



AN INTERNATIONAL CONFERENCE ON  
**INNOVATIVE APPROACHES TO  
RESEARCH EXCELLENCE IN  
LANDSCAPE AND HEALTH**

**SOUTH HALL CONFERENCE SUITE,  
POLLOCK HALLS, EDINBURGH**

**19-21 SEPTEMBER 2007**

open space  people space

**CONFERENCE PROCEEDINGS**  
SUMMARY PAPERS AND POSTER ABSTRACTS

## Conference Committee and Organisation

---

Peter Aspinall - OPENspace, Heriot-Watt University  
Simon Bell - OPENspace, Edinburgh College of Art  
Catharine Ward Thompson - OPENspace, Edinburgh College of Art  
Anna Orme - OPENspace, Edinburgh College of Art  
Alan Rees - International Play Association, Scotland  
Lucy Ribchester - OPENspace, Edinburgh College of Art

## Post Conference Programme

---

Royal Botanic Gardens, Edinburgh  
The Yard, Edinburgh  
Edinburgh Back Greens Initiative  
Charles Jencks Garden, Portrack

## For further information:

---

OPENspace Research Centre  
Edinburgh College of Art  
Lauriston Place  
Edinburgh  
EH3 9DF

t: 0131 221 6167 / 6177

e: [openspace@eca.ac.uk](mailto:openspace@eca.ac.uk)

w: <http://www.openspace.eca.ac.uk/conference2007/confbackground.htm>

Sponsored by:



**Open Space : People Space 2**

**Innovative approaches to  
research excellence  
in landscape and health**

Conference proceedings

Summary papers and poster abstracts

Edinburgh, 2007

---

©OPENspace Research Centre

ISBN-13: 978-1-904443-18-6

**Contact details:**

OPENspace Research Centre  
Edinburgh College of Art  
74 Lauriston Place  
Edinburgh  
EH3 9DF

T: +44 (0) 131 221 6177

F: +44 (0) 131 221 6157

E: [openspace@eca.ac.uk](mailto:openspace@eca.ac.uk)

W: [openspace.eca.ac.uk](http://openspace.eca.ac.uk)

---

**Acknowledgements**

**Editors:** Peter Aspinall, Simon Bell and Catharine Ward Thompson

**Co-ordination and Production:** Anna Orme and Lucy Ribchester

**Editorial Assistant:** Anne Boyle

**Layout design:** Elaine Dick

**Cover graphics:** H&A Graphic Design Limited

<b>Introduction</b>	1
<b>Plenary Paper Summaries</b>	
<b>Theories and methods on engagement with place</b>	
Psychological restoration: one set of processes joining landscape and health	2
Opening space for core project pursuit: affordance, restoration and chills	3
Landscape quality and quality of life	7
<b>Environmental determinants of health</b>	
Active landscapes – challenges in developing the evidence on urban environments to achieve a more active nation	11
Nearby nature and human health: possible causal mechanisms and their implications	15
<b>Affordances in the landscape</b>	
The participatory character of landscape	18
Alnarp rehabilitation garden: possible health effects from the <i>design</i> , from the <i>activities</i> and from the <i>therapeutic</i> team	24
Research methodology for understanding the impact of design on preschool physical activity	29
<b>Spatial structure and research methods for designers</b>	
Feeling good and feeling safe in the landscape: a ‘syntactic’ approach	32
Prioritising factors influencing visits to greenspace: conjoint analysis	35
Healthy urban outdoors for children and families: theory, methods and measures	40
<b>Poster Abstracts</b>	
The school journey: towards a socialising institution - a case study in Tehran	45
How can the neighbourhood environment make a difference to the health of older people?	45
City centre living and wellbeing: an exploratory study of the relationship(s) between green spaces and wellbeing for the residents of Sheffield city centre	46
Active by design: methods for investigating the relationship between school ground design and children’s physical activity	46
The meaning of the outdoor environment to residents at nursing homes	47
Patterns of pedestrian flows and static occupancy of the Diag of University of Michigan, City of Ann Arbor, examined by Space Syntax analysis	47
Relevance of work loads and strains to local outdoor recreation	48
Displacement, NIMBYism and the siting of energy technologies	48
Doorstep-to-nature: uses of landscape design in promoting healthy activity from the doorstep outward	49



Social and spatial functions of everyday landscape and their relevance to residential quality in periurban areas	49
Prospect or affordance: threshold for Chinese outdoor environmental use	50
Sensory gardens: assessing their design and use	50
Movement in relation to space – different designs support different types of walks in a garden	51
Making green spaces healthier: health impact assessment guidance	51
Testing a model of enhanced restoration	52
Green areas and housing's inhabitability	52
Is the grass greener on the other side of town? An examination of the accessibility, quality, and use of public play spaces in London, Canada	53
Local identities, memories and experiences as inspirers of urban silviculture	53
Turkish migrants living in Limburg and Lahn in Germany: is place attachment a function of cultural background?	54
Landscape characteristics, policy guidelines and quality of life: the UK and Egypt - different contexts, same targets	54
Spatial decision support tools for the strategic assessment of green space provision	55
Development of a 'walkability' tool to use to identify relationships between the physical environment and walking patterns of sedentary individuals within the west of Glasgow	55
Clare apartments: design and evaluation of a therapeutic landscape for people living with HIV disease	56
Quantifying restorative qualities in urban green environments	56
Exploring the relationship between landscape spatial structure and landscape preference through visualisation techniques	57
Understanding change in place: spatial knowledge acquired by visually impaired users through change in footpath materials	57
Connecting with wilderness landscapes: effects on health and wellbeing	58
Sustainably regenerating derelict land through community involvement and landscaping	58
Collaborative planning of urban forests - promoting the health of residents?	59
Associations of neighbourhood greenness with physical and mental health: what are the underlying mechanisms?	59
Free-range teenagers? The role of wild adventure space in young people's lives	60
Children's preference for preschool environments	60
<b>Index by author</b>	<b>61</b>
<b>Index by keyword</b>	<b>62</b>
<b>Key speakers</b>	<b>64</b>

