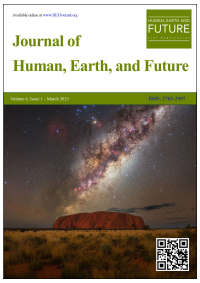
Available online at www.HEFJournal.org

ISSN: 2785-2997

Journal of
Human, Earth, and Future

Vol. 6, No. 1, March, 2025



From Emotion to Environmental Action: Influences on Tourists' Environmentally Responsible Behavior in Forest Parks

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Received 07 January 2025; Revised 15 February 2025; Accepted 21 February 2025; Published 01 March 2025

Abstract

This study investigates the emotional drivers of Environmentally Responsible Behavior (ERB) with visitors in forest parks, addressing gaps in existing research. The primary objective is to develop the AffectiveSatisfaction-Responsibility (A-S-R) model under Social Exchange Theory (SET) with the intention to investigate how emotional elements like emotional solidarity (ES) and place attachment (PAT) in shaping ERB. A survey of 851 visitors in China was used to gather data, along with structural equation modeling (SEM) for evaluating direct, mediating, and moderating interactions. The findings show that PAT and ES significantly influence ERB through tourist satisfaction (TS), with TS acting as a mediator. Additionally, the study highlights the moderating role of self-efficacy (SE) and destination social responsibility (DSR), enhancing the emotional impacts on ERB. The proposed A-S-R model provides a novel theoretical framework that emphasizes non-cognitive influences on ERB, filling a crucial gap in the literature. These results have practical implications for sustainable tourism practices, suggesting that fostering emotional connections between tourists and destinations can significantly promote responsible behaviors. These findings provide stakeholders in the tourist industry valuable insights for creating plans to improve sustainable travel, especially for the post-pandemic context.

Keywords: Environmental Responsible Behavior; Forest Park; Destination Social Responsibility; Place Attachment; Emotional Solidarity.

1. Introduction

Forest parks are vital ecosystems that offer significant recreational opportunities for tourists while also playing a crucial role in biodiversity conservation [1]. These areas serve as important destinations for leisure and relaxation, highlighting their dual role in environmental protection and tourism [2]. Environmentally Responsible Behavior (ERB) among tourists is essential for minimizing negative impacts on natural environments and promoting sustainable tourism practices [3]. ERB includes behaviors such as waste reduction, recycling, and adherence to environmental regulations. Despite its importance, traditional research has predominantly focused on cognitive factors such as environmental knowledge and awareness, neglecting the emotional dimensions that may significantly influence tourists' willingness to engage in ERB [4]. Recently, some academic studies have begun to investigate the importance of emotional factors in ERB, such as emotional solidarity [1] and place attachment [5]. However, a significant gap remains in recognizing how these emotional factors drive ERB among tourists, particularly in the context of forest parks [3].

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http://dx.doi.org/10. 28991/HEF-2025-06-01-012

Social Exchange Theory (SET) offers a valuable structure for explaining the emotionally driven behavior of tourists in forest parks, as it emphasizes the interrelationship between individual behavior and social interaction [6]. SET posits that human behavior is motivated by exchanges that result in rewards or advantages, with reciprocity being a fundamental principle governing these exchanges [7]. Regarding tourism, SET has been utilized to describe how pro-social behaviors like ERB can result from pleasant interactions between visitors and places [8]. Applying SET to the field of forest park tourism can help gain a deeper understanding of the relationship between tourists' emotions and ERB. This understanding, in turn, provides a strong theoretical foundation for the development of effective management strategies [1]. However, previous studies using SET in tourism contexts have largely focused on cognitive factors, leaving a gap in understanding the role of emotional factors [9].

Although the increasing awareness of emotional factors in ERB, existing research remains fragmented and lacks a comprehensive understanding of their interactive dynamics. Tourist satisfaction, a core indicator of emotional response, is influenced by both external environmental factors (e.g., destination environmental responsibility) and internal individual factors (e.g., self-efficacy) [10]. However, these factors are often examined in isolation, neglecting their interplay in shaping ERB. For instance, while destination environmental responsibility has been shown to positively influence tourists' perceptions and behaviors [11], its combined impact with emotional factors such as place attachment and emotional solidarity remains largely underexplored. Similarly, self-efficacy, which boosts tourists' confidence in engaging in ERB, has not been systematically integrated with other factors [12]. This fragmented approach limits our understanding of how these factors collectively drive ERB in forest parks. To clarify the intricate relationships between personal motives, external environmental activities, and emotional considerations in promoting sustainable tourist behaviors, a more comprehensive framework is required.

This study intends to fill these gaps by investigating how non-cognitive elements influence ERB in the context of forest park tourism, with an emphasis on emotional connection. The study has three primary objectives: (1) To review existing research on ERB and establish SET as a framework for comprehending non-cognitive factors in ERB; (2) To develop the 'Affective → Satisfaction - Responsibility' (A-S-R) model under SET to capture the emotional dynamics of ERB in forest tourism; and (3) To validate the A-S-R model through a field survey of tourists in forest parks, examining how emotional factors influence their ERB. This research fills the gap for previous literature through a more nuanced understanding of emotional influences on ERB, which has practical significance in the context of carbon neutrality and sustainable growth in tourism. This study aims to methodically investigate the interplay between emotional elements and environmentally responsible behavior (ERB) by integrating them into the Social Exchange Theory (SET) framework. Through the process, it seeks to improve theoretical knowledge and real-world implementations in sustainable tourism management [2].

2. Literature Review and Hypothesis Development

2.1. Social Exchange Theory (SET)

Social Exchange Theory (SET) is a foundational framework that elucidates human behavior through the lens of exchanges aimed at maximizing rewards and minimizing costs [6]. SET posits that individuals are motivated by reciprocal relationships, where positive interactions lead to mutual benefits and reinforce pro-social behaviors [7]. In tourism research, SET has been extensively applied to explore the relationship between tourists and destinations, with a particular focus on encouraging sustainable practices [8]. Recent studies have demonstrated that SET can effectively explain the relationship between tourists' emotional connections and their engagement in ERB. Positive relationships between visitors and local communities, for example, that are marked by place attachment and emotional solidarity, can greatly increase visitor pleasure [1]. In the meantime, this satisfaction motivates travelers to reciprocate by adopting eco-friendly practices [10]. Moreover, SET highlights how visitors' attitudes and actions are influenced by external environmental elements, such as destination environmental responsibility [11]. Travelers are more inclined to use ERB in return when they believe that a place is dedicated to protecting the environment.

However, despite these insights, existing applications of SET have predominantly focused on cognitive factors in tourism research, including environmental knowledge and awareness, while neglecting the emotional dimensions that significantly influence ERB [2]. This gap is especially noticeable in the setting of forest parks, where little is known about the relationship between sustainable behavior and emotional ties to the environment. For a more thorough understanding of ERB in forest parks, emotional elements like place attachment and emotional solidarity must be incorporated into the SET framework.

2.2. Environmentally Responsible Behavior (ERB)

The growing academic interest in the drivers of ERB provides a strong foundation for this study. Given that the focus here is on the role of non-cognitive factors in driving ERB in terms of forest tourism, it is essential to assess the current state of research on these factors within the tourism industry. Previous journals have uncovered a number of important non-cognitive factors that impact ERB, including Affective factors, Satisfaction factors, and Responsibility factors. These factors are instrumental in impacting the way tourists feel and act towards environmental sustainability. Affective

factors such as place attachment [13], ecological emotions [14], cultural attachments [15], and emotional solidarity [16], among others. Additionally, satisfaction factors like tourist satisfaction [17], environmental satisfaction [18], along with service satisfaction [19] are relevant. Responsibility factors, including corporate social responsibility (CSR) [20], corporate environmental responsibility [21], and destination social responsibility [22], have been identified as playing a positive role in ERB.

Current scholarship has also found that affective factors influence individual attitudes in a novel way. Using people-oriented and place-oriented viewpoints [23], it was confirmed that place attachment and emotional solidarity among affective factors can influence tourists' loyalty to tourist destinations. This suggests that emotionally connected interactions are where the driving influence of emotions on personal attitudes is realized. Similarly, a study by Wai et al. [24] found that when people believe in their own skills, they are more willing to take on more challenging environmental behaviors. The above study confirms that the implementation of responsible environmental behavior by tourists is not a simple process.

