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Do Situations Influence the Environmentally Responsible Behaviors of National Park Visitors? Survey from Shennongjia National Park, Hubei Province, China

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Abstract: Natural ecological protection in protected areas involves the restriction of land use patterns and their intensity. Typically, the goal of land use is to balance environmental protection with community development. Nature education and ecological experiences in protected areas encourage visitor environmentally responsible behavior (ERB) which supports the sustainable use of land in national parks and reduces the degradation of natural environments. The existing research literature has a focus on ways of facilitating ERB through rational and external influences. However, individual behaviors are contextual and specific situations affect behavior. This research used environmental knowledge as a rational factor and situations were viewed as a moderator in stimulating ERB based on situational cognition theory. A knowledge-situation-behavior latent variable moderator model was constructed and tested with visitor survey data from Shennongjia National Park, Hubei Province, China. The findings showed that situations had a significant positive moderating effect on the relationship between environmental knowledge and ERB. Books, articles, authors and familiar people had a significant positive moderating effect on ERB, as did environmental interpretation and staff guidance. Precise measures to promote the ERB of national park visitors were proposed.

Keywords: environmentally responsible behavior; altruism; environmental knowledge; situated cognition theory; national parks; moderating effects

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1. Introduction

The impacts of human activities are contributing to global warming and the degradation of natural environments. These negative impacts can be partly reduced by encouraging greater environmentally responsible behavior (ERB). Maintaining natural ecological environments is one of the important purposes of protected area systems. As an eco-sensitive area, in the context of China where social systems and natural systems are deeply embedded, nature reserves seek to lower the tensions between people and land uses, especially with respect to social and economic development. National park visitors often have spontaneous ERB and willingness [1]. They will abide by the environmental norms of a protected area, and even are willing to admonish environmentally unfriendly behaviors of other visitors. If the focus is shifted from reducing visitor environmental damage to promoting and encouraging ERB in national parks, this will more effectively promote the sustainable development of the environment [2]. Encouraging visitors to have greater ERB is vital for the sustainable development of nature reserves and the use of land resources.

China is introducing a new natural protected area system, and national parks are the main component of its nature reserves. The national goal is to achieve the sustainable use of natural resources through nature education and ecological experiences that foster ERB and promote more sustainable use of resources. The essence of nature reserve ecological

protection is the restriction of land use patterns and intensity. The balance between environmental protection and community development is achieved in how land is used scientifically and rationally. Nature education and ecological experiences cultivate better environmental citizens who demonstrate ERB [3]. Two aspects are involved in these initiatives. First, nature education and ecological experiences enhance the awareness of land resource issues among visitors. As a result of their participation, visitors better appreciate and enjoy the beauty of nature, accumulate important life experiences, intensify connections with nature, become more environmentally friendly, adopt ERB practices and contribute to creating an ethos of nature conservation. People more strongly support the expansion of protected areas, which reinforces ecological protection and the sustainable land use of the affected communities.

Second, nature education and ecological experience activities reduce the land uses available to residents of national park communities. The land in national parks is strictly restricted in use patterns and intensity. Previously consumable land use patterns are forbidden, and it may be difficult to sustain the traditional livelihoods of communities. However, nature education and ecological experiences attract visitors into these communities. Communities can obtain an alternative source of livelihood by participating in nature education or engaging in the hospitality industry based upon offering ecological experiences. Thus, nature education and ecological experiences can act as bridges between conservation and community development since residents benefit from nature education and ecological experience activities. Thereby, communities can adapt to more stringent protection requirements, support the control measures for national park land, and integrate ERB into their work and lives, which in turn facilitates sustainable land use in protected areas.

Land-based natural ecosystems have the right of abode in national parks, and all humans who enter national parks are visitors. Those who participate in nature education and ecological experiences include non-local visitors and community residents. Compared with external visitors, the residents stay longer in the nature reserves and have more in-depth and extensive and convenient exposure to all aspects of protected areas [4]. Their living and production environments are an important part of protected areas. In particular, the land and other natural resources in China's protected areas are collectively owned by community residents, who have the right to transform these land resources according to their production and living requirements. Therefore, whether residents adopt ERB in their production and lives directly affects the environmental quality of protected areas, and the degree of impact may be more significant than that of visitors [5]. Cultivating better environmental citizens through nature education and ecological experiences and enhancing ERB is not only the responsibility of national parks, but also an effective way to increase sustainable land use in protected areas. On the one hand, motivating greater ERB among visitors effectively overcomes some of the ecological dilemmas of protected areas and reduces the costs of environmental protection. On the other hand, this effort aimed at community residents has a spillover effect on ERB in daily life and has far-reaching impacts on the use and development of national lands and natural resources.

