

Article

The Influence of Perceived Physical and Aesthetic Quality of Rural Settlements on Tourists' Preferences—A Case Study of Zhaoxing Dong Village

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Abstract: Rural settlements, as crucial human habitats, encompass various values such as residential living, cultural tourism, and industrial development. This paper investigates the environmental physical and aesthetic factors perceived by tourists, which influence their preferences for rural settlement environments. Previous studies have predominantly focused on evaluating the impacts of physical or aesthetic factors on tourists' environmental preferences, with limited research simultaneously examining their combined effects. To reduce this research gap, we selected Zhaoxing Dong Village in China, characterized by typical rural environmental traits, and collected 450 valid questionnaires. The questionnaire data underwent correlation analysis and multiple linear regression analysis. The results indicate that when considering only environmental physical quality factors, most of the physical quality factors are significantly correlated with tourists' preferences. Among them, "visual quality" shows the highest correlation, followed by "facility" and "maintenance", while "security" shows the lowest correlation. When aesthetic quality factors are added to the model as independent variables, they enhance the explanatory power of the model and exhibit more significant associations compared to the relationship between physical quality factors and preferences. Among the aesthetic quality factors, "multisensory" and "sublime" demonstrate the highest correlation, whereas "diversity" shows the lowest correlation. The current study demonstrates the validity of the two scales for measuring tourists' perceived levels of physical and aesthetic quality in rural settlement environments. These findings contribute to the effective utilization of environmental capital within rural settlements and provide guidance for rural settlement planning and design.

Keywords: environmental quality; Zhaoxing Dong Village; perception measurement; rural settlements; environmental preferences



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1. Introduction

Rural settlements are important places for human living and activities [1]. They are shaped by diverse factors such as the geographical environment, socio-economic conditions, and historical and cultural heritage, resulting in distinct settlement patterns and local traditions [2–4]. Comprising various cultural ecosystem services and practical functions, rural settlements not only provide habitats for local communities but also create significant value in terms of agricultural production [5,6], cultural heritage preservation and inheritance [7,8], cultural landscape creation [9], as well as leisure and tourism [10–12]. As a vast multi-ethnic country, China possesses abundant local and ethnic cultures, giving rise to diverse rural settlements characterized by unique geographical environments and historical backgrounds. However, in the era of globalization, rapid urbanization in China has irreversibly damaged the fragile ecological fabric of rural settlements [13]. Many rural settlements are confronted with issues such as "constructive destruction", the hollowing out of villages, and cultural disconnection [14]. Despite the implementation of the "Regulations

on the Protection of Historical and Cultural Cities, Towns, and Villages” (https://www.gov.cn/zhengce/2020-12/27/content_5574469.htm, accessed on 8 June 2023) by the Chinese government in 2008, the increasing urbanization and modernization have resulted in a noticeable “gap” between the infrastructure conditions of rural settlements and the growing demand for high-quality spatial resources.

The environment of rural settlements has a profound impact on the well-being of the population [15]. High-quality rural settlement environments not only play a crucial role in cultural dissemination and promoting local economic development [16], but also offer numerous benefits to the users and visitors. For instance, the aesthetic value of rural environments can alleviate the impact of stress-inducing life events on mental health [17,18], and they can also attract tourism [19] and leisure activities while enhancing the life satisfaction of local residents [20]. Several studies have simultaneously demonstrated the positive impacts of high-quality spatial elements in rural settlements on tourists, which are closely related to cultural, ecological, and aesthetic values. In summary, the quality of rural settlement environments plays a significant and multifaceted role. Investigating and researching the quality of rural settlement environments is of great importance, as these studies can uncover the relationship between these qualities and their benefits, thus providing insights for environmental planning and management to bridge the gap between development and conservation. However, despite the increasing attention being paid to rural settlements as cultural and tourism destinations, attracting more tourists through improving environmental quality remains a challenge [21]. There may be a correlation between tourists’ environmental preferences and the enhancement of rural environments. From the perspective of tourists, the elements of travel, accommodation, food, leisure, shopping, and entertainment in rural settlements exhibit different emotions, perceptions, and psychological tendencies during the tourism process [22]. Exploring these psychological inclinations can provide a more focused reflection on actual environmental improvement issues. In addition, high-quality environments generate greater interest among tourists, attracting more tourism activities. For instance, the aesthetic quality, historical and cultural significance, and comfortable experiences of the environment influence tourists’ preferences and their choices regarding the sequence of visiting attractions. In the study of Sojasi Qidari et al. (2016), it is also proved that there is a relationship between environmental quality and tourism attractiveness, and that the improvement of physical quality and aesthetic quality plays a positive role in improving the attractiveness of rural tourism and will affect users’ tourism choices [23]. Therefore, studying the influence of environmental quality on tourists’ preference is very important to the improvement of rural settlement environment, tourism attractiveness, service management and planning decision-making [24].

The study of environmental preferences can be traced back to the 1960s and is often defined as the “liking” or search for aesthetically pleasing locations [25,26]. Environmental preferences are determined by the environmental features that have potential functional significance to the perceiver [27]. Due to the interactions, perceptions, and information biases between individuals and the environment, users may have different aesthetic preferences for the environment [28]. Also, the environmental preferences may be influenced by factors such as age, culture, level of education, and residential environment [29].

