

Urban Built and Mixed Spaces

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Natural areas are now broadly recognised as important resources to restore the cognitive and emotional resources of urban dwellers, but everyday urban environments are rarely studied for their salutogenic properties. This review collects emerging evidence of instances in which built and mixed urban environments were found to be more restorative than natural ones for the urban population. Generally, historical, recreational and panoramic places have been found to have the most restorative potential of all mixed and built urban environments. This particularly applies to teenagers and older people who value social interactions for their well-being. Vegetation and natural elements were still found to play an important role in the assessment of this restorative potential.

Keywords: restorative potential ; urban environment ; attention restoration theory ; environmental psychology ; built and mixed environments

1. Introduction

While much work has been conducted specifically on the importance of natural environments and elements, the restorative potential of the everyday urban environment has seldom been taken into account. Therefore this section presents the current evidence for the potential restorative effects urban population could perceive from built and mixed environments in the city. In doing so, it presents a preliminary answer to the questions: Can built and mixed urban environments be restorative? And for whom?

2. Historical and Theoretical Perspective on the Health Effects of Urban Environments

Negative perceptions of built and mixed urban environments are almost as old as cities themselves. In a review of the links between the landscape and health ^[1], Prof. Ward Thompson presents a thorough history of human perceptions of green spaces and cities. She notes that the ancient Greeks were aware of the importance of green spaces for an urban life, choosing to locate their cities in sites where clean water and natural beauty were available. Romans mostly continued that trend but, even then, Pliny the Younger is reported to have written about the “profound and undisturbed retirement” he experienced in his villa in the countryside by putting distance between himself and “the business of the town and the interruption of troublesome clients”. His contemporary, Martial, coined the phrase *rus in urbe* to express the desired inclusion of countryside elements into the urban context ^[1].

The health of urban populations became a critical issue for city planners once the Industrial Revolution had started and the rural exodus alongside it brought more and more people into the city to fill the factories. Major cholera, typhoid and tuberculosis epidemics threatened the cramped and overcrowded neighbourhoods where the industrial workforce was housed. This prompted authorities to start considering green spaces as necessary to improve health conditions and cities, thus initiating the concept of parks as “the lungs of the city” ^[1]. Similarly, Frederick Law Olmsted and Calvert Vaux famously designed Central Park as a way to provide relief to the residents of New York city, following the idea that:

“A man’s eyes cannot be as much occupied as they are in large cities by artificial things or by natural things seen under obviously artificial conditions, without a harmful effect, first on his entire mental and nervous system and ultimately on his entire constitutional organisation”

Olmsted, 1886, in ^[1] (p. 192)

He listed these “harmful effects” as “excessive nervous tension, over-anxiety, hasteful disposition, impatience and irritability” (Olmsted, 1886, in ^[1] (p. 192)). According to him, the only way to counteract these effects was through the use of an Arcadian landscape, a pleasing rural scenery masking the buildings around it and displaying no obvious sign of

human intervention ^[1]. This myth of Arcadia, originally from ancient Greece, was brought back into popular culture in the Renaissance through music, poetry and paintings. Although originally meant to designate the wild landscape where Pan and his dryads reigned, it came back in the shape of a pastoral landscape softly shaped by humans but not corrupted by civilization. This utopic idealised landscape seemed therefore to have been in itself created as a way to offer an escape to inhabitants of cities to an environment which was similarly tamed and humanised through the use of agriculture, but which was also perceived as simpler and, ultimately, healthier. As a pastoral landscape, it is placed somewhere in the middle of the gradient between completely wild and completely built environments.

Although the cities of Olmsted were quite different from the amenity-centred modern metropolis of today, this perception of cities as overloaded with stimuli that leads to saturation is still alive and well. In fact, it is this same perception which has led to the perpetuation of the urban-bad/nature-good dichotomy. Therefore, built and mixed urban environments are typically associated with the high presence of information and stimuli such as crowds, noise ^{[2][3]}, but also pollution and little aesthetic value. On an epidemiological level, cities are also seen as foci of infections in part due to the density of human populations. In developing countries, rapid urbanization has had an impact on the pattern of infectious diseases through the development of new built environments in forested areas, overcrowding, and precarious urban and housing infrastructures ^[4]. The high temperature of cities as a result of the heat island effect created by the modification of land surfaces was also found to play a major role in some vector-borne diseases transmission ^[4]. On a cognitive level they are also considered to require more top-down processing than natural environments, which necessitates more directed attention and in turn generates more cognitive fatigue ^[5].

| 3. Urban Environments in Restoration Theories

So, can built and mixed environments be restorative in theory? Out of the four pathways linking landscape and health only the physiological pathway strictly requires a natural environment, as built settings can also provide opportunities for social contact and physical activity. But what about the psychological one?

