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Consistency Analysis of Spatial Perception Measurement of Tourists and Residents in Fuzhou Xi-Hu Park

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Authors' contributions

This work was carried out in collaboration between both authors. Author CJH designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors CJH and TFY managed the analyses of the study. Author TFY managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Fuzhou Xi-Hu Park is Located in the central area of Fuzhou, It has a history of over 1,700 years and is the most complete classical garden in Fuzhou. Many people come to the Xi-Hu Park for sightseeing when they arrive in Fuzhouas well as residents. The purpose of this study is to explore whether the structure and measurement method of the questionnaire are uniform for tourists and residents in the measurement of spatial perception. Data were collected by questionnaire survey, 650 number of questionnaire were distributed and 583 were received. The results revealed that the scales of measurement across residents and tourists were invariant. The measurement weights, measure residuals and structural residuals were not significant indicating that there is no difference across residents and tourists. It means that the study can re analyze the difference between tourists and residents' perception of space.

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1. INTRODUCTION

The current generation of residents is working under stress, and many people are more and more eager to live in natural conditions in their free time. The user's perception and attitude towards the surrounding environment is considered to be the most direct factor in evaluating the development of the local environment. Understanding the user's perception of the environment can help managers use the data to provide a basis for decision-making management and create a more friendly environment. However, the configuration of the space in the park is very important but fewer ones study them. It is necessary to have a reasonable configuration to meet the needs of people's recreation. Many related methods and principles are also proposed [1,2,3,4]. Therefore, some tourist destinations will carry out user perception surveys on tourist destinations. Through the results of the survey, the project will be modified to optimize the landscape configuration of the tourist destinations and attract more tourists to visit the tourist destinations. However, there are very few relevant perceptual studies on a historic park. Are there any other differences in landscape perception among visitors and residents while they remember the great and delicate work done by the ancients in the garden project? When the historic park becomes a leisure spot for neighbors to visit, the local residents 'perceptual feedback can become an important maintenance and construction index. Fuzhou XI-HU Park is a historic leisure place. It is the most complete classical garden in Fuzhou, with a history of more than 1700 years. With the unique style of Suzhou garden and the strange stone spectacle of rabbit ear mountain, it is the best place for Fuzhou citizens to have leisure. The West Lake of Fuzhou was chiseled by Yan Gao, the governor of Taikang in Jin Dynasty (282 A.D.), and it was already a tourist attraction at the end of Tang Dynasty. In the Five Dynasties, the West Lake of Fuzhou became the imperial garden of Wang Yanjun, the second son of King min, who was judged by the king of Fujian. In the Song Dynasty, it became more prosperous. In the eighth year of qingdaoguang (1828 A.D.), Lin Zexu built stone for the lake bank and rebuilt it. In 1914, it became the XI-HU Park. Visitors to the park can be divided into two categories. Their stay time and rest time inside the park will be different, so there will be differences in perception of the space.

Yen [5] believes that the use of the meter tool has different applicability for different research objects, which may cause differences in measurement paths, variations in covariance and the difference in measurement residual, such research topics are rarely discussed. The purpose and significance of this study are: (a) to investigate the spatial perception measurement invariance of residents and tourists in Fuzhou XI-HU Park. (b) Advice on the application of environmental management in historical parks, and (c) to identify areas for future scholarly inquiry. Byrne [6] suggested the tests for multi-group invariance are: (a) factor loadings, (b) factor covariances, and (c) structural regression paths. the researcher proposed three hypotheses as follows:

> **Hypothesis 1:** Assuming model measurement weights to be variant for different kinds of participants.
>
> **Hypothesis 2:** Assuming model structural covariances to be variant for different kinds of participants.
>
> **Hypothesis 3:** Assuming model measurement residuals to be variant for different kinds of participants.

