ORIGINAL ARTICLE

A Study on Tourist Psychological Capacity of Scenic and Historic Area and Its Influencing Factors
― A Case Study of Mount Tai Scenic Spot

Lin―Sen Cao, Yong―Ji Piao[1], Rui Zhang, Tae―Dong Cho[2]*

Forestry College, Shandong Agricultural University, Tai'an 271018, China

[1]*Horticultural Science and Engineering College, Shandong Agricultural University, Tai'an 271018, China*

[2]*Department of Environmental Landscape Architecture, Gangneung-Wnoju National University, Gangneung 210-320, Korea*

Abstract

Tourist Psychological Capacity (TPC) is an important issue of the Tourism Capacity research. We gained the tourist satisfaction through the questionnaire investigation in Mount Tai Scenic Area and obtained the tourist satisfaction function using SPSS17.0 regression analysis method. Then we got the best psychological capacity of tourists with the Marginal Satisfaction Method. Finally we verified the influencing factors on TPC. The study found that the best TPC of Mount Tai Scenic Area is 10323 persons; Female shows lower TPC than male. Moreover, female satisfaction is more easily influenced by visitors' number increasing than male satisfaction; TPC plays negative correlation with the increasing of age. Teenagers and adults have no much difference in TPC, but the seniors present a relatively lower TPC than other; The higher education, the smaller TPC.

1. Introduction

With the development of society and economy, the tourism industry ushered in the golden age of their own development. As the world's largest industry, there have been more and more problems in the rapid development of tourism. Social, economic and ecological problems have been more serious with a large influx of tourists. Tourism Environmental Capacity (TEC) was proposed to solve the contradiction between the development of tourism and the protection of the environment, to make tourism sustainable development with the research of the environmental capacity management (Liu, 2008).

Tourism Environmental Capacity is the maximum number of tourist in the case of the acceptable decline of the environmental quality and tourist experience (Mathieson,Alister, Wall et al., 1982). TEC is an important standard to measure whether the environment and tourism development is coordination. TEC is generally divided into five basic capacities, namely: Tourism Psychological Capacity (TPC), Tourism Resources Capacity, Tourism Ecological Capacity, Tourism Economic Development Capacity and Regional Tourism Community Capacity (Liu and Jin, 1985). TPC which is the only concept of a respect of

demand, is an important issue of TEC. TPC is a narrow understanding of tourism psychological capacity, which is mean that the number of tourists of the tourism destination when the tourism activities of tourists keep a certain level (Bao and Chu,1999). According to the principles of behavioral psychology of people, everyone has his own requirements and recognition of their surrounding environment when they are engaging in tourism activities, which is called personal space. On tour, the visitors' visual, auditory, tactile sensation and action together constitute their own personal space. If this personal space is invaded and destroyed, it will cause a decline of visitors' satisfaction.

In this paper, we make the Mount Tai Scenic Area as an example to research the size of the TPC and verify its influencing factors in order to provide a scientific basis for the sustainable development of scenic spots.

2. Research Methods

2.1. Marginal satisfaction method

Because of the influence of many factors, TPC is not easy to measure. At present one of the mainstream approaches is Satisfaction Method. To obtain the satisfaction of tourists through the questionnaire, and then establish the relationship model between the number of visitors and tourists' satisfaction by mathematical method, which is based to analysis the

variation of tourist satisfaction. We borrow economics marginal benefit curve theory, introducing the concept of marginal satisfaction. Marginal satisfaction is the first derivative function of the satisfaction function. When the marginal satisfaction reached 0, then the tourists' satisfaction is the most ideal satisfaction, also is the most economic satisfaction (Manning RE, 1980; Saveriades and Alexis, 2000).

2.2. The content of the questionnaire

Questionnaire is divided into three parts. Firstly, use Li Kete's 5 level scale (very dissatisfied, not satisfied, in general, satisfied, very satisfied) to investigate the tourists' overall satisfaction. Secondly, in order to accurately understand the tourists' feel, we set the visual, auditory, tactile sensation, action four items (Tab.1); Finally, we used the nominal scale to survey respondents' gender, age, occupation, education etc.

