

The Empirical Research on Tourists' Environmental Attitude and Environmental Behavior-- A Case Study of Shenzhen OCT East

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Abstract

Environmental attitudes and environmental behavior have been the focus of environmental sociology research. Eco-tourism is well recognized as one of the important ways for sustainable development of tourism industry as it can well deal with the environmental problem and it focuses on providing environmental education for tourists so as to achieve environmental benefits. However, in recent years, eco-tourism has been wrongly used and brought much pressure to the environment, and the tourists' behavior also caused damage to the environment. This study shows an empirical research on Shenzhen OCT East. It aims to find out the relationship between environmental attitude and environmental behavior through questionnaires and interviews and the data has been handled with correlation and regression analysis. The results show that environmental knowledge, environmental emotion and environmental morals and responsibilities have a positive relationship to the environmental behavior. Tourists' environmental emotion is the most powerful predictor of tourists' environmental behavior. Finally, the paper proposes some suggestions on tourists' management.

Keywords Eco-tourism, Environmental attitude, Environmental behavior, Overseas Chinese Town East

Introduction

Opinions of the State Council on accelerating the development of Tourism (No.41, 2009 Document of State Council, Opinions for short) was formally published on December 1st, 2009. It symbolizes that tourism has formally entered China's National strategy system and it was also the first time for the Chinese government to officially confirm the role of tourism in the national economy and social development pattern, whose core guiding ideology is to develop tourism into a strategic pillar industry of the national economy and a more satisfying modern service industry for the people.

A variety of tourist activities with ecotourism as the vehicle have flourished in China. However, ecotourism has become a marketing tool to cater to the market demand, the boundary of which has been generalized. As a result, news of environmental damage has constantly been reported that due to tourism exploitation in some of domestic world heritage sites, national scenic areas, national forest parks, national nature reserves, the environments of the tourist sites have been damaged. On the one hand, developers exploit ecotourism in the name of protecting the environment and loving nature. On the other hand, ecotourism of protecting the environment and caring for nature has also attacked the natural ecological environment in the scenic areas. These two have formed a sharp contradiction. Behaviors of tourists who are the subjects of tourist activities may pose threat or even damage to natural environment in the following two cases. In the first case, the tourists are unaware of the damage caused by their ignorance of the protection requirements. The other case is the damage brought due to tourists' misconducts, such as disturbing protected animals, littering, carving and scribbling and soon. Therefore, tourists' environmental attitudes and

environmental behaviors are of crucial importance to the true realization of the goal of ecotourism. With a drastically increasing number of ecotourism tourists and more attention paid to protection of resources of the environment from all walks of life, the managers of all kinds of scenic areas are all faced with pressure coming from all sides. How to know tourists' environmental attitudes and guide their behaviors to conduct efficient management of tourists has become the biggest problem facing the managers.

Given this, the author will conduct surveys to find out the current situation of tourists' environmental attitudes and environmental behaviors and make an in-depth research on the relationship between tourists' environmental attitudes and environmental behaviors from the perspective of tourists' environmental attitudes and environmental behaviors so as to provide auxiliary decision-making evidence for the development and management of China's domestic tourist destinations.

1. Review on Tourists' Environmental Attitude and Environmental Behavior

Environmental sociology has become one field of sociology internationally. Research on environmental attitude and environmental behavior is the core and mainstream of researches in this field involving several disciplines such as psychology, pedagogy, politic science, resources and environment management and architecture. Many researchers have put forward theories and methods in relation to environmental attitude.

Stern and Dietz (1994) have put forward the value-basis theory. They consider that environmental attitude is the result of individual values and each person has three different value targets: self, others and biosphere. The degree of loyalty towards these three targets reflects an individual's three different values, and thus creates three different environmental attitudes: egoistic environmental attitude, altruistic environmental attitude, and ecological environmental attitude.

However in Schultz's inclusion theory (2000), low level of inclusion considers that self, others, and nature are independent from each other, which is an inclination of egoistic environmental attitude; middle level of inclusion considers self and others are interconnected, which is an inclination of altruistic environmental attitude; high level of inclusion considers self and all creatures are interconnected, which is an inclination of ecological environmental attitude.

Stern et al (1999) has come up with three levels of environmental values, namely ecological value, social altruistic value and egoistic value. Schultz (1999) has carried out research on environmental attitude with college students as respondents. Hyounggon (2006) has applied the New Ecology Paradigm to make a research on the environmental values of participants in Brazilian International Environmental Film Festival (aimed to increase tourism revenue and promote tourists' awareness of environmental problems) and found that there exist obvious differences in motivations among participants with values of different levels. Won et al (2005) utilized the New Ecology Paradigm to analyze the environmental attitudes of tourists in Australian Kingfisher Bay Ecological Tourism Resort. In terms of the influencing factors of environmental attitude, Ewert (2005) has launched a probe into the influence on individual environmental attitude exerted by early life experiences including medium influence, negative environmental events, and outdoor activities and so on.

Hines (1986) has made an analysis of 128 published articles with meta-analysis and found situational variable can predict the happening of environmental behavior, and there is a positive correlation among environmental knowledge ($r=0.299$), environmental moral responsibility ($r=0.33$) and environmental behavior. Stern (2000) explains the formation

mechanism of individual environmental behavior in combination with New Environmental Paradigm through behavior, belief and regulation, and proposes that moral responsibility is the most fundamental antecedent variable affecting environmental behavior which even can influence any kind of environmental behavior.