Although there are many factors that influence user environmental preferences, the relationship between environmental quality and preferences has been widely emphasized [30,31]. The physical environment plays an important role in shaping tourist preferences, such as topographical changes [32], vegetation greening [33], visual aspects of the environment [34], and the quantity of elements [35]. Topographical changes can enrich the comfort and enjoyment of tourists. Altering the position and shape of paths among forests can provide unique walking experiences for tourists [36]. Increasing or decreasing the height and steepness of hills can enhance the pleasure and sense of challenge during climbing [37]. Abundant vegetation greening can provide a more oxygenated environment, promote physical activity, and evoke positive emotions [38]. Moreover, facilities and management [38], as well as artificial elements [39], also play a significant role in tourists’

environmental preferences. On the other hand, the aesthetic quality of the environment may influence tourist preferences, as it is a form of aesthetic experience [40]. Typically, studies on physical environmental quality evaluate the physical characteristics or attributes of the environment, while studies on aesthetic quality assess the cognitive and aesthetic responses of tourists after their multisensory interactions with the environment [41]. Previous research on environmental aesthetics has primarily focused on the visual aspects, such as visual coherence [42], visual focus [33], and visual complexity [43]. Although these visual experiences are crucial, they neglect the impact of multisensory experiences on preferences, such as the influence of visual and auditory stimuli [44], the effect of tactile and olfactory sensations on preferences [45], and the sense of mystery that encourages further exploration [46]. However, previous studies on the relationship between environmental quality and preferences have often discussed physical features or aesthetic perceptions in isolation, rarely considering both aspects of environmental quality simultaneously. Human evaluations of the environment are not isolated psychological processes but rather results based on the joint action of the physical environment and related emotional and cognitive structures [47]. For example, tourists can perceive the artificial facilities conditions (physical quality factors) and the diversity of scenery (aesthetic quality factors) at the same time, meaning that they can make a more comprehensive and accurate evaluation of the environment of the scenic area [48]. Therefore, it is essential to consider both physical quality and aesthetic quality comprehensively when discussing environmental preferences.

In conclusion, environmental quality comprises both physical quality and aesthetic quality, both of which jointly influence individuals' perception and evaluation of the environment. Previous research on environmental quality has mostly focused on urban streets [49], building interior [50], blue–green space [51] and other areas, with less emphasis on the study of rural settlement environments. The purpose of this study is to establish the link between tourist preferences and environmental quality by investigating tourists' perceptions of the environmental quality of rural settlements. It aims to gain a comprehensive understanding of tourists' environmental preferences to support environmental improvement, service management, and planning decisions for rural settlements. The specific objectives are as follows:

- (1) Measure tourists' evaluations of the physical quality of the rural settlement environment.
- (2) Measure tourists' evaluations of the aesthetic quality of the rural settlement environment.
- (3) Establish the relationship between tourists' environmental preferences and these two aspects of environmental quality.

2. Method

2.1. Study Sites

This study was conducted in Zhaoxing Dong Village, located in Liping County, Qian-dongnan Miao-Dong Autonomous Prefecture, Guizhou Province, southwestern China (Figure 1). The village is approximately 72 km away from Liping County, covering an area of about 180,000 square meters [52], and is home to over 1100 households and more than 6000 residents. It is one of the largest Dong ethnic villages in China [53]. Geographically, the village is situated in a basin surrounded by mountains, with a river formed by the convergence of two small streams flowing through the village. The architectural layout of the village follows the river and topography, forming a linear pattern. The village is characterized by wooden stilted structures constructed from Chinese fir, consisting of residential buildings and public buildings. The latter includes drum towers, covered bridges, opera stages, village gates, etc., serving as visual focal points of the architectural landscape and central spaces for public activities. The village is surrounded by farmland and forests, visually harmonizing with the natural environment, providing a foundation for local agricultural and forestry development. As a historically and culturally renowned village in China, Zhaoxing Dong Village is one of the earliest developed Dong ethnic villages. It has a rich historical heritage and cultural landscape, attracting a large number of tourists for sightseeing and cultural experiences. According to statistics, Zhaoxing Dong Village

received more than 1.6 million tourists in 2022, generating substantial tourism revenue for the local community and possessing significant value in terms of environmental protection and tourism development [54].

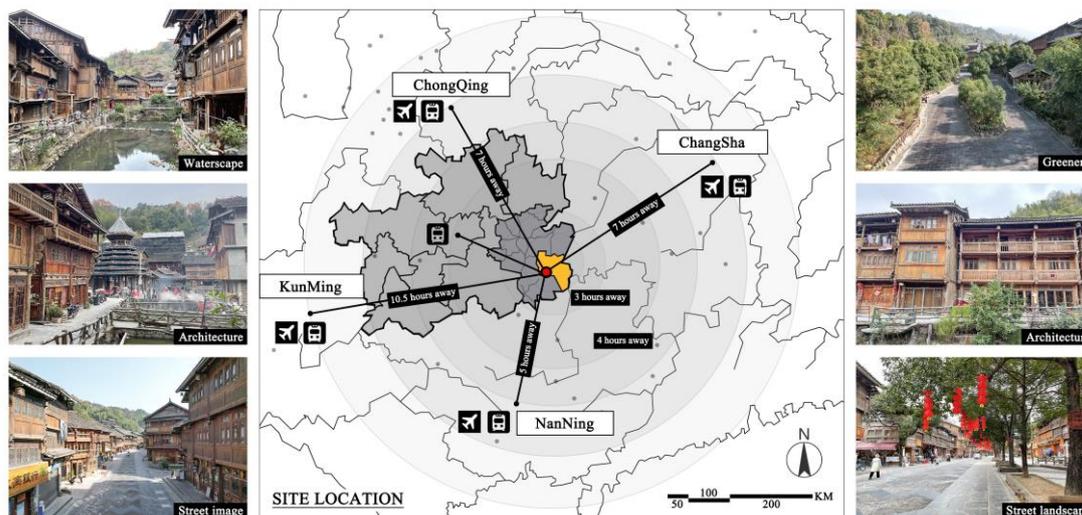


Figure 1. The location and photos of the study site (by author).

However, with the development of urbanization and the tourism industry, many rural buildings and landscapes are being transformed or renovated. These construction activities are primarily based on the preferences of planners or economic considerations [55], often neglecting the preferences of residents or tourists. As a result, the outcomes of these designs may not always align with the needs of the users. Therefore, this study evaluates a variety of environmental qualities in this rural settlement space and analyzes their impact on tourists' evaluation of this environmental setting (that is, the extent to which the environment is liked, representing the individual's preference for this environment). This research aims to provide a basis for the targeted improvement of environmental quality, in order to protect the village environment, attract more tourist activities, and promote local economic growth.

