

Exploring the Characteristics of Urban Streets that Influence People's Restorative Experience

Xinyi Zeng*

The University of Sheffield, Sheffield S1 4TY, United Kingdom

*Corresponding author: Xinyi Zeng, 546184587@qq.com

Abstract: Research about restorative quality of landscape can help to mitigate possible negative effects of urban densification on people. Previous studies discussed the restorative experience on natural environments or urban open space. However, further research is needed on the application of restorative experience in specific scenarios, for example streetscapes. There are a few studies that have explored the relationship between restorative quality and the landscape characteristics on streets context. However, there is little research on the practice of these theories. This article delves into the study of its predecessors and summarizes the primary factors that influence the restorative ability of streets. Then, using these data in a case study, consider if streets that provide a positive experience for people have these restorative street qualities in common. In addition, this article investigates the potential street characteristics that influence street restorative value and identifies areas for development in these situations. The findings could lead to a more commonly applied method for creating a psychologically sustainable streetscape.

Keywords: Restorative experience; Streetscape; Landscape characteristic; Experiential landscape

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1. Introduction

With the increasing urban densification, it become important to explore the impact of urban open space on people's mental health. World Health Organization pointed that health is the complete health of physical, mental and social well-being. Although, many methods can mediate mental fatigue, some researches proved that landscapes are also important on it ^[1].

Some previous researchers found that nature environment can have psychological benefits for human's mental health ^[2]. There are two influential theories in this field, one is attention restoration theory (ART) presented by Kaplan and Kaplan in 1989 ^[3], another is the stress recovery theory (SRT) developed by Ulrich in 1981 ^[4].

According to Thwaites et al ^[5], urban open space has the ability to give people with a soothing experience. They developed the experience landscape theory in the context of common metropolitan landscapes that individuals encounter on a regular basis. As a result, it is critical to comprehend whether streets can contribute to people's mental health and what qualities of streets can have a good impact on people's mental health.

This literature review aims to investigate the restorative capacity of urban streets, identify the key landscape aspects on streets that enhance restorative quality, and investigate academic support for constructing sustainable restorative streets.

2. Method

For literature review, the information was acquired from journal articles on the website databases: the University of Sheffield library on StarPlus, Scopus, and Google scholar.

In terms of the case study, the author chose one based on the topic's relevancy and the features it possessed. The author employed a range of elements to evaluate the restorative capacities of each case study, including the diversity of vegetation and its quality, the building height and facade, and the traffic conditions of the streets, among others, for the specific analysis method. This will be used as a blueprint for future urban sustainable and street design.

3. Analyses of literature

3.1. Attention restoration theory

Kaplan state three interacting factors can cause people to face psychological pressure in their daily life, include advanced technology, the knowledge explosion, and the increasing population in the world ^[2]. Kaplan & Kaplan present that nature environment has rich characteristics for restorative experience and that can help alleviate the mental fatigue ^[3]. They conceptualized the attention restoration theory. Attention restoration theory means that the psychological benefits of nature environment can recovery people's directed attention.

The natural environment, on the other hand, can reclaim people's focussed attention through these elements. Mountains, streams, grassland, and lakes are just a few examples of natural places that can give individuals a sense of "Being Away." Though these elements work in an unobtrusive manner, they can provide people with opportunity to think about something else in their busy lives, and they can easily capture people's attention.

3.2. Stress restoration theory

Ulrich, developed a stress recovery theory. He found that patients feel more relax when they see nature than urban environment ^[4]. In his experiment, they provide sixty slides as simulations, and there are three types:

- (1) Natural environment with water.
- (2) Nature rich in greenery.
- (3) Urban without water or plants.

Nature and urban types of slides showed very different results, and nature environment was more beneficial to individuals' psychophysiological states. Furthermore, this research suggests that the contacts with nature not only have the benefits in environment aesthetics, but also can be beneficial to people's mental health.

However, Ulrich points that the results of this research cannot be consider as an indictment for urban environment on psychophysiological context. The urban environment with some nature content can have more positive effects on people's psychological condition.

3.3. Norberg-Schulz's spatial types

Norberg-Schulz ^[6] came up with a principal advocate to research the relationship between nature and the space and function of human lives. The essential concept of Norberg-Schulz's theory is conceptualizing human's movement and interaction with the surrounding environment by three-dimensional structure of space. Proximity means the spatial expression that represent people's natural sense of orientation.

Continuity represents individual's awareness of the objects beyond the locations being tightly connected. Change referred to the awareness of people that when they transformed from one space sensation to another. Moreover, these three categories of spatial sensation can be also interpreted as location, direction and transition. Kevin Lynch relates that the spatial sense of "continuity" is an important element for

human's psychological well-being ^[7]. The continuous and seamless spatial experience is essential and significant for individuals, and is consistent with Norberg-Schulz's spatial model ^[5].

