

Article

Spatial Justice Evaluation of Psychological Therapeutic Landscapes in High-Density Residential Areas

Xin Zhang ¹, Xiangyu Liu ² and Runzhe Shi ^{3,*}

¹ Faculty of Humanities and Social Sciences, Macao Polytechnic University, Gaomeishi Street, Macau, China; zhangxin000131@163.com

² School of Landscape Architecture and Architecture, Shangqiu University, No. 66, Beihai East Road, Shangqiu 476000, China; lxy12042026@163.com

³ Ecological Civilization Research Institute (Tourism Research Center), Hebei Academy of Social Sciences, No. 67 Yuhua West Road, Shijiazhuang 050053, China

* Correspondence: srzsxy@163.com

Abstract

The global mental health issue is becoming increasingly prominent. The fair supply of psychological therapeutic landscape spaces in urban high-density residential areas is a core path to ensuring the physical and mental health of residents and maintaining social health equity. This study takes the theory of spatial justice as the core framework, selects 20 typical high-density residential areas in Shijiazhuang City as empirical samples, and collects basic data through structured questionnaire surveys and on-site observations to explore the justice dilemma, evaluation system, and group demand differentiation characteristics of psychological therapeutic landscape spaces in high-density residential areas. The research results show that there are three core injustice problems in the psychological therapeutic landscape spaces of high-density residential areas: insufficient spatial inclusiveness, lack of ecological space justice, and incomplete facilities and management systems. Residents' evaluations of the spatial justice of therapeutic landscapes can be divided into four dimensions: practical, ecological, social, and management. Among them, the ecological dimension is the core dimension that residents pay the most attention to. Individual characteristics such as gender, age, identity category, community activity duration, and governance participation willingness have a significant impact on residents' evaluations of spatial justice. This study constructs an evaluation system for the spatial justice of therapeutic landscape spaces suitable for high-density residential areas, providing theoretical support and practical guidance for the planning, design, and optimization and renewal of fair and inclusive psychological therapeutic landscapes in high-density residential areas in northern China. At the same time, it provides a scientific basis for the construction of healthy cities and the practical application of spatial justice in the field of human settlements.

Keywords: psychological therapeutic landscapes; high-density residential areas; spatial justice; landscape space evaluation; public health



Received: 21 February 2026

Revised: 19 March 2026

Accepted: 20 March 2026

Published: 23 March 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

1. Introduction

Global attention to mental health issues has been on the rise [1], and the mental health levels of urban residents, especially those with chronic diseases, are generally low [2]. The high prevalence of anxiety disorders highlights the urgency of local mental health problems. Strengthening mental health support has significant positive implications for personal development [3], social stability, and the overall well-being of the population [4]. In recent

years, although the Chinese government has closely monitored the needs of residents for a comfortable and livable environment, complex factors such as urban pollution, traffic congestion, and work pressure still leave a large number of people in a sub-healthy state [5], giving rise to an urgent need for therapeutic-type physical and mental health spaces [6]. Guided by the principle of spatial justice, the optimization of community landscape spaces has become a research focus in the intersection of public health and urban planning [7]. Integrating therapeutic landscapes into community public spaces should provide universal physical and mental benefits to residents through fair distribution of health space resources [8]. Specifically, three dimensions of therapeutic landscapes—resource allocation and accessibility, adaptation to the needs of diverse groups, and the guarantee of long-term operation, maintenance, and public participation—correspond respectively to the core tenets of spatial justice theory: distributive justice, the protection of differentiated spatial rights, and procedural justice in usage.

However, in the current practice of psychological therapeutic landscape space planning, there is a widespread phenomenon of spatial injustice, that is, high-quality therapeutic landscape resources are mostly concentrated in high-income communities or urban core areas, while old communities, urban villages and areas where disadvantaged groups gather often face the predicament of insufficient supply and poor quality of therapeutic spaces. At the same time, there are significant differences among different groups in terms of accessibility to therapeutic spaces, usage rights and planning participation rights, resulting in an unbalanced distribution of health space resources [9]. This spatial injustice not only weakens the public health value of therapeutic landscapes, but also exacerbates social inequality in the field of mental health [10]. In addition, the COVID-19 pandemic, a major global public health event, has further deepened the academic and public understanding of interactive spaces for healthy communities. During the pandemic, home lockdown measures [11] rendered healing sites such as urban parks and gardens completely inaccessible [12], and communities—as the only accessible public activity spaces for residents—emerged as the core support for residents' mental health [13]. This reality also validates that if healing landscape resources are concentrated solely in urban core areas rather than being deployed at the community level, their healing value will be significantly diminished under lockdown measures imposed during public health emergencies. As Nikolas Rose has argued, the future of psychiatry lies in its reconstruction as a “social medicine” that attends to social determinants, meaning it should be understood within the context of an individual's social situation, spatial environment, and power structures [14]. As the core activity field for residents, the recreational and activity functions of community landscape spaces can effectively relieve stress, regulate emotions and promote the positive development of residents [15], which is highly consistent with the core needs of residents for a healthy and livable environment [16], making the resolution of injustice in therapeutic landscape space planning more urgent in reality [17].

Psychological therapeutic landscapes are a core research area at the intersection of landscape planning and public health [18], aiming to improve and enhance human physical and mental health through the creation of spatial environments [19], and they hold significant theoretical and practical value [20]. From the perspective of spatial justice theory, the fair supply of therapeutic landscapes, equal accessibility for diverse groups, and the rational allocation of spatial resources are key prerequisites for their service to public health. Currently, the academic community has conducted a series of studies on therapeutic landscapes [21]. International research on therapeutic landscapes started earlier and has established a relatively systematic theoretical framework and mature practical models. In the second half of the 19th century, Olmsted's concept of landscape therapy [22] first revealed the positive correlation between contact with the natural environment and human health,

laying the foundation for the theoretical construction of natural therapeutic [23]. Ulrich, the founder of modern rehabilitation theory, through a series of empirical studies, clarified the mechanism of the interaction between the landscape environment and human psychology, and confirmed the positive effects of natural elements on postoperative recovery, providing a core paradigm for quantitative research on therapeutic landscapes [24,25]. Based on this, Gesler's concept of therapeutic landscapes [26] emphasizes the synergistic therapeutic effect of natural and artificial landscapes [27], particularly highlighting the reinforcing value of the integration of architecture and ecological spaces for therapeutic [28]. Subsequently, many scholars have delved into the study of psychological therapeutic landscapes, establishing a demand-oriented design framework and evaluation system for therapeutic landscapes [29], deepening the integration of public needs and the natural environment [30], and providing theoretical support for the creation of therapeutic spaces [31]. Therefore, research on therapeutic landscapes has also achieved certain accomplishments in practice, such as offering postgraduate courses in medical garden design [32], and promoting therapeutic projects in medical settings, creating the necessary natural basis for hospital patients through rehabilitation and therapeutic landscape design [33], fully verifying the practical effectiveness of therapeutic landscapes.

As research deepens, the perspective has gradually expanded from patient groups to multiple subjects such as medical staff, focusing on the interaction between physical environmental elements and users [34], and promoting the expansion of therapeutic environments from medical settings to urban public spaces [35]. For instance, Browning et al., taking biophilia theory as the core framework, systematically demonstrated that nature-inclusive design in built environments has certain health benefits [36], and through multi-disciplinary empirical research, confirmed that contact with nature can effectively relieve human stress [37] and restore attention [38], thereby significantly improving the physical and mental health status and productivity of users [39], providing important theoretical and empirical support for the exploration of the health value of natural therapeutic landscapes in urban living environments and their practical application. China's research on therapeutic landscapes started relatively late. Current research on therapeutic landscapes in China remains centered on fundamental spatial design and renovation, with insufficient in-depth analysis of psychological healing mechanisms. Additionally, targeted research findings specific to residential scenarios are relatively limited [40]. However, significant achievements have been made in localized exploration, such as the integration of traditional Chinese medicine concepts with traditional ecological wisdom [41], and the establishment of theoretical frameworks for horticultural therapy and landscape therapy, clarifying design principles, evaluation methods, and adaptation strategies for diverse groups [42], laying a foundation for localized research on therapeutic landscapes [43,44].

In summary, existing studies have fully validated the positive effects of natural landscapes and therapeutic environments on stress alleviation [45], mood enhancement [46], and physical and mental rehabilitation [47]. However, existing research still has certain limitations: first, there is a structural imbalance in the application scenarios of therapeutic landscapes, which are predominantly concentrated in medical institutions [48], whereas the supply in daily living contexts such as residential areas is severely inadequate [49]. This not only fails to meet residents' regular psychological therapeutic needs but also violates the core principle of equitable distribution of spatial resources. Second, insufficient attention has been paid to the group adaptability of therapeutic landscapes, with a lack of consideration for the differentiated needs of groups across different age brackets, health statuses, and social strata [50], leaving obvious gaps in research on spatial accessibility and usage equity. With the acceleration of urbanization, psychological problems among residents have become a regular feature, and the demand for mental health has shifted towards daily and

universal healing services. As the core living space for residents, the current landscapes in residential areas generally lack systematic healing designs, highlighting the contradiction between supply and demand and underlining the necessity of this research. It also expands a new dimension for related studies on health and well-being equity from the perspective of spatial justice. Against this backdrop, the present study centers on residential settings and systematically incorporates the theory of spatial justice into research on psychotherapeutic landscapes within residential areas. This approach not only supplements and advances the existing research framework of therapeutic landscapes but also offers theoretical underpinnings and practical guidance for the construction of equitable, healthy, and livable human settlements. In the context of accelerated urbanization, high-density residential areas in northern China are grappling with spatial justice predicaments, including imbalanced allocation of landscape resources and a lack of therapeutic functions [51], which accentuates the contradiction between residents' demands for psychological well-being and the current landscape supply. As a representative northern city, Shijiazhuang has yet to clarify the compositional characteristics and existing issues of therapeutic landscape spaces in its high-density residential areas, and there is a dearth of evaluation systems and design guidelines that balance equity and effectiveness. Accordingly, this study takes high-density residential areas in Shijiazhuang as the empirical case, focusing on the core contradictions in the current state of therapeutic landscape spaces from the perspective of spatial justice. It explores the existing predicaments and influencing mechanisms of psychotherapeutic landscape spaces in high-density residential areas, and identifies their evaluation dimensions and differentiation laws. On this basis, it proposes planning optimization strategies that are equitable and inclusive, thereby providing theoretical underpinnings and practical guidance for improving the restorative quality of residential landscape spaces. The specific research framework of this study is illustrated in Figure 1.

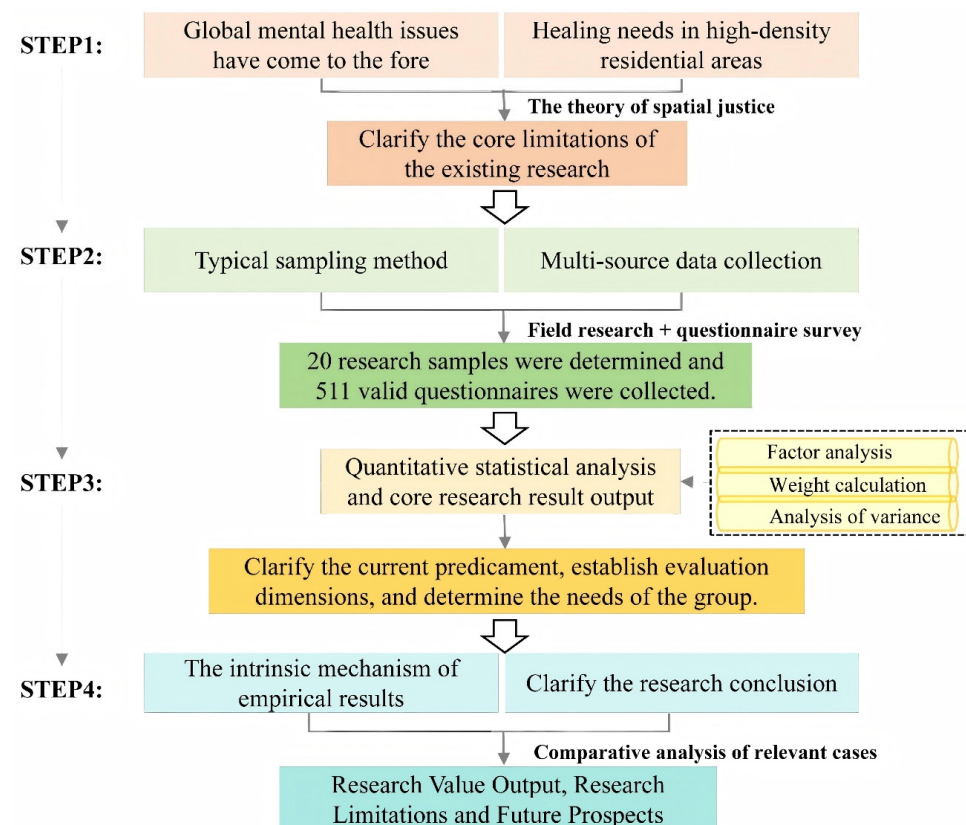


Figure 1. Research Framework and Technical Route.