How to convince protected area visitors to practice greater ERB? There are many studies on how to promote the ERB of visitors to nature reserves [6–8]. This research explored influential factors to provide a scientific basis for building a stronger environmental protection culture and increased ecological protection awareness. The existing studies on ERB place more attention on individual visitor characteristics [9–11]; however, external factors such as the situations experienced by visitors are less examined. Thus, the impacts of different external situation factors on visitor ERB were analyzed in this research.

The main intended contribution was to extend the research on the factors influencing ERB based on situational moderation and to enrich the understanding of influential factors on visitors to national parks. The academic contribution is in adding to the research on the situational factors that may stimulate enhanced ERB. Existing studies primarily explore the formation of ERB based on the Theory of Planned Behavior (TPB) [12] and the Theory of Rational Action (TRA) [13]. However, national park visitors actually experience nature

education, and production and consumption are simultaneous; therefore, ERB is affected by the particular situations surrounding these experiences. The findings confirmed that the impact of situations on ERB were significant, when divided into their instrumental and embedded aspects. The managerial contribution of these research findings lies in providing guidance for national park administrators to enhance visitor ERB and the sustainable use of natural resources.

2. Literature Review and Theoretical Framework

2.1. Environmentally Responsible Behavior

Environmentally responsible behavior (ERB) is a concept in environmental psychology [14], which reduces the impact of global environmental degradation and promotes sustainable development [15]. Similar concepts include pro-environmental, environmentally friendly and green behaviors [16]. ERB was first proposed as all actions taken by individuals and groups to remedy environmental problems [17]. However, the meanings and applications of ERB are constantly expanding. In addition to the passive implementation by individuals, Lee et al. (2013) defined ERB as the non-interference with the ecosystems and biospheres of destinations while engaging in recreation and tourism activities [18]. This is consistent with the requirements of national parks and other protected natural areas where visitors participate in nature education and ecological experiences. ERB refers to a series of behaviors adopted by individuals and groups to reduce the use of natural resources and promote the sustainability of natural resources including land [19]. Yu et al.'s (2015) study cited this concept [20]. Individuals and groups practicing ERB take the initiative to improve natural ecological environments and promote the sustainable use of natural resources. This notion accurately expresses the true meaning of the ERB of community residents and visitors within national parks. Community residents within national parks should not practice consumptive uses of natural resources. Visitors while within national parks and in everyday life and work should practice ERB based upon the nature education and ecological experiences they have acquired. Such behaviors ultimately will be more conducive to achieving sustainable management levels for national land and other natural resources.

The measurement of ERB is the basis for many studies on the phenomenon [20,21]. ERB can be measured by a single dimension [22] or according to multiple dimensions [23]. Kaiser's single-dimensional ecological behavior scale is much used, and subsequent research studies have also developed single-dimension measurement scales [24–26]. For multi-dimensional scales, there are four categories (radical environmental behaviors, non-radical behaviors in the public domain, environmental behaviors in the private domain and other environmentally significant behaviors) [27]. A tourist environmental responsibility scale was proposed in the context of community tourism [18]. A ten-dimensional prediction scale has also been designed, which includes the concepts of "biospheric value" and "valence" [28]. In the existing literature on leisure and recreation, ecological experiences and tourism, the ERB multi-dimensional evaluation scale proposed by Smith-Sebasto and D'Costa is applied [23], but most scholars apply single-dimensional scales to measure ERB [29–31]. The scale developed by Smith-Sebasto and D'Costa was adapted and applied for ERB measurement.

The formation of ERB is a core consideration for protected area management. Park management agencies must introduce programs to improve ERB which are based on the knowledge of how ERB is formed. These knowledge-based programs can be used to guide the offering of nature education and ecological experiences in national parks that facilitate more sustainable use of land. Researchers have modeled the antecedents of ERB and have analyzed the relationships among influential factors. Theoretical approaches that have been used include cognitive theory [32–34], the environmental education path (knowledge–understanding–concern–responsibility–action-awareness) [35] and the environmental knowledge-environmental sensitivity- ERB model [36]. These theoretical frameworks are applied for predicting individual levels of ERB. Individuals with advanced

environmental sensitivity are more inclined to assume environmental protection responsibilities. Enjoying nature and acquiring environmental knowledge is viewed as the basis for increased environmental sensitivity [37]. The purpose of environmental education is to cultivate environmental knowledge and attitudes and eventually form ERB, such as perceiving nature, understanding the learning process and influencing future behavior [34]. Environmental knowledge can be defined as knowledge about environmental protection, sustainable development, the natural environment and ecosystems [36,38]. Nature education and ecological experiences in national parks are effective ways for imparting environmental knowledge, and environmental knowledge is the starting point for the environmental education path and ERB. Henceforth, this research treated the acquisition of environmental knowledge as the initial generator of ERB.