2.2. The Questionnaire

In order to assess the physical quality of the rural settlement environment, we referred to the relevant literature on physical environmental quality studies [48,56,57]. These studies have demonstrated that physical factors (or physical features) significantly influence the relationship between tourists and the environment, such as safety and security, infrastructure conditions, visual quality of the site, and management and maintenance. We adapted some of these items to better match our research focus on rural settlement environments.

The initial version of the questionnaire was evaluated by an expert panel organized by the first author, which included 5 PhD holders and 10 graduate students. Some items that were deemed difficult to answer were removed, such as "visibility of the scenery" and "visual pollution" in the evaluation of physical environmental quality, as well as statements related to aesthetic quality such as "well-maintained." These panel members were experts in landscape design, environmental science, ecology, and urban planning from the author's institution. The final version of the questionnaire consisted of 20 items divided into four sections and used a 7-point Likert scale for rating descriptions [57]. In this scale, 1 represented a low perception level (very poor/very few), and 7 represented a high perception level (very good/very high) (Table 1).

Table 1. Questionnaire for physical environment quality evaluation.

Category	Statement	Score
SE (Security)	(1) How is the public security environment of the village? (The higher the score, the safer you feel.)	Very poor 1–7 Very good
	(2) How is the security infrastructure of the village? (e.g., guardrails, handrails)	Very poor 1–7 Very good
	(3) Are the lighting facilities in the village sufficient?	Very poor 1–7 Very good
FA (Facility)	(4) How are the dining service conditions in the village?	Very poor 1–7 Very good
	(5) How are the commercial services such as retail and shopping in the village?	Very poor 1–7 Very good
	(6) How are the accommodation conditions in the village?	Very poor 1–7 Very good
	(7) How are the road and traffic conditions in the village?	Very poor 1–7 Very good
	(8) How are the conditions of traffic guidance facilities? (e.g., road signs, guide map)	Very poor 1–7 Very good
VI (Visual quality)	(9) How is the overall visual aesthetics of the site?	Very poor 1–7 Very good
	(10) How is the visual appearance of pedestrian paths in the site?	Very poor 1–7 Very good
	(11) How is the visual appearance of residential buildings in the site?	Very poor 1–7 Very good
	(12) How is the visual aesthetics of public buildings in the site?	Very poor 1–7 Very good
	(13) How is the visual attractiveness of natural landscapes in the site?	Very poor 1–7 Very good
MA (Maintenance)	(14) How is the attractiveness of vegetation in the site?	Very poor 1–7 Very good
	(15) How is the maintenance and management of sidewalks in the village?	Very poor 1–7 Very good
	(16) How is the maintenance of hard surfaces in the village? (e.g., squares, roads)	Very poor 1–7 Very good
	(17) How is the maintenance of buildings in the village?	Very poor 1–7 Very good
	(18) How is the vegetation management in the village?	Very poor 1–7 Very good
	(19) How is the maintenance of street facilities in the village? (e.g., street lamps, trash cans, road signs)	Very poor 1–7 Very good
	(20) How is the maintenance of safety equipment such as guardrails in the village?	Very poor 1–7 Very good

For aesthetic quality, we referred to the research conducted by Subiza-Pérez et al. (2019) [58], who proposed a self-report tool based on factor analysis to assess the perceived aesthetic quality of spaces. This tool consisted of 23 statements divided into five components and demonstrated good internal consistency, thus proving its usefulness in urban planning research. Additionally, we consulted the study by Sevenant et al. (2009) [59] to expand the perception evaluation items that align with our project site. In this study, we applied the aforementioned tool and evaluation items to the research on rural settlement environments, while also referencing the work of Luo et al. (2023) [60] to ensure the accuracy of our item descriptions. Following expert evaluation and preliminary surveys, we removed items that were deemed difficult to answer or redundant, resulting in a simplified version comprising 31 items from eight components, which were evaluated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Table 2).

In addition, this study used three questions to measure visitors' overall environmental preferences for the rural settlement environment (Zhaoxing Dong Village), including "How much do you like this place?", "Would you consider visiting again?", and "Would you recommend this place to a friend?" (1 = strongly dislike/strongly disagree, 7 = strongly like/strongly agree). The preference score for each visitor was the average of these three items. The final section of the questionnaire included basic background information about the respondents, such as gender, age, place of residence, income, and education level.

Table 2. Questionnaire for the evaluation of environmental aesthetic quality.

Category	Statement	Score
MU (Multisensory)	(1) The scenery here is beautiful.	Strongly disagree 1–7 Strongly agree
	(2) The sounds here are pleasant.	Strongly disagree 1–7 Strongly agree
	(3) The surface underfoot is comfortable.	Strongly disagree 1–7 Strongly agree
	(4) The air here is fresh or has a pleasant smell.	Strongly disagree 1–7 Strongly agree

Table 2. Cont.

