

Article

# Park Recreation Intention and Satisfaction of Blue-Collar Workers Based on the ACSI Model: A Case Study of Anning Industrial Park in Yunnan

Xiaohuan Xie <sup>1,2</sup>, Yinrong Li <sup>2</sup>, Ruobing Wang <sup>2</sup> and Zhonghua Gou <sup>3,\*</sup> 

<sup>1</sup> Shenzhen Key Laboratory of Built Environment Optimization, Shenzhen University, Shenzhen 518060, China

<sup>2</sup> School of Architecture and Urban Planning, Shenzhen University, Shenzhen 518060, China

<sup>3</sup> School of Urban Design, Wuhan University, Wuhan 430072, China

\* Correspondence: zh.gou@whu.edu.cn

**Abstract:** The negative effects of long working hours and shift work on the physical and mental health of blue-collar groups should not be underestimated. Under intense stress, they have limited time to access recreational green space, and their own health is thus affected. In this study, a conceptual model of recreational satisfaction among blue-collar workers was established based on the American Customer Satisfaction Index (ACSI). The model explores the factors affecting their level of satisfaction when using recreational spaces. Anning Industrial Park in Yunnan Province was used as an example. User data were collected and analyzed using a questionnaire survey and structural equation methods. The results indicate that recreation intention, perceived park quality characteristics, and perceived value all had significant and positive effects on the park recreation satisfaction of blue-collar workers. This study applied social economics theory to the field of landscape planning, identified the typical characteristics of blue-collar workers and their green space use, and strived to optimize the UGS configuration and functional facilities through the evaluation of recreation satisfaction indexes, which provided guidance and reference for improving the service quality of green spaces.



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**Keywords:** park recreation satisfaction; blue-collar workers; ACSI model; multi-group analysis

## 1. Introduction

An increasing number of studies indicate that contact with urban green space (UGS) is beneficial to human health. UGS is an essential part of the urban environment and can reduce the negative environmental impact on urban residents by lessening air pollution [1], mitigating the urban heat island (UHI) effect [2], and decreasing noise [3]. Several mechanisms have been proposed to explain the association between green space and health, and one of these is the restoration theory, based on the idea that it is possible to increase mental health and decrease stress by visiting a natural environment [4]. In the field of psychological health, many studies have confirmed that spending time in natural areas such as parks and green spaces can help to reduce loneliness, alleviate mental stress, and improve sleep quality, thereby lowering the risks of depression and anxiety and enhancing well-being [5,6]. Moreover, compared to the built environment, short-term visits to natural spaces are more likely to reduce mental stress and have a positive effect [7]. Studies related to physical health have also suggested that UGS can reduce the incidence of diseases such as obesity [8], cardiovascular diseases [9], and diabetes [10] to some extent. Furthermore, UGS is beneficial to social health by providing an environment for people to meet and communicate, which facilitates their participation in social activities and enhances social cohesion [11].

Recreational satisfaction (the combined degree of visitor expectations and recreation quality) is often used to assess the recreation experience. Satisfaction may vary according to individual preferences, expectations, perceptions, and motivations. Current research

on recreation satisfaction takes mainly three directions: first, investigating the status quo of park recreation so as to optimize park design [12]; second, designing related tourism products based on recreation activities [13]; and third, focusing on visitor behaviors and exploring the factors influencing their recreational satisfaction, such as their psychological expectations of tourist destinations [14], park quality, and frequency of use [15]. It has been found that individual characteristics [16], sign systems [17], cultural resources, and landscapes [18] can all influence recreation satisfaction. In recent years, studies in this area have also started to consider the equity of green spaces, focusing mostly on residents [19], the elderly [20], and children [21], while paying less attention to blue-collar groups.

According to the 2021 Report on the Monitoring Survey of Migrant Workers by the National Bureau of Statistics of China [22], the total number of migrant workers in cities has reached 292 million in China (6.91 million more than that in 2020), representing a substantial increase in the total number. The proportion of migrant workers engaged in secondary industries is 48.6%, 0.5% higher than in 2020 (including 27.1% in manufacturing and 19.0% in construction). Current studies conducted based on this population mainly involve sociological, psychological, and medical fields, mainly exploring their vulnerability [23], social stress, and status [24]. Studies related to group satisfaction are also mainly about job satisfaction [25], rather than park recreation satisfaction.

The research group of this study is more in line with the classification of blue-collar workers. Blue-collar workers are those that are mainly engaged in industrial, engineering, or manual work, and are typically represented by frontline operators in factories. Most studies show that blue-collar workers often work in hazardous industries or jobs that require heavy physical labor, such as construction and agriculture. The current study group included occupational workers working in steel and chemical plants with tasks in a workshop environment (operational, mechanical, maintenance, electrical, etc.). During the questionnaire distribution process, it was established through interviews that the blue-collar group in this study were all from towns (small cities), not from rural areas, had literacy skills, and had an overall consistent level of cognition. Researchers across multiple disciplines have reported that blue-collar workers are especially likely to experience discrimination [26], marginalization [27], employment insecurity, and uncertainty [28]. They are also likely to have limited access to healthcare benefits and training [29]. In addition, as blue-collar worker groups mostly work in noisy and poorly conditioned production workshops, they often face more challenges and threats to their physical health than white-collar workers [30]. Most of the current research has focused on both comparative studies of the health status and condition of this group, and subjective perception ratings (including satisfaction, health self-assessment, etc.). In comparison to male blue-collar workers or other women, female blue-collar workers have a poorer health status [31]. A synthesis of the literature in recent years reveals that there is a large influence of environment on subjective perception ratings, while more often explored are the work environment, temperature, humidity, and noise [32]. Research on parks is inadequate and focuses more on productivity-related factors of the blue-collar group rather than on leisure and recreation indicators and park satisfaction factors. In studies on Chinese industrial parks, which are workplaces for this group, the areas of sustainable development of the parks [33], industrial product emissions [34], and pollutant management [35] are mainly covered, and less attention is paid to the internal green environment.

In recent years, research on the evaluation of satisfaction with green space parks has flourished and can be divided into two main dimensions: one is the spatial dimension, exploring the correlation of factors affecting the outdoor environment of parks, such as the site and facility configuration [36], signage system [17], hard landscape color [37], and the degree of soundscape tranquility (STD) [38], with satisfaction; the second focuses on different group characteristics, such as residents [39], tourists [40], parent-child families [41], and the elderly [42], to evaluate the factors affecting satisfaction with UGS. It can be seen that for blue-collar groups, investigations on their environmental assessment and satisfaction after use are relatively scarce, focusing mostly on exploring outdoor environmental factors and

a specific group. The features of different types of people are essential aspects influencing the satisfaction and perceived environmental quality of residents with UGS and cannot be ignored. Research targeting specific groups is conducive to improving the public image of urban park systems, increasing park visitation rates, and maximizing park benefits.

“Happiness” indicates an individual’s assessment of his or her overall quality of life, and the term is often used interchangeably with “life satisfaction”. It is worth noting that happiness has been widely researched by both domestic and international scholars, including the measurement of happiness and the analysis of influencing factors. The following tools have been widely used by many scholars to study happiness in recent years (Table 1). Recently, Chen et al. used SWLS to measure the happiness of couriers, delivery workers, and online taxi drivers in Hangzhou, China, to analyze the factors affecting happiness [43]. Taking Guangzhou, China, as an example, Liu et al. concluded that SWLS can effectively assess the happiness of migrant workers and found that the absolute economic disadvantage of migrant workers was negatively related to their subjective happiness [44]. Liu et al. combined SWLS and PANAS to measure happiness and found that the happiness of the migrant population was lower [45]. Taking Zhejiang Province as an example, Xing et al. confirmed that the Multiple Happiness Questionnaire (MHQ) had good reliability and validity in assessing the happiness of migrant workers, and that the happiness of the new generation of migrant workers is significantly higher than that of the first generation [46]. Lee and Zhao concluded that the General Health Questionnaire (GHQ) had wide applicability in assessing happiness. In addition, happiness was higher among those who were married, healthy, and had high household income [47]. From the above analysis, it can be concluded that there are few studies that directly address the well-being of blue-collar workers in China.