## Introduction to Open Space : People Space 2

# Innovative approaches to research excellence in landscape and health

South Hall Conference Suite, Pollock Halls, Edinburgh

Wednesday 19 September - Friday 21 September 2007

Following the success of the first Open Space: People Space conference in 2004, OPENspace - the research centre for inclusive access to outdoor environments - is pleased to host a second conference on 2007. This time the focus is on excellent and innovative methods to research the links between outdoor environments and health, in order to better inform policy and practice relating to everyday places in the urban and rural environment. Good planning and design of such environments has implications for the way in which people connect with the landscape, and understanding the relationship between landscape and health is important in the context of efforts to enhance quality of life.

OPENspace is pleased to be able to host this three-day international conference in Edinburgh to debate emerging issues in models and approaches, both theoretical and practical. The programme includes contributions from international experts under the following themes:

*Theories and methods on engagement with place*

*Environmental determinants of health*

*Affordances in the landscape*

*Spatial structure and research methods for designers*

In addition, poster presentations demonstrate a range of current research in the field.

We are grateful to our guest speakers and chairs of the round table discussions: Professor Ian Sanderson, Head of Analytical Services, Scottish Executive; Andrew Thin, Chairman of Scottish Natural Heritage; Professor George Morris, Chief Medical Officer, Scottish Executive; and Marcus Sangster, Adviser on Land Use and Social Research, Forestry Commission. We are also grateful to our conference sponsors for their support: the Health Department of the Scottish Executive; the Forestry Commission; The British Academy; The EDI Group; and Edinburgh College of Art.

**Terry Hartig**

Institute for Housing and  
Urban Research and  
Department of Psychology,  
Uppsala University;  
Department of Plant and  
Environmental Sciences and  
Department of Landscape  
Architecture and Spatial  
Planning, Norwegian  
University of Life Sciences

**Psychological restoration: one set of processes joining  
landscape and health**

When we talk of landscape and health, we imply some number of processes through which environmental experience comes to affect people in ways relevant to effective functioning, physical fitness, wellbeing, and the like. In this presentation, I will focus on that set of processes gathered under the rubric psychological restoration, and the characteristics of environments that best support those processes. I have previously observed that efforts to understand restorative environments as health resources can be seen as steps in a sequence, from the study of discrete restorative experiences to the study of the cumulative effects of repeated restorative experiences to the study of social ecological influences on access to and the use of places for restoration. In building on that earlier discussion, I will discuss some key features of restoration processes and the challenges that they present to researchers.

For one, the fact that restoration extends through time raises a number of issues relevant to the design of studies, as with the duration of effects of discrete restorative experiences and the time span needed for meaningful cumulative effects to emerge. For another, because restoration proceeds in tandem with other processes that also affect the resources that people use to meet everyday demands, efforts to estimate the outcomes of restoration require distinguishing them from the outcomes of other processes. For a third, the cyclical character of restoration – how restoration becomes potentiated with the depletion of resources, concludes when depleted resources become renewed, becomes potentiated again, and so on – compels questions about the structure of people's lives that might induce such cyclicity.

Finally, restoration proceeds in the course of activities that people perform in environments, but identifying the characteristics of environments responsible for promoting restoration involves some significant difficulties. In this regard, I will discuss tests of mediation and moderation, constraints on restorative activities, and some issues in environmental sampling.

**Keywords:**

activity cycles, mediation,  
moderation, restoration, time



## Opening space for core project pursuit: affordance, restoration and chills

Brian R. Little

McGill University and  
Carleton University

### 1. Personal projects in time and space.

For the past four decades, my students and I have been exploring the interrelations between persons, places and projects (Little, 1972, 1983; Little, Salmela-Aro & Phillips, 2007). We have developed a methodology, personal projects analysis (PPA) which allows us to explore, in some detail, the content, appraisal, dynamics, and impact of personal projects. Such projects can range from the seemingly simple act of 'putting out the cat' to a clearly complex pursuit such as 'sack Troy' (the historical impact of which depends on the precise nature of the verb 'to sack' and whether Troy is an ancient city or an unsuspecting man).