2.3. Investigation and statistical method

The investigation time was legal holidays and weekends, they were October 1st to 8th, 13th, 20th, 2013. The survey site was red gate rode, which is the main line of mountain-climbing. The survey members were constituted by the masters of landscape architecture. The main respondents were tourists who were over 14 and happy to be investigated. We listen to the views of tourists by face-to-face communication. Granting 400 questionnaires, we have 386 are available. The efficient is 96.5%. We analyzed the

Table 1. Items Setting

Project	Very dissatisfied	Not satisfied	In general	Satisfied	Very satisfied
Visual	Crowded, line of sight is blocked a lot	The line of sight is often blocked	Feeling in general	Line of sight is blocked occasionally	Line of sight is clear
Auditory	Very noisy	Noisy	Feeling in general	Quiet	Very Quiet
Tactile sensation	Huge Crowded, continue to encounter others	Crowded, often encounter others	Feeling in general	Few of people, encounter others occasionally	Very few people, no touch
Action	Action is very difficult	Action is difficult	Feeling in general	Action is convenient	Action is very convenient

data with SPSS17.0 and excel. The results were analyzed with single factor variance analysis, independent samples T-test and regression analysis.

3. Results and Discussion

3.1. Determination of TPC of Mount Tai Scenic Area

We use the Delphi method to weight assignment. Visual, auditory, tactile sensation, action 4 index weights were 0.35, 0.3, 0.2, 0.15. The tourists' visual satisfaction, auditory satisfaction, tactile sensation satisfaction, action satisfaction and the weighted average satisfaction in the process of tourism are shown in table 2.

The data were used for regression analysis with SPSS17.0. We made a variety of related curve simulation by curve estimation model. Among them, the R2 of quadratic curve is 0.982, which has a higher fitting degree and meet the test of R. This quadratic equation is:

$$y = 3.929 + 1.066 \times 10^{-6} x - 5.163 \times 10^{-11} X^2$$

<div align="right">Equation(1)</div>

We got TPC curve of Mount Tai Scenic Area:

The derived function of equation (1):

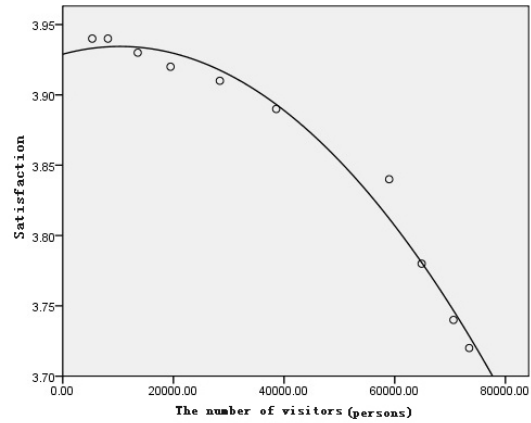$$y' = 1.066 \times 10^{-6} - 10.326 \times 10^{-11} X \qquad \text{Equation (2)}$$

Fig. 1. The TPC curve of Mount Tai Scenic Area.

In equation (2), when the Y'=0, x=10323. It means that when the marginal satisfaction reached 0, 10323 persons, the tourist satisfaction is the best. So we got the conclusion that the best TPC of Mount Tai Scenic Area is 10323 persons.

3.2. Study on influencing factors of TPC

The academia has no conclusion about the influencing factors on psychological capacity. Overall, there were the following aspects:

Table 2. the results of survey data

The investigation time	The number of climbers	The number of valid samples	Visual satisfaction	Auditory satisfaction	Tactile satisfaction	Action satisfaction	Overall satisfaction
10-1	19479	40	4.08	4.04	3.67	3.61	3.92
10-2	64868	39	3.85	3.90	3.62	3.59	3.78
10-3	73468	38	3.76	3.86	3.54	3.56	3.72
10-4	70623	39	3.79	3.88	3.59	3.57	3.74
10-5	58991	38	3.91	3.97	3.67	3.66	3.84
10-6	28397	37	3.98	4.09	3.69	3.69	3.91
10-7	13556	39	4.01	4.09	3.72	3.69	3.93
10-8	5328	39	4.06	4.10	3.65	3.71	3.94
10-13	38584	38	3.96	4.05	3.69	3.67	3.89
10-20	8167	39	4.03	4.11	3.70	3.69	3.94

