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The Restorative Effects of Unique Green Space Design: Comparing the Restorative Quality of Classical Chinese Gardens and Modern Urban Parks

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Abstract: The purpose of this paper is to explore the restorative effects of two unique Urban Green Spaces (UGSs): modern urban parks (MUPs) and classical Chinese gardens (CCGs). Compared to MUPs, little research has been conducted on the potential restorative effects of CCGs. To fill this gap, we collected video clips of various scenes in Suzhou, Jiangsu Province, 'the city of gardens' in China, and produced video images of CCGs and MUPs representing UGSs. Public ratings of these videos were collected using the Short-Version Revision Repair Scale (SRRS) to analyze the perceived restorative effects and drivers of CCGs and MUPs in combination with landscape elements, which were deeply parsed using computer vision techniques (semantic segmentation techniques) and expert scoring methods. The aim is to enhance the therapeutic effects of CCGs and MUPs. The results indicate that the differences between the two landscape types in terms of their restorative effects are not significant. The videos representing CCGs had a greater standard deviation of restorative effects (a lower level of consensus) compared to the videos depicting MUPs. Deep learning techniques for semantic segmentation combined with expert scoring methods can effectively help us to understand the drivers influencing restorative effects, and we combined our findings to conclude that improved waterscape design is an essential driver for enhancing the perceived restorative effects of CCGs and that decreasing specific artificial modern structures, enhancing vegetation cover, and increasing public exposure to nature are critical to strengthening the restorative effects of both. Hopefully, these findings will improve visitors' recovery in UGS environments and guide landscape architects to more effectively design healing UGSs.

Keywords: classical Chinese garden; computer vision; landscape elements; perceived sensory dimensions; perceived restorative effects; semantic segmentation

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1. Introduction

Research Background

As per a World Health Organization (WHO) survey, 75% of the world's population is in a state of subhealth, which seriously affects their quality of life and efficiency at work [1]. The rapid development of high-density urbanization includes high-pressure fast-paced work and lifestyles, which have led to a series of social problems of concern [2]. For instance, mental health disorders [3], chronic diseases [4,5], and underlying illnesses appear [6] at a young age. These social problems arising from urbanization and lifestyles are also particularly acute in high-density cities such as Singapore [7], countries such as Japan [8], and regions such as Hong Kong [9,10]. As part of the process of high-density urbanization, the number of cities with more than one million people in China has increased from 90 in 2000 to 161 in 2019. However, China's urbanization has led to severe health consequences. Unhealthy occupational activities, economic inequality, and social pressures have contributed to the rising incidence of mental illnesses [11,12]. Characteristics such

as limited green spaces and inactive modes of travel have significantly reduced physical activity, leading to declines in physical fitness and immunity, as well as increases in chronic diseases such as obesity [13]. To address this situation, China's "Healthy China 2030" plan, enacted in 2016, further underscored the importance of health, and the outbreak of COVID-19 has heightened the emphasis on health across all sectors of society.

Green spaces are an essential part of modern cities and are defined as 'areas of grass, trees or other vegetation set apart from other urban environments for recreational or aesthetic purposes'. The Sustainable Development Goals (SDGs) aim to provide universal access to urban green spaces, according to the United Nations Department of Economic and Social Affairs (UNDESA) [14,15]. Research has found that urban green spaces (UGSs) were invaluable to the health of urban residents during special periods such as the COVID-19 pandemic, and in normal times, they are critical to maintaining the physical and mental health of residents. They help residents recover from fatigue [16]; lead to an enhanced mood and self-esteem [17]; act as a buffer against daily stresses [18]; foster greater self-discipline [19]; lead to lower levels of depression [20], anxiety, and stress [21]; lead to improved mental and social health [22]; increase residents' physical activity [23,24]; reduce violence and crime [15,25]; and decrease health-related inequalities [26,27]. The literature suggests that developing access to nature may be an important investment in community health and well-being.

Nonetheless, the loss and degradation of green spaces in recent years due to dense urbanization [28] have exerted a number of negative impacts on human beings, including the destruction of habitats [29], reduced quality of life [30], and negative psychological [31] and health effects [32]. The proliferation of green space use [33], however, has inspired the creation of new solutions in green space construction in many areas to address these negative impacts. Many scholars have analyzed perceived landscape characteristics and their perceived restorative effects by studying a specific type of urban green space in order to propose solutions for green space construction; however, to date, research on the restorative effects of urban green spaces has mainly focused on urban forests and natural areas [34,35], parks [36,37], zoos [38], university campuses [39], and cemeteries [39]. Less research has been conducted on city-specific cultural urban green space types. Therefore, there is a need to emphasize the relevance of urban green spaces, especially specific types of urban green spaces, and their role in maintaining the physical and mental health of urban residents. This is one of the most important ways to improve the well-being and health of urban dwellers. As urbanization continues to challenge public health, the historical significance and restorative qualities of classical Chinese gardens (CCGs) provide increasingly valuable insights for contemporary urban design. Integrating these traditional landscapes into modern urban spaces is crucial for enhancing the well-being of city dwellers and addressing health issues stemming from rapid urban development.

2. Historical Context and Restorative Effects Assessment

2.1. China's Unique Green Spaces: Classical Chinese Gardens

Building on this understanding, classical Chinese gardens (CCGs) emerge as a distinct and historically rich form of urban green space, uniquely integrating sustainability, ecological value, and cultural heritage. As the earliest-established and longest-lasting landscape-style garden system in the world, CCGs integrate sustainability, ecological value, urban features, amusement, and healthcare [40]. Scholars have studied CCGs from the aspects of history [41,42], culture [41,43], space and landscape [44,45], materials and technology [45], and design and conservation [41,46]. Some scholars have expanded the research dimension of CCGs by combining advanced technological tools and concepts, such as the use of laser scanning and digitization techniques to record and preserve garden spaces [47,48], and scholars have also analyzed garden images using intelligent technological tools [49–51]. In today's society, as people pay more attention to the health of green spaces, many scholars are focusing on how to analyze the restorative effect of CCGs

through scientific means and use the results to provide reference for healthier modern urban green space design [52].

CCGs could not have emerged without ancient Chinese elites (literati and scholars). Chinese landscape literature flourished during the Tang and Song dynasties [53]. Several elites operated CCGs with profound insights into natural landscapes and integrated their philosophical experiences and feelings toward life into their construction. Amidst court strife, these elites craved CCGs as a spiritual support and solace. They sought solace, relaxation, and wisdom in quiet walks, meditations, and painting sessions in the gardens. Under the influence of this social trend, the CCG emerged as a "healing garden" of cheerfulness and informativeness. A synthesis of Chinese history, science, culture, and art, a CCG embodies the harmony and unity of traditional Chinese human thought and nature and served as a spiritual utopia for the ancient elites [54]. Thus, CCGs essentially reflect traditional Chinese ideas of healthy habitat creation and traditional health culture; therefore, exploring CCGs provides a basis for contemporary research on healthy landscape design. A health-oriented exploration of the landscape construction of traditional gardens could help in the current and future construction of aesthetic green spaces with restorative effects. This deep-rooted connection between nature and human well-being in CCGs highlights their potential as models for modern urban landscapes designed to promote mental and physical health.

The concept of urban parks originated in the Western world as a means of mitigating the environmental degradation caused by industrial development and urban expansion in the West [55]. The concept of the urban park originated in the public gardens of Ancient Greece, which was combined with a place for sporting activities [56]. The earliest urban park was Birkenhead Park in the UK. However, the true meaning of modern urban parks originated in the middle of the 19th century in the United States of America, with New York Central Park, which was for the pleasure of the general public and shows the true meaning of modern urban park design and creation [57]. The birth of modern city parks provided residents with a natural place to get away from human-made environments and relieve stress. In 1868, the British built China's first city park in Shanghai and named it the 'Public Garden', which is now known as Huangpu Park [58]. After the Revolution of 1911, under the influence of Western culture and technology, the development of city parks entered its first expansion period. After the founding of the People's Republic of China, the design and management of urban parks were introduced with reference to the park concepts of the former Soviet Union [59]. Since the Chinese government's reform and the opening-up of economic policy in 1978, a large number of modern urban parks (MUPs) were built to counteract environmental degradation, providing urban residents with modern urban green spaces for leisure and recreation [33]. Nevertheless, the stylistic patterns of these modern urban green spaces suffer from foreign cultural impacts, mainly from Western culture. As opposed to the flourishing of city parks, only a handful of traditional Chinese-style gardens have been restored or built in China over the past century [60]. Suzhou, the city with the largest number of surviving CCGs, was reported to have only 23 CCGs left intact in the 1982 Historic Monuments Register. However, 142 CCGs had been identified prior to 1949, and while some of these CCGs could be restored, 96 CCGs were completely destroyed [61]. Thus, our research aims to analyze whether the restorative effects of traditional gardens hold any reference value for the design of current urban green spaces for healing. In addition, by comparing CCGs and MUPs, we seek to determine which exhibits more significant restorative effects. Indeed, the fact that most previous researchers have examined traditional gardens or urban parks separately implies unresolved questions [62,63].

2.2. Restorative Effects Assessment

To better compare the restorative effects of CCGs and MUPs, this study introduces theories and methods for evaluating restoration outcomes. Attention recovery theory suggests that attention is directed and non-directed. The former refers to attention directed by cognitive control processes, and the latter refers to attention being drawn to inherently

intriguing or important stimuli [64]. Directed attention plays an essential role in an individual's health [65]. Findings show that increased exposure to natural landscapes enhances directed attention, which, in turn, can release stress and heal the mind and body [66]. Additionally, theories of psychological stress suggest that a favorable natural setting may even rehabilitate the nervous system. Emotional preference rating methods in research can be used to study psychological stress reduction [67]. Among current research, though, observation, questionnaires, interviews [68,69], and other survey methods are mainly concerned with the behavior and feelings of subjects, and there are fewer studies related to the use of questionnaires for research subject indicators [70,71].