Within ART, the Kaplans considered that the urban lifestyle might be a major cause of the depletion of directed attention. By contrast to the city, a natural environment is considered as less demanding which allows individuals to switch into effortless attention and provides a rest for the directed attention. But none of the environmental characteristic they provide to describe restorative settings, except perhaps fascination, strictly requires the presence of natural elements.

Similarly, Ulrich considered the built urban environment too complex and too high in arousal to enable us to relax ^[6]. However, he also points out that aesthetically pleasing built settings containing water and prominent amounts of vegetation might carry a restorative influence similar to more natural scenes ^{[7][8]}. Furthermore, following arousal theory, he also admits that individuals suffering from excessively low arousal or chronic boredom might benefit from being exposed to lively and stimulating urban views ^[6].

Finally, Appleton's prospect-refuge theory specifies the physical structure of an environment, as it relates to views and openness, rather than its specific elements. Therefore, by considering solely the criteria formulated by ART, PET and prospect-refuge theory, it is also conceivable that some urban settings might be used as restorative environments ^{[2][9]}.

| 4. Review of Evidence

Recently, some empirical studies have been carried out on the restorative potential of built and mixed urban environments. Most notably, Karmanov and Hamel ^[9] have found that their participants who watched a short video of an urban residential environment reported a decrease in anger and tension comparable to the one experienced by the participants who watched a similar video but of a natural environment. Similarly, while exploring the restorative potential of urban leisure settings, Troffa and Fornara ^[10] found that a green urban park rated similarly to two attractive built environments. This equality of restorative potential was also found in Scopelliti and Giuliani's study, in which they asked residents of different ages and backgrounds to list restorative experiences they might engage in ^[11]. Indeed, in this case, natural settings were not cited more often than built or mixed ones.

However, when comparing a historical, mostly built urban environment to a forest, Stigsdotter et al. ^[12] found that neither environment had any measurable physiological effect on heart-rate variability or blood pressure of visitors, but that the forest would still be assessed as having the higher perceived restorativeness. This finding was also supported by Scopelliti et al. ^[8] who compared the perceived restorativeness potential of a completely built historical plaza and that of a large public park and found that the more natural environment generally scored higher. Generally, it seems the presence of vegetation can still significantly improve the restorative potential of an urban environment ^{[2][13][14]}.

Finally, not comparing with a natural environment, San Juan et al.'s participants reported a better psychological state after spending some time in an urban square [2]. Although their initial levels of attentional fatigue and emotional distress were shown to be low, the students had worked an average of 4 h previous to the experiment and the benefits they received from their visit to the built space were found to include reduced anger, hostility, tension, anxiety, fatigue and stress, and increased happiness. They also explored the importance of environmental features for restoration by comparing two different public squares alongside some of ART's criteria (greenness, presumably as a proxy to soft fascination, and mystery, which is more often associated with the Kaplan's preference matrix rather than ART [15]). However, they could not find any effect from these variables which suggests the restoration provided by built environments might follow a different framework than the one articulated by ART and PET.

5. Populations More Likely to Use Built and Mixed Urban Environments for Restoration

Although some of the studies reported here were carried out using the convenience sample of students in the field of psychology [2][3][9][16], many others have focussed on the specific populations which might generally benefit from the type of restoration provided by urban built and mixed environments.

Generally, teenagers and adolescents have been the focus of many studies and their preference for built environments over natural ones has often been noted. In a comparison of perceptions of nature's restorativeness across age groups, Berto found that adolescents (11–14 years old) were the ones to prefer city streets and housing to natural environments the most [17]. Similarly, in their survey of 450 eight-grade students, Bixler and Floyd [18] found that adolescents who reported negative perceptions of wildlands also reported an increased preference for social indoor recreation, manicured park paths, urban paths and biology lab sites with clear water. Although this alone is not enough to conclude these places might be restorative for them, the link between preference and restoration previously mentioned suggests they could be. Generally, adolescents seem to value settings such as urban centres which offer opportunities for social interaction and promote affiliation and identification with a group [17].