Guided by SET, we propose an Affective-Satisfaction-Responsibility (ASR) model to explain how non-cognitive factors drive ERB in forest tourism contexts. In this model, we integrate three key socio-emotional resources:

- Place Attachment (from the Place-Oriented perspective),
- Emotional Solidarity (from the People-Oriented perspective),
- Destination Social Responsibility (as influenced by businesses and local governments). These socio-emotional resources interact to enhance exchange quality (the quality of engagement between tourists, locals, and other interested parties), which in turn increases tourist satisfaction. As satisfaction grows, self-efficacy is activated, leading tourists to engage more actively in environmentally responsible behaviors. This process is depicted in Figure 1:

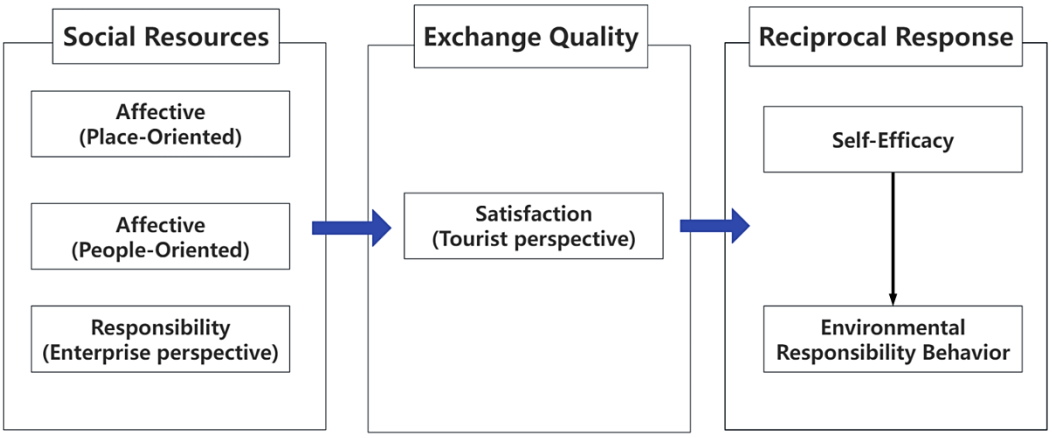

Figure 1. ASR MODEL

2.3. Affective Factor (Social Resources): Place Attachment (PAT) (Place-Oriented)

According to Blasi et al. [25], Place Attachment (PAT) is the emotional connection that a person has to a particular place, which is defined by sentiments of identity, belonging, and affection for that place. It is a more personal and place-specific connection that can influence tourists' behaviors towards the environment. Furthermore, the emotional bond that a person has with their physical surroundings and the feeling of identity that results from that bond are the main topics of PAT. PAT affects ERB by fostering a greater feeling of stewardship and environmental commitment. Moreover, Place attachment has been demonstrated to improve environmental stewardship and commitment in the tourism setting, motivating travelers to participate in ERB due to a feeling of personal accountability and fondness for the destination [26]. Tourists who have a strong attachment to a forest park may be more likely to engage in ERB out of a sense of personal responsibility and affection for the place itself. In China, the concept of place attachment is deeply rooted in cultural values that emphasize a harmonious relationship with nature. Chinese tourists often develop strong emotional bonds with natural environments, viewing them as integral parts of their cultural heritage. Environmentally responsible behavior (ERB) and place attachment can both be improved by this cultural emphasis on nature.

2.4. Affective Factor (Social Resources): Emotional Solidarity (ES) (People-Oriented)

Emotional Solidarity (ES) represents the feeling of belonging and shared responsibility that visitors have for a place and its people. It is rooted in the concept of social cohesion and collective identity, where individuals feel a strong emotional bond with others who share similar values, experiences, or goals [27]. ES is primarily influenced by social interactions and shared experiences with local residents and other tourists. It emphasizes the role of community and

collective responsibility in driving ERB [16]. Through value co-creation behaviors, ES can improve ERB by encouraging visitors to preserve the environment as a means of improving the welfare of the local population [28]. Moreover, visitors who experience a strong emotional bond with the locals may be more inclined to engage in conservation efforts in a forest park that benefits the locals and the environment. Chinese society values social harmony and collective well-being. Emotional solidarity, which involves a sense of community and shared responsibility, aligns well with these cultural norms. Tourists in China are likely to feel a stronger sense of emotional solidarity with local communities and other visitors, which can drive their engagement in ERB.

According to Brown & Raymond [29], the emotional connection that visitors have with a destination is just as important as its natural and cultural features in determining its appeal. The beneficial effect of PAT on ES is also supported by the relationship between place identification and tourist environment identity [30]. From a social exchange perspective, PAT enhances ES through encouraging a feeling of belonging and identity [31], promoting reciprocal emotional value between travelers and local citizens. This mutual recognition strengthens community ties, leading to a more harmonious relationship. Based on these insights, we proposed the first hypothesis as follows:

- ***H1:*** *PAT impacts positively on ES.*

2.5. Satisfaction Factor (Relationship Quality): Tourist Satisfaction (TS)

An important component in comprehending how visitors' emotional bonds result in ERB in forest parks is Tourist Satisfaction (TS). It functions as a thorough measure of the total emotional and mental assessment of a visitor's experience, taking into account their interactions with the surroundings, nearby communities, and the larger destination [32]. Therefore, satisfaction is not merely a by-product of the experience but a critical driver of pro-environmental actions. According to SET, individuals engage in behaviors that maximize benefits and minimize costs, with satisfaction being a key indicator of perceived benefits. As for tourism, satisfaction reflects the overall emotional and cognitive evaluation from travel experience [1]. Positive acts as ERB, are more likely to be reciprocated by tourists who are happy with their experience. This reciprocal relationship aligns with SET's principle of mutual benefit and reinforcement of pro-social behaviors [7]. In forest parks, satisfaction serves as a critical intermediary that captures the holistic experience of tourists, making it a robust mediator between emotional factors and ERB.

Emotional factors such as PAT and ES create strong emotional bonds between tourists and the destination. These bonds enhance tourist satisfaction, which encourages visitors to participate in ERB as a way to show appreciation [10]. Visitors who have an emotional connection to a forest park, for instance, are more likely to be happy with their visit and take actions that preserve the environment. Satisfaction, in this context, acts as a bridge that translates emotional connections into tangible actions. Previous studies have consistently demonstrated that tourist satisfaction significantly influences ERB in various contexts. For instance, Wu et al. [1] found that satisfaction with the environment and social interactions in ecotourism settings leads to higher levels of ERB. Similarly, [10] showed that satisfaction with destination management practices enhances tourists' willingness to participate in sustainable behaviors. Such results underscore the critical role of satisfaction in driving ERB, highlighting its necessity in the context of forest parks. These findings lead to the following hypotheses:

- ***H2:*** *PAT impacts positively on TS.*
- ***H3:*** *ES impacts positively on TS.*
- ***H4:*** *TS impacts positively on ERB.*

Forest parks provide a special fusion of leisure activities, educational opportunities, and scenic beauty. Tourists' emotional and mental assessments of their trip are reflected in satisfaction, which sums up the total quality of this whole experience. Furthermore, high satisfaction levels show that visitors had a satisfying and positive experience, which is crucial for encouraging environmental stewardship and responsibility. According to SET, happy experiences result in positive behaviors, highlighting the reciprocal nature of exchanges. Satisfied visitors are more likely to reciprocate in forest parks by practicing ERB, including abiding by park rules, taking part in conservation initiatives, and advocating for sustainable practices. This reciprocal behavior is essential for the long-term sustainability of these natural areas. Satisfaction serves as a critical mediator between emotional factors (PAT and ES) and ERB. It captures the emotional and cognitive evaluations of tourists' experiences, translating emotional connections into tangible actions. Satisfaction mediates the relationship between emotional elements and ERB, offering a thorough grasp of the mechanisms behind the pro-environmental actions of tourists. Improving visitor happiness may be a useful tactic for advancing ERB from a management standpoint. Forest park managers can focus on improving the quality of visitor experiences, ensuring that tourists have positive interactions with the environment and local communities. By fostering high levels of satisfaction, managers can indirectly influence tourists' willingness to engage in ERB, contributing to the overall sustainability of the park. Given these insights, the following hypotheses are suggested:

- ***H4a:*** *TS mediates the link between PAT and ERB.*
- ***H4b:*** *TS mediates the relationship between ES and ERB.*

2.6. Responsibility Factor (Social Resources): Destination Social Responsibility (DSR)

DSR has evolved from the definition of Corporate Social Responsibility (CSR) to emphasize the constructive actions that stakeholders perform at a destination, like social responsibility, ecological preservation, and cultural preservation, with the goal of enhancing the environment there as a whole [33]. DSR not only influences individual pro-environmental behaviors but also plays a key mediating role in fostering emotional connections that drive the implementation of ERB [34]. This demonstrates that DSR is a crucial factor in encouraging ERB by tourists towards the destination. In this study, DSR is characterized by the responsible actions taken by tourism stakeholders (primarily tourism enterprises in the context of forest tourism) to create a favorable environment, reflecting the enterprises' emotional commitment to the destination. Given this, exploring how different emotional factors interact with DSR to influence ERB is essential for advancing sustainable tourism practices.

Tourists often establish an emotional connection with a destination when making their choice to visit [35]. Tourism is inherently an interactive process, involving both performance and activities, which necessitate the participation or presence of tourists. Exchanges between hosts and visitors are therefore unavoidable. The extent to which visitors feel fully immersed in the experience depends largely on the design and caliber of the destination location. Therefore, tourists' attitudes toward destination evaluation, particularly satisfaction, are significantly influenced by the emotional resources (such as PAT and TS) they invest in the destination, which can be shaped by varying levels of DSR. We argue that the significance of tourists' emotional responses—such as anger versus sympathy—depends on their perceptions of DSR. On one hand, PAT, which arises from a person's viewpoint and experience of a destination, is affected by environmental quality, cultural values, and sustainability practices. These factors are particularly linked to the social responsibility and sustainable practices of the place [36]. Nevertheless, signaling theory suggests that sustained DSR activities send stronger signals to residents and tourists alike. For example, in heritage tourism, local residents have more skills in passing on cultural practices, and they benefit from the destination's commitment to social well-being, thereby promoting ES with tourists [37]. In contrast, low levels of DSR can result in tourists feeling less empathy for the destination and its stakeholders, leading to lower satisfaction and negative evaluations of the destination. The following hypotheses are advanced in light of the foregoing:

- ***H5:*** *DSR moderates the effect of PAT on ES.*
- ***H6:*** *DSR moderates the effect of PAT on TS.*
- ***H7:*** *DSR moderates the effect of ES on TS.*

2.7. Driving Factor: Self-Efficacy (SE) (Driving Responsible Behavior)

Self-Efficacy (SE), which refers to the belief that an individual has in their capacity to carry out specific tasks, is recognized by social cognition theory as a crucial component of motivation, emotion, and action [38]. In tourism studies, SE has become a key factor influencing personal decision-making, particularly in environmental contexts. For example, Wadhar et al. [39] highlighted SE as a determinant of travel readiness among Chinese tourists avoiding international leisure travel. Additionally, Erfanian et al. [40] found that in the domain of forest tourism, SE significantly influenced the environmental behaviors of urban forest tourists in Tehran, confirming its role in driving ERB. These findings establish a foundation for this study by underlining SE's importance in motivating tourists to translate their environmental intentions into actions. Despite this, most existing research on SE and ERB relies heavily on social cognitive theory and protection motivation theory, typically exploring SE as a mediator between various factors. Nevertheless, there still exists a void in understanding the multiple theories and mechanisms by which SE influences ERB, which this study aims to address.