Personal projects, more formally, are *extended sets of personally meaningful action in context*. The theoretical analysis of personal projects developed in lockstep with the creation of new methodological tools (Little & Gee, 2007). The extended nature of personal projects means that they are best conceptualised and assessed as patterns of action over time and in this respect, they share certain assumptions with time-budget analysis in behavioural geography. Their personal meaning entails that we adopt methods that elicit accounts by individuals of their idiosyncratic pursuits and this aligns us with those who adopt narrative approaches to the study of people's lives. The fact that projects are embedded in contexts, places our research squarely at the intersection of the study of persons and their environments and we draw both inspiration and guidance from those who design and manage the physical space within which projects may be prescribed or proscribed - may flourish through beneficent affordances or may, through contrivance or carelessness, be utterly thwarted (Little, 1999a, 1999b, 2000a, 2000b).

### 2. Sustainable pursuit of core projects.

Over the years, we have been able to demonstrate that human wellbeing is enhanced to the extent that individuals are pursuing projects that are meaningful, manageable and embedded in a sense of community. More recently, we have augmented these 'cooler' appraisal dimensions with appraisals that tap into the 'hotter' aspects of project pursuit. We have clear evidence in several different countries that emotions, ranging from frustration and hatred to love and joy, are intimately linked to the vicissitudes of project pursuit.

Personal projects have an inner face and an outer face. Looking inward, they represent features of individuals, their relatively fixed traits, their desires and aspirations, commitments and concerns. Looking outward, projects are embedded in a set of contexts which may facilitate, frustrate, prescribe or proscribe their pursuit. As analytic units, then, personal projects conjoin the study of person and places and provide a focus for potential intervention to promote human wellbeing.

#### Keywords:

personal projects, free traits,  
aesthetic chills

A central theoretical proposition of personal projects theory is that *human flourishing is based on the sustainable pursuit of core projects*. Internal, self-regulatory skills and orientations are necessary for sustainable pursuit as well as the capacity and willingness to commit to courses of action. But human flourishing also requires social ecological factors that will stimulate, shape and guide project pursuit. We have developed assessment modules that allow us to examine both the inner and outer aspects of project pursuit. Simply examining the content of personal projects being pursued by a person is intriguing. Some are commonplace ("losing weight" being the most frequently elicited project); others are idiosyncratic if not singular (e.g. "Be a better Druid"). The meaning, manageability, support and affect experienced in these two projects will depend, importantly, on features of the places in which individuals live. 'Losing weight' is a project that will be facilitated by contexts in which temptations are minimised and diversions from eating abundant. 'Being a better Druid' may be more challenging if the project pursuer is living in a desert rather than a wooded area.

It should be noted, too, that the sustainable pursuit of core projects means that the project needs to be carried out in such a way that the surrounding social ecology is not compromised. Some of our assessment modules look explicitly at 'where' and 'with whom' one is carrying out projects and what impact your projects have on others. Personal projects that destroy the social ecology needed for their sustained pursuit, will eventually lower the likelihood of flourishing, although short-term gains may blind individuals to the long-term consequences of impassioned but ill-conceived project pursuit. When considering these issues, project analysts come into close conceptual contact with moral philosophers (e.g. Lomasky, 1984; Williams, 1981).

### **3. Project affect and well beings.**

We are currently exploring several different lines of inquiry with personal projects analysis (e.g. Little, Pedrosa de Lima & Whelan, 2006). Each features methodological innovation and each can contribute to understanding how environments, spaces and places may promote emotional and physical wellbeing.

The affective aspects of project pursuit seem particularly promising as foci for understanding physical health. What are the projects that cause individuals to experience considerable consternation and frustration, and to what extent are environmental barriers contributing to these potentially dangerous transactions? In short, can we open the environmental space within which projects are enacted, in order to reduce negative affects and their physical health costs?

There is increasing evidence that emotional support of one's core projects is a key aspect of wellbeing. Whether it is in hard indicators of successful child-birth (e.g. APGAR scores) or hard indicators of successful entrepreneurial success (e.g. profit margins) the emotional support of key partners is crucial. Is the increasing use of mediated communication likely to enhance or diminish expressions of support? Do

we need frequent, unmediated, informal exchanges with those who support our core projects, as Christopher Alexander has persuasively argued? Or are frequent text messages saying “Fantastic” sufficient to sustain core projects?

Although relatively ‘fixed traits’ such as extraversion and neuroticism have been strongly linked to wellbeing, the project analytic perspective examines a more dynamic concept of traits as resources that can be adopted to advance one’s projects. A biogenically introverted professor, for example, can adopt a ‘free trait’ of extraversion in order to effectively complete a core project of “instilling excitement in my students”. But such ‘free-traited’ behaviour can result in physiological costs and subsequent burnout and health decline. Here is where environmental affordances become critical. If a person who has protractedly acted ‘out of character’ can escape to a restorative niche, more in sync with her biogenic traits, the costs of free traits can be reduced. This suggests that there may be many different types of restorative environment. A pseudo-introvert, for example, would require a restorative niche that was exciting, stimulating and arousing. A pseudo-extravert would find the restorative effect of utter solitude more salutary (Little, 1996, 2005).