Alexander (1995) finds through surveys that individual values have a very remarkable influence on environmental behavior, and the awareness of the environment and the perception of the control can also influence environmental behavior. Kaiser's (1999) survey of over 3000 members in Switzerland shows that influencing factors of environmental behavior can be categorized into three aspects: environmental knowledge, the intention to environmental behavior, and environmental value. He also employs the structural equation model to observe these three aspects' influence on environmental behavior. The result is environmental knowledge, and environmental value have 40% explanatory ability towards the intention of environmental behavior, and the explanatory ability of the intention to environmental behavior towards environmental behavior is 70%. Gatersleben (2002) took a survey on Dutch household energy use behavior and found out that intention-guided environmental behavior is mainly under the influence of attitude variable, whereas the environmental behaviors influencing the goal are more linked with social demographic variables such as family type and income, and that energy use is related to attitude of household energy use and less related to the general environmental attitude. Tanner (2003) finished a research on green consumption behavior among residents of Bem in Switzerland finds that the perceived factors such as time barrier, convenience and economic constraints have marked influence on green consumption behavior and resident's rubbish management behavior, and that individual environmental attitude and environmental belief have positive predictive effect on green consumption behavior, and a positive attitude towards environmental protection is favorable to spur the occurrence of green consumption behavior. However, the relationship between environmental attitude and environmental behavior isn't always so close. Scott (1994) completed an empirical research in a large sample of Pennsylvania residents' and the result showed that the correlation between environmental attitude and environmental behavior isn't so strong, and this research has gained acknowledgment by researches done by Maloney & Ward, Ostman and Parker.

Research on environmental attitude and environmental behavior started quite late in China, beginning from the environmental awareness survey domestically in 1990s.

As far as environmental awareness is concerned, Zhaoxia Xiao (2004) found that the tourists do not have ecological awareness with shallow environmental responsibility when he finished a survey of Bitu Lake tourists. Jun Lv (2009) has conducted a survey on tourist's environmental awareness from environmental knowledge, environmental attitude, environmental evaluation and environmental behavior, and has found that tourists own little environmental knowledge and poor environmental attitude. Yanwei Hou (2010) measured tourists' environmental awareness on the basis of environmental knowledge, environmental attitude, the intention of environmental behavior and environmental behavior, and this study demonstrated that tourists' environmental awareness is limited by their environmental attitude. As for the influencing factors of environmental attitude and environmental behavior, Fen Luo (2008) and Jing Gao et al (2009) have made analysis respectively on the influence that social-demographic characteristics such as gender, income and profession have exerted on environmental attitude and environmental behavior, and proposed to reinforce the narration and publicity of scenic areas with the purpose of enhancing tourists' experience. As for environmental attitude and environmental behavior, Yanqin Li (2006) has made an analysis of the research on Baihua Mountain Nature Reserve in Beijing and some nations and regions as Taiwan, Poland, Canada and America, and launched a probe into the

difference of the characteristics of tourists' ecotourism behavior at home and abroad. Wei Yu (2010) believed that environmental knowledge has remarkable influence on environmental attitude, and is the most important prior variable of environmental behavior after he finished a survey of residents in seven middle and big cities in Shandong Province. The survey has also found that environmental sensitiveness can affect environmental intention through external standard pressure, internal attitude and sense of behavior control and that environmental value can directly influence environmental attitude so to further influence environmental behavior. Yong Yu et al (2010) takes Wulingyuan Scenic and Historic Area as an example and has made an research on the different influence of tourists' age, profession and form of tourism on environmental behavior, and made a canonical correlation analysis on nature and the mechanism of the influence of environmental attitude on environmental behavior, and advocated to guide and regulate tourists' behavior through strengthening environmental education. Qiuyan Qi (2009) divides environmental attitude into four dimensions of environmental emotion, environmental responsibility, environmental knowledge and environmental morality through factor analysis with the example of Jiuzhaigou Valley, and indicates that environmental knowledge and environmental emotion have a remarkable and positive influence on environmental behavior inclination. Xiaoling Peng (2010) has divided tourists into three types of ecological-oriented, strict ecotourism-oriented and general ecotourism according to environmental attitude, and his research has showed that there exists a significant correlation between environmental attitude and environmental behavior, and there exists difference in tourists' environmental behaviors belonging to different types of environmental attitudes.

All in all, our domestic research on environmental attitude and environmental behavior at present is in its infancy and mainly focused on environmental awareness, environmental attitude and environmental behavior and isn't systematic with few researches specially done on the tourists' environmental attitude and environmental behavior in ecotourism destinations.

2. Research Design

2.1 Variable Selection

In the related researches on environmental attitude and behavior, most of them view environmental attitude as the most important psychological variable to predict environmental behavior, and most empirical researches have also proved the remarkable and positive correlation between environmental attitude and environmental behavior. By summarizing others' previous researches and combining relevant theories of psychology, the author divides the environmental attitude variable into different measurement dimensions as follows:

(1) Environmental Knowledge

In the relevant researches on environmental attitude and environmental behavior, a majority of the researches view environmental attitude as the most important psychological variable to predict environmental behavior, and most empirical researches have also proved the remarkable and positive correlation between environmental attitude and environmental behavior. This article divides environmental attitude into the following dimensions based on the summary of others' previous researches and the relevant theories of psychology combined.:

(2) Environmental Value

Environmental Value can be defined as individual's perceived value of environment

and environmental problems. In many relevant researches on environmental problem, a majority of conflicts are caused by different values held by individuals. Therefore, environmental value can be taken as a variable to explain tourists' environmental behavior.

(3) Environmental Emotion

Environmental emotion reflects tourist's emotional attitude towards the ecological environment of the destination. Many researches show that the dimension of environmental emotion has a remarkable and positive influence on environmental behavior inclination. Therefore, the author also takes environmental emotion as an important variable of explaining environmental behavior.

(4) Sense of Environmental Moral Responsibility

Sense of environmental moral responsibility means sense of responsibility and morality displayed in one's environmental behavior for environmental problems or solving environmental problems. Kaiser (2003) adds the variable of sense of moral responsibility to the original TPB model, which greatly strengthens explanatory power of environmental behavior. Hence the author chooses sense of environmental moral responsibility as one of the reference variables in predicting environmental behavior.

2.2 Theoretical Model and Research Hypothesis

This article aims to explore the relationship between environmental attitude and environmental behavior. Based on the basic psychological cognition that attitude affects behavior and by combining synthesizing scholars' relevant researches on environmental attitude and environmental behavior in literature reviews and the various variables mentioned above, this article puts forward the following research theoretical model (See Figure 1).