SE influences cognitive functioning through its effect on self-satisfaction and the motivation to achieve personal goals [41]. For example, Tabernero & Hernández [42] found that individuals with high SE are more likely to engage in pro-environmental activities, such as recycling responsibly, and to set more ambitious goals. However, studies conducted during the COVID-19 pandemic, like Zhou et al. [43], revealed that people's increased anxiety about health risks decreased their desire to travel, demonstrating that SE might intensify emotional reactions to environmental stimuli. This study argues that those who have higher levels of SE are more inclined to participate in ERB, particularly when enhanced tourist satisfaction further drives their emotional investment in the destination. The following hypotheses are proposed in light of these findings:

- ***H8:*** *SE moderates the positive link between TS and ERB.*

See Figure 2 for a visual representation of the study's framework model.

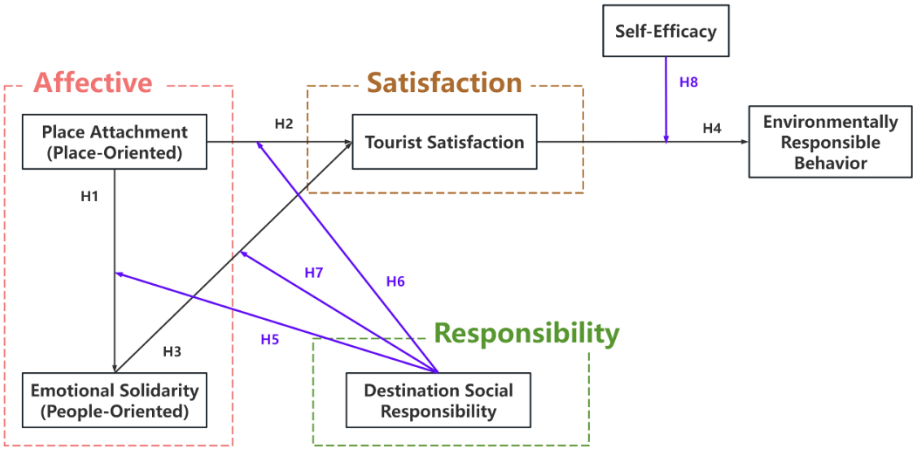

Figure 2. Research framework

3. Research Methodology

3.1. Instrument Development and Measures

In this study, the effects of three factors—responsibility, emotion, and satisfaction—on tourists' ecologically conscious actions in China's forest parks close to cities were examined. The measuring questions for each of the six variables taken into consideration in this study were derived from scales developed in previous research and suitably adjusted to reflect context-specific scenarios of tourists' intention to adopt ecologically responsible activities. The PAT scale was based on Ramkissoon et al. [44] and contains a total of 12 measures across 4 dimensions. Firstly, ES was measured using a 12-item questionnaire with 3 dimensions developed by Woosnam et al. [45]. Secondly, a unidimensional scale with four measurements served as the basis for TS [46]. Thirdly, the DSR scale was based on Su et al. [47] and has 12 measures in 3 dimensions. Finally, a 3-item assessment tool created by Huang et al. [48] was used to measure SE. The ERB is derived from a two-dimensional scale containing 8 measurement items [44, 49]. Appendix I shows the questionnaire's structure and the items.

Based on Cheng & Wu [50]'s findings on the stability and accuracy of the 5-point Likert scale, it was adopted for all variables, between '1' ('strongly disagree'/'never') and '5' ('strongly agree'/'always').This study used measurement instruments that have been approved by reputable studies to guarantee content validity. The 'translation-back-translation' method of Metwally et al. [51] was employed for coherence between the two languages' texts. This involved translating the English questions into Chinese and then re-translating them into English for comparison. Four experts reviewed the translated questionnaires to ensure validity. Additionally, respondents' privacy was safeguarded, and they were informed that taking part was entirely optional and could be stopped without prior notice.

3.2. Critical Selecting Peri-Urban Forest Parks

This study used Yuanbaoshan Forest Park in Rongshui County, Liuzhou City, Guangxi Zhuang Autonomous Region, as the data collection site for three reasons: (1) Mount Yuanyuan is the third-highest peak in South China, (2) the park is marketed as 'China's Great Miao Mountain' Recreation and Tourism Forest Park, and (3) Rongshui County attracted 7.45 million tourists in 2023, a 52.9% increase from the previous year, with tourism revenue reaching 8.29 billion yuan (up 41.36%), placing it among the top-performing parks in China (see Figure 3).

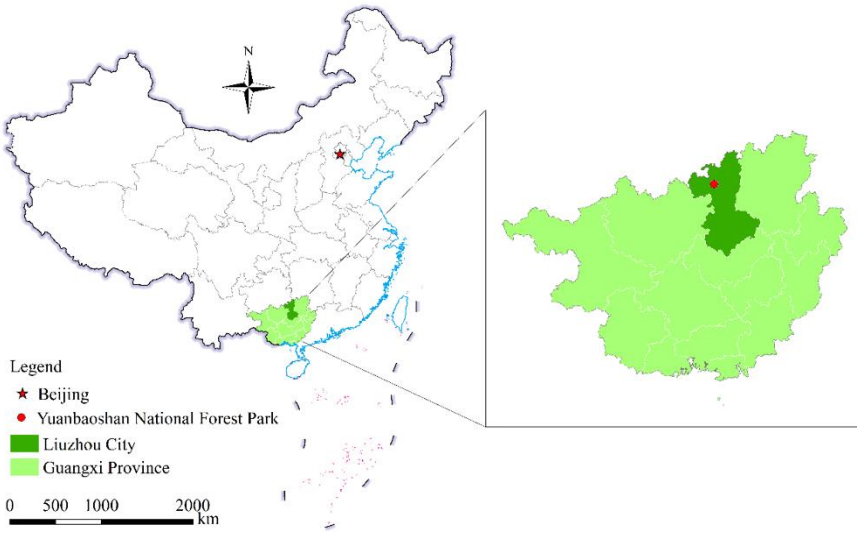

Figure 3. The map of greenway around Yuanbaoshan National Forest Park, Liuzhou, Nanning, Province, China

3.3. Sample and Data Collection Procedures

To reduce measurement bias from subjectivity [52], data collection was confined to the designated study site. Valid surveys were selected through several criteria: (1) exclusion of samples with social acceptance or cognitive bias regarding environmentally responsible behaviors, based on logical consistency between scores and screening questions; (2) exclusion of local residents who were tourists; (3) elimination of responses completed in under three minutes; and (4) discarding incomplete responses. The questionnaires were distributed between March and April 2024, with a total of 920 online surveys sent out. Among them, 851 valid responses were received, resulting in a validity rate of 92.5%.

Table 1 presents the demographic profile of the sample. The majority of respondents were female (59.8%, n=509), while 40.2% (n=342) were male. The largest age group was 31–45 years old, comprising 40.9% (n=348) of the sample, and over 60% of participants held at least a bachelor's degree. Respondents represented a variety of occupations, with monthly household incomes ranging from $2,600 to $3,599. Additionally, 63.3% of respondents were tourists from outside Guangxi province.

Table 1. Statistical analysis of respondents' characteristics

Category	Group	Frequency (n = 851)	Percentage (%)
Gender	Male	342	40.2
	Female	509	59.8
Age	less than 18 years	152	17.9
	18 to 30 years	168	19.7
	31 to 45 years	348	40.9
	46 to 60 years	115	13.5
	Over 60 years	68	8.0
Education	Primary	45	5.3
	High school	102	12.0
	Professional degree	144	16.9
	Undergraduate degree	332	39.0
	Master's degree	122	14.3
	PhD/Doctorate	106	12.5
Occupation	Office work	88	10.3
	Processional work	76	8.9
	Sales/Service related	65	7.6
	Student	187	22.0
	Civil service/Education	176	20.7
	Manufacturing/Technical work	144	16.9
	Self-employed	135	15.9
	Housewife	60	7.1
	Other	8	0.9
Monthly household income	Below US$1699	178	20.9
	Between $1700 and $2599	142	16.7
	Between $2600 and $3599	256	30.1
	Between $3600 and $4599	102	12.0
	Between $4600 and $5599	90	10.6
	$ 5600 or above	53	6.2
Origin	Other regions in Guangxi	321	7.1
	Outside Guangxi	530	0.9

3.4. Methods of Analysis

The study evaluated the normality of questionnaire data and assessed common method bias using a three-stage analytical approach. Next, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used to ensure scale stability by assessing structural, convergent, and discriminant validity [53]. Lastly, a latent variable SEM was developed to test direct and mediating effects, in addition to moderation and moderated mediation effects. This study develops structural models to evaluate the effects of PAT on ES, PAT and ES on TS, and TS on ERB. The mediating role of TS is then analyzed. Lastly, interaction terms are incorporated to assess DSR's moderating influence on both mediating and independent variables, along with the moderated mediation effect of SE.