2. Methods

2.1. Site Selections

Guided by the core concerns of spatial justice theory regarding the fairness of spatial resource allocation [52] and the adaptability to the spatial needs of diverse groups [53], and combined with the research objectives of investigating the current status and development level of psychological therapeutic landscape spaces in high-density residential areas, this study systematically screens and determines the research area. Shijiazhuang City's high-density residential areas are selected as the core scope of investigation to ensure the universality and scientific rigor of the research conclusions. Figure 2 presents the regional planning of Shijiazhuang's urban area, where the blue zone denotes the research site of this study. It can be observed that high-density residential areas are primarily concentrated in the core section of the central urban district, exhibiting characteristics of contiguous high-density development. Currently, the city has a permanent population of 11.2235 million and an urbanization rate of 71.44% [54], exhibiting significant agglomeration characteristics of high-density residential areas within the urbanization process. Drawing on relevant research references, this study defines high-density residential areas as high-rise residential complexes with a plot ratio of 2.0 to 4.0, a greening rate of $\geq 30\%$, and a building density of 20% to 30% [55]. The central urban area, with a total administrative area of 405 square kilometers, encapsulates the core developmental trajectory of Shijiazhuang's urban construction. Aligning closely with the high-density residential development models adopted by other provincial capital cities, it serves as a highly representative case in terms of the spatial layout of high-density residential zones and the allocation of landscape resources. Furthermore, regarding the socio-cultural context, the population structure has transitioned into an aging society (in 2020, the population aged 60 and above accounted for 18.47%, and those aged 65 and above accounted for 12.86%) [56]. The demand among the elderly population for accessibility and adaptability in therapeutic landscape spaces underscores the necessity of landscape planning guided by spatial justice. Collectively, these factors constitute the primary rationale for selecting this region as the study area.

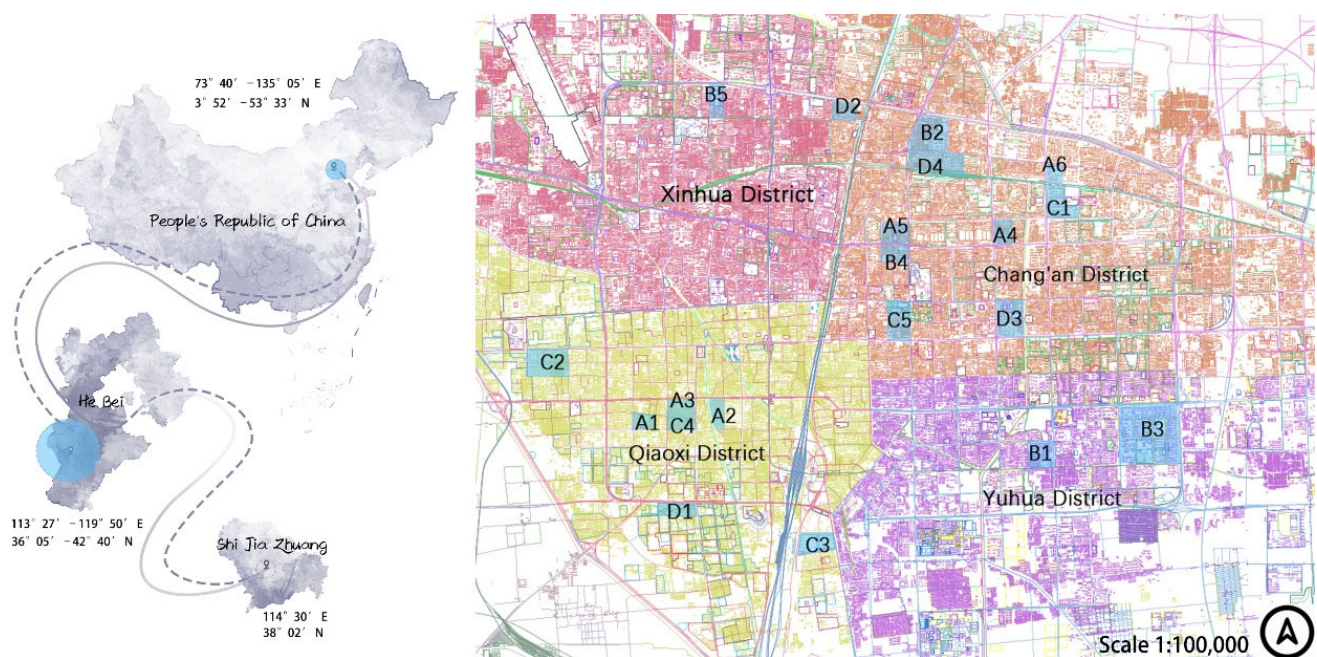


Figure 2. Urban planning map of Shijiazhuang City and the investigation area of this study (The blue box area is the selected research location).

In this study, purposive typical sampling was employed for sample selection. This method is well-suited for selecting representative typical cases to conduct empirical research in specific research contexts, and it is highly aligned with the core objectives of this study. Sample screening strictly follows the following criteria: construction completed between 2010 and the present, a plot ratio of 2.0–4.0, the green space ratio $\geq 30\%$, a building density of 20–30%, and distinct characteristics of high population agglomeration. To align with the examination of landscape spatial rights across groups of varying socioeconomic status from the perspective of spatial justice, the samples encompass three distinct tiers of residential areas: low-to-mid-end, mid-end, and high-end. The classification of these tiers is based on core indicators including housing price levels, completeness of living amenities, community environmental quality and security assurance levels, accessibility of educational resources, and transportation convenience. The landscape designs within the selected samples encompass the mainstream spatial forms of psychological therapeutic landscapes found in Shijiazhuang’s high-density residential areas, thereby fully ensuring the representativeness and typicality of the samples. It was ultimately decided to select 20 high-density residential areas within the urban area of Shijiazhuang City as the field research samples. The specific survey locations are shown in Table 1 (the survey area is the blue box area in Figure 2).

Table 1. Basic Information of the Residential Areas Where the Respondents Live.

Number	Community Name	Completion Date	Floor Area Ratio	Green Space Ratio	Floor Area	On-Site Photo
A1	Oujingyuan	2010	3.4	45%	65,366 m ²	
A2	Hengda Huafu	2012	3.2	33%	570,000 m ²	
A3	Haitang Homestead	2012	3.5	30%	230,000 m ²	
A4	Prosperous Chang'an	2012	3.0	46%	130,000 m ²	
A5	Xinyuan Yanfu	2010	3.5	35%	61,200 m ²	
A6	Huilongwan	2010	2.5	40%	16,407.45 m ²	
B1	Tianhai World	2015	3.17	30%	40,378 m ²	
B2	Beicheng International	2014	2.0	40%	213,440 m ²	
B3	Guoshi Mountain	2015	2.8	30%	68,000 m ²	

Table 1. Cont.

Number	Community Name	Completion Date	Floor Area Ratio	Green Space Ratio	Floor Area	On-Site Photo
B4	Bijing Garden	2013	3.5	35%	106,667 m ²	
B5	Shanggeli	2013	3.5	30%	55,096 m ²	
C1	Aobei Garden	2016	3.0	40%	32,500 m ²	
C2	Dongsheng Ziyu	2018	3.0	40%	533,333 m ²	
C3	Taifeng Guanhu	2016	3.5	40%	121,333 m ²	
C4	Jinzheng Dijingcheng	2018	3.9	42%	660,000 m ²	
C5	Rongsheng Huaifu	2018	3.0	42%	226,700 m ²	
D1	Tianlun Jincheng	2020	2.4	36%	34,122 m ²	
D2	Guo He	2021	2.99	35%	133,258 m ²	
D3	Yuantaijiayuan	2019	2.0	30%	28,500 m ²	
D4	Vanke Zijun	2021	3.0	30%	32,000 m ²	

Note: All data are from the publicly available data of the residential area research project.

2.2. Questionnaire Design and Survey

The research tool of this study adopts a structured questionnaire that has been localized and revised based on international mature theories and validated scales. Questionnaire surveys have been widely applied in urban planning research [57,58], urban issues [59,60], and restorative landscape perception investigations [61], etc., thus this research method is highly reliable and rigorous. The design of this questionnaire strictly adheres to the international general norms of social science research, with the three-dimensional theory of urban spatial justice [62] and the therapeutic landscape perception scale as the core, ensuring the rigor of the questionnaire design.

The questionnaire consists of four core sections, with the spatial evaluation logic rooted in the perspective of spatial justice integrated into each dimension. Specifically, the first section addresses recognition justice, focusing on residents' psychological states and demands for therapeutic spaces. It primarily investigates residents' preferences for coping strategies during negative emotional states and their specific requirements for the environmental functions of therapeutic landscape spaces. The second section corresponds to distributive justice, centering on the evaluation of environmental justice in public spaces. Key indicators examined include satisfaction with existing therapeutic landscapes in public spaces, planning rationality, and accessibility of use (the specific questions of the first and second parts can be seen in Section 3.2.2 Table 3). The third section pertains to procedural justice, emphasizing spatial usage behaviors and demand feedback. By surveying residents' opinions and suggestions regarding community public spaces and related activities, it clarifies the core directions for spatial optimization. The fourth section collects basic information of respondents, such as age, gender, and duration of community space usage, providing a basis for group differentiation analysis of recognition justice and distributive justice.

To ensure sample comprehensiveness and data reliability, the survey schedule encompassed rest periods on workdays and full days on weekends, thereby accommodating adult groups with varying daily routines while also including a small number of samples from minors. The survey locations included the core range of the study area and surrounding open activity spaces to achieve complete coverage of the research setting. Questionnaire distribution employed a hybrid random sampling approach combining online and offline methods; a total of 520 questionnaires were distributed, and 511 valid responses were retrieved. Furthermore, concurrent field observations were conducted at different times during the survey period to record residents' activity characteristics in public spaces and map their activity routes. This served to supplement and verify the veracity of the questionnaire data, further deepening the understanding of community public space utilization efficiency and the extent to which spatial justice is realized.

2.3. Data Analysis

The questionnaire results were imported into the numerical analysis software SPSS 26 for statistical analysis. In the descriptive stage, the mean was used to determine the public's cognitive situation regarding the demand for spatial justice in therapeutic landscapes. Subsequently, an analysis of the public's evaluation hierarchy of therapeutic spaces was conducted. Through factor analysis of relevant evaluation scales, principal component analysis was used to extract common factors, and the maximum variance method was adopted for factor rotation to determine the factors and weights of public space justice evaluation. Additionally, analysis of variance (ANOVA) and Spearman correlation coefficients were employed to analyze the correlation and influencing factors of the evaluation of therapeutic landscape space justice, thereby identifying the factors influencing the public's differentiated evaluation of therapeutic landscapes.

3. Results

3.1. Existing Problems and Influencing Factors of Landscape Spaces in High-Density Residential Areas

The landscape of residential areas is not merely a physical environment but also a carrier for residents to exercise their spatial rights and access psychological therapeutic resources. Based on field investigations, this section explores the existing predicaments of landscape spaces in high-density residential areas and their underlying influencing mechanisms.