2.2. Altruism, Situations and ERB

In the 1980s, the mainstream school of psychology believed that all human behaviors, including prosocial behavior, were driven by selfish desire. Therefore, altruism should be a kind of helping behavior, not motivation. Baston (1987) proposed that there are two orientations of output altruism: one is ego altruism, which refers to helping others in order to reduce inner tension and anxiety. The motivation of this situation is self-serving. Helpers reduce their pain, make themselves feel powerful or experience a kind of self-worth through helping others. Another orientation is pure altruism, which means that individuals empathize because they see someone in trouble, so as to help others to alleviate the pain of others, and its purpose is for the well-being of others [39]. The latter is motivated by empathy [40], rather than expectation of rewards or evasion of punishments. The pure altruistic behavior is the voluntary behavior of individuals to benefit others.

Even though social psychologists have explained the altruistic behavior among non-relatives from the perspective of ego altruism and pure altruism, biological experts have also put forward their own views. American evolutionary biologist Robert Trivers (1971) had put forward reciprocal altruism to promote the understanding of altruistic behavior among non-relatives [41]. One organism provides benefits to another organism and can "altruism" to promote the better survival of all organisms.

Reciprocal altruism has a more positive effect on individual altruistic behaviors [42]. "The other" is vague and mysterious. It is the expression of the objectification trend in its own relationship. It can be other humans except the self, or the natural world including animals and plants. In short, it includes all organisms. Individuals engage in reciprocal altruistic behaviors because they expect rewards, immediate or delayed, such as improvement in their social reputation as a result of adopting altruistic behaviors [43]. ERB is largely driven by altruism and is a typical altruistic behavior [44]. When visiting national parks, individuals expect rewards from the natural ecosystems, such as recreation, leisure and enjoying natural beauty, as well as upholding mainstream values of social-ecological protection and gaining societal respect.

Then, how can individual altruism be inspired based on ERB? Environmental knowledge, as a rational factor generating ERB, is insufficient for stimulating ERB [45]. Situational factors are extensively applied in research on altruistic behavior [46], and may constitute a principal influencing factor in stimulating ERB. Individual behavioral patterns are contextual, and context is one of the critical background factors for behaviors [47,48]. Context generation is the process in which individuals construct and interpret the world through their surrounding environments. Consequently, attention should be paid to the interactions between individuals and their environments [49]. Human intelligence, cognition, and knowledge all depend on people's interactions with situations [50]. Situational cognition theory was developed based on objective cognition. Cognition is not an abstract or transcendental ability, but an adaptive activity in specific situations. Hence, it is predicted that individuals interact with different situations, and the generation of ERB will be determined by these situations of individuals to some extent.

Which situations impact ERB? People may be motivated to exhibit ERB and individual cognition and judgment in specific situations may inspire ERB levels. However, even people with high-level altruism may not behave altruistically in all situations. Therefore, context is not a mediator for ERB but may act as a moderating factor. Existing studies on the influencing factors for ERB give more consideration to rational factors. However, from the perspective of altruism, the generation of ERB is more motivated by specific situations. Do visitor perceptions of situations through nature education and ecological experiences in a national park affect ERB? What are the differences in the impacts of different situations on ERB? These questions have not been addressed in previous studies and this research was intended to fill the literature gap.

2.3. Hypotheses and Theoretical Framework

Scholars have continuously expanded the scope and deepened the research on ERB. The environmental education path and ERB regard environmental knowledge as a catalyst for ERB. When individuals have more environmental knowledge, they pay more attention to the environment. People with a higher level of environmental knowledge will fulfill their responsibilities with respect to environmental protection [37]. Environmental knowledge improves people's environmental sensitivity, while environmental knowledge and sensitivity affect the performance of environmental behavior [19]. Thus, this research assumed that environmental knowledge has a positive effect on ERB.

Hypothesis 1. Environmental knowledge has a significant positive impact on ERB.

Cognition is not only neuronal activity in the brain but also affects the body, situations and surrounding factors. People, their surrounding environments and social-cultural backgrounds coexist as a whole, and together constitute the cognitive system. Situatedness is a concept widely accepted and recognized by researchers in cognitive science. Situational cognition theory is very rich, and it can be understood from different perspectives. Situational cognition theory is mainly viewed through extended cognition and situationally embedded cognition [51]. Extended cognition uses tools to help cognition and is also called instrumental cognition.

The situational factors in this research were of three types: instrumental, national park and social and cultural situations. Instrumental situation contains books and authors [52], training seminars [53,54], television media [37], associates [25] and other visitors [55]. The situational embedding factors included the national park context and social culture. It was expected that a comprehensive ecological conservation and interpretation system in a national park promotes visitor ERB. The environmental protection at home in the visitor origins and local traditional culture may also have an influence on ERB.

Hypothesis 2. Situations have a moderating effect on ERB.