Furthermore, landscape preference is also controversial and has been researched in terms of environmental psychology and landscape architecture. Scholars claim that applying "evolutionary theory" to explain visual landscape preferences is a beneficial human response that contributes to survival and welfare [72]. One study revealed that people's preference for particular environments tends to be associated with its restorative effects, since environmental preferences are based on the perceiver's emotional response to the environment [73]. Healing environments entail benefits to one's cognitive and physiological health. With this in mind, many experts have studied landscape preference and restorative effects and identified a profitable correlation between them [74,75]. Based on this, several studies found that selected natural landscape elements in green spaces may positively impact aesthetic preferences and psychological restoration [76]. In contrast, the artificial landscape elements of certain buildings and roads have negative aesthetic effects and inhibit psychological restoration [77], although not all artificial landscape elements have the same effect. Nevertheless, certain culturally or artistically associated artificial features (e.g., poetry walls and sculptures) lead to a greater preference for the landscape and greater restorative effects [78].

Despite being an essential part of urban green spaces and urban cultural heritage, CCGs receive limited attention regarding their restorative effects. A CCG serves as a retreat from the busy world, where people seek solace and relaxation through quiet darkness and meditation. However, current research on CCGs has focused on their historical characteristics [79], the purpose and art of their design [80], and their aesthetic values [19]. While there have been some studies on the relationship between environmental factors and restorative effects [52], comprehensive research is lacking. The objective of this study is to analyze public perceptions of the restorative effects of CCGs through quantitative methods, with MUPs as a comparative reference, to comprehensively explore the relationship between environmental factors and the quality of restorative effect outcomes. The goals of this study are as follows:

- To compare the visual aesthetic preferences and the restorative effects between CCGs and MUPs;
- To examine which elements of CCGs and MUPs affect respondents' restorative effects;
- To provide guidance for the design of CCGs and MUPs.

3. Materials and Methods

3.1. Research Design

Questionnaires, deep learning techniques, and statistical methods were employed in this study to investigate people's aesthetic preferences for and the participants' feelings of restoration of CCGs and MUPs. The analysis involved software including Anaconda, Pycharm 2023, and SPSS 26.0. Anaconda is a Python-based environment management tool for the creation and management of Python environments, which provides a large number of open-source scientific libraries for machine learning [81]. Pycharm is an integrated development environment (IDE) designed for Python development designers [82,83]. It can be used to analyze and complement code, helping to boost the code's quality and efficiency, and to deconstruct video landscape elements. SPSS is a commonly used statistical analysis software platform that provides advanced statistical analyses, machine learning algorithms, and data integration to examine spatial factor correlations. In the present

study, the questionnaire method was used to obtain the mean values of participants' aesthetic preferences and the environment's restorative effects after viewing the video. Based on the environment's restorative effect from the perspective of landscape design, questionnaires were designed according to four dimensions (emotional, physical, cognitive, and behavioral). The investigation deconstructed the landscape elements in the video by combining the quantitative approach of deep learning techniques and the qualitative approach of an expert scoring method. The research compared the quality of restorative effects of classical Chinese gardens with those of modern urban parks and used correlation coefficients to investigate the association between the restorative effect of various landscape elements and participants' preferences. On this foundation, stepwise multiple regression analysis was used to explore the drivers of these restorative effects and aesthetic preferences in different scenarios (Figure 1).

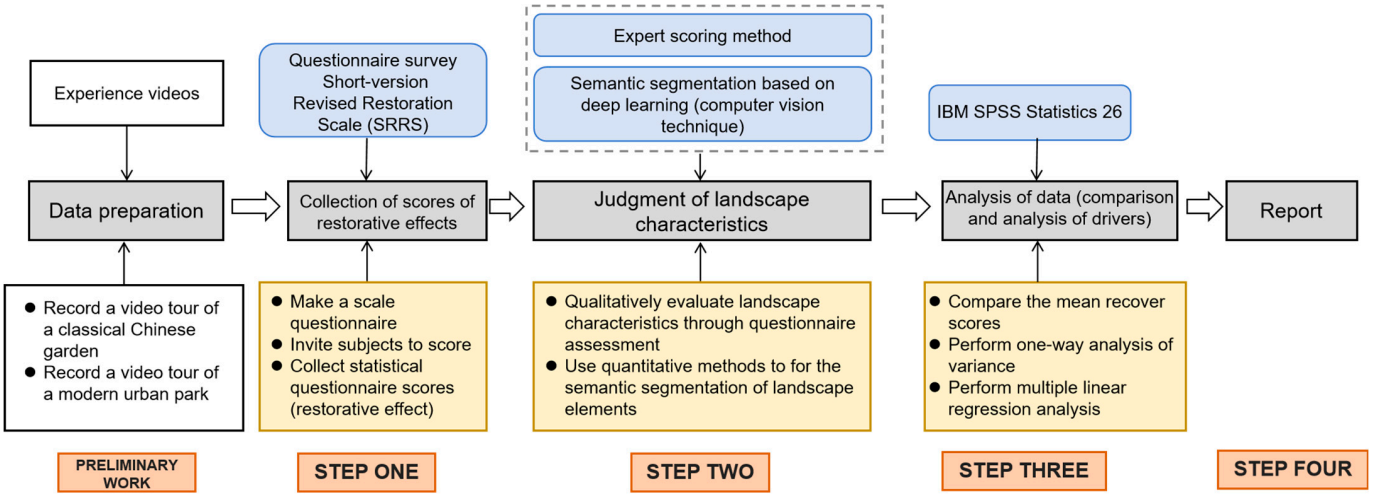

Figure 1. Flowchart of the method used in this research study.

3.2. Restorative Effect Quality Measures

3.2.1. Study Sites and Locations

The traditional gardens in Suzhou are a typical example of classical Chinese gardens [84]. The video data of CCGs and MUPs used in this study were obtained from Suzhou City, Jiangsu Province, China (Figure 2). According to the data provided by the Suzhou government (www.suzhou.gov.cn) (accessed on 12 November 2023), there are currently 12 Suzhou traditional gardens and 202 urban parks open to the public in Suzhou. Nine CCGs with a long history and high degree of visibility were selected for this study, and seven MUPs with equally high degree of visibility were selected for comparison. Large amounts of video data were recorded at these sites. The majority of these selected CCGs were built by the Chinese literati community or elite, for instance, bureaucrats, poets, and painters. As these elites were in the upper class, Confucian, Taoist, and Buddhist philosophies mainly influenced their thinking. This group of people wished to create beautiful landscapes that would provide a refuge from the stresses of real life for their jaded guests.

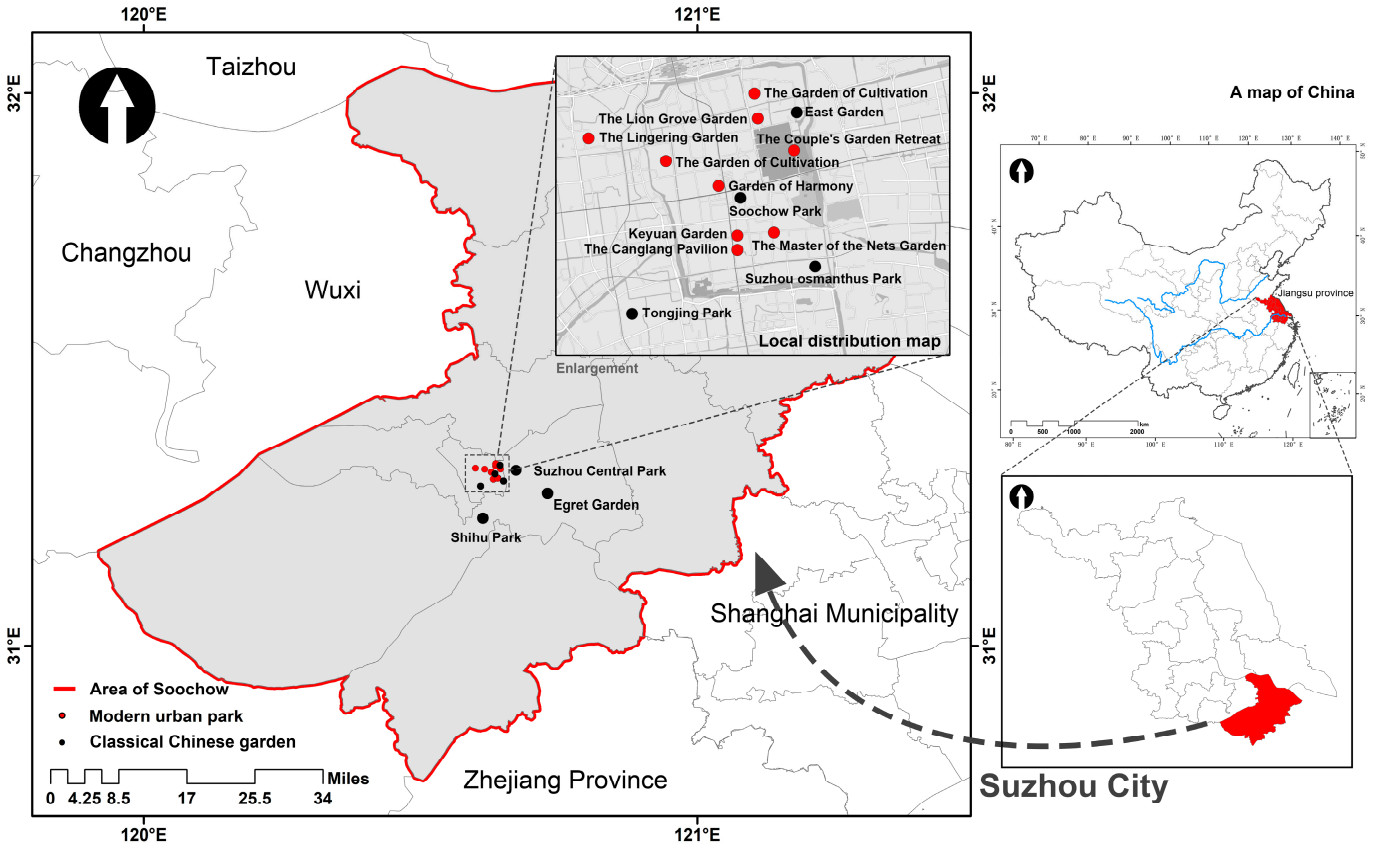

Figure 2. The sites of CCGs and MUPs used in this study.