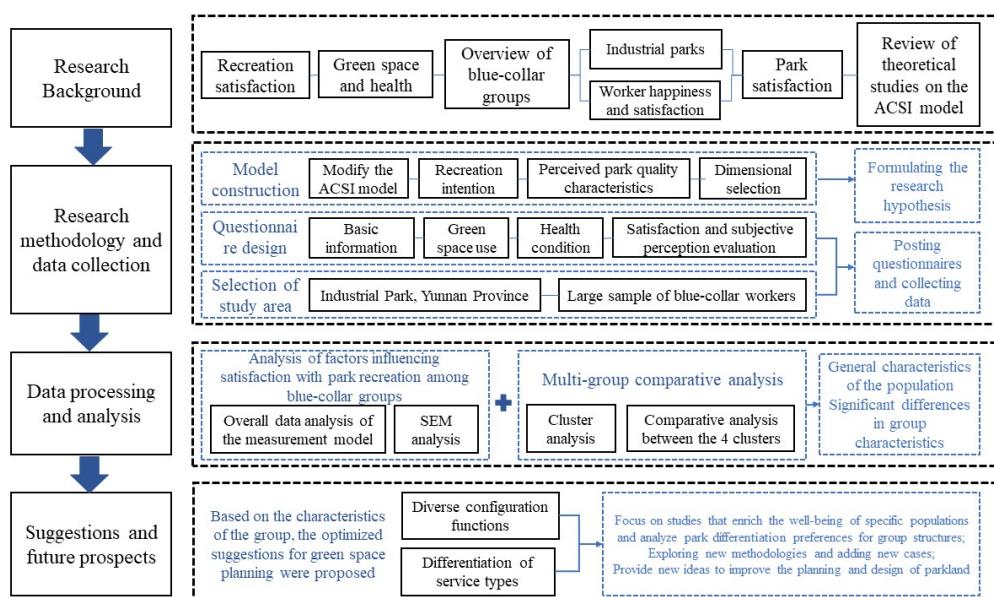
**Table 1.** Main tools for measuring well-being.

Tools	Application Fields	Application Population	Limitations
Satisfaction with Life Scale (SWLS)	Measures subjective well-being, including via psychology, health, and social sciences	Wide range of people, including youth, adults, and elderly people	The SWLS has been criticized for not capturing domain-specific life satisfaction, and it may not be sensitive to changes in satisfaction over time.
Positive and Negative Affect Scale (PANAS)	Measures subjective well-being, including via psychology, health, and social sciences	Wide range of people, including youth, adults, and elderly people	The PANAS may not capture the full range of emotions and may be influenced by response biases.
World Health Organization Quality of Life Measurement Tools (WHOQOL-BREF)	Measures quality of life, including via psychology, health, and social sciences	Wide range of people, including youth, adults, and elderly people	The WHOQOL-BREF may not capture all aspects of quality of life, and some items may not be relevant or important to all individuals.
Oxford Happiness Questionnaire (OHQ)	Measures subjective well-being, including via psychology, health, and social sciences	Wide range of people, including youth, adults, and elderly people	The OHQ may not capture all aspects of subjective well-being, and some items may be influenced by cultural factors.

In addition, for park satisfaction studies, some scholars [48] linked the park visitation and park satisfaction (dependent variables) measured by different data sources with seven spatial factors (independent variables) through generalized linear models (GLMs) and analyzed the similarities and differences between the influencing factors of park visitation and park satisfaction. They provided a comparative perspective by assessing the correlations between the social media data and official survey data. However, this study differs from the above studies in that it considers parks as a special product service, explores

the satisfaction of blue-collar workers with this special service commodity, and collects data for evaluation through the distribution of research questionnaires. As a macro index that measures the quality of economic output, ACSI [49] is a comprehensive evaluation of customer satisfaction based on the consumption process of products and services, which has been extensively used to measure satisfaction and loyalty at the national, industry, and company levels. It is often used to explore the field of the market economy [50]. Moreover, it has been applied to transportation and daily travel [51], tourism services [52], e-services [53], public administration [54], and insurance services [55] in recent years. At the same time, the ACSI model is considered by many scholars to be a widely available tool that is useful and simple, and has been used frequently in relevant studies in China. In addition, the model has now been extended to measure customer satisfaction with various products and services, including specific public services such as green space. The study of green space use and inequality is an important research topic of global significance, irrespective of national boundaries and regions. Therefore, this study adopts a globalized customer satisfaction index model, adapting and complementing it with elements of park characteristics. Methodological innovations and empirical additions are attempted in order to build on the current study.

In general, there are abundant study results on recreation satisfaction. However, cross-sectional research using the ACSI model in this field and blue-collar worker groups still requires further exploration. This study attempts to apply the ACSI model in the field of social economics to landscape planning and build an SEM of the park recreation satisfaction level of blue-collar workers, taking into account the elements of variables to provide measures as a reference to improve the recreation satisfaction of blue-collar workers. The structure of the research in this paper is shown in Figure 1. At the same time, this study takes Anning Industrial Park as an example to summarize the typical group characteristics of blue-collar workers based on underprivileged social groups and further conducts the multi-group analysis of actual green space use behaviors to promote equity in the use of green space resources. From the perspective of users, this study proposes corresponding optimization strategies for the planning and design of green spaces in industrial parks, as well as new research ideas and optimization directions for the planning of UGS and parks.



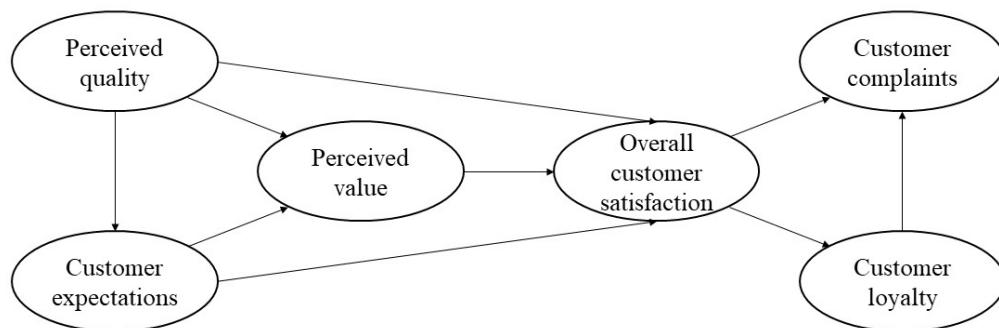
**Figure 1.** Research structure.

## 2. Research Methodology

In this study, a park recreation intention and satisfaction model based on ACSI was first constructed for blue-collar worker groups, and research hypotheses were proposed. Subsequently, the relevant questions were prepared according to the research object, i.e., blue-collar worker group; research questionnaires were distributed, and the reliability of questionnaire content and data was verified by means of statistical and structural equation analysis methods. Then, descriptive statistical analysis, analysis of variance (ANOVA), correlation analysis, and tests on reliability and validity were conducted by AMOS24, SPSS26, Excel 2016, and R Studio to explore the factors affecting the recreation satisfaction of blue-collar worker groups. The patterns of green space were then used by different groups of blue-collar workers as summarized through cluster analysis and multi-group comparison to investigate the patterns and characteristics of green space use by blue-collar workers. Finally, based on the behavioral characteristics of green space use by the four categories of blue-collar workers, their perceived quality evaluation of park green space was combined to identify their specific demand for UGS parks and put forward targeted suggestions for the optimal design of green spaces.

### 2.1. Construction of Research Model and Proposal of Research Hypotheses

The ACSI model measures the cause-and-effect relationship that runs from the antecedents of customer satisfaction level (customer expectation, perceived service quality, and perceived value) to its consequences (customer complaints and customer loyalty), as shown in Figure 2.

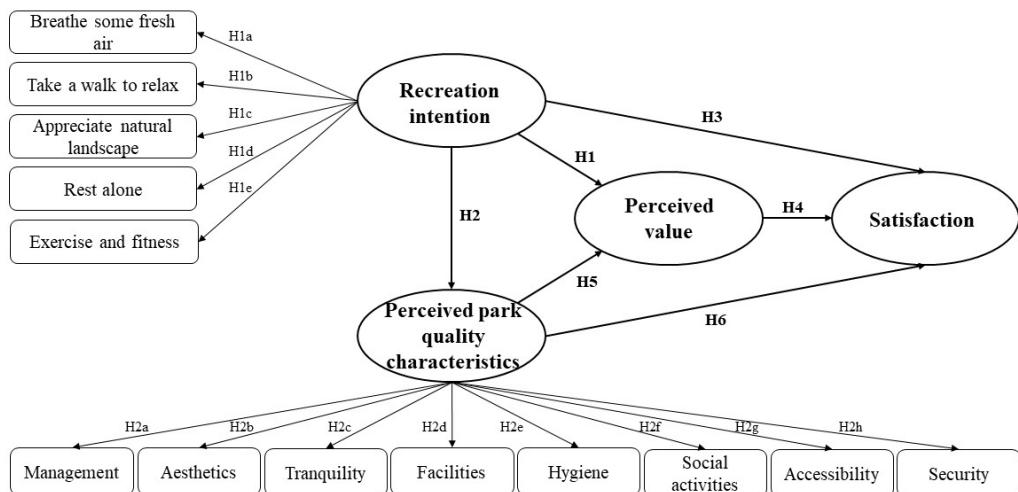


**Figure 2.** American Customer Satisfaction Index (ACSI) model.

The ACSI model focuses more on analyzing products and services from the perspective of satisfaction, while the green spaces and parks in this study are not products or services in the general sense, but special types of public services. The variables and dimensions in the original model cannot be directly applied to the present model. Therefore, the ACSI model was adjusted according to the content and purpose of this study to build the research model with the architecture in Figure 3. Two variables (recreation intention and perceived park quality characteristics) were introduced based on the framework of the original model, and two original variables (perceived value and satisfaction) were retained.