3.1.1. Existing Issues

High-density residential areas, as the core residential form in response to population concentration, face multiple practical predicaments in the planning and construction of their landscape spaces. These issues essentially reflect the lack of justice in the allocation and utilization of spatial resources, which significantly deviates from the core concept of spatial justice theory emphasizing the fair distribution of spatial resources [63].

Insufficient Spatial Inclusivity

Against the backdrop of Shijiazhuang's high-density residential areas, the prioritization of maximizing population carrying capacity has resulted in persistently high building densities, with landscape spaces severely compressed into fragmented and miniaturized forms—structures that fail to accommodate residents' diverse interactive needs. From the lens of spatial production logic, landscape planning for such residential areas predominantly relies on standardized design paradigms, overemphasizing land use efficiency while disregarding the social attributes of space and the differentiated demands of multiple stakeholders. This has led to a lack of participatory appeal in landscape spaces. On-site questionnaire surveys indicate that resident demographics in these areas are diverse, yet insufficient spatial scale and design deficiencies have deprived different groups of equitable communication platforms, fostering social isolation. The imbalance in spatial allocation undermines residents' equal right to spatial participation, weakens the landscape's social integration function, and violates the justice principle that frames space as a carrier of social relations [64].

Lack of Ecological Spatial Justice

Natural landscape elements constitute the core components of psychotherapeutic landscapes [65], and their supply level directly determines the degree of protection for residents' physical and mental health rights. Field investigations reveal that under the development orientation of maximizing land value in Shijiazhuang's high-density residential areas, developers generally reduce the construction and operation/maintenance costs of natural landscapes, leading to the substantial simplification or even omission of core natural elements such as vegetation and water bodies. Furthermore, as most of these residential areas are located in urban core zones, the scarcity of land resources further exacerbates the compression of ecological spaces, making it difficult for residents to access natural ecological services on an equal basis. The lack of natural elements not only causes the loss of landscape diversity but also deprives residents of sufficient natural healing experiences and intensifies their psychological stress. In essence, this reflects the unfair distribution of ecological space resources and disregards residents' basic ecological and health rights.

Inadequate Facilities and Management System

The planning logic of high-density residential areas overemphasizes the rapid implementation of residential functions, while neglecting the systematicity of supporting landscape space facilities and the forward-looking nature of management systems. Constrained by land resource limitations in core urban areas, public facilities (e.g., rest zones, pedestrian paths, outdoor fitness equipment) struggle to achieve balanced layout and sufficient supply, failing to support the diverse activities required by psychotherapeutic landscapes and thus restricting residents' right to choose spatial usage.

Surveys indicate that some high-density residential areas lack effective management and maintenance mechanisms for landscape spaces, leading to issues such as environmental squalor, facility damage, illegal space occupation, and pedestrian safety hazards. These phenomena reflect a responsibility deficit in spatial management processes, which undermines the use value of landscape spaces, fails to effectively safeguard residents' right to spatial usage, further exacerbates spatial usage injustice, and weakens the psychotherapeutic function of landscape spaces.

3.1.2. Influencing Factors

The formation of landscape space problems in high-density residential areas is the result of the combined effect of multiple factors and the logic of space production. The influencing factors are also closely related to the realization path of spatial justice. Among them, natural factors, as the physical basis of landscape space, their distribution and characteristics directly affect the quality and fairness of space use. Reasonable utilization of natural conditions is an important prerequisite for achieving spatial justice.

Sunlight Environment: Constraints on Temporal Equity of Spatial Usage

Solar radiation serves as a core determinant of landscape space comfort and exerts a significant regulatory effect on residents' psychotherapeutic behaviors. Shijiazhuang boasts an average annual sunshine duration of 2480.5 h, with seasonal distribution as follows: 28% in spring, 26% in summer, 23% in autumn, and 21% in winter. The overall solar conditions are favorable, and adequate sunshine coupled with ventilation can effectively enhance residents' physical and mental well-being while promoting their engagement in therapeutic activities.

However, from the perspective of temporal equity in space utilization, a seasonal contradiction arises between insufficient winter sunshine and excessive summer solar exposure. Specifically, short winter daylight hours reduce the comfort of certain activity spaces, whereas intense summer sunshine may curtail residents' outdoor activity duration. This phenomenon reflects a lack of adaptability to natural conditions in landscape space design, failing to fully safeguard residents' equal right to space access across seasons. To address this, seasonal shading and daylighting optimization strategies are required to achieve temporal equity in space utilization.

Acoustic Factors: Inclusive Provision of Spatial Sensory Experiences

Sound, as a pivotal sensory element in landscape spaces, has its therapeutic value scientifically validated [66]. Therefore, sound design for landscape spaces should accommodate the sensory needs of diverse groups, provide diversified sound environment options, avoid the disruption of a single sound environment to some residents, safeguard residents' equal right to access sound therapy, and achieve inclusive provision of sensory experiences.

Color Factors: Diverse Adaptability of Spatial Psychological Regulation

Color influences the excitability of human cranial nerves through variations in wavelength and frequency, exerting a significant regulatory effect on psychological states [67]. The color design of landscape spaces is inherently a process of allocating psychotherapeutic resources. It requires that color combinations fully account for the psychological needs and health status of diverse resident groups, avoid discomfort caused by monochromatic design to certain populations, and provide residents with equitable access to psychological regulation resources through the scientific integration of diverse colors—thereby enhancing the inclusivity and therapeutic efficacy of the space.

Spatial Hierarchy: Diversified and Equitable Provision of Spatial Functions

The richness of spatial hierarchy directly correlates with the diversity and level of engagement in resident activities, constituting a key factor in enhancing the vitality of landscape spaces. According to spatial justice theory, landscape spaces must transcend the limitations of mono-functionality to construct a diversified spatial system that integrates “private–public,” “concentrated–dispersed,” and “planar–vertical” configurations. This approach addresses the activity needs of distinct groups by providing private sanctuaries for solitary meditation alongside public realms for group interaction, while simultaneously configuring concentrated activity zones and distributed resting nodes. By ensuring the equitable provision of diversified spaces, this strategy stimulates residents’ enthusiasm for engaging in therapeutic activities and reinforces community cohesion, ultimately realizing a just allocation of spatial functions.

3.2. Evaluation Factors and Weights of Psychological Therapeutic Landscape Spaces

3.2.1. Participant Information

Figure 3 illustrates the gender ratio of the respondents, with males accounting for 46% and females for 54%, approximating a balanced 1:1 distribution. Figure 4 presents the age distribution, which is characterized by a predominance of young and middle-aged adults. In terms of identity status, 89.2% of the respondents are residents of the surveyed areas. Figure 5 depicts the willingness to participate in community governance, revealing that the majority of participants hold a relatively positive attitude. Regarding the utilization of community spaces, the data indicates that 75% of respondents spend less than one hour daily in community public spaces, whereas only 5.1% engage in activities for more than three hours.

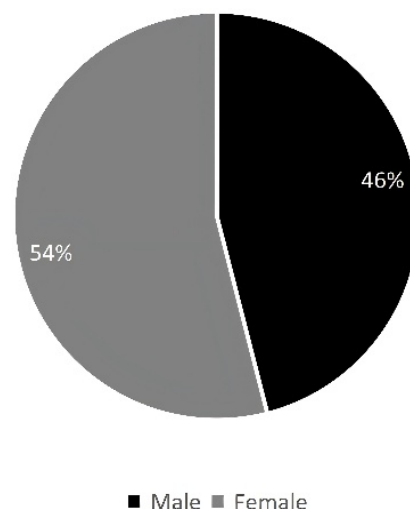


Figure 3. Ratio of male to female respondents.

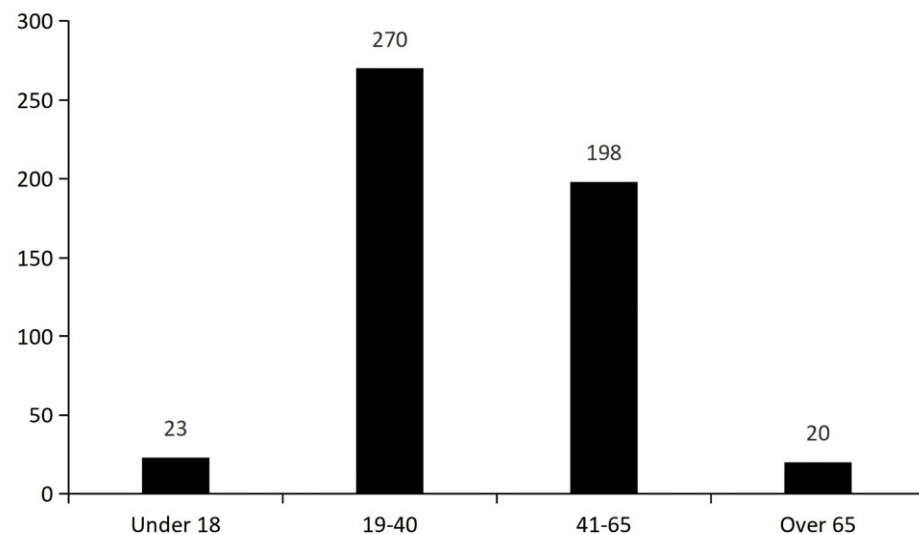


Figure 4. Age distribution of respondents.

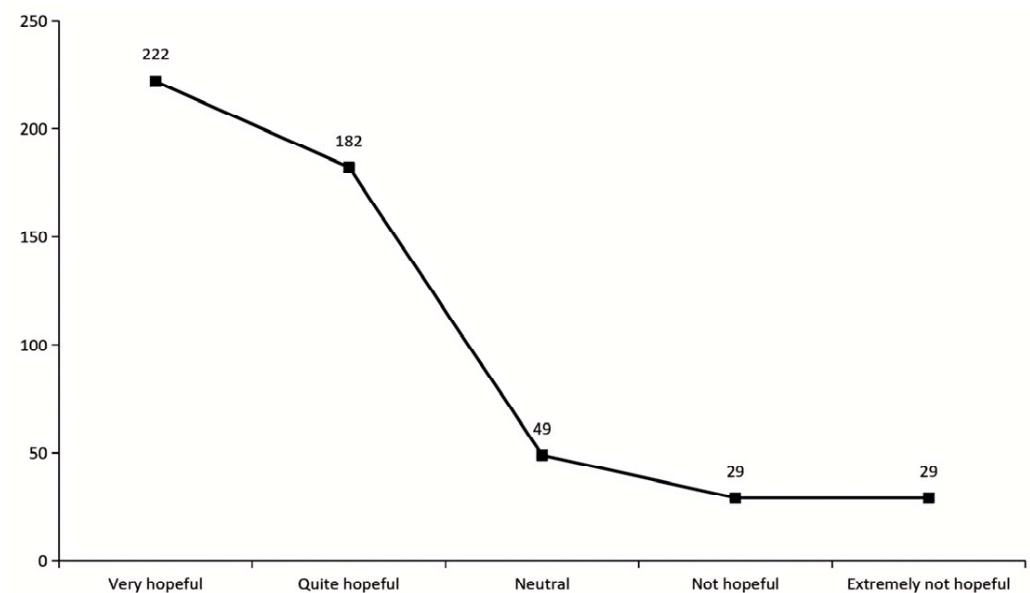


Figure 5. Respondents' willingness to participate in community governance.

3.2.2. Extraction of Evaluation Factors for Spatial Justice

This section analyzes the evaluation hierarchy of psychological therapeutic spaces among general residents by applying the factor extraction method in SPSS software, based on data from resident questionnaires. First, reliability analysis was conducted on two components of the questionnaire: Part 1 (residents' needs for therapeutic spaces) and Part 2 (evaluation of environmental justice in public spaces). The KMO value was calculated as 0.807, which exceeds the threshold of 0.5, indicating that the data is suitable for principal component extraction and demonstrates high validity. Subsequently, the principal component analysis (PCA) was applied to the 11 items to extract key factors, with varimax rotation employed for factor rotation. The total variance explained is presented in Table 2. The results revealed 4 principal factors, which collectively account for 42.72% of the total variance in the sample.