2. LITERATURE REVIEW

There are many studies on the perception differences between residents and tourists in the tourism environment [7,8], People's perception of space will affect people's feelings in an environment and affect people's emotions. Therefore, some scholars have studied space perception. Liu [9] thinks that the interior space environment of the new Qiang's room in Beichuan village is an important part of Beichuan's rural tourism experience, and evaluates the satisfaction perception of the Aborigines for the investigation of the interior space environment construction. Ma and Liu [10] Based on the spatial characteristics of micro terrain elements, spatial scale and spatial sequence, this paper studies the spatial perception deeply, constructs the research model of micro terrain spatial perception, and summarizes the key points of micro terrain design.

Many experts think that individuals with different characteristics will have different views on the same thing. Therefore, they have done relevant research. Liu [11] found that there were significant differences in environmental awareness behaviors between tourists and residents. Wang [12] found that tourists and residents have great experience conflicts in environment, rights and culture. Yen [5] discussed the destination image in rural tourism context, and established the consistency of research methods (measurement structure and measurement process) according to gender differences.

3. MATERIALS AND METHODS

There are four questions about the of spatial awareness. 1) I like the number of tourists in the scenic spot to be relatively small; 2) I want to stay away from other tourists while visiting the area; 3) I 'd like to find a suitable place to stay in the scenic spot;4) I'm interested in some of the open-space style in the area. Questionnaire survey was employed to collect the data. To ensure validity, this study is constructed on the basis of scales adopted, in large part, from previous studies, using existing scales for measuring space perception Zuo [13]. Four items were adopted. Likert scales (1-5) with anchors ranging from “strongly disagree” to “strongly agree” are used for all questions. All of these scales have been shown to be reliable and valid, based upon prior research. A questionnaire was prepared for collecting rating and other information. Items measuring the various constructs were distributed about in the questionnaire to reduce halo effects.

The empirical study was carried out in Fuzhou XI-HU Park region, during November to December in 2017. The information about the subject was listed in Table 1.

Table 1. Descriptive statistics

Sample characteristics	Numbers	Percentage
Gender	Male	45.5%
	Female	54.5%
Age	Below 18	4.8%
	18–25	43.9%
	26–35	26.8%
	36–45	11.1%
	46-55	5.3%
	Above 56	8%
Education	High school graduates or below	11.3%
	Junior college graduates	23.3%
	University graduates	59.9%
	Master’s degree or up	5.4%
Job	Government agencies	2.4%
	Private enterprise	26.1%
	Farmers	3.4%
	Student	34.6%
	Soldier	1.9%
	Retirees	6.7%
	Freelancers	13.9%
	Others	11%
Annual income (RBM)	Below 1000RBM	10.1%
	1000-2000RBM	20%
	2000-3000RBM	22.1%
	3000-4000RBM	8.6%
	4000-5000RBM	22.9%
	Above 5000RBM	16.2%
Residents or tourists	Residents	44.3%
	Tourists	55.7%

4. RESULTS AND DISCUSSION

The Structure Equating Modeling (SEM) by Analysis of Moment Structure (AMOS) software was applied to test the model structure and hypotheses. The factor analysis for four components of space awareness was showed as Fig. 1. The results of multi-sample analysis for the unconstrained and the three constrained models were listed as Table 2. The unconstrained model showed an acceptable baseline model for both residents and tourists. The multi-sample analysis also showed the indexes of model fit for three constrained models - measure weights, structural covariances (See Table 3) and measurement residuals, across gender, and these indexes indicated the three constrained models were accepted.

The χ^2 difference test (χ^2 (3)=4.23, p>.05) between baseline model and constrained model for measurement weights was not significant, indicating the factor loadings across residents and tourists in this scale were equivalent. The χ^2 difference test between baseline model and constrained model for structural residuals ($\chi^2(4)$= 13.21, p<.05), but p was affected by the samples, we must refer to other indicators (Nχ^2 FI Delta-1<.05,IFI Delta-2<.05,..). It was notsignificant, indicating the structural residuals across residents and tourists were equivalent. It shows that the spatial perception of residents and tourists in the Fuzhou XI-HU Park has a not significant difference in influencing coefficients. However, theχ^2 difference test between baseline model and constrained model for measurement residuals (χ2(10)= 29.702, p<.05,NFI Delta-1<.05,IFI Delta-2<.05) was not significant, indicating the measurement residuals across residents and tourists were equivalent. Thus, H1, H2 and H3 were not support.