4. Data Analysis and Results

4.1. Normality Test

To mitigate SEM bias, the sample data underwent a normality test [54]. SPSS 27.0 was utilized to analyze the questionnaire data for normal distribution, with findings detailed in Table 2.

Table 2. Kurtosis and skewness

Contact	Mean	Standard Deviation	Skewness	Standard Error	Kurtosis	Standard Error
PAT	2.8884	0.58164	0.021	0.084	-0.258	0.167
ES	3.0799	0.59755	-0.104	0.084	-0.226	0.167
ST	3.178	0.73086	-0.095	0.084	-0.315	0.167
ERB	3.0566	0.67702	-0.118	0.084	-0.368	0.167
DSR	3.0128	0.60923	0.033	0.084	-0.226	0.167
SE	2.9565	0.71533	0.015	0.084	-0.142	0.167

Table 2 reports a maximum absolute univariate skewness of 0.11 (with some values below 1) and a maximum absolute univariate kurtosis of 0.36 (with most values under 1). No outliers were detected. As per Bryne [55], acceptable skewness falls between −2 and +2, while kurtosis should remain within −7 to +7. The sample data met these criteria, confirming multivariate normality and ensuring reliable parameter estimation in SEM [56].

4.2. Common Methodological Biases

Given that this study relied on a self-reported questionnaire, common method bias may have influenced the relationships between variables. To minimize potential misunderstandings, the questionnaire was refined using a validated scale, with measures implemented to ensure anonymity and a logical sequence of questions. However, procedural controls alone could not completely eliminate common method bias, making further testing necessary. Factor analysis in SPSS 27.0 identified four factors with eigenvalues greater than 1, with the first factor accounting for 31.27% of the variance—well below the 40% threshold—thus satisfying Harman's single-factor test criteria [57].

4.3. Reliability and Validity Tests

4.3.1. Reliability and KMO Test

Cronbach's alpha was used in SPSS 27.0 to evaluate scale reliability. Table 3 shows that all alpha coefficients were above 0.7, demonstrating that the questionnaire met reliability standards.

Table 3. Kaiser-Mayor-Olkin (KMO) and Bartlett test

Construct	Cronbach's Alpha (CA > 0.7)	KMO Value (KMO > 0.5)	Bartlett Test Significance (p < 0.05)	Factor Analysis Suitability
PAT	0.890	0.888	<0.001	Acceptable
ES	0.901	0.914	<0.001	Acceptable
ST	0.856	0.824	<0.001	Acceptable
ERB	0.884	0.887	<0.001	Acceptable
DSR	0.901	0.916	<0.001	Acceptable
SE	0.808	0.715	<0.001	Acceptable

SPSS 27.0 was used to perform KMO and Bartlett tests on the sample data. As shown in Table 3, KMO values exceeded 0.7, and Bartlett test p-values were under 0.05, indicating that the data were suitable for further factor analysis [58].

4.3.2. Validity Tests

This study included items from established scales that have been published in respectable journals in order to ensure strong content validity [59]. To evaluate structural validity, CFA was conducted [60]. Table 4 illustrates he model fit indices: x^2/df = 1.24 (within the acceptable 1–3 range), RMSEA = 0.017 (<0.08), and SRMR = 0.024 (<0.08). All other fit indices surpassed 0.9, demonstrating a strong model fit and excellent structural validity.

Table 4. Main indices of model fit test.

Fitness	x^2/df	RMSEA	CFI	TLI	SRMR
Reference	1 < NC < 3	0.08	≥ 0.09	≥ 0.09	0.08
Value	1.24	0.017	0.987	0.986	0.024

This section evaluates the convergent validity of the sample data, which measures the correlation strength among different indicators of the same concept [61]. Three key criteria were used for validation. First, standardized factor loadings (SFL) had to be ≥ 0.5 [53]. Second, composite reliability (CR) was deemed acceptable if it exceeded 0.6 [62]. Third, the average variance extracted (AVE) needed a minimum threshold of 0.5 [62].

According to Table 5, all indicators exceeded their respective thresholds: the minimum SFL was 0.73 (>0.50), the lowest CR was 0.80 (>0.70), and the lowest AVE was 0.56 (>0.50). These findings confirm the scale's strong convergent validity.

Table 5. Convergent validity results

Constructs	Items	SFL	CR	AVE > 0.5
PAT	PI1	0.74	0.80	0.58
	PI2	0.77		
	PI3	0.77		
	PD1	0.79	0.84	0.63
	PD2	0.80		
	PD3	0.80		
	PA1	0.82	0.85	0.66
	PA2	0.80		
	PA3	0.81		
	PSB1	0.84	0.85	0.65
	PSB2	0.82		
	PSB3	0.76		
ES	FW1	0.75	0.87	0.62
	FW2	0.81		
	FW3	0.76		
	FW4	0.82		
	EC1	0.76	0.84	0.56
	EC2	0.75		
	EC3	0.73		
	EC4	0.76		
	SU1	0.78	0.87	0.62
	SU2	0.78		
	SU3	0.77		
	SU4	0.81		
TS	TS1	0.75	0.86	0.60
	TS2	0.81		
	TS3	0.73		
	TS4	0.81		
ERB	TERB1	0.80	0.88	0.64
	TERB2	0.83		
	TERB3	0.81		
	TERB4	0.77		
	PERB1	0.82	0.89	0.66
	PERB2	0.79		
	PERB3	0.82		
	PERB4	0.82		

DSR	SDSR1	0.84	0.89	0.67
	SDSR2	0.82		
	SDSR3	0.8		
	SDSR4	0.81		
	EDSR1	0.75	0.84	0.57
	EDSR2	0.76		
	EDSR3	0.77		
	EDSR4	0.74		
	ENDSR1	0.79	0.87	0.63
	ENDSR2	0.82		
	ENDSR3	0.82		
	ENDSR4	0.74		
SE	SE1	0.75	0.81	0.59
	SE2	0.76		
	SE3	0.78		

Discriminant validity assesses how well variables differentiate from one another. When a construct's Pearson correlation with related variables is less than or equal to its square root of its AVE, it is established [53] and when the Pearson coefficient is below 0.9 [63]. Table 6 verifies that all constructs passed the discriminant validity test.

Table 6. Assessing discriminant validity

	PAT	ES	TS	ERB	PE	DSR
PAT	0.63					
E S	0.269**	0.6				
T S	0.338**	0.358**	0.6			
ERB	0.129**	0.154**	0.286**	0.65		
DSR	0.098**	0.096**	0.127**	0.121**	0.62	
S E	0.119**	0.110**	0.100**	0.098**	0.120**	0.59

Notes. Bold diagonal values are square roots of AVE; lower triangles are Pearson correlation coefficients between variables. ** $p < 0.01$

4.4. Model Results

The paper shows an SEM derived from the theoretical framework, with fit indices confirming a strong model fit: $x^2 / df = 1.28$, RMSEA = 0.018, CFI = 0.990, TLI = 0.987, and SRMR = 0.026. Shown in Figure 4 are the SEM findings.

The results of the hypothesis testing can be found in Table 7 and Figure 4. The path PAT → ES (β = 0.344***) confirms a significant impact of PAT on ES, supporting H1. This suggests that a stronger emotional connection to the forest park directly enhances tourists' willingness to engage in environmentally responsible behaviors. Similarly, PAT → TS (β = 0.300***) indicates a significant effect of PAT on TS, confirming H2. This result suggests that tourists with a high emotional bond with the forest park are more likely to be satisfied with their overall experience. The relationship ES → TS (β = 0.338***) demonstrates that ES significantly influences TS, supporting H3. It shows that when tourists form emotional connections with local communities and other tourists, they are more likely to have a positive experience, which is reflected in higher satisfaction. This finding emphasizes the role of social interaction and community engagement in promoting positive travel experiences. Lastly, TS → ERB (β = 0.373***) verifies that TS has a significant effect on ERB, confirming H4. This result suggests that tourists who are more satisfied with their experience are more likely to engage in ERB, reinforcing the link between satisfaction and responsible environmental behavior.

