

Influences of Red Tourists' Perceptions of Red Education and Environmental Education on Pro-environmental Behavior: Taking Place Attachment as Mediating Variable

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Abstract: Tourists' pro-environmental behavior is a hot topic in the study of tourism geography, but the case study of red tourist destination is rare. Compared with other types of tourist destination, red tourist destination carries the main function of red cultural education and implements necessary environmental education for tourists. It is of certain theoretical and practical significance to do case study in order to clarify the characteristics, influencing factors, influencing mechanism and promotion path of the pro-environmental behavior of tourists in red tourism destinations in mainland China, under the background that tourism ecological civilization is vigorously being promoted. Therefore, this paper chooses Shaoshan Scenic Spot, a classical red area in Hunan Province as the research site. Based on 406 sample data, a structural equation model was constructed with tourists' perception of red education and environmental education as independent variables, pro-environmental behavior as dependent variable and place-attachment as mediating variable. The results revealed that tourists generally had a high level of pro-environmental behavior; tourists' perception of red education had a significant positive impact on pro-environmental behavior, which was mediated by place attachment; tourists' perception of environmental education had a significant positive impact on pro-environmental behavior, among which self-guided environmental education was more effective than other-guided environmental education. Accordingly, the red tourist destination may improve tourists' pro-environmental behavior through both rational educational intervention and emotional cultivation. Specifically, in order to comprehensively enhance tourists' comprehensive perception of on-site environmental education, besides providing self-guided environmental interpretation, the destination may strengthen the other-guided environmental interpretation as well, that is, to

increase the demonstration, intervention and guidance role of on-site staff, and to encourage mutual or multiple supervision among tourists. At the same time, it may pay attention to the organic combination of red education and environmental education, and strengthen the emotional management of tourists to enhance the place attachment.

1. Introduction

Tourists' pro-environmental behavior is a typical positive relationship between people and environment in tourist destinations. It is one of the important targets of both tourists' environmental education and management of tourists' environmental behavior. In recent years, this behavior has become a research hotspot in tourism geography, tourism management, environmental psychology and other related academics, with the impact mechanism of which has gradually got more attentions. In fact, with the deepening of research, it is obvious that the connotation of tourists' pro-environmental behavior is being constantly enriched. Compared with other similar tourist acts such as pro-social behavior, environmentally responsible behavior and environmentally friendly behavior, tourists' pro-environmental behavior is being endowed more and more emotional meanings. That is to say, 'pro-environment' in 'pro-environmental behavior' reflects the distance between tourists and the environment is getting closer not only physically, but also psychologically and emotionally. Evidence shows that tourists' pro-environmental behavior is more regarded as the high-level affinity (goodwill) behavior of tourists to the broad environment and its composition elements in the tourist destination, including empathy behavior, respect behavior, learning behavior, aesthetic behavior, attachment behavior, protective behavior and other kinds of positive environmental behavior. At the same time, in the researches of behavioral mechanism, emotional variables such as (place) attachment, empathy and perception have been adopted as antecedent variables or mediating ones.

It must be pointed out that despite the emergence of researches on tourists' pro-environmental behavior, yet most of the research areas are nature reserves, wetland parks, forest parks, urban general historical and cultural blocks, etc. few red tourist sites were taken as the case study area. In the mainland of China, apart from necessary environmental education, the red tourist destination carries the main function of educating tourists in revolutionary history and spirit, i.e. red culture. At the same time, compared with other types of tourist destinations, what are the characteristics of the pro-environmental behavior of tourists in red tourist destinations? What are the influencing factors? What is the impact mechanism? How to improve their pro-environmental behavior? The exploration of these issues is of certain academic and practical significances especially under the background that the construction of tourism ecological civilization is being strengthened in tourism industry of China. Based on this, the paper chooses Shaoshan, Hunan Province as research cite, which is the birthplace of Mao Zedong and has become the most classical and well-known red tourism destination. With perceptions of red education and environmental education as independent variables, pro-environmental behavior as dependent variables, place attachment as mediator, a structural equation model is constructed to explore the influencing factors and mechanism of tourists'

pro-environmental behaviors in this special red tourism destination. On one hand, the study aims to expand the case sites of related domestic researches and to reveal the influencing mechanism of tourists' perception of red education and environmental education on pro-environmental behavior. On the other hand, besides helping protect and improve the environment, it tries to provide possible solutions for guiding and promoting domestic tourists' pro-environmental behavior in red tourist destinations in China mainland.

2. Literature Review

Under the background of the world environmental movement from 1960s to 1970s, the researches on environmental education and pro-environmental related behavior came into being and flourished gradually(Wenming & Yongde, 2009). Since the development of environmental education is more inclined to campus education, relying on formal education system to intervene the students' environmental behaviors (Jianxia, 2007) , therefore it brings about lots of related research outputs which are followed by the rising studies on informal environmental education and pro-environmental related behavior in tourism industry (Wenming & Yongde, 2009) and with behavior characteristics description as the main focus(Dolnicar & Leisch, 2008). Afterwards, the researches on pro-environmental behavior have been enriched with personal and social factors adopted, such as sense of responsibility, environmental protection knowledge, religion and culture (Gifford & Nilsson, 2014), but the main foci are internal reasons of the individual. It was not until nearly 10 years ago that empirical studies on intervention and evaluation of tourists' pro-environmental behavior emerged one after another(Xiaobing & Yan, 2017). Yet, existing empirical studies pay more attention to natural resources-based scenic spots rather than red cultural resources and other human landscape-based scenic spots. Actually, due to the lack of both environmental education and red education, the unethical and incivility behavior in the red tourism area also appears frequently like other kinds of tourism areas(Yingxin & Hua, 2015). Therefore, it is necessary to strengthen the multiple educational function of red tourism areas in order to meet tourists' spiritual needs, to purify social culture and to improve the morality of tourists as well(Yanmin, 2017).