Based on these research hypotheses, a conceptual model in a latent regulatory structural equation format was proposed to describe the generation of ERB among national park visitors. The model includes the three latent variables of environmental knowledge, situations and ERB (Figure 1).

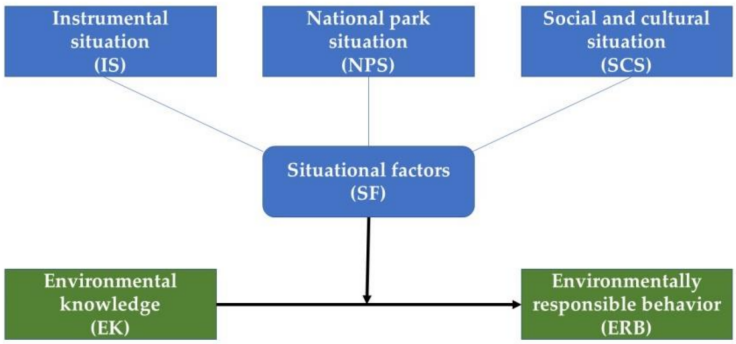

Figure 1. Conceptual research model.

3. Study Area

Shennongjia National Park is located in the south of the Shennongjia Forest District, Hubei Province, China, covering an area of 1170 km^2 (Figure 2). In May 2016, it was approved to be one of the first national park system pilot areas in China. The Shennongjia National Park has an intact subtropical forest system and a peat moss wetland ecosystem. In the park, there are 36 species of national key protected wild plants such as dove trees and 75 species of key protected wild animals including the golden monkey. Its intact ecosystems, rich biodiversity, as well as the original and unique inland alpine culture make it a "natural zoo and botanical garden" and a "gene pool of species".

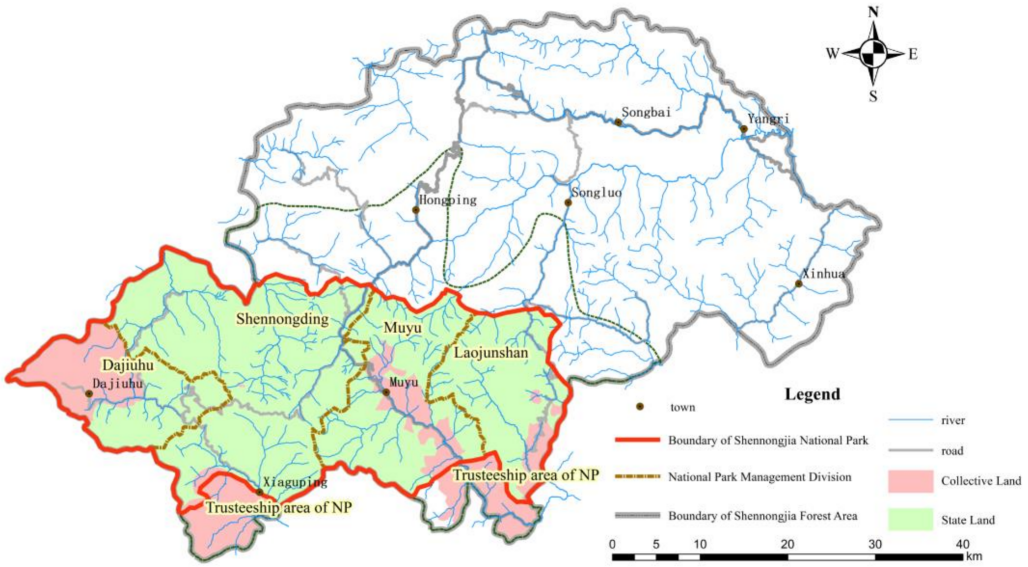

Figure 2. Shennongjia National Park study area.

Shennongjia National Park has formulated regulations on visitor limits, behavioral guidance and environment interpretation systems. It has created a recreation product system with distinct themes, and launched a study on health tourism assets. The National Park has established a science popularization and interpretation system and prepared a complete list of biological resources, striving to build a "nature classroom" for national education.

4. Materials and Methods

4.1. Research Instrument Design

The measurement items of situational factors, environmental knowledge and ERB were derived from previous research which are listed in Table 1 and adapted for the situation of Shennongjia National Park to form the final questionnaire (Table 1). A latent

moderating structural equation model was used to explore the moderating effect of situations on the ERB of national park visitors. This research sets two categories of situational factors, including the instrumental and embedded situations (i.e., National Park situation and socio-cultural situation), which were measured by 13 items. Among them, the instrumental situation had six items (IS1–IS6), the National Park situation consisted of four items (NPS1–NPS4) and the socio-cultural situation had three items (SCS1–SCS3). Latent variable environmental knowledge was measured by 10 items, and ERB was measured by nine items. Therefore, the scale included 32 items, all of which were measured by five-level Likert scales.