Table 2. Total Variance Explained Table.

	Total	Variance Percentage	Cumulative %	Total	Variance Percentage	Cumulative %	Total	Variance Percentage	Cumulative %
1	1.321	12.009	12.009	1.321	12.009	12.009	1.269	11.539	11.539
2	1.190	10.817	22.826	1.190	10.817	22.826	1.189	10.807	22.346
3	1.107	10.065	32.891	1.107	10.065	32.891	1.141	10.369	32.715
4	1.081	9.829	42.720	1.081	9.829	42.720	1.101	10.005	42.720
5	1.041	9.467	52.187						
6	0.963	8.755	60.943						
7	0.954	8.672	69.614						
8	0.915	8.315	77.929						
9	0.879	7.995	85.924						
10	0.777	7.063	92.987						
11	0.771	7.013	100.000						

Table 3 presents the rotated factor matrix derived from the factor analysis. The results indicate that residents' evaluations of psychological therapeutic landscape spaces in high-density residential areas are structured into four distinct dimensions: the practical dimension (explaining 11.53% of the variance; comprising Questions 3, 6, 7, and 8), the ecological dimension (explaining 10.8% of the variance; comprising Questions 5 and 10), the social dimension (explaining 10.369% of the variance; comprising Questions 1 and 9), and the managerial dimension (explaining 10% of the variance; comprising Questions 2, 4, and 11).

Table 3. Rotation Factor Matrix Table.

The Rotated Component Matrix A				
	Ingredient			
	1	2	3	4
1. From the perspective of the equitable allocation of community spatial resources and demand adaptation, do you believe the current spatial environment of the community satisfies your needs for psychological restoration?	0.293	−0.031	0.543	0.126
2. From the dimension of security assurance within spatial justice, do you consider that the safety environment of community public spaces provides an equitable experience of safety for all residents?	0.292	−0.140	0.052	0.370
3. At the level of accessibility and usage rights regarding community natural spaces, what emotional experiences do you derive when engaging with the natural environment outdoors?	0.512	0.249	−0.464	−0.145
4. At the level of accessibility and usage rights regarding community natural spaces, what emotional experiences do you derive when engaging with the natural environment outdoors?	−0.105	−0.006	0.128	0.770
5. From the perspectives of community public space accessibility and spatial justice, do you perceive travel to these spaces as being both convenient and equitably accessible?	0.046	0.702	0.138	0.022
6. From the perspectives of community public space accessibility and spatial justice, do you perceive travel to these spaces as being both convenient and equitably accessible?	0.546	−0.087	0.083	0.009
7. Integrating the equitable allocation of community spatial resources with the adaptation to residents' livelihood needs, how would you rate your satisfaction with the provision and layout of recreational facilities within the community?	0.374	−0.121	0.274	0.053

Table 3. Cont.

The Rotated Component Matrix A				
	Ingredient			
	1	2	3	4
8. From the perspective of information accessibility and resource allocation within spatial justice, how satisfied are you with the installation and layout of cultural facilities such as notice boards, signage, and wayfinding markers within the community?	0.611	0.066	0.010	0.000
9. From the perspective of information accessibility and resource allocation within spatial justice, how satisfied are you with the installation and layout of cultural facilities such as notice boards, signage, and wayfinding markers within the community?	−0.010	0.219	0.658	−0.195
10. From the perspective of the diversified utilization of community spatial resources and residents' rights to spatial development, do you desire that spaces such as balconies, walls, and rooftops within the community support plant cultivation activities?	0.108	−0.708	0.076	−0.028
11. Incorporating the principle of equalized configuration of livelihood services within spatial justice, would you support the addition of public service facilities, such as health monitoring devices, within the community?	0.010	0.196	−0.267	0.541

Note: The bolded values are the factor loadings with the largest absolute values.

3.2.3. Calculation of Evaluation Factor Weights

As illustrated by the statistical results in Figure 6, among the evaluation factors for spatial justice within the therapeutic landscapes of high-density residential areas, the ecological dimension achieved the highest score of 4.01. This was followed by the social dimension and the managerial dimension, which recorded scores of 3.94 and 3.72, respectively. The practical dimension received the lowest score, at 3.07.

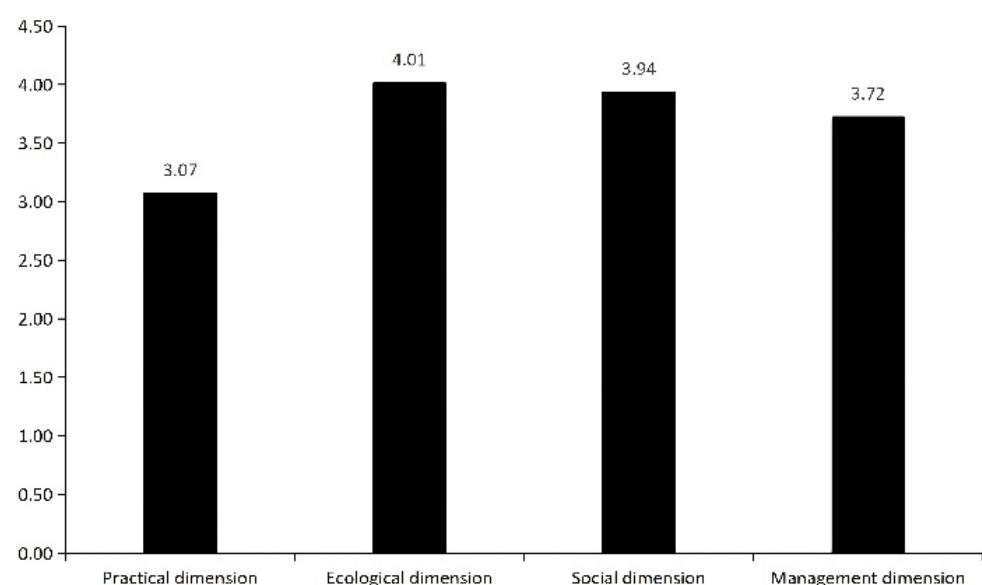


Figure 6. Scores of factor evaluation.

Weight calculations for the spatial justice evaluation factors were performed using SPSS software to determine the relative importance of each factor category within public perception, thereby providing empirical data for future community therapeutic landscape planning. Initially, the subjective data for the four evaluation factors were standardized.

Subsequently, factor analysis was conducted on these standardized values to generate the factor loading matrix presented in Table 4. The analysis of factor weights is primarily based on the factor loading matrix derived from Principal Component Analysis.

Table 4. Component matrix of each evaluation factor.

	Ingredient	
	1	2
Practical dimension	0.590342	0.114543
Ecological dimension	0.29898	0.477095
Social dimension	0.724598	−0.06773
Managerial dimension	−0.14378	0.879489

Figure 7 illustrates the weight values for each evaluation category, which, in descending order, are the ecological dimension, practical dimension, managerial dimension, and social dimension. A comparison between the evaluation scores and the weight rankings reveals significant discrepancies within the practical and social dimensions. This phenomenon reflects an imbalance between the importance weights of the various spatial justice evaluation dimensions for therapeutic landscapes in high-density residential areas and their actual construction performance. Specifically, the resource investment and priority allocation across these dimensions in current therapeutic landscape development fail to align effectively with the weighted requirements identified within the evaluation system.

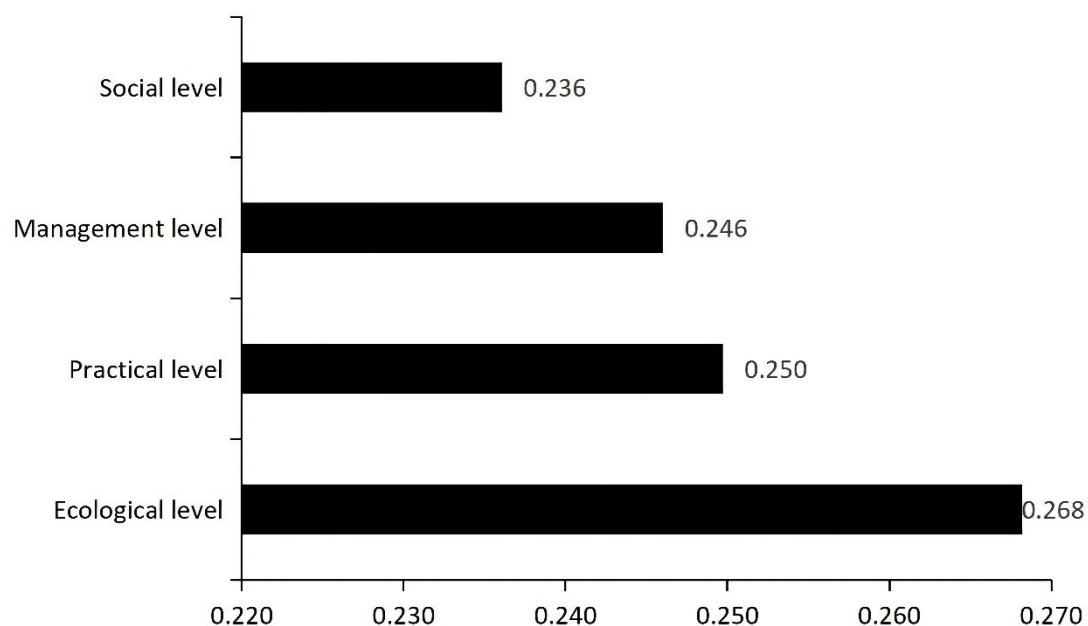


Figure 7. Evaluation of factor weights.

3.3. Differences in Therapeutic Landscape Evaluation Under Social Group Differentiation

While factor analysis identified the cognitive evaluations and weight distributions across various spatial justice dimensions for therapeutic landscapes, the cumulative variance explanation rate of 42.72% suggests that the factors influencing evaluations in high-density residential areas are relatively multifaceted. Consequently, a more granular and in-depth analysis of specific questionnaire Questions is necessitated.

3.3.1. Evaluation Comparison

The evaluation of the demand for therapeutic spaces and environmental justice regarding public spaces in high-density residential areas (specific Questions are detailed in

Table 3) employed a 5-point scale, wherein higher numerical values indicate more positive subjective attitudes. Initially, Spearman's correlation coefficient was utilized to analyze the degree of association among the 11 specific Questions. The analysis revealed significant positive correlations across all 11 Questions. This indicates that, overall, there is a strong correlation between residents' demand for therapeutic spaces and the evaluation of environmental justice in this study, thereby ensuring the robustness of the results regarding subjective perception evaluation.

Subsequently, statistical frequency analysis was utilized to obtain results regarding residents' demands for therapeutic spaces and their evaluation of environmental justice in public spaces within high-density residential areas, as illustrated in Figure 8. Question 10, asking "Do you desire that spaces such as balconies, walls, and rooftops within the community support plant cultivation activities?" achieved the highest score of 4.08. In contrast, Question 2, asking "Do you consider that the safety environment of community public spaces provides an equitable experience of safety for all residents?" received the lowest rating, at only 3.25. The remaining evaluations exhibited minimal variance, with scores ranging between 3.7 and 4.0.

