

Therapeutic park design and effect validation in the Eco-city

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ABSTRACT: Ecology is an important part of sustainable urban design, and Eco-city has a healing effect for human. In this paper, the ecological park in Hexi District of Nanjing was taken as an example to explore and study the healing effect. The results demonstrate that the water landscape is the most healing element, followed by low vegetation and finally green trees for adults. This research has positive implications for urban designers and landscape architects.

Keywords: Ecological city; Healing landscape; Healthy city; Design psychology

1 INTRODUCTION

With the rapid development of urbanization in China, great pressure and damage have been caused to the whole ecological environment. Up to now, there have been many problems in urban construction. among which ecological urban design is one of the key problems. Especially in big cities, the harmonious relationship between urban construction and environment needs special attention. Ecological park design is one of the important representative means to meet the sustainable development of cities. At the same time, more and more researchers pay attention to the healing effect of Eco-city.

As a key part of ecological park, the study of green vegetation system has a great significance. Urban green spaces have positive effect on urban sustainability, such as reducing the heat island effect, lowering air pollutants, enhancing biodiversity and mitigating the effects of noise [1-5].

According to existing research, ecological park design can improve citizens' satisfaction, which is beneficial to people's physical health and happiness, especially for mental health [6-7]. for example, it can improve concentration, relieve stress, and has a positive effect on people working in big cities [8].

Examples of the positive effects of ecological parks on human health are as follows: Through the natural investigation, researcher conducted the exploration connection between green nature and human mental health [5]. Stress reduction tests have also been studied to check the restoration effect of ecological green space [9]. If children spend a long time in the ecological

park, their happiness will be improved [10]. The quality of ecological park design will directly affect the social behavior of visitors, especially for children [11].

In this paper, this article takes Nanjing as an example, combined with the design of ecological park, to deeply discuss the healing effect.

2 METHODOLOGY

2.1 study area



Figure 1 The boundary between the city and the park

Table 1 Design details in the park





A long view of the whole park is shown in figure 1. Because the park is located in the center of the city, the boundary between the building and the park can be clearly seen. The park provides the city residents with a place to rest on a daily life and at the same time, it provides psychological healing for the citizens. Table 1 reveals the design details in the Eco-park, which includes water landscape, green way, lawn, landscape corridor, green trees and green building.

2.2 Tool

In order to explore the healing effect of Eco-park, questionnaire survey method is applied to this paper, to confirm the favorite type of respondents.

2.3 Indicators

To evaluate the healing effect quantitatively, three kinds of indicators are applied in this study, which the emotional indicator (fear, happiness, and relaxation), cognitive indicator (compatibility and attention) and non-symptom indicator (anxiety and depression).

3 RESULTS AND DISCUSSION

3.1 Data statistics

Table 2 Psychological indicators collection

Psychological indicators	Visual parameters	Green space (%)	Water space (%)	Building area (%)
Emotional	Reduced fear	35	64	5.2
	Increased relaxation	45	75	4.6
	Increased happiness	38	82	5.1
Cognitive	Increased attention	33	67	3.8
	Increased	41	75	4.5

	compatibility			
Non-symptoms	Reduced anxiety	58	86	2.3
	Reduced depression	52	90	4.8
	Reduced worries	48	79	3.7

3.2 Results analysis

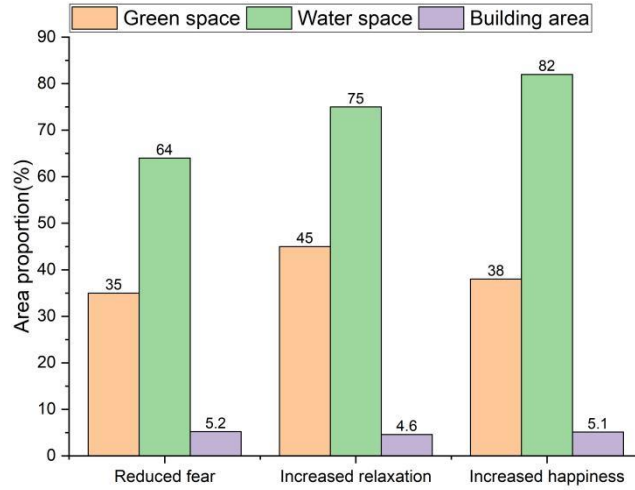


Figure 2. Emotional indicators comparison

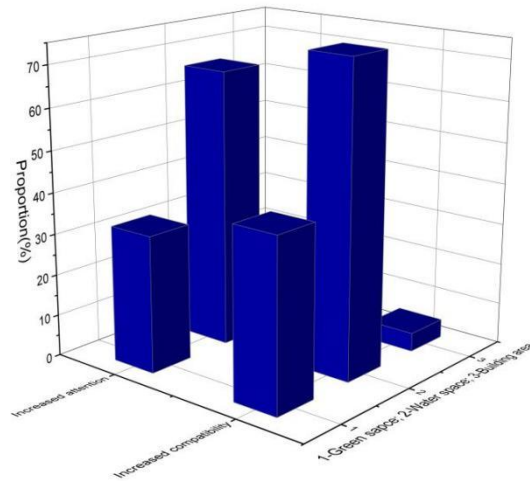


Figure 3. Cognitive indicators comparison

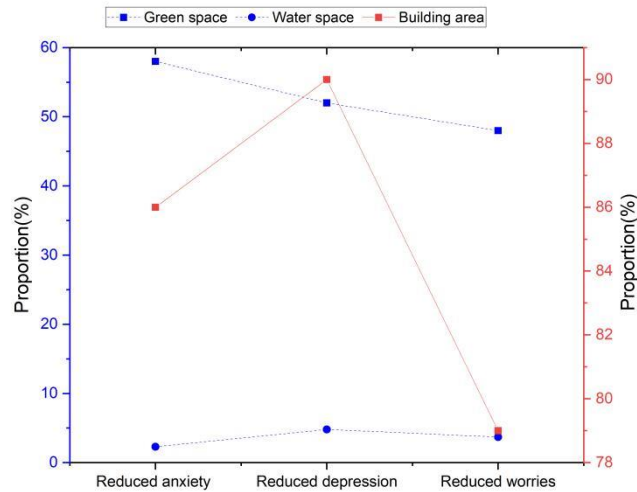


Figure 4. Non-symptoms indicators comparison

Data collection through questionnaire survey has been finished in table 2. The specific results have been displayed in figure 2, figure 3 and figure 4.

From the Emotional indicators to analyze, water space is the most important for the tourists, which can enhance happiness, reduce fear and increase relaxation. Citizens spend the most time near the water to talk with each other or enjoy the scenery. They confirm their pressure is slowly being released when they see the water landscape. The second most influential factor is the design of green space, which also has the healing effect. However, the healing effect of green space is less than that of water. The least effective healing is in building design, because city residents see too many tall buildings, they want to enjoy more natural scenery.

From a cognitive perspective and non-symptoms to discuss, similar conclusion can be got, water landscape design can improve attention and compatibility, reduce anxiety, depression and worries than green space and building design.

ACKNOWLEDGEMENT. The work described in this paper was supported by the Open Fund of the State Key Laboratory of Silicate Materials for Architectures (Wuhan University of Technology) (SYSJJ2022-16).

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