Category	Statement	Score
DI (Diversity)	(5) The landscape here is diverse.	Strongly disagree 1–7 Strongly agree
	(6) The vegetation here is diverse.	Strongly disagree 1–7 Strongly agree
	(7) The architecture here is diverse.	Strongly disagree 1–7 Strongly agree
	(8) The scenery here does not feel monotonous.	Strongly disagree 1–7 Strongly agree
UN (Unspoiled)	(9) The traditional architectural style here is well protected.	Strongly disagree 1–7 Strongly agree
	(10) The natural environment here has not been damaged.	Strongly disagree 1–7 Strongly agree
	(11) The traditional cultural atmosphere here is strong.	Strongly disagree 1–7 Strongly agree
PR (Protective)	(12) The architecture here is worth protecting.	Strongly disagree 1–7 Strongly agree
	(13) The natural landscape here is worth protecting.	Strongly disagree 1–7 Strongly agree
	(14) The folk culture here is worth protecting.	Strongly disagree 1–7 Strongly agree
	(15) The folk art here is worth protecting.	Strongly disagree 1–7 Strongly agree
HI (Historical)	(16) The environment here makes me feel like it has a long history.	Strongly disagree 1–7 Strongly agree
	(17) The architecture here makes me feel like it has a long history.	Strongly disagree 1–7 Strongly agree
	(18) The folk festivals here make me feel like it has a long history.	Strongly disagree 1–7 Strongly agree
	(19) The folk art here makes me feel like it has a long history.	Strongly disagree 1–7 Strongly agree
HA (Harmonious)	(20) Everything here matches the environment.	Strongly disagree 1–7 Strongly agree
	(21) This place is easy to understand.	Strongly disagree 1–7 Strongly agree
	(22) The scale of this place makes me happy and satisfied.	Strongly disagree 1–7 Strongly agree
	(23) The different things and areas here form a coherent whole.	Strongly disagree 1–7 Strongly agree
FA (Familiarity)	(24) Staying here makes me feel comfortable inside.	Strongly disagree 1–7 Strongly agree
	(25) This place seems familiar to me.	Strongly disagree 1–7 Strongly agree
	(26) It can evoke memories I have had before.	Strongly disagree 1–7 Strongly agree
SU (Sublime)	(27) I feel like I belong to this place, and it gives me a sense of belonging.	Strongly disagree 1–7 Strongly agree
	(28) This place is unique.	Strongly disagree 1–7 Strongly agree
	(29) This place is very magnificent.	Strongly disagree 1–7 Strongly agree
	(30) Staying here makes me feel small.	Strongly disagree 1–7 Strongly agree
	(31) The beauty of this place makes me feel admiration and awe.	Strongly disagree 1–7 Strongly agree

2.3. Data Collection

Prior to conducting the main study, a preliminary questionnaire survey was conducted in the village, which was not included in the final sample. The preliminary survey aimed to test measures, wording, response formats, and implementation procedures, and to make modifications based on participants' feedback regarding any difficulties or issues encountered while answering the questionnaire. Additionally, a field investigation was conducted prior to the formal survey to identify specific locations with a high volume of visitors for on-site questionnaire distribution.

This study employed a sampling method to collect questionnaires, which is a non-probability sampling technique widely used in social science research and has demonstrated reliability [61,62]. The questionnaires were collected from 8 December 2022 to 5 January 2023 within Zhaoxing Dong Village between 9:00 AM and 5:00 PM. The first author approached visitors randomly at the survey site and provided them with the survey questionnaire, encouraging their companions to participate as well (Figure 2). All participants were informed about the research purpose and the anonymity of the survey to ensure questionnaire quality, and verbal consent was obtained from each participant. Field surveys were conducted only in comfortable weather conditions (no rain or strong winds) to control potential weather-related influences on the results.

Participation was voluntary. Some potential interviewees declined when approached, citing a lack of time, lack of knowledge, unwillingness to participate, and not wanting to be disturbed.



Figure 2. Photographs of the survey conducted by the first author in the study site (taken by author).

2.4. Statistical Analysis

SPSS version 27 (IBM, Armonk, NY, USA) was used for all statistical analyses in this study. Firstly, we examined the correlations between variables using Spearman's correlation coefficient. Secondly, we assessed the issue of multicollinearity in the questionnaire data. All predictor variables were within acceptable tolerance levels (>0.30) and VIF ratios (<4.00), indicating the absence of multicollinearity in the data for this study [63]. Finally, we conducted hierarchical linear regression analyses. In this study, overall environmental preference served as the dependent variable, while physical environmental quality and aesthetic quality were the independent variables. We constructed three regression models to examine the differences between demographic variables, physical environmental variables, aesthetic quality variables, and the overall model. In each model, demographic data were entered as control variables, physical environmental quality factors were entered in Model 2, and additional environmental aesthetic quality factors were included in Step 3. The significance level was set at $p < 0.05$.

3. Results

3.1. The Samples

Specific information on the sample of all respondents is shown in Table 3. A total of 458 questionnaires were collected in this survey, with 8 incomplete or invalid questionnaires, resulting in a response rate of 98.25%. The final sample consisted of 450 responses. Among them, there were 166 males, accounting for 36.9% of the total respondents, and 284 females, accounting for 63.1% of the total respondents. The majority of respondents were young adults aged 18–35 ($n = 331$, 73.6%), followed by the 35–55 age group ($n = 107$, 23.8%), and only 12 individuals (2.7%) were aged 55 and above. Most of the respondents were from urban areas ($n = 323$, 71.8%), while a small portion were from rural areas ($n = 127$, 28.2%). In terms of income, the majority of respondents had a monthly income ranging from CNY 4500 to 8000 ($n = 172$, 38.2%) or above CNY 8000 ($n = 139$, 30.9%), while a smaller proportion had a monthly income between CNY 2000 and 4500 ($n = 74$, 16.4%) or below CNY 2000 ($n = 65$, 14.4%). The educational background of the respondents was predominantly at the undergraduate level ($n = 327$, 72.7%).