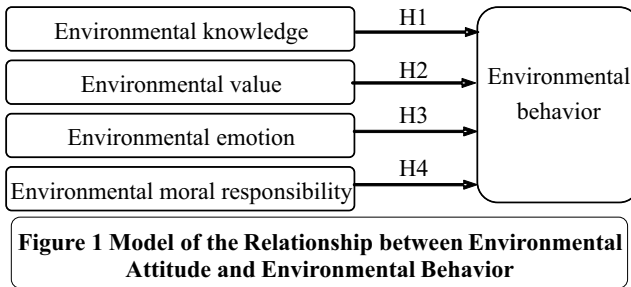


Figure 1 Model of the Relationship between Environmental Attitude and Environmental Behavior

According to the set variables and path relationship in the research model, this article puts forward research hypothesis as follows:

Hypothesis 1 (H1): Environmental knowledge correlates significantly with environmental behavior and exerts a positive influence on environmental behavior.

Hypothesis 2 (H2): There is a significant correlation between environmental value and environmental behavior.

Hypothesis 3 (H3): Environmental emotion correlates significantly with environmental behavior. The more active tourists' emotion is the more active their environmental behaviors are.

Hypothesis 4 (H4): Environmental emotion correlates significantly with environmental behavior. The stronger tourists' sense of environmental moral responsibility is, the more active their environmental behaviors are.

2.3 Questionnaire Design and Analytical Method

Questionnaire design was done based on the measurement of tourists' environmental attitude and environmental behavior. The design of this questionnaire makes reference to research achievements about measurement of environmental attitude and environmental behavior at home and abroad, and has made adjustments accordingly. The questionnaire totals 34 items, including three parts of measurement of tourists' environmental attitude, measurement of tourists' environmental behavior and tourists' personal information, all being objective single choices.

The main part of this questionnaire consists of environmental attitude and environmental behavior involving four variables mentioned in the first section of this chapter and measurement of environmental behavior. It designs five questions for measuring environmental knowledge, four questions for environmental value, five for environmental emotion measurement, five for environmental moral responsibility and another eight for measurement of environmental behavior. This questionnaire adopts Likert Five Point Scale as the measurement method to make assessment, and each item is granted quantitative score ranging from 1 to 5, 1 representing much disagreement (huge disapproval), 2 for disagreement (disapproval), and 3 for average (neutral), 4 for agreement (approval), 5 for great agreement (huge approval).

The part of personal information mainly collects information from seven aspects concerning tourists' gender, age, education background, occupation, monthly salary, tourism partner, participation in environmental protection organization. There are more research programs (GAO Jing et al.2009) indicates that there are apparent differences in tourists' environmental attitude and behavior in terms of the seven socio-demographic characteristics mentioned above.

The analytical method employs statistical software to precede some analyses of data gained from surveys, descriptive analysis, factor analysis, correlation analysis and regression analysis included.

(1) Descriptive analysis: Trying to know tourists' characteristics in environmental attitude and environmental behavior by making simple descriptive analysis of the average number of surveyed items.

(2) Factor analysis: It aims to test the credibility and construct validity of the questionnaire and figure out the main factors influencing visitors in environmental attitude and environmental behavior.

(3) Correlation analysis: Analyzing the correlation between environmental attitude and environmental behavior to judge environmental attitude's influence on environmental behavior.

(4) Regression analysis: Validating causal relationship of the theoretical model with environmental being independent variable and environmental behavior being dependent variable.

3. Empirical Analysis—A Case Study of Shenzhen OCT East

3.1 Overview of the Research Area

Situated in Dameisha of Shenzhen, Guangdong Province in China with an area of 9 square kilometers, Shenzhen OCT East is elaborately built with an investment of 3.5 billion RMB by OCT Group. It is China's first large and comprehensive "National Demonstration Area of Eco-Tourism" integrated with leisure, tourism, outdoor sports, science education, eco-adventure and other themes. OCT East mainly comprises six parts, including the Grand

Canyon Ecological Park, Tea Valley Leisure Park, Sea Clouds Valley Sports Park, Hua Xing Temple, Theme Hotel Complex, Day Foothill Estate and covers two theme parks, three tourism towns, four resort hotels, two mountain golf courses, huge Hua Xing Temple and Day Foothill Estate. OCT's goals of planning, construction and management are scientific and reasonable planning, complete functional facilities, beautiful urban environment, fashionable refined civilization and advanced standard management with the purpose of letting the city dwellers return to nature. The project reflects harmony between human and nature with least disturbance of mountain, water and vegetation in its planning and strengthened protection of mountain, water and vegetation in its development and construction.

3.2 Data Collection and Sample Analysis

3.2.1 Data Collection

This article's respondents are tourists in the scenic areas of Shenzhen OCT East. The questionnaire surveys mainly concentrate on the first two weeks of March and all survey data come from questionnaires recovered from the field surveys. The recovery is 100 percent with 240 questionnaires issued and 240 recovered, among which there are 217 effective questionnaires with 90.4% recovery. Deleted ineffective questionnaires are mainly composed of two categories: one is the questionnaires without complete answers or personal information; the other is the questionnaires of the same answers.

3.2.2 Basic Situation of Samples

A statistic analysis of these 217 effective questionnaires obtained from the surveys shows that age distribution of the respondents is relatively even with males accounting for 48.4%, females, 51.6%, resulting in a proportion of 1:1. The age distribution mainly concentrates on three age groups, among which the age group between 18 and 24 years old accounting for 34.1% , the group aged 24 to 30 with a ration of 28.1%, and the age group between 31 and 40 years old making up 17.5%, that's to say, most of the respondents are young and middle-aged. In terms of occupation composition, the main part consists of management personnel in enterprise and public institutions, company employee, teaching staff, researchers and students with a proportion of 13.4%、 27.2%、 13.8% and 11.5% respectively. The fact that all occupations are included indicates OCT East appeals to all walks of life. As for the education backgrounds, people who have graduated from senior high school or technical secondary school, junior college, and college make up a big share with a proportion of 23.0%、 26.7% and 41.5% respectively. The respondent with an education background above junior college occupies 70 percent of the total number of the respondents, which indicates the respondents' overall cultural qualities are relatively high. There is a relatively even income distribution among samples with 12.9% below 1000 yuan, 16.6% from 1001 to 2000, 24.9% from 2001 to 3000, 18% from 3001 to 4000 and 27.6% above 4001. Regarding the choice of tourism forms, group tour as a principal tourism form accounts for 47.5% in the whole samples, travel with company of friends with a ration of 25.8%, and 21.2% people choose to travel with family or relatives. 68 respondents have participated or are participating in environmental organizations with a ratio of 31.3%. However, most people don't have experience of participating in environmental organizations.