Many tools for evaluating the micro characteristics and restorative effects of the environment have been proposed and implemented [56–60]. These have contributed to a more comprehensive picture of green space and its consequent psychological benefits. The most typical and widely used tools are the perceived sensory dimensions (PSDs) proposed by Grahn [61] and the perceived restorativeness scale (PRS) proposed by Hartig [62]. Grahn summarized the PSDs as the eight different sensory experiences people obtain from interacting with the natural environment, including serene, nature, rich in species, space, prospect, refuge, social, and culture. On the other hand, Hartig described PRS as the capacity of an environment to induce a restorative effect through the facilitation of the feeling of fascination, being away, extent, and compatibility. PSDs focus on the sensory attributes of the environment that contribute to an individual's overall impression of the

space, while PRS focuses on the restorative potential of the environment and its ability to promote psychological well-being. For the measurement of perceived park quality characteristics, this study drew on the PSDs proposed by Grahn to assess the quality of UGS. Based on the current literature, eight dimensions (management, aesthetics, tranquility, facilities, hygiene, social activities, accessibility, and security) were proposed through pilot research to identify the demands of blue-collar worker groups for green space use.



**Figure 3.** Conceptual model of recreation satisfaction of blue-collar workers.

1. Recreation intention: Refers to the intrinsic needs and motivations of users to use green spaces, i.e., the basic characteristics of user travel intention, preferences, revisit intention, recreation frequency, and recommendation intention. It represents users' most direct perception of their physical and mental health and affects their attitude and behavior towards green spaces.

**Hypothesis 1 (H1).** *Recreation intention has a significant positive effect on perceived value.*

**Hypothesis 2 (H2).** *Recreation intention has a significant positive effect on the perceived quality characteristics of parks.*

**Hypothesis 3 (H3).** *Recreation intention has a significant positive effect on satisfaction.*

2. Perceived value: Users' perceived value includes the assessment of functional aspects (such as quality of facilities, green space value, convenience) and emotional aspects (such as social situation and emotional state). Perceived value reflects the subjective feelings of blue-collar workers about park recreation after measuring the quality of a green space/park and the purpose of visiting the green space.

**Hypothesis 4 (H4).** *Perceived value has a significant positive effect on satisfaction.*

3. Perceived park quality characteristics: High-quality parks and their facilities are essential to encourage the use of green spaces. The use frequency of green spaces depends on a range of factors, including the physical attributes and quality of green space and its context. Some studies have also highlighted a strong correlation between visitor use patterns and urban park components (such as distance, amount of vegetation, security, quality, and hygiene) [63].

**Hypothesis 5 (H5).** *Park quality characteristics have a significant positive effect on perceived value.*

**Hypothesis 6 (H6).** *Park quality characteristics have a significant positive effect on satisfaction.*

4. Satisfaction: Satisfaction evaluation is a subjective conclusion based on users' own recreational needs and the balance between the supply and demand of the destination. Recreation satisfaction is the evaluation result of users' subjective perception of the environment through environmental characteristics, environmental perception, and honest feedback, which can reflect the demands of urban residents and the deficiencies of parks. The level of satisfaction can affect users' attitudes and behavioral tendencies. The higher the satisfaction level, the more likely users are to visit the green space. If satisfaction is not high, more users perceive no positive effects of the green space.

## 2.2. Selection of Study Area

Anning Industrial Park, as the only industrial park in Yunnan Province and rare in China since it integrates the three major heavy industries of petroleum, iron, and steel, in addition to phosphorus chemical production, is one of the key industrial parks in the province and is the core industrial development area of the state-level Dianzhong New Area. The park is located in the western part of Anning, 28 km from Kunming, the capital city of Yunnan Province, with a wide area of jurisdiction, a planning control scope of 200 km<sup>2</sup>, and a planning construction scope of 100 km<sup>2</sup>. With a solid industrial foundation, the park has a high industrial aggregation degree and strong development strength. Presently, there are 63 industrial enterprises in the park, including a number of large and important enterprises such as PetroChina, Kunming Iron & Steel, Yuntianhua, and Xiang Feng. Therefore, there are many factories in this industrial park with a large sample size of blue-collar workers, providing a broad base of research subjects.

To ensure the reliability, accuracy, and authenticity of the research content, field interviews and questionnaire pre-surveys were carried out in the early stage to screen the green spaces frequented by blue-collar worker groups in the main urban area. According to China's current Standard for Classification of Urban Green Space (No. CJJ/T85-2017), UGS is divided into park green space, green buffers (for environmental protection), land for squares, and attached green space. This study mainly considered the green space demand of blue-collar worker groups and the functions and service levels of different green spaces. According to the statutory plan of the area, the green parks involved in the research group are divided into three categories: comprehensive parks (G11), sorted parks (G13), and amusement parks (G1). The basic information about the selected parks is shown in Table 2.

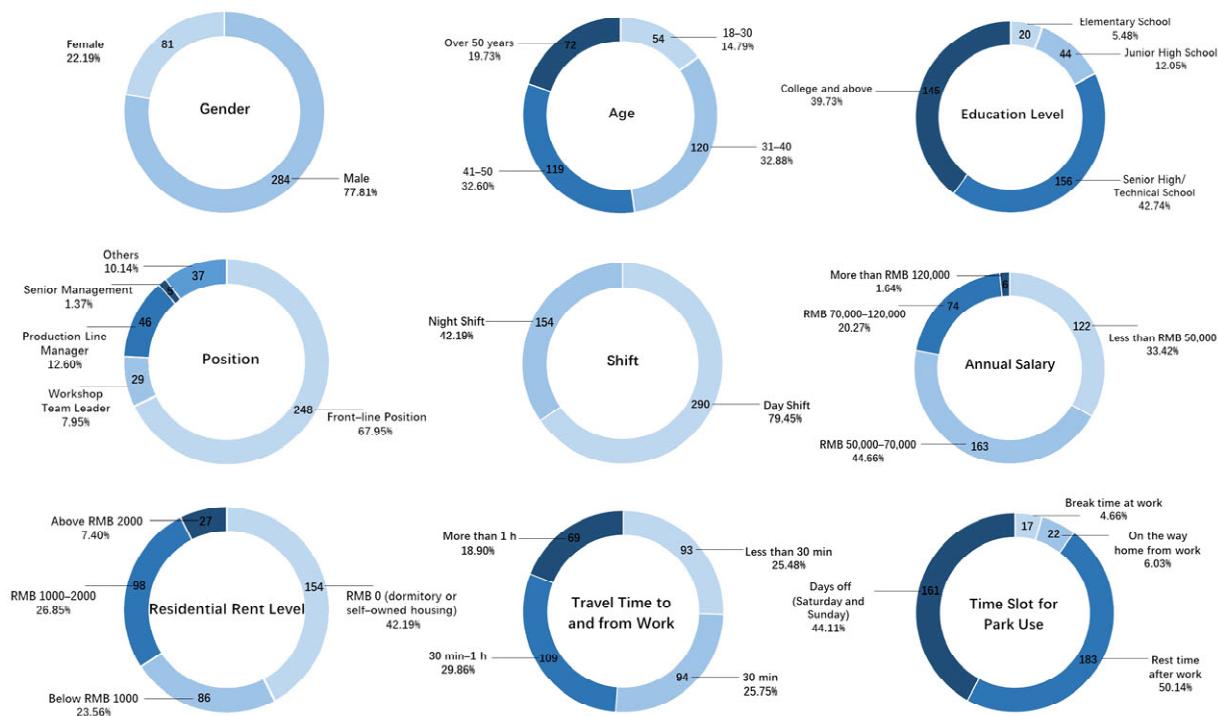
## 2.3. Questionnaire Setting and Data Collection

The survey questionnaire on green space use by blue-collar worker groups included four main aspects: basic information, green space use, health status, satisfaction with park recreation, and subjective perception evaluation. Part I included basic information, which was collected through a closed-ended questionnaire. Part II included green space use, including the frequency of green space use, means of transportation, leisure time budget, choice of green space type, etc. Relevant questions were set based on the research objectives of this paper and the actual situation of the survey respondents. Part III included health status, which included two categories: physical and mental health; the questions were rated on a 5-point Likert scale, and participants were required to give ratings on a quantitative scale from 1 (none) to 5 (very obvious) according to their situation. Part IV included the park recreation intention and satisfaction model scale, and was the main part of the questionnaire. It showed each model variable and its measurement questions. The scale design for this section drew on well-established scales from previous studies and was adapted for the present study subjects. All questions were rated on a 5-point Likert quantitative scale from 1 (never/very dissatisfied) to 5 (often/very satisfied). The basic composition of the user survey questionnaire and the setting of questions are detailed in Table A2.