Table 3. The influencing factors of Tourist psychological capacity

Author（Time）	Ruyck（1997）	Bao Jigang and Chu Yifang (1999)	Wang Xiaoyan and Wang Chen（2007）
Influencing factors	The organization form of team, The intimate relationship between tourists, Tourist routes organization form etc	The character of tourism activities, The unit space capacity of tourist sites, Tourist individual age, gender, social economic status and culture level etc	The perception of visual , auditory, tactile and behavior

Mount Tai is a mature landscape cultural tourist destination in China, whose tourist activity form, the spatial structure of scenic spots, tourist routes organization forms are relatively stable. Therefore, the study on the influencing factors of TPC focused on the attributes of tourists in this paper.

Tourists' attributes includes gender structure, age structure, education and income level. As the income level is influenced by a lot other factors, such as the family roles. So the level of personal income does not accurately explain its impact on the psychological capacity. Thus we will focus on the relationship of the first three tourists' attributes and the TPC.

3.2.1. The relationship between gender and TPC

In China, the study of tourists' gender is not enough, and started rather late (Tang and Zhu, 2007). For a long time, the design of landscape has been advocated universal design, which focused more on the convenience of vulnerable groups, such as the disabled, the elderly and children ignoring the gender factor. Space need of women has been ignored (Huang and Gu, 2003; Xu, 2004; Liu and Shen, 2008). Research shows that the autonomic nervous system control of visceral and skills in women are more complex than the male. This makes the emotion expression of the female is more clear and delicate. More likely to fear, shock and fear. Also more easily excited, happy and sad. Therefore, women may need more "safe distance" than men, leading to female TPC is smaller than men. So we can assume "female TPC is smaller than men".

We divided the questionnaires into male and female two groups to analysis. The data were analyzed by independent samples T test in SPSS17.0. The results showed the male and the female has significant differences. We got the Fig.2 in excel:
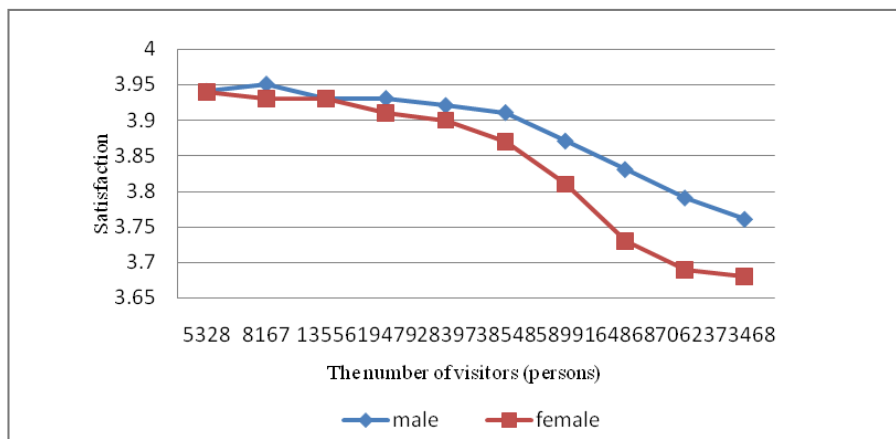

Fig. 2. TPC curves of Male and Female.

The figure shows that the female and male TPC is relatively stable and closed before the best TPC (10323persons). The two lines all showed decline after the best TPC, but the female TPC declining trend is more obvious and severe than men, with the women more sensitive to the change of environment. Overall, Thus we can infer that the hypothesis " female TPC is smaller than men" is confirmed.