3.3 Data Analysis and Processing

3.3.1 Descriptive Analysis

In order to know tourists' characteristics in environmental attitude and environmental behavior, this research has made a descriptive analysis of these surveyed items in relation to average number and frequency. The statistical result shows that tourists' environmental

attitude has the following characteristics:

Tourists' inadequate knowledge of ecotourism and environmental protection

We can see from table 1 that tourists' average numbers are less than 4 (agreement) in items of serial number 1, 2 and 3, which indicates that tourists don't agree with these items and don't grasp the true meaning of ecotourism environment protection and benefitting local people and reflects tourists' inadequate knowledge of ecotourism and environmental protection. Average numbers of tourists with education background above bachelor degree in item 1, 2 and 3 are 4.04, 4.02 and 3.95 respectively higher than those of tourists with education background of junior college or below, namely 3.65、3.72、3.91 respectively. This shows that education enables tourists to have a more scientific knowledge of ecotourism and environmental protection and make them focus more on environmental interests.

Table 1 Descriptive Analysis Statistical Table of Tourists' Environmental Knowledge

Serial number	Item of Environmental Attitude	Average Number	Standard Deviation
1	Too many tourists easily cause destruction of natural resources in ecotourism scenic area	3.82	0.96703
2	Nature reserve area should have limits of opening time and people number	3.85	1.04368
3	Ecotourism development should protect local residents' interests	3.93	0.89001

Tourists have positive emotions towards environment and pay attention to environmental explanation

It can be seen from table 2 that surveyed items from one to five describe concern for environment and affection towards nature. Average numbers of tourists' surveyed items from 1 to 5 are all larger than 4 (agreement), which is an indication of tourist' agreement to the expressions from item one to item five and tourists' fairly positive emotions towards environment. 93.6 percent of tourists hold the view that the relevant environment explanatory sign matters very much in ecotourism, which shows that tourists attach great significance to environment explanation.

Table 2 Descriptive Analysis Statistical Table of Tourists' Emotion

Serial Number	Item of Environmental Attitude	Average Number	Standard Deviation
1	I like nature very much and very interested in it	4.29	0.75500
2	Relevant environment explanatory sign matters very much in ecotourism	4.35	0.63711
3	Natural environment protection is urgent	4.49	0.65351
4	Environmental problems reported by media often worry and frustrate me	4.04	0.86479
5	I am very angry seeing the environment of tourist destination under destruction	4.15	0.70705

Meanwhile, tourists have the following characteristics in environmental behavior:

Tourists' self-disciplined environmental behaviors are relatively positive and their interactive environmental behaviors are relatively negative.

Table 3 Descriptive Analysis Statistical Table of Tourists' Environmental Behavior

Serial Number	Item of Environmental Behavior	Average Number	Standard Deviation
1	I will try my utmost not to disturb flora and fauna in ecotourism scenic area	4.16	0.72442
2	I properly handle the waste (rubbish)during the tour	4.28	0.69340
3	Seeing other tourists harming the environment, I persuade them not to do so	3.61	0.79198
4	I follow completely guide's explanation and notice items in scenic area during travel	4.08	0.68214
5	I learn about local folk customs and geographical environment before travel	3.98	0.74513
6	I am ready to spare money and time for improving environmental quality	3.56	0.78552

We can know from table 3 that item one, two and four give a description of tourists' individual environmental behaviors and that item three, five and six describe tourists' environmental behavior of interaction with other tourists and scenic areas. In terms of item one, two and four, average number of tourists' evaluation scores are larger than four (agreement), indicating that tourists' self-disciplined environmental behaviors are relatively positive; whereas average number of tourists' evaluation scores in item three, five and six are less than 4 (agreement), which indicates tourists has low level of interaction with other tourists and scenic areas in environmental protection. In item six of being ready to spare money and time for improving environmental quality, the average number is only 3.56. It means that tourist have low level of readiness to actively participate in environmental protection when it comes to finance and action in a real sense. Many tourists express in interviews that though sparing money and time for protecting environment is a good deed, real financial donation without return requires further consideration:

Little Achievement shown in the role of ecotourism on tourists' environmental education

The fact that the average number of tourists' evaluation scores in the survey item saying “I will pay more attention to environmental protection after travel” equals to 2.11, larger than 2 (disagreement), which shows that ecotourism doesn't necessarily guarantee tourists' more interest in the environmental benefits and its role of environmental education on tourists doesn't work greatly.

3.3.2 Credibility and Effectiveness Analysis

Before making an analysis of questionnaire, we should check the questionnaire's credibility and effectiveness to ensure its effectiveness for truly reflecting the research content of the questionnaire. Credibility is for testing uniformity and accuracy of the questionnaire results. Cronbach's α value is the most frequently used one. The larger factor α is, the more uniform the results of the questionnaire items are and the more credible the questionnaire is. According to the viewpoint of American statisticians as Joseph F. hair Jr., when the value of α is larger than 0.7, data's credibility is fairly high and its value in explorative research can be less than 0.7, but should be larger than 0.5. This research also uses this factor to check the questionnaire's credibility. Before deleting question items, the values of α of variables including environmental knowledge, environmental value, sense of

environmental moral responsibility and environmental behavior are 0.637, 0.637, 0.620, 0.705 respectively. After deletion, several variables' credibility becomes lower including the first item (environmental knowledge), the sixth item (environmental value), the fifteenth item (sense of environmental moral responsibility) and the seventh and eighth items of variable of environmental behavior, and the value of α becomes 0.776, 0.704, 0.720 and 0.730 respectively. Credibility of questionnaire's variables are shown as table 4.