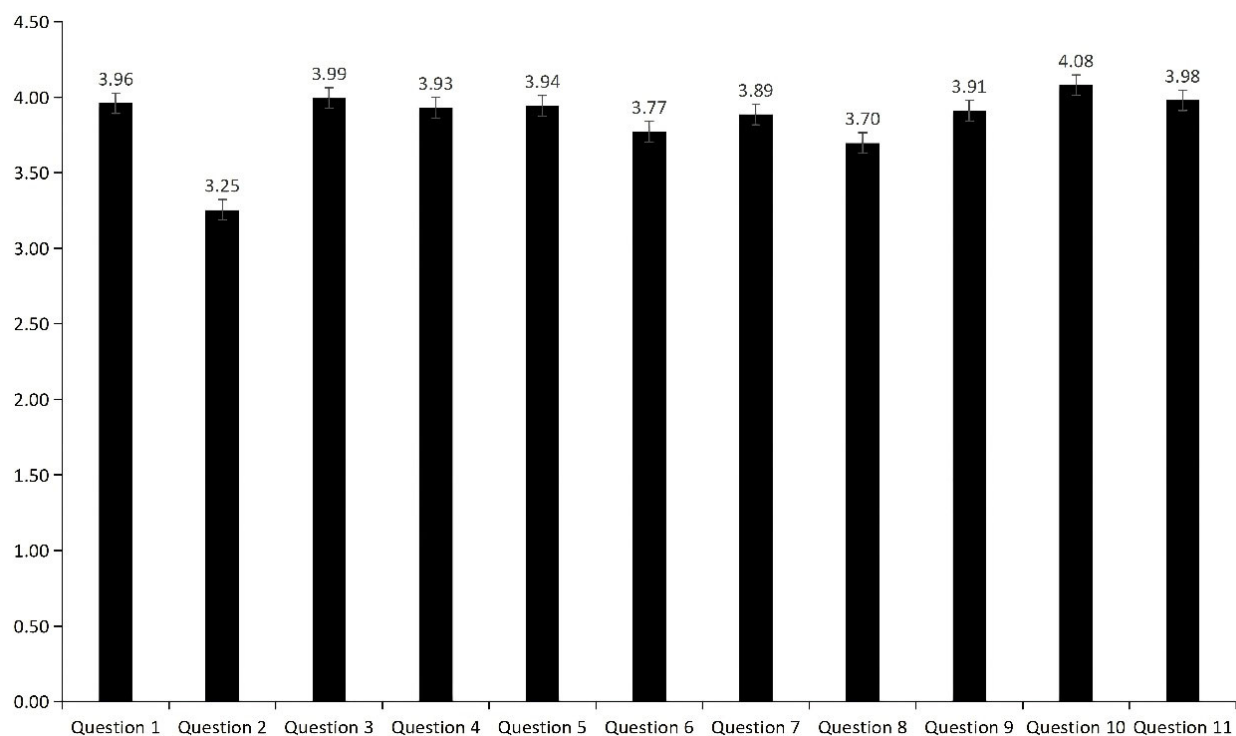


Figure 8. Evaluation results of specific issues in the therapeutic landscape.

3.3.2. Factors Affecting Evaluation

A K-S test for normality was conducted, confirming that the data follows a normal distribution. Drawing on relevant studies indicating that sociodemographic characteristics influence respondents' subjective perceptions of the environment [68], this study utilized Analysis of Variance (ANOVA) to examine the impact of individual factors—including age and gender—on the demand for therapeutic spaces in high-density residential areas and the evaluation of environmental justice in public spaces. Table 5 presents the significance coefficients for the factors analyzed via ANOVA.

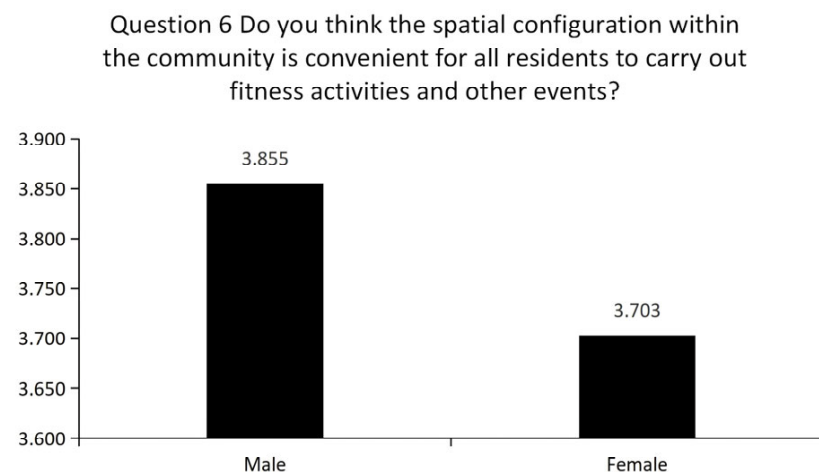
Table 5. Subjective cognitive evaluation of therapeutic landscape in high-density residential areas based on variance analysis of changes in different social characteristics.

	Gender	Age	Participation in Governance	Identity Category	Activity Duration
Question 1	0.836	0.533	0.805	0.893	0.775
Question 2	0.645	0.765	0.108	0.580	0.939
Question 3	0.729	0.086	0.825	0.674	0.337
Question 4	0.926	0.338	0.005 **	0.024 *	0.557
Question 5	0.073	0.313	0.737	0.407	0.023 *
Question 6	0.000 **	0.842	0.824	0.038 *	0.618
Question 7	0.345	0.385	0.647	0.535	0.920
Question 8	0.749	0.043 *	0.066	0.020 *	0.531
Question 9	0.298	0.134	0.331	0.370	0.189
Question 10	0.133	0.782	0.534	0.847	0.570
Question 11	0.321	0.322	0.361	0.654	0.894

** The representative significance level is at the 0.01 level; * The representative significance level is at the 0.05 level.

The ANOVA results indicate that gender significantly influenced responses to Question 6 (Do you perceive travel to these spaces as being both convenient and equitably accessible?). Significant differences were observed across age groups regarding Question 8 (How satisfied are you with the installation and layout of cultural facilities such as notice boards, signage, and wayfinding markers within the community?). Willingness to participate in community space governance had a significant impact on Question 4 (What emotional experiences do you derive when engaging with the natural environment outdoors?). Identity category had a substantial effect, showing significant influence on Questions 4, 6, and 8. Finally, the duration of time residents spent in community spaces significantly affected Question 5 (Do you perceive travel to these spaces as being both convenient and equitably accessible?).

Further analysis was conducted on the differential evaluations among population groups based on these influencing factors. As shown in Figure 9, male respondents were more inclined than female respondents to perceive the configuration of community spaces as convenient for all residents to engage in fitness and related activities. Figure 10 illustrates the satisfaction ratings regarding the layout of community cultural facilities across different age groups; minors (under 18) and middle-aged respondents (41–65) reported higher satisfaction, whereas young adults and elderly respondents reported relatively lower satisfaction.

**Figure 9.** Differences in Gender Evaluation of Question 8.

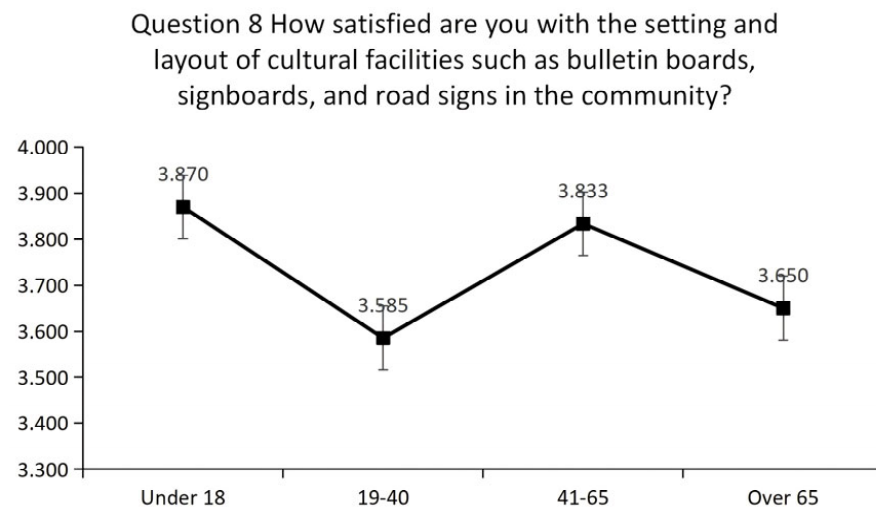


Figure 10. Differences in evaluation of question 8 by age groups.

Figure 11 reveals significant differences and substantial fluctuations in evaluation scores based on the willingness to participate in community space governance. The evaluation score peaked when the willingness to participate was “average,” indicating that this group of residents had the highest recognition of the reasonableness of night lighting configurations. Figure 12 details the specific discrepancies across respondent identity categories regarding Questions 4, 6, and 8; non-residents gave higher satisfaction ratings for night lighting configurations and fitness activities, while residents reported higher satisfaction with the provision and layout of cultural facilities. Finally, as indicated in Figure 13, respondents who spent less than one hour on community activities reported higher satisfaction with the convenience of access. Furthermore, the data demonstrates a negative correlation, where satisfaction levels decrease as the duration of residents’ activity in the community increases.

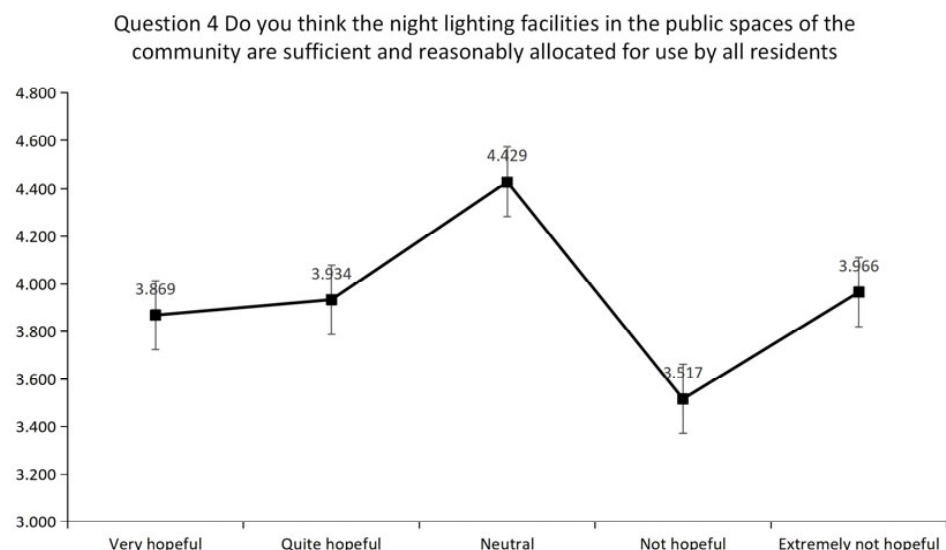


Figure 11. Differences in evaluation of question 4 by different participation intentions.

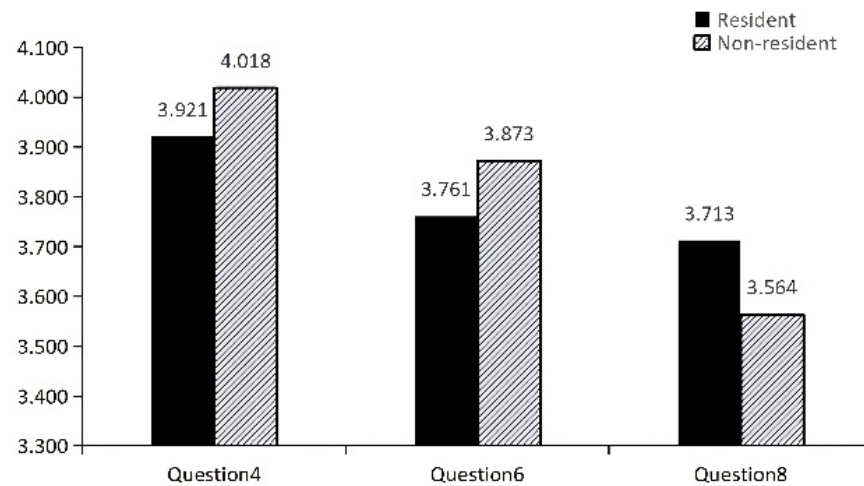


Figure 12. Differences in evaluation of questions 4, 6, and 8 by different identity categories.