**Table 2.** Introduction to green spaces.

	Park 1	Park 2	Park 3	Park 4	Park 5	Park 6	Park 7
Location							
Park Name	Baihua Park	Donghu Park	Ninghu Park	Riyue Lake Park	Xiaotang Park	Wetland Park	Mountain Park
Nature of Green Space	Comprehensive Park	Comprehensive Park	Comprehensive Park	Comprehensive Park	Comprehensive Park	Sorted Park	Amusement Park
Park Area	68,827 m <sup>2</sup>	204,437 m <sup>2</sup>	494,474 m <sup>2</sup>	121,672 m <sup>2</sup>	82,340 m <sup>2</sup>	62,843 m <sup>2</sup>	43,247 m <sup>2</sup>
Representative Photos							

In terms of data collection, user survey questionnaires were filled out through on-site scanning. A total of 510 questionnaires were distributed, and 365 valid ones were recovered, with an effective rate of 72%. The sample structure characteristics are shown in Figure 4. In terms of group characteristics, the study found that there were common characteristics of blue-collar worker groups, such as prolonged standing, heavy physical labor, long hours of equipment operation, stressful work, and mostly poor workplace environmental conditions. As a result, skin allergies and difficulty breathing are inevitable due to airborne irritants and dust that does not fully dissipate. In terms of green space use, the study found that the respondents used green space or parks 1–2 times in a week, most of them chose to walk, and those who walked for 20 min or less accounted for more than 61%, indicating that the distance between their residence and the green space was relatively close. The majority of respondents were relatively young and physically active, which was essentially consistent with the actual situation. Second, those who chose to use green space in public open areas accounted for the highest proportion, indicating that public green areas or parks were the main way this group used these areas. Their recreation sites were distributed in various locations.



**Figure 4.** Sample structure of respondents.

### 3. Analysis

#### 3.1. Analysis of Factors Affecting Park Recreation Satisfaction of Blue-Collar Worker Groups

##### 3.1.1. Overall Data Analysis of the Measurement Model

Before analysis, the reliability of data and samples was tested by means of two methods in this paper. First, the Cronbach's  $\alpha$  coefficient was calculated using SPSS software (see Table A3). The reliability of perceived park quality characteristics was high (Cron  $\alpha = 0.954$ ), that of recreation intention was good (Cron  $\alpha = 0.888$ ), and that of perceived value and satisfaction was average (Cron  $\alpha = 0.787/0.760$ ). The results of all statistical values were above 0.7, indicating that the scale had good internal consistency and reliability. Second, the correlation of perceived park quality characteristics was strong ( $KMO = 0.979$ ); that of recreation intention was appropriate ( $KMO = 0.884$ ); that of perceived value was average ( $KMO = 0.704$ ), and that of satisfaction was acceptable ( $KMO = 0.696$ ). The results of the validity test indicate that the collected sample data met the conditions for factor analysis.

Second, in the AMOS method reliability analysis, the confirmatory factors were analyzed through two indicators: combined reliability (CR) and average variance extracted (AVE). In the model, the questionnaire design related to perceived park quality characteristics and recreation intention, and the data had good consistency ( $CR = 0.954/0.890$ ;  $AVE = 0.563/0.618$ ). There was no significant difference between the two variables, which were within a relatively good interval. However, perceived value and satisfaction had average reliability compared to the other two variables ( $CR = 0.779/0.770$ ;  $AVE = 0.541/0.527$ ). Both CR and AVE were above 0.5, which was compliant with the minimum requirement. This may be due to the relatively small number of questions for both, and optimization can be performed for the variable and question design (see Table A7 for details). Overall, the measurement model has sufficient convergent validity as well as good reliability and validity. Therefore, this study concluded that this model could be used for subsequent analysis.

To verify the correlational relationship between different variables, correlation analysis on nine variables from the questionnaire data was also conducted in this paper (see Table 3). The results indicate that there was a significant positive correlation between the four independent variables (satisfaction, recreation intention, perceived value, and perceived park quality characteristics), with the pairwise correlation coefficients significant at the 0.01 level (two-tailed). This means that when individual users had an intrinsic need and motivation for green space/park use behavior, they would use the functions of a relatively close park to meet their needs. In terms of the relationship between the use frequency variable and other variables, it had a significant positive relationship with the perceived park quality characteristics, with a correlation coefficient of 0.103 (significant at the 0.05 level (two-tailed)). This indicates that the higher the quality and rating of the park, the higher the frequency of use, and there was a significant positive correlation. From the overall results of the correlation analysis, the model was well-constructed, and the data met the requirements of analysis with high reliability.

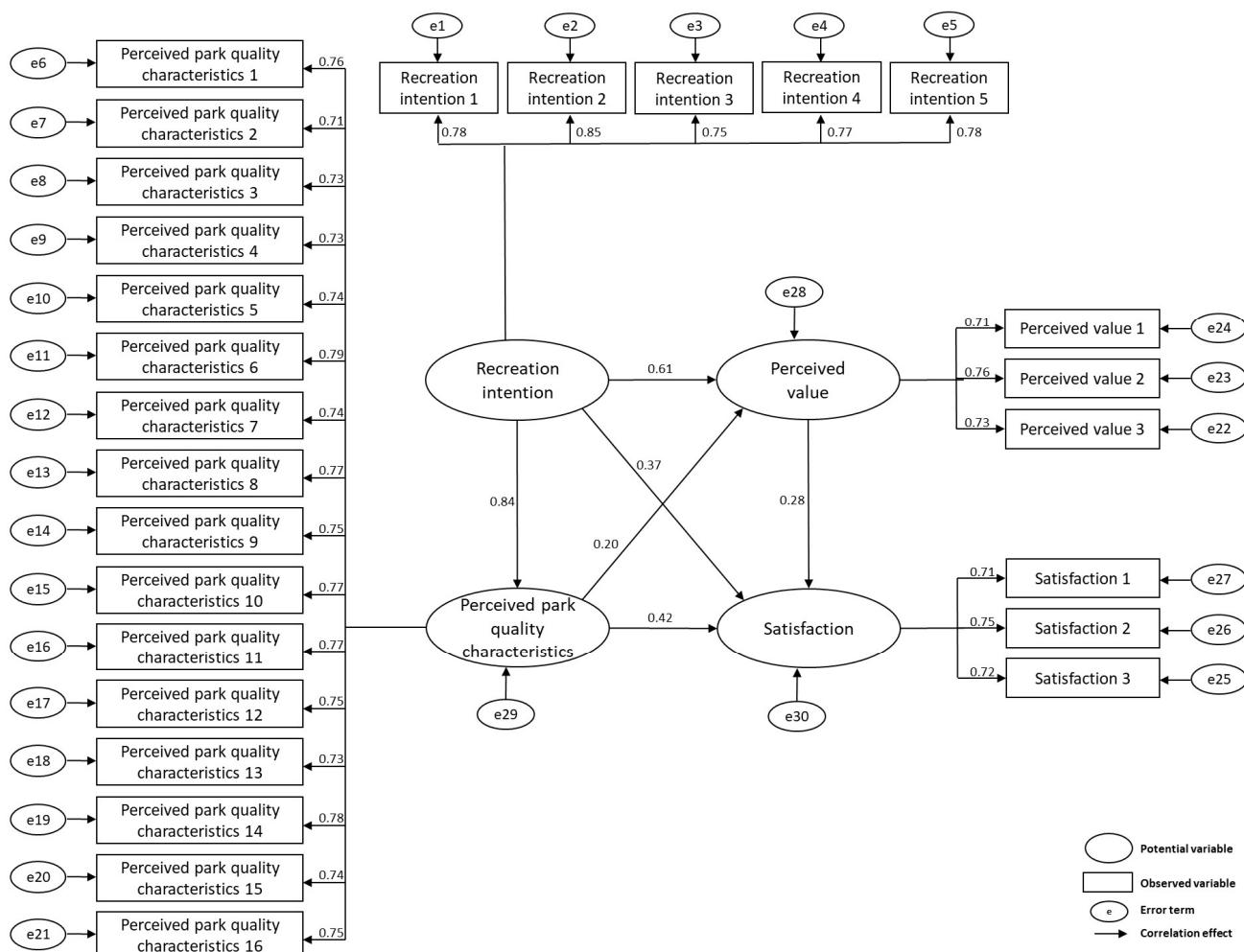
**Table 3.** Correlation analysis among variables.