3.2. Overall Statistics

The perception data are presented in Figure 3. Overall, in terms of physical environmental quality, the security dimension received the highest rating, with a mean score of $5.64 (\pm 0.9)$, followed by the visual quality factor, with a score of $5.54 (\pm 0.91)$, and the facility factor, with a score of $5.47 (\pm 0.96)$, which suggests that visitors feel safer here and are more satisfied with the quality of the landscape and the facilities. The lowest rating was given to the maintenance, with a mean score of $5.32 (\pm 0.97)$, indicating that it is necessary to strengthen the maintenance of the local landscape, buildings, and facilities. Regarding aesthetic quality, the highest rating was given to the protective dimension, with a mean score of $6.19 (\pm 0.88)$, followed by a sense of history and multisensory beauty, with mean

scores of 5.95 (± 0.92) and 5.72 (± 0.92), respectively, which means that protecting the local natural environment and cultural heritage and maintaining the historical atmosphere of the village as well as the multisensory beauty are important for the experience and preferences of tourists. The dimensions of harmonious, unspoiled, diversity, and sublime received moderate ratings, with mean scores of 5.71 (± 0.94), 5.66 (± 0.94), 5.31 (± 1.07), and 5.07 (± 1.11), respectively. The familiarity factor received the lowest rating, 4.97 (± 1.32); this may be due to the fact that most tourists live in urban settings and have less experience of the rural settlement environment. Additionally, we validated the reliability of all components, with Cronbach's alpha ranging from 0.735 to 0.913, indicating high internal consistency.

Table 3. Socio-demographic characteristics of the sample.

	Category	Frequency	Percentage (%)
Gender	Male	166	36.9
	Female	284	63.1
Age	18–35	331	73.6
	35–55	107	23.8
	>55	12	2.7
Residential	Rural	127	28.2
	Urban	323	71.8
Income (Monthly, RMB)	<2000	65	14.4
	2000–4500	74	16.4
	4500–8000	172	38.2
	>8000	139	30.9
Education	Primary	8	1.8
	Junior	30	6.7
	Senior	44	9.8
	University	327	72.7
	Graduate	41	9.1

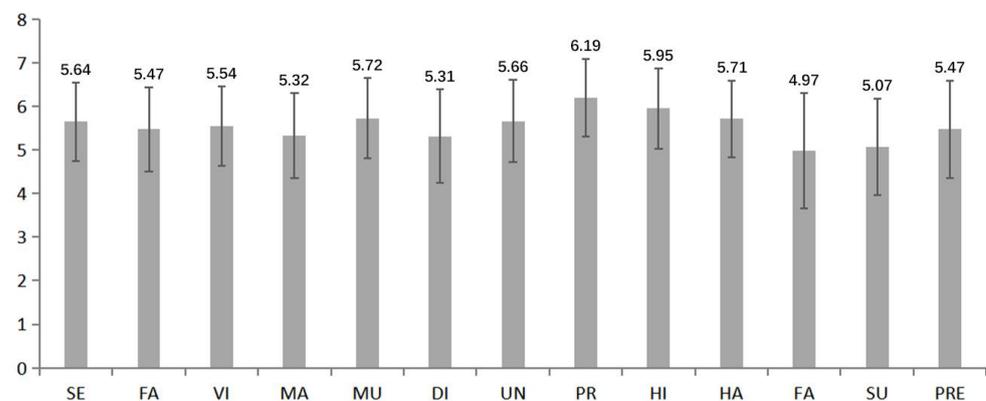


Figure 3. Overall statistics of the survey site (SE = Security. FA = Facility. VI = Visual quality. MA = Maintenance. MU = Multisensory. DI = Diversity. UN = Unspoiled. PR = Protective. HI = Historical. HA = Harmonious. FA = Familiarity. SU = Sublime. PRE = Preference).

3.3. Correlation Analysis

Table 4 summarizes correlations between variables in this study. All physical environmental factors and environmental aesthetic factors exhibited positive and significant correlations ($r = 0.23\text{--}0.75$, $p < 0.01$). In addition, physical environmental factors showed a significant positive correlation with the environmental preference ($r = 0.44\text{--}0.62$, $p < 0.01$). All environmental aesthetic factors appeared to have moderate to large effects on the environmental preference ($r = 0.47\text{--}0.72$, $p < 0.01$). Demographic variables were only significantly correlated with specific physical and aesthetic factors, and showed no significant association with environmental preference. Except for gender, age, and income differences, the remaining demographic variables (place of residence, education level) exhibited either positive or negative correlations with most of the variables.

Table 4. Correlation analysis (Spearman).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1.GEN	-																		
2.AGE	-0.177 **	-																	
3.RES	-0.009	-0.017	-																
4.INC	0.021	0.102 *	0.275 **	-															
5.EDU	0.019	-0.123 **	0.391 **	0.305 **	-														
6.SE	-0.082	0.096 *	-0.083	-0.027	-0.131 **	-													
7.FA	-0.087	0.046	-0.069	-0.069	-0.122 **	0.725 **	-												
8.VI	-0.078	-0.015	-0.065	-0.078	-0.103 *	0.631 **	0.690 **	-											
9.MA	-0.046	-0.032	-0.132 **	-0.074	-0.159 **	0.703 **	0.691 **	0.677 **	-										
10.MU	-0.107 *	0.057	-0.108 *	-0.074	-0.126 **	0.549 **	0.610 **	0.747 **	0.671 **	-									
11.DI	-0.095 *	0.042	-0.102 *	-0.104 *	-0.164 **	0.528 **	0.576 **	0.671 **	0.639 **	0.717 **	-								
12.UN	-0.031	-0.056	-0.072	-0.048	-0.102 *	0.502 **	0.599 **	0.719 **	0.649 **	0.675 **	0.617 **	-							
13.PR	-0.043	-0.063	-0.021	-0.079	0.028	0.319 **	0.402 **	0.449 **	0.373 **	0.474 **	0.359 **	0.535 **	-						
14.HI	-0.047	-0.003	-0.043	-0.097 *	-0.048	0.384 **	0.503 **	0.613 **	0.505 **	0.611 **	0.563 **	0.612 **	0.571 **	-					
15.HA	-0.059	-0.011	0.002	-0.061	-0.065	0.564 **	0.653 **	0.725 **	0.628 **	0.717 **	0.640 **	0.708 **	0.549 **	0.678 **	-				
16.FA	-0.113 *	0.036	-0.178 **	-0.080	-0.198 **	0.381 **	0.405 **	0.501 **	0.458 **	0.482 **	0.565 **	0.499 **	0.238 **	0.341 **	0.483 **	-			
17.SU	-0.068	-0.010	-0.132 **	-0.080	-0.140 **	0.385 **	0.426 **	0.595 **	0.502 **	0.610 **	0.637 **	0.548 **	0.339 **	0.491 **	0.575 **	0.631 **	-		
18.PRE	-0.065	0.025	-0.058	-0.030	-0.061	0.442 **	0.523 **	0.612 **	0.523 **	0.713 **	0.603 **	0.589 **	0.476 **	0.569 **	0.628 **	0.483 **	0.647 **	-	