Table 4 Credibility Statistics of Questionnaire's Variables

Variable	Number of Variable	Credibility of Variable
Environmental Knowledge	4	0.776
Environmental Value	3	0.704
Environmental Emotion	5	0.711
Environmental Moral Responsibility	4	0.720
Environmental Behavior	6	0.730

It can be known from the above table, the value of α of each variable is larger than the standard 0.7, which indicates the results of this questionnaire are basically reliable.

Effectiveness is to test whether the survey questionnaire can truly reflect its expected research content. High effectiveness means the evaluation items of the questionnaire are complete in content and reasonable in the overall structure. This research mainly adopts the main component analysis method of factor analysis to test its effectiveness and conducts revolving of factor matrix through the varimax of biggest variance and carry out factor extraction of all variables according to the standard that the factor eigen value should be larger than one and load factors of each item should not be less than 0.3 (effectiveness test results of each factor shown as table 4 and table 5).

Table 5 Main Component Factor Effectiveness Load Matrix

Factor	Factor Items	Factor Load
Environmental Knowledge	Nature reserve area should have limits of opening time and people number	0.766
	Ecotourism development should protect local people's interests	0.705
	Like human, floral and fauna have their right to existence	0.831
	Human must live in harmony with nature for survival	0.808
Environmental Value	Human are entitled to change natural environment to meet their own need.	0.740
	Nature has sufficient balancing capability to eliminate the impact of modernization and industrialization	0.825
	My concern of environmental problems is for the interest of my family and myself, not the society and others	0.814
Environmental Emotion	I like nature very much and am interested in it	0.706
	Relevant environment explanatory sign matters very much in ecotourism	0.615
	I am very angry seeing the environment of tourist destination under destruction	0.713
Environmental Moral Responsibility	Development of scenic area doesn't need to take resources protection as a prerequisite	0.735
	Tourists are obliged to protecting the environment of scenic area and should try their best to improve or solve environmental problems	0.625
	Destroying environment is an immoral behavior	0.810
	The behavior of destroying environment should be punished	0.784
Environmental Behavior	I will try my ut most not to disturb flora and fauna in ecotourism scenic area	0.651
	During the tour, I will properly handle the waste (rubbish)	0.674
	Seeing other tourists harming the environment, I persuade them not to do so	0.679
	I follow completely guide's explanation and notice items in scenic area during travel	0.666
	I learn about local folk customs and geographical environment before travel	0.690
	I am ready to spare money and time for improving environmental quality	0.561

It can be seen from the above table, the analysis has produced five factors in total, among which four factors have been extracted from the variable of environmental attitude, namely environmental knowledge, environmental value, environmental emotion and sense of environmental moral responsibility; and one factor comes from the variable of environmental behavior. All the factor loads of factors' measurement items are larger than 0.3, which indicates that each factor's measurement is the same question, representing that this survey method has good content effectiveness.

3.3.3 Correlation Analysis between Variables in Hypothesis Model

Correlation analysis is a statistical approach to studying the level of closeness between variables. It demonstrates whether two phenomena are related in direction and size of the change of development, but it can't confirm the casual relation between the two phenomena. This research has made a correlation analysis of environmental value, environmental emotion, sense of environmental moral responsibility and environmental behavior respectively and the analysis results are as follows:

Table 6 Correlation Analysis between Environmental Knowledge and Environmental Behavior

		Environmental Behavior
Environmental Knowledge	Correlation Coefficient	0.184 (**)
	Sig (Bilateral)	0.007
	N	217

It can be seen from table 6 that the result of the correlation analysis between environmental knowledge and environmental behavior is that the correlation coefficient R between them equals to 0.184 with prominence less than 0.05, which indicates that there is a very prominent positive correlation between the two variables. The result of this correlation analysis makes it clear that the tourists' environmental knowledge has a prominent positive influence on their environmental behavior, thus hypothesis 1 is valid.

Table 7 Correlation Analysis between Environmental Value and Environmental Behavior

		Environmental Behavior
Environmental Value	Correlation Coefficient	0.005
	Sig (Bilateral)	0.939
	N	217

It can be seen from table 7 that the result of the correlation analysis between environmental value and environmental behavior is that the correlation coefficient R between them equals to 0.005 with prominence larger than 0.05, which indicates that there is no correlation between the two variables. The result of this correlation analysis shows that there is no correlation between environmental value and environmental behavior, thus hypothesis 2 is invalid.

Table 8 Correlation Analysis between Environmental Emotion and Environmental Behavior

		Environmental Behavior
Environmental Emotion	Correlation Coefficient	0.619 (**)
	Sig (Bilateral)	0.000
	N	217

It can be seen from table 8 that the result of correlation analysis between environmental value and environmental behavior is that the correlation coefficient R between them equals

to 0.619 with prominence less than 0.001, which indicates that there is a very prominent positive correlation between the two variables. The result of this correlation analysis shows that the more positive the environmental emotions of tourists are, the more positive their environmental behaviors are and vice versa. Therefore hypothesis 3 is valid.

Table 9 Correlation Analysis between Sense of Environmental Moral Responsibility and Environmental Behavior

		Environmental Behavior
Sense of Environmental Moral Responsibility	Correlation Coefficient	0.405 (**)
	Sig (Bilateral)	0.000
	N	217

It can be seen from table 9 that the result of the correlation analysis between environmental value and environmental behavior is that the correlation coefficient R between them equals to 0.405 with prominence less than 0.001, which indicates that there is a very prominent positive correlation between the two variables. The result of this correlation analysis shows that the stronger tourists' sense of environmental moral responsibility is, the more positive their environmental behaviors are and vice versa. Therefore hypothesis 4 is valid.