3.2.2. Stimuli

Forms of media have evolved and diversified considerably. To date, human experimentation has become more consistent with these media. Full-color video has been widely used in the previous literature as a proxy for real landscapes [85,86]. Research has demonstrated that natural exposure to videos provides emotional healing for those unable to access the outdoors, comparing it to real outdoor experiences, with both being emotionally beneficial and restorative [87]. Research has also shown that the healing effect of landscape color can be verified by creating a digital roaming landscape and inviting subjects to complete a Likert scale [88]. One study analyzed the healing effect of the type of greenery on both sides of a road by producing a video of the road and inviting the public to watch it and fill in a Likert scale [89].

Sixteen sites (Table 1) were investigated for this study, and a large number of landscape videos were filmed. We randomly selected a total of eight videos from the videos representing the two landscape types (CCGs and MUPs) (Figure 3), respectively, as stimuli for visual quality assessment. The weather reflected in all the videos was remarkably similar, with bright clear skies. The selected videos basically conformed to the following characteristics: (1) each road had different environmental features and design elements; (2) these roads covered most of the shown area; (3) there were different types of roads, such as main roads, side roads, and recreational trails; (4) there were different kinds of enclosures; and (5) there were no grand views. In addition, the experiments mainly focused on the visual landscape elements; so, factors that may affect the sensory and restorative value of green spaces, such as sound, were not investigated in this study. In order to avoid affecting the experimental data, there were usually no sounds, people, or other factors in the main video scenes. The videos were edited to be used as the experimental material.

Table 1. Information on venue selection.

No	Camera Site	Type
1	The Cang-lang Pavilion *	Classical Chinese Garden
2	Humble Administrator's Garden *	Classical Chinese Garden
3	The Lingering Garden	Classical Chinese Garden
4	The Couple's Garden Retreat *	Classical Chinese Garden
5	The Lion Grove Garden	Classical Chinese Garden
6	The Garden of Cultivation	Classical Chinese Garden
7	Ke-yuan Garden	Classical Chinese Garden
8	Garden of Harmony	Classical Chinese Garden
9	The Master of the Nets Garden *	Classical Chinese Garden
10	East Garden *	Modern Urban Park
11	Suzhou Central Park *	Modern Urban Park
12	Soochow Park *	Modern Urban Park
13	Shihu Park	Modern Urban Park
14	Egret Garden	Modern Urban Park
15	Tongjing Park	Modern Urban Park
16	Suzhou osmanthus Park	Modern Urban Park

* Filmed locations in the video after filtering (two videos exist for one location).

Figure 3. Partial photographs from videos of an MUP and CCG.

3.2.3. Restorative Effects Scale

This work introduces a quantitative approach to measure the restorative effects of a CCG and MUP for comparison. To assess the degree of the perceived environmental restorative effect, a variety of self-report scales have been designed from different perspectives and for different needs, including the Restoration Component Scale (RCS) [90], the Perceived Restoration Characteristics Questionnaire (PRCQ) [38], and the Perceived Restoration Scale (PRS) [91]. From the point of view of the researchers, the structure of the questionnaire should not be too long, so that there is no time pressure and participants will not feel annoyed, which could result in the questionnaire losing its significance [92]. The present study, after careful consideration, chose to utilize the short version of the Revised Restoration Scale [93] to achieve its objectives. The scale (Table 2) consisted of eight items describing the numerical values of emotional, physical, cognitive, and behavioral dimensions considered as therapeutic qualities, and these dimensions have been related to psychological restoration resulting from UGSs [89,93,94]. For each video, participants rated each item on a nine-point scale. For the purpose of determining the restorative effects of the landscapes in the videos on the respondents, the mean of the four dimensions was used as the final restorative effect score for each video. Regarding the selection of respondents, undergraduate students were selected to participate in the survey. Despite studies claiming that students are not representative of the public [95], some studies have concluded that there are no significant research differences between students and the public in term of their landscape preferences for urban green spaces [96]. In addition, several studies have

suggested that students could be substituted for the public in landscape assessments of urban green spaces [73,89,97]. A total of 161 students were invited to participate in this experiment, of whom 156 provided a valid questionnaire, with a valid response rate of 96.9%. The study did not collect information on the socio-demographic characteristics of the respondents, as this was not the purpose. Finally, the study collected 156 questionnaires for each video, for a total of 1248 ($n = 1248$). This study was conducted under the approval of the Ethics Committee of Soochow University.

Table 2. Short-version Revised Restoration Scale (eight variables that assess the four aspects of factors (F1–F4)).

	(F1) When you are in the video scene, how would you describe your emotional response?		
V1	Grouchy (very much)	1___2___3___4___5___6___7___8___9	Good-natured (very much)
V2	Anxious (very much)	1___2___3___4___5___6___7___8___9	Relaxed (very much)
	(F2) When you are in the video scene, how would you describe your physiological response?		
V3		My breathing is becoming faster.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)
V4		My hands are sweating.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)
	(F3) When you are in the video scene, how would you describe your cognitive response?		
V5		I am interested in the presented scene.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)
V6		I feel attentive to the presented scene.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)
	(F4) When you are in the video scene, how would you describe your behavioral response?		
V7		I want to visit here more often.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)
V8		I want to stay here longer.	
	(not at all)	1___2___3___4___5___6___7___8___9	(very much so)

3.3. Measurements of Landscape Characteristics

3.3.1. Landscape Composition Analysis

A fundamental aim of research on therapeutic environments is to enhance their restorative effects, and scientific evidence in the design field should lend itself to being translated into design guidelines in a readily understandable way. This research deconstructed the landscape elements in videos using deep learning techniques from the field of computer vision. One key to computer vision is the semantic comprehension of visual scenes [98]. For the present research, we used the ADE20K dataset, which was highly annotated with various types of scenes, objects, and sometimes even portions of parts. In total, there were 25,000 photos of intricate real-world scenarios with a range of items in their organic spatial settings. Each image had 10.5 object classes and 19.5 instances on average. We built benchmarks for scene parsing and instance segmentation based on the ADE20K dataset [98,99]. Networks trained on the ADE20K dataset have been shown to segment a wide range of scenarios and objects [98].

This deep learning technique was applied in the study to extract information from the video images for computation, especially image semantic segmentation [100]. Image semantic segmentation is a critical technique for understanding visual scenes, assigning classification labels at each pixel point to identify different objects in an image instance accurately. The scale of the training dataset mainly determines the amount of object classes that can be recognized by the segmentation model [101]. The video material was disassembled frame by frame into images in the pre-study phase (Figure 4). To extract the visual features from each image, we used Deep Lab V3+ model, a particularly precise and intuitive neural network model [102], which was trained on the ADE-20K datasets [103]. The model (Figure 5) refined the results of the segmentation based on the ADE-20K datasets using the effective decoder module after encoding multi-scale context

data using atrous convolution. The dataset employed for the study was the publicly available ADE-20K dataset from MIT (Figure 6), published by the MIT CSAIL Computer Vision Group [104]. The dataset was released in 2016, and it can be used for scene perception, parsing, segmentation, multiple-object recognition, and semantic understanding [105]. It can accurately recognize and complete pixel-level classification for elements in 150 scenes from daily life. By involving semantic segmentation, including sky, roads, rivers, and plants, and utilizing this dataset, the ADE20K model obtained a more comprehensive picture of the visual environment elements and environmental features of the study area compared to the Cityscape model.

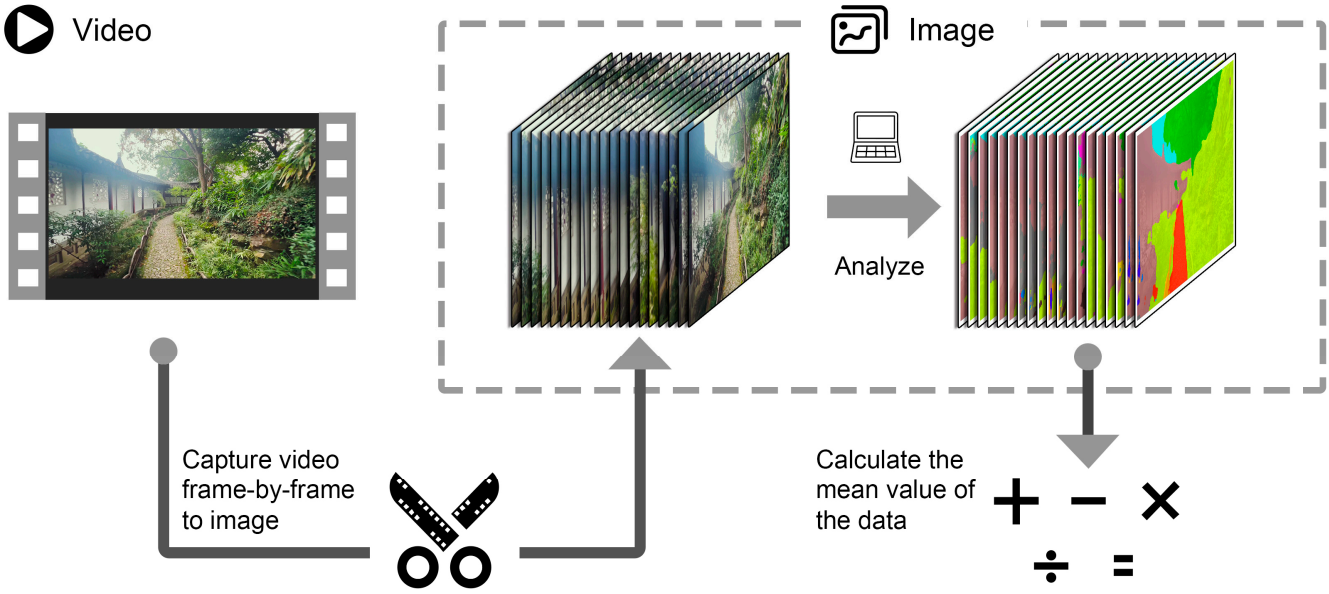

Figure 4. Framework for analyzing the video data.