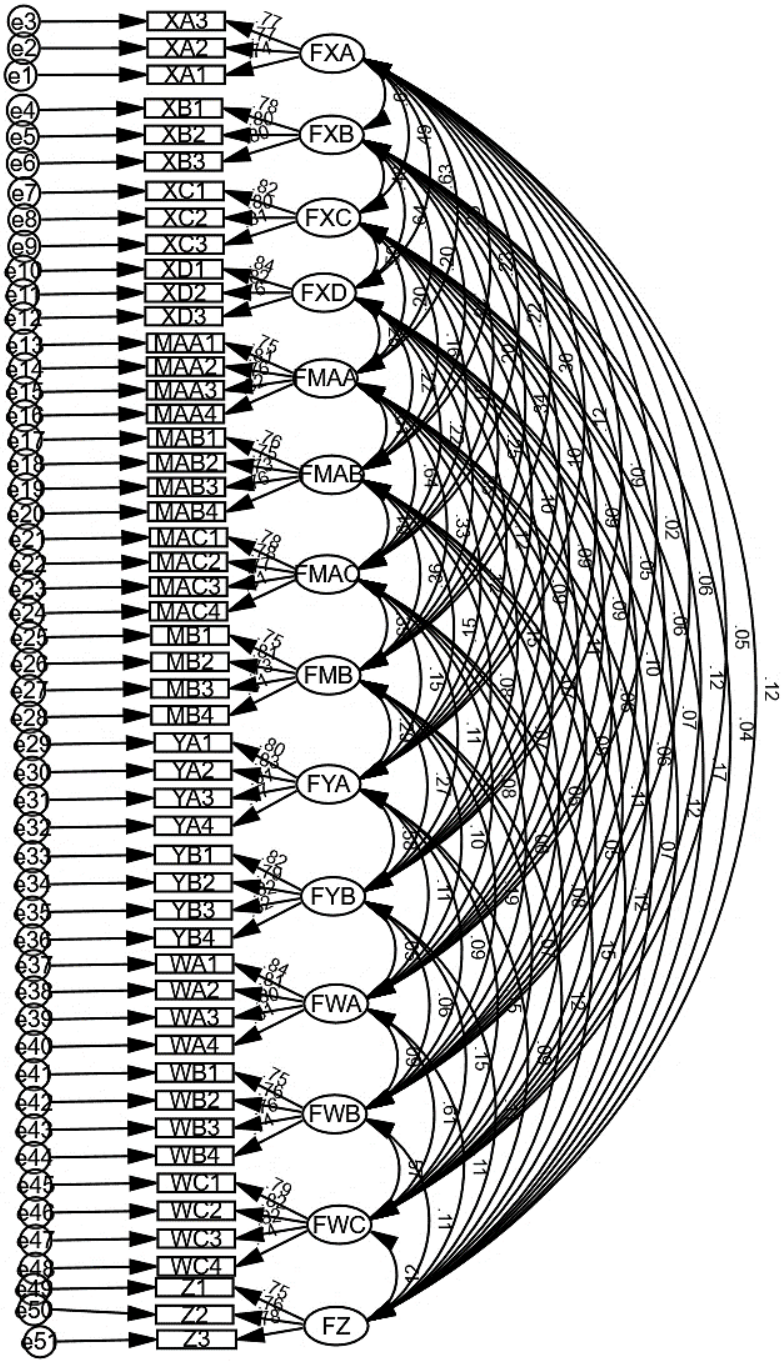

Figure 4. SEM of this study

Table 7. Hypothesis testing (direct effect)

H	Path	Estimate	S.E.	p	Decision
H1	PA→ES	0.344	0.040	***	Supported
H2	PA→TS	0.300	0.040	***	Supported
H3	ES→TS	0.338	0.040	***	Supported
H4	TS→ERB	0.373	0.041	***	Supported

*** $p < 0.000$.

4.5. Mediating and Moderating Effects

4.5.1 Mediating Effects of Tourist Satisfaction (TS)

It was in this study that the mediating function of TS was examined. Based on SEM, the bias-corrected non-parametric percentile bootstrap method was employed, with 5,000 resamples used for mediation analysis [64]. Table 8 displays the results.

Table 8. Test for mediation effect

Hypothesis	Paths	ML	Bootstrap	
		Estimate (SE)	95%CI (Low)	95%CI (High)
H4a	PAT→TS→ERB	0.112***(0.021)	0.076	0.160
H4b	ES→TS→ERB	0.126***(0.021)	0.087	0.172

As shown in Table 8, the mediation path PAT → TS → ERB had a value of 0.112 (***) with a confidence interval of [0.076, 0.160], which did not include 0, confirming a significant partial mediation effect of TS between PAT and ERB, thus verifying H4a. This finding suggests that a stronger emotional bond with the place enhances tourist satisfaction, which in turn drives environmentally responsible behavior (ERB).

Similarly, the mediation path ES → TS → ERB had a value of 0.126 (***) with a confidence interval of [0.087, 0.172], also excluding 0, indicating a significant partial mediation effect of TS between ES and ERB, supporting H4b. This result implies that a sense of community and shared responsibility strengthens tourist satisfaction, which subsequently fosters ERB.

4.5.2 Moderating Effects of Destination Social Responsibility (DSR)

SEM-based moderation analysis was conducted in Mplus 7.0 using interaction terms. To account for multiple variable dimensions, item packaging was applied to derive total mean scores before observational variable modeling. The model fit was strong, with indices: $x^2 / df = 1.806$, RMSEA = 0.031, CFI = 0.980, TLI = 0.959, and SRMR = 0.028.

The findings reveal that the interaction term (PAT ×WITH DSR) significantly impacted ES (β = 0.129***), proving that DSR positively moderates the relationship between PAT and ES, supporting H5. This indicates that higher levels of DSR enhance the positive impact of PAT on ES, suggesting that responsible destination management practices can strengthen the sense of community among tourists. Likewise, the interaction term (PAT × WITH DSR) had a significant effect on TS (β = 0.147***), confirming that DSR enhances the relationship between PAT and TS, thereby validating H6. This suggests that DSR amplifies the positive effect of PAT on TS, highlighting the role of responsible destination management in enhancing tourists' overall satisfaction. Furthermore, the interaction term (ES × WITH DSR) significantly influenced TS (β = 0.104***), confirming that DSR positively moderates the ES–TS relationship, supporting H7. This suggests that greater DSR levels amplify the beneficial effects of ES on TS, underscoring the significance of conscientious destination management in fostering contentment and eco-friendly practices.

For better clarity and logical flow, this work applied the point selection method to categorize DSR into three levels: low (M − 1SD), medium (M), and high (M + 1SD). The influence of PAT on ES, as well as the effects of PAT and ES on TS, were assessed with regards to high and low DSR conditions. A simple slope analysis diagram was then constructed to illustrate the results.

In Figure 5, the steep slope demonstrates that PAT exerts a strong influence on ES at high DSR levels. However, when DSR is low, this effect weakens, reducing PAT's positive impact on ES.

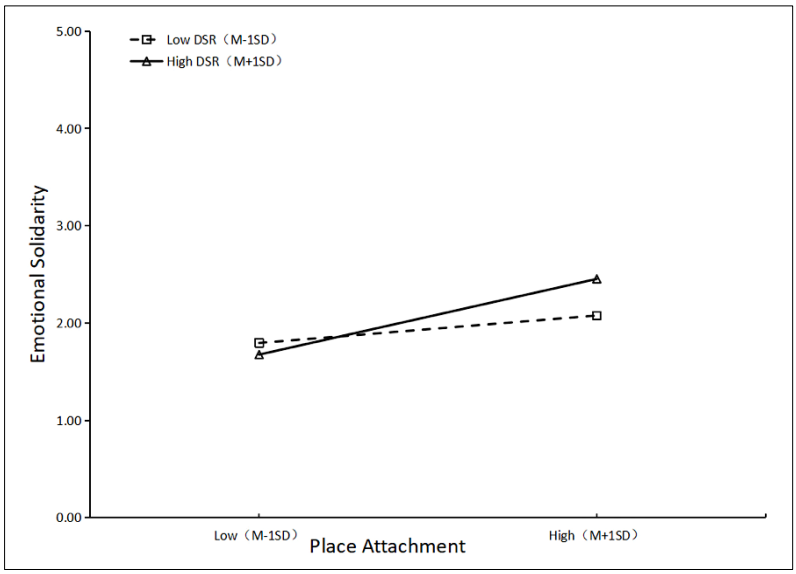

Figure 5. DSR moderating effects between PAT and ES

The flatter slope in Figure 6 indicates that when DSR is low, PAT has a comparatively weakly positive effect on TS. The steeper slope, however, indicates that PAT has a greater impact on TS when DSR is large.

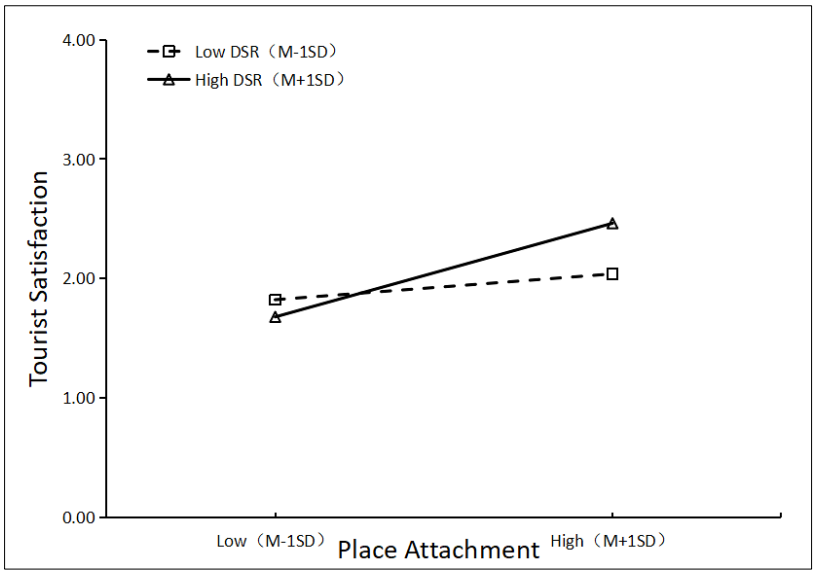

Figure 6. DSR moderating effects between PAT and TS

In Figure 7, likewise that ES strongly affects TA when DSR is high, this effect diminishes under low DSR, with PAT having a weaker positive impact on ES.