3. Research Design

3.1 Hypothesis

3.1.1 Pro-environmental Behavior and Perception of Red Education

Pro-environmental behavior (PEB) originated from environmental education research in the 1960s and 1970s. It was first defined as action taken by an individual to solve environmental problems by virtue of his knowledge and ability (Hines, Hungerford, & Tomera, 1987), and further extended to individual or collective actions to protect the environment and conserve natural resources (Sivek & Hungerford, 1990). Stern (Stern, 1999) first proposed the concept of 'Pro-environment' in consumer behavior study, and defined it as the behavior of changing the use of substances and energy in the environment to make the environment develop normally or better (Stern, 2000). A large number of following studies did not provide a unified and complete definition for it, until Kollmuss (Kollmuss & Agyeman, 2002) formally proposed the definition of pro-environmental behavior on the basis of summarizing the research at that time as follows: behavior that consciously seeks to minimize the

negative impact of one's actions on the natural and built world. Liu Hui (Hui, 2005) first introduced the concept of pro-environment to Chinese study, and analyzed it from the perspective of egoism and altruism. Subsequent studies continued to dig deeper into the connotation of pro-environment, in which altruistic values were further extended to the level of national quality and social morality (Feng & Guojian, 2010) such as intervention in other people's sabotage and participation in collective environmental protection activities (Zongjin, Lili, & Xiaofang, 2013). It can be seen that with the deepening of pro-environment research, its scope is no longer limited to the relationship between human and natural environment. Today's research has introduced social issues such as social reputation (Tam & Chan, 2018) and life satisfaction (Schmitt, Aknin, Aksen, & Shwom, 2018). Therefore, pro-environmental behavior is no longer only limited to the pro to natural environment (pro-environmental behavior), but also the pros to both social environment (pro-ego behavior) and the individual's own self micro physical and psychological environment (pro-id behavior) (Wenming, 2018). Thus, it is a broad pro behavior to the generalized environment (pro-super-ego behavior).

Red tourism originated in Jiangxi Province. In order to develop tourism routes, the provincial government put forward the concrete practice of the 'red tourism' based on the combination of two concepts of 'red' and 'tourism' (Haiyang & Jing, 2012). Subsequently, the *2004-2010 National Red Tourism Development Program (China & Council, 2004)* defined it as: 'A kind of themed tourism visiting and studying activities based on memorial and monumental places and attractions symbolising the revolutionary history, events and spirit during the periods that the Chinese Communist Party led Chinese people to march toward the founding and early construction of the People's Republic of China. The development of red tourism in China has played a role in economic development, tourist education, environmental protection and poverty alleviation. Among which, the educational function is to carry out ideological and political education, moral civilization education and ecological life moral education for tourists (Haiyang & Jing, 2012). As for the three kinds of specific social education function: ideological and political education is to cultivate tourists' values and political concepts, with the aim of harmony with themselves (Xia & Changqiu, 2011); moral civilization education is to regulate interpersonal activities and build a civilized society, with the aim of harmony with others (Jing, Yuhua, & Mei, 2008), ecological life moral education lies in the cultivation of red resource identification and protection, with the aim of harmony between man and nature (Pei & Guochao, 2017). For this social enlightenment function of red attractions, we define it as Red culture education toward tourists (ECETT), which means 'the tourists learn from the Red scenic spots about content in personal values, social life and ecological civilization morality'.

Through Red cultural education, guiding tourists to implement environmentally friendly behaviors has extremely important effects and significance for red tourist attractions. Actually, as mentioned before, the development mode of Red tourist destinations is generally based on the combination of "Red and green", that is, the combination of Red tourism and ecotourism (Xiaoying, Mian, & Mengyu, 2005). The Red resources making foundation for the development of red tourism belong to special revolutionary cultural relics or heritage and are evidently irreplaceable and non-renewable (Xuemei, 2007). Green resources belonging to the ecological landscape of nature are fragile. Therefore, the protection of Red and green resources is the premise and foundation for the development of Red tourist attractions, and finally achieves the benign interaction between Red tourism and ecological civilization (Congxin, Weiquan, & Jianwen, 2008). The existing empirical research shows that Red education can arouse the positive emotions of tourists, thus enhancing the educational effect and

promoting the ideology cultivation and social behavior level of tourists(Huan, Nan, & Changhong, 2018). At the same time, it can also strengthen the tourists' Red resource identity and protection awareness, and lead to the willingness to actively implement and improve environmental protection behavior(Pei & Guochao, 2017).

Based on this, the paper proposes the hypothesis:

Hypothesis 1: Tourists' perception of Red education has a significant positive impact on pro-environmental behavior

3.1.2 Perception of Environmental Education and Pro-Environmental Behavior

The broad definition of tourists' perception of environmental education is an integrated concept which combines perceptions of 'self-guided' and 'other-guided' environmental education. 'Self-guided' environmental education system includes tour guides, scenic area managers, volunteers, etc. 'Other-guided' environmental education system includes environmental interpretation cards, warning signs, multimedia display systems, and sound and light revivification systems(Wenming, 2012a). The goal of environmental education could be divided into three levels: the low level is to improve the environmental behavior of tourists in the scenic area through educational intervention, the middle is to attract tourists' attention to environmental issues through media propaganda, and the high is to change the tourists' attitude through the output of values(Wenming & Yongde, 2009). However, it is difficult to examine the operational effects of the environmental education interpretation system from the perspective of scenic spots management party. Therefore, we transferred the perspective to tourists, audiences of environmental education, to reflect the quality and effectiveness of the environmental education interpretation system in the scenic spot by measuring their perception of environmental education.