3.3.4 Regression Analysis between Variables in Hypothesis Model

Regression analysis is a statistical approach to studying whether there is some certain linear or non-linear relation between one or multiple independent variable and one dependent variable. For testing the predictive effect on environmental behavior made by three dimensions of environmental knowledge, environmental emotion and sense of environmental moral responsibility, this research makes a regression analysis of the three dimensions (analysis results shown as table 10 and table 11).

Table 10 Analysis Result of Regression Model

Model	R	R ²	Adjusted R ²	Standard Error	Value of F	Sig
1	0.643 (a)	0.414	0.406	0.77088	50.158	0.000

Table 11 Analysis Result of Regression Coefficient

Model	Nonstandard Regression Coefficient		Standard Regression Coefficient	T	Sig	
	B	Standard Deviation	Beta			
1	Constant Term	-2.157E-16	0.052	-	0.000	1.000
	Environmental Knowledge	0.059	0.054	0.059	1.099	0.273
	Environmental Emotion	0.536	0.058	0.536	9.263	0.000
	Environmental Moral Responsibility	0.176	0.058	0.176	3.053	0.003

Regression prediction includes three items of environmental knowledge, environmental emotion and sense of environmental moral responsibility. The dependent variable is environmental behavior. The above regression result shows:

(1) The regression coefficient between environmental knowledge and environmental behavior equals to 0.059 with prominence larger than 0.05, which means the prediction effect of environmental knowledge on environmental behavior isn't prominent.

(2) The regression coefficient between environmental emotion and environmental behavior equals to 0.536 with prominence less than 0.001, which means the prediction effect of environmental knowledge on environmental behavior is very prominent, that is to say that the more positive tourists' environmental emotion is, the more positive their environmental behavior is.

(3) The regression coefficient between sense of environmental moral responsibility and environmental behavior equals to 176 with prominence less than 0.05, which means the sense of environmental moral responsibility has a very prominent prediction effect on environmental behavior, that is to say that the stronger the tourists' sense of environmental moral responsibility is, the more positive their environmental behavior is.

3.4 Solutions and Suggestions of OCT East's Ecotourism Management

With the vigorous development of ecotourism, the number of ecotourism tourists will increase gradually and the contradiction between tourists' violating behavior and operational management of the scenic area will be intensified resulting in more grave challenges facing the scenic area. Because the concept of ecotourism is too much theorized with many difficulties in real operation, whereas the concrete and measurable goal of reducing the carbon dioxide emission in the tourist activity proposed by low carbon tourism provides a practical approach which is more workable for the development of ecotourism. Therefore, in order to realize the ecological, social and economic benefits of ecotourism, promote the development and expansion of real ecotourism, and achieve the sustainable development of the scenic area and tourism, several solutions and suggestions are summarized and generalized on the basis of the above survey and analysis results as follows:

3.4.1 To Establish the Mechanism of Publicity and Feedback for Spreading the Concept of Ecotourism and Low Carbon Tourism

It is found through the author's field survey that there is a positive correlation between tourists' environmental knowledge and their environmental behavior with the regression coefficient being 0.184. But the tourists lack adequate understanding for ecotourism and knowledge of environmental protection and the effects of their tourist activity on the environment. In addition, tourists know little about the campaigns of ecotourism and environmental protection launched by OCT East and don't take initiatives to get to know OCT East before the travel. Consequently the ecotourism campaigns of OCT East failed to fulfill their role of environmental education on tourist. Education of environmental protection has been weak. The restraining force of tourists' environmental behavior is mainly derived from sense of self-awareness, so it's hard for tourists to resist external temptation or the drive of self-interest, which can easily give rise to the weakening of environmental self-awareness. Therefore, the key point is to promote tourists' environmental knowledge. The scenic area can reinforce their efforts in publicity and education and spreading correct environmental value to alter their environmental attitude. Firstly, they should incorporate the spirit and the real meaning of ecotourism, the ecotourism products of the scenic area and knowledge of environmental protection should be covered within the range of publicity, which should not be only limited to the renowned OCT East's reputation as world-class travel destination. And diverse approaches of low carbon can be adopted in publicity means. For example, the publicity publications of the scenic area can be made into things close to tourists' life such as a fan, thus they can be recycled and the publicity effect is strengthened at the same time. Most tourists say that there is a relatively small amount of information about OCT East that can be searched online, which is detrimental to further knowledge. Therefore the scenic area should intensify their efforts in online publicity and can also carry out joint

publicity with some large websites such as Tencent in addition to the publication on the official website since online publicity is both low carbon and beneficial to tourists' convenient knowledge of OCT East. In terms of publicity forms, the form of storytelling can be used so that the publicized content can be remembered more easily. Secondly, the scenic area should also strengthen the publicity education of staff and launch systematic training of environmental education. The training can guide the staff to develop correct environmental attitude and restrain their own environmental behaviors. In addition, as personnel with the longest and most direct contact with tourists, staff with adequate knowledge of environmental protection can make better environment explanation for tourists in service, which helps the tourists establish self-conscious awareness of the environmental protection, guide their environmental behavior and make the staff the promoter of the low carbon concept. Finally, a good feedback channel should be established to adjust the priority and key point of publicity education by knowing and monitoring tourists' environmental attitude and environmental behavior through feedbacks. On the one hand, the existing ecological monitoring demonstration station in OCT East can be used to conduct monitoring and evaluation to know the quality and change of the environment of the scenic area, which can provide a basis for the guidance of tourists' environmental behaviors. On the other hand, the scenic area can set up a feedback email or launch an official blog with the theme of environmental protection so that tourists and staff can report the behavior of destroying the environment of the scenic area and offer advice and suggestions about environmental protection. And praise can also be given to the tourists or staff whose opinions have been accepted so that tourists can participate in the decision-making of the environmental protection in the scenic area. The tourists should be encouraged to have a better understanding of ecotourism and knowledge of environmental protection and pay more attention to their own environmental behaviors with the purpose of changing their environmental attitudes.