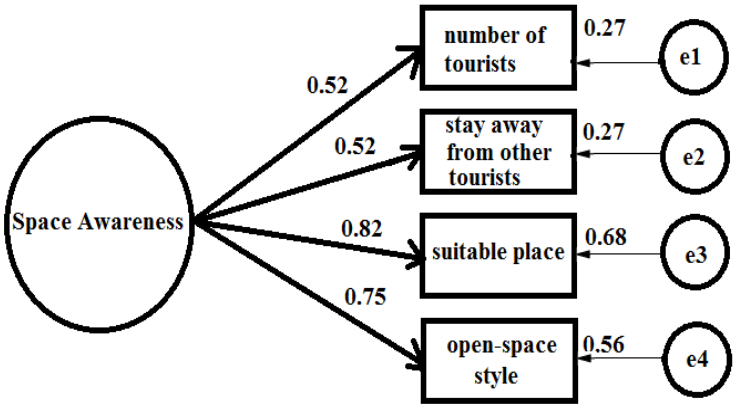

Fig. 1. Factor analysis for four components of space awareness

Table 2. Model fit indexes for unconstrained and constrained model

Model	χ^2	DF	P	χ2/DF	GFI	AGFI	CFI	RMSEA
Unconstrained	89.22	4	0.00	22.30	.930	.652	.866	.191
Measurement weights	93.45	7	0.00	13.35	.929	.797	.864	.146
Structural residuals	102.4	8	0.00	12.80	.922	.805	.851	.143
Measurement residuals	107.6	12	0.00	8.97	.917	.861	.849	.117

Table 3. Nested model comparisons

Model	CMIN	DF	P
Measurement weights	4.23	3	0.237
Structural residuals	13.21	4	0.010
Measurement residuals	18.41	8	0.018

5. CONCLUSIONS

The results revealed that the scale of measurement across residents and tourists were invariant. The measurement weights, measure residuals and structural residuals were not significant indicating that there is no difference across residents and tourists. Milfont and Fischer (2010) and Yen (2017) claimed that the full measurement invariance was questionable to hold in reality. This finding filled up the gap of previous studies. Therefore, the measurement of tourists and residents' perception of space awareness could be applied to Fuzhou XI-HU Park tourism context while the measurement weights, measurement residuals and structural residuals should be concerned carefully. Moreover, suitable place revealed the highest factor loadings for both residents and tourists, indicating that the suitable place to rest and relaxing was important.

Managers usually think that the process of tourists and residents to the park is not the same, so the mood of tourists and residents will be affected by different process, which will make tourists and residents have different perception of the park space. However, when discussing the difference of space perception between tourists and residents, we must pay attention to the homogeneity of the questionnaire structure and measurement method to the subjects. When the measurement scale is different from the subject in structure or measurement method. Based on different basis, the measurement results will have significant differences. It can't really know the truth of the measurement results. The results of this study show that there is no significant difference in the structure and measurement process between tourists and residents. It means that we can re analyze the difference between tourists and residents' perception of space.

Managers of Fuzhou XI-HU Park should concerned first when shaping images of the destination. Furthermore, the factor loadings of open space revealed the second one for both residents and tourists, it showed that open-space style awareness could be one of the important factors of spatial perception. Different perceptions could be met among various of park user and consequently, the perception of space might be different. The number and convenience of residents to the park might be higher, but the number of visitors to the park was relatively small, and might go through a more difficult traffic environment. So the spatial perception of the park will have different results. The results of this study also confirmed this phenomenon.

This study suggests that when using the questionnaire method for research, it is necessary to analyze the consistency of the questionnaire for various subjects and then continue the comparative analysis when the differences are not significant. This study can continue to explore the differences between residents and tourists in the park's spatial perception in the future. In addition to spatial perception, landscape perception includes visual perception, olfactory perception and so on. It is also a future research object.

CONSENT

As per international standard or university standard written participant consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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