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Are livable elements also restorative?

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ABSTRACT

The present study examined whether three elements claimed by Whyte (1980) as making plazas more livable – seating, triangulation, and food – also make plazas more restorative. We manipulated color slides of three plazas for the presence or absence of each element. Sixty participants (23 men, 37 women) rated each plaza, presented in random order, on a five-item restorativeness scale (PRS_5). The scale proved reliable, we found no gender differences in response and found that adding triangulation (sculpture) or adding both sculpture and seats to plazas improved restorativeness, but that plazas with all three elements had lower scores than plazas with two of them. These findings echoed earlier findings for livability. We also examined complexity, because it might affect fascination, preference, and thus restorativeness. Restorativeness and its items did not relate to restorativeness. We found that differences in perceived livability and restorativeness related to two restorative properties: fascination and coherence.

1. Introduction

Restorative environments, primarily natural environments, replenish mental capacities, reduce stress, and improve emotional states (Kaplan, 1995; Kaplan & Kaplan, 1989; Ulrich, 1984; Ulrich et al., 1991). Livable spaces (Whyte, 1980) also have positive effects. They may enhance human sense of attachment, social life, mental and physical health and quality of life (Amin, 2008; Madanipour, 2010; Whyte, 1980, 1988; Wooley, 2003). We wondered if elements that contribute to livable places would also enhance restorativeness.

Whyte's (1980, 1988) Street Life Project brought attention to livability and its use to improve public places. It sought to identify the elements that made plazas vibrant and inviting, or in Whyte's terms, livable. Because livable and livability have broader meanings in urban design, we henceforth refer to them as "visitable" and "visitability" instead. Whyte's team observed, photographed, and filmed people's behavior in sixteen plazas and three small parks, in New York City over three years during different times of the day, days of the week, and seasons. They also interviewed plaza users, took physical measures (e.g. dimensions of sitting spaces, sound levels), and documented other characteristics of the plazas (such as size, layout, surrounding, sunny and shaded areas, gender and age of users). The project identified seven elements that enhance visitability: *sitting space*, *access to the street*, *sunlight*, *wind*, *trees*, *water*, *food*, and *triangulation*. Whyte characterized these features as follows.

- *Sitting space* is the most important factor. Plazas that had lots of sittable space, with various locations, characteristics, types and flexibility attracted more use.
- *Triangulation*, some unusual element such as a performer or a sculpture, leads passersby to stop and talk. The right sculpture can lead people to stop, look touch and talk about it. Although Whyte (1980, 1988) does not mention it, a triangulation element can serve as local landmark (such as the waterfall in Paley Park), drawing attention to it (Appleyard, 1969; Evans, Smith, & Pezdak, 1982) and adding fascination to a place.
- *Food* attracts people which in turn attracts more people
- *Access to the street* is also important. People like to watch people, so a plaza should connect to the street such that passersby can look into the plaza and people in a plaza can watch the passersby.
- *Deciduous trees* and *sunlight* go together. People gravitate to sunlight in the winter and avoid it in the summer. Deciduous trees enhance a plaza because, in addition to their visual appeal, they protect people from unwanted sunlight in the summer, but allow it during the winter.
- Finally, *water* is also visually pleasing and its sound can mask street noise, replacing it with a sound perceived favorably.

Although Whyte's work is a model for urban design research, correlational studies like his cannot establish cause. Other work on

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visitable places also did not use controlled experiments (see for example work by Project for Public Spaces, 2011). One study, however, used a controlled experiment to test the *perceived* visitability of three of Whyte's key elements — seats, triangulation (sculptures), and food (Abdulkarim & Nasar, in press). It developed a four item Perceived Visitability Scale (PVS) which had high inter-item and inter-observer reliability. In three plazas and in a factorial design, it manipulated the presence and absence of each of the three elements. Using the PVS, it found that adding seats, sculptures or food alone improved visitability, the combination of seats and sculpture further improved visitability, and visitability was higher for the presence of any two elements than for all three. It also found that the largest plaza had a higher PVS score than the two smaller plazas; and contradicting Whyte's claim, men and women did not differ in their judgments of perceived visitability. The present study used a controlled experiment to test the effects of those three visitable features – seats, sculptures, food – on restorativeness.