3.3.2. Judgment of Landscape Characteristics

This study attempted to model landscape characteristics and their restorative effects. Yet, some qualitative landscape features (e.g., cultural and artistic architecture or the scale of human perception) in both CCGs and MUPs cannot currently be analyzed using deep learning techniques. For the purpose of reducing the deviation of the scores of each landscape characteristic, this study adopted the expert scoring method based on computer vision analysis. We invited five experts in the field of landscape architecture (including designers and research scholars working in relevant professions) to watch the video and evaluate the landscape features in the video according to the Landscape Characteristics Measurement Scale (Table 3). Their responses were recorded as scores from 0 to 3, and the average of the evaluations was calculated as the final score of each characteristic.

3.4. Statistical Methods

The respondents' answers were statistically analyzed using the statistical software SPSS 26, and the significance level was set at $p < 0.05$. The average of all respondents' assessments of each item listed in the restoration scale was calculated, an analysis of variance (ANOVA) was used to compare the restorative effects of the CCGs and the MUPs, and then correlation coefficients were utilized to explore the relationships between different landscape elements, participants' feelings of restoration, and participants' preferences. The participants' feelings of restoration and the drivers of their aesthetic preferences for all of the scenes were analyzed using stepwise multiple linear regression.

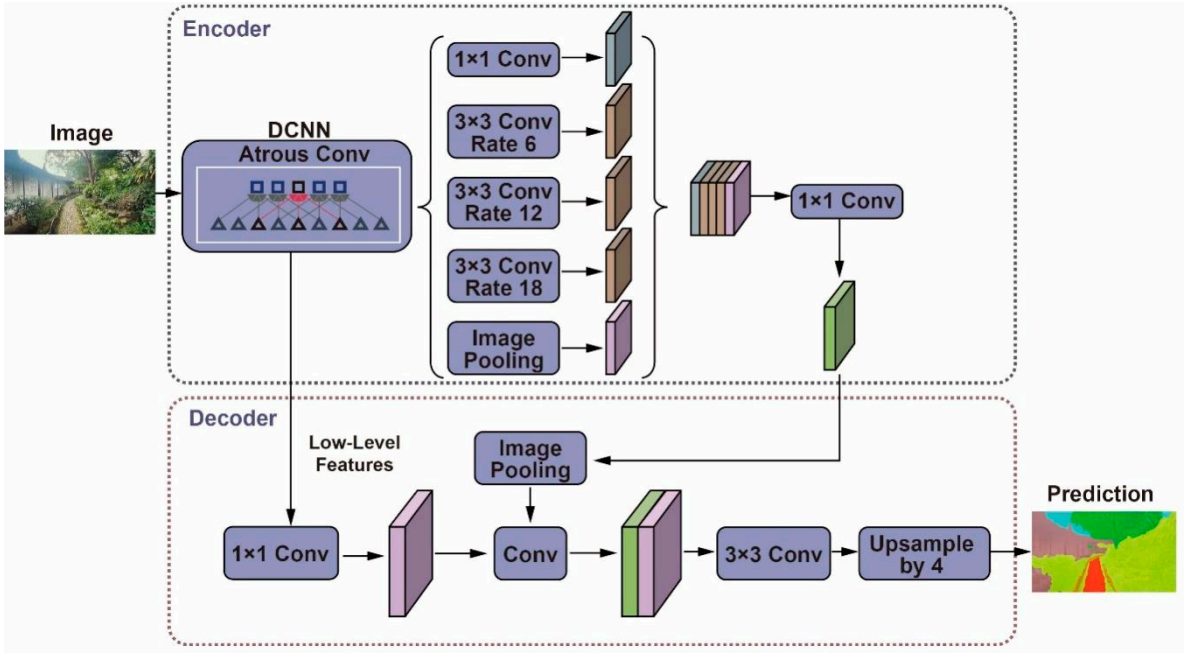

Figure 5. DeepLabV3+ configuration. The encoder module applies atrous convolution at several scales to encode multi-scale contextual information for a given input garden view image. In contrast, the decoder module refines the segmentation findings along object boundaries. Eventually, a garden view image that has been identified pixel-by-pixel and assigned semantic categories is generated.

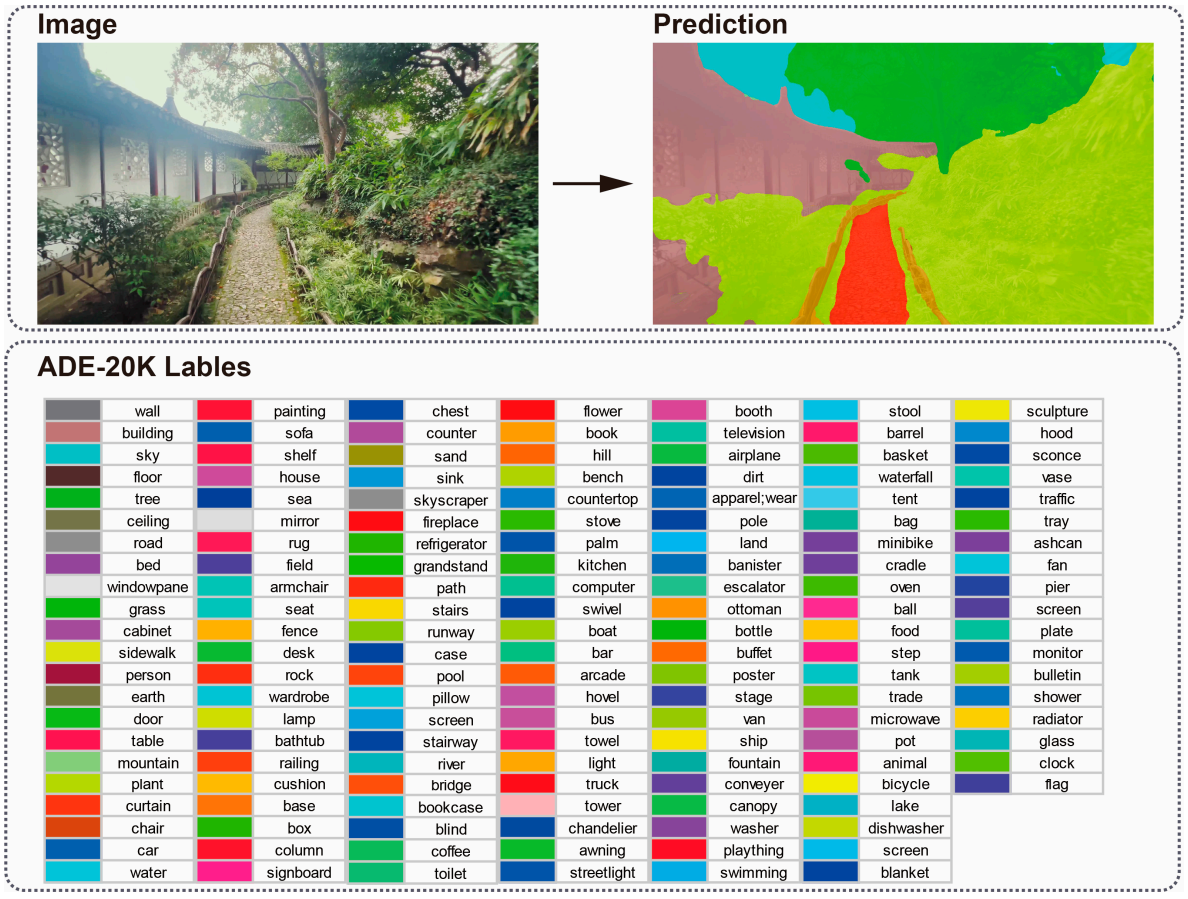

Figure 6. Visualization result of the segmentation using the proposed method.

Table 3. Scale for measuring the landscape characteristics.

Landscape Characteristics	Score			
	0	1	2	3
Number of landscape elements	Single element	Relatively simple elements	Relatively rich landscape elements	Rich landscape elements
Percentage of rockeries in the video	No rockeries	<35%	36%–70%	71%–100%
Mobility of water	No water	Static	Flowing	Fast-flowing (waterfall)
Plant age		Budding	Vigorous and lush	Ancient trunks
The coverage of cultural architecture	No buildings	<35%	36%–70%	71%–100%
Visual scale		Closed space	Semi-open space	Open space
Number of colors	One	Two	Three	Four
Percentage of land covered by vegetation	No vegetation	<35%	36%–70%	71%–100%
Type of land vegetation	No vegetation	Grasses or (and) shrubs	Only trees or trees with grass	Mixed vegetation
The naturalness of land vegetation	No vegetation	Orderly configuration	Semi-natural configuration	Natural configuration
Water quality (by visual observation)	No water	Bad	Moderate	Clear
Type of bank	Hard wall as bank	Somewhat hard bank	Semi-natural bank	Natural bank
Terrain		Almost flat	Slightly undulating	Undulating
Path tortuosity		Almost straight	Slightly zigzagging	Zigzagging
Accessibility of water	No water	Difficult to access	Moderately easy to access	Easy to access

4. Results

4.1. Reliability

In this study, the respective interclass reliabilities of the restorative effect scores were calculated for the two landscape types: CCGs and MUPs. The Cronbach's alpha was 0.924 for the CCGs and 0.925 for the MUPs. The Cronbach's alpha is measure of the reliability of a scale or test; it has been pointed out that a Cronbach's alpha of >0.7 usually indicates that a questionnaire has a good level of reliability, and when the Cronbach's alpha is >0.9, it usually indicates that a questionnaire has an excellent level of internal consistency and reliability. Thus, the results suggest that both have an excellent level of internal reliability concerning the restorative effects of the landscapes.

