



Community Vitality and Green Spaces

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Introduction

It is an interesting exercise to try and imagine a community without green spaces. The aesthetic implications are perhaps the most obvious: imagine Vancouver without Stanley Park or New York without Central Park. Frederick Law Olmsted, the famous American park designer, described the value of parks through an “economic” lens in 1880: “When the principal outlay has been made, the result may, and under good management must, for many years afterwards, be increasing in value at a constantly advancing rate of increase, and never cease to increase as long as the city endures” (Barber, 2005). Olmsted is referring to the many benefits that access to green spaces provides such as improved human health—physical and mental well-being, space for reflection, connection and social capital, in addition to the provision of ecological services and biodiversity conservation.

Green spaces, however, are not necessarily synonymous with parks. In some cases parks are designed to encourage social gatherings, as is the case with plazas in Hispanic countries. Often, however, parks are green spaces with varying degrees of management by humans and the aesthetics of these spaces can have a dominant influence on society's understanding of ecology. For the purposes of this paper, green spaces can also be niches or nooks with vegetation and without legal or cultural designation. Green spaces may also be associated with what we normally consider the built environment, as is the case with living walls and living roofs. Broadly speaking, green spaces are essentially patches of green in an urbanized landscape. The impact of these spaces, small and large, for the urban ecosystem, culture, economics and health, while clearly significant, are not always clearly articulated. In the following paragraphs, different benefits of green space will be explored.

Benefits to Human Well-Being

Access to nature can have a major impact on health outcomes, but because of the complexity of factors involved, this relationship can be difficult to demonstrate. A literature review by OPENspace in the U.K. (Morris, 2003) summarizes five key aspects of that relationship:

- enhanced personal and social communication skills;
- increased physical health;
- enhanced mental and spiritual health;
- enhanced spiritual, sensory and aesthetic awareness; and
- ability to assert personal control and increased sensitivity to one's own well-being.

The restorative effect of nature is illustrated by a classic 1984 study which reported that post-surgical patients whose hospital windows overlooked trees, rather than a brick wall, recovered more rapidly and required less pain relief (Gies, 2006). If green space can heal, evidence that access to green space can make people live longer (Takano, Nakamura, & Watanabe, 2002) is logically consistent.

Green space is also associated with better attentional functioning for both children and adults (Taylor, Kuo & Sullivan, 2002). James' Theory of Attention (Taylor, Kuo, & Sullivan, 2001) proposes that humans have two types of attention: voluntary and involuntary. After prolonged and intense use, capacity for voluntary attention becomes fatigued. Natural environments draw on involuntary attention, giving voluntary attention a chance to rest (Ibid). A study from Sweden provides further evidence to support this theory. The study found a statistically significant relationship between exposure to urban open green spaces and self-reported experiences of stress – regardless of the informant's age, sex and socio-economic status. The results suggest that the more often a person visits urban open green spaces, the less often he or she will report stress-related illnesses (Grahn & Stigsdotter, 2003). The increasing dominance of internet communication technologies means that the function of natural spaces as a place of "mental" rest may be even more critically important, particularly for children (Wells, 2000). Interestingly children may understand the importance of green space to their development. When urban children aged 9 to 12 were asked to make a map or drawing of all their favourite places, 96 percent of the illustrations were of outdoor places (Wells & Evans, 2003).

One of the more unique characteristics that determines the health benefits that a green space delivers is its degree of biodiversity. Psychological benefits gained by green-space users increase with levels of species richness, and most interestingly, the visitors to urban green spaces can perceive differences in the species richness of some well-known higher taxa (Fuller, Irvine, Devine-Wright, Warren & Gaston, 2007). In particular, the degree of psychological benefit was positively related to species richness of plants and, to a lesser extent, of birds.

More predictable characteristics of green spaces include size and function, particularly if the space is of a sufficient size to support exercise. A group of studies reviewed in the *American Journal of Preventive Medicine* showed that the creation of spaces for physical activity produced an almost 50 percent increase in the frequency of physical activity. The same studies showed that easy access to a place to exercise results in an increase in aerobic capacity, along with weight loss, a reduction in body fat, improvements in flexibility, and an increase in perceived energy level (Gies, 2006).