Note: GEN = Gender. AGE = Age. RES = Residential. INC = Income. EDU = Education. SE = Security. FA = Facility. VI = Visual quality. MA = Maintenance. MU = Multisensory. DI = Diversity. UN = Unspoiled. PR = Protective. HI = Historical. HA = Harmonious. FA = Familiarity. SU = Sublime. PRE = Preference. * $p < 0.05$. ** $p < 0.01$.

3.4. Multiple Regression Models

Table 5 presents the regression results of the three models with preference as the dependent variable. Model 1 serves as the baseline model, including only socio-demographic characteristics. The results indicate that the socio-demographic characteristic variables have a non-significant impact on preference, and the model's explanatory power is poor ($\text{Adj } R^2 = -0.003$). In contrast, in Model 2, we incorporate four variables related to the evaluation of physical environmental quality, leading to a significant improvement in the model's power ($\text{Adj } R^2 = 0.386$). Specifically, the visual quality has the largest coefficient ($\beta = 0.406, p < 0.001$), followed by the maintenance ($\beta = 0.188, p < 0.05$) and the facility ($\beta = 0.186, p < 0.05$) factors, while security does not show a significant effect ($\beta = -0.090, p > 0.05$). Additionally, the education level among the population characteristic variables shows a significant influence on environmental preference in Model 2 ($\beta = 0.095, p < 0.05$).

Table 5. Ablation experiments (dependent variable: overall preference).

Variables	Model 1	Model 2	Model 3
Gender	−0.059	−0.024	0.014
Age	0.007	0.037	0.013
Residential	−0.067	−0.053	−0.016
Income	−0.005	0.016	0.049
Education	0.002	0.095 *	0.074 *
Physical environment quality			
Security		−0.090	−0.053
Facility		0.186 *	0.118 *
Visual quality		0.406 ***	−0.031
Maintenance		0.188 *	−0.020
Environmental aesthetic quality			
Multisensory			0.351 ***
Diversity			0.017
Unspoiled			0.024
Protective			0.085 *
Historical			0.117 *
Harmonious			0.056
Familiarity			0.087 *
Sublime			0.245 ***
R²	0.008	0.398	0.603
Adj R²	−0.003	0.386	0.587
F	0.734	32.339 ***	38.553 ***

Note: Standardized coefficients are reported. * $p < 0.05$. *** $p < 0.001$.

It is worth noting that in Model 3, we included all independent variables, including the eight variables assessing the aesthetic quality of the environment. Model 3 showed a 20.1% increase in information compared to Model 2 ($\text{Adj } R^2 = 0.587$). It can be observed that the multisensory factor has the largest coefficient ($\beta = 0.351, p < 0.001$), followed by the sense of sublimity ($\beta = 0.245, p < 0.001$). In addition, variables related to the perceived value of protection, historical sense, and familiarity also showed a moderate coefficient ($\beta = 0.085, p < 0.05$; $\beta = 0.117, p < 0.05$; $\beta = 0.087, p < 0.05$). Interestingly, the variable representing visual quality, which had the highest coefficient in Model 2 for physical environmental quality, was no longer significant in Model 3 ($\beta = -0.031, p > 0.05$). The same situation occurred for the maintenance variable ($\beta = -0.020, p > 0.05$). Furthermore, the coefficient of the facility dimension decreased ($\beta = 0.118, p < 0.05$).

4. Discussion

This study selected the physical and aesthetic quality factors in line with the environmental characteristics of rural settlements, selected Zhaoxing Dong Village for on-site investigation, and measured tourists' perception and evaluation of rural settlement environmental quality through a designed questionnaire. The impact of environmental quality

factors on tourists' preferences was measured via hierarchical linear regression analysis. The overall model results show that all environmental quality factors are significantly positively correlated with preference, and the facility, multisensory, protective, historical, familiarity and sublime factors have a significant impact on tourists' preferences. The analysis of these results and findings as well as the significance of this study will be elaborated upon below.

4.1. Tourists' Evaluation of the Physical and Aesthetic Environmental Quality of Rural Settlements

In the overall evaluation of Zhaoxing Dong Village, there were significant differences in the ratings of physical environmental quality and environmental aesthetic quality. The highest rating in the evaluation of physical environmental quality was for safety assurance (SE = 5.64). The unique settlement lifestyle of the Dong ethnic group contributes to a sense of trust among neighbors, as previous research has shown a correlation between perceived neighborhood safety and trust [64]. Furthermore, safety infrastructure such as streetlights, handrails, and fire hydrants also have some influence on tourists' perception of safety assurance. High-quality lighting conditions and reduced crime rates enhance the sense of safety in the space [65]. The scores for infrastructure condition, visual quality of the site, and management and maintenance were similar, with values of 5.47, 5.54, and 5.32, respectively. Regarding infrastructure condition, with the development of urbanization and the intervention of commercial capital, the rise of industries such as catering, accommodation, and tourism in Zhaoxing Dong Village has led to higher-quality service conditions compared to undeveloped Dong villages [66]. This may be the main reason for tourists' high evaluation of village facilities. In terms of the visual quality of the site, the neatly arranged and ethnically characteristic rural wooden structures in Zhaoxing Dong Village enhance the overall visual aesthetics. Among them, the drum tower architecture is the most representative landmark of the Dong ethnic group. Paintings with daily life themes serve as decorations on the buildings, and the complex wooden craftsmanship forms polygonal and multilevel architectural structures. At the same time, Zhaoxing Dong Village is located in an area rich in natural resources, with abundant natural landscapes surrounding the settlement, while the presence of pear and peach trees within the site adds to the attractiveness of Zhaoxing Dong Village. Previous studies have found that natural vegetation can enhance the sense of hierarchy and aesthetics in a space [67]. In terms of management and maintenance, previous research has indicated that the maintenance of buildings and artificial facilities is a dominant factor influencing users' landscape preferences [68]. In Zhaoxing Dong Village, some aging facilities and buildings have not received timely maintenance and renovation, which might be a reason for the lower evaluations from tourists.