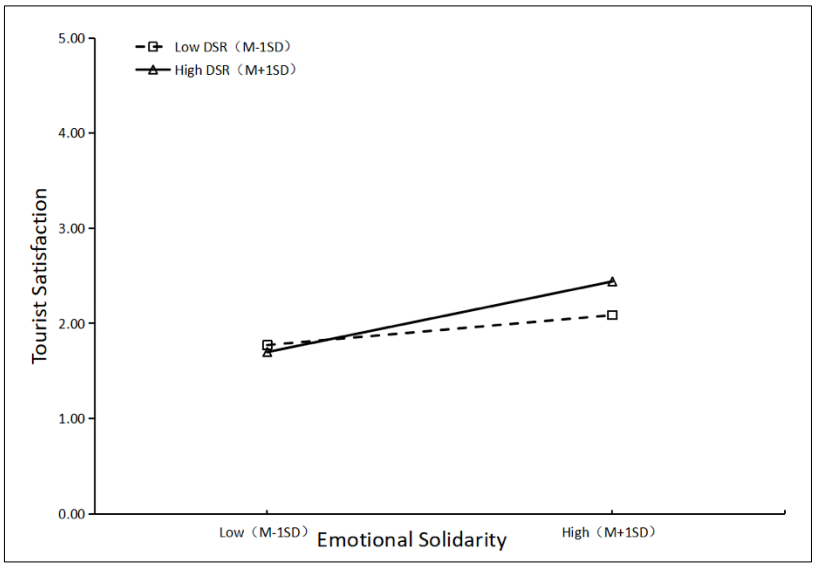

Figure 7. DSR moderating effects between ES and TS

4.5.3. Moderating Effects of Self-Efficacy (ES)

The findings reveal that the interaction term (TS ×WITH SE) significantly affected ERB ($\beta = 0.151$***), indicating that SE enhances the link between TS and ERB, thereby confirming H8. Figure 8 illustrates this effect, with a steeper slope showing a strong influence of TS on ERB at high SE levels. Conversely, when SE is low, this effect diminishes, leading to an effect that is less favorable of TS on ERB. This implies that the favorable effect of TS on ERB is amplified by higher levels of SE, suggesting that visitors' contentment with their capacity to participate in ERB increases the influence of pro-environmental activities.

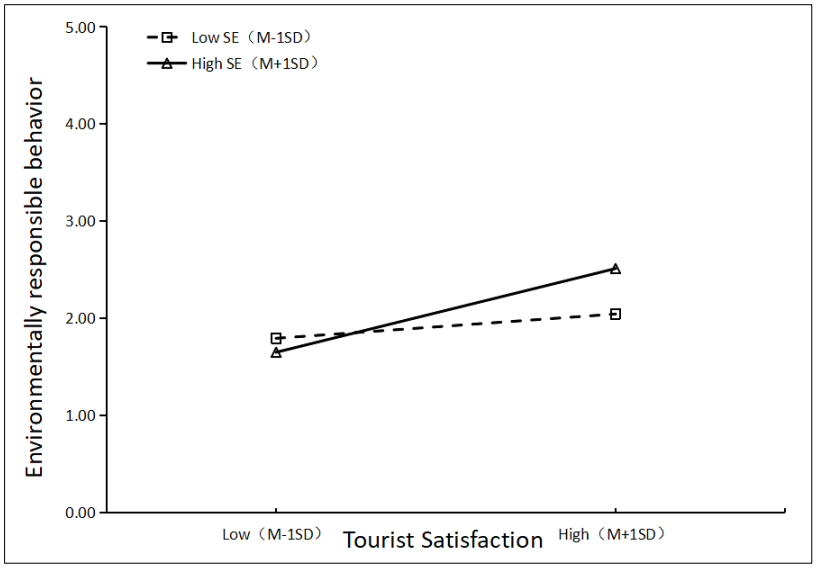

Figure 8. SE moderating effects between TS and ERB

4.5.4. Moderated Mediation Effects

Moderated mediation stands for a mediating effect that changes based on a moderating variable. It is able to be confirmed by integrating the mediating effect into the full model [65]. The study was proved using Maximum Likelihood Estimation with 95% confidence level, calculated utilizing MPLUS 8.0 as presented in the Table 9. The present discussion addresses the mediating role of TS in terms of two moderating factors, DSR and SE

From Table 9, as the DSR changes from low to high groupings, the SE level also gradually moves from low to high groupings, and the estimates of the paths PAT→TS→ERB are statistically significant as a whole, and none of the confidence intervals contain 0, which suggests that the mediating effect of TS is robust. In addition, the mediation effects differed significantly across DSR and SE levels when compared pairwise, as shown by the fact that none of the confidence intervals for these variables included 0. Specifically, the mediation effect of TS between PAT and ERB increased significantly as the levels of DSR and SE increased. This suggests that DSR and SE positively modulate the relationship between the two, and that the strength of the mediating effect of TS increases as DSR and SE increase.

Table 9. Moderated mediation effects（PAT→TS→ERB）

Mediator	DSR	SE	Indirect effect
DSR and SE PAT→TS →ERB	-1SD	-1SD	0.013[0.003, 0.032]
	Mean	-1SD	0.032**[0.012, 0.059]
	+1SD	-1SD	0.050**[0.019, 0.090]
	-1SD	Mean	0.029*[0.009, 0.055]
	Mean	Mean	0.070***[0.050, 0.098]
	+1SD	Mean	0.110***[0.080, 0.151]
	-1SD	+1SD	0.044*[0.013, 0.083]
	Mean	+1SD	0.107***[0.078, 0.150]
	+1SD	+1SD	0.171***[0.123, 0.225]

* $p < 0.05$, ** $p < 0.01$.

Also, in accordance with Table 10, the mediating effect of TS with moderation between ES and ERB remains held. The mediating effect of TS tended to be significantly enhanced with increasing levels of DSR and SE. That is, the mediating role of TS between ES and ERB was positively regulated by DSR and SE together.

Table 10. Moderated mediation effects (ES→TS→ERB)

Mediator	DSR	SE	Indirect effect
DSR and SE ES→TS→ERB	-1SD	-1SD	0.020*[0.007, 0.041]
	Mean	-1SD	0.034**[0.013, 0.060]
	+1SD	-1SD	0.047**[0.017, 0.082]
	-1SD	Mean	0.044***[0.022, 0.070]
	Mean	Mean	0.073***[0.050, 0.099]
	+1SD	Mean	0.102***[0.073, 0.140]
	-1SD	+1SD	0.069***[0.032, 0.107]
	Mean	+1SD	0.113***[0.080, 0.151]
	+1SD	+1SD	0.158***[0.113, 0.213]

* $p < 0.05$, ** $p < 0.01$.

5. Discussion

The study's findings support the direct relationship between PAT and ES (H1 is established), suggesting that, from the standpoint of emotional attachment, visitors' deep attachment to the forest park may foster a sense of reciprocity and belonging, resulting in the formation of an emotional bond. This is in line with the findings of Patwardhan et al. [66] regarding destination loyalty, which further demonstrates that the interactive relationship between emotional factors not only activates repeat visit behavior and promotes the development of the tourism economy, but also effectively promotes sustainable tourism. On the one hand, this supports the application of social exchange theory in the tourism context. These cultural norms are reflected in the study's findings. The collectivist and nature-oriented cultural norms in China are probably responsible for the important roles that place attachment and emotional solidarity play in affecting ERB. These cultural values may enhance the strength of these constructs and their impact on ERB compared to more individualistic cultures.

Also under the influence of the direct effect of TS, this study demonstrates the direct effect of PAT and ES on TS (H2, H3 are established). The study shows that emotional attachment (place attachment and emotional solidarity) positively influences ERB through tourist satisfaction. This is consistent with SET's emphasis on exchange quality. Travelers who experience a strong emotional bond with a place are more inclined to reciprocate by participating in ERB. From the perspective of human-place emotion, this study supports the findings of a survey conducted among Chinese tourists in nature reserves Chow et al. [67] regarding the relationship between PAT and TS. According to the poll, Chinese visitors form an emotional connection with forest parks that also have a primitive setting after the new crown outbreak. This is crucial for meeting people's need to connect with nature and have a positive experience. On the other hand, in the relationship between ES and TS, from the perspective of interpersonal emotional connections, it is confirmed [39] that using the SOR theory, social interactions between travelers and local people determine the satisfaction of visitors. This study, from the perspective of emotional reciprocity, confirms that tourists' interactions with the residents and other tourists they encounter at the destination can enhance their satisfaction with the forest park.

Moreover, this study supports the idea that TS mediates the link between PAT, ES, and ERB (H4) in the discussion of TS's mediating role. This indicates that for forest park tourism, tourist satisfaction as a factor of affective feedback can transform affective connections into a key role in environmentally responsible behavior. From one perspective, this aligns with the research conducted by Chow et al. [67] about the function of TS as a mediator between PAT and ERB. According to the study's findings, an emotive bond with a location raises satisfaction, which in turn encourages ERB, as seen through the lens of human-land relationships. This suggests that visitors are environmentally conscious and personally accountable. On the other perspective, the mediating effect of TS between ES and ERB is also confirmed by the conclusion of Wadhar et al. [39]. The study's findings demonstrate that visitors' sense of belonging and shared duty will encourage them to take part in ERB as a means of giving back to the local community and its citizens.