Studies by Li Wenming(Wenming, 2012a) and Zhang Hong et al. (Hong, Zhenfang, Yelin, Wei, & Kun, 2015)show that perception of environmental education has a positive impact on the effectiveness of environmental education. Among them, the tourists' perception of environmental education content can indirectly represent the effect of ecotourism environment educational (Hanley et al., 2009). The effect of environmental education includes the increase of ecological knowledge, biodiversity knowledge and environmental protection skills, the environmentally friendly behaviors like classification of garbage into the dustbin, protection of animals and plants, and as well as behavior willingness to conduct environmental public welfare donations, etc.(Wenming, 2012a). Therefore, perception of environmental education can promote the tourists' pro-environmental behavior to a certain extent. For example, in the empirical study of the environmental education system of Badaling National Forest Park, it was found that the environmental interpretation signboard not only conveyed environmental knowledge, but also improved the environmental awareness of tourists and improved the environmental behavior of tourists(Tao, Qiongrui, Jinglan, & Qiaohui., 2018). Therefore, this paper proposed the following hypotheses:

Hypothesis 2: Tourists' perception of self-guided environmental education has a significant positive impact on pro-environmental behavior

Hypothesis 3: Tourists' perception of other-guided environmental education has a significant positive impact on pro-environmental behavior

3.1.3 Place Attachment and Pro-Environmental Behavior

Tuan (Tuan, 1974) first considered the influence of ‘local sense’ in people’s environmental behaviors, and found that those with a higher sense of place were usually more willing to practise environmentally friendly behavior. In 1983, Shumaker & Taylor (Shumaker & Taylor, 1983) first defined the concept of place attachment as the emotional connection between people and their place of residence. Kaltenborn et al (Kaltenborn, Bjerke, & Strumse, 1998) first proposed the role of place attachment to the environmental behavior of local residents when conducting research on the environmental protection behavior of local residents in Norway. The study by Vaske and Korbin (Vaske & Korbin, 2001) went one step further. They used two-dimensional scale proposed by Williams et al to target young people participating in resource conservation activities, and through empirical methods, confirmed place attachment had a positive promotion for pro-environmental behavior.

Chinese researchers like Tang Wenyue et al. (Wenyue, Jie, Hao, Song, & Xiaozhong, 2008) conducted empirical studies on place attachment and environmental behavior attitudes (resource protection attitudes) earlier. In their study, local residents’ place attachment had a significant positive impact on resource protection attitudes in Xidi village, Hongcun village and Nanping village. Huang Tao and Liu Jinglan (Tao & Jinglan, 2017), Zhang Qian et al. (Qian, Dongxu, & Wenming, 2018) found respectively in the study of the environmental behavior of Beijing National Park tourists and Zhangjiajie tourists, place attachment could not only directly affect the generation of environmental behavior, but also played a mediating role among recreational involvement, environmental knowledge and pro-environmental behavior.

Therefore, this paper proposed the following hypotheses:

Hypothesis 4: Tourists’ place attachment has a significant positive impact on pro-environmental behavior

Hypothesis 5: Tourists’ place attachment plays an intermediary role between perception of red education and pro-environmental behavior

Hypothesis 6: Tourists’ place attachment plays an intermediary role between perception of self-guided environmental education and pro-environmental behavior

Hypothesis 7: Tourists’ place attachment plays an intermediary role between perception of other-guided environmental education and pro-environmental behavior

3.1.4 Establishment of Conceptual Model

Based on the above seven hypotheses, the relationship was established between place attachment, perception of red education, perception of environmental education and pro-environmental behavior. The conceptual model of this paper is shown in Figure 1:

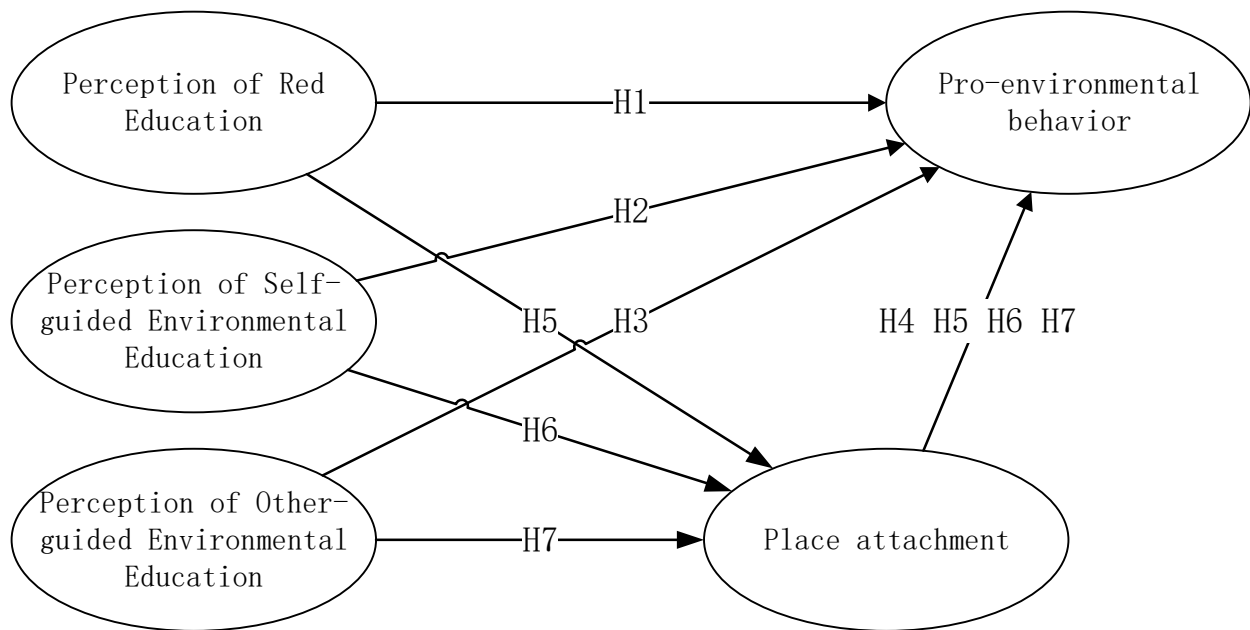


Figure 1: Conceptual model diagram

3.2 Survey Design

The questionnaire designed in this paper consists of four parts. The first part measures the place attachment feelings of tourists, the second part measures the tourists' perception of red education in the scenic area, the third part measures the environmental behavior of tourists, and the fourth part measures the tourists' perception of environmental education. The fourth part can be further divided into two kinds of environmental education systems: self-guided and other-guided.

The place attachment measurement scale refers to the two-dimensional division method of Williams et al (Williams, Patterson, Roggenbuck, & Watson, 1992), which divides place attachment into two dimensions: place dependence and place identity. However, in this paper, four items were selected from each of the two dimensions to form a measurement scale for place attachment, with a total of eight items.