Variables	1	2	3	4	5	6	7	8	9
1	1								
2	0.859 **	1							
3	0.785 **	0.778 **	1						
4	0.666 **	0.617 **	0.589 **	1					
5	0.08	0.096	0.096	0.103 *	1				
6	0.028	0.027	0.084	0.065	-0.036	1			
7	-0.114 *	-0.088	-0.077	-0.106 *	0.014	-0.056	1		
8	0.064	0.098	0.049	0.052	0.146 **	-0.222 **	-0.139 **	1	
9	-0.044	-0.086	-0.071	-0.033	-0.113 *	-0.196 **	-0.179 **	-0.758 **	1

Note: \* significant at the 0.05 level (two-tailed); \*\* significant at the 0.01 level (two-tailed). 1–9: Satisfaction, recreation intention, perceived value, perceived park quality characteristics, use behavior frequency, use during work breaks, use on the way home from work, use during rest after work, and use on days off, respectively.

### 3.1.2. SEM Analysis

Prior to SEM analysis, model fit analysis was also conducted in this study (see Table A8). The comprehensive analysis of indexes revealed that the degree of fit was at a good level, and the analysis results were reliable and suitable for further analysis. Based on the above analysis, structural equation analysis was conducted on the research model of this paper to explore the factors affecting satisfaction, as shown in Figure 5.

**Figure 5.** Structural equation model.

The results of SEM path analysis (Table 4) indicate that: (1) recreation intention affected perceived value, perceived park quality characteristics, and satisfaction directly and significantly, i.e., H1, H2, and H3 held in the SEM model. (2) Perceived value was significantly correlated with satisfaction, i.e., H4 held in the SEM model, suggesting that the mediating variable has a significantly positive effect on the dependent variable. (3) The perceived park quality characteristics were significantly correlated with perceived value and satisfaction, i.e., H5 and H6 held in the SEM model. Based on the path relationship between variables, all paths were valid, i.e., the mediating effect held. Therefore, the double mediation model established in this study holds. In this model, both perceived park quality characteristics and perceived value play a significant positive mediating role.

**Table 4.** Significance analysis of the model.

Variables Being Acted Upon	Path	Actuating Variable	Estimate	S.E.	C.R.	p
Perceived Value	←	Recreation Intention	0.612	0.072	8.457	***
Perceived Park Quality Characteristics	←	Recreation Intention	0.844	0.065	12.925	***
Satisfaction	←	Recreation Intention	0.367	0.099	3.694	***
Satisfaction	←	Perceived Value	0.277	0.135	2.054	0.04
Perceived Value	←	Perceived Park Quality Characteristics	0.195	0.058	3.351	***
Satisfaction	←	Perceived Park Quality Characteristics	0.42	0.051	8.307	***

Note: \*\*\* significant at the 0.001 level (two-tailed). S.E. refers to the standard error of the estimated parameter; C.R. refers to the critical ratio of the test statistics.

### 3.2. Multi-Group Comparative Analysis

#### 3.2.1. Cluster Analysis

In this study, cluster analysis was performed on samples using the k-means model. The samples were grouped into four clusters; different variables were significantly different in various clusters, indicating that this was the optimal number of clusters. Through the construction of the cluster model combined with the background of the study area and the characteristics of individual sample information, different green space users were grouped into four clusters: Cluster 1 included non-frontline employees who were relatively young and lived in dormitories or self-owned housing. Cluster 2 included non-frontline employees who were relatively older and rented housing outside. Cluster 3 included frontline employees who were relatively young and lived in dormitories or self-owned housing; Cluster 4 included frontline employees who were relatively older and rented housing outside. The cluster center table of the clustering results is shown in Table 5.

**Table 5.** Cluster center table (4 clusters).

Variables	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Age	2	3	2	3
Job	4	4	1	1
Rent	1	3	1	3
Commuting hours	2	3	3	2

According to the cluster center table obtained, the differences in green space use among different blue-collar worker groups can be understood more accurately. The characteristics and preferences of green space use among the four clusters of blue-collar workers are discussed separately to explore their demand for green space use, as shown in Table 6. From the perspective of green space use variables, in terms of use frequency, non-frontline employees displayed a higher value than those on the frontline. In terms of transportation means, there were internal differences among frontline (non-frontline) employees. In terms of walking duration, Cluster 1 recorded the longest, mainly because blue-collar workers in this group were young, physically active, and had relatively inexpensive accommodation, and therefore they walked for the longest time, while Cluster 3 had the shortest walk. The difference between these two clusters was whether they were frontline employees, suggesting that the different types of work can have a relatively great influence on physical exertion and directly determine the walking duration. There was no significant difference in the used space and recreation sites.

**Table 6.** Analysis of the differences in green space use behaviors among different clusters.

Variables	Group	N	Mean ± SD	F	p
Use behavior: frequency	Cluster 1	44.00	2.30 ± 0.55	2.49	0.06
	Cluster 2	43.00	2.47 ± 0.80		
	Cluster 3	151.00	2.19 ± 0.51		
	Cluster 4	127.00	2.33 ± 0.77		
Use behavior: transportation means	Cluster 1	44.00	1.73 ± 1.21	2.20	0.09
	Cluster 2	43.00	1.47 ± 0.91		
	Cluster 3	151.00	1.73 ± 1.11		
	Cluster 4	127.00	1.43 ± 1.01		

**Table 6.** Cont.

Variables	Group	N	Mean ± SD	F	p
Use behavior: walking duration	Cluster 1	44.00	2.57 ± 1.02	3.33	0.02
	Cluster 2	43.00	2.37 ± 1.18		
	Cluster 3	151.00	2.13 ± 1.04		
	Cluster 4	127.00	2.47 ± 1.09		
Use behavior: used space	Cluster 1	44.00	2.59 ± 0.92	1.22	0.30
	Cluster 2	43.00	2.35 ± 1.04		
	Cluster 3	151.00	2.26 ± 1.07		
	Cluster 4	127.00	2.32 ± 0.99		
Use behavior: recreation site	Cluster 1	44.00	2.41 ± 1.06	0.37	0.77
	Cluster 2	43.00	2.23 ± 1.04		
	Cluster 3	151.00	2.23 ± 1.05		
	Cluster 4	127.00	2.28 ± 1.06		

### 3.2.2. Path Analysis among Different Groups

The overall results (Table 7) indicate that the SEM models of the four clusters had slightly poorer results than the overall samples. Only the Cluster 3 paths were significant, indicating that the SEM model established in this study was more applicable to samples in Cluster 3. The group in this cluster was characterized by frontline positions, low income, lowest rent, medium age level, and long working hours. This represents a typical middle-aged blue-collar worker group. This group accounted for the highest proportion and was the main group in this study. Second, the path analysis results of Clusters 1 and 2 were not satisfactory. The common feature of these two groups was that they worked as senior managers, indicating that the questionnaire and model of this study did not apply to blue-collar workers in senior positions, which was consistent with the original purpose of this study.

Therefore, it can be observed from the path analysis that, on the one hand, both the questionnaire and the model had their own applicable context and population, especially when there was a relatively significant difference among various groups. For example, in Clusters 1, 2 and 3 of this study, the difference in job position directly determined the working hours and income level, which further affected the rent level. As it applied to Cluster 3, it was less applicable to Clusters 1 and 2. Clusters 3 and 4 were essentially the same type of group at different stages, both of which had frontline jobs. However, with the increasing age, blue-collar workers in Cluster 4 may have started their own families and businesses, with higher rents to pay and more elderly relatives and children to take care of. Consequently, they tended to work fewer overtime hours. The overall performance of Cluster 4 was between Clusters 1, 2, and 3 and in the middle of the pack. On the other hand, even in Clusters 1 and 2, with more insignificant paths, the paths of Recreation Intention—Perceived Value and Recreation Intention—Perceived Park Quality Characteristics still held. This suggests that the mediating effect of Recreation Intention—Perceived Park Quality Characteristics—Perceived Value held. That is, the correlation path of recreation intention on satisfaction and the associated mediating effect may not have applied to samples in different clusters, but this path applied to all samples, and this mediating effect held across all samples. The mediating effect of this path was robust and did not vary due to sample differences in various clusters. Similarly, perceived value and park quality characteristics also affected satisfaction. Specifically, the differences in results across clusters were reflected in the effect of other variables on satisfaction.