Similarly, the importance of social contact as a drive for visiting specific environments has also been studied in the case of older people. For example, Gardner [19] found that for people over 75 year old, third places such as public parks but also social centers like shops and cafes, churches; thresholds such as front yards and balconies; and transitory zones such as streets and pavements could all support significant social interactions.

Furthermore, in an urban context and with the current development of technologies, most contact with natural environments must now be through deliberate choices and self-selected recreational activities [20] and "if the environment is negatively perceived, activities that occur within it may also be avoided" [18]. Conversely, when investigating restorative experiences, as opposed to the characteristics of the environment alone, Scopelliti and Giuliani found that natural environments were not evaluated as more restorative than built or mixed ones. Indeed, the latter might in fact be considered more accessible and preferable for engaging in social activities during leisure time, particularly if that time is limited by other constraints [11]. This finding was supported by Staats et al. [3] who found a significant effect of personal and contextual factors such as being alone or in company or the existing level of attentional fatigue on the perceived restoration likelihood of built spaces (in this case a café in a city centre).

Finally, other populations such as the ones most afraid of nature or suffering most from biophobia might also be more likely to choose built and mixed urban environments to restore their cognitive and emotional capacities.

6. Specific Urban Environments

Although many studies on the benefits of natural areas rely on the use of urban "busy street" environments as surrogates to represent the whole variety of urban settings [3][16][21][22], the research presented in this section has explored the specific qualities of mixed and built urban environments which may promote restoration.

Most notably, Hidalgo et al. [23] conducted several studies to assess the aesthetic qualities of several types of mixed urban environments in Spain and Italy. Although they were primarily looking at people's aesthetic responses, they also asked residents of Malaga (Spain) and Padova (Italy) to assess the perceived restorativeness of these settings and found a high correlation between the two judgements, which they interpreted to mean that the perceived restorativeness could also predict aesthetic appreciation [23]. They found the most attractive urban environments to be:

- Cultural-historical places/landscapes which they define as “representative and/or emblematic places of the city, linked strongly with its historical-cultural development” (p. 117). Cultural-historical settings were also explored by Scopelliti et al. [8]. They found that an attractive historical plaza in Rome could rate as high as an urban green space in perceived restorativeness potential. Much like Hidalgo et al. [23], they related this effect to, in part, the aesthetic value of such environments, but also investigated the individual components of ART. In their study, the historical plaza visitors rated their surroundings highly in terms of fascination, compatibility and, to a lesser degree, extent. The element of being away did not seem to contribute to the overall perceived restorativeness of the environment, but they do warn “the measure of being away in the Perceived Restorativeness Scale does not include items referring to feeling away in ancient times or in a different world, which are all relevant aspects for historical environments” [8] (p. 9).
- Recreational places for leisure and/or walking such as urban parks, squares and public open spaces designed in order to be used by citizens with such aims. These are considered mixed environments with various degrees of greenness such as in the studies by San Juan et al. [2] and Subiza-Pérez [24], who also specifically investigated public squares as centres of a city’s social life.
- Panoramic places such as favoured places in the city offering a wide sight of large areas or of the whole city. The restorative potential of panoramic places has been found in at least one other study [10] and is in line with Appleton’s Prospect-Refuge theory which states our preference for high-prospect, low-refuge environments [15].

Residential areas, as mixed environments, have also been found to sometimes perform better than more natural environments, as is the case in the study of neural responses of older people walking in various urban environments, where a quiet residential street with front gardens yielded less frustration than a medium-sized park in Edinburgh [5]. Similarly, the stimulus used in the study from Karmanov and Hamel [9] was a video of a recently built neighbourhood in the Netherlands, with houses built alongside canals. In this case, the aesthetic aspect of the environment might be more salient, with complex architectures and facades being able to produce similar responses to natural scenes [13]. Additionally, as highlighted by Ulrich in PET, the presence of water could also have influenced the participants’ perceptions [25].

In conclusions, it is possible to extend theories of restoration to encompass the study of built and mixed urban environments. Using these criteria, some settings, particularly social or aesthetically pleasing ones, have been found to be preferred by some urban dwellers for their restoration needs. However, in most cases, the presence of vegetation still plays a significant part on people’s responses. Indeed, none of the studies reported any preference for purely built environment. Instead, urban vegetation is appreciated for its aesthetic value and as a symbolic element of the city’s identity [26]. Nevertheless, it is possible the type of restoration experienced in built and mixed settings follows a different framework than the ones articulated by ART, PET and prospect-refuge theory.

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