#### **4. Chilling: opening inner and outer spaces.**

Finally, we are concerned that by focusing on project pursuit we may have conveyed the impression that human flourishing is as simple as doggedly pursuing one’s projects, ignoring distractions and pushing very hard against one’s social ecology. This is not our position. Rather, we have argued that it is important to develop one’s peripheral vision in order to become aware of events, affordances, and opportunities that may otherwise be obscured by overly zealous project pursuit (Little, Salmela-Aro & Phillips, 2007). As part of our research in this area, we have been examining the nature of ‘chills’ (more technically pilo-erections) in which one experiences goose bumps and shivers. Often, we find, such chills emerge unbidden and unsought, yet are sources of immense delight. We also feel that they may offer a key to identifying core project domains which have been unexplored by individuals. What gives us shivers and aesthetic chills? If the experience of these wonderfully subtle aspects of human experience is both fortuitous and salutary, then we need to have both an outer ecology of chill-inducing stimulation and an inner ecology of accommodation to delightful surprises. Both inner and outer spaces need opening.

#### **Key concluding points.**

- Personal projects serve as integrative units for the study of persons, places and wellbeing.
- Personal Projects Analysis (PPA), as an extensive modular methodology, facilitates creative interdisciplinary research and practice.
- Environments provide affordances for project pursuits and restorative niches for people acting out of character. They allow us to chill and provide us with chills.
- Physical and emotional wellbeing is intimately linked with the sustainable pursuit of core projects in which the integrity of both persons and their contexts is essential.

## References

- Little, B.R. (1972) 'Psychological man as scientist, humanist and specialist,' in *Journal of Experimental Research in Personality*, 6, 95-118.
- Little, B. R. (1983) 'Personal projects: A rationale and method for investigation,' in *Environment and Behavior*, 15, 273-309.
- Little, B. R. (1996) 'Free traits, personal projects and idio-tapes: Three tiers for Personality Psychology,' in *Psychological Inquiry*, 7, 340-344.
- Little, B. R. (1999a) 'Personal projects and social ecology: Themes and variations across the life span,' in Brandstadter, J. and Lerner, R.M. (eds.) *Action and Self-Development: Theory and Research Through the Life Span*. Thousand Oaks, CA: Sage, pp.197-221.
- Little, B. R. (1999b) 'Personality and Motivation: Personal Action and the Conative Evolution,' in Pervin, L.A. and John, O.P. (eds.) *Handbook of Personality Theory and Research*. Second edition. New York: Guilford.
- Little, B. R. (2000a) 'Free Traits and Personal Contexts: Expanding a Social Ecological Model of Well-Being,' in Walsh, W.B., Craik, K.H. and Price, R. (eds.) *Person Environment Psychology*. Second edition. New York: Guilford, pp. 87-116.
- Little, B. R. (2000b) 'Persons, Contexts and Personal Projects: Assumptive Themes of a Methodological Transactionalism,' in Wapner, S., Demick, J., Yamamoto, T. and Minami, H. (eds.) *Theoretical Perspectives in Environment-Behavior Research*. New York: Plenum, pp. 79-88.
- Little, B. R. (2005) 'Personality Science and Personal Projects: Six Impossible Things Before Breakfast,' in *Journal of Research in Personality*, 39, 4-21.
- Little, B. R. and Gee, T. L. (2007) 'Personal Projects Analysis,' in Salkind, N. (ed.) *Encyclopedia of Measurement and Statistics*. Thousand Oaks, CA: Sage.
- Little, B. R., Pedrosa de Lima, M. and Whelan, D. C. (2006, January) 'Positive and Negative Affect in Personal Projects: Exploring Hot Pursuits in Portugal and Canada' Presented at Association for Research in Personality, Palm Springs, CA.
- Little, B. R., Salmela-Aro, K. and Phillips, S. D. (2007) *Personal Project Pursuit: Goals, Action and Human Flourishing*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Lomasky, L. E. (1984) Personal projects as the foundation of human rights. *Social Philosophy and Policy*, 1, 35-55.
- Williams, B. (1981) *Moral luck*. Cambridge, UK: Cambridge University Press.

## Landscape quality and quality of life

### 1. Introduction.

Commonsense tells us that the quality of the landscape in which we lead our lives makes a difference to the quality of the lived experience. At some level, it might be argued that we don't need further research to tell us what appears self-evident. Good designers working with well-established understandings of what makes for attractive and accessible environments might be all that we need to create places that offer optimal potential for quality of life. What, apart from funding availability, do we need to know that we don't know already?

However, as soon as we dig a little deeper, it becomes apparent how poorly we understand how best to invest in the environment, often urban, in which most people spend their days, to offer maximum benefit. There has been considerable interest in establishing minimum space standards for access to green spaces (e.g. English Nature's Accessible Natural Greenspace Standards (ANGSt) model (Handley et al., 2003) but less clarity over the theoretical basis for such standards and the mechanisms of human experience that lie behind such attempts. How much green space is enough to make a difference to someone's daily life and how is that difference effected? Many papers at this conference are addressing aspects of such questions, seeking to understand the mechanisms behind observed relationships between health or quality of life and the availability of green environments, however defined. What this paper proposes is a series of methodologies, often drawing on the theoretical work of such experts, to illuminate an understanding of what qualities of the landscape are important or relevant for different people's health and quality of life. It draws on a number of projects undertaken by OPENspace research centre since 2001 and on modes of enquiry developed by its multidisciplinary team of researchers to address the intersection of landscape design and human/environment interaction.