Table 1. Questionnaire design.

Latent Variable		Items	References
Situational factors (SF)	Instrumental situation (IS)	I have acquired environmental knowledge and skills from classroom study and extracurricular activities. (IS1)	Barr et al., 2012 [52]
		I used to have experience in the beautiful natural environment. (IS2)	Tanner, 1980 [56]
		I have received environmental knowledge from an influential article, book or environmentalist author. (IS3)	Barr et al., 2012 [52]
		I have learned the values and behaviors of protecting the environment from people around me. (IS4)	Cialdini et al., 1990 [57] Han et al., 2015 [58]
		I have learned to practice ERB from lectures or training on the environment. (IS5)	Zhu, 2013 [54]
		The information I got from TV, the Internet and other media has made me more willing to adopt environmental behavior. (IS6)	Xia et al., 2016 [53]
	National park situation (NPS)	Environmental protection activities in the Shennongjia National Park have promoted my ERB. (NPS1)	Wang, 2018 [59] Go et al., 2020 [7]
		The setting of the environmental interpretation system in the Shennongjia National Park has promoted my ERB. (NPS2)	
		The environmental protection in the Shennongjia National Park has promoted my ERB. (NPS3)	
		The exhortation from the staff of Shennongjia National Park has helped me adopt environmental behavior. (NPS4)	
	Socio-cultural situation (SCS)	Society strongly advocates environmental protection, making me more willing to adopt environmental protection behavior. (SCS1)	Han et al., 2010 [25]
		Persuasion from fellow visitors helped me adopt environmental behavior. (SCS2)	Wang et al., 2014 [55]
		Other visitors' behavior in protecting the environment affects my behavior. (SCS3)	
Environmental knowledge (EK)	I think the recreation activities in national parks are different from that in general scenic areas. The recreation and nature education in national parks should promote ERB among visitors. National park visitors should respect life and care for the natural environment.		New environmental knowledge based on the national park context
	Ecological balance is conducive to sustainable development. Uncontrolled and consumptive utilization of natural resources will lead to ecological deterioration. Species diversity in national parks is conducive to ecosystem stability. Nature conservation supports intergenerational equity. Excessive recreational activities can damage the ecological environments of national parks. Exhaust emissions from motor vehicles contribute to a decline in air quality in national parks. Green travel is conducive to environmental protection.		Haron et al., 2005 [60]
Environmentally responsible behavior (ERB)	I will not litter in Shennongjia National Park. I will not pick flowers in Shennongjia National Park. I tried to solve environmental problems in Shennongjia National Park. I discussed environmental protection in Shennongjia National Park with others. I tried to persuade my companions to practice ERB for the natural environment in Shennongjia National Park. When I see others behaving badly in Shennongjia National Park, I discourage them. According to relevant laws and regulations, I will prevent any action that damages the environment of Shennongjia National Park. I will take the initiative to pick up garbage when I see it. If environmental protection activities are launched in Shennongjia National Park, I will take an active part.		Smith-Sebasto et al., 1995 [23]

4.2. Questionnaire Administration

Due to COVID-19 in China, visitors to the Shennongjia National Park only began to increase in August 2020. Questionnaires were distributed at the recreation exhibition areas, science popularization exhibitions, and traditional utilization areas of Shennongjia National Park from 22 August to 30 August 2020. The science and education recreation areas are mainly in Guanmenshan, Shennongding and Dajiuhu, while the traditional utilization areas are in Muyu and Dajiuhu. There were more visitors to the national park in the above areas. A total of 439 survey questionnaires were collected, including 409 that were valid, with an effective return rate of 93.2%.

5. Results and Discussions

5.1. Reliability and Validity

SPSS 25.0 was used for the reliability testing. Cronbach's α coefficients for the three latent variables (situations, environmental knowledge and ERB), are in Table 2, with the lowest value being 0.949. The Cronbach's α coefficient for the sample population was 0.901, greater than the acceptable standard of 0.7 and the reliability of the questionnaire data was appropriate, indicating that the measurement has good stability.

Table 2. Reliability of scale.

Latent Variables	Cronbach's α	CR	AVE
SF	0.965	0.966	0.686
EK	0.965	0.966	0.739
ERB	0.949	0.95	0.679
Overall scale	0.901	-	-

Construct validity is mainly reflected by convergent validity and discriminant validity. Confirmatory factor analysis (CFA) was conducted for the three latent variables in oblique models to obtain standard indicator loading estimates. Then the composite reliabilities (CR) and average of variances extracted (AVE) of latent variables were calculated. AVE was represented by convergent validity (CV). As shown in Table 3, the CR values of EK, SF and ERB were 0.966, 0.966 and 0.950, which were all greater than 0.9, indicating that the CRs of all latent variables were relatively high. The AVE values of EK, SF and ERB were 0.739, 0.686 and 0.679, which were all greater than 0.5, reaching an acceptable level, indicating that there was good convergent validity between the items measuring the same variable. In addition, Table 3 shows the discriminant validity analysis of the three latent variables in the scale. The diagonal line is the AVE square roots, and the other values are correlation coefficients. The oblique diagonal values of the three latent variables were all larger than the other values, indicating that the three latent variables had good discriminant validity.

