

How does enclosure influence environmental preferences? A cognitive study on urban public open spaces in Hong Kong



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ABSTRACT

Open space can be stress alleviating and healing through the appropriate enclosure. Based on theories about environmental preferences and empirical studies on spatial enclosure, this study examined the relationship between environmental preference indicators and enclosure of urban public open spaces in Hong Kong. The preference indicators including four perceptual attributes and feedbacks on six feelings were evaluated together with the spatial enclosure of 178 subjects based on images of 26 single spaces selected in Hong Kong. All of the four perceptual attributes and five out of six feelings showed significant differences between different spatial enclosures. The results showed that subjects from Hong Kong tended to prefer more open spaces to enclosed ones. Through further interpretations, paths, visual connection with adjacent spaces, and a clear and simple spatial structure of enclosure seemed to influence subjects' feelings and their preferences towards certain spaces. When spatial enclosure is somehow ambiguous, the space could still be preferred as long as the relationship between the single space and its adjacent spaces is clear. Design implications are then discussed for public space in high-rise high-density urban contexts.

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1. Introduction

Open spaces located between buildings and working as connections between surrounding environments, provide a sense of direction by integrating and organising different places and elements; they also provide an aesthetic sense by involving attractive surroundings and creating visual surprises (Payne, 2009). Especially in a compact urban environment where people are exposed to high levels of environmental and mental stress in their daily life (Hammen, 2005; Sagerstrom & Miller, 2004), the design of open spaces goes far beyond providing just a crossing place; it should also be healing – serving functional as well as mental needs. Therefore, encouraging the provision of open space in high-rise living environments is seen as an important urban design guideline for high-rise high-density cities like Hong Kong. To support the planning and design of such open space for public use, the Hong Kong Government has published a series of guidelines, such as “Recreation, Open Space and Greening” (Hong Kong Planning Department, 2007), “Public Open Space in Private Developments Design and

Management Guidelines” (Hong Kong Development Bureau, 2011) etc. with the aim of effectively providing planting and facilities in open spaces and to maximise accessibility and usability of open spaces. However, the focus and attention are on functionality (Lo & Jim, 2012) and physical comfort (Ng & Cheng, 2012; Yang, Lau, & Qian, 2010); while psychological impacts an open space might have on its users are not yet addressed in these guidelines and relevant studies. Open space should be stress alleviating and healing through greenery and other natural elements, and also through the appropriate degree of enclosure. The former can be found in a rich body of literature (Adevi & Mårtensson, 2013; Evans & McCoy, 1998; Hartig & Marcus, 2006; Lau & Yang, 2009) while the latter is less investigated.

According to the Oxford English Dictionary (Kay, 2010), to enclose is “to surround (with walls, fences, or other barriers) so as to prevent free ingress or egress.” An enclosure is “wherewith something enclosed; . . . an encompassing fence or barrier; buildings around a court . . . that which is enclosed . . . a space included within or marked off by boundaries”. Enclosure's essential function has been highly emphasised from the beginning of definitions of outdoor space. For instance, garden, derived from the Indo-Germanic word *ghorto-s*, means wattle, fence, enclosure; park, from the Middle Latin *parricus*, means fenced-in space, enclosed hunting grounds or forest (Olonetzky, 2007). The boundary of the

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space defined by the enclosing barricades subsequently decides the structural and ordering characteristics of the space (Bell, 2004). Besides this, enclosure is vital, not only to space, but also to people who experience the space. As cited in Norberg-Schulz (1968), “the definition and enclosure of a domain . . . fixed the emotionally insecure limits between the ego and the outer world,” and it is “man’s first architecturally important intrusion into his environment”. He also suggests that the brain has a fast response to spatial enclosure because safety is an important function of environment. This has been supported by later scientific research, when a region in the human brain was identified as specifically responding to enclosure (Epstein & Kanwisher, 1998). Under such circumstance, users’ experience and preference towards different spaces might vary according to different configurations of enclosing barricades, even when the same materials are employed.

The objective of this article is two-fold: the first is a literature review to capture main design elements and findings to complement open space design guidelines; the second is to conduct a cognitive study to explore less-established relationships between degree of enclosure and perception of identified design elements in a compact urban context.