### 2. Environmental support for individuals' needs and desires.

If we are to understand what qualities of the environment are important to people's quality of life, we need to acknowledge the diversity that exists in people's capabilities, experience, desires and needs. This is a challenge for designers; the response conventionally has been to look for factors in the environment that matter to most people, or to a defined group of people, and to address those factors as if they were equally important. Yet for any individual, different qualities and elements in the environment may be a matter of indifference (e.g. certain colours if you are visually impaired) or vitally important (e.g. proximity of an accessible toilet if you have a weak bladder). This was highlighted in our research on older people's engagement with outdoor environments, in the I'DGO project (Inclusive Design for Getting Outdoors) – a collaboration with the universities of Salford and Oxford Brookes – where participants' life circumstances and abilities varied widely. To address this, we explored the notion of 'environmental supportiveness' as a way of conceptualising the relationship between the outdoor environment and activities undertaken at a personal level (Sugiyama & Ward Thompson, 2007c). We developed two instruments to measure the quality of the environment relevant to older people's level of activity, on the premise that environments

Catharine Ward  
Thompson, Simon Bell,  
Catherine Millington,  
Katherine Southwell,  
Jenny Roe and Peter  
Aspinall

OPENspace Research Centre,  
Edinburgh College of Art and  
Heriot-Watt University,  
[www.openspace.eca.ac.uk](http://www.openspace.eca.ac.uk)

**Takemi Sugiyama**

Cancer Prevention Research  
Centre, School of Population  
Health, The University of  
Queensland

#### Keywords:

landscape quality,  
environmental support,  
personal projects, walkability,  
spatial structure

which make chosen outdoor activities easy and enjoyable are contributing to a better quality of life. Of particular relevance here is the use of personal projects (Little, 1983) as a methodological approach, founded on Kelly's (1955) personal construct theory. In contrast with normative ways of measuring the quality of the environment, where criteria are fixed and are assumed to be equally salient to all, this idiographic method makes it possible to assess environmental supportiveness based on individuals' needs, wants and a relevant setting within which chosen activities are undertaken. It offers a unique way of investigating how well individuals' needs, desires and aspirations are supported or frustrated by their environment and how well people cope with the environment in which they find themselves (Sugiyama & Ward Thompson, 2007a).

### **3. Environmental support for physical activity.**

A particular aspect of environment-person interaction highly pertinent to this conference is the notion that there may be salutogenic environments, i.e. environments which support healthy behaviours and responses, by contrast with, for example, obesogenic environments which support lifestyles that are conducive to people becoming overweight and obese. Public health concerns over sedentary lifestyles and lack of cardio-vascular fitness in the populations of the developed world have led to a particular focus on environments that encourage people to walk more, since walking has been called "the nearest activity to perfect exercise" (Morris & Hardman, 1997: 328) and requires no specialist skills or equipment. The question for researchers is: what qualities in the outdoor environment (where most walking is likely to happen) make a difference to how much people walk (Sugiyama & Ward Thompson, 2007b)? Such a simple-sounding challenge is immensely difficult to address, as Fiona Bull's paper will attest. OPENspace researchers have been engaged in developing audits to assess the quality of the urban environment in relation to levels of walking and attempts to modify walking behaviours in Glasgow, as part of SPARColl (the Scottish Physical Activity Research Collaboration). The focus for OPENspace has been, initially, to develop a reliable 'walkability' audit tool that is appropriate to the European city (by contrast with North American and Australian instruments developed to date) and to compare such audits both with local participants' subjective assessments of their environment and with objective measures using GIS. This offers a triangulation valuable in teasing out which qualities of the physical environment (if any) appear to be important in relation to walking levels, and the relative value of subjective or objective measures. Ultimately, it is hoped that such normative methods can be supplemented by use of idiographic approaches, using a personal projects approach as outlined above.

### **4. Understanding the dynamic experience of the environment.**

There is growing evidence, to which OPENspace has contributed, to suggest that a certain level of access to green space and 'nature' of some sort is a key contributor to quality of life and patterns of healthy living (Bell et al, 2004; Ward Thompson et al, 2005; Sugiyama & Ward Thompson, 2007b). Various forms of contact with nature, for instance, are known to produce restorative benefits (Hartig, 2007) and we in OPENspace have found evidence of

social and emotional benefits associated with different experiences of the landscape. Abstract experiential qualities such as perceptions of 'safety' and 'attractiveness' have been identified as important factors in stated preferences for parks and green spaces (Bedimo-Rung, Mohen & Cohen, 2005) and there has been much written over many years on landscape aesthetics (e.g. Appleton, 1975; Bourassa, 1991) and how this might influence preference and use (e.g. Kaplan & Kaplan, 1989). By contrast with research on environment and health, this is a domain rich in theoretical concepts for the mechanisms behind engagement with the environment but poor in terms of tools to measure the detailed spatial and structural qualities of different landscapes in relation to how people actually use and experience them. For landscape designers, this is of crucial interest. There have been attempts to develop guidance based on general principles (e.g. Kaplan, Kaplan & Ryan, 1998) but few tools to measure the dynamic spatial experience in practice.