The measurement scale of perception of red education refers to the theory proposed by Li Xia and Zeng Changqiu (Xia & Changqiu, 2011). She divides the function of red education into six main dimensions: 'thought guidance' 'political control' 'moral demonstration' 'psychological optimization' 'aesthetic education' and 'legal education'. The original scale designed 2 items for each dimension, a total of 12 questions, but in the pre-study, 3 of them were found to be ineffective and were removed. The questionnaires of the formal survey were made up of 9 items totally at last.

The tourist's pro-environmental behavior measurement scale was designed based on the scale designed by Halpenny (Halpenny, 2006), and the language of the item was modified according to the actual situation of the scenic spot to make it more easy to understand. In the field research, 5 items was found not to meet the standard, and 7 items remained after the deletion eventually.

The perception of environmental education scale of tourists refers to the method of dividing the

environmental education system proposed by Li Wenming(Wenming, 2012b), and questionnaires were designed from the perspectives of self-guided and other-guided environmental education. The self-guided education system mainly involves environmental interpretation slogans and environmental protection signs in the scenic area, while other-guided education system mainly involves staff and tour guides.

3.3 Data Collection

This study selected Hunan Shaoshan Scenic Area as the research site. Shaoshan is the hometown of China's founding leader Mao Zedong, and has now been developed and built into a national AAAAA-level scenic spot. Most of the attractions in the scenic spot is free of charge and visitors can basically visit most of the attractions in one day. Therefore, in order to understand what tourists think after visiting, our research survey is mainly arranged in the afternoon and evening, mainly in the attractions such as Mao Zedong bronze statue square, Mao Zedong Memorial Hall, Mao Zedong's former residence, Mao's Ancestral Hall et. al.

The research survey in this paper has been carried out for three times. For the first time, a pre-study was conducted in March, 2018. The main task of this survey was to measure the reliability and validity of the questionnaire items. Randomly surveyed the tourists in the scenic spot by means of on-the-spot questionnaires. Since the items in the questionnaire involve the evaluation of the participating activities and facilities and environment in the scenic spot, so the questionnaires are sent to the tourists who have completed the tour in the scenic spot through simple communication and interviews with the tourists. A total of 300 questionnaires were distributed in this survey, and 249 valid questionnaires were collected and the valid recovery rate was 83%.

The results of the first survey showed that the factor load of each item was between 0.6 and 0.9, indicating that the questionnaire has acceptable reliability and validity. Therefore, the second field survey was conducted in August, 2018, with the first questionnaire applied and some of the details revised and the language of the item polished. Due to the lack of the enough numbers of valid questionnaire, the third survey (supplementary survey) was conducted on December 24-27th, 2018. During this period before and after the birthday of Chairman Mao Zedong - December, 26th, the tourists from all over the country and some from the world gathered in the Shaoshan Mountain Scenic Area. In the latter two surveys, 500 questionnaires were distributed, and 406 valid questionnaires were collected, with an effective rate of 81.2%.

3.4 Sample Description

The demographic characteristics of 406 samples are shown in Table 1. The number of males (52.71%) and females (47.29%) is similar and basically balanced; the age group composed of mainly young and middle-aged people aged 16-45 (63.05%). The education level is mostly undergraduate (33.50%) and junior high school (25.62%). The overall education level is high, and that of high school and above accounts for 54.43%. Therefore, the overall income level is not high, with middle income (36.95%) and lower income (36.70%) accounting for 73.65%.

Table 1: Profiles of the sample

	Category	Frequency	Percentage
Gender	Male	214	52.71
	Female	192	47.29
Age(years old)	1-15	62	15.27
	16-30	129	31.77
	31-45	127	31.28
	46-60	71	17.49
	Over 61 years	17	4.19
Educational level	Primary school	81	19.95
	Junior high school	104	25.62
	Senior High school or college	59	14.53
	University	136	33.50
	Graduate	26	6.40
Monthly income(Chinese yuan)	≤3000	149	36.70
	3001-6000	150	36.95
	6001-9000	57	14.04
	≥9001	50	12.32

According to the Likert 5-point scale scoring rule (Tosun, 2002), the average of the items reaches 3.5-5 points, which can be considered to have a high degree of recognition. From the mean and variance table (Table 2) of the questionnaire items, it can be seen that the visitors have enough local

attachment feelings (Mean=4.34), and their environmental behaviors are showed pro-environmental characteristics (Mean= 4.145). Moreover, they have high recognition for the red education system (Mean=4.558), environmental education interpretation system (Mean=4.37) and environmental education self-guided interpretation system (Mean=4.435). It further indicates that visitor samples surveyed are suitable for this study.

Table 2: Mean and variance table of the questionnaire items

Coding	Items	Single mean	Standard deviation	Overall mean
Place attachment				
PA1	When mentioning the red tour, I first think of Shaoshan, Hunan.	4.35	1.041	4.34
PA 2	Hunan Shaoshan tourist attractions have more advantages than other red tourist attractions.	4.31	1.022	
PA 3	I can learn a lot of revolutionary spirit and culture in Shaoshan Mountain Scenic Area.	4.56	0.864	
PA 4	I like the attractions of Hunan Shaoshan more than other Hunan attractions.	4	1.199	
PA 5	When I talk to others about Hunan, I always mention Shaoshan.	4.26	1.157	
PA 8	I am proud to visit the Shaoshan Mountain Scenic Area.	4.54	0.931	
Perception of red education				
PRE2	The exhibitions and performances in Shaoshan Mountain area have given me a deeper understanding and recognition of Marxism and Mao Zedong Thought.	4.46	0.909	4.558
PRE 3	The exhibitions and performances in Shaoshan Scenic Area have inspired my patriotism.	4.6	0.812	
PRE 4	The exhibitions and performances in Shaoshan Scenic Area have strengthened my Communist ideology.	4.57	0.812	

PRE 5	The exhibitions and performances in Shaoshan Scenic Area taught me the spirit of hard struggle, honesty and trustworthiness, selfless dedication and so on in the spirit of revolution.	4.61	0.824	
PRE 7	Exhibitions and performances in Shaoshan Scenic Area are also a noble art form.	4.55	0.817	