3.2.2. The relationship between age structure and TPC

Due to the differences of physical, psychological and social experience, tourists of different ages have different tourist behavior and preferences (Li and Qian, 1994). As a vulnerable group, the elderly need more personal and safe space. Adult need more travel experience. Theoretically, with the increasing of age, TPC will be reduced. So we can assume "TPC plays negative correlation with the increasing of age".

According to our country's age classification standard and the actual situation of the questionnaire, the age structure is divided into youth (under age 18), adult (18 to 55 years of age), old people (above 55) in the investigation. Then we did the single factor variance analysis of the statistical data with spss17.0. The

results showed that significant difference exists among these data. We got the Fig3 in excel:

Overall, the figure shows that TPC of youth are higher than adults, but the gap is not obvious. Because the sample of old people is small, lead to the results are not very stable. But overall the elderly TPC is generally less than the other groups. Their satisfaction's fluctuation is bigger, so they should be more easily affected by the increase of visitors. Therefore, we can infer that the hypothesis "TPC plays negative correlation with the increasing of age" is partly confirmed. It should be added that youth and adult TPC gap is small, the old people TPC is relatively smaller and more sensitive to the change of environment

3.2.3. The relationship between culture level and TPC

Tourists with different cultural level show significant differences in the way to travel (Ji, 2008). In general, highly educated persons require a higher quality of tourism, hoping to get a more relaxed space. So their psychological capacity may be smaller than the lower educated persons. So we can assume "TPC plays negative correlation with the level of education"

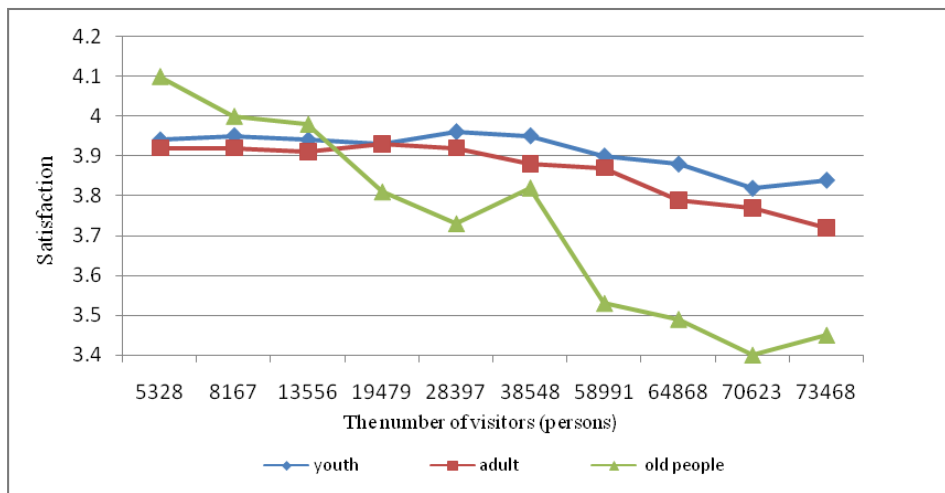We divided tourists' cultural degree into "junior

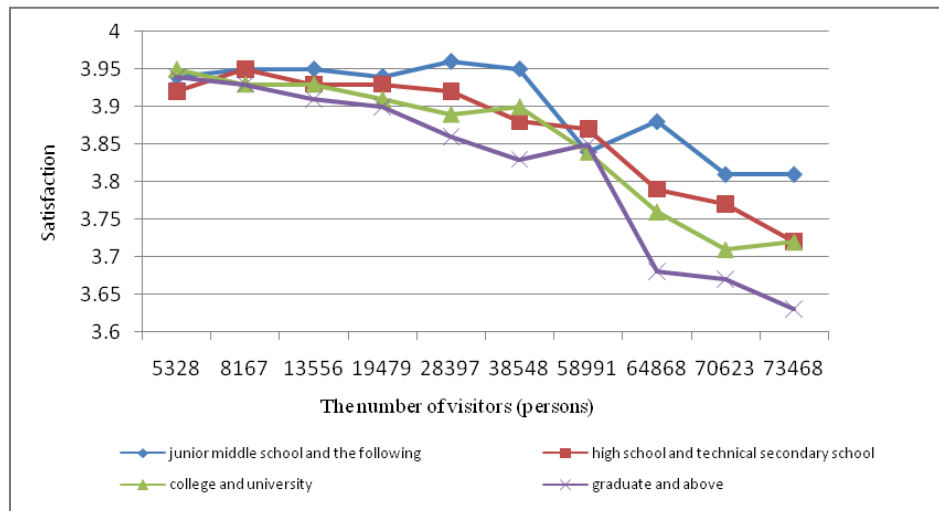**Fig. 3.** TPC curves of different age level.