4.2. Comparison of the Restorative Effects between the CCGs and MUPs

The research revealed the restorative effects of both landscape types, which had four components (Figure 7). According to the restorative effect scores, the CCGs (mean score $= 6.71$) were slightly better than the MUPs (mean score $= 6.61$); the one-way ANOVA showed that there was no significant difference between them ($p = 0.159$). The standard deviation of the restorative effect scores for the MUPs was, however, higher than the standard deviation of the scores for the CCGs. A higher standard deviation implies a greater dispersion of numerical scores and more erratic restorative effects [106]. Therefore, the restoration potential of the modern parks was weaker than that of the CCGs, indicating that the quality of urban parks is more variable than that of CCGs. Among the four dimensions of therapeutic quality, there was a significant difference in only the behavioral dimension ($p = 0.017$), which implies that visually, the CCGs calmed the participants and elicited better behavioral

responses than the MUPs. In contrast, differences in restorative effects were non-significant in the other dimensions of landscape type.

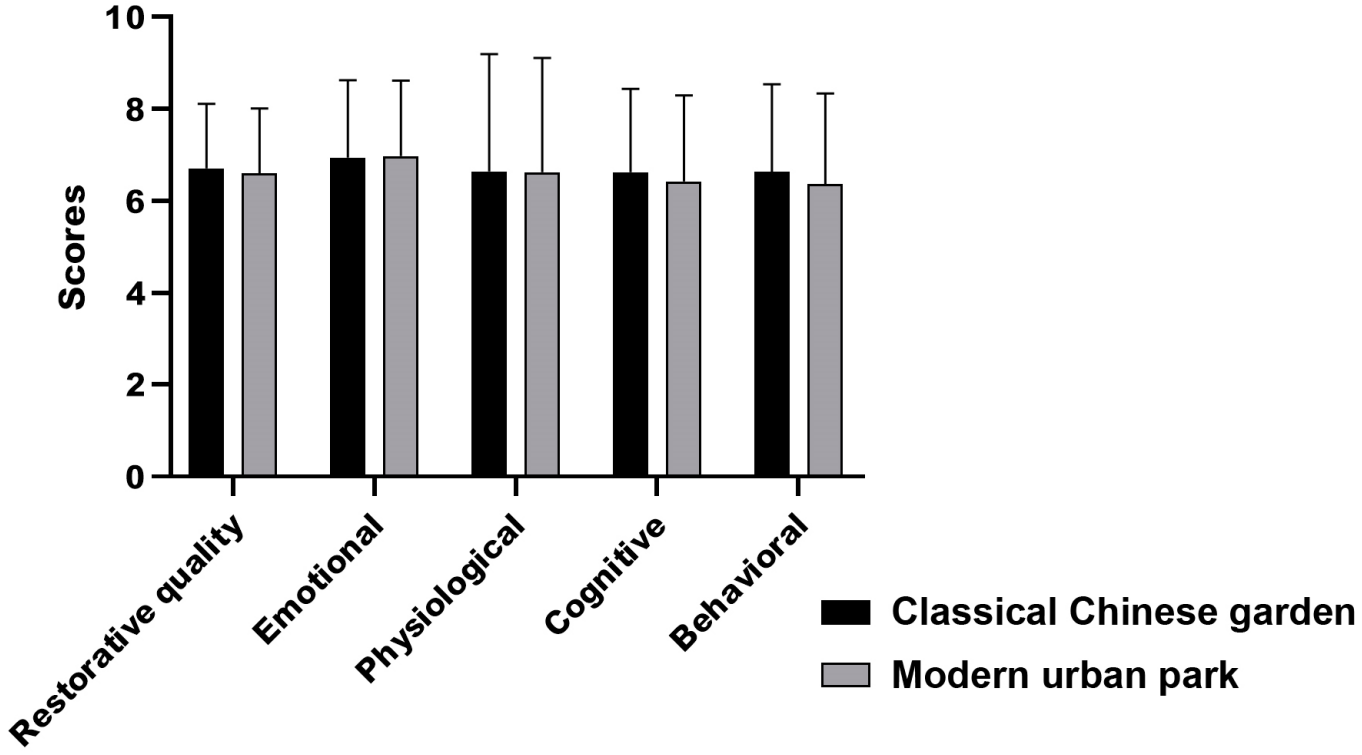

Figure 7. The mean restorative effect scores and four component scores (±standard error) among respondents for both the CCGs and MUPs.

4.3. Correlations between Restorative Effects and Landscape Characteristics

The correlation analyses indicated that the quality of the restoration effects of the CCGs combined with the landscape elements from the videos parsed using the computer vision techniques declined with more 'bench' elements (Figure 8). Scores in the emotional dimension increased with more elements of 'house' buildings and 'banister' structures, and scores in the cognitive dimension decreased with more elements of 'house' buildings and 'banister' structures. This may result from the fact that 'railings' and 'houses' provide a sense of emotional security [107] for people in traditional gardens; however, buildings and railing structures provide a sense of territoriality and thus subconsciously keep people at arm's length. In the MUPs, the quality of the restorative effect decreased with more 'wall' elements, 'banister' elements, and 'columns' (Figure 9). The emotional scores decreased with the addition of 'bench' elements, and the physiological dimension scores showed a significant negative correlation with the presence of 'house' architectural elements and a significant positive correlation with 'column' elements. The cognitive dimension scores decreased with the addition of 'floor coverings' and 'bench' elements, while the behavioral dimensions showed a significant positive correlation with 'plant' elements.

In addition, in the quality of the restorative effect of CCGs, according to the data obtained from the expert scoring method (Figure 10), scores in the emotion dimension decrease with increasing levels of landscape water mobility, increased accessibility to the water landscape, and more natural banks. In contrast, however, scores of restorative effects in the perception dimension increase gradually with more natural banks, increased water mobility, and increased accessibility to water, showing a positive significant correlation.

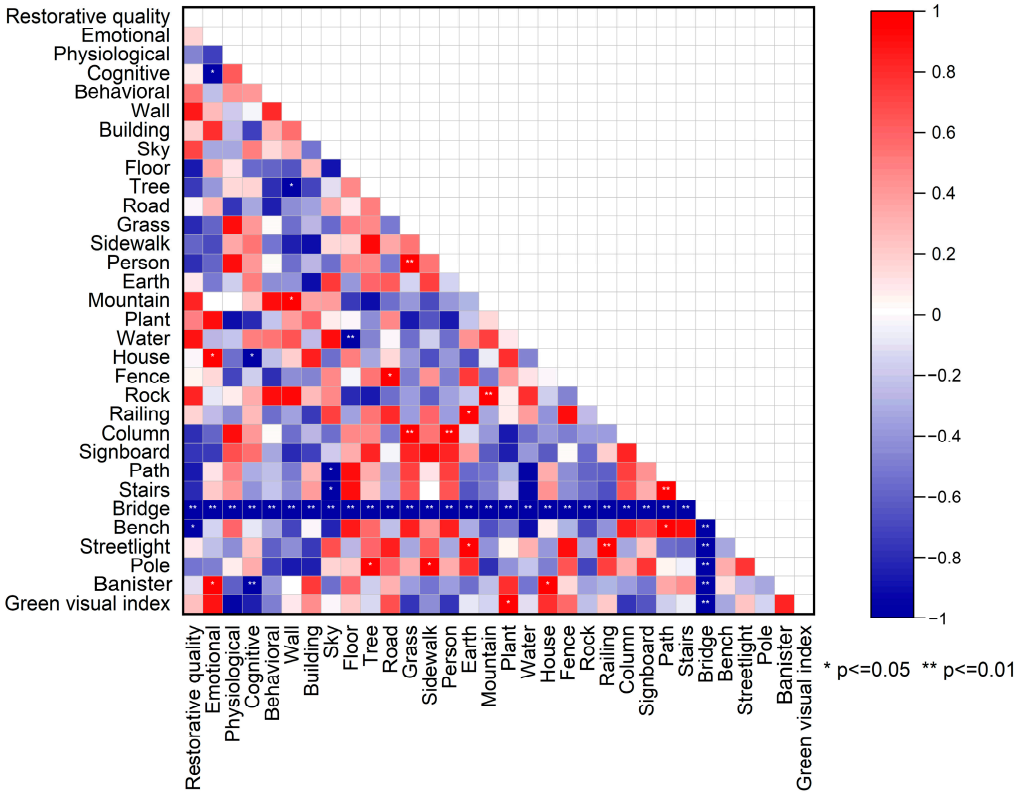

Figure 8. Connections between a CCG's healing qualities and the features of its surrounding environment (computer vision).