Pro-environmental behavior

PEB3	I'll tell my friends not to litter in the scenic spots.	4.38	0.973	4.145
PEB 4	I will take the initiative to understand the current situation and problems of the environment in this scenic spot.	4.17	1.051	
PEB 5	For the sake of protecting the environment of the scenic spot, I will report the relevant information to the relevant government departments or the scenic area management authorities.	4.24	0.977	
PEB 6	I volunteered to participate in volunteer services to protect the scenic area, such as providing help to cleaners, et al..	3.79	1.378	

Perception of self-guided environmental education

PSEEE1	A variety of environmental protection signs and interpretation boards have been set up in the scenic area.	4.4	0.953	4.435
PSEEE 3	I learned a lot about ecology from environmental slogans and interpretation boards in scenic spots.	4.37	0.969	
PSEEE 4	Environmental protection signs, environmental interpretation boards and so on in scenic spots not only spread environmental protection knowledge and skill, but also spread red culture.	4.55	0.82	
PSEEE 5	I will strictly follow the suggestions of environmental protection signs to protect the environmental resources in the scenic spots.	4.42	0.934	

Perception of other-guided environmental education

POGEE1	Tour guides and scenic staffs are actively guiding us to protect the environment.	4.31	1.055	4.37
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POGEE 2	Tourist guides or scenic staffs play an exemplary role in protecting the environment.	4.37	1.009
POGEE 3	Tour guides or scenic staffs are ready to actively prevent environmental damage	4.43	0.947

4. Research Results

4.1 Analysis of Reliability and Validity

The results of reliability and validity analysis of the data in this paper are shown in Table 3. The reliability test of data is based on SPSS22.0 software. The results show that the overall Cronbach coefficient is 0.946, the KMO value is 0.942, and the significance of Bartlett test is below 0.001. The Cronbach coefficient of each potential variable is above 0.8, which indicates that the data has good internal consistency and high reliability.

The validity analysis mainly uses Mplus 7.1 software to construct factor analysis model. The results show that the standardized regression coefficient (Std.) of each item is above 0.7, and all of them reach the significant level of 0.001, which indicates that each item has reached a good degree of interpretation of latent variables. Meanwhile, the average variance extraction rate (AVE) of each latent variable has reached more than 0.5, which shows that the overall validity of the data is qualified. At the same time, the discriminatory validity of each potential variable is further analyzed, and the results are shown in Table 4. It can be seen that the discriminatory validity of the items reached 0.001 level, which is significantly lower than the root number of the average variance extraction on the diagonal line, indicating that the latent variables have better discriminatory validity between the items.

Table 3: Reliability and Validity

Coding	Std. Estimate	S.E.	P-Value	SMC	C.R.	AVE	α
YL1	0.742	0.025	0	0.551	0.905	0.613	0.91
YL2	0.755	0.024	0	0.57			
YL3	0.775	0.022	0	0.601			
YL4	0.793	0.021	0	0.629			
YL5	0.811	0.02	0	0.658			

YL8	0.82	0.019	0	0.672			
HJ2	0.813	0.019	0	0.661	0.927	0.719	0.93
HJ3	0.874	0.014	0	0.764			
HJ4	0.893	0.013	0	0.797			
HJ5	0.862	0.015	0	0.743			
HJ7	0.794	0.02	0	0.63			
QHJ3	0.765	0.026	0	0.585	0.838	0.565	0.83
QHJ4	0.794	0.024	0	0.63			
QHJ5	0.76	0.026	0	0.578			
QHJ6	0.683	0.031	0	0.466			
HJZ1	0.779	0.023	0	0.607	0.884	0.657	0.88
HJZ3	0.846	0.019	0	0.716			
HJZ4	0.837	0.019	0	0.701			
HJZ5	0.778	0.024	0	0.605			
HJT1	0.907	0.014	0	0.823	0.898	0.747	0.89
HJT2	0.92	0.014	0	0.846			
HJT3	0.756	0.024	0	0.572			

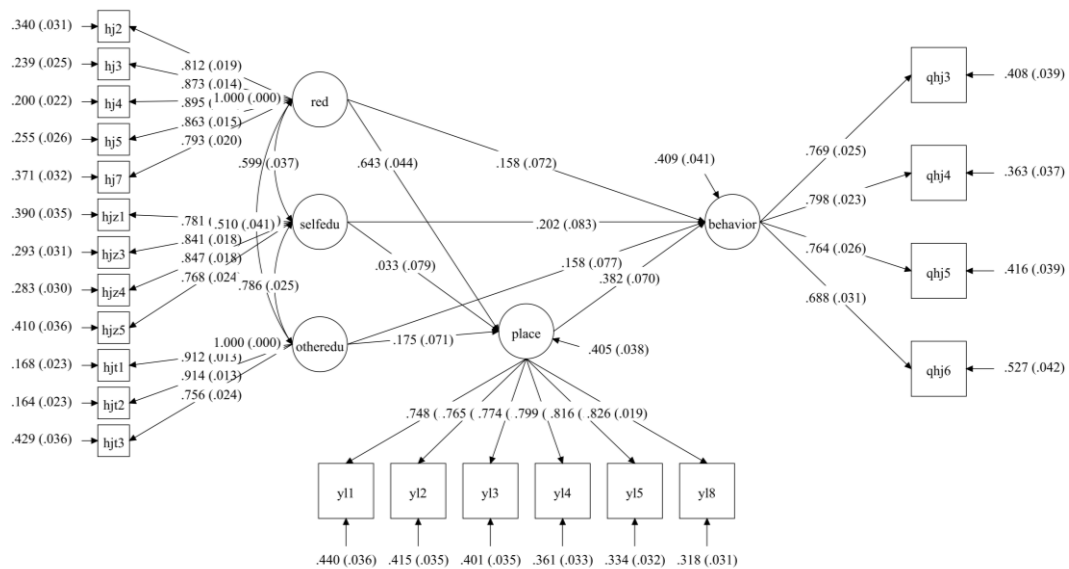
Table 4: Distinctive Validity Table

	PLACE	RED	BEHAVIOR	SELFEDU	OTHEREDU
PLACE	0.783				
RED	0.752***	0.848			
BEHAVIOR	0.697***	0.647***	0.752		
SELFEDU	0.556***	0.599***	0.633***	0.811	
OTHEREDU	0.529***	0.510***	0.599***	0.786***	0.864

Note: The diagonal bold characters are AVE root numbers, the lower triangle is Pearson correlation, and *** means $P < 0.001$.