Additionally supported were H5, H6, and H7, demonstrating the beneficial moderating influence of DSR. These findings suggest that the degree of DSR at the location has a major impact on how well emotional resources work to increase visitors' pleasure and ERB. The moderating influence of DSR is consistent with earlier studies that highlighted the significance of destination-level social responsibility in influencing the attitudes and actions of travelers. For instance, Su et al. [37] demonstrated that DSR contributes to tourists' pro-environmental behaviors by enhancing their emotional connections with the destination. Similarly, Durkheim [27] indicate that DSR can influence tourists' emotional responses, leading to more positive interactions and behaviors. However, this study extends these findings by integrating DSR into an Affective-Satisfaction-Responsibility (A-S-R) framework and examining its moderating role in multiple pathways related to ERB. The findings imply that the beneficial effects of PAT on ES and TS are amplified at greater DSR levels. This suggests that visitors are more likely to develop deeper emotional ties with a destination and its residents when it actively participates in social responsibility programs, such as environmental conservation, cultural preservation, and community welfare. This, in turn, enhances their satisfaction and willingness to engage in ERB. For

example, in heritage tourism, destinations that prioritize social responsibility can foster a greater sense of emotional solidarity among tourists, leading to more sustainable behaviors [38]. Additionally, DSR mitigates the impact of ES on TS. This link emphasizes how crucial social interactions are in determining how satisfied tourists are. Travelers are more likely to view their encounters with residents and other visitors as good and significant when places exhibit a commitment to social responsibility. The social exchange approach, which holds that constructive relationships and reciprocal advantages promote deeper emotional bonds and, eventually, more lasting behaviors, is in line with this study.

The results indicate that SE significantly enhances the predictive power of TS on ERB (H8 is established). The moderating role of SE in this study aligns with existing literature that highlights its importance in influencing environmental behaviors. For instance, by increasing people's confidence in their capacity to change things, perceived self-efficacy has a favourable impact on pro-environmental attitudes and behaviors [24]. These results are further supported by this study, which shows that SE not only has a direct effect on ERB but also improves the correlation between ERB and satisfaction in a tourism setting. This suggests that while satisfaction is an important driver of ERB, the actual translation of satisfaction into sustainable actions is contingent upon individuals' belief in their ability to perform those actions effectively. In another word, visitors who are happy with their trip but lack confidence to contribute for protecting environment may be less likely to engage in EPB. Conversely, tourists with high SE are more likely to view their satisfaction as a catalyst for positive environmental actions, leading to higher levels of ERB. From a theoretical perspective, this finding supports the application of *Social Cognitive Theory* [1] in the context of tourism. SE acts as a mediating mechanism that bridges the gap between emotional states (such as satisfaction) and behavioral outcomes (such as ERB). This study offers a more sophisticated explanation of the psychological mechanisms behind travelers' sustainable actions by emphasizing the function of SE. It also emphasizes how crucial it is to take into account both affective (like satisfaction) and cognitive (like self-efficacy) components when predicting ERB.

6. Conclusions

This study aimed to examine whether Chinese tourists in forest tourism contexts effectively drive ERB by establishing an emotional connection mechanism with the destination. The A-S-R factor model was developed by applying SET theory to confirm the direct relationships between PAT, ES, and TS, and TS and ERB, and to test the mediating role of TS in PAT, ES, and ERB, along with the moderating utility of DSR and SE. The outcomes showed that in the A-S-R factor model with an affective connection perspective, PAT not only influences ES but also positively influences TS, and TS influences ERB, supporting hypotheses H1, H2, H3, and H4. TS mediates this process, confirming H4a and H4b. In addition, all these utilities, DSR and TS, support H5, H6, H7, and H8. This work's outcomes confirm that it is indeed essential to effectively use the emotional resources between destinations and tourists and further translate them into green behavioral aspects. In terms of promoting and directing ERB for environmental sustainability, this has significant theoretical and practical ramifications.

6.1. Theoretical Contributions

This study applies Social Exchange Theory (SET) to explain the mechanisms underlying tourists' ERB in forest parks. SET posits that human behavior is motivated by the expectation of reciprocal benefits, and this study demonstrates how emotional and social exchanges between tourists and destinations can lead to pro-environmental behaviors. By proposing that positive emotional connections (e.g., PAT and ES) enhance tourists' satisfaction, which in turn drives ERB, this research extends SET to the context of sustainable travelling. This application of SET offers a robust theoretical foundation for understanding how affective factors can influence ERB through reciprocal exchanges, thereby filling a gap for previous studies. The development and validation of the A-S-R factor model represent a significant theoretical enhancement in the study of ERB. This model integrates affective factors (PAT and ES), satisfaction (TS), and responsibility factors (Destination Social Responsibility, DSR, and Self-Efficacy, SE) to offer a comprehensive structure for analyzing the drivers of ERB. The findings confirm that the A-S-R model fits well with the data, demonstrating its effectiveness in capturing the complex dynamics of ERB in forest tourism contexts. This model not only highlights the mediating role of TS but also underscores the importance of DSR and SE as moderators. This study provides a fresh perspective for understanding and advancing ERB for researchers and practitioners by confirming the A-S-R model.

The incorporation of affective elements into the ERB analysis is one of the study's main theoretical contributions. Emotions and place-based attachments have frequently been overlooked in traditional ERB research, which has mostly concentrated on cognitive aspects like environmental knowledge and attitudes. Through their impact on Tourist Satisfaction (TS), this study emphasizes the significance of Place Attachment (PAT) and Emotional Solidarity (ES) as major drivers of ERB. By demonstrating that PAT and ES significantly impact ERB via the mediating role of TS, this research offers an increasingly nuanced understanding of how emotional connections to a destination can translate into sustainable behaviors. This finding aligns with the "affective turn" in tourism research, emphasizing that emotions and place-based experiences are crucial in shaping tourists' actions. Another key theoretical contribution of this research is the examination of the moderating roles of DSR and SE in the relationships between affective factors and ERB. Furthermore, the results show that the connections between PAT and ES, PAT and TS, and ES and TS are all positively

moderated by DSR. This suggests that destinations with higher levels of social responsibility can enhance tourists' emotional connections and satisfaction, ultimately leading to more sustainable behaviors. Similarly, SE was found to moderate the relationship between TS and ERB, indicating that tourists with higher self-efficacy are more likely to translate their satisfaction into ERB. These results enhance the body of knowledge on sustainable tourism practices by highlighting the significance of taking into account both destination-level and individual-level aspects when analyzing ERB.

This study adopts a dual perspective by examining both place-oriented (PAT) and people-oriented (ES) factors in the context of ERB. This approach provides a more holistic understanding of how tourists' emotional connections to a destination and its people can influence their behaviors. To sum up, this study emphasizes the need to take into account both the spatial and social aspects of visitors' experiences by showing that both PAT and ES have a significant impact on ERB through TS. This dual viewpoint enhances earlier research that mostly concentrated on social interactions or location attachment separately.

6.2. The Potential Implications for Managerial Practice

This research offers critical insights for forest park managers with the aim to enhance visitor engagement in ERB and promote sustainable tourism. The findings suggest that targeted interventions can significantly strengthen visitors' emotional and social connections to the park, thereby increasing their commitment to ERB. Place attachment plays a key role in fostering ERB, as visitors who develop a deep emotional connection to a destination are more likely to engage in conservation efforts. Park managers can enhance place attachment through interactive interpretive centers that provide immersive learning experiences about local biodiversity and conservation challenges. Guided eco-tours that emphasize the park's ecological uniqueness and sustainability efforts can reinforce this attachment. Moreover, personalized engagement initiatives, such as "Adopt a Tree" programs and citizen science projects, allow visitors to take part in conservation activities, fostering a stronger sense of stewardship. This study emphasizes the value of community engagement in fostering place attachment. Park management can foster a sense of shared responsibility for environmental preservation among residents and visitors by planning cooperative conservation projects and cultural activities. Emotional solidarity, a relatively underexplored factor in tourism sustainability research, has been shown in this study to be a key driver of ERB. Besides, visitors are more inclined to take part in pro-environmental activities when they have a sense of social connection with people who have similar environmental ideals. To foster this sense of solidarity, park managers should facilitate group-based activities, such as community clean-ups, eco-volunteering programs, and interactive conservation workshops. These activities not only promote social bonding among visitors but also create a supportive environment where ERB is reinforced collectively. Additionally, leveraging digital platforms and social media engagement can extend these social connections beyond the physical visit, creating an ongoing community of environmentally conscious travelers who share their experiences and inspire others to act sustainably.

Additionally, this study emphasizes how crucial visitor happiness is to advancing ERB, especially when it comes to the caliber of the amenities and services offered. Positive, pleasurable experiences in a natural environment increase the likelihood that visitors will form a lifelong appreciation for environmental preservation. To improve satisfaction while maintaining sustainability, park managers should invest in eco-friendly infrastructure, ensuring that visitor facilities such as restrooms, picnic areas, and visitor centers are well-maintained, accessible, and aligned with green tourism principles. Additionally, the study underscores the need for diverse activity offerings tailored to different visitor segments, including family-friendly nature trails, guided birdwatching tours, educational workshops for children, and adventure-focused activities for more experienced hikers. Implementing feedback mechanisms, such as visitor surveys and digital rating platforms, can help managers continuously refine their offerings and address concerns effectively. In addition to passive conservation measures, this study emphasizes the critical role that Destination Social Responsibility (DSR) plays in making sure that forest parks actively support sustainable tourism. To achieve this, park managers should institutionalize eco-friendly operational strategies, such as waste reduction programs, renewable energy adoption, and sustainable procurement policies that prioritize ethically sourced materials. Transparent communication of these sustainability efforts through interpretive signage, brochures, and digital platforms can educate visitors and reinforce pro-environmental behaviors. Additionally, the park's influence can also be increased by forming cooperative alliances with nearby companies, non-profits, and eco-friendly travel agencies that support sustainable food alternatives, eco-friendly lodging, and ethical souvenir manufacturing. Further, fostering educational outreach and visitor participation through interactive programs, conservation workshops, and hands-on ecological restoration projects strengthens visitors' commitment to sustainability. By integrating these multi-dimensional DSR strategies, forest parks can transform into living models of sustainability, demonstrating how tourism can coexist with conservation while fostering collective environmental responsibility among visitors, communities, and stakeholders.