Fig. 4. TPC curves of different cultural level.

middle school and the following", "high school and technical secondary school", "college and university", "graduate and above" four classes. Then we did the single factor variance analysis of the statistical data with spss17.0. The results showed that significant difference exists among these data. We got the Fig4 in excel:

As the samples of "junior middle school and the following" and "graduate and above" were small, the results were not very stable. But overall, the tendency of the four lines is consistent. When the number of visitors is certain, the higher level of education, the lower level of TPC. Thus we can infer that the hypothesis " TPC plays negative correlation with the level of education" is confirmed.

4. Conclusions

Based on the Mount Tai Scenic Area as an example, we obtained the TPC curve by using satisfaction survey method and marginal satisfaction function model method. We got the data of the best TPC and verified the influencing factors of TPC. The study found that: the best TPC of Mount Tai Scenic Area is 10323 persons; female shows lower TPC than male.

Moreover, female satisfaction is more easily influenced by visitors' number increasing than male satisfaction. TPC plays negative correlation with the increasing of age. The youth and adult have no much difference in TPC, but the seniors present a relatively lower TPC than other groups and they are sensitive to the increase of visitors' number. The higher education, the greater freedom of access to space needed, but the smaller TPC.

It should be pointed out that, the different nature of the tourism destination, the personal characteristics of tourists, tourism organization way and other factors will affect the TPC, Therefore these research conclusions have reference meaning for the similar tourism destination and tourism activities. Other types of tourism destination and tourism activities need to be re-measured.

References

Bao J. G., Chu Y. F., 1999, Tourism Geography, Higher Education Press,6,152. (in Chinese)

Huang C. X., Gu C., 2003, Space-perspective based feminist: A new planning concept, Urban planning, 27, 81-85. (in Chinese)

Ji C. Z., 2008, Investigation of travel motivations of different groups in Guangdong Province, Sports science, 12,8-10. (in Chinese)

Li R. Q., Qian W. L.,1994, Modern consumer psychology, China Business Press, 9, 65-68. (in Chinese)

Lin M. Z., 2008, Forest vegetation and ecological tourism of Guangdong Southern Kunshan ecological tourist area, China Meteorological Press, 1, 121-128. (in Chinese)

Liu L., Shen Q., 2008, The research of the Differences of Gender's concerns on the city square design elements Based on the feminist perspective, Geography, 23, 12-16. (in Chinese)

Liu Z. L., Jin J., 1985, Scale studies on specific regional tourism. Tourism theory, 2, 26-29. (in Chinese)

Manning R. E.,1980, Recreation density and user satisfaction: Afurther explo-ration of the satisfaction model, Leisure Research, 12, 245-32.

Mathieson, Alister, Wall, et al., 1982, Tourism: Economic, physical and so-cialimpacts, Longman, 12, 21-22.

Saveriades, Alexis, 2000, Establishing the social tourism carrying capacity for the tourist resorts of the east coast of the republic of Cyprus, Tourism Management, 21, 147-156.

Tang X. Q., Zhu H., 2007, Sex topics in Tourism Research, Tourism Tribune, 22, 43-48. (in Chinese)

Xu C. H., 2004, The relationship between gender's difference and the campus space environment, Huazhong University of Science and Technology. 29, 42-44 (in Chinese)