



Research paper

Environmental affordances: A practical approach for design of nearby outdoor settings in urban residential areas



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HIGHLIGHTS

- Participant-generated photo grouping is proposed to interpret preferences.
- The proposed approach serves as a practical tool for people-oriented design process.
- The most preferred environmental affordances are community gardens.
- Dense plantings and enclosure are most preferred attributes of gathering spaces.
- Seating areas that encourage socializing are most preferred.

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ABSTRACT

While daily contact with nature is essential in large cities, such opportunities are often limited, thus reducing chances for psychological restoration. Even if available, however, such places will not be used if they fail to meet residents' needs and preferences. This study focuses on the preferred qualities of nearby nature in terms of both environmental affordances and design characteristics in urban neighborhoods. The study was conducted in the Logan Square Neighborhood in Chicago, IL, and involved 53 individuals. The research instrument was a set of 93 photos arranged in columns, depicting a variety of commonly used landscape design elements and urban outdoor scenes. Participants selected their preferred scenes and grouped them based on what they considered meaningful. The findings offer evidence of participants' preference for small green spaces that provide opportunities for both socializing and growing plants. This study illuminates interconnections between environmental affordances and green space design attributes that address participants' concerns and expectations. It uncovers the importance of environmental affordances in green space preference studies, a topic that is largely missing from existing work on landscape preference. Further, it showcases a novel method—the use of participant-generated photo grouping to better understand the basis of preferences. The method emerged from pragmatic application of the Environmental Affordances Theory from Environmental Psychology to the landscape planning and design process. Finally, the results were used to create a set of useful recommendations to help urban planners and designers create more livable spaces in dense urban areas.

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1. Introduction

There is a large body of research on the significance of nearby nature in terms of its positive effects on wellbeing (Hartig et al., 2011; Kaplan & Kaplan, 1989; Kaplan, 1995; Ward Thompson, 2011). In large crowded cities, however, the opportunity to have

daily contact with nature is generally infrequent. This highlights the importance of considering all possible pieces of urban open space for their potential as restorative environments for residents. Such places, though will not be used if they do not meet residents' needs and preferences. It is thus advisable to investigate the residents' needs and preferences before making decisions on planning and design of public outdoor spaces in order to create nature settings that encourage people to use them more frequently. While there is a substantial literature on environmental preference (Han, 2010; Herzog, 1989; Kaplan, 1973; Schroeder & Orland, 1994; Van den Berg, Hartig, & Staats, 2007), relatively few empirical studies

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(e.g., Nordh & Østby, 2013) have focused on preferred qualities of the nearby nature in terms of the design characteristics of such spaces in urban residential neighborhoods. The key concern of this study is to explore the interconnections between residents' perception of and preferences for the physical qualities of nearby outdoor environments. It tests an approach for interpreting preferences by focusing on environmental attributes and affordances as a tool to extract practical design solutions for outdoor green spaces in urban areas.

Furthermore, as Brown and Corry (2011) suggest, landscape architecture needs to move toward an evidence-based profession in terms of social and cultural components of design, and use scholarly evidence in making decisions about the use and shaping of the land. Evidence-based design process bridges the gap between scholars and practitioners in landscape architecture and related fields. During this process scholarly information is transformed and interpreted for direct application by design practitioners. Drawing on linkages between the disciplines of environmental psychology and landscape architecture, the analytical approach used in this study demonstrates the translation and interpretation aspects of evidence-based design. By virtue of the methods selected in this research to study the nature of preference for landscape characteristics, our outcomes offer direct applications in support of a people-oriented design.

1.1. Environmental preference and affordances

Drawing on previous experience, preference judgments are based on perceptions (Kaplan & Kaplan, 1989) and are linked to basic concerns and needs. As a key element of preference, perception is defined as the process of achieving awareness and comprehending sensory information (Bell, 1999), incorporating both the content of a scene and a very quick unconscious assessment of what it is possible to do in the setting (Kaplan & Kaplan, 1989). Gibson (1979) proposed that people recognize opportunities for action in the environment by perceiving the affordances of either objects within the environment or the environment itself. According to Gibson's affordance theory, for an environment to be preferred over others it must afford the functions that are important and meaningful to individuals, and might also afford activities that other environments do not support (Clark & Uzzell, 2006). According to this approach, even pleasure and beauty can be considered as environmental affordances (Grahñ & Stigsdotter, 2010) because they reflect an assessment of the environment in terms of its compatibility with human needs and purposes, which affects effective human functioning in the settings (Kaplan & Kaplan, 1989). We can explore the environmental affordances and attributes through preference research to learn about those that are more important and meaningful to people.