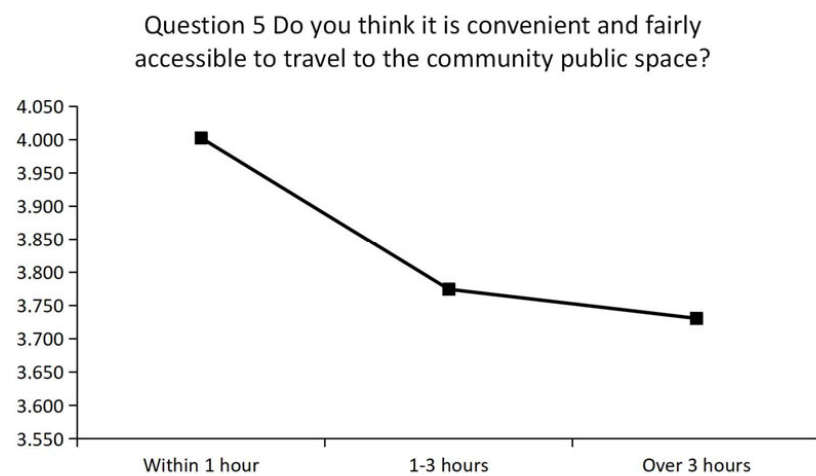


Figure 13. Differences in evaluation of question 5 for different activity durations.

4. Discussion

This section will systematically dissect the core dilemmas of injustice in the psychological therapeutic landscape spaces of high-density residential areas, grounded in the core framework of spatial justice theory and integrated with experimental findings. It will analyze the similarities and differences between the evaluation dimensions of this study and those of other types of therapeutic landscape assessments, while exploring the characteristics of demand differentiation and internal mechanisms among different social groups regarding therapeutic landscapes, thereby providing theoretical guidance for the planning and design of inclusive psychological healing landscapes.

4.1. Analysis of Spatial Justice Dilemmas in Therapeutic Landscapes of High-Density Residential Areas

The findings indicate that three intertwined issues—insufficient spatial inclusivity, the absence of ecological spatial justice, and the inadequacy of facility and management systems—collectively undermine the psychological therapeutic function of the landscape. Furthermore, the standardized design paradigm overlooks the heterogeneous needs of residents with diverse social backgrounds and educational levels, ultimately giving rise to implicit social segregation. This phenomenon confirms that the attenuation of the social integration function of landscape spaces in high-density residential areas is fundamentally rooted in the absence of spatial distributive justice. The lack of ecological spatial justice exposes the conflict between the profit-driven orientation of “maximizing land value” and

the protection of residents' ecological rights. As core carriers of psychological therapeutic, natural landscape elements are essential for the mental health of urban residents [69]. Their insufficient provision not only leads to the loss of landscape diversity but also deprives residents of the right to equitable access to natural therapeutic, further verifying the potential negative impacts of unfair ecological space distribution on residents' physical and mental well-being. Existing studies have demonstrated that short-term exposure to architectural green facades in high-density urban environments can effectively activate brain waves associated with human relaxation and enhance parasympathetic nervous system activity, thereby significantly improving individuals' emotional states and positive psychological experiences. This intervention exhibits clear effects on stress recovery and well-being enhancement [70]. This finding aligns with the result presented in Section 3.3.1, where plant cultivation activities received the highest public evaluation. Thus, high-density residential areas can effectively address the challenge of insufficient green space provision through vertical greening—a landscape form characterized by its inclusivity and low spatial footprint.

The therapeutic influence of the environment on psychological development relies on the synergy between spatial provision and management [71]. However, this study finds that the inadequacy of facilities and management systems in many residential areas partially reflects the dual absence of initial allocation and process guarantee in the realization of spatial justice. This not only restricts residents' choices in space utilization but also undermines the psychological therapeutic efficacy of the landscape, highlighting that landscape space planning in high-density residential areas must address the dual justice demands of resource provision and process management.

4.2. Analysis of Differences in the Structure and Weighting of Evaluation Factors

This study identified four analytical levels: practical, ecological, social, and management. In contrast, the traditional healing landscape is deeply integrated and constructed from the dimensions of material, cognitive, and social cultural rituals [72]. The four-dimensional analytical framework proposed in this study, while inheriting the core essence of traditional healing landscapes that “healing is not an inherent attribute of the place but a relational generation of multiple elements and subject interactions [73]”, has completed theoretical adaptation and system expansion in response to the constraints of the built environment in high-density residential areas, residents' psychological healing needs, and the core goal of spatial justice. Specifically, the practical and ecological levels deepen the traditional material dimension, addressing the issue of unfair distribution of spatial resources in high-density environments; the social level extends the relational healing of the binary subject to the construction of a multi-social connection network in the community; the newly added management level fills the research gap in the long-term operation and institutional guarantee of the traditional system, providing systematic theoretical guidance for related planning practices.

Existing studies have demonstrated that the integration of high-quality soundscapes in urban environments enhances environmental restorative capacity [74]. As shown in Table 6, soundscape research typically extracts 2–3 principal factors, with 1–2 factors often exhibiting significantly higher weights and explaining the majority of variance. By contrast, therapeutic landscapes in high-density residential areas constitute a complex, multi-sensory therapeutic system integrating visual, auditory, tactile, and olfactory modalities. Correspondingly, this study extracted four principal factors with relatively balanced weights, each contributing approximately equally to the total sample variance. This suggests a more complex evaluation structure for therapeutic landscapes in high-density residential areas, with a greater number of factors influencing subjective assessments. In other ur-

ban ecological landscape studies, a single factor (e.g., the “lifestyle” principal factor in university campus settings) often exerts a dominant influence on overall perception and largely determines evaluation outcomes. However, the balanced importance of factors in this study indicates that, from a spatial justice perspective, future utilization of therapeutic landscapes in high-density residential areas can leverage a diverse range of hierarchical factors across multiple dimensions.

Table 6. Comparison of research results of semantic segmentation method in different soundscape studies.

Research Content and Research Object	Main Factors
University campus soundscape evaluation [75]	Life Communication Spatial sense
Acoustic and landscape evaluation of urban public open spaces [76]	Relaxation Communication Spatiality Dynamic
Investigation of traditional village soundscapes [77]	Resting Meditation sensation Spatial sense

The weight analysis of evaluation factors reveals the public’s cognitive preferences regarding the spatial justice of therapeutic landscape spaces. The ecological dimension emerges as the most highly prioritized evaluation factor among the public. This not only reflects, to a certain extent, residents’ urgent demand for natural therapeutic resources but also indirectly indicates the scarcity of green spaces in high-density residential areas. The practical dimension ranks second, reflecting residents’ fundamental demands for utilitarian functions of landscapes (e.g., recreation and fitness), which aligns with the core positioning of therapeutic landscapes as a tool for daily physical and mental regulation. However, a significant discrepancy exists between the evaluation scores and weight rankings of the practical and social dimensions. This result reveals a “cognition-construction imbalance” in the spatial justice of therapeutic landscape spaces in high-density residential areas: the current prioritization of landscape resource investment and allocation fails to align with the public’s demands for therapeutic landscape spaces, leading to insufficient fairness and rationality in spatial resource allocation. The evaluation results and weight distribution of the management dimension underscore the importance of “process guarantee” in spatial justice. While the fair initial allocation of spatial resources serves as a foundation, a robust management mechanism is critical to ensuring the sustainable use of space. The issues identified in the survey—such as environmental squalor and facility damage—corroborate the low evaluation of the management dimension. Thus, landscape planning for high-density residential areas must establish a full-chain justice guarantee mechanism encompassing “planning, construction, and management.” The social dimension has the lowest weight, indicating that the provision of social interaction functions in existing therapeutic landscapes may not fully meet residents’ needs within the context of psychological therapeutic landscape planning for high-density residential areas. This mismatch undermines the inclusiveness of therapeutic landscapes and their therapeutic efficacy in the social dimension.

4.3. Disparities in Spatial Needs and Justice Claims Under Social Group Differentiation

The results of the analysis of variance indicate that social background characteristics such as gender, age, identity category, and activity duration have a significant impact on residents' evaluations of spatial justice, reflecting the differences in the needs and perceptions of therapeutic landscapes among different groups of people.

The results of variance analysis indicate that social background characteristics such as gender, age, identity category, and activity duration exert a significant influence on residents' spatial justice evaluations, reflecting the divergent needs and perceptions of therapeutic landscapes among different demographic groups. Gender differences significantly impact the evaluation of fitness space configuration, with males reporting significantly higher satisfaction than females. This finding reveals that the current design and layout of fitness facilities are more aligned with male usage habits—a phenomenon likely stemming from the insufficient consideration of women's specific needs (e.g., safety, privacy, and parent–child interaction functions) during the planning and design phase, which results in the failure to balance the rights of different genders in therapeutic landscape planning. In terms of age, minors and middle-aged groups exhibit higher satisfaction with cultural facilities, while young and elderly groups show lower evaluations. This discrepancy may be attributed to the differentiation of activity needs across age groups: minors prioritize entertainment-oriented signage, middle-aged individuals focus on practical guidance, young people demand higher aesthetic and interactive qualities in cultural facilities, and the elderly rely more on clear wayfinding systems. Thus, in the planning of therapeutic landscapes, the principle of “age-friendly inclusivity” must be emphasized to accommodate the needs of diverse age cohorts. For instance, for the elderly population, age-specific therapeutic landscape spaces can be designed by integrating dimensions such as spatial organization and sensory experience [78]. For adolescents, landscapes with local cultural attributes can be incorporated to enhance their perceptual restoration potential and stress alleviation effects [79].

Public identity categories significantly shape the demand for and perception of therapeutic landscapes: non-residents express higher satisfaction with night lighting and fitness facilities, whereas residents demonstrate greater recognition of cultural facilities. This pattern may arise from non-residents' lower usage frequency and more superficial needs, while residents—as long-term users—are more sensitive to the detailed flaws and management gaps of spatial facilities, making their evaluations more reflective of the actual quality of therapeutic landscapes. A negative correlation is observed between activity duration and evaluations of travel convenience, further confirming that long-term users have higher demands for spatial quality. In future landscape planning for high-density residential areas, priority should be given to the needs of core users: optimizing spatial accessibility and enhancing facility support to safeguard the spatial rights of high-frequency users. Additionally, the willingness of the public to participate in community governance has a differentiated impact on night lighting evaluations. The group with “moderate” willingness reports the highest evaluations, possibly because their expectations of the spatial environment are more aligned with actual supply. Groups with high willingness are more sensitive to spatial issues due to their higher participation, while those with low willingness lack a deep understanding of the spatial environment due to low usage frequency.

Based on the analysis of the aforementioned influencing factors, the design of therapeutic landscapes should align with the evolving context of the times, integrating progressive adaptive devices and e-health technologies [80], thereby delivering therapeutic spaces that cater to the physical health needs of diverse populations [81]. Furthermore, findings from the differential analysis indicate that the realization of spatial justice in therapeutic landscape spaces necessitates not only supply optimization at the planning level but

also the facilitation of residents' participation in spatial governance [82]. A robust interactive mechanism encompassing "demand articulation—planning response—feedback-based optimization" should be established to fully amplify the spatial justice claims of multiple stakeholders.

5. Conclusions

This study investigates psychological therapeutic landscapes within high-density residential areas. By analyzing existing issues through the lens of spatial justice, it proposes relevant strategies for future planning. The principal conclusions are as follows:

1. The core predicament of the psychological therapeutic landscape space in high-density residential areas essentially lies in the structural imbalance of spatial justice, which is specifically manifested as insufficient spatial inclusiveness, the absence of ecological spatial justice, and an imperfect facility management system. The existing problems, caused by the inadequate adaptation of physical attributes such as sunlight, sound, color, and spatial hierarchy, directly affect the temporal fairness, sensory inclusiveness, and functional diversity of space usage, resulting in the lack of justice in the therapeutic landscape space. Against this backdrop, subsequent planning and management of therapeutic landscapes should incorporate design strategies for the equitable accessibility of green spaces and establish a robust management framework, so as to safeguard the equal right of diverse groups to access ecological therapeutic resources.

