Evaluating the benefits of urban green space- progressing the research agenda

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Being outside in natural surroundings is good for us...

Frederick Law Olmsted wrote that being in a natural setting:

“employs the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system”

(Olmsted 1865, cited in Ulrich et al. 1991 and in Knecht, 2004).

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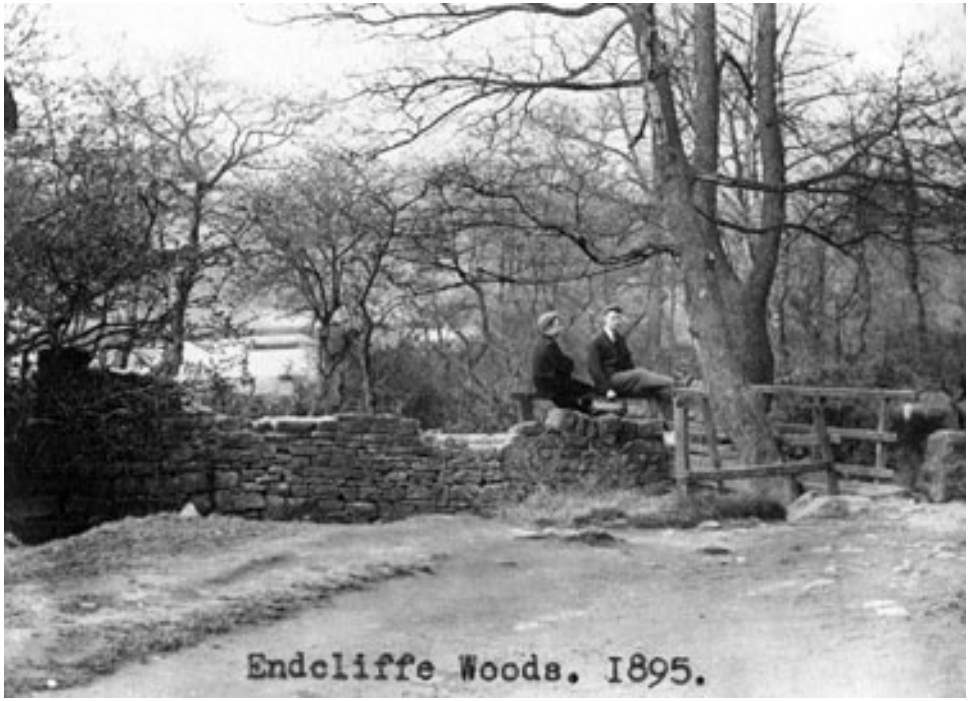

Contents

- Benefits and the causal processes underlying them (focusing mainly on physical health and psychological benefits)
- The particular environments that generate these benefits
- Role of inter-personal differences
- Gaps in the research and future research agendas

Evidence for the health benefits of green space

- Mitchell & Popham, 2008- study published in The Lancet
- Epidemiological study of population of England that measured the quantity of green space where people lived
- Findings: Exposure to green space was associated with lower all cause mortality and death from circulatory disease in low income areas

Causal processes- stress relief

- Stress relief aka ‘restoration’
- Different models
  - Restoration of attention deficit developed by Rachel and Stephen Kaplan (Kaplan, 1995)
  - Improvement in mood states accompanied by physiological changes dveloped by Roger Ulrich and others (Ulrich *et al.*, 1991)

Stress and health

- Stress has adverse health consequences (Arranz et al., 2007; Padgett & Glaser, 2003)
- Stress increases neuroendocrine hormones causing delayed wound healing, impaired responses to vaccination and development and progression of cancer (Webster & Glaser, 2008)
- There is also evidence linking chronic stress with risk of cardio-vascular disease and type 2 diabetes (Godbout & Glaser, 2006)
- Agyemang *et al.* (2007) suggest that the biological pathway between neighbourhood environment and poor health may be mediated by an abnormal neuroendocrine secretory pattern due to stress

Physical activity and health

- There is now ‘irrefutable’ evidence of the efficacy of physical activity in the prevention of obesity, cardiovascular disease, diabetes, cancer, hypertension, depression and osteoporosis (Warburton *et al.*, 2006)
- Physical inactivity has been found to be directly responsible for 3% of morbidity and mortality in the UK, and is estimated to cost the National Health Service in the UK over £1.06 billion annually (Allender *et al.*, 2007)
- But is physical activity linked to the existence of green space?

Is physical activity linked to the existence of green space?

- Living in areas with walkable green spaces (aka "greenery filled public areas") positively influenced the longevity of senior citizens in Japan (Takano et al., 2002)
- 9/12 studies dealing with the relationship between neighbourhood characteristics and physical activity found an unambiguously positive relationship
- Only 7/12 of these mentioned green space and only 3/7 of these suggested a clear positive relationship
- Other factors linked with physical activity were higher residential density, access to shops, presence of pavements and cycle lanes, mixed land use, street connectivity, better access to public transport, social capital and neighbourhood socio-economic status

Other benefits of green space

- Presence and quality of greenspace has also been linked with:
  - Self rated health (Agyemang *et al.*, 2007)
  - Lower systolic blood pressure and risk of hypertension (Agyemang *et al.*, 2007)
  - Reduced noise annoyance and stress-related psychosocial symptoms (Gidlof-Gunnarsson & Ohrstrom, 2007)
  - Mental health and vitality (Guite *et al.*, 2006)
  - Neighbourhood satisfaction (Leslie & Cerin, 2008)
  - Reduced stress and obesity (Nielsen & Hansen, 2007)
  - Mental well-being (O'Campo *et al.*, 2009)
  - Children's Body Mass Index (Potwarka *et al.*, 2008)

What is a restorative environment?