In terms of environmental aesthetic quality, the highest rating was given to the perceived value of protection (PR = 6.19), followed by the sense of history (HI = 5.95). Zhaoxing Dong Village has a long history, and its ancestors can be traced back to the Baiyue tribe in the pre-Qin period. Despite the long process of development, they have still inherited an ancient folk culture, architectural culture, and belief culture [54]. These conditions make it difficult for tourists not to give high ratings to the perceived value of protection and the sense of history in Zhaoxing Dong Village. Furthermore, as described earlier, the abundant natural resources surrounding Zhaoxing Dong Village enhance tourists' ratings of multisensory beauty (MU = 5.72), especially in terms of soundscapes. Previous research has extensively studied the soundscapes of Zhaoxing Dong Village, indicating the importance of soundscapes in historic areas [52]. It is worth mentioning the rating for the sense of harmony (HA = 5.71). The street scale in Zhaoxing Dong Village is very suitable for walking ($D/H \approx 0.8$, where "D" represents the width of the road and "H" represents the height of surrounding buildings), and there is a rhythmic increase in space at important nodes, such as the drum tower area ($D/H \approx 1.2$). These spatial proportions have been proven to create the most harmonious and comfortable spatial scale in urban design [69]. Lastly, the lowest rating was given to the sense of familiarity (FA = 4.97). Due to the differences in the residential environment of the respondents, most urban residents were found to be visiting

Zhaoxing Dong Village for the first time, and such rural settlement environments do not exist in cities. Therefore, it is understandable that the rating for the sense of familiarity is quite low.

4.2. The Influence of Environmental Physical Quality and Aesthetic Quality

This study found that most physical environmental quality factors have a significant impact on environmental preference factors ($p < 0.001$), and Model 2 can explain 38.6% of the variance. However, when environmental aesthetic quality factors are introduced as an additional dimension in Model 3, the explanatory power of the model increases to 58.7%. Although significant correlations were found between most physical environmental quality factors and preferences, the significance levels of the physical factors significantly decrease when aesthetic quality factors are introduced as regression variables. This can be attributed to the fact that the correlation between physical environmental quality factors and preference became weak when considering physical and aesthetic qualities simultaneously. A study on the environmental quality of urban parks by Wan et al. (2020) also confirmed this point—that is, in the interaction between users and urban parks, most of the psychological factors have a greater impact on the outcome variables than physical factors [48]. Whether in urban space or rural settlements, aesthetic experience dominates users' perception and evaluation of the environment to a large extent.

In terms of physical environmental quality, the visual quality of the site has the closest relationship with visitor preferences in Model 2 ($\beta = 0.406, p < 0.001$). Compared to other perceived physical environmental factors, respondents consider providing better visual aesthetics to be more important, reflecting visitors' pursuit and appreciation of rural environmental landscapes. Some studies have found that vegetation greening in rural environments can provide a healthier breathing environment, promote human physical activity, and evoke positive emotions [42]. Additionally, distinctive regional natural landscapes can help to reduce mental stress from work or study [70], and promote social interaction [71]. Furthermore, there is a significant association between the infrastructure conditions and management maintenance of rural settlements and visitor preferences ($\beta = 0.186, p < 0.05$; $\beta = 0.188, p < 0.05$). Meeting visitors' basic infrastructure needs such as dining, shopping, accommodation, transportation, etc., is considered to have a significant and positive impact on visitor preferences. Well-developed infrastructure and good management maintenance have a positive impact on visitor experiences [72]. However, it should be noted that the perceived safety of the physical environment does not seem to be significant ($p > 0.1$), which is also the case in Model 3. We speculate that this may be because people's perception of safety in the physical environment is not clear enough. At the same time, village life provides a higher sense of security, and people can more easily establish networks of mutual support and social connections [73].

In terms of environmental aesthetic quality, the factors of multisensory beauty and sublimity are shown in Model 3 to be the most relevant aesthetic quality factors to visitor preferences ($\beta = 0.351, p < 0.001$; $\beta = 0.245, p < 0.001$). Multisensory beauty is the most reliable aesthetic quality factor across most outcomes. This result supports previous research conclusions demonstrating that visual, auditory, tactile, and olfactory senses play a significant role in stimulating human sensory preferences for the environment [40,44]. For example, in auditory studies, soundscapes have been widely proven to facilitate the recovery from work or study stress, and people prefer to relax in natural environments with the sound of birdsong and flowing water [74]. This indicates that the pursuit of beauty, whether in visual, auditory, or olfactory aspects, largely influences people's emotional preferences. Furthermore, sublimity enhances the visual attractiveness of rural settlements, and grand and historic architecture can generate strong interest among visitors, often resulting in clustering effects [75]. On the other hand, aesthetic factors such as conservation value, sense of history, and familiarity also have a significant impact on visitor preferences ($\beta = 0.085, p < 0.05$; $\beta = 0.117, p < 0.05$; $\beta = 0.087, p < 0.05$). The sense of familiarity has

been confirmed in studies on place attachment, indicating that people prefer to live or visit familiar environments [76].