2. Residents' evaluation of spatial justice in psychological therapeutic landscapes can be explicitly categorized into four dimensions: the practical dimension, ecological dimension, social dimension, and management dimension. The weights of these dimensions exhibit balanced differences, reflecting the complexity of the evaluation structure and the multiplicity of influencing factors. The weight ranking is as follows: ecological dimension (highest), practical dimension, management dimension, and social dimension (lowest). The ecological dimension's highest weight corroborates residents' urgent demand for natural therapeutic resources; the practical dimension's second-place ranking underscores the core value of basic landscape functions such as recreation and fitness. This evaluation system provides a quantitative foundation for subsequent optimization of therapeutic landscapes in high-density residential areas grounded in spatial justice. For instance, by integrating regional climatic characteristics (e.g., the seasonal sunlight distribution in Shijiazhuang) and establishing a full-chain management system encompassing "planning, construction, operation, and maintenance," the sustainability of residents' access to therapeutic spaces can be ensured.

3. Frequency analysis reveals that the item "support for plant cultivation" achieved the highest score, while "equity of public space safety" scored the lowest, reflecting residents' core demands for ecological space utilization and safety rights. Variance analysis indicates that individual characteristics such as gender, age, and identity category exert a significant influence on evaluations: males report higher satisfaction with fitness spaces; minors and middle-aged groups show greater recognition of cultural facilities; non-residents rate night lighting and fitness facilities more favorably than residents; activity duration is negatively correlated with evaluations of travel convenience; and the group with "moderate" willingness to participate in community governance demonstrates the highest recognition of night lighting. These differences essentially reflect the divergence in spatial needs, usage frequency, and expectations across different groups. Therefore, in the design of therapeutic landscapes, the principle of differentiated adaptation should be adopted—for example, addressing the parent–child interaction needs of female users, as well as the aesthetic and interactive needs of different age groups—while fully safeguarding residents' right to participate in planning, so as to formulate an inclusive therapeutic landscape scheme.

This study constructs an evaluation system for spatial justice of psychological healing landscapes in high-density residential areas, systematically revealing the predicaments of spatial injustice and the patterns of differentiated group needs. It provides core theoretical support and empirical evidence for the planning of inclusive healing landscapes in northern Chinese cities. In future research, comparative studies will be conducted across multiple cities and residential area types to further validate the findings and enhance the generalizability of the research outcomes. Existing research has confirmed that wearable sensors can establish a quantitative correlation between landscape environments and residents' health responses through real-time physiological data collection [83], addressing the core limitation of traditional landscape design that relies on empirical judgment [84]. The mature equipment verification specifications and quality control systems of wearable sensors also offer rigorous methodological assurance for the reliability of physiological data. However, this study has limitations: subjective evaluations account for an excessively high proportion, and the causal mechanisms underlying the therapeutic effects of landscape elements have not been verified through controlled experiments. Future research will employ VR technology to construct virtual scenes of gradient therapeutic landscapes, conduct controlled experiments using human factors equipment such as eye trackers and wearable physiological sensors, precisely quantify the psychological therapeutic effects of different landscape elements, verify and optimize the spatial justice evaluation system, and provide more accurate scientific support for the design of therapeutic landscapes in high-density residential areas.

Author Contributions: X.Z.: Conceived and designed the experiments, performed the experiments, analyzed and interpreted the data, contributed reagents, materials, analysis tools or data, wrote the paper. X.L.: Performed the experiments, analyzed and interpreted the data, contributed reagents, materials, analysis tools or data, wrote the paper. R.S.: Conceived and designed the experiments, analyzed and interpreted the data, contributed reagents, materials, analysis tools or data. All authors have read and agreed to the published version of the manuscript.

Funding: This research has been supported by the National Office for Philosophy and Social Science (Grant no 24CGL087).

Institutional Review Board Statement: The survey in this article is non-interventional and anonymous, aiming to explore the evaluation of therapeutic landscapes in high-density residential areas and its influencing factors, etc. The research was not conducted on patients, nor did it involve human material or human tissues. All respondents had the right not to participate in the survey and by filling out the questionnaire, they expressed their consent to participate in the research. Ethical clearance from our home institutions is not required for this type of research.

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

Data Availability Statement: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Acknowledgments: The authors thank all participants for their engagement in this study.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Moitra, M.; Owens, S.; Hailemariam, M.; Wilson, K.S.; Mensa-Kwao, A.; Gonesse, G.; Kamamia, C.K.; White, B.; Young, D.M.; Collins, P.Y. Global mental health: Where we are and where we are going. *Curr. Psychiatry Rep.* **2023**, *25*, 301–311. [[CrossRef](#)]
2. Cheng, C.; Yang, C.Y.; Inder, K.; Wai-Chi Chan, S. Urban–rural differences in mental health among Chinese patients with multiple chronic conditions. *Int. J. Ment. Health Nurs.* **2020**, *29*, 224–234. [[CrossRef](#)]
3. Hufeng, W. *Healthy China: Policy System and Development Path*; People's Forum: New York, NY, USA, 2024.
4. Huang, Y.; Wang, Y.U.; Wang, H.; Liu, Z.; Yu, X.; Yan, J.; Yu, Y.; Kou, C.; Xu, X.; Lu, J.; et al. Prevalence of mental disorders in China: A cross-sectional epidemiological study. *Lancet Psychiatry* **2019**, *6*, 211–224. [[CrossRef](#)]

5. Peng, X.; Liao, L.; Tan, X.; Yu, R.; Zhang, K. City health assessment: Urbanization and eco-environment dynamics using coupling coordination analysis and flus model—A case study of the Pearl River delta urban agglomeration. *Land* **2024**, *14*, 46. [\[CrossRef\]](#)
6. Hua, Y. Healthy China Construction: Strategic Significance, Current Situation, and Key Points for Advancement. *J. Natl. Sch. Adm.* **2017**, 105–111+163. [\[CrossRef\]](#)
7. Chen, F.; She, W.; Zeng, F.; Gao, M.; Wen, C.; Liu, G.; Wu, L.; Wu, Y.; Zhang, C. Optimization strategy of community planning for environmental health and public health in smart city under multi-objectives. *Front. Public Health* **2024**, *12*, 1347122. [\[CrossRef\]](#) [\[PubMed\]](#)
8. Jian, I.Y.; Chan, E.H.; Xu, Y.; Owusu, E.K. Inclusive public open space for all: Spatial justice with health considerations. *Habitat Int.* **2021**, *118*, 102457. [\[CrossRef\]](#)
9. Bikomeye, J.C.; Namin, S.; Anyanwu, C.; Rublee, C.S.; Ferschinger, J.; Leinbach, K.; Lindquist, P.; Hoppe, A.; Hoffman, L.; Hegarty, J.; et al. Resilience and equity in a time of crises: Investing in public urban greenspace is now more essential than ever in the US and beyond. *Int. J. Environ. Res. Public Health* **2021**, *18*, 8420. [\[CrossRef\]](#) [\[PubMed\]](#)
10. Masuda, J.R.; Crabtree, A. Environmental justice in the therapeutic inner city. *Health Place* **2010**, *16*, 656–665. [\[CrossRef\]](#)
11. Winata, F.; McLafferty, S.L. Therapeutic landscapes, networks, and health and wellbeing during the COVID-19 pandemic: A mixed-methods study among female domestic workers. *Soc. Sci. Med.* **2023**, *322*, 115803. [\[CrossRef\]](#)
12. Slater, S.J.; Christiana, R.W.; Gustat, J. Recommendations for keeping parks and green space accessible for mental and physical health during COVID-19 and other pandemics. *Prev. Chronic Dis.* **2020**, *17*, E59. [\[CrossRef\]](#)
13. Sepe, M. COVID-19 pandemic and public spaces: Improving quality and flexibility for healthier places. *Urban Des. Int.* **2021**, *26*, 159–173. [\[CrossRef\]](#)
14. Rose, N. *Our Psychiatric Future*; John Wiley & Sons: Hoboken, NJ, USA, 2018.
15. Zhang, L.; Liu, S.; Liu, S. Mechanisms underlying the effects of landscape features of urban community parks on health-related feelings of users. *Int. J. Environ. Res. Public Health* **2021**, *18*, 7888. [\[CrossRef\]](#)
16. Guan, S.; Wang, J. Research on the optimal design of community public space from the perspective of social capital. *Sustainability* **2023**, *15*, 9767. [\[CrossRef\]](#)
17. Livne-Tarandach, R.; Steckler, E.; Leigh, J.; Wheeler-Smith, S. Cultivating organizations as healing spaces: A typology for responding to suffering and advancing social justice. *Humanist. Manag. J.* **2021**, *6*, 373–404. [\[CrossRef\]](#)
18. Sweileh, W.M. Research landscape analysis on dual diagnosis of substance use and mental health disorders: Key contributors, research hotspots, and emerging research topics. *Ann. Gen. Psychiatry* **2024**, *23*, 32. [\[CrossRef\]](#)
19. Dushkova, D.; Ignatieva, M. New trends in urban environmental health research: From geography of diseases to therapeutic landscapes and healing gardens. *Geogr. Environ. Sustain.* **2020**, *13*, 159–171. [\[CrossRef\]](#)
20. Kearns, R.; Milligan, C. Placing therapeutic landscape as theoretical development in Health & Place. *Health Place* **2020**, *61*, 102224. [\[CrossRef\]](#) [\[PubMed\]](#)
21. Bell, S.L.; Foley, R.; Houghton, F.; Maddrell, A.; Williams, A.M. From therapeutic landscapes to healthy spaces, places and practices: A scoping review. *Soc. Sci. Med.* **2018**, *196*, 123–130. [\[CrossRef\]](#) [\[PubMed\]](#)
22. Szczygiel, B.; Hewitt, R. Nineteenth-century medical landscapes: John H. Rauch, Frederick Law Olmsted, and the search for salubrity. *Bull. Hist. Med.* **2000**, *74*, 708–734. [\[CrossRef\]](#) [\[PubMed\]](#)
23. Coutts, C.; Hahn, M. Green infrastructure, ecosystem services, and human health. *Int. J. Environ. Res. Public Health* **2015**, *12*, 9768–9798. [\[CrossRef\]](#) [\[PubMed\]](#)
24. Ulrich, R.S. Human responses to vegetation and landscapes. *Landsc. Urban Plan.* **1986**, *13*, 29–44. [\[CrossRef\]](#)
25. Ulrich, R.S. View through a window may influence recovery from surgery. *Science* **1984**, *224*, 420–421. [\[CrossRef\]](#)
26. Gesler, W.M. Therapeutic landscapes: Medical issues in light of the new cultural geography. *Soc. Sci. Med.* **1992**, *34*, 735–746. [\[CrossRef\]](#)
27. Rathmann, J. *Therapeutic Landscapes: An Interdisciplinary Perspective on Landscape and Health*; Springer Nature: Berlin, Germany, 2021.
28. Ulrich, R.S.; Berry, L.L.; Quan, X.; Parish, J.T. A conceptual framework for the domain of evidence-based design. *HERD Health Environ. Res. Des. J.* **2010**, *4*, 95–114. [\[CrossRef\]](#) [\[PubMed\]](#)
29. Chun, H.; Lee, S. A study on the design guidelines of healing landscape in housing complexes. *J. Korean Inst. Landsc. Archit.* **2016**, *44*, 26–37. [\[CrossRef\]](#)
30. Yan, Y.; Wang, C.; Quan, Y.; Wu, G.; Zhao, J. Urban sustainable development efficiency towards the balance between nature and human well-being: Connotation, measurement, and assessment. *J. Clean. Prod.* **2018**, *178*, 67–75. [\[CrossRef\]](#)
31. Gao, T.; Zhou, H. The Evolution and Potential of Emotional Healing Design: A Systematic Review with Thematic Analysis. *Sociol. Compass* **2025**, *19*, e70082. [\[CrossRef\]](#)
32. Marcus, C.C. Healing gardens in hospitals. *Interdiscip. Des. Res. e-J.* **2007**, *1*, 1–27.
33. Belčáková, I.; Galbavá, P.; Majorošová, M. Healing and therapeutic landscape design—examples and experience of medical facilities. *ArchNet-IJAR Int. J. Archit. Res.* **2018**, *12*, 128. [\[CrossRef\]](#)

