intentions [22,68]. For beginner trail tourists, due to the lack of experience with nature, they are not aware of the possible consequences of irresponsible environmental behavior to nature, which explains why awareness of consequences (AC) in the NAM model failed to explain beginner trail tourists' ERB intention (Figure 4). Another reason is that beginners trail tourists tend to seek a more hedonic experience [22,94] and their personal norm (PN) is not fully activated to conduct ERB in the tourism context [22,95]. Moreover, some beginner trail tourists hold the viewpoint that protecting nature is the government's responsibility, not an individual's [14]. Therefore, the ascription of responsibility (AR) may not show significant relationship with PN in the NAM model. By contrast, pro-environment act is normally considered a collective responsibility or effort. Therefore, an individual's ERB tends to be activated when she/he perceives such similar behavior from others [60,61], which demonstrates how the subjective norm (SN) influences their behavioral intention in TPB [14].

5.2. Theoretical and Practical Implications

This research presents one of the first attempts to compare the TPB mode and NAM model simultaneously to examine trail tourists' intention of undertaking ERB in China's national forest trails. This study demonstrates the following theoretical contributions to the exiting literature. First, the study found that both the TPB and NAM models demonstrate significant explaining capacity on trail tourists' intention of undertaking ERB, which further validates the findings of previous studies [23–28]. Therefore, combining the TPB and NAM models is shown to be effective and beneficial to examine tourists' ERB in mountain trails and to gain a deeper understanding of the influence mechanism behind such behavior.

Second, in the comparison between the TPB and NAM models, the TPB model's adaptability and explaining capacity is superior to the NAM model. The model fit indices of TPB were consistent in the whole sample and two subsample in the analysis and the path relationships also showed a more rigorous result than the NAM model. In other words, to examine tourists' behavioral intention in national forest trails, the rationality model is superior to the morality model. As visitors' ERB can benefit themselves, people are more likely to have a basis for their reasoned choices, a rational-choice model seems more plausible to interpret the visitors' intentions of undertaking environmental responsibility [96]. This finding extends previous research on a comparison between local visitors and nonlocal tourists' pro-environmental intention, in which the NAM model implied superiority compared to the TPB model [22,68].

Third, the TPB model and the NAM model have different applicability in examining trail tourists' ERB in the beginner trail tourist samples, who had less hiking experience. In explaining the beginner trail tourists' ERB, the TPB model had a better fit than the NAM model. It shows that for the beginner trail tourists, attitude (ATT), subjective norms (SN), and perceived behavior control (PBC) have more influence on their intention of undertaking ERB; whereas morality-based factors, such as awareness of consequences (AC), ascription of responsibility (AR), and personal norm (PN), comparatively had less influence on their ERB in national forest trails.

This study provides management implications to destination management organizations on better interaction with trail tourists and preserving national forest trails. The study constructs a comparison of two models based on TPB theory and NAM theory. A more systematic analysis explains the influencing factors on trail tourists' behavior intention of undertaking environmental responsibility in the Qinling Mountain, Wuyi Mountain, and Taihang Mountain national forest trails in China. According to Hofstede's cultural dimension theory [97], China has a strong cultural orientation of collectivism, and social norms defined by the collective who have a deep influence on individual norms and individual behavior [98,99]. When people perceive behavior as pervasive in their reference group and their group identity is strong, they are more likely to become involved in the same action [100,101]. In other words, an individual tends to involve in group conformity in order to be similar to his/her group peers. Research on nominal groups shows that group identity plays a central role in the ability of group members to persuade other groups member [102]. Hiking is a typical team activity in China, and the behavior of individual trail tourists is readily affected by the behavior of his/her group or other trail tourists.

For beginner trail tourists, they might feel less connected to nature, or have no prior experience on pro-environmental practices, which make them less attentive to the environment [83], resulting in irresponsible behavior towards the environment. Therefore, to promote the ERB of trail tourists, they must be well educated in environmental responsibility practices. The Qinling Mountain, Wuyi Mountain, and Taihang Mountain national forest trails should provide education programs on the function of the ecological system, enhance the promotion of environmental protection knowledge, and establish the practical dos and don'ts in protecting the environment. The concept of consumption consciousness cultivates the knowledge of environmental responsibility behavior of trail tourists. In the national forest trails, regular publicity activities, billboards, and lectures on environmental responsibility for the vast number of trail tourists should be established to cultivate the

trail tourists' environmental tourism attitude and awareness of outcomes. For most trail tourists, the opinions of the reference group are important in affecting their ERB, especially the opinions of friends and fellow trail tourists. In China, most trail tourists join hiking clubs in order to participate in group trail hiking activities. Therefore, hiking clubs should take the lead and the responsibility to promote ERB and positively influence new club members and trail tourists. At the same time, the Qinling Mountain, Wuyi Mountain, and Taihang Mountain national forest trails should launch different types of hiking trails for trail tourists, enrich the experience diversity, increase the attractiveness of these experiences, and embed pro-environment practices in the whole trail experience, to obtain more support and cooperation from trail tourists regarding ERB.

5.3. Limitations and Future Research

Although this study provides a new perspective for the study of ERB of trail tourists on the national forest trails in China, there are some limitations which suggest further research. First, there are many factors that affect the ERB of trail tourists, and there are direct or indirect influences among them. This study did not take into account the relationship of all factors, such as the subjective norm link to personal norm [103,104]. Future research should develop a theoretical framework based on the integration of the TPB and NAM models. Second, this study is based on a 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. Third, government policy interventions in social norms may also have an impact on trail tourists' intention on ERB, and future research should consider adding this influencing factor, particularly in research settings in China, because China's national forest trails belong to the government, which usually launches policies and regulations on environmental protection. Fourth, the COVID-19 pandemic has significantly influenced various destinations and tourists' behavior and consumption in many aspects, which calls for further research on tourists' perception and engagement in pro-environmental behavior. Future research should consider the pandemic situation and its influences on destinations and tourists' behavior.

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