Urban Forestry & Urban Greening 10 (2011) 95–103

Contents lists available at ScienceDirect

Urban Forestry & Urban Greening

journal homepage: www.elsevier.de/ufug

Assessing restorative components of small urban parks using conjoint methodology

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ARTICLE INFO

Keywords:
Attention restoration
Landscape architecture
Park design
Restorative environment
Stress recovery

ABSTRACT

Many studies have supported the proposition that natural environments contribute positively to psychological restoration. Less attention has been given to the relative importance of the physical environmental components that contribute to the restorative potential of such environments. The aim of the current study was to investigate the relative importance of environmental components, in small urban parks, for people looking for somewhere to sit down and rest. To address this aim, we used choice-based conjoint analysis, coupled with hierarchical Bayes estimation, to assess the utilities assigned to grass, bushes, trees, flower beds, water features, and the number of other people in the park. Via a web-based questionnaire, adult residents of Oslo, Norway ($N = 154$) were presented with text describing successive pairs of park alternatives. Each alternative was comprised of a set of environmental components at different levels. The respondents were to choose the preferred alternative in each pair, given that they were fatigued and looking for a place to rest for a little while. The amounts of grass, trees and other people had the most influence on their choices among park alternatives. Responses across groups defined by age, gender and earlier experience with parks and nature were relatively homogenous. From a planning perspective, the findings indicate the importance of focusing on structural components such as grass and trees rather than decorative components such as flowers and water features.

Introduction

Scientific knowledge about nature as a setting for restorative experiences has developed mainly during the last 50 years (for reviews, see Knopf, 1987; Hartig, 2007). Many of the empirical studies have compared natural settings with outdoor public urban spaces that are predominantly built (see for example Hartig et al., 1996; Laumann et al., 2001; Herzog et al., 2003; Hartig and Staats, 2006). Such research has supported general policy and planning measures, such as the preservation of natural areas (e.g., County of Stockholm, 2003). However, the studies provide relatively little guidance for specific environmental design measures (Velarde et al., 2007). The need for such guidance is growing (James et al., 2009). In Europe and elsewhere, the trend in city planning is towards densification (Beatley, 1999). Given that densification commonly entails the loss of access to some natural areas and open spaces within cities, it is of pressing importance to identify ways to create opportunities for restoration with the outdoor spaces that remain accessible to the public within cities (Thwaites et al., 2005; Van den Berg et al., 2007).

In this study we focus on small parks and open spaces as settings for psychological restoration. This focus encompasses a range of outdoor public spaces, from grey ones, square-like, with hard ground cover and little vegetation, to green ones with much vegetation. The type of park is referred to as a pocket park (Nordh et al., 2009). All pocket parks of interest here are open to the public and located near a city centre, among dwellings, businesses, and other buildings. They are no bigger than an ordinary city block. These spaces presumably will become increasingly important as settings for restoration as the demand for densification of cities increases. They provide opportunities for restoration near the workplaces and homes of urban residents. They function as spaces where people can get away from daily demands mentally and physically and become pleasantly engaged by the greenery and other features (Kaplan, 1995; Kaplan et al., 1998; Nordh et al., 2009).

Small parks may function well as settings for restoration. The possibility for restoration afforded by a pocket park is not only a matter of its size, but also a matter of its design and the components used to create it (Nordh et al., 2009). By exploring

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doi:10.1016/j.ufug.2010.12.003

the relative importance of specific components in the environment, rather than comparing examples from broad categories of natural and built as in much research on restorative environments, this study helps to fill a gap in the empirical literature concerning restorative environments (see for example Velarde et al., 2007). It also provides potentially valuable information to professionals working with landscape architecture and planning who must make decisions about the design of our future cities (James et al., 2009).

The components of interest in this study are grass, bushes, trees, flower beds, water features, and the number of other people in the park. The choice of components is based on research by Nordh et al. (2009, 2010). In a study concerned with the restorative quality of small urban parks and open spaces in Scandinavia, Nordh et al. (2009) found that the environmental components most predictive of the judged likelihood of restoration were the percentage of ground surface covered by grass and the amount of trees and bushes visible from the given viewing point. The more vegetated the image was, the higher the aggregate rating of restoration likelihood it received.