Table 3. Discriminant validity of scale.

Variables	EK	SF	ERB
EK	**0.86**		
SF	0.74	**0.828**	
ERB	0.66	0.351	**0.824**

Moreover, this research followed the basic procedures and principles of scale development when designing the questionnaire, and avoided potential problem with the content validity of measurements. Thus, the scales used in the questionnaire for this research were reliable and appropriate.

5.2. Respondent Demographic Characteristics

The demographic characteristics of the respondents are shown in Table 4. Females (55.99%) were more than males (44.01%), and the ages were concentrated in the 18–25 years

old range (32.03%). The majority of respondents were students (41.81%), freelancers (12.22%) and self-employed (10.76%), and their educational backgrounds were distributed as undergraduate (36.43%) and junior college (33.5%). Since most of the respondents were students, their monthly income was below 2000 yuan (40.1%). Annual trips taken were 1–2 (34.23%), 3–4 (35.95%) and 5 times or more a year (29.83%).

Table 4. Demographic profile of respondents.

Demographic Characteristics		N	%
Gender	Male	180	44.01
	Female	229	55.99
Age (years)	≤18	48	11.74
	18–25	131	32.03
	26–35	84	20.54
	36–45	71	17.36
	46–55	75	18.34
	≥56	0	0
Profession	Civil servants	38	9.29
	The staff of enterprises and public institutions	34	8.31
	Professional cultural, educational, scientific and technological personnel	39	9.54
	Self-employed	44	10.76
	Service/sales staff	33	8.07
	Freelancers	50	12.22
	Retirees	0	0
	Students	171	41.81
Education	Junior high school and below	46	11.25
	High school/technical secondary school	55	13.45
	College	137	33.50
	Undergraduates	149	36.43
	Master's degree or above	22	5.38
Income (per month, yuan)	≤2000	164	41.10
	2001–4000	8	1.96
	4001–6000	81	19.80
Demographic Characteristics		**N**	**%**
	6001–8000	87	21.27
	≥8000	69	16.87
Annual number of trips	1–2	140	34.23
	3–4	147	35.94
	≥5	122	29.83

5.3. Model Fit

Mplus 7.4 software was used to test the goodness of fit of the model. The results of model fit analysis are presented in Table 5. The fit statistics were X^2 = 891.775 (df = 461, p = 0.000), NCI (X^2/df) = 1.93, CFI = 0.965, TLI = 0.962, $RMSEA$ = 0.048, $SRMR$ = 0.032. All of the statistics met the fit criteria proposed by Jöreskog et al. [61], indicating that the model constructed had a good fit with the data.

Table 5. Model fit statistics.

Statistics	Fit Results	Criteria	Judgement
NCI (X^2/df)	1.93	<3	Fit
CFI	0.965	>0.9	Fit
TLI	0.962	>0.9	Fit
$RMSEA$	0.048	<0.05	Fit
$SRMR$	0.032	<0.1	Fit

5.4. Moderating Effect of Situations

5.4.1. Moderating Effect of Situations on ERB

MPLUS 7.4 software was applied to build a latent moderating structural equation model and test whether situational factors (SF), as latent variables, had a moderating effect on ERB. The moderating effect in statistics is also called an interaction. According to Hypotheses 1 and 2, the influence of EK on ERB is moderated by the SF, that is, the influence of EK on ERB changes with a change in SF. The moderating effect should be the product of SF and EK. If the results are statistically significant, this indicates that SF has a moderating effect on the impact of EK on ERB.

The results from applying MPLUS 7.4 are shown in Table 6. The path regression coefficient of EK and ERB was 0.551 ($t = 3.210 > 1.96$, $p = 0.001 < 0.1$). Therefore, it was concluded that environmental knowledge had a significant positive effect on ERB, and the interaction term had a significant positive effect on ERB, supporting Hypothesis 1. The interaction term (EK*SF) coefficient between EK and SF was 0.247 ($t = 2.683 > 1.96$, $p = 0.007 < 0.1$), indicating that it had a significant moderating effect on ERB, that is, situations exerted a significant positive moderating effect on ERB, implying that Hypothesis 2 was supported.

Table 6. Unstandardized path coefficients and significance of model.

	Estimate	S.E.	Est./S.E.	*p*-Value
ERB ← EK	0.551 ***	0.172	3.210	0.001
ERB ← SF	0.338 *	0.203	1.916	0.055
SF*EK	0.247 ***	0.092	2.683	0.007

* $p < 0.1$, *** $p < 0.01$.