**Table 7.** Significance analysis of each variable in four clusters.

	<b>Variables Being Acted upon</b>	<b>Path</b>	<b>Actuating Variable</b>	<b>Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>p</b>
Cluster 1	Perceived Value	<—	Recreation Intention	0.553	0.151	3.662	***
	Perceived Park Quality Characteristics	<—	Recreation Intention	0.781	0.154	5.081	***
	Satisfaction	<—	Recreation Intention	-0.46	1.993	-0.231	0.817
	Satisfaction	<—	Perceived Value	2.291	3.679	0.623	0.533
	Perceived Value	<—	Perceived Park Quality Characteristics	0.176	0.136	1.3	0.193
	Satisfaction	<—	Perceived Park Quality Characteristics	-0.093	0.763	-0.122	0.903
Cluster 2	Perceived Value	<—	Recreation Intention	1.491	0.512	2.912	0.004
	Perceived Park Quality Characteristics	<—	Recreation Intention	1.262	0.298	4.24	***
	Satisfaction	<—	Recreation Intention	1.237	1.264	0.979	0.328
	Satisfaction	<—	Perceived Value	-0.353	0.7	-0.505	0.614
	Perceived Value	<—	Perceived Park Quality Characteristics	-0.236	0.289	-0.817	0.414
	Satisfaction	<—	Perceived Park Quality Characteristics	-0.018	0.31	-0.059	0.953
Cluster 3	Perceived Value	<—	Recreation Intention	0.586	0.124	4.724	***
	Perceived Park Quality Characteristics	<—	Recreation Intention	0.924	0.118	7.834	***
	Satisfaction	<—	Recreation Intention	0.276	0.154	1.798	0.072
	Satisfaction	<—	Perceived Value	0.539	0.226	2.384	0.017
	Perceived Value	<—	Perceived Park Quality Characteristics	0.17	0.088	1.941	0.052
	Satisfaction	<—	Perceived Park Quality Characteristics	0.36	0.074	4.861	***
Cluster 4	Perceived Value	<—	Recreation Intention	0.557	0.102	5.469	***
	Perceived Park Quality Characteristics	<—	Recreation Intention	0.725	0.091	7.994	***
	Satisfaction	<—	Recreation Intention	0.21	0.145	1.451	0.147
	Satisfaction	<—	Perceived Value	0.299	0.219	1.368	0.171
	Perceived Value	<—	Perceived Park Quality Characteristics	0.253	0.098	2.576	0.01
	Satisfaction	<—	Perceived Park Quality Characteristics	0.595	0.101	5.866	***

Note: \*\*\* significant at the 0.001 level (two-tailed).

### 3.2.3. Comparative Analysis between Different Groups

The analysis of the perceived park quality characteristics variable (detailed in Table A7) indicates that in Cluster 1, the main intention and demand were exercise and fitness. Users were engaged in a dynamic process of continuous movement, while the park fountain and statues were static and unchanging, and so they would not be pleasantly surprised. With increasing age, those in Cluster 2 were more inclined to perform sedentary activities or low-intensity exercise. There was no significant difference between the items of perceived park quality characteristics in Cluster 3. On the one hand, this may be due to the fact that the questions set in the questionnaire were beyond the comprehension and perception of this group. On the other hand, this group paid no attention to these questions during use. In Cluster 4, three items of the accessibility variable were distinct. Although the park was relatively far, this group could still go there at a relatively low cost and in a short time, which was attributed to convenient public transportation.

The analysis of the recreation intention variable (detailed in Table A7) indicates that in Cluster 1, the demand for exercise and fitness was much higher than the other demands. In Cluster 2, blue-collar workers preferred less physically demanding programs, and the two highest demands were “Take a walk to relax” and “Breathe some fresh air”, while the differences between other demands were relatively significant. In Cluster 3, the differences between different intentions and demands were relatively small, except for “Take a walk to relax”. In Cluster 4, the recreation intention was higher. This result reveals that the frontline manual worker population had a greater demand for park and green space use. This group tended to be exhausted, physically and mentally, after a day of physical labor and urgently needed ways to relax and relieve stress. Hence, the coefficients of recreation intention were all relatively high and balanced, without any particularly outstanding items.

In the analysis results of the perceived value variable (detailed in Table A7), two points should be noted: (i) the perceived value in the younger groups was smaller than that in the older ones, i.e., Cluster 1 < Cluster 2 and Cluster 3 < Cluster 4 among groups with the same job position; and (ii) the perceived value in the groups with lower job positions was smaller than that in those with higher job positions, i.e., Cluster 3 < Cluster 1 and Cluster 4 < Cluster 2, among groups at the same age level. In Cluster 3, the main sample group of this study, the perceived value had the lowest impact among the four clusters.

The analysis of the satisfaction variable (detailed in Table A7) indicates that there were no significant differences among various clusters because: (i) the study subjects were relatively concentrated and similar in biological and social attributes, without significant differences in cognitive levels and demands; and (ii) the data were collected in a small area, and thus the parks closest to their residence were often the same. Although there were some employees who rented housing outside, this proportion was relatively low; those who did rent housing outside generally chose residences close to their workplace.

## 4. Discussion

This study explored the factors affecting the satisfaction of blue-collar workers with park recreation by constructing a SEM model, and the results show that all paths held true and were significant. More details are discussed as follows:

### 4.1. Green Space Access Effectiveness of Blue-Collar Worker Groups Based on the ACSI Model

In this study, the relationship between satisfaction and latent variables was clarified from specific populations through empirical research with blue-collar worker groups as the study subjects. Recreation intention, perceived park quality characteristics, and perceived value all had a significantly positive effect on recreation satisfaction, which is consistent with previous studies. However, there are still different analytical results from other studies based on this theoretical model. There are still model variables that do not have a significant or negative effect. In a study of factors affecting satisfaction with online training for sustainable professional development of higher education teachers, expected quality

was negatively correlated with perceived value. Additionally, expected and perceived quality had no significant effect on satisfaction [64]. This may be due to the difference in the study groups: in general, teachers have higher expectations of pedagogical knowledge to be acquired from online training, as this is prone to increase the gap between expected high quality and perceived actual value, while decreasing their perceived value. Moreover, they are more likely to perceive the specific experience after the actual use, taking the expected and perceived quality into comprehensive consideration, rather than judging the training satisfaction in a preconceived way. In a study of theme park festival visitor satisfaction, visitor expectations were negatively correlated with perceived value [65], which deviated from the results of this study, possibly due to differences in product and study content. Parks and green spaces are usually not as well-promoted as theme park festivals and therefore have less impact on visitor expectations and perceived value deviations.

In addition, the paths of the perceived park quality characteristics variable in this study were inconsistent with expectations. Specifically, in the analysis of Cluster 3 in this study (see Table 7), the path coefficients of perceived park quality characteristics for perceived value and satisfaction were 0.17 and 0.36, respectively. The path coefficient for satisfaction was greater, probably due to the unreasonable variable and model design. Regarding the variable design, all other variables and paths performed as expected. Therefore, the overall model is appropriate. Concerning the model design, it is probably due to the problem of the Park Quality Characteristics—Perceived Value path. Regarding blue-collar workers, they had limited judgment about perceived value. In other words, they were better able to express their level of satisfaction, but not good at making judgments about perception questions that required thinking and weighing. This was due to the overall low literacy level of this group in addition to their long-term engagement in manual work. It is not appropriate to use overcomplex models and variables for this group. It is recommended that the perceived value should be removed and a simplified model more applicable to this group be used.

#### 4.2. Green Space Access Characteristics of Blue-Collar Workers

In terms of general characteristics, the frequency of blue-collar workers using green spaces was relatively low, at only one to two times a week, and most of them chose to walk. This group tended to visit parks in public open areas and near their place of residence. Conversely, the characteristics of green space visits differed significantly among the four clusters. In terms of use frequency, the values for non-frontline employees were higher than those for frontline employees, i.e., Cluster 1 > Cluster 3, Cluster 2 > Cluster 4; in terms of transportation means, the difference was reflected within frontline and non-frontline employees, i.e., Cluster 1 > Cluster 2, Cluster 3 > Cluster 4. In terms of walking duration, the difference in the length of time spent lay in whether they were frontline employees, with Cluster 1 being the longest and Cluster 3 being the shortest. Compared to other special groups, various groups had different patterns and characteristics of green space use. For example, most elderly people preferred walking to the park every day and lived less than 15 min from the park. They also preferred trails, paved open spaces, and other natural areas [66]. Regarding children, some research findings suggest that even if the parks closest to home have attractive features, they cannot guarantee to attract visitors. Instead, some children and families are willing to travel further to visit larger parks [67]. In addition, some studies have pointed out that most white-collar worker groups perform activities near their workplaces and prefer green pocket spaces with commercial facilities, and a few of them choose to spend their recreational time in parks [68]. Blue-collar workers are as an underprivileged group of green space users neglected in green space studies. They visit parks mostly for simple activities such as taking a walk to relax, with lower frequency of use and limited opportunities to enjoy green spaces. Multi-group analysis can help us determine how to optimize and improve the direction of green space planning and design around this group from the perspective of blue-collar workers.