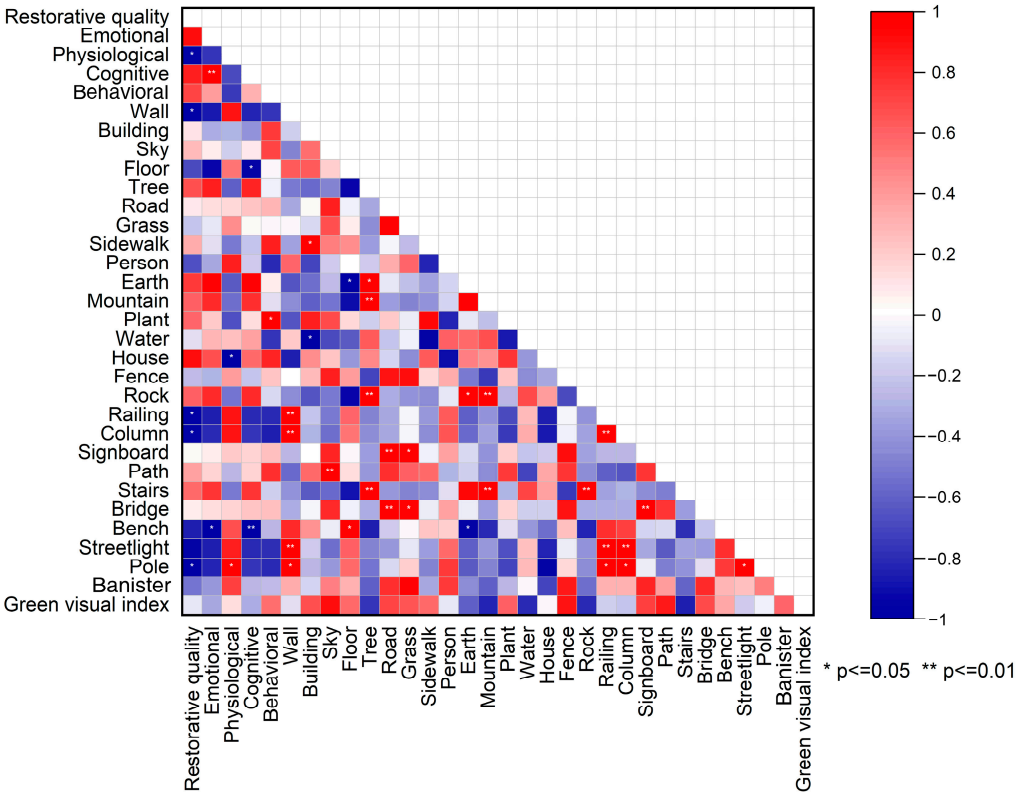

Figure 9. Connections between an MUP's healing qualities and the features of its surrounding environment (computer vision).

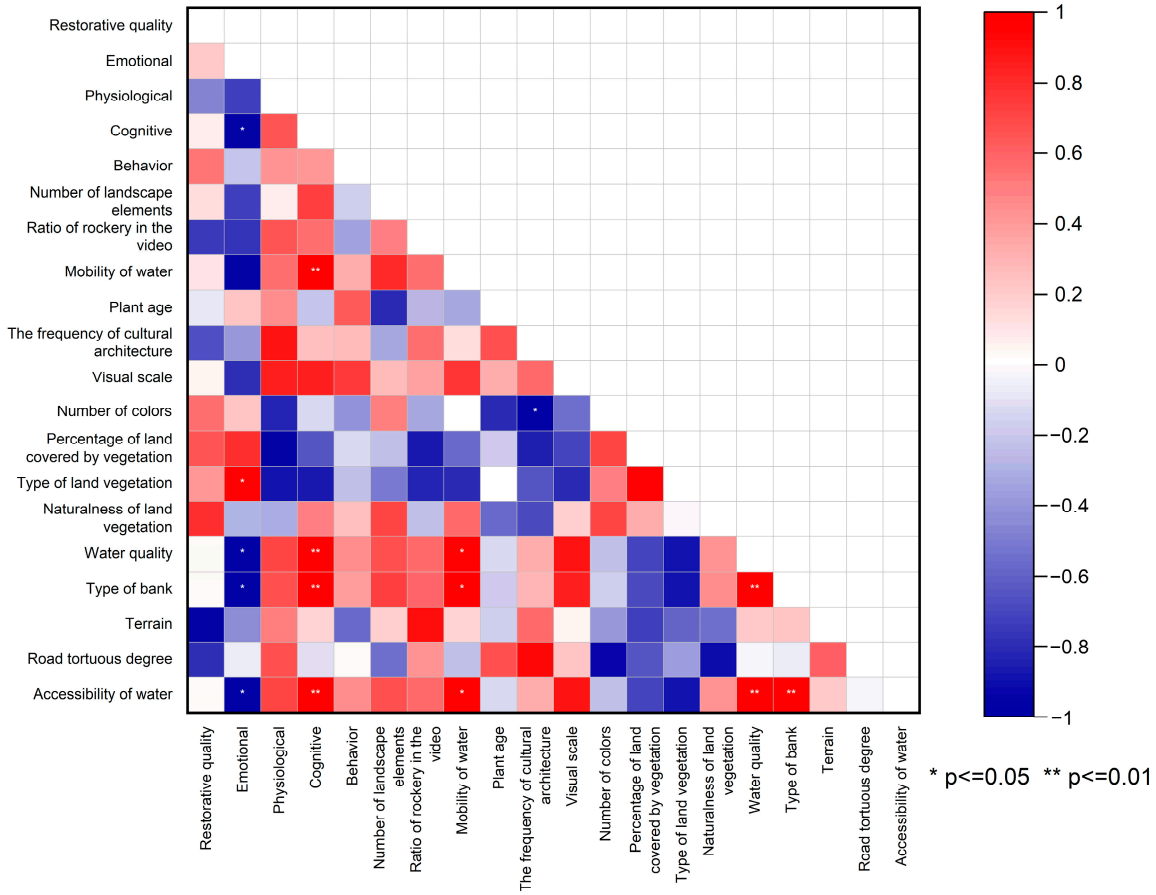

Figure 10. Connections between a CCG's therapeutic quality and the features of the landscape (expert scoring method).

4.4. Significant Predictors of the Restorative Quality of CCGs and MUPs

Correlation analyses can only individually account for the relationship between the restorative effect quality scores and the landscape characteristics due to the complex interactions between landscape characteristics. Previous research suggests that multiple regression analyses can address this issue [52,73,108]. Regarding the landscape features and elements as independent values while considering the average restorative effect score and the four dimension scores as dependent values, a stepwise multiple linear regression analysis was employed to establish the quantitative associations between the participants' feelings of restoration and the landscape features of the CCGs and MUPs. The results revealed a linear correlation between the landscape characteristics and restorative effect quality ($F = 28.886$, $p = 0.033$) in the CCGs (Table 4) and ($F = 65.270$, $p = 0.015$) in the MUPs (Table 5). The existence of model tolerances ($Tolerance\ values < 0.2$) or variance inflation factors ($VIF > 10$) suggests the presence of a potential multicollinearity problem, which is not present in the current model ($lowest\ tolerance\ value = 0.608$; highest VIF = 1.645). Thus, the results are considered acceptable. The model results indicate that, in the CCGs, landscape elements such as benches have a significant effect on the participants' feelings of restoration, riparian area types have a significant impact on their mood, and elements such as railings have a substantial effect on participants in the cognitive dimension. In the MUPs, 'columnar' elements have a significant effect on the participants' feelings of restoration, while 'bench elements' have a substantial effect on them in terms of emotional and cognitive dimensions, 'house' architecture has a significant effect on them in terms of the physiological dimension, and 'plants' have a substantial impact on them in terms of the behavioral dimension.

Table 4. Significant variables influencing the therapeutic quality of CCGs that were discovered using stepwise multiple linear regression analysis.

Dependent	Independent	Unstandardized	Coefficient	Standardized	t	Sig.	Collinearity	Diagnosis
		B	SE	Beta			Tolerance	VIF
Restorative quality (R^2 = 0.935; adjusted R^2 = 0.903)	(constant)	6.755	0.007		995.201	0.000		
	Bench	−31.154	5.797	−0.967	−5.375	0.033	1	1
Emotional (R^2 = 0.955; adjusted R^2 = 0.932)	(constant)	7.178	0.002		3779.767	0.000		
	Revetment type	−0.119	0.001	−0.822	−174.76	0.004	0.651	1.537
Cognitive (R^2 = 0.998; adjusted R^2 = 0.997)	(constant)	6.725	0.001		10,826.227	0.000		
	banister	−230.425	0.459	−1.027	−502.469	0.001	0.706	1.416

Table 5. Significant variables influencing MUPs' restorative quality that were discovered using stepwise multiple linear regression analysis.

Dependent	Independent	Unstandardized	Coefficient	Standardized	t	Sig.	Collinearity	Diagnosis
		B	SE	Beta			Tolerance	VIF
Restorative quality (R^2 = 0.970; adjusted R^2 = 0.955)	(constant)	6.651	0.001		8822.056	0.000		
	pole	−148.475	0.801	−0.847	−185.415	0.003	0.608	1.645
Emotional (R^2 = 0.978; adjusted R^2 = 0.967)	(constant)	7.092	0.002		2958.415	0.000		
	bench	−308.83	3.445	−0.961	−89.65	0.007	0.967	1.034
Physiological (R^2 = 0.974; adjusted R^2 = 0.960)	(constant)	3.515	0		16,143.803	0.000		
	house	−19.198	0.026	−0.895	−748.48	0.001	0.757	1.321
Cognitive (R^2 = 0.999; adjusted R^2 = 0.998)	(constant)	6.632	0		23,828.49	0.000		
	bench	−340.232	0.193	−1.025	−1760.734	0.000	0.643	1.556
Behavioral (R^2 = 0.966; adjusted R^2 = 0.949)	(constant)	6.277	0.021		302.024	0.000		
	plant	0.81	0.108	0.983	7.506	0.017	1	1

Moreover, a linear regression using the sum of the restorative effect quality of the CCGs and MUPs as a dependency value (Table 6) reveals that a more significant number of landscape elements contributes to the mental restoration of the users. An increase in plant cover to reduce the proportion of 'sky' in the video had a significant effect on the participants in terms of emotional aspects such as spirituality. At the same time, improvements in 'floor' paving and 'banister' elements contributed to the cognitive dimensions of the healing effect.