5.4.2. Differences in Situational Moderating Effects on ERB

The analysis indicated that situations had a significant positive influence on ERB but did not reveal which situations had the greatest impact. Therefore, the moderating effects of different situations on ERB were analyzed (Table 7). The comparison of the roles played by third parties in stimulating ERB can assist national park managers in formulating relevant measures. Items IS1 and IS2 were excluded from the comparison.

Table 7. Comparison of moderating effects in different situations.

SF	Code	Situations	Path	Estimate	S.E.	Est./S.E.	*p*-Value
IS	IS3	Articles, books or authors	ERB ← EK	0.465 **	0.200	2.325	0.020
			ERB ← IS3	0.025	0.116	0.219	0.827
			ERB ← EK*IS3	0.104 **	0.129	1.974	0.028
	IS4	Familiar people around me	ERB ← EK	0.617 ***	0.137	4.512	0.000
			ERB ← IS4	0.050	0.092	0.539	0.590
			ERB ← EK*IS4	0.217 ***	0.074	3.799	0.002
	IS5	Lectures or training	ERB ← EK	0.771	0.053	0.097	0.923
			ERB ← IS4	0.024	0.072	0.806	0.39
			ERB ← EK*IS4	0.254	0.065	0.921	0.357
	IS6	TV, Internet and other media	ERB ← EK	0.547	0.095	0.111	0.911
			ERB ← IS6	0.051	0.452	0.221	0.825
			ERB ← EK*IS6	0.214	0.408	0.247	0.805
NPS	NPS	Environmental protection activities, environmental interpretation systems, environmental protection facilities, exhortation from staff	ERB ← EK	0.584 ***	0.179	3.259	0.001
			ERB ←NPS	0.242	0.213	1.136	0.256
			ERB ← EK*NPS	0.213 **	0.091	2.334	0.020
SCS	SCS1	Social environmental protection atmosphere	ERB ← EK	0.529	0.805	0.657	0.511
			ERB ← SCS1	0.094	0.302	0.312	0.755
			ERB ← EK*SCS1	0.135 **	0.194	1.966	0.049
	SCS2	Persuasion from fellow visitors	ERB ← EK	0.583 ***	0.202	2.880	0.004
			ERB ← SCS2	0.214	0.180	1.194	0.232
			ERB ← EK*SCS2	0.209	0.100	0.870	0.537
	SCS3	Protection behavior from fellow visitors	ERB ← EK	0.593 *	0.051	0.165	0.069
			ERB ← SCS3	0.041 *	0.068	1.710	0.087
			ERB ← EK*SCS3	0.133 **	0.079	2.052	0.040

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The instrumental situation is essentially the cognitive extensions made by individuals with the help of external tools. Cognitive processes extend from the brain to the environmental tools that a person uses. Cognitive processes are a cognitive system that spans the brain, the body and the environment. The generation of ERB may be based on books and articles related to environmental protection, surrounding familiar people or lectures or training on environmental protection, as well as introductions on TV, the Internet and other media. This research treated these environmental instruments as potential catalysts for ERB, and analyzed and compared the moderating effects of the four types of environmental instruments.

Among the four environmental instruments, the moderating effect of training lectures, television, and other media on ERB was not significant. The environmental protection information communicated through traditional media such as TV and electronic media such as the Internet tends to be fragmented and thus is ineffective in changing long-term behavior. The frequency of training lectures is difficult to maintain, and audiences are restricted. In addition, the stereotype of tedious individual lectures may cause their limited acceptance. Books, articles, authors and familiar people had a significant moderating effect on ERB. The situational interaction terms for environmental protection-related books, articles or authors and familiar people were 0.104 ($t = 1.974 > 1.96$, $p = 0.028 < 0.05$) and 0.217 ($t = 3.799 > 1.96$, $p = 0.002 < 0.01$), respectively. When individuals read books, pay attention to environmental authors, and follow environmental practitioners with whom they are familiar, this has a lasting and long-term positive impact and fosters ERB.

The situation-embedded cognitive view holds that cognitive activities are related to situations and are embedded in them. In other words, the cognitive process is a dynamic process in which the brain, the body and the environment interact. Cognitive activity is situation-dependent and situation-deep. The embedded situations were composed of the national park (NPS) and social and cultural situations (SCS). The situations embedded in this research are in a narrow sense and broad. The narrow view is the national park situation, and the organized environmental protection activities, environmental interpretation system, environmental protection facilities, and the guidance of national park staff. The broader view is the social and cultural atmosphere. If visitors have a strong social and cultural atmosphere of environmental protection, they will be influenced by this atmosphere and it will promote ERB. The results indicated that the national park and social and cultural situations had significant positive moderating effects on ERB. The interactive term for the national park situation was 0.213 ($t = 2.334 > 1.96$, $p = 0.020 < 0.050$). National parks create a positive atmosphere through environmental activities, facilities, interpretation systems and staff. The interactive term for social environmental protection atmosphere was 0.135 ($t = 1.966 > 1.96$, $p = 0.049 < 0.050$). When a society strongly advocates environmental behavior, visitors under the pressure from social norms and other people, will pay greater attention to ERB to improve their social reputations.