Two theoretical models have been put forward to support the claim that nature and natural environments are restorative, either because they reduce stress (Ulrich, 1983) or because they help people recover from directed attention fatigue (Kaplan & Kaplan, 1989, 2009). In theory, nature and natural environments have restorative value either because they reduce stress (Ulrich, 1983) or because they help people recover from directed attention fatigue (Kaplan & Kaplan, 1989, 2009). Taking a psycho-evolutionary approach in which natural environments involve rapid responses that reduce stress, some research has found natural environments as more restorative than built ones on the emotional and physiological side (Parsons, Tassinary, Ulrich, Hebl, & Grossman-Alexander, 1998; Ulrich, 1984; Ulrich et al., 1991). According to Kaplan's Attention Restoration Theory or ART (1995), restorative environments have four components: fascination, being-away, extent, and compatibility. *Fascination* evokes a kind of effortless attention and interest that attracts people to try to make sense of the environment. *Being-away* allows the person to explore and frees the mind from directed attention. *Extent* provides a visually rich but coherent environment that encourages involvement. Some measures of it include assessments of scope and coherence environments that have *compatibility* comply with people's inclinations and efforts to function in them. Researchers have developed, refined, and tested verbal scales to measure the restorative properties (or potential) of the environment (Berto, 2005; Hartig, Book, Garvill, Olsson, & Gärling, 1996; Hartig, Kaiser, & Bowler, 1997; Hartig, Korpela, Evans, & Gärling, 1997). Studies using those scales and structured measures of direct attention have found natural environments as more restorative than built ones on the cognitive side (Berto, 2005; Hartig, 1991; Hartig, Kaiser, et al., 1997). Kaplan (1995) tried to combine the two models by defining stress (the perception of existing threat or harm/danger) as another form of mental fatigue implying that the attentional fatigue (the depletion of cognitive capacity) may also result from stressful situations. Studies that incorporated the two models of restoration found that restorative environments restored both attentional fatigue and relieved stress (Hartig, 1991; Hartig, Evans, Jamner, Davis, & Gärling, 2003; Ulrich et al., 1991).

Research on restorative environments has focused on nature as restorative (e.g. Cole & Hall, 2010; Hartig, 1991) or comparisons between natural and built scenes (e.g. Berto, 2005; Berto, Massaccesi, & Pasini, 2008; Cackowski & Nasar, 2003; Hartig et al., 2003; Hartig, Kaiser, et al., 1997; Hartig, Korpela, et al., 1997; Herzog, 1997; Herzog, Maguire, & Nebel, 2003). However, some studies have tested the restorative qualities of certain categories of built environments. This research builds on the association between restorativeness and preference (van den Berg, Koole, & van der Wulp, 2003; Hidalgo, Berto, Galindo, & Getrevi, 2006; Laumann, Garling, & Stormark, 2001; Peron, Berto, & Purcell, 2002; Purcell, Peron, & Berto, 2001; Staats, 2003). One study that looked at five categories of the built environment found that environments which people like, such as historic/cultural and recreational places, are also restorative (Hidalgo et al., 2006). Other research has found restorative potential in well-designed and attractive urban environments (Karmanov & Hamel, 2008) and in museums (Kaplan, Bardwell, & Slaker, 1993).

Perhaps other desirable built physical elements can improve the restorative value of a place. Recall that plazas having seats, sculpture, or food, or both seats and sculpture had higher perceived visitability scores than plazas without those elements (Abdulkarim & Nasar, in press). The visitability scale assessed the degree to which a plaza would attract people to walk out of their way and spend time, to stop if passing by, to regularly visit, and to choose as a place to meet a friend. Through reported behavioral intent, it may capture perceived desirability or preference. As restorativeness relates to preference, the more visitable plazas may have higher restorativeness as well. The present study sought to find out if the visitable elements also enhance restorative value. In addition to enhancing preference, seats, sculpture and food may support one or more of the four components of restoration (fascination, being-away, extent, and compatibility), and as such may have restorative potential. Seats, for example, may enhance the perception of being-away (by offering a place to sit, relax and escape from aspects of daily routines), and compatibility in that they can potentially support users' intended activities such as relaxing, reading, socializing. Sculpture, as a form of art, may evoke fascination, the perception of being-away, and, as a focal point that helps people orient and find their way around, it may evoke compatibility. Food may enhance the compatibility of the place in providing an option for users to eat and relax.

The experiment used the same protocols as those used by Abdulkarim and Nasar (in press), but assessed restorative value instead. The study used color photographs of public plazas manipulated through Photoshop CS5 software. It assessed restorativeness using a five-item Perceived Restorativeness Scale (PRS) adapted from Berto (2005). This scale has been found correlated with the longer version of PRS (Pasini, Berto, Scopelliti, & Carrus, 2009) and with psychophysiological response (Berto et al., 2008).

Given the link between restorativeness and preference, and the likelihood that perceived visitability (PVS) relates to preference, it seemed likely that the results for restorativeness would parallel those for visitability. Specifically:

- The restorative scores would correlate with PVS scores.
- Adding seats, sculpture or food to a plaza without any of those elements would increase its restorative value, because seats may evoke a sense of being away and compatibility, sculpture may evoke a sense of fascination, being-away, and compatibility; and food may evoke a sense of compatibility.
- Plazas with seats and sculpture would have higher restorative value than plazas with either element alone, because the combination would increase the sense of being-away, fascination, extent, and compatibility.
- Adding food to plazas with seats, sculpture, or seats and sculpture would not improve the restorative value. Though in theory all three elements should further increase each property of ART, the study of visitability (Abdulkarim & Nasar, in press) found a decrease in visitability for plazas having all three elements, perhaps because they became more chaotic and crowded, thus reducing coherence, extent and compatibility.