34. Meng, X.; Zhang, M.; Lian, X. How environmental physical characteristics relate to children's restorative experiences and psychological well-being in Chinese primary schools: A qualitative study. *Build. Environ.* **2025**, *272*, 112653. [CrossRef]
35. Bornioli, A.; Subiza-Pérez, M. Restorative urban environments for healthy cities: A theoretical model for the study of restorative experiences in urban built settings. *Landsc. Res.* **2023**, *48*, 152–163. [CrossRef]
36. Browning, B. Healthier workplaces, happier employees. *People Strategy* **2015**, *38*, 14.
37. Hassan, A.; Deshun, Z. Better nature: Improved interactions with nature may reduce psychophysiological stress in Chinese adults. *HortScience* **2023**, *58*, 779–784. [CrossRef]
38. Ohly, H.; White, M.P.; Wheeler, B.W.; Bethel, A.; Ukoumunne, O.C.; Nikolaou, V.; Garside, R. Attention Restoration Theory: A systematic review of the attention restoration potential of exposure to natural environments. *J. Toxicol. Environ. Health Part B* **2016**, *19*, 305–343. [CrossRef]
39. Largo-Wight, E.; Chen, W.W.; Dodd, V.; Weiler, R. Healthy workplaces: The effects of nature contact at work on employee stress and health. *Public Health Rep.* **2011**, *126*, 124–130. [CrossRef]
40. Jiang, S. Therapeutic landscapes and healing gardens: A review of Chinese literature in relation to the studies in western countries. *Front. Archit. Res.* **2014**, *3*, 141–153. [CrossRef]
41. Ren, Q.; Weng, Y.; Hu, Z. A study of space creation for healing landscape design in the post-epidemic era. *Front. Psychol.* **2025**, *16*, 1618451. [CrossRef]
42. Shuhua, L.I.; Yanan, Y.A.O.; Lingshuang, M.E.N.G.; Huaizhen, Z.H.U. From Horticultural Therapy to Natural Healing: Types, Development, Mechanisms, and Prospects. *Landsc. Archit.* **2024**, *31*, 12–22. [CrossRef]
43. Wang, H.; Zou, Z.; Tsai, S.C. Exploring Environmental Restoration and Psychological Healing from Perspective of Resilience: A Case Study of Xinglin Bay Landscape Belt in Xiamen, China. *Int. J.* **2022**, *2*, 44–54. [CrossRef]
44. Du, H.; Li, S.; Jiang, B.; Chen, Z.; Long, H.; Yuan, X. Healthy City and Healing Environment. *South Archit.* **2022**, 1–8.
45. Kavoshpour, N.; Fattahi, K. Evaluating Design Parameters in Therapeutic Landscapes: The Role of Natural and Built Elements in Stress Reduction and Healing. In *Fábos Conference on Landscape and Greenway Planning*; University of Massachusetts Amherst Libraries: Amherst, MA, USA, 2025; Volume 8.
46. Yan, S.; Azmi, A.; Mansor, N.; Wang, Z.; Wang, Y. Healing spaces as a design approach to optimize emotional regulation for patients with mood disorders. *Buildings* **2024**, *14*, 472. [CrossRef]
47. Husada, U.C.; Louise, C.; Markes, A.; Saputro, D.; Bektı, A.S.; Andarini, S. Environmental Impact Analysis for Healing Mental Health Patient. *J. Community Health Prev. Med.* **2022**, *2*, 10–19. [CrossRef]
48. Miller, W.L.; Crabtree, B.F. Healing landscapes: Patients, relationships, and creating optimal healing places. *J. Altern. Complement. Med. Paradig. Pract. Policy Adv. Integr. Health* **2005**, *11*, s-41–s-49. [CrossRef] [PubMed]
49. Mossabir, R.; Milligan, C.; Froggatt, K. Therapeutic landscape experiences of everyday geographies within the wider community: A scoping review. *Soc. Sci. Med.* **2021**, *279*, 113980. [CrossRef] [PubMed]
50. Rigolon, A.; Browning, M.H.; McAnirlin, O.; Yoon, H. Green space and health equity: A systematic review on the potential of green space to reduce health disparities. *Int. J. Environ. Res. Public Health* **2021**, *18*, 2563. [CrossRef] [PubMed]
51. Hu, M.; Shao, J. Research on the Collaborative Innovation Path of Residential Community Landscape and Architectural Design under the Concept of Green Building. *Jushe* **2026**, 138–141.
52. Feitosa, F.O.; Wolf, J.H.; Marques, J.L. Spatial justice models: An exploratory analysis on fair distribution of Opportunities. In *International Conference on Computational Science and Its Applications*; Springer International Publishing: Cham, Switzerland, 2021; pp. 674–683.
53. Israel, E.; Frenkel, A. Social justice and spatial inequality: Toward a conceptual framework. *Prog. Hum. Geogr.* **2018**, *42*, 647–665. [CrossRef]
54. Shijiazhuang Municipal People's Government. Overview of Shijiazhuang. Available online: <https://www.sjz.gov.cn/columns/3b67f926-6962-4cac-96e8-480412da785c/> (accessed on 10 December 2025).
55. Shi, F.; Chen, Y.; Yue, W.; Wang, Y. High-rise residential district morphology optimization for enhancing the green space cooling effect. *Buildings* **2024**, *14*, 183. [CrossRef]
56. Shijiazhuang Municipal People's Government. Reply of the Civil Affairs Bureau of Shijiazhuang City to the Proposal No. 0377 of the Fifth Session of the 13th Committee of the Chinese People's Political Consultative Conference of Shijiazhuang City. Available online: <https://mzj.sjz.gov.cn/columns/91b66256-e2b1-4885-8d7e-8e07ebc5be9f/202108/06/f48f06e0-babf-46b4-8f75-2abf33726944.html> (accessed on 10 December 2025).
57. Wang, Y.; Wong, Y.D.; Goh, K. Perceived importance of inclusive street dimensions: A public questionnaire survey from a vision (ing) perspective. *Transportation* **2021**, *48*, 699–721. [CrossRef]
58. Fácányi, Z.; Keresztes-Sipos, A. Questionnaire-Based Surveys and Data Processing in Research of Community Urbanism. In *Proceedings of the 19th IEEE International Symposium on Applied Computational Intelligence and Informatics*, Budapest, Hungary, 19–24 May 2025.

59. Ameen, R.F.M.; Mourshed, M. Environmental, social and economic challenges for urban development: Stakeholder's perception in a developing economy. In Proceedings of the 16th International Conference on Computing in Civil and Building Engineering (ICCCBE2016), Osaka, Japan, 6–8 July 2016.
60. Abdalla, S.S.; Elariane, S.A.; El Defrawi, S.H. Decision-making tool for participatory urban planning and development: Residents' preferences of their built environment. *J. Urban Plan. Dev.* **2016**, *142*, 04015011. [\[CrossRef\]](#)
61. Wang, X. A Study of Healing Landscapes in Urban Parks Based on Questionnaires and SPSS Correlation Analysis:--Take Xiling Lake Park in Wu'an City, Hebei Province as an example. In Proceedings of the 2021 2nd International Conference on Urban Engineering and Management Science, Sanya, China, 29–31 January 2021.
62. Fainstein, S.S. The just city. *Int. J. Urban Sci.* **2014**, *18*, 1–18. [\[CrossRef\]](#)
63. Mehta, P.; Sari, S.; Mosqueda, T. *Community Visioning Through the Lens of Spatial Justice: A Guidance Framework for Inclusivity and Ecological Resilience*; OCAD University: Toronto, ON, Canada, 2024.
64. CorsinJiménez, A. On space as a capacity. *J. R. Anthropol. Inst.* **2003**, *9*, 137–153. [\[CrossRef\]](#)
65. Naor, L.; Mayseless, O. Therapeutic factors in nature-based therapies: Unraveling the therapeutic benefits of integrating nature in psychotherapy. *Psychotherapy* **2021**, *58*, 576. [\[CrossRef\]](#) [\[PubMed\]](#)
66. Ratcliffe, E. Sound and soundscape in restorative natural environments: A narrative literature review. *Front. Psychol.* **2021**, *12*, 570563. [\[CrossRef\]](#) [\[PubMed\]](#)
67. Turubarova, A.; Pozdniakova-Kyrbiatieva, E.; Hordiienko, N.; Zhrebtsova, T. The influence of color on the psycho-emotional state of individuals across different age periods. *Public Adm. Law Rev.* **2025**, *2*, 111–125. [\[CrossRef\]](#)
68. Zhang, X.; Ba, M.; Kang, J.; Meng, Q. Effect of soundscape dimensions on acoustic comfort in urban open public spaces. *Appl. Acoust.* **2018**, *133*, 73–81. [\[CrossRef\]](#)
69. Cai, D.; Hao, H. Strategies for natural healing design based on restorative environment theory. *J. Biotech Res.* **2025**, *21*, 247–254.
70. Elsadek, M.; Liu, B.; Lian, Z. Green façades: Their contribution to stress recovery and well-being in high-density cities. *Urban For. Urban Green.* **2019**, *46*, 126446. [\[CrossRef\]](#)
71. Chrysikou, E. *Architecture for Psychiatric Environments and Therapeutic Spaces*; SAGE Publications Limited: London, UK, 2014. [\[CrossRef\]](#)
72. Bignante, E. Therapeutic landscapes of traditional healing: Building spaces of well-being with the traditional healer in St. Louis, Senegal. *Soc. Cult. Geogr.* **2015**, *16*, 698–713. [\[CrossRef\]](#)
73. Perriam, G. Sacred spaces, healing places: Therapeutic landscapes of spiritual significance. *J. Med. Humanit.* **2015**, *36*, 19–33. [\[CrossRef\]](#)
74. Zhang, Y.; Kang, J.; Kang, J. Effects of soundscape on the environmental restoration in urban natural environments. *Noise Health* **2017**, *19*, 65–72. [\[CrossRef\]](#)
75. Li, Z.; Lin, L. Extraction of campus soundscape evaluation factors based on semantic segmentation method-taking the South Campus of Sun Yat-sen University as an example. *Planner* **2015**, *31*, 285–288.
76. Kang, J.; Zhang, M. Semantic differential analysis of the soundscape in urban open public spaces. *Build. Environ.* **2010**, *45*, 150–157. [\[CrossRef\]](#)
77. Fuqi, H. Research on the Evaluation and Protection and Utilization Strategies of the Soundscape of Traditional Villages of the Dong Ethnic Group. Master's Thesis, Hebei University of Engineering, Hebei, China, 2022. [\[CrossRef\]](#)
78. Demello, K.K. Healing Through Design: The Psychological Effects of Design on the Elderly. Doctoral Dissertation, University of Hawaii at Manoa, Honolulu, HI, USA, 2016.
79. Nosrati, A.; Pazhouhanfar, M.; Chen, C.; Grahn, P. Designing Stress-Relieving Small Inner-City Park Environments for Teenagers. *Land* **2024**, *13*, 1633. [\[CrossRef\]](#)
80. McIntosh, J.; Marques, B.; Cornwall, J.; Kershaw, C.; Mwipiko, R. Therapeutic environments and the role of physiological factors in creating inclusive psychological and socio-cultural landscapes. *Ageing Int.* **2022**, *47*, 433–446. [\[CrossRef\]](#)
81. Erdoğan, D. Landscape Design Criteria in the Development of Healing Gardens. *Ecol. Perspect.* **2025**, *5*, 59–74. [\[CrossRef\]](#)
82. Marques, B.; McIntosh, J.; Kershaw, C. Healing spaces: Improving health and wellbeing for the elderly through therapeutic landscape design. *Int. J. Arts Humanit.* **2019**, *2*, 20–34.
83. Giurgiu, M.; von Haaren-Mack, B.; Fiedler, J.; Woll, S.; Burchartz, A.; Kolb, S.; Ketelhut, S.; Kubica, C.; Nigg, C.; Timm, I.; et al. The wearable landscape: Issues pertaining to the validation of the measurement of 24-h physical activity, sedentary, and sleep behavior assessment. *J. Sport Health Sci.* **2025**, *14*, 101006. [\[CrossRef\]](#)
84. Su, B. Application of wearable sensors in urban landscape design: From the perspective of environment and health. *J. Biotech Res.* **2025**, *22*, 402–412.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.