Table 6. Significant determinants of the restorative effect quality of both CCGs and MUPs were identified using stepwise multiple linear regression analysis.

Dependent	Independent	Unstandardized	Coefficient	Standardized	t	Sig.	Collinearity	Diagnosis
		B	SE	Beta			Tolerance	VIF
Restorative quality (R^2 = 0.937; adjusted R^2 = 0.911)	(constant)	6.532	0.018		366.296	0.000		
	column	−3.427	0.471	−0.829	−7.274	0.001	0.978	1.022
	Number of landscape elements	0.063	0.018	0.392	3.443	0.018	0.978	1.022

Table 6. *Cont.*

Dependent	Independent	Unstandardized	Coefficient	Standardized	t	Sig.	Collinearity	Diagnosis
		B	SE	Beta			Tolerance	VIF
Emotional (R^2 = 0.828; adjusted R^2 = 0.759)	(constant)	6.162	0.172		35.86	0.000		
	Percentage of land covered by vegetation	0.433	0.089	0.995	4.847	0.005	0.816	1.226
	sky	−1.975	0.712	−0.57	−2.774	0.039	0.816	1.226
Cognitive (R^2= 0.894; adjusted R^2 = 0.852)	(constant)	6.696	0.03		219.615	0.000		
	floor	−2.959	0.533	−0.807	−5.551	0.003	0.999	1.001
	banisters	−165.185	51.8	−0.464	−3.189	0.024	0.999	1.001

5. Discussion

5.1. Comparison of the Healing and Restorative Effects of CCGs and MUPs

It is well established that natural environments typically offer superior restorative effects compared to built environments (e.g., urban landscapes) [109–111]. However, research has revealed that in terms of restoration consistency, CCGs demonstrate more consistent restoration effects compared to MUPs. Judging from the variability in the restorative effects of the MUPs, the greater variability in restorative effects found in the MUPs, as indicated by higher standard deviations in the ratings, may stem from the inclusion of elements not harmoniously integrated within the landscape, such as benches and pillars that are not carefully designed, thus disrupting visual and psychological continuity. This study uniquely contributes to the literature by isolating specific sensory and cultural dimensions within classical Chinese gardens (CCGs) that amplify their restorative potential. This research introduces a new conceptual framework that integrates traditional Chinese aesthetic principles with modern landscape design practices, providing actionable insights into how CCGs can be adapted to contemporary urban spaces to enhance public well-being. Unlike prior studies, our research emphasizes the integration of traditional Chinese philosophical and aesthetic principles into modern urban green spaces, providing a new framework for enhancing urban resilience through culturally informed landscape design. In fact, MUPs were initially established by planners to improve the production and living environment of citizens, aiming to mend the rift between cities and nature against the backdrop of deteriorating urban environments. However, while MUPs have successfully expanded the quantity of urban green spaces in China, their development has not yet led to a transformative shift towards the integration of restorative design principles and urban planning. This lack of integration has limited the potential for these spaces to fully enhance the well-being of city residents by harmonizing with local cultural and ecological contexts. That is, it has not leveraged the wisdom of Chinese garden design to foster multidimensional integration between parks and local cities. CCGs are slightly better than MUPs in relieving respondents' mental stress. Therefore, in the design of urban green spaces in China, landscape designers should not just use the natural or green environment of modern city parks to create green spaces, but they can learn from the landscaping techniques of CCGs and add a unique Chinese landscape environment or humanistic architectural elements to enhance their restorative effects. In addition to this, we highlight that the results of this study were obtained using videos as the stimulus. While some studies have shown the healing effects of exposure to nature in videos to be broadly consistent with real experiences outdoors [87], CCGs have a unique organoleptic profile. This is probably due to the fact that China has attached significance to the experience of the human senses since ancient times, and the construction of classical Chinese gardens focuses on both the senses of smell and hearing, along with other organoleptic qualities. As an example, The Listen-to-the-Rain Pavilion is a small room with windows in the Humble Administrator's Garden, which is used as a place to listen to and watch the rain (Figure 11a), and the sound of the rain on the plantain relaxes people. The Osmanthus Fragrance Pavilion is a place of enjoyment in the Lingering Garden,

where people enjoy smelling the fragrance of osmanthus flowers (Figure 11b), meditating, and becoming enlightened. Thus, classical Chinese gardens might have restorative effects on participants through multiple senses, and purely visual sensations might not comprehensively heal or restore participants. In the landscape design process, designers can also take this into full consideration and incorporate multi-sensory experience design based on visual landscape design to enhance the restorative effects of public visits to Chinese green spaces.

(**a**) (**b**)

Figure 11. Restorative places with different sensory experiences in classical Chinese gardens (author photography): (**a**) listening to the sound of rainwater falling on the plantain at the Listen-to-the-Rain Pavilion; (**b**) smelling the fragrance of osmanthus at the Osmanthus Fragrance Pavilion.

5.2. Healing Effects of CCGs

The application of computer vision and semantic segmentation in this study provided unprecedented detail in analyzing how water-related landscape features—such as mobility, quality, and accessibility—interact with cultural symbolism to enhance psychological restoration. These techniques enabled a more precise measurement of landscape elements, revealing that subtle variations in water movement and quality can significantly alter the psychological impact of gardens. This level of detail offers urban designers a powerful tool to optimize green spaces for mental health benefits, making this research not just an academic exercise but a practical guide for future landscape design. By combining advanced computer vision techniques with expert scoring, we provide a nuanced analysis of how these elements function not just as aesthetic components but as integral parts of a holistic healing environment. Our findings suggest that the incorporation of these water

features into modern urban landscapes could significantly improve their restorative quality, bridging the gap between traditional design and contemporary urban needs. Water-related poems are often found in Chinese poetry, and the ancient Chinese elite would resort to water features to calm their emotions or for artistic inspiration. People are generally more emotionally receptive to gentle rivers and water-safe landscapes. However, on the cognitive side, Chinese poets are attracted to fast-flowing waterfalls and treacherous rivers, which tend to inspire their art. This would also explain the discrepancy between the restorative effect scores and the landscape characteristics produced in the two dimensions.

Building on previous findings, this study advances our understanding by demonstrating how the placement and design of benches in CCGs not only affect their restorative effects but also interact with the gardens' cultural symbolism and the participants' sensory experience. This research introduces the concept of 'cultural coherence' in landscape elements, in which the physical design is deeply intertwined with the garden's philosophical and symbolic meanings, thereby enhancing the overall healing experience. Comfortable furniture was often considered to be crucial in urban areas and was installed in cities to allow pedestrians to rest [107]. As a product of modern society, in traditional gardens, this type of furniture (Figure 12a) affects the restoration of traditional gardens. In ancient times, while intricately designed stools were present in gardens, such as continuous benches along verandas or natural elements like stones and stumps, pavilions were more commonly used as resting places (Figure 12b). These structures not only served as seating areas but also played a significant role in the visual and aesthetic composition of a garden. In ancient China, this kind of architecture was called a "spotlight landscape" [112]. In addition, this "point-of-view" technique often involves open-scale architecture that embraces nature, which can make people feel relaxed and inspire a desire to enter the garden and explore. Research indicates that in buildings that are connected to and embrace nature, people can more easily access nature (such as the sky and plants), thereby facilitating relaxation [113]. While the benches shown in Figure 12a may lack the intricate design and varied contours traditionally seen in CCG elements, it is important to recognize that many benches in CCGs are thoughtfully designed with high visual aesthetics, enhancing the harmony and restorative qualities of the garden. These benches, along with other seating elements, are strategically placed to complement the garden's overall design, contributing positively to both the aesthetic and restorative effects of the space.

(**a**) (**b**)

Figure 12. Sitting space in a traditional Chinese garden (author photography): (**a**) a resting place in "The Garden of Pleasure" featuring a bench; (**b**) a resting place in "Keyuan Garden" featuring a pavilion.

5.3. Healing Effects of MUPs

This study critically reevaluates the design practices commonly employed in modern urban parks (MUPs), particularly the use of benches and columns, and demonstrates how these elements can sometimes diminish the intended restorative effects. The analysis reveals that while these features are often implemented for functional purposes, their design and placement may not align with the principles of restorative landscape design, potentially leading to visual and psychological dissonance. By comparing these findings with the culturally integrated design of CCGs, the authors advocate a more thoughtful approach to MUP design—one that harmonizes functional needs with restorative goals. By comparing these findings with the culturally rich design of CCGs, this research proposes a shift towards incorporating culturally resonant and nature-integrated design principles into MUPs, which could significantly enhance their healing effects. Although sitting on benches relieves people from stress and fatigue [114], the uniformity of seats does not relieve visual fatigue for tourists who are visiting the site. Columns are often used as load-bearing architectural structures; however, they are also used to create a sense of space [115]. However, the random arrangement of columns can have a visual impact and create a feeling of vertigo. The color of the columns can also have a restorative effect on people. For example, while some columns are red to echo the splendor of the setting, this striking color also symbolizes danger and can equally create tension [116]; in addition, some fitness equipment in parks with purple columns tends to invoke depression [117]. In terms of housing construction, studies have, in fact, proven that people prefer to be exposed to natural environments as opposed to high-rise housing structures [118]. Plants, as the most critical landscape elements in green spaces, have a positive and active impact on the restorative effect of urban parks. As a matter of fact, it has been established that natural landscapes have a better ability to provide restoration than artificial landscapes [107]. Having reasonable green configurations and a high degree of green visibility can effectively relieve the tension and visual fatigue experienced by modern residents in cities [107]. In fact, from the point of view of color psychology, natural green light, with a medium wavelength [119], can visually calm people [120], inducing positive emotions; so, many environmental designers also choose green to express the emotion of life [121].