At OPENspace we have been developing for some time a mapping tool, drawing on the pioneering work of Appleyard, Lynch & Myer (1964), to record the experience of moving along a path in the landscape in relation to the changing pattern of the surrounding vegetation, landform, and structures. This 'view from the path' mapping has been used in a number of research projects relating to forest and woodland landscapes (Ward Thompson et al, 2004; Ward Thompson, Roe & Alves, 2007) and we hope to develop it further as a reliable form of data collection that can be compared with other data on attitudes to the landscape and landscape use. Uniquely, it offers a means to research links between the spatial and structural properties of landscape design and human engagement with (and response to) the environment. It has also provided a basis for understanding aspects of wayfinding that are relevant to countryside users (Southwell & Findlay, 2007) and has led to the production of a wayfinding assessment toolkit, to be published later this year (Southwell, Ward Thompson & Findlay, 2007, in press).

### **Key concluding points.**

- There is a need to better understand what qualities of the landscape are important or relevant for different people's health, wellbeing and quality of life.
- The notion of 'environmental supportiveness' has been developed as a way of conceptualising the relationship between the outdoor environment and an individual's chosen activities.
- The use of personal projects analysis makes it possible to assess environmental supportiveness based on individuals' needs, wants and personally available environments.
- The development of a 'walkability' environmental audit tool appropriate to European urban contexts is a contribution to research on physical activity and health.
- The development of 'view from the path' mapping techniques offers the possibility of linking environment-behaviour relationships with the dynamic experience of the physical and spatial structure of the landscape.
- There is value in developing a broader view of how studies from different fields, and their underlying theories and frameworks, can coherently build on one another.



## References

- Appleton, J. (1975) *The experience of landscape*. New York, NY: John Wiley.
- Appleyard, D., Lynch, K. and Myer, J. R. (1964) *The View from the Road*. Cambridge, MA: MIT Press.
- Bedimo-Rung, A. L., Mowen, A. J. and Cohen, D. A. (2005) 'The significance of parks to physical activity and public health: A conceptual model', in *American Journal of Preventive Medicine*, 28(2S2), 159-168.
- Bell, S., Morris, N., Findlay, C., Travlou, P., Montarzino, A., Gooch, D., et al. (2004) *Nature for people: The importance of green spaces to East Midlands communities* (Research report 567). Peterborough, UK: English Nature.
- Bourassa, S. C. (1991) *The Aesthetics of Landscape*. New York: Belhaven.
- Kaplan, R. and Kaplan, S. (1989). *The experience of nature: a psychological perspective*. New York: Cambridge University Press.
- Kaplan, R., Kaplan, S. and Ryan, R.L. (1998) *With people in mind: design and management of everyday nature*. Island Press: Washington DC.
- Handley, J., Pauleit, S., Slinn, P., Barber, A., Baker, M., Jones, C., et al. (2003). *Accessible natural green space standards in towns and cities: A review and toolkit for their implementation* (Research report 526). Peterborough, UK: English Nature.
- Hartig, T. (2007) 'Three steps to understanding restorative environments as health resources', in Ward Thompson, C. and Travlou, P. (eds.) *Open Space: People Space*. Abingdon, UK: Routledge, pp.163-179.
- I'DGO <http://www.idgo.ac.uk>
- Kelly, G. (1955). *The psychology of personal constructs*. New York: Norton.
- Little, B. R. (1983) 'Personal projects: A rationale and method for investigation', in *Environment and Behavior*, 15(3), 273-309.
- Little, B. R. (2000) 'Persons, contexts, and personal projects: Assumptive themes of a methodological transactionalism', in Wapner, S., Demick, J., Yamamoto, T. and Minami, H. (eds.) *Theoretical perspectives in environment-behavior research: Underlying assumptions, research problems, and methodologies*. New York: Plenum.
- Morris, J. N. and Hardman, A. (1997) 'Walking to health', in *Sports Medicine*, 23, 306-332.
- Southwell, K. and Findlay, C. (2007) "'You just follow the signs", understanding visitor wayfinding problems in the countryside', in Ward Thompson, C. and Travlou, P. (eds.) *Open Space: People Space*. Abingdon, UK: Routledge, pp.111-124.
- Southwell, K., Ward Thompson, C. and Findlay, C. (2007, in press) *Site Finder: Assessing the countryside visitor's wayfinding experience*. Edinburgh, UK: OPENspace research centre.
- Sugiyama, T. and Ward Thompson, C. (2007a) 'Measuring the Quality of the Outdoor Environment Relevant to Older People's Lives', in Ward Thompson, C. and Travlou, P. (eds.) *Open Space: People Space*. Abingdon, UK: Routledge, pp.153-162.
- Sugiyama, T. and Ward Thompson, C. (2007b) 'Older people's health, outdoor activity and supportiveness of neighbourhood environments', in *Landscape and Urban Planning* doi:10.1016/j.landurbplan.2007.04.002.
- Sugiyama, T. and Ward Thompson, C. (2007c) 'Outdoor environments, activity and the well-being of older people: Conceptualising environmental support', in *Environment and Planning A*, 39, 1943-1960. DOI:10.1068/a38226.
- Ward Thompson, C., Aspinall, P., Bell, S., Findlay, C., Wherrett, J. and Travlou, P. (2004) *Open space and social inclusion: Local woodland use in central Scotland*. Edinburgh, UK: Forestry Commission.
- Ward Thompson, C., Aspinall, P., Bell, S. and Findlay, C. (2005) "'It gets you away from everyday life": Local woodlands and community use - What makes a difference?', in *Landscape Research*, 30(1), 109-146.
- Ward Thompson, C., Roe, J. and Alves, S. (2007) *Woods in and Around Towns (WIAT), Evaluation: Baseline Survey*. Unpublished report for Forestry Commission Scotland, Edinburgh, UK: OPENspace research centre.