Unexpectedly, some environmental quality factors that were expected to significantly influence preferences did not show a significant effect in this study, such as security, diversity, and sense of harmony. Previous research has demonstrated a close correlation between a sense of security and tourist preferences [60]. However, for tourists visiting Zhaoxing Dong Village for short-term travel, they may have a more positive perception of locally distinctive environmental elements. Therefore, a sense of security might not be a primary factor influencing tourist preferences in this location. Additionally, Ran (2019) proposed that diversity is one of the dominant factors affecting Chinese tourists' landscape preferences [68]. However, this relationship may not be evident in our study site, as tourists generally have higher expectations for unified historical buildings and cultural landscapes in Zhaoxing Dong Village.

Finally, in the demographic variables of Models 2 and 3, education level shows a significant and positive impact on visitor preferences ($\beta = 0.095, p < 0.05$; $\beta = 0.074, p < 0.05$). This may be because highly educated young individuals tend to have a higher preference for nature [77]. For individuals, the perceived relationship between self-cultivation and aesthetics is more positive for high-education groups than for low-education groups [78].

In summary, this study provides decision-makers with a multidimensional perspective to examine whether rural planning should continue with more diverse facility construction. Additionally, management agencies or managers can conduct more targeted environmental management for the entire rural settlement.

4.3. Study Implications

This study has theoretical and practical significance for the planning and design of rural settlements. While both physical environmental quality and aesthetic quality factors influence people's preferences for rural settlements, many physical environmental quality factors are difficult to fully consider in a comprehensive model. In the process of perceiving rural settlements, environmental aesthetic factors are an essential driving force. People who have positive views of the environment may perceive the environment more positively, thus forming a new understanding and evaluation of the environment. Therefore, it is worth considering adopting intervention strategies that can improve people's cognition of rural settlements. The study of rural environmental quality plays a guiding role in our judgment and will be crucial in future rural planning and design.

In terms of physical quality factors, site visual quality is vital for rural tourism, and efforts to optimize the visual appearance of roads, buildings, natural landscapes, and even vegetation can significantly improve the visual quality of the rural environment. In addition, the construction of rural facilities needs to be paid attention to, and the optimization of local transportation, accommodation, commerce and catering conditions will have a positive impact on the perception and evaluation of tourists. In terms of aesthetic quality factors, providing multisensory experiences is also beneficial in enhancing visitor preferences. In existing sites, introducing sounds of wildlife such as birdsong, frog croaks, or insects chirping can be incorporated. Attracting birds, frogs or insects can be achieved by enriching plant diversity and creating good habitats. For newly built or redesigned sites, it is worth considering exploring and making full use of the existing natural and biological resources to create scenic spots that allow tourists to enjoy a multisensory experience. In addition, planners can reasonably set up garbage treatment stations and sewage treatment facilities according to the wind environment of the settlement, and plant fragrant plants to enrich tourists' sense of smell. Secondly, preserving traditional architectural landscapes and creating an atmosphere with historical and cultural characteristics also play a significant role in improving the evaluation for this setting of visitors. While people come to experience local customs and traditions, they are more inclined to visit well-preserved rural buildings that reflect traditional farming cultures. Therefore, it is very necessary to maintain the local cultural heritage such as historical buildings and landscapes regularly.

The economic benefits brought about by this study should not be overlooked. Governments, managers, and designers can more easily focus on the issues present in rural settlements, providing a good benchmark for resource investment and allocation. Additionally, improving the overall environmental quality of rural settlements can attract a large number of tourists and stimulate local consumption, thereby driving the development of surrounding industries. In the future, this study can be used to guide rural managers and planners to formulate intervention strategies and development plans, and designers can also predict the environmental value of rural settlements through extensive research on user preferences.

4.4. Limitations

This study has certain limitations that should be considered in future research. Firstly, our survey focused only on users of this site, and people who did not visit the study area were excluded. Additionally, the analysis did not consider differences in population perception. Conducting surveys among different groups of people and comparing them among different types of visitors would be beneficial for future research. Secondly, we selected only one village for this study. However, the reliability of the results suggests that the current questionnaire can be applied to other similar study areas. Therefore, more research is needed to supplement the knowledge in this field. Thirdly, due to the complexity of physical and aesthetic quality, which is also influenced by climate change, these scales need further development to encompass a wider range of perceptual items. For example, including temperature perception, perceived brightness, and perceived thermal comfort could be considered in future studies. Fourth, this study employed random sampling, which is a non-probability sampling method and has been widely used in social science research. However, there are some potential limitations to this method, such as the lower probability of underage and elderly groups being surveyed due to the restricted population source of tourists. Also, some populations that are not interested in the topic of this survey are potentially excluded.

5. Conclusions

Through the field investigation of rural settlements with specific environmental characteristics, this study investigates tourists' perception and evaluation of the environmental quality of rural settlements, and analyzes the relationship between environmental quality and tourist preferences. Building upon previous research, two scales were used to measure visitors' perception of the physical and aesthetic quality of rural settlements. The reliability results indicate that the composition of the 12 questionnaire items is acceptable. In the results, we found that eight components significantly influence visitors' environmental preferences in rural settlements. Among them, site visual quality had the highest impact, followed by multisensory aesthetics and sublimity. Infrastructure conditions, management and maintenance, and historical significance had a moderate influence, while factors such as conservation value and familiarity had a relatively minor impact. Factors like safety and security, diversity, undisturbed surroundings, and harmony were found to have a slight influence on visitor preferences. Through this study, we identified key environmental components that affect visitor preferences in rural settlements, deepening our understanding of the factors relevant to rural settlements. Although this study may be limited by the research population, climate change, sampling methods and so on, it still has considerable significance in terms of the current research situation. This research can provide guidance on how to effectively utilize natural and artificial resources in rural settlements and inform the environmental design of rural settlement spaces. Importantly, these findings can benefit managers, policymakers, planners, and designers in their decision-making processes.

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Informed Consent Statement: Oral consent was obtained from all subjects involved in the study.

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