The findings of this research offer practical insights for tourism marketers seeking to improve targeted strategies that not only develop the visitor experience but also enhance ERB. By utilizing the key motivators identified in this study, tourism marketers can develop more effective campaigns that appeal to different visitor segments while reinforcing sustainable tourism principles. Marketing activities that are tailored to the heterogeneity of different tourists, for example, a marketing strategy for ecotourism tourists, focus on emphasizing the destination's commitment to conservation and ecological integrity. The promotional interface for tourism activities focuses on highlighting unique

environmental features and conservation success stories while actively creating opportunities for this type of tourist to participate in sustainable development programs (such as volunteer programs and eco-certification programs). For leisure tourists, the focus is on creating immersive and enjoyable experiences with subtle environmental messages. The promotional strategy focuses on promoting environmentally friendly accommodation, sustainable dining options, and nature-based activities that offer both relaxation and sustainability awareness. Diversify to build an emotional connection with tourists. Tourism marketers are advised to use storytelling techniques on social media to share impactful conservation stories, testimonials from tourists, and behind-the-scenes efforts towards sustainability. Encouraging user-generated content through dedicated hashtags can amplify the impact of these narratives. Collaborate with sustainability-conscious influencers, travel bloggers, and environmental activists to increase awareness and credibility. In destination branding, integrating sustainability into the brand positioning can increase credibility and enhance consumer trust. On the one hand, actively promote the destination's sustainability initiatives, such as the use of renewable energy, waste management plans, and community-driven conservation efforts. On the other hand, obtain recognized sustainability certifications (e.g., GSTC, Green Key, EarthCheck) and prominently display them in marketing communications. Attract ethically conscious tourists through these strategies. Develop interactive visitor engagement programs in the design of activities, such as sustainability challenges or incentive-based programs that encourage ERB (e.g., incentives for using reusable products, responsible waste disposal activities). Incorporate structured workshops, eco-tours, and interpretive programs into the tourism activity process to educate visitors about environmental protection and encourage long-term sustainable behavior. Effective marketing of these experiences can attract audiences interested in purposeful travel.

6.3. Research Limitations and Future Research Directions

This study has a number of limitations that should be noted despite the insightful information it offered. Firstly, although Social Exchange Theory (SET) provides a strong foundation for comprehending how emotional attachment plays a part in environmentally responsible behavior (ERB), other theoretical stances that could help clarify the complexities of pro-environmental actions are not included in the study. The Theory of Planned Behavior (TPB), for instance, could provide complementary insights by emphasizing the role of perceived behavioral control, subjective norms, and intention in shaping ERB. Future research should consider an integrated theoretical approach, combining SET, TPB, and other behavioral theories to construct a more comprehensive model of ERB in the tourism context. A mixed-methods approach or longitudinal design could be particularly useful in capturing the dynamic interplay between emotional, cognitive, and behavioral factors over time. Secondly, this research focuses on the importance of place attachment and emotional solidarity in driving ERB, but their interactions in different tourism contexts remain underexplored. Future research should examine how these emotional bonds function across various tourism settings, such as urban ecotourism, marine tourism, and cultural heritage tourism, to assess their contextual applicability. Additionally, longitudinal studies are needed to investigate how place attachment and emotional solidarity evolve over time and whether their influence on ERB is sustained in the long run. Such studies could provide deeper insights into how emotional connections develop, fluctuate, or diminish based on repeat visits, changing environmental conditions, or shifting tourist motivations. Third, the potential mediating mechanisms in the relationship between emotional factors and ERB warrant further exploration. While this study identifies emotional attachment as a key driver, other psychological constructs such as environmental awareness [28, 68] and perceived behavioral control Ajzen [69] may also serve as mediators, influencing how emotional connections translate into sustainable behaviors. To improve the theoretical and empirical knowledge of the psychological mechanisms behind ERB, future studies should investigate these alternate mediators. Furthermore, employing longitudinal or experimental methodologies could provide stronger causal inferences regarding the influence of emotional attachment on pro-environmental behavior over time.

Finally, the results of this study may not be as broadly applicable as they may be because it was carried out in a particular sociocultural context. Given that cultural values and social norms significantly shape individuals' attitudes and behaviors, cross-cultural comparative studies are needed to assess whether the relationships between place attachment, ERB, and emotional solidarity hold across different cultural and geographical contexts. Understanding how cultural factors influence these constructs could provide valuable insights for global sustainable tourism strategies. Future research should also examine whether destination-specific factors—such as local environmental policies, governance structures, and community engagement practices—moderate the relationship between emotional factors and ERB. In conclusion, future research should aim for theoretical integration, methodological diversification, and cross-cultural validation to further advance the understanding of ERB in tourism. Future studies can help create more successful, evidence-based plans for encouraging sustainable tourism practices in a variety of locations by tackling these constraints.

7. Declarations

7.1. Author Contributions

Conceptualization, W.L. and P.P.; methodology, W.L., P.P., and S.P.; formal analysis, W.L., P.P., and S.P.; data curation, W.L. and P.P.; writing—original draft preparation, W.L.; writing—review and editing, P.P. and S.P. All authors have read and agreed to the published version of the manuscript.

7.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7.4. Institutional Review Board Statement

Not applicable.

7.5. Informed Consent Statement

All participants in the study provided informed consent.

7.6. Declaration of Competing Interest

The authors declare that there are no conflicts of interest concerning the publication of this manuscript. Furthermore, all ethical considerations, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I

Table A1. Questionnaire's structure

Measure	Items
Place Attachment	I wholeheartedly concur/acknowledge the significance of this woodland park.
	The recollections of my visits to Forest Park hold significant value in shaping the tapestry of my existence.
	The absence of Forest Park throughout prolonged periods of separation evokes a sense of longing inside me
	I've always imagined that the environment and facilities of the forest park here would put me at ease enough to do my favorite things.
	In comparison to other forest parks, the facilities and environment at this park are the nicest I've ever seen.
	I enjoy visiting the tourist sites near the forest park, and I believe the tourist facilities and amenities near the forest park are superior to those found on other rural tours.
	I really enjoy this forest park.
	Forest Park has environmental amenities that give me a deep sense of belonging.
	It means a lot to me to be able to rest and recover in this woodland park.
	My friends and family enjoy visiting this forest area for rest and recuperation.
	I'd like to take my friends/family to this forest park for some rest and relaxation.
	Rest and rehabilitation vacations in Yuanbaoshan Forest Park and the surrounding area have provided many beautiful memories for me and my family/friends!
Emotional Solidarity	As a visitor to the area, I am pleased that I am well cared for here.
	I can sense the inhabitants' gratitude for my gift to Forest Park.
	I treat locals the same way I treat my friends.
	The people are appreciative for my contribution to the growth of the tourism sector in the Forest Park area.
	I feel a connection to some of the people who live in Forest Park and the neighboring areas.
	I can make friends with some of the people who live in Forest Park and the nearby areas.
	I can go to people's homes in and surrounding Forest Park.
	Residents of Forest Park and its environs will communicate with me.
	I understand local people's efforts to protect the environment.
	During my visit to the forest park, I found that I had many similarities with the locals.
	I have a favorable opinion of the locals.
	I agree with some of the ideals and behaviors of the locals.
Tourists' satisfaction	I feel at ease in this forest park's natural setting.
	I am pleased with the environmental facilities and tourism management methods in and around the Forest Park.
	I appreciated the procedure of resting and exploring the Forest Park.
	In general, I am pleased with my visit to Yuanbaoshan Forest Park.
Environmentally Responsible Behaviour	Please collect your own waste and empty it into the garbage can during the tour.
	Please do not pick flowers, plants, or leaves while on the trip.
	During the tour, do not take shortcuts or walk on the grass.
	Remind your friends not to litter or damage the flowers and trees at the Forest Park or other public sites in the vicinity.
	In Yuanbaoshan Forest Park, take the initiative to clean up trash thrown by others and place it in garbage cans.
	If you witness other people hurting the environment at Yuanbaoshan Forest Park, go ahead and convince them not to.
	Inform the management or personnel of the region to which you belong about any environmental problems in Yuanbaoshan Forest Park.
	During my recuperation trip, I will actively participate in environmental preservation initiatives in the Yuanbaoshan Forest Park.
Destination Social Responsibility	The tourist destination donates and supports local community development
	The tourist destination strives to improve the quality of life of local residents
	The tourist destination attaches great importance to protecting the authenticity and integrity of cultural heritage (such as maintaining the original style of ancient architecture, folk culture, and customs)
	The tourist destination strives to support the development of local cultural undertakings (such as inheriting and promoting folk culture, folk villages, etc.)
	The tourist destination strives to improve its business performance and efficiency
	The tourist destination values establishing long-term and stable relationships with tourists
	The tourist destination strives to provide high-quality tourism products and services
	The tourist destination strives to provide cost-effective products and services
	The tourist destination conducts tourism activities within an environmentally acceptable range
	The tourist destination strives to control the impact of tourism activities on the environment (such as managing waste, controlling and treating pollutants, etc.)
	The tourist destination pays attention to environmental protection in production and operation
	The tourist destination attaches great importance to the conservation and protection of natural resources
Self-Efficacy	I believe I have the ability to take action to protect the environment at my destination
	Although this may cause inconvenience, I can still change my behavior to protect the environment at the destination
	I believe I can effectively travel on an environmental mission