## 5. Conclusions

In this paper, an SEM on the recreation intention and satisfaction of blue-collar worker groups was established based on ACSI theory. It was found that this model had good reliability and validity and significant correlations among variables, and the paths basically held. The results of the preliminary and exploratory evaluation of park recreation satisfaction of blue-collar workers indicate that the ACSI theory can predict and explain users' recreation intention and satisfaction effectively. It is valid to apply this theory in the field of social economics to this landscape planning study. From the model analysis, not only were three main factors (recreation intention, perceived value, and perceived park quality characteristics affecting the recreation satisfaction of blue-collar worker groups) derived, but this paper also found general characteristics of blue-collar worker groups such as the effects of intense hard work, and common conditions such as muscle soreness, physical exhaustion, and anxiety. This influenced individual characteristic differences regarding the behavior relating to green space use, and the characteristics of green space use by different blue-collar worker groups. In general, this paper applied the ACSI theory to the green space and park use behaviors of blue-collar groups. Based on the demands of blue-collar groups, it is proposed that parks should be diversified in functions, equipped with a full range of facilities, and differentiated in service types that consider the characteristics and requirements of blue-collar groups. This could further promote more use of green spaces by blue-collar groups. In this regard, based on the characteristics of the group, the optimized suggestions for green space planning were proposed:

(1) Park configuration functions and facilities should be complete and diverse

Take the perceived quality characteristics of parks in group 3 as an example. For this group, the park design should emphasize its practicality and functionality, and reduce design elements such as landscape and aesthetics. At the same time, the selection of facilities and equipment should also be based on durability and practicality as the first principle, instead of prioritizing high-end quality. For weekday-use green spaces, experience improvements should focus on the low-intensity use at noon and in the evening. These two periods are blue-collar workers' day and night shift times. Besides providing sunshade cooling facilities in green space which is exposed to direct sunshine, increasing facilities, such as non-commercial tables, chairs, smoking areas, free drinking water, and so on can strengthen blue-collar workers' experience of such a green space within a limited time span.

(2) Differentiated configuration of park services

Creating parks near office areas or industrial areas requires considering the nature of enterprises and employees. First of all, labor-intensive enterprises have greater willingness and demand for parks or green spaces. However, their needs are diversified and complex. It is recommended to set up parks with multiple functions to provide more activity sites. For example, adding courtyards for table tennis and badminton will encourage participation in these activities. Secondly, employees who focus on office work or those with relatively high income require more health and sports activities. Therefore, sports trails and special fitness facilities next to their offices are appropriate.

There are still some limitations in this study: first, the study subjects of this paper were blue-collar worker groups, and in preparing the research questionnaire, the number of perception-type questions may have caused differences due to their perception of the questions or the differing cognitive levels of the research subjects. These cognitive differences are related to the blue-collar group's own cultural and educational levels, which vary from one level of education to another, while the cultural level and ability to understand the questions among most of the blue-collar group are limited. The measurement of satisfaction and the improvement of specific questions are crucial for our subsequent studies. Second, as the current questionnaire and model were not applicable to most of the samples, it is necessary to improve the applicability of the questionnaire and model so that they can be applied to more cluster samples. Furthermore, subject to the limited availability of data, we chose to conduct the survey only in Yunnan Province. The extensiveness of samples

and sample area distribution requires further improvement. Finally, the discussion of the effectiveness of specific design strategies was insufficient. More analysis of the relevant influencing factors of each strategy could be considered to explore the relationship between variables in depth in order to determine whether the green space use by blue-collar workers is universal so as to facilitate reasonable design and improve the utilization and satisfaction of UGS. This study suggests that future related studies can focus on enriching the happiness of specific groups of people such as blue-collar workers, deeply analyzing the different park preferences of internal group structures, further exploring new methods, adding new cases, and providing new ideas for the government, enterprises, and other relevant units to actively introduce various policies, improve the well-being of special groups, promote social equity, and improve the planning and design of parks and green spaces.

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## Appendix A

**Table A1.** Scale of park recreation satisfaction model for blue-collar workers.

Variables	Items	References
Management	Traffic control in the park is good The facilities in the park are well maintained	[69]
Aesthetics	The green space in the park is decorated with landscape elements such as fountains and statues The green space in the park has different water features, such as lakes and ponds The park has high vegetation coverage and a variety of plants and flowers for viewing	[61,70]
Tranquility	The park has good privacy and some space for solitude There is no traffic noise around the park	[61,71,72]
Facilities	The park has sufficient fitness facilities for my workout (jogging track, fitness equipment) The park has sufficient recreation and leisure facilities, such as seats and benches	[61,72]
Hygiene	The park has good air quality and very clean grounds	[61]
Social activities	Whether the park has space for events, such as free outdoor movies Whether the park holds frequent events, such as flower shows and lantern fairs	[73]
Accessibility	The park can be easily accessed The park has an excellent location There are ample options and frequent public transportation near the park	[70]
Security	I feel safe spending time in the park	[70]

**Table A2.** Scale of park recreation satisfaction model for blue-collar workers.

Variables	Items	References
Recreation intention	Breathe some fresh air	
	Take a walk to relax	
	Appreciate natural landscape	[74–76]
	Rest alone	
	Exercise and fitness	
Perceived value	Are you satisfied with the cost of visiting recreational parks?	
	Does the overall quality of the recreational parks you visited meet your requirements?	[77–79]
	Overall, visiting recreational parks is valuable to me	
Satisfaction	How did the recreational parks you visited actually perform compared to your expectations?	
	How did the recreational parks you visited actually perform compared to your ideal ones?	[77,80,81]
	The recreational parks I visited are generally satisfactory	

**Appendix B****Table A3.** Reliability and validity analysis of main variables.

Variables	KMO	Cron $\alpha$	No. of Items
Recreation intention	0.884	0.888	5
Perceived value	0.704	0.787	3
Satisfaction	0.696	0.760	3
Perceived park quality characteristics	0.979	0.954	16

**Table A4.** Reliability and validity analysis by AMOS.

Model	Items	Path	Variables	Estimate	CR	AVE
Overall blue-collar worker groups	Perceived value 1	<—	Perceived value	0.712	0.779	0.541
	Perceived value 2	<—	Perceived value	0.759		
	Perceived value 3	<—	Perceived value	0.734		
	Security	<—	Perceived park quality characteristics	0.758	0.954	0.563
	Management 1	<—	Perceived park quality characteristics	0.713		
	Management 2	<—	Perceived park quality characteristics	0.731		
	Accessibility 1	<—	Perceived park quality characteristics	0.729		
	Accessibility 2	<—	Perceived park quality characteristics	0.743		
	Accessibility 3	<—	Perceived park quality characteristics	0.791		
	Aesthetics 1	<—	Perceived park quality characteristics	0.742		
	Aesthetics 2	<—	Perceived park quality characteristics	0.769		
	Aesthetics 3	<—	Perceived park quality characteristics	0.745		
	Tranquility 1	<—	Perceived park quality characteristics	0.769		
	Tranquility 2	<—	Perceived park quality characteristics	0.766		
	Facilities 1	<—	Perceived park quality characteristics	0.753		
	Facilities 2	<—	Perceived park quality characteristics	0.728		
	Social activities 1	<—	Perceived park quality characteristics	0.783		