In addition to physical health benefits, green space may also inhibit anti-social behaviour leading to crime (Kaplan, 1984), although the literature is contradictory and there is evidence

that people associate vegetation and green spaces with crime even when there is no evidence of a relationship (Talbot, 1984).

Ambient environment

Green spaces improve the physical characteristics of the ambient environment, one of the ways in which they improve health outcomes. For example, trees clean the air and moderate the temperature and wind speed. Beneath individual and small groups of trees over grass, midday air temperatures at 1.5m above ground are approximately 1 degree Celsius cooler than in an open area (Nowak, 1994), due both to shade and to evaporation of water released by vegetation. Wind speed can be lowered by 10–30 percent (Bolund, 1999).

Trees remove air pollution primarily by uptake via leaf stomata and by intercepting airborne particles. In 1994, trees in New York City removed an estimated 1,821 metric tons of air pollution at an estimated value of \$9.5 million in reduced health care costs. Estimates of the amount of air pollution that can be removed vary from 8–15 percent in areas with 100 percent tree cover (Nowak, 1994) to 85 percent in a park or 70 percent on a street lined with trees (Bolund, 1999).

Vegetation can also be a buffer from the audible and visible noise of the community. Estimates of the amount of vegetation required to significantly reduce sound vary significantly and depend on local conditions. One estimate is that 5 metres of dense shrubbery can reduce noise levels by 2 dB (Bolund, 1999).

The idea of using traditional economic methods to value the services described above has begun to take hold with economists under the umbrella of ecosystem services (European Communities, 2008). A major study by the David Suzuki Foundation evaluated some of the ecosystem services around Metro Vancouver and found that forests, wetlands, grasslands, shrub lands and agricultural soils provided climate regulation worth \$1.7 billion per year, water filtration by forests and wetlands was worth \$1.6 billion per year and flood protection by forests was worth \$1.2 billion per year (Wilson, 2010). The idea of ecosystem services is premised on the idea that if we can value ecosystem services in economic terms, we will have a greater incentive to protect and restore green spaces. Others argue that ecosystem valuation dangerously simplifies the complex, values the invaluable and lays the foundation for making private property what is commonwealth (Kosoy & Corbera, 2010). This is not a debate that will be easily resolved. Nevertheless, it is clear that green spaces contribute to individual and community vitality in diverse ways.

An interesting experiment was conducted in the older inner core of Los Angeles (Pincetl & Gearin, 2005). Two scenarios were created. The first involved improvements to public property by installing a full complement of trees on city streets. The second scenario involved adding trees to parking lots and other private property, using permeable surfaces for parking lots, adding boulevard medians, greening alleys, and other measures. A GIS model called CITYgreen was used to calculate environmental benefits and the results were presented to local residents for consideration. The study reported that, “focus group results indicated both a sort of desperation for urban green space, and a pragmatic approach to create and maintain it” (Ibid, p.376).

In cities like Toronto and Chicago, the dichotomy between buildings and green space is disappearing with regulations for living roofs on new buildings. Many living roofs are exclusively the domain of nature with no access for humans. The Vancouver Convention Centre roof provides five acres of green space that is available only to non-human species, the only such space in the City (Vancouver Convention Centre, 2011). Green roofs provide a range of additional benefits including increased retention of rainwater, increased roof durability, heating and cooling energy reductions, heat island reductions and aesthetic advantages (Oberndorfer et al., 2007), as well as gardens.

Urban green spaces are traditionally considered either remnant islands of ecosystems or vegetated spaces designed by humans within an urban environment dominated by roads and buildings. But one can also argue that urban green spaces extend beyond the urban limits of cities as most of the ecosystem “services” such as water filtration and treatment, pollination and nutrient flows required to support the urban space occur outside of urban areas. A study of the 29 largest cities in the Baltic Sea region estimated that the ecosystem support area was 500–1000 times larger than the physical area of the cities themselves (Bolund, 1999). Thus one can argue that a discussion of urban green space cannot be limited urban boundaries. New York City is in the throes of such a discussions as it debates the merits of allowing natural gas exploration in a watershed far from City Hall, a watershed that provides the City's drinking water (Hakim and Confessore, 2011).