## **Active landscapes – challenges in developing the evidence on urban environments to achieve a more active nation**

**Fiona C. Bull**

British Heart Foundation  
National Centre for Physical  
Activity and Health, School  
of Sport & Exercise Sciences,  
Loughborough University, UK

Physical inactivity has been identified as one of the leading causes of many chronic conditions, and it contributes substantially to the burden of disease, disability and premature death, with heavy resulting economic costs (Department of Health, 2004). Recent efforts to promote and increase physical activity at the population level have focused heavily on individual and behavioural interventions and yet rates of physical activity remain relatively static and at the same time, sedentary activities have increased. This has contributed to increasing chronic diseases, and partially contributed to the rise in obesity rates. A better understanding of the determinants of physical activity is essential to the development of an effective comprehensive population-based approach to the promotion of physical activity.

The socio-ecologic model posits that comprehensive approaches to physical activity need to consider interventions at multiple levels - individual, social and environmental. The latter component includes exploring the relationship between the urban landscape and physical activity, particularly walking, and is a relatively new area of research. The challenges involved in developing our knowledge and this evidence base are the subject of this presentation.

As a new field, there has been an explosion of primary research followed very quickly by review papers attempting to synthesise the emerging evidence. Indeed, over the last three to four years, there have been 14 published reviews assessing the strength of association between a wide range of urban design factors and levels of physical activity, particularly, in both children and adults (Bauman & Bull, 2007).

The general interpretation of the evidence to date indicates that, for physical activity, there are some reasonably consistent associations between access to physical activity facilities, convenience of access and proximity to destinations, higher residential density, mixed land use and urban 'walkability' scores. That is, where these urban features are there in the positive sense, there is more likelihood of higher levels of participation. There is some evidence showing an association between physical activity and perceived safety and the availability of exercise equipment or facilities, e.g. pavement or 'sidewalks' but less clear relationships are found for aesthetic features of the environment and, rather surprisingly, with measures of perceived crime.

Although these results suggest some emerging themes, there are a number of key methodological limitations to this body of evidence that constrain the potential applicability and transferability of this knowledge to practice in the UK. These include the small sample sizes in many primary studies, the lack of a theoretical basis and the reliance on cross-sectional study design. The lack of an established temporal relationship limits inference of a causal relationship. There is a notable dearth of well

### **Keywords:**

physical activity, supportive  
environments, urban design,  
health promotion,  
measurement

conducted intervention studies and more studies exploring causal pathways and, particularly, the issue of self-selection are needed (Giles-Corti et al, 2007; Handy, Cao & Mokhtarian, 2006).

Although there are many socio-ecologic models adapted to address physical activity, as yet there is no consensus on any specific ecologic model. More recent work has called for greater specificity in the development of models for specific types of physical activity outcome variables (Giles-Corti et al, 2005; Pikora et al, 2003).

The lack of standard measures of environment features is another limitation. Both the independent and dependent variables in this field of research pose measurement challenges. Measurement of physical activity is difficult due to the complexity of the behaviour and interest in a number of different attributes (type, setting, purpose, duration, frequency, intensity). The two most commonly used methods are self-report instruments (completed as a written survey or a telephone/household interview) and, to a lesser extent, objective measures of movement (such as pedometers or accelerometers). The majority of the research undertaken to date has used self-report measures of physical activity, however, there is great variation in the amount of detail collected and the presentation of the outcome variable. Data may be dichotomised or categorised, for example, 'meeting recommended levels of activity for health benefits'; or whether particular activities have been undertaken (walked, cycled). Alternatively, a continuous variable of physical activity can be presented such as minutes of activity. In either approach, single or multiple domains of physical activity can be incorporated (e.g., total activity, leisure-time only, walking for recreation, cycling to work). Although new instruments are being developed to refine the details of activity captured (Giles-Corti et al, 2006), across the physical activity research field there are well recognised limitations to the use of self-report measures, particularly with children. Thus the use of objective measures of activity is a necessary and promising development, particularly those combining technologies (such as accelerometers with integrated GPS).

Measurement of urban features, for example park quality, access, safety and aesthetics, is also complex, with a wide variety of data collection methods and analyses used to present data (Moudon & Lee, 2003). This makes the task of assessing and comparing the results across studies much more difficult. Few studies, and thus reviews to date, identify separately their findings by objective versus subjective measurement methods yet this is known to be an important issue from research beyond the traditional public health sector. Future research should make an explicit attempt to include and explore this issue.

The assessment of physical (and social) environments remains in a relatively early stage of development and is limited by what has been measured and how. Researchers may omit important dimensions in their studies. For example, if cultural

and social norms foster and support sedentary behaviours versus physical activity but they are not measured, then identifying 'social norms' as a correlate will not have occurred, and may lead to missed opportunities for intervention. Integration of variables on the social environment has yet to occur in much of the work on physical activity and the urban landscape.

Finally, it is evident that much of the available research on urban design has been carried out almost exclusively in North America and Australia, thus the evidence base for understanding the role of urban landscape and physical activity in England is very limited, particularly among minority and specific sub-populations. Until primary research studies are undertaken in the UK, the application of the findings to date will rely on the generalisability of the available literature (NICE, 2006).