**Table A5.** Reliability and validity analysis by AMOS.

Model	Items	Path	Variables	Estimate	CR	AVE
Overall blue-collar worker groups	Social activities 2	←	Perceived park quality characteristics	0.736		
	Hygiene	←	Perceived park quality characteristics	0.745		
	Satisfaction 1	←	Satisfaction	0.711	0.770	0.527
	Satisfaction 2	←	Satisfaction	0.749		
	Satisfaction 3	←	Satisfaction	0.717		
	Recreation intention_ Breathe some fresh air	←	Recreation intention	0.784	0.890	0.618
	Recreation intention_ Take a walk to relax	←	Recreation intention	0.853		
	Recreation intention_ Appreciate natural landscape	←	Recreation intention	0.746		
	Recreation intention_ Rest alone	←	Recreation intention	0.768		
	Recreation intention_ Exercise and fitness	←	Recreation intention	0.777		
	Perceived value 1	←	Perceived value	0.731	0.764	0.519
	Perceived value 2	←	Perceived value	0.693		
	Perceived value 3	←	Perceived value	0.737		
	Security	←	Perceived park quality characteristics	0.770	0.944	0.514
	Management 1	←	Perceived park quality characteristics	0.715		
	Management 2	←	Perceived park quality characteristics	0.765		
Cluster 1	Accessibility 1	←	Perceived park quality characteristics	0.732		
	Accessibility 2	←	Perceived park quality characteristics	0.634		
	Accessibility 3	←	Perceived park quality characteristics	0.782		
	Aesthetics 1	←	Perceived park quality characteristics	0.691		
	Aesthetics 2	←	Perceived park quality characteristics	0.818		
	Aesthetics 3	←	Perceived park quality characteristics	0.780		
	Tranquility 1	←	Perceived park quality characteristics	0.619		
	Tranquility 2	←	Perceived park quality characteristics	0.654		
	Facilities 1	←	Perceived park quality characteristics	0.709		
	Facilities 2	←	Perceived park quality characteristics	0.615		
	Social activities 1	←	Perceived park quality characteristics	0.738		
	Social activities 2	←	Perceived park quality characteristics	0.752		
	Hygiene	←	Perceived park quality characteristics	0.659		
	Satisfaction 1	←	Satisfaction	0.817	0.783	0.548
	Satisfaction 2	←	Satisfaction	0.702		
	Satisfaction 3	←	Satisfaction	0.695		
Cluster 2	Recreation intention_ Breathe some fresh air	←	Recreation intention	0.675	0.856	0.546
	Recreation intention_ Take a walk to relax	←	Recreation intention	0.779		
	Recreation intention_ Appreciate natural landscape	←	Recreation intention	0.667		
	Recreation intention_ Rest alone	←	Recreation intention	0.658		
	Recreation intention_ Exercise and fitness	←	Recreation intention	0.889		

**Table A6.** Reliability and validity analysis by AMOS.

Model	Items	Path	Variables	Estimate	CR	AVE
Cluster 2	Perceived value 1	←	Perceived value	0.849	0.839	0.635
	Perceived value 2	←	Perceived value	0.786		
	Perceived value 3	←	Perceived value	0.752		
	Security	←	Perceived park quality characteristics	0.820	0.957	0.584
	Management 1	←	Perceived park quality characteristics	0.674		
	Management 2	←	Perceived park quality characteristics	0.729		
	Accessibility 1	←	Perceived park quality characteristics	0.729		
	Accessibility 2	←	Perceived park quality characteristics	0.745		
	Accessibility 3	←	Perceived park quality characteristics	0.832		
	Aesthetics 1	←	Perceived park quality characteristics	0.840		
	Aesthetics 2	←	Perceived park quality characteristics	0.806		
	Aesthetics 3	←	Perceived park quality characteristics	0.745		
	Tranquility 1	←	Perceived park quality characteristics	0.771		
	Tranquility 2	←	Perceived park quality characteristics	0.737		
	Facilities 1	←	Perceived park quality characteristics	0.749		
	Facilities 2	←	Perceived park quality characteristics	0.776		
	Social activities 1	←	Perceived park quality characteristics	0.762		
	Social activities 2	←	Perceived park quality characteristics	0.705		
	Hygiene	←	Perceived park quality characteristics	0.782		
Cluster 3	Satisfaction 1	←	Satisfaction	0.560	0.761	0.520
	Satisfaction 2	←	Satisfaction	0.798		
	Satisfaction 3	←	Satisfaction	0.781		
	Recreation intention_ Breathe some fresh air	←	Recreation intention	0.839	0.871	0.579
	Recreation intention_ Take a walk to relax	←	Recreation intention	0.880		
	Recreation intention_ Appreciate natural landscape	←	Recreation intention	0.709		
	Recreation intention_ Rest alone	←	Recreation intention	0.711		
	Recreation intention_ Exercise and fitness	←	Recreation intention	0.638		
	Perceived value 1	←	Perceived value	0.639	0.726	0.470
	Perceived value 2	←	Perceived value	0.724		
Cluster 3	Perceived value 3	←	Perceived value	0.691		
	Security	←	Perceived park quality characteristics	0.756	0.955	0.572
	Management 1	←	Perceived park quality characteristics	0.737		
	Management 2	←	Perceived park quality characteristics	0.717		
	Accessibility 1	←	Perceived park quality characteristics	0.756		
	Accessibility 2	←	Perceived park quality characteristics	0.786		
	Accessibility 3	←	Perceived park quality characteristics	0.775		
	Aesthetics 1	←	Perceived park quality characteristics	0.742		
	Aesthetics 2	←	Perceived park quality characteristics	0.739		
	Aesthetics 3	←	Perceived park quality characteristics	0.734		
	Tranquility 1	←	Perceived park quality characteristics	0.790		
	Tranquility 2	←	Perceived park quality characteristics	0.775		

**Table A7.** Reliability and validity analysis by AMOS.

Model	Items	Path	Variables	Estimate	CR	AVE
Cluster 3	Facilities 1	←	Perceived park quality characteristics	0.771		
	Facilities 2	←	Perceived park quality characteristics	0.762		
	Social activities 1	←	Perceived park quality characteristics	0.789		
	Social activities 2	←	Perceived park quality characteristics	0.726		
	Hygiene	←	Perceived park quality characteristics	0.736		
	Satisfaction 1	←	Satisfaction	0.687	0.767	0.523
	Satisfaction 2	←	Satisfaction	0.755		
	Satisfaction 3	←	Satisfaction	0.726		
	Recreation intention_ Breathe some fresh air	←	Recreation intention	0.766	0.881	0.597
	Recreation intention_ Take a walk to relax	←	Recreation intention	0.859		
	Recreation intention_ Appreciate natural landscape	←	Recreation intention	0.703		
	Recreation intention_ Rest alone	←	Recreation intention	0.786		
	Recreation intention_ Exercise and fitness	←	Recreation intention	0.740		
	Perceived value 1	←	Perceived value	0.738	0.821	0.604
	Perceived value 2	←	Perceived value	0.799		
Cluster 4	Perceived value 3	←	Perceived value	0.794		
	Security	←	Perceived park quality characteristics	0.750	0.954	0.565
	Management 1	←	Perceived park quality characteristics	0.697		
	Management 2	←	Perceived park quality characteristics	0.728		
	Accessibility 1	←	Perceived park quality characteristics	0.696		
	Accessibility 2	←	Perceived park quality characteristics	0.731		
	Accessibility 3	←	Perceived park quality characteristics	0.804		
	Aesthetics 1	←	Perceived park quality characteristics	0.729		
	Aesthetics 2	←	Perceived park quality characteristics	0.788		
	Aesthetics 3	←	Perceived park quality characteristics	0.755		
	Tranquility 1	←	Perceived park quality characteristics	0.786		
	Tranquility 2	←	Perceived park quality characteristics	0.789		
	Facilities 1	←	Perceived park quality characteristics	0.742		
	Facilities 2	←	Perceived park quality characteristics	0.703		
	Social activities 1	←	Perceived park quality characteristics	0.796		
	Social activities 2	←	Perceived park quality characteristics	0.752		
	Hygiene	←	Perceived park quality characteristics	0.763		
	Satisfaction 1	←	Satisfaction	0.760	0.777	0.538
	Satisfaction 2	←	Satisfaction	0.730		
	Satisfaction 3	←	Satisfaction	0.710		
	Recreation intention_ Breathe some fresh air	←	Recreation intention	0.817	0.909	0.666
	Recreation intention_ Take a walk to relax	←	Recreation intention	0.828		
	Recreation intention_ Appreciate natural landscape	←	Recreation intention	0.823		
	Recreation intention_ Rest alone	←	Recreation intention	0.783		
	Recreation intention_ Exercise and fitness	←	Recreation intention	0.830		

Note: CR refers to the critical ratio; AVE refers to the mean variance extraction value.

**Table A8.** Model fitting indices.

Index	Ideal Criteria	General Criteria	Model Results	Conclusion
CMIN/DF	1~3	<10	2.904	Good fit
RMSEA	<0.08	<0.1	0.072	Good fit
RMR	<0.08	<0.1	0.06	Good fit
GFI	>0.9	>0.8	0.845	General fit
CFI	>0.9	>0.8	0.916	Good fit
IFI	>0.9	>0.8	0.916	Good fit
NFI	>0.9	>0.8	0.878	General fit
TLI	>0.9	>0.8	0.907	Good fit

Note: CMIN/DF (Ratio of Chi-square to Degrees of Freedom); RMSEA (Root-Mean-Square Error of Approximation); RMR (Root Mean square Residual); GFI (Goodness of Fit Index); CFI (Comparative Fit Index); IFI (Value-Added Fit Index); NFI (Normed Fit Index); TLI (Tucker-Lewis Index).

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