5.4. The Combined Healing Effects of CCGs and MUPs

The findings of this study indicate that urban green space designers could adopt a hybrid model, seamlessly integrating the visually appealing and culturally distinctive elements of CCGs, such as water features, traditional architecture, and vegetation, with the spatial accessibility and functionality of MUPs. This model aims to enhance emotional and cognitive restoration by incorporating specific elements already proven effective in CCGs, such as water flow and cultural landmarks. However, the application of this model requires careful consideration of the contextual environment, as the integration of CCG elements should complement, rather than overshadow, the functional layout of MUPs. The results strongly support a hybrid model for urban green space design. By combining these diverse elements, the model provides a balanced framework that meets the aesthetic, cultural, and health needs of urban populations. The research indicates that the integration of these elements in landscapes can offer a more enriching experience in terms of restorative effects. However, emphasis must be placed on maintaining the unique identity and accessibility of urban parks during implementation. Therefore, this research offers a transformative vision for urban landscape design, one that could be adapted globally to create more effective restorative environments. This model emphasizes the integration of multisensory experiences, cultural symbolism, and ecological sustainability to create urban environments that not only meet modern aesthetic and recreational needs but also enhance emotional and physiological well-being. By drawing on the rich heritage of CCGs, our framework offers a new direction for urban park design that can be adapted to diverse cultural and ecological contexts. The proposed model suggests incorporating CCG elements proven to enhance their restorative effects, such as winding paths and multisensory experiences,

into MUPs to create urban spaces that are rich in cultural heritage and conducive to public health [122]. Despite effectively enhancing the accessibility of urban green spaces in China, the development of MUPs has not yet achieved a complete integration of restorative design principles with urban planning. This limitation hinders these spaces from fully optimizing the well-being of urban residents through harmonious integration with local culture and ecological context. Although some artificial landscape elements in MUPs, such as benches and columns, may be perceived as visual distractions due to their over-emphasis on functionality at the expense of design form or aesthetic appeal [107], learning from the practices of CCGs and carefully incorporating elements with cultural symbolism can transform these features into valuable resources for promoting psychological restoration. For instance, within CCGs, historical architecture, pavilions, and cultural sculptures are not only aesthetically pleasing but also imbued with deep cultural symbolism, stimulating a sense of belonging and mental healing. Additionally, CCGs skillfully employ landscape elements such as winding paths to create serene and captivating environments, fostering exploration and contemplation [123]. This research indicates that, compared to MUPs, CCGs are slightly better in alleviating psychological stress, suggesting that integrating these traditional design elements into MUPs could significantly enhance their restorative effects.

5.5. Application for Landscape Design

Based on the previous discussion, water bodies have an essential healing role in healthy landscape design, which is why water landscape design should be considered in modern landscape design. Instead of just regular ornamental water features, architects should consider touchable, sensory, and participatory landscapes to stimulate engagement and play. The level of auditory landscape diversity around water features can also be enhanced, creating a rich soundscape. A multi-sensory approach to water creation that brings together the senses of touch, sight, and sound evokes a more positive attitude toward life. Moreover, the principles derived from this study are applicable to diverse cultural contexts, rendering them highly valuable in global urban design. When designing therapeutic landscapes, it is crucial to integrate elements that resonate with local culture, ensuring these spaces not only offer aesthetic and recreational value but also establish deep emotional connections with the community. Designers should actively seek materials, forms, and spatial arrangements that hold cultural significance for local residents. These elements can be drawn from traditional customs, historical references, or local art forms, and can be incorporated into paving patterns, bench designs, or the layout of specific landscape elements.

This study concluded that although some well-designed MUPs do not suffer from this problem, artificial modern landscape elements such as benches, walls, and columns in China currently negatively affect the healing element of landscapes. This negative impact may be due to poor design, the random arrangement and placement of these elements, or the lack of consideration of their color. Compared to buildings, rockeries, and water bodies, these elements are often regarded as less significant components of the landscape, resulting in limited research on their visual impact. However, studies have found that these landscape factors themselves play a crucial role in people's visual perception and should be considered an important aspect of visual research in CCGs and MUPs. An appropriate reduction in urban furniture or components that detract from visual aesthetics or attention to these landscape elements in the design of MUPs could be more effective in enhancing the healing effects of urban parks. The landscape design of modern urban parks should appropriate the landscape techniques of classical Chinese gardens, for instance, viewing benches as a part of the landscape in the park, decorating the walls with plants or ornamental perforated windows, designing a gallery, and using columns to cleverly design framed views to achieve a natural and harmonious configuration. By understanding and respecting the cultural significance of landscape features, designers can create environments that resonate with local communities while promoting health. This approach ensures that even the most subtle elements, such as the choice of paving materials, the shape of benches,

or the types of plants used, contribute to a sense of cultural integration and emotional support within the space. These methods, in adapting to diverse cultural backgrounds, can foster urban green spaces that are both aesthetically pleasing and rich in cultural meaning, offering solace to the soul.

Additionally, architects should be aware of the fact that certain path landscape elements (paving materials, textures, and railings) also have a significant impact on the healing effect of landscapes. For instance, traditional gardens feature paths that connect private and public spaces, creating a sense of distance from home and work, allowing people to forget some of the pressures of life. On the other hand, paths with specific curves in the landscape can enrich the spatial layering of the landscape, foster public sentiment, and stimulate people's interest in the landscape.

5.6. Limitations and Future Studies

This study has a number of shortcomings, and some limitations may affect the validity of the research or the generalizability of the findings.

1. The selection of the experimental sample for this study included eight videos, four videos for each landscape type. Compared to other studies, a smaller sample size of data like this may create bias, whereas a larger sample will reduce bias;
2. Although the practice of using students as respondents has been verified by other studies, a landscape preference study has demonstrated that the variability in respondents has a considerable impact on aesthetic preference [124–126]; so, the differences in population groups in landscape evaluations cannot be ignored. However, the demographic component of the participants in our study was not determined, as the study did not record socio-demographic data, and we could not explore the relevance of the survey results based on the participants' age, place of origin, education level, residence, etc. This may weaken the findings of the study and reduce its generalizability. Therefore, future research should encompass a broader audience and explore the relationship between demographic variables and the quality and design strength of restorative effects;
3. Using video alone is not comprehensive, as when we enter natural environments, we may hear, smell, and touch things that will affect our emotions. Classical Chinese gardens pay more attention to the experiential feelings of various senses; in addition, MUPs may also have such characteristics, and the two could be comparatively studied. Therefore, in future experiments, researchers should add more sensory experiences. With the development of 5D immersive holographic projection technology, this vision may gradually become possible;
4. As this study relied on the visual characteristics of landscape elements for analysis, it excluded various dynamic factors, such as visitors (their demographic composition and the parks' visitor capacity), the diversity of visitor activities and interactions, the spaces and facilities supporting such diversity, and the weather conditions, instead examining the stress-relieving and health-promoting benefits of parks. Future scholars may explore the therapeutic effects of CCGs and MUPs considering these dynamic factors;
5. Although this work used the analysis method of computer vision technology to study the landscape, it still used a traditional questionnaire method to obtain data on the restorative effects, which rely on the standard scoring of the participants and involve a certain degree of error, as compared to instrumental calculations. Future research can use more advanced instruments to conduct measurements, such as eye movement meters or electroencephalographs;
6. In addition, due to the study design and constraints, we only collected data on the subjective perception of restorative experiences, which may have some potential bias, although this is a common approach that has been used in previous studies [127]. For example, future research could consider measuring objective attention improvements through pre- and post-visit attention test scores;

7. We posit that the research object of future healthy landscapes can be expanded from gardens and parks to cities, villages, and even wider scopes; that it can be based on more disciplines such as psychology, ecology, computer science, etc.; and that the means of obtaining data can be applied to a broader range of methods, such as an extensive data analysis, which would be more scientific in nature;
8. The use of innovative research methods in this study, combining computer vision techniques and statistical analysis methods, is noteworthy and interesting; however, we obtained questionnaire responses rather than a more representative sample survey. Future researchers could try to use the same method to conduct a more representative sample survey, which would have very interesting and useful results.

6. Conclusions

Classical Chinese gardens, as desirable spaces for poetic living, possess a spatial art that is unique to China. Being in a garden gradually restores one's mind and body to a state of well-being and even guides one towards wisdom and inspiration. Using a research methodology that was a combination of the quantitative method of computer vision techniques and the qualitative method of expert ratings, this study attempted to deconstruct landscape elements in videos and combine them with statistical analysis tools to compare the restorative effects of classical Chinese gardens and modern urban parks. The results show that although classical Chinese gardens and modern city parks have similar visual healing effects, the driving factors of these are different. Water feature design is a crucial factor in enhancing the therapeutic effects of classical Chinese gardens, while the addition of unreasonable modern artificial structures, such as poorly designed benches, undermines the healing benefits of these gardens. Modern urban parks should also take inspiration from classical Chinese garden design, for example, in establishing some traditional cultural buildings as a "spotlight landscape", designing classical garden paths, incorporating the spatial art of classical gardens, and harmoniously integrating modern urban furniture into the landscape design. Hopefully, these results will allow researchers to better understand the mechanisms through which green spaces have restorative effects on visitors in China and provide some guidance for landscape design and management. Additionally, designs should pay attention to factors such as design quality, arrangement, and adjustments based on human reactions to color, texture, and scale. This can help urban residents have better mental health and well-being and can promote the sustainable development of urban construction.

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