5.4.3. Moderating Effects of Fellow Visitor Behavior and Verbal Persuasion

If peer visitors consciously practice ERB, or persuade companions to abide by environmental protection norms, this can affect the behavior of others. However, verbal persuasion and behavioral demonstration had differing ERB promotion effects on visitors (Table 7). The interactive term for SCS2 (protective behavior from fellow visitors) was 0.133 ($t = 2.052 > 1.96$, $p = 0.040 < 0.050$), and the interactive term for SCS3 (persuasion from fellow visitors) was 0.209 ($t = 2.052 > 1.96$, $p = 0.537 > 0.100$). The behavioral demonstration of peer visitors had a significant moderating effect on the ERB of other individuals. Relevant psychological research shows that all human beings practice imitative behavior, that is, visitors will adopt the same or similar behavior as others. Especially when such behavior will not bring harm to people, but will produce benefits, the behavior is more likely to occur. For example, people may see fellow visitors taking photos of flowers and stepping on the flower beds to do so, regardless of no trampling signs. Assuming this to be an acceptable behavior, they do the same. If fellow visitors do not snap photos in this way,

others will likewise stay off of the flower beds. The reason why the moderating effect of language persuasion was insignificant may be that it failed to arouse reflectivity among many visitors themselves, leading to little or no persuasive effect.

6. Conclusions and Implications

Based on situational cognition theory, the analysis of ERB was expanded based on situational moderation and this enriches the connotation of the ERB influential factors in national parks. This research adds to the research on the influence of situational factors in the formation of ERB. According to Situated Cognition Theory, the situational factors which promote ERB were divided into two categories, including extended (instrumental) and embedded situations. The latter were the national park situation and socio-cultural atmosphere. The classification of situational factors results in more comprehensive implementation of measures to promote greater ERB. According to the results of the latent moderating structural equation model, the following four conclusions were drawn. First, as the starting point for research on ERB, environmental knowledge had a positive role in promoting ERB. This was consistent with the conclusions of previous studies [36]. Second, situations exerted a significant moderating effect on ERB, and different contexts showed dissimilar moderating effects. In the instrumental situation, given the persistence of its impact on ERB, books, articles, authors and familiar people triggered a significant positive moderating effect on ERB, but training, lectures, TV, Internet and other media information showed no significant moderating effect because they did not have a sustained effect on visitors. Third, for the embedded situations, the national park situation and the social environmental culture atmosphere all had positive moderating effects on ERB. The research of Gupta et al. (2021) showed that the site-specific environment affects the ERB of visitors [6], and this study once again confirmed that when visitors are in the site-specific environment of Shennongjia National Park, this environment has a positive impact on visitor ERB. The national park situation is formed by environmental protection activities, facilities, interpretation system and staff guidance. Finally, behavioral demonstrations can significantly promote greater visitor ERB, while verbal persuasion does not significantly promote the ERB.

Promoting greater visitor ERB is not only of great significance to the sustainable utilization of land resources in nature reserves, but also contributes to a socio-cultural ethos of environmental protection. The following policy recommendations are put forward based on the above results of this research. The first policy initiative is to create a social environment protection atmosphere thereby enhancing people's awareness of environmental protection. The social and cultural atmosphere has a significant influence on ERB. Societies must promote environmental protection through different channels, such as producing vivid and interesting videos on environmental protection, and publishing related books and articles, especially for children and other young people. Schools should increase and improve curricular content on environmental education, carry out various types of environmental protection activities, enrich student environmental knowledge and produce important life experiences.

The second policy initiative is to improve the environmental interpretation system of national parks and enrich visitor knowledge of environmental protection. The national park situation has a significant moderating effect on the relationship between environmental knowledge and ERB. National parks are one of the main bases for nature education and ecological experiences. Promoting ERB is of great significance to the sustainable use of natural resources including land. National parks need to convey environmental protection knowledge to visitors through guided and self-guided environmental interpretation systems. National park staff must demonstrate environmental behavior to visitors. Environmental behavior modeling in national parks is more effective than verbal persuasion. For example, the management personnel in national parks should keep the environment clean and tidy and remove garbage in a timely manner. Reception facilities should meet environmental protection standards. National parks should periodically conduct environmental education

campaigns to expand their audiences by inviting the public to participate and demonstrate the behavior to those around them.

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