4.2 Structural Equation Model

Based on Mplus 7.4 software, this paper constructed the structural equation model, and its operation results are shown in Figure 2. The chi-square value of the model is 495.218, the degree of freedom is 199, and the ratio of RMSEA and SRMR is 2.49 and less than 3. Meanwhile, the RMSEA and SRMR values of the model are 0.061 and 0.035 respectively, which are less than 0.08. CFI and TLI are 0.954 and 0.947 respectively, which meet the standard of 0.9, so the model is acceptable.



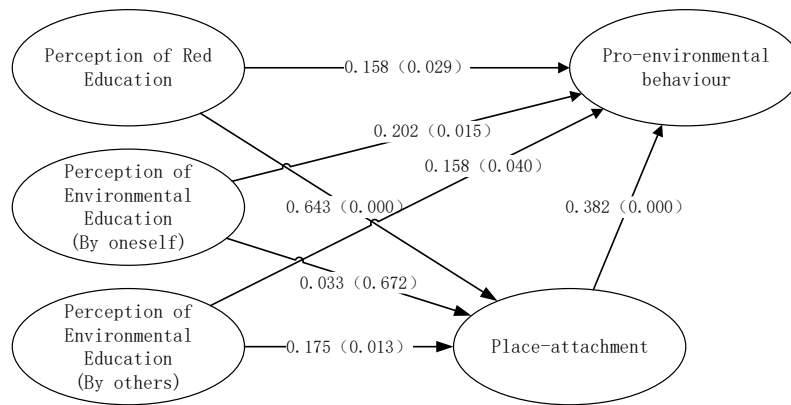


Figure 2: Structural Equation Model

At the same time, in order to further verify the mediating role of place attachment. We used Bootstrap to set up 1000 iteration sampling methods to verify the results as shown in Table 5.

Table 5: Bootstrap results and confidence interval tables

Hypothesis	Path	Estimate	S.E.	Est./S.E.	P-Value	Percentile 95% CI		Result	
						lower5	upper5		
Direct effect									
H1	BEHAVIOR ← RED	0.158	0.072	2.189	0.029	0.039	0.276	Accept	
H2	BEHAVIOR ← SELFEDU	0.202	0.083	2.423	0.015	0.065	0.339	Accept	
H3	BEHAVIOR ← OTHEREDU	0.158	0.077	2.052	0.040	0.031	0.284	Accept	
H4	BEHAVIOR ← PLACE	0.382	0.070	5.485	0.000	0.268	0.497	Accept	
Place attachment as intermediary									
H5	BEHAVIOR ← RED	0.643	0.092	7.016	0.000	0.473	0.779	Accept	
H6	BEHAVIOR ← SELFEDU	0.033	0.146	0.228	0.820	-0.177	0.296	Reject	
H7	BEHAVIOR ← OTHEREDU	0.175	0.122	1.433	0.152	-0.038	0.370	Reject	

4.3 Hypothesis Test

As shown in Table 5, the hypotheses presented in this paper have been verified.

Hypothesis 1 is accepted at 0.05 significance level, it shows that tourists' perception of red education has a significant positive impact on their pro-environmental behavior, and its standardized path coefficient is 0.158.

Hypothesis 2 is accepted at 0.05 significance level, which shows that tourists consciously learn environmental protection knowledge and skill from environmental interpretation facilities in the scenic area, and apply them into practice. Its standardized path coefficient is 0.202. It can be seen that the degree of influence of environmental education is greater than that of red education.

Hypothesis 3 is accepted at 0.05 significance level, which shows that tourists in scenic spots are also educated by the third party, such as tour guides and managers. At the same time, they follow their guidance and demonstration to regulate their behavior. The standardized path coefficient is 0.158. Its influence degree of perception is equal to that of red education, and lower than of self-guided environmental education. It reflects the fact that tourists' pro-environmental behavior mainly depends on self-restraint.

Hypothesis 4 is accepted at the level of 0.001 significance, which corroborates the empirical research on place attachment and pro-environment behavior at home and abroad, such as the research by Tang Wenyue et al. (Wenyue et al., 2008). It proves once again that people's feelings towards place can significantly and positively promote their pro-environmental behavior.

Hypothesis 5 was accepted at 0.001 significance level, with 95% confidence interval of mediation effect ranging from 0.473 to 0.779, excluding 0. At the same time, because the perception of red education has a significant direct impact on pro-environment behavior, it can be considered that place attachment does play a part of the mediating role, and the mediating effect is greater than the direct effect of red education perception.

Hypothesis 6 was rejected because it is not significant. It can be seen that tourists' perception of self-guided environment education can directly lead to pro-environmental behavior without the mediating role of other emotions.

Hypothesis 7 is also rejected because it is not significant. Perception of other-guided environment education also directly affects tourists' behavioral outcomes without the mediating role of place attachment.

5. Discussion

Generally, the analysis of 406 sample data of Shaoshan scenic region in Hunan Province showed three apparent characteristics in the multiple relation and influencing factors between tourists' perception of red education, environmental education, place attachment and pro-environmental behavior:

(1) 'Sense of country' played a prominent role in the formation of place attachment

Place attachment and pro-environmental behavior are the current research hotspots, and more and more empirical studies have been conducted on the relationship between them. A large number of empirical studies have shown that tourists' place attachment had a significant positive impact on their pro-environment behavior. Among them, the study of place attachment broke through the geographical boundaries from the original homeland to the later cities and countries(Zaberkeley,

Ziqiang, & Dan, 2011). Not only by the comparison with foreign countries (Laczko, 2005) but also in our own country, 'sense of country' (kind of nationalism) played an important role in the place attachment of tourists. When tourists visited important scenic spots related to national history, they quickly established social relations among strangers because of their common national identity, which as Chow & Healey (Chow & Healey, 2008) showed, directly led to the generation of place attachment. As shown in Table 2, most tourists had obvious attachment to Shaoshan, even did those who entered the scenic region for the first time.