The study by Nordh et al. (2009) focused on visual aspects of pocket parks, using photographs as the media for presentation of the parks to research participants. In the present study we used a web-based approach, presenting lay people with brief texts that described different combinations of physical components in a pocket park. By presenting the environments with words instead of photos, the approach relied on the respondents' ability to imagine the different alternatives by referring to their own experiences. The components all commonly exist in pocket parks; even people without any professional knowledge should be able to imagine them.

Although we assumed that most if not all people could imagine the different park components on the basis of past experience, we did not assume that all people would assess the different components similarly. For example, previous research indicates that demographic factors can influence environmental preferences (Stamps, 1999). Information on such differences may also be of interest to practitioners in planning new pocket parks. We decided to compare evaluations of the park alternatives on the basis of our respondents' age, gender, frequency of park visits, and earlier professional experience with parks/nature. This set of variables overlaps with the set of variables examined by Aspinall (2007), who performed a cluster analysis to identify subgroups within a sample of visitors to woodlands.

Our use of text in presenting the different parks was in line with our use of choice-based conjoint analysis, a method that enables examination of preferences for various attributes and levels of attributes that define alternatives. In this study the attributes are the different park components. There are three primary methods or types of conjoint analysis: conjoint value analysis, adaptive conjoint analysis and choice-based conjoint analysis (Orme, 2009). We adopted choice-based conjoint (CBC) with a full profile set up as recommended when the alternatives have six or fewer attributes (Orme and King, 1998; Orme, 2009). With a full profile set up, each park component of interest is presented at some level in a given park alternative. The levels used are realistic descriptions of the possible variation in the attribute (e.g., many trees, a few trees or no trees).

Conjoint analysis has mainly been used in marketing research in the development of new products (Orme, 2009). In our case, the park is the "product", elaborated in terms of different park components. Respondents were presented with pairs of park alternatives which differed in the levels of different components. Given a pair of alternatives, each with six components at different levels, the respondent's task was to choose the alternative that was best for him or her. In the present study, the matter of what is best was framed in terms of the possibility for needed restoration. The method provides a set up that reminds respondents of real world choices; it creates a realistic choice situation to which respondents can relate and in which they can make trade-offs.

Utilities represent the degree of worth or preference assigned by an individual to the different levels of the park components. These utility values cannot themselves be compared across components, but they can be used to calculate the relative importance of different components. Relative importances represent the 'weight' or the maximum influence park components may have on the choice of parks, bearing in mind the levels of the components. The significance of such a measure lies in the fact that it is ratio-scaled and sums to zero; that is, a component with an importance of 20% is as twice important as a component with an importance of 10% with regard to how the respondents made their choices given the set of components under study. This has practical implications as it suggests that meaningful comparisons can be made in terms of the potential influence of the park components within a study. Such comparisons can inform practitioners' decisions on where to focus attention in order to enhance the potential restorative experience of a park or to attract different segments of people (e.g., a particular age group).

In sum, the aim of the present study was to assess the relative importance of specific components in Scandinavian pocket parks using conjoint methodology. Via a web-based questionnaire, residents of Oslo were presented with brief texts that described different combinations of physical components in a pocket park. The components under study were grass, bushes, trees, flower beds, water features, and the number of other people in the park.

Method

A web-based questionnaire was constructed using Sawtooth Software SSI Web version 6.4.4. With the web-based set up, respondents could log on to the survey from any computer with a web connection.

The park components

Choices regarding components and levels of components are of great importance in conjoint studies. Small differences between levels can affect the calculation of utilities and in turn the determination of the relative importances assigned to the different components. As mentioned previously, our choice of components for the alternatives (grass, bushes, trees, flower beds, water features, and the number of other people in the park) was based on the findings from Nordh et al. (2009, 2010). The levels of each component, except for water and flowers, were none, a few, and many (e.g., no trees, a few trees, many trees). These three levels give clear and separable distinctions between the park alternatives. The levels for water features were no water, mirror pond, and small fountain. Flowers had only two levels, flowers and no flowers (see Fig. 1).

All of the components except for other people can be used by a landscape architect when designing small urban parks. They also commonly appear in Scandinavian parks. The variable "other people" was in Nordh et al. (2009) found to have a weak bivariate association with restoration likelihood. However, in subsequent work with eye-tracking methodology, Nordh et al. (2010) found that the presence of people in a park image attracted visual attention. This result and the assumption that the presence of other people can influence the possibility for restoration (Ulrich et al., 1991; Staats and Hartig, 2004) led us to include this component in our study.