- Some environments are more restorative (stress-relieving) than others
- Qualities of a restorative environment: “being away”, “extent”, “fascination”, “compatibility” (Kaplan, 1995)

Does ‘green’ matter?

Are natural settings more restorative than urban ones (Hartig *et al.*, 2003; Karmanov & Hamel, 2008)?

Does being outside matter?

Joye (2007) argues that natural elements and structural landscape features can be integrated into the built environment

1. The interior of Gaudi's Sagrada Familia contains schematic interpretations of natural contents. Left: columns as treelike structures. Right: flowerlike canopies. (From Guillaume Paumier. Used with permission).

2. The "forest of trees" in Calatrava's Orient Station. (From Inge Kanakaris-Wirtl; www.structurae.de . Used with permission.)

3. 2. A typical fractal pattern. This is a detail of the Mandelbrot set.

All captions from Joye (2007)

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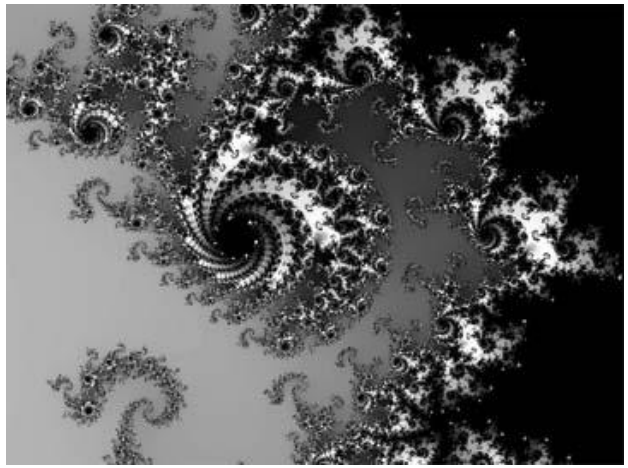

Are all green spaces equally beneficial?

- Green spaces are more diverse than we might think: parks & gardens, natural and semi-natural urban green spaces, green corridors, outdoor sports facilities, amenity greenspace, provision for children and teenagers, allotments, community gardens & urban farms, cemeteries & churchyards, accessible countryside in urban fringe areas, civic spaces (PPG17)
- Continuum of scale (small to large)
- Continuum from highly maintained to apparently wild

Are all green spaces equally beneficial?

- Role of biodiversity? Fuller *et al.* (2007) found that green space users linked 4 factors with their biodiversity measures: ‘reflection’, ‘distinct identity’ & ‘continuity with past’ were linked with greenspace area and habitat diversity; ‘reflection’ & ‘distinct identity’ with plant richness; ‘continuity with past’ & and ‘Attachment’ with bird richness
- ‘Being away’ and ‘extent’
- Safety and accessibility?

Relationships between green space typologies and human interactions

- Micro-restorative episodes e.g. Looking out of the window (Kaplan, 2001)
- Improvement in mood states during brief park visit (Hull, 1992)
- Emotional self-regulation in favourite places (Korpela *et al.*, 2001)
- “Deep restoration” in wilder natural settings (Jorgensen & Wilson, research in progress; Borrie & Roggenbuck, 2001; Pohl et al., 2000; Kaplan & Kaplan, 1989)

Role of inter-personal differences

- A number of inter-personal differences have been found to impact on the ways we experience and interact with green space
  - Gender (Jorgensen *et al.*, 2002)
  - age/life course stage (Jorgensen & Anthopoulou, 2007)
  - culture/ethnicity (Rishbeth,2001; Rishbeth & Finney, 2005)
  - interests/expertise (Tveit, 2009)

Changing motivations for visiting green space through the life course

  - Children: bodily interactions with natural objects
  - Teenagers: getting away and socialising
  - Families: parent/child interactions
  - Middle age: rediscovering nature
  - Older people: contemplation
- Sequential phases or a snapshot of how (some) people behave now?
- Importance of childhood nature experiences in establishing patterns of behaviour (Ward Thompson et al., 2004)

Research agenda

- More work need on discrete areas:
  - The causal processes or pathways underlying the benefits
  - Distinguishing between the impacts of different types of green space
  - Finding out exactly what it is about these green spaces that produces the benefits
  - Understanding the impact of inter-personal differences on attitudes towards green space
- Need to understand the interactions between these factors to build more holistic models

Research agenda

- Methodological issues
  - When you look at some interactions e.g. between health benefits to humans and other ecosystem services e.g. water management, then questions of scale become crucial i.e. urban park or urban watershed?
  - Building more holistic models integrating different aspects necessitates inter/multi-disciplinary working
  - Inter-disciplinary working also helpful in terms of assessing social and policy implications

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