3.4.2 The Creation of an Environmental Explanatory System of Full Coverage in the Scenic Area and the Initiate of Low-Carbon Consumption

The survey results show that 93.6% tourists consider the environment explanatory signs in ecotourism are of great significance, therefore the construction planning of scenic area should include the successful construction of low-carbon facilities and the environment explanatory signs to provide a basis for tourists' practice of ecotourism behaviors. On the one hand, they should make full use of the existing low-carbon facilities, such as windmill power facility in the Grand Canyon, the water promenade of Marsh Park, solar photovoltaic generating station, the constructed the ecological engineering wetlands in the Tea Valley, sewage treatment station and the cycle track and so on, thus tourists' consumption behaviors can link to the utility of these facilities. On the other hand, specific and reader-friendly explanation and guidance should be made to the utility of low-carbon facility and the implementation of tourists' low-carbon travel behavior. And the resource of low-carbon facility can be reorganized and reused when necessary and explicit route guidance should be made to tell the tourists how to properly carry out the behavior of environmental protection. For example, the scenic area can reduce the setup of single recycling bin, gather severable recycling bins for classification recycling and the recycling type, and rubbish of each type should be labeled on the recycling bins so that it's easy for the tourists to conduct classification recycling and treatment. In the meantime, specific route directions should be made for tourists to find the recycling bin timely in need. Introductions and explanations of the rare plants in the scenic area should be made, which can spread natural biological

knowledge to tourist and avoid the occurrence of tourists' picking the plants. Tourists' entry into the scenic area is a consumption behavior. To truly guide tourists' environmental behavior, it's necessary to advocate the low-carbon consumption behavior. For example, we can adopt magnetic card entrance ticket to replace paper entrance ticket and advocate tourists to use environment-friendly bags and reduce the usage of plastic bags. In terms of transportation, tourists are encouraged to choose public transportation and travel on foot to reduce carbon emission, such as cable car, electric car, green bus, ecological trail and so on. As for hotels, hotel is an important part of OCT East Scenic Area and should use clean energy and facilities and products which are environment-friendly and energy efficient, such as the toilet requisites and environment-friendly tissues. And the hotels should do their best to recycle and reuse the sewage and rubbish. They can install signs of energy conservation in hotels to encourage tourists to pay attention to the details of environmental protection, save water and electricity, set proper temperature of air conditioner and switch off the lights when leaving and so on. In terms of catering, the scenic area should strengthen the management of hotels and other restaurants to decrease the usage of disposable tableware and use environment-friendly tableware and provide green food of ecological protection as a priority to tourists. In regard to souvenir, souvenirs made of environment-friendly materials with environment-friendly techniques with simple and practical packaging, which should be sold safe and pollution-free. The staff should be able to provide correct information about environmental protection for tourists in the tourist service center.

3.4.3 The Design of Interactive Ecotourism Products and the Creation of Tourist-Oriented Low Carbon Environment

The data analysis result shows that there is a very strong positive correlation between tourists' environmental emotion and environmental behavior with a correlation of 0.619 and that environmental emotion has the strongest predictive effect on environmental behavior with its regression coefficient equaling to 0.536, which means that the stronger tourists' environmental emotions are, the more active their environmental behaviors are. However, tourists have relatively low level of initiatives in participation of interactive environmental behavior. Consequently, the scenic area can design some interactive ecotourism products to create environment of low-carbon tourism for tourists and develop tourists' favorable emotion towards environment during activities. Firstly, the existing low-carbon facilities can be packaged into ecotourism products, such as windmill power facility, house on the water, ecological greenhouse, Marsh Park, sundial. The scenic area should enhance naturalness and interaction in the packaging of products and get tourists to know the function of the facilities to realize low carbon goal in promoting and making the interpretation more interesting to arouse tourists' interest. Secondly, some ecotourism projects can be developed through cooperation with environmental protection organizers to bring to tourists more knowledge of environmental protection and instruments of environmental protection that can be used in daily life through the interaction between environment protectors and tourists. Meanwhile competitions of environmental protection creativity can be launched, such as golf match, cycling race, game of recycling waste materials. Tourists' participation will offer them a chance to experience the campaigns personally, then they will truly understand the meaning of environmental protection for the scenic area, tourists themselves, the society and nature, which will boost their environmental emotion and further lead to conscious behavior of environmental protection. Finally, the scenic area can plan interesting and individual low carbon travel routes for tourists instead of being limited to the publicity of some single tourist attraction, which can serve as a guide for

tourists to travel by the scenic area's scheduled routes so that the management of tourists' environmental behavior can be enhanced.

3.4.4 The Guiding of Tourist's Low-Carbon Behavior and the Enhancing of Tourist's Environmental Moral Responsibility

The survey shows that there is a prominent positive correlation between tourists' environmental moral responsibility and environmental behavior with a correlation of 0.405 and that environmental moral responsibility has a very prominent predictive effect on environmental behavior. And the stronger tourists' environmental moral responsibilities are, the more active their environmental behaviors are. At present, the domestic ecotourism is in the stage of mass ecotourism. For ordinary tourists, it's very tempting to go on an in-depth tour of the scenic spot, but it's not suitable for all tourists to travel in ecotourism scenic area. During the survey interviews, the author finds that most tourists consider behaviors of destroying the environment immoral. But when asked whether this kind of behavior should be punished, many tourists take neutral stance and they won't pay more attention to the environmental interest after the travel. More tourists believed that this is caused by the lack of necessary guidance and restraint during tourism activities. Therefore the scenic area should reinforce the monitoring and management of tourists' behavior and formulate workable code of conduct for ecotourism tourists so that tourists can understand their due responsibility they should shoulder in environmental protection. Thus their sense of moral responsibility will be enhanced and their behavior of environmental protection can be well guided. The code of conduct should include two parts for tourists: the "dos" and the "don'ts", specifying the corresponding feedback and report channel at the same time, and corresponding punishments and praises and environmental emergency response procedures and measures should be formulated. In the implementation of the code of conduct, the staff in the scenic area should make specific guidance to carry out the code of conduct. The number of tourists should be limited properly in the peak hour of tourism to avoid what the author saw in the item of Torrential Mountain in OCT East that tourists dispersed in a instant after watching the item with rubbish strewn over the ground, but the scenic area didn't make any guidance in this regard.

