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Research on Planting Design of Chinese Gardens from the Perspective of Environmental Psychology

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Abstract: With the transformation and development of the landscape design industry in China, the status of environmental psychology in design is increasingly elevated. The landscape plantings in traditional Chinese gardens, as a significant feature of local landscape development, provide excellent reference models for contemporary landscape design. This study integrates the plantings in traditional Chinese gardens with the basic concepts and principles of environmental psychology, analyzes the impact of traditional planting schemes on the psychology of viewers in terms of plant trait selection, spatial layout, and interactive experience, and explores how to optimize the planting design in modern garden landscapes through the principles of environmental psychology, to provide psychological perspectives for the practical development of Chinese garden landscape design.

Keywords: Environmental psychology; Garden design; Planting arrangement

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1. Environmental psychology

Environmental psychology focuses on people's experiences in specific environments, including their perception of landscape elements, responses to the environmental atmosphere, and overall satisfaction. According to environmental psychology theory, its elements can be divided into three aspects: the organism, behavior, and the environment. Plants themselves are part of the garden environment and also a direct factor that stimulates the organism to react. Therefore, in garden planting, attention should be paid to the physical feelings and real-world reactions of landscape participants. The cognitive processes of attention, memory, and thinking methods demonstrate the impact of landscape elements on people's perception and emotional responses. By using the feeling information transmitted by actual users, appropriate materials and elements can be selected to guide people's sensory experiences and create an engaging environment to better meet people's cognitive needs [1].

2. Planting in Chinese gardens

Due to the development history of Chinese gardens and their aesthetic intention of pursuing nature, plant elements hold an important position in Chinese gardens [2]. In landscape planting, three relationships need to be considered: First, the planting of different types of plants, which requires considering factors such as their mutual growth influence, landscape perception, and seasonal changes. Second, the relationship between plants and other garden elements, such as the landscape collocation between architecture, rockeries, water bodies, and plants. Third, the relationship between the planted landscape and landscape participants. For example, the psychological feedback of the colors, scents formed by plant combinations, and the landscape environment to landscape participants directly reflects the effect of plant planting. These three factors jointly influence the direction of planting design and its final evaluation.

3. Impacted objects

3.1. Impact on visual interaction

The visual sense is the dominant sense among all human senses. It can directly convey environmental information to people. Therefore, the visual landscape can provide people with more intuitive feelings [3]. The selection and collocation of plants can create a rich and colorful visual effect. Different psychological experiences can be created through the trait changes of different plants [4]. By varying the heights of plants, a sense of dynamics can be created, guiding people's lines of sight, adding a sense of layering to the space, and generating a sense of pleasure in exploration and discovery. In terms of the collocation with rockery landscaping, a common technique is to combine plants with rockeries to form a mimicry of natural mountain and river landscapes. In terms of the collocation with building landscaping, the planting breaks the rigid and straight building outlines, creating diverse viewing angles and visual feelings.

3.2. Impact on olfactory interaction

As the only sense that directly connects the brain to the external environment, the sense of smell not only plays an important role in breastfeeding, food-seeking, threat prediction, and interpersonal relationship regulation but also affects an individual's emotions [5]. Under normal circumstances, the olfactory interactivity shown in planting should generate positive emotional guidance, thus effectively enhancing the attractiveness and usage rate of the space [6]. In traditional Chinese gardens, spaces for planting plants with strong odor attributes, such as gardens and flower beds, are often set up. For example, in the Imperial Garden of the Forbidden City in Beijing, there are plants such as peonies, tree peonies, Chinese flowering crabapples, symbiotic cypresses, elms, plum blossoms, pomegranates, and pagoda trees. Tall trees like cypresses and elms provide fresh air for the environment, while shrubs like peonies and tree peonies provide the fragrance of flowers in specific seasons.

4. Strategies of environmental psychology in garden planting design

According to environmental psychology theory, the organism will respond with corresponding behaviors due to environmental stimuli and will also change the environment it is in due to different behaviors [7,8]. It emphasizes that it is not a simple combination of individual characteristics but also has strategies and characteristics that are not possessed by each part. However, as the endpoints of these two cycles, the organism

and the environment can effectively guide the presentation of the final result. Therefore, in garden planting, the characteristics of the organism and the environment composed of plants need to be considered. Under the guidance of this approach, garden planting can be summarized as: trait strategy, perception strategy, space strategy, and feedback strategy.