As far as red tourism is concerned, Shaoshan can be regarded as the most influential red tourism destination in China. As it is the birthplace of Chairman Mao Zedong, the founding leader of the People's Republic of China (PRC), it is not only an important revolutionary memorial place, a national youth revolutionary traditional education base, a national key revolutionary cultural relics protection unit, but also a famous tourist attraction at home and abroad (for foreign tourists of collective tourism, it is also a must-see place of "discovering China trip"), and has been ranked as the AAAAA Class scenic region. There are many classical scenic spots such as Mao Zedong's former residence in Shaoshanchong village, Mao Zedong Square, Comrade Mao Zedong Memorial Hall, Dripping Cave, Mao's ancestral temple and so on. Therefore, Shaoshan is undoubtedly an 'important scenic region related to national history'. Most of the tourists were Chinese Communist Party (CCP) members and the staff from various official organizations or state-owned enterprises, or the teachers and students from schools at all levels, who came to Shaoshan to receive revolutionary tradition and patriotism education. At the same time, a considerable number of individuals (i.e. family members, friends, et al.) or non-governmental groups spontaneously came to here to visit the great people's former residence for pilgrimage. Tourists from all walks of life (some of them even had made pilgrimages for several times, showing a very high level of attachment to the place). Tourists have raised personal respect for the great man Mao Zedong to the recognition of the country, and therefore their sense of place to Shaoshan was full of a distinct sense of country, their place attachment and national attachment were highly integrated.

At the same time, this attachment was more about the significance of these physical environments (Stedman, 2003). As for that of Shaoshan red tourism destination, Shaoshan itself was shaped as a physical space with the function of cultivating citizens' sense of country, and providing red education activities and red learning experience aimed at promoting national identity. As a result, the perception of red education and place attachment in Shaoshan promoted each other and demonstrated a high statistics score.

(2) There was a dual coexistence of rational path and emotional path in the governance of tourists' pro-environment behavior

As shown in Table 5, the perception of red education had the same effect as the perception of other-guided environmental education, which had a significant positive impact on pro-environmental behavior. The rational attitude and emotional engagement conjunctively promoted the results of behavior, reflecting an obvious turn in the study of tourists' pro-environmental behavior nowadays, that is, from the former dominant rational perspective to the perceptual perspective gradually, showing the coexistence of two major perspectives (Zhenzhen & Hao, 2017). From the rational point of view, by constructing theories such as theory of planned behavior (TPB) or theory of reasoned action (TRA), some researchers attempted to discover the objective rule or occurrence mechanism of tourists' environmental behavior and tend to emphasize tourists' obligations by formulating

regulations, norms, conventions and other generalized ‘laws’ to promote their positive environmental behavior. While from the perceptual point of view, other researchers attempt to discover the subjective mechanism of tourists' emotional influence on behavior by applying the theories such as place attachment theory in emotional geography or empathy theory in environmental psychology, and tried to strengthen the implication or leading role of positive emotions on their positive behavior through the implementation of ‘rule of virtue’ or emotional influence.

This trend in academia has also led to corresponding changes in the practice of tourist behavior management in the industry. In Shaoshan Red Tourist Area, there are also some tourists' environmental behavior problems, such as littering, trampling on grasslands and lettering, et al. In order to advocate the pro-environment behavior of tourists and restrain the problematic environmental behavior, the Shaoshan administration, on one hand, suspended pictures with slogans such as ‘Civilization is the most beautiful scenery’, ‘Long journey accompanied by civilization’, ‘Beautiful moment of touring, civility at anytime and anywhere’, ‘Civilized travel around the world, happy you and me’, ‘Every flower and tree is a landscape, every word and deed should be civilized’, ‘Chinese civilization for five thousand years’, ‘Consider the country of etiquette, remember the image of China’ and so on. These slogans were made to advocate tourists' civilized travel and green travel through rational tips, that is, conducting rational environmental behavior guidance.

On the other hand, they also provided tourists with excellent visual experience and civilized atmosphere by creating excellent visiting environment and high-quality service. Tourists were emotionally cultivated the place attachment by experiencing the emotional process from ‘like’ to ‘love’ and to ‘care’ in the emotional environmental behavior management. However, at the same time, place attachment only mediated the perception of red education, which also reflected the limitations of emotional management. Actually, most of the tourists who took the initiative to visit Shaoshan scenic spot were very excited due to the red performances and the rendering of the red atmosphere in the scenic spot, their original intention is understandable to make pro-environmental and pro-social actions, yet excitement and positive emotions may not always lead to correct and positive behavior. Because of bad habits (such as smoking), low environmental sensitivity (such as blatant noise) and other reasons, there would still be unconscious environmental damage (interference) by tourists and unintentional social conflicts in the scenic area. Therefore, in order to better improve the tourists' pro-environmental behavior, the environmental education system in scenic areas needs not only emotional management, but also practical rational supervision (intervention) and demonstration of staff, tour guides and even other tourists as well.

(3) Tourist-oriented red education and environmental education contributed commonly to the intersection of tourists' behavior goals.

Compared with other types of tourist destinations in China, domestic red tourist destinations play a unique role in red education. Red education lays particular emphasis on patriotism, deal and belief, while environmental education lays particular emphasis on love and protection for the environment. Are there any intersections between the two on the objective of tourists' environmental behavior? This study showed that the answer was yes. In patriotism, ‘country’ is a geographical concept to some extent. Country is composed of different administrative divisions such as provinces, cities, counties (districts), scenic areas and their surrounding environment which connectively are certain parts of the country. The environment of environmental education can be as big as the biosphere of the earth, and as small as a grassland or a building sketch in a tourist attraction or scenic spot. Therefore, patriotism

and environment-friendly objects overlap in space boundaries. At the same time, patriotism also refers to protecting or maintaining the national image. Protecting the environment refers to protecting the authenticity and sustainability of the environment. The authenticity and sustainability of the environment are part of the national image of the environment. On the other hand, tourists' personal problematic environmental behavior may damage the image of the country in the eyes of international tourists who are traveling in the country. In other words, the country is the big environment of a specific tourist destination and its small environment. In this sense, to cherish the environment and ecology of a specific tourist destination is a micro or medium-sized patriotic act, and is an integral part or necessary meaning of the macro-patriotism in cherishing the whole territory. The above-mentioned Shaoshan scenic area hanged 'remember the country of etiquette, bearing in mind the image of China', 'five thousand years for Chinese civilization, etiquette at every moment for citizens' and so on, which reflects the dialectical unity of patriotic behavior and environmental protection behavior in the goal of tourists' pro-environmental behavior.