3.4. Experiential landscape

Thwaites et al articulate the theory of experiential landscape place and its restorative potential of urban open space ^[5]. Thwaites's experiential landscape theory includes four spatial features: center, direction, transition and area. This experiential landscape theory can be interpreted by Norberg-Schulz's spatial model. The center represents a place that gives individuals a sense of being here and proximity, and it is a subjectively significant location. The term "direction" refers to a subjective sense of continuity that allows people to feel as if they are already there and know where they will be in the future. A place or area that stimulates people's sense of transformation is referred to as a transition. A place that can create a sense of cohesion and enclosure is referred to as an area. This notion can be used to analyze the quality of place and create a more sustainable home environment in modern urban design and landscape practice.

3.5. Restorative streetscape

Streets have tight connections with people's daily lives. Thus, it is also significant to explore the restorative effects of streets.

Lindal and Hartig investigated the relationship between vegetation and restoration possibility on urban streets, and they found that the presence of vegetation can influence restoration likelihood ratings ^[8]. It shows that streets with a significant number of trees and flowers provide a more restorative experience for people, and that both of these factors are influenced by perceptions of being away and fascination. Lindal and Hartig investigate the beneficial restorative impacts of physical attributes on residential streetscapes, focusing on architectural variety and building height ^[9]. Since different building characteristics offer more opportunities for people to explore and grab people's attention, higher degrees of architectural variation will contribute to a more restorative experience in the residential environment.

Zhao et al. analyzed the relationship between street characteristics and their restorative qualities in the urban environment ^[10]. The first major finding of their analysis is that higher-density greenery on city streets has a stronger positive impact on people's mental health. Second, clear traffic signals and fewer non-motor vehicles on the streets can help to improve the streets' restorative qualities. According to the literature review, the presence of plants, the shape of buildings, and traffic conditions on streets all have an impact on street restoration. The article will then investigate these qualities and their relationship to street restorative capacities in practice through case studies.

4. Case study

4.1. Bayswater road, London, the United Kingdom

Bayswater road is in the west of central London and it is the main road in the north of the Hyde park. Since it is located next to Hyde Park, this road has excellent ecological and natural environment. The surrounding area of this streets is very busy and prosperous. The buildings around Bayswater road are mainly hotels. In addition, there are also many cafes, shops, and restaurants on the north sides of the street. Hyde park contributes greatly to the aesthetic perception of the streets and the presence of natural elements. The plants on both sides of the road are very abundant, and there are even some very old trees.

4.2. Vegetation

Bayswater road are lined with lush greenery. Most of the street trees are have big canopies, it not only increases the proportion of the natural environment, but also can provide shade for pedestrians. Bayswater road also have some deciduous trees to bring beautiful colors for the street. Lush street trees and lots of

understory plants can increase the judgment of restorative experience together, and it can bring people the sense of being away and fascination. However, Bayswater road don't have much flowering trees or shrubs, which can be a significant factors to benefit individuals psychological restoration.

4.3. Architectural characteristics

Buildings along the Bayswater road have very beautiful and delicate appearance, and the height of these buildings are not too high. Most of them are traditional European architecture. According to Lindal and Hartig, fitness of Architectural surface and the height of the buildings can influence people's sense of being away and fascination^[8]. However, skyline of the building may relatively simple while most of the roofline silhouette are straight line. If the roofline of architectures is more various, it may be better to help restore people's direct attention. In sum, the buildings along the street are very beautiful and exquisite, but there is still room for improvement.

4.4. Traffic conditions

With three bus lines running along the route, Bayswater is a fairly busy street. Furthermore, it is adjacent to the Paddington railway station, which means there is a lot of traffic. However, on both sides of the roadway, there are few non-motor vehicles, and the street surface appears to be wide and clean. When people travel down this route, they get a sense of order and security. As a result, it may be able to assist in improving the restorative environment on Bayswater Road and restoring people's mental health.

4.5. Other factors

Bayswater road is besides Hyde park, thus it offer opportunities for pedestrians to contact with more complex nature environment except only street trees. People can see the wide grassland and dense woodland in Hyde park from Bayswater road, and it can rich the nature landscape along the street and further enhance the restorative likelihood of pedestrians.

5. Results and discussion

According to the literature review, the presence of greenery, the type of architecture, and the traffic conditions on the street are the three primary elements that will boost inhabitants' restorative experience on the streets. For starters, abundant and diverse plants can improve pedestrians' mental health. According to past study, being in a natural setting can help people feel less mentally exhausted and have better psychological states. Aside from ornate building facades, different rooflines of buildings, and low-rise buildings, the restorative quality of streets can be improved. Finally, safe and legible traffic conditions will contribute to a more restorative experience on the streets. Aside from these three criteria, there are other features that help the urban restorative environment that may also apply to the streetscape, such as the ability for people to interact in their surroundings. This study could help to create a more sustainable urban environment and contribute to future urban planning.

Disclosure statement

The author declares no conflict of interest.

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