4.1. Planting methods influenced by the trait strategy

Plants are part of the environment. The trait strategy takes plants as the main body and landscape participants as the object, using the trait changes of the main body to stimulate the object to respond with different feelings. In planting design, the characteristics of plants often determine the effect and spatial feeling created. First, follow the characteristic strategy and carry out planting design according to the relevant elements of plants themselves, such as color, scale, flowers, leaves, fruits, and scents. By effectively considering the traits of plants, the spatial feeling can be accurately and efficiently influenced, and the organism can be stimulated to react.

4.2. Functional division influenced by the perception strategy

Vision can directly reflect the surrounding environment. The design of plant planting should first meet the visual aesthetic needs and provide positive stimuli to viewers. Use clear planting techniques to guide the viewing line of sight and reasonably allocate plant subjects and landscape objects [9]. Plants can affect the effective development of the spatial sequence. The evolution of the spatial sequence is the result of combining usage requirements. Planting should meet the functional division in the sequence. In the change of the spatial sequence: plants arranged in rows can increase the spatial fluidity and guide the line of sight, and are often used in passages, such as the cypresses planted on both sides of the passage in the Temple of Heaven; solitary plants need to display their characteristics, forming the landscape core in the space and slowing down the spatial fluidity; clustered plants can enrich the spatial landscape changes, increase the landscape experience, and slow down the spatial flow rate; paired plants will create a solemn and respectful feeling, emphasizing the landscape core point again.

Aromatic plants refer to plant groups whose leaves, flowers, fruits, roots, or the entire plant have a fragrance or can provide aromatic oils [10]. Planting aromatic plants in the garden can compensate for the shortcomings of visitors' olfactory experiences. At the same time, the scent of a plant can be associated with a region or a solar term. While providing visual stimuli, it can change the overall environment through its scent, making the organism respond accordingly. In traditional Chinese gardens, the scents of fragrant wood plants and fragrant herb plants are often relatively soft and stable, and they also play a good role in greening; fragrant fruit plants and fragrant flower plants have a limited lifespan and strong scents, and are mostly planted individually as ornaments or replaced regularly in planting. The scents of these plants are often used to enrich the sensory experience of the space and deepen the emotional connection to the garden [11].

4.3 Landscape creation influenced by the space strategy

Different landscapes can be created according to the scale relationship between space and plants [12]. For example, planting bamboo forests of appropriate scale on both sides of a primary road can guide tourists to the next space, while planting thick bamboo forests on both sides of a narrow road will greatly reduce the probability of tourists entering. Since plants can regulate the environment, using different design techniques in different spaces can create a temperature, humidity, and air in the garden space that is different from the

external space. This unique environment creation not only provides tourists with a pleasant experience but also has a positive psychological feedback effect [13,14].

4.4. Space guidance influenced by the feedback strategy

Use planting methods to provide timely and clear feedback on space use, guide tourists to complete the tour along the optimal route, or reduce the crowd density in narrow spaces, thus effectively dividing the actual use functions of different spaces. The interactive feedback of landscape gardens can effectively increase the mobility of people, guide tourists to suitable activity spaces and make them stay. That is, more exquisite landscape configurations are set up on the main axes and scenic spots of the landscape. Different colors, types, and shapes of plants are combined with landscape structures or water-rockeries. These obvious and attractive landscapes attract most tourists to go and stay at the main nodes, thus giving tourists positive emotional feedback and guiding subsequent tours [15].

5. Conclusion

This paper explores the design methods of Chinese garden planting from the perspective of environmental psychology, aiming to deeply explore the psychological impact of plants on landscape participants in gardens and how to optimize garden landscapes through the principles of environmental psychology. By analyzing the plant-planting schemes of traditional Chinese gardens, it reveals the complex impact mechanism of plant traits, cultural connotations, spatial layouts, and interactive experiences on the psychology of viewers. The introduction of environmental psychology enables us to understand people's perception and experience of plant landscapes more deeply, providing more entry points for garden landscapes and injecting new thoughts and inspiration into the field of landscape design.

Disclosure statement

The authors declare no conflict of interest.

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