Over the last four decades a large experimental literature has focused on preference studies using slides or photographs as an instrument to investigate people's preferences (Hartig & Staats, 2006; Herzog, 1985; Herzog, 1989; Kaplan, 1973; Korpela, Kyttä, & Hartig, 2002). It has been shown that photographs can be used with confidence in preference judgments and perceptual studies as surrogates for actual landscapes (Coetier, 1983; Kaplan, 1985; Shuttleworth, 1980). These studies generally used a 5-point rating scale of preference as the dependent variable, tried to sample widely in terms of the range of scenes presented within a certain type of environment. The studies have varied in the types of environments considered, including both the built and the natural environments (Hartig & Staats, 2006; Herzog, 1989; Kaplan, 1987), specific types of natural spaces (Balling & Falk, 1982; Han, 2010), forest environments (Herzog, 1984; Kearney & Bradley, 2011) and waterscapes (Bulut & Yilmaz, 2009; Herzog, 1985). However, a substantial number of studies have focused on preferences for urban

nature settings (Kaplan & Kaplan, 1989). For instance, some studies focused on urban environments with a variety of natural elements in conditions from well-maintained to neglected (Herzog, 1989); some focused on parks (Payne, Mowen, & Orsega-Smith, 2002) and some investigated preferences for specific landscape styles such as desert landscapes (Larsen & Harlan, 2006).

The few preference studies that have focused on environmental affordances of urban settings as the predictor of preference (Clark & Uzzell, 2002; Kyttä, 2002; Min & Lee, 2006), have tended to be limited to specific age groups such as children and adolescents. The fundamental assumption of most of these studies is that preference for a place relates to the function and use of the place by children and adolescents; in other words, liking a place is associated with its social, physical and emotional affordances (Clark & Uzzell, 2006; Heft, 1988; Roe & Aspinall, 2011). These studies provide illuminating results in terms of the significance of social, physical and emotional affordances of the environment. However, they do not address the design attributes of the spaces and thus do not make the linkages between the findings and planning and design processes. In one of the few examples of linkages between affordances and design attributes, Nordh and Østby (2013) asked participants to indicate the types of activities they could imagine doing in the parks presented in a set of photos. The study's focus on activities differs from the aim of the current study, which is to examine preferences for urban nature settings. Although we focus on environmental attributes and affordances as a tool to link adults' preferences with planning and design considerations, the participants are not directly asked about affordances. It should be acknowledged that the role of environmental affordances as a critical aspect of landscape preferences emerged during the process of data analysis, thus leading to organizing the presentation of the results in terms of both affordances and attributes.

1.2. Perception of affordance-attribute interactions

Although it is easy for participants in preference studies on outdoor spaces to make judgments, they are generally unable to explain their choices in terms of the reasons behind their judgments (Kaplan, 1987). Many preference studies have explored the way people perceive the environment by statistically extracting perceptual categories based on the participants' preference ratings of photos or slides. The groupings identified across a great diversity of studies provide some insights into the significant aspects of environmental perception (Kaplan & Kaplan, 1989), but they are not intended to link directly to specific environmental affordances or affordances. Rather than using preference ratings of individual images, the study presented here examined preference judgments by asking the participants to pick the pictured scenes that they prefer relative to other scenes. Participants were then asked to group the selected scenes into personally meaningful groups and describe each group in a few words. The preference and categorization task provides the basis for examining the interconnections between perceived attributes and affordances of the depicted environment. These in turn illuminate place-based practical design implications that can help designers create outdoor spaces that are more attuned to what people need and appreciate.

2. Methods

2.1. Photo set

A hundred photos depicting a variety of commonly used landscape design elements and urban outdoor scenes typical of the style found in the Chicago neighborhoods under study were downloaded from the web. To avoid the possible effects of familiarity on

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