Accessibility

Access to green space appears to be dependent upon the socio-economic status of a neighbourhood. For example, the Trust for Public Land has identified a notable lack of parks in poor communities, and, more generally, a correlation among factors that discourage exercise such as poverty, minority status, obesity, ill health, and the absence of parks and recreation facilities in particular neighbourhoods (Gies, 2006). This argues powerfully for Soja's concept of spatial justice, that is, the need for a broader spatialization of our basic ideas of democracy and human rights, and in this case, for access to what some would define as basic amenities, such as green space.

A GIS analysis of the city of Milwaukee considered the distribution of the city's urban forest against variables such as ethnicity and income, concluding “the contemporary distribution of urban canopy cover within Milwaukee should be viewed as a form of injustice requiring amelioration” (Heynen, Perkins & Roy, 2006, page 20). Just under 5 percent of urban forest in Milwaukee is considered public (mainly street edges) and the remaining 95 percent is on private property and, therefore, not accessible to the public.

Another study by the Trust for Public Land considered access to green spaces from the perspective of children in New York City. New York City has approximately half the number of total park-acres of Los Angeles, but because the parks are more equitably distributed approximately 90 percent of children live within walking distance of a park, compared to just one-third of all children in Los Angeles, (The Trust for Public Land, 2004). The Trust's finding is notable because it points not only to inequitable access to green spaces and parks but also to an inequitable socio-political system that has generated that result (Soja, 2008).

City	% of children within one-quarter mile of a park	Number of children without access to a park
Boston	97%	2,900
New York	91%	178,500
San Francisco	85%	16,700
Seattle	79%	18,600
San Diego	65%	102,300
Dallas	42%	182,800
Los Angeles	33%	657,700

Distribution of parks or green spaces varies from city to city but so does extent of green spaces. No study was found that compared the extent of green space in Canadian cities but a study in Europe also found that the area of green space varies widely, ranging from, for example, 11 percent in Birmingham to 45 percent in Sheffield. Three hundred and eighty-six European cities with a total population 170.6 million people in 2001 were analyzed by Fuller & Gaston, (2009). The findings are illustrative, including that green space was positively correlated with latitude and on a per capita basis green space varied by two orders of magnitude from 3–4 m² per person to 300 m² per person. Generally, cities that were geographically large had greater areas of green space. The first key conclusion of the study was that as cities grow, interactions between people and nature depend increasingly on landscape quality outside of formal green space networks (i.e. parks). The second conclusion the report identified a significant opportunity for increasing green space by restoring brownfield sites. Between 1988 and 1993, over 19 percent of brownfield sites in Britain were converted into green spaces (Sousa, 2003).

Conclusion

Social ties are what turn a collection of unrelated neighbours into a neighbourhood – a source of social support and sense of community, and a social unit more capable of forming local organizations, defending against crime, and mobilizing for political purposes (Kuo, Brunson, Sullivan & Coley, 1998). People in urban settings desire contact with nature (VanHerzele, 2003). Green space is, therefore, a means of increasing informal contact in a community, whether it is people walking their dogs, taking their children out to play or sitting on a bench, working in a community garden or other activities associated with green space (Armstrong, 2000). Green space doesn't need to take the form of a park; it may just be an area of trees and grass between houses. Kuo et al (1998) found that level of vegetation in common spaces predicted both use of common space and neighbourhood social ties in low-income public housing.

Clearly, as shown in the discussion paper on social capital, the more diverse places people have to come together in diverse ways, strengthens the social capital of a community, contributing to its vitality. Community vitality is interdependent upon place and space, and

green space provides more amenities than are under-appreciated by traditional economic valuation, including mental, spiritual and aesthetic dimensions.

The aesthetics of green spaces can play a critical role in society's understanding and valuing of nature. It is generally understood that humans cannot directly sense ecological quality but that aesthetics can influence our understanding of ecosystems (Gobster, Nassauer, Daniel & Fry, 2007). Nassauer argues that nature is identified with the picturesque, a cultural, not ecological concept (Nassauer, 1995), and this understanding in turn shapes urban green spaces. This insight returns us to the notion of Soja's spatial justice, with the implication that urban green spaces are equally social places, products of a society and culture that happen to contain nature, as opposed to places in which nature exists independent of human shaping, perhaps in some ways, critical thirdspaces (Soja, 1996) essential to community vitality.

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