Conclusion

Based on this research's survey on tourists' environmental attitude and environmental behavior and the statistical analysis of the survey data, the author comes to the following conclusions:

- (1) There is a prominent positive correlation between tourists' environmental knowledge and their environmental behavior, which validates hypothesis 1.
- (2) The influence of tourists' environmental value on their environmental behavior isn't obvious and there is no correlation between them, that is to say, hypothesis 2 is invalid.
- (3) Tourists' environmental emotion exerts a very significant influence on their environmental behavior. The more active tourists' environmental attitudes are, the more active their environmental behaviors are, which means that hypothesis 3 is valid.
- (4) Tourists' environmental moral responsibility exerts a very significant influence on their environmental behavior. The stronger tourists' environmental moral responsibilities are, the more active their environmental behaviors are, which means that hypothesis 4 is valid.

- (5) Regression analysis indicates that both tourists' environmental emotion and environmental moral responsibility have prominent predictive effect on their environmental behaviors, and the effect of environmental emotion is the most evident. Therefore, the scenic area should pay attention to tourists' environmental emotion and cultivate tourists' good sense of responsibility towards the environment.

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References

- Alexander Grob. (1995). A structural model of environmental attitude and behavior. *Journal of environmental psychology*, (15):209-220.
- Ewert A, Place G, Sibthorp J. (2005). Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Science*, 27(3):225-239.
- Gao Jing, Hong Wen-Yi, Li Wen-Ming, Zhang Yong-Gang, Luo Fen. (2009). Visitors' Environmental Attitude & Behavior in Natural Reserve—the Case of Poyang Lake Natural Reserve. *Economic Geography*, 29(11): 1931-1936. (in Chinese)
- Gatersleben B., Steg L, Vlek C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior*, 34(3):335-362.
- Hines J. M., Hungerford H. R.. (1986). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education*, 18(2):1-8.
- Hou Yanwei, Wu Chengliang, Zhan Yujun. (2010). Environmental awareness survey of visitors and related factors analysis. *Hebei journal of Forester and orchard research*. 25(3):315-320. (in Chinese)
- Hyounggon Kim, Marcos C. Borges, Jinhyung Chon. (2006). Impacts of environmental values on tourism motivation: the case of FICA, Brazil. *Tourism Management*, 27(5): 957-967.
- Kaiser F G, wolfing S, Fuhrer U.(1999). Environmental attitude and ecological behavior . *journal of environmental psychology*, (19):1-19.
- Kaiser F. G., Scheutle H. (2003).Two challenges to a moral extension of theory of planned behavior: moral norms and just world beliefs in conservationism. *Personality and Individual Differences*, 35(5):1033-1048.
- Li Yanqin, (2006).A Comparative on Ecotourist' Behavior and attitude both at home and abroad—a case study of Baihuashan Nature Reserve in Beijing. *Tourism Tribune*, 21(11):75-80.(in Chinese)
- Luo Fen, Chen Chao, Li Wenming.(2008). A Probe into the Tourists' Environmental Attitude and Behavior in World Natural Heritage Sceneries: A Case Study of Wulingyuan Scenic & Historic Interest Area, *Journal Of Central South University Of Forestry & Technology(Social Sciences)*, 2(6): 50-55. (in Chinese)
- Lv Jun, Chen Tian, Liu Limei. (2009).An investigation and analysis of tourists' environmental consciousness. *Geographical research*, 28(1):259-270. (in Chinese)
- Peng Xiaoling. (2010). Study on visitors' environmental attitude and behavior in world heritage area:a case of Wulingyuan Scenic & Historic Interest Area. *Journal of Central South University of Forestry & Technology*, 30(7):166-171. (in Chinese)
- Qi Qiuyin, Zhang Jie, Yang Yang, Lu Shaojing, Zhang Honglei. (2009).On Environmental Attitudes and Behavior Intention of Tourists in Natural Heritage Site A Case Study of Jiuzhaigou. *Tourism Tribune*, 24(11):41-46. (in Chinese).
- Schultz P. W., Zelezny L. (1999). Values as predictors of environmental attitudes. *Journal of Environmental Psychology*, 19(3): 255-276
- Schultz, P. W. (2000). Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues*, (56):391-406.

Scott D, Willits F K. (1994). Environmental attitude and behavior: a Pennsylvania survey. *Environment and Behavior*, 26(2):239-260.

Stern P C, Dietz T, Abel T, Guagnano G. A., Kalof L. (1999). A value-belief-norm theory of support for social movement: The case of environmentalism. *Research in Human Ecology*, 6(2):81-97

Stern P C. (2000). Toward a coherent theory of environmentally significant behavior. *Environmental education research*, 56(3):407-424.

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50, 65-84.

Tanner C., Kast S.W.(2003) . Promoting sustainable consumption: determinants of green purchase by Swiss consumers. *Psychology & Marketing*, 20(10):883-902.

Won Hee Lee, Gianna Moscardo. (2005). Understanding the impact of ecotourism resort experiences on tourists' environmental attitudes and behavioral intentions. *Journal of Sustainable Tourism*, 13(6):546-565.

Xiao Zhaoxia, Yang Guihua. (2004).A survey on the ecological consciousness of the domestic ecotourists-a case study on Bitahai ecological scenic spot, Shangri-La. *Tourism Tribune*, 19(1):67-71.(in Chinese)

YU Wei. (2010).Study on the Formation Mechanism of Urban Environmental Behavior From TPB: Investigation from Large and Medium-sized Cities in Shandong Province. *Ecological Economy*, (6):160-163. (in Chinese)

Yu Yong, Zhong Yong. (2010). A Forecasting Research on Tourists Environmental Behavior Based on Environmental Attitudes--A Case Study of Wulingyuan Scenic Spot. *Tourism Forum*, 3(5):514-520. (in Chinese)

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