2. Literature review

Theories, such as the prospect and refuge theory (Appleton, 1975, 1990, 1996), theories of ecological psychology (Gibson, 1986) and environmental preference framework (R. Kaplan & S. Kaplan, 1989), consider enclosure contributes significantly to feelings of security and safety, and even survival (Hildebrand, 1991; Nasar & Jones, 1997; Stamps, 2005). Among these theories, the environmental preference framework developed by R. Kaplan & S. Kaplan, (1989) based on lots of studies is striking as it discusses indicators of preference which directly connect to spatial characteristics. The framework contains four indicators of environmental preference: coherence, legibility, complexity, and mystery. According to the framework, coherence refers to the extent to which the scene “hangs together”. Greater coherence leads to greater preference. Legibility is the extent to which an environment can be “read” easily, or the extent to which it appears as if one could explore it extensively without getting lost. More legible environments are preferred over less legible ones. Legibility can serve human beings’ need to efficiently comprehend and predict (S. Kaplan, 1976; S. Kaplan, R. Kaplan, & Wendt, 1972; Lee, 1979; Ulrich, 1983). Complexity reflects the number and variety of elements found in a scene. Greater complexity leads to greater liking, as long as it does not become too extreme. Finally, mystery implies a promise that one could obtain further information if one walks deeper into the scene (R. Kaplan, S. Kaplan, & Ryan, 1998). Mystery is identified in environments that promise new information with a change in vantage point, which serve evolving organisms’ knowledge-hungry state (Appleton, 1975; Kaplan, 1977).

At the same time, nature and gardens have been revealed as leading to positive feelings. For instance, nature evokes feelings of pleasure, sustained attention or interest, relaxed wakefulness, and diminution of negative emotions, such as anger and anxiety (Rohde & Kendle, 1994). According to interviews conducted in health-care facilities, gardens within such facilities make users feel more relaxed and calmer, as well as refreshed and rejuvenated (Marcus & Barnes, 1995), while community gardens were reported to help improve a sense of security and safety in local communities (Ferris, Norman, & Sempik, 2001; Schmelzkopf, 1995).

Besides this, numerous studies on enclosure-related spatial features have revealed a close relationship between these features and people’s preference, and even human beings’ instinctive need for safety and survival. Having been examined many times

by different scholars or with different experiment designs, those identified relationships have been confirmed again and again. Such enclosure-related spatial features include space size (Garling, 1969), or horizontal area (Stamps, 2009, 2011); height of back walls (Hayward & Franklin, 1974), or boundary height (Stamps, 2005, 2011); distance of the back wall (Hayward & Franklin, 1974), or depth (Stamps & Smith, 2002), or elongation (Stamps, 2011); as well as number of open sides (Stamps & Smith, 2002), or openings in the barricade, physical and visual access (Stamps, 2005).

The literature review enlightens this research with how to measure the enclosure and which enclosure-related environmental preferences should be investigated for psychological well-being, which is further elaborated on in the section on Methodology to instruct the design of a cognitive study.

3. Methodology

To test subjective responses to open spaces with different spatial settings, this study adopted an imagery approach based on cognitive sciences (Johnson-Laird, 1980) allowing subjects to perceive, familiarise themselves with, memorise, sense, and respond to a series of differently enclosed open spaces in images. These spaces were photographed within or near public housing estates.

More than 160 public housing estates have been developed during the last 60 years in Hong Kong. These estates serve over two million people, which is nearly one-third of the entire population of Hong Kong (Hong Kong Housing Society, 2005). For this group of residents, public open spaces are constructed and accessible within or near their estates. All of these public open spaces are managed by the Leisure and Culture Department of the Hong Kong government, under the same management standard, which covers security patrols, regular cleaning, and facility maintenance, as well as furniture (i.e., lighting fixtures, benches, and rubbish bins) selection and maintenance. As a result, differences between these spaces mainly lie in spatial configuration, including enclosure extent and structure. According to observations, these spaces are mainly and frequently used by nearby residents. Therefore, residents in public housing estates were selected as subjects. The general process is as follow (Fig. 1).

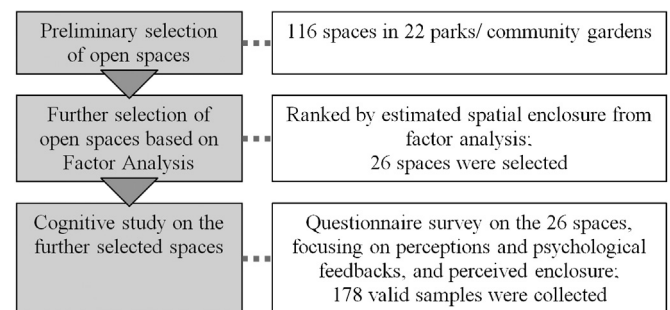


Fig. 1. Research design.

3.1. Selection of open spaces

At the beginning, 116 spaces with clear boundaries and different configurations of enclosure (enclosing materials and manner of enclosure) were selected from 22 parks or community gardens within a distance of 0.4 km of three or more public housing estates (Hong Kong Housing Society, 2005; Hong Kong Planning Department, 2007). However, the energy or capacity of one subject to judge efficiently is limited. Subjects would have become tired if they had been asked to judge all 116 spaces at one time. Under such circumstance, the precision of their judgments would decrease due to attention fatigue (Laumann, Gärling, & Stormark,

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