6. Conclusions and Prospects

6.1 Conclusions

This paper took tourists of Shaoshan scenic area in Hunan as the research object, mainly investigated the influence of perceptions of red education and environmental education on pro-environment behavior, and considered place attachment as mediator. Through the analysis of 406 samples with structural equation model, it revealed the average score of place attachment was 4.34, showing a very high level of place attachment. The average score of pro-environmental behavior was 4.145; the average score of perception of red education was 4.558; the average score of perception of other-guided environment education was 4.37; and the average score of perception of self-guided environment education was 4.435. Tourists' perceptions of red education and environment education both positively affected pro-environment behavior. The higher the perception of education was, the better was pro-environment behavior. At the same time, place attachment played a part of intermediary role between perception of red education and pro-environment behavior.

Although the samples' pro-environmental behavior had a high level, there were still some problems in the current Shaoshan scenic area in the overall management of tourists' pro-environment behavior: Firstly, the self-guided environmental education was slightly inadequate than the self-guided environmental education. The formation of the other-guided environment education atmosphere depended not only on the management of tour guides and staff, but also on mutual supervision between tourists. Although the self-restraint of tourists in the sample was very good, they still very rarely intervened in other tourist's problematic behavior. Although with the popularity of the red tourism destination and tourists' attachment, the prevailing custom of caring for the environment have not yet formed.

Secondly, the overall level of red education perception in the scenic area was higher than that of environmental education. Apart from the self-financed outdoor live-action performance of *Mao Zedong Emerging in China*, most of the red education was static cultural relics display or ritual worship activities, focusing on knowledge dissemination and spiritual inheritance, and there were few educational interventions. But the natural environment and artificial landscape in the scenic area conveyed rich red culture, which made the whole scenic area full of solemn red atmosphere. The

atmosphere affected tourists and aroused their inner feelings, thus strengthening the control of their own behavior. Environmental education mainly consisted of behavior persuasion or warning, and more importantly, it was more behavior oriented and easy to be perceived. Since there was a huge flow of people in the scenic area, the staff were mainly busy with order and safety work, and paid less attention to the management of tourists' environmental protection behavior.

In view of the above problems, on the one hand, the scenic area should strengthen the other-guided environment education system, so that tour guides and managers could more actively demonstrate and promote pro-environment behavior, be authorized more power and conduct more responsibility in supervising tourists' environmental behavior, creating a pro-environment atmosphere, and encouraging tourists to supervise and remind each other. The match activities of honorary tourists and 'Red Heart and Green Travel' tourists in Shaoshan could be carried out to stimulate tourists' sense of ownership by means of spiritual encouragement and material rewards for supplement so as to enhance their enthusiasm to intervene in other people's environmental problematic behavior. On the other hand, the red education and environment education should be further integrated, and the environment education in the content of red education (such as sorting out the ideas and practices environmental protection of Mao Zedong and other revolutionaries related to Shaoshan) should be deeply excavated. Furthermore, it was necessary to enhancing the value of red education in environmental education (such as uncovering and explaining the symbiosis of environmental protection and patriotism) in order to make the two forms of 'educations' complement each other and mutually beneficial.

6.2 Prospects

Because of the time and other reasons, this paper still had the following shortcomings: Firstly, the two variables of perception of red education and perception of environmental education adopted in this paper have not been found in domestic and foreign academic circles, whose measure scales were exploratory and tested in this paper based on the relevant earlier achievements of the main authors and other researchers. Validity and reliability might still need to be further optimized. Secondly, because the time of centralized questionnaire deliver and on-site interviews was mainly around mid-August and solar New Year's Eve, which coincided with the summer vacation of schools at all levels and Mao Zedong's birthday, the majority of respondents were students or CCP Party members, and their travel mode was mainly by unit or team organization and mainly concentrated in Mao Zedong Bronze Statue Square and Comrade Mao Zedong's former residence, et al., so the representativeness of the sample has been affected to a certain extent. The following study would expand the sampling time to more than one year. Besides the winter and summer holidays, other traditional festivals such as the Spring Festival and the Mid-Autumn Festival and so on would also be selected to enhance the timing representativeness.

In fact, red tourism is a kind of cultural tourism with unique Chinese characteristics, and it also has the characteristics of heritage tourism. In the future, we will further explore and optimize the measurement scale of tourists' perceptions of red education and environment education in red tourism destinations. At the same time, due to the particularity of Chinese revolutionary culture, in tourist destinations like Shaoshan, the average persons of different age groups showed a certain degree of worship to the world-famous Chairman Mao. Many tourists come to Shaoshan to celebrate Mao's

Birthday almost every year on the eve of Chairman Mao's birthday to express their feelings of remembrance for the great people, that is, they had a high loyalty and high rate of re-visit to Shaoshan tourist destination. Therefore, the study of place attachment can also be further deepened into PERSONAL ATTACHMENT to explore the impact of personal attachment on the pro-environment behavior of tourists in the famous or great persons' birthplaces or places of activity. In addition, Shaoshan tourists' activities were mainly concentrated in artificial or social environments such as Comrade Mao Zedong's former residence and Mao Zedong Bronze Statue Square. In this paper, the 'environment' in "pro-environment behavior" actually emphasized the social environment, and seldom involved the natural environment. In Shaoshan tourism, especially on the way to Comrade Mao Zedong's former residence, there was often a long queue. In the queue process, there inevitably existed the issues such as interpersonal humidity and queue jumping, social interaction between tourists and local residents, young volunteers and other groups, et. al. Therefore, in the future, the research of tourists' pro-environmental behavior could be expanded to that of tourists' pro-social behavior. Our research team would continue to pay attention to the above research directions in the following study.

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