This overview has identified notable challenges for future research if we wish to produce the evidence needed to underpin large-scale investment in the urban landscape using a 'health case'. More focused research is needed to explore specific settings and types of physical activity. Physical activity measurements are improving, and future research should use reliable and valid instruments and consider the level of specificity of behaviour required, for example, walking for recreation, cycling for transport. Further development of the methods for measuring the environmental characteristics, including definitions and methods of aggregation, is necessary and greater consistency will allow for better synthesis and understanding across studies. More emphasis on longitudinal studies is needed to identify true 'determinants' and separate them from factors that are simply statistically associated 'correlates'. Results from these studies will advance our understanding and help the development of intervention study designs.

Despite the fact that numerous questions remain about the determinants of physical activity, it is clear that multiple determinants, from individual level factors, through to environmental factors are important. Optimal interventions are likely to require actions at multiple levels, including the urban landscape and should attempt to influence multiple domains of physical activity.

## References

- Bauman, A.E. and Bull, F.C. (2007) *Environmental Correlates of Physical Activity And Walking in Adults and Children: A Review of Reviews*. London: National Institute for Health and Clinical Excellence.
- Department of Health (2004) *At least five a week. Evidence on the impact of physical activity and its relationship to health*. A report from the Chief Medical Officer. London: Department of Health.
- Giles-Corti, B., Cutt, H., Timperio, A., Pikora, T.J., Bull, F.C., Knuiman, M., Bulsara, M., Van Niel, K. and Shilton, T. (2006) 'Development of a reliable measure of walking within and outside the local neighbourhood: The RESIDE project', in *Preventive Medicine*, 42, 455-459.
- Giles-Corti, B., Knuiman, M., Timperio, A., Van Niel, K., Pikora, T.J., Bull, F.C., Shilton, T. and Bulsara, M. [2007] 'Evaluation of the implementation of a government community design policy aimed at increasing local walking: Design issues and baseline results from RESIDE', in *American Journal of Preventive Medicine*. Accepted July 2007.

Giles-Corti, B., Timperio, A., Bull, F.C., Pikora, T. (2005) 'Behaviour and context specific ecological models of physical activity', in *Exercise and Sports Science Reviews*, 33 (4), 175-181.

Handy, S., Cao, X.Y., Mokhtarian, P.L. (2006) 'Self-selection in the relationship between the built environment and walking - Empirical evidence from northern California', in *J Am Planning Ass.*, 72(1), 55-74.

Moudon, A. and Lee, C. (2003) 'Walking and Bicycling: An evaluation of environmental audit instruments' in *American Journal of Health Promotion*, 18, 21-37.

National Institute for Health and Clinical Excellence (NICE) (2006) *Public Health Collaborating Centre – Physical activity. Physical activity and the environment Review Two: Urban Planning and Design*. London: National Institute for Health and Clinical Excellence.

Pikora, T., Giles-Corti, B., Bull, F.C., Jamrozik, K. and Donovan, R. (2003) 'Developing a Framework for Assessment of the Environmental Determinants of Walking and Cycling', in *Social Science and Medicine*, 56, 1693-1703.

## Nearby nature and human health: possible causal mechanisms and their implications

Sjerp de Vries

Alterra, Green World  
Research, Wageningen  
University and  
Researchcenter (WUR)  
P.O. Box 47, 6700 AA  
Wageningen, The  
Netherlands

### 1. Introduction.

Many people think of spending time in contact with nature as being good for their health. However, in the spatial planning of residential areas, the inclusion of green areas and elements to promote public health is not commonplace. There appear to be other, more pressing reasons leading to a preference for compact cities, densely populated, and with small amounts of greenery (Van den Berg et al, 2007). Why is the relationship between nature and health, that so many of us assume exists, not more strongly reflected in health, spatial and nature policies? In this paper, we will look at the evidence base regarding the health effects of nearby nature in an urban context. The following two related questions will guide our evaluation:

- a. What exactly is the size of health benefits of having nearby nature in an urban context?
- b. What is the most efficient way to realise a health benefit of a certain size by making use of green space?

### 2. Background.

In the Netherlands, a relationship between the amount of nearby greenery and the perceived general health of residents has been observed (De Vries et al, 2003; Maas et al, 2006). The latter study showed that the proportion of people that reported having less than good health was about 1.5 times as high when only 10% of a 3-km circle around one's residence consisted of green space than when this was 90%. Such studies give a rough idea about the possible dose-response relationships but due to their correlational nature, they offer little insight into the mechanism behind the observed relation. Moreover, it is not even clear to what extent the amount of green space plays a causal role at all. Although composition effects dealing with the socio-economic status of the local population were statistically corrected to some degree, many alternative explanations remain possible.

### 3. Possible causal explanations.

The aforementioned studies were based on the premise that the amount of nearby nature would matter, because it would lead to more exposure to and/or contact with nature. The hypothesised importance of contact with nature was mainly based on theories and research on the restorative effects of such contacts (see e.g. Hartig et al, 2003). Ideas about which type(s) of nature would be (more) relevant, were not very clearly developed, so all types were included: agricultural land, forests and nature areas, as well as urban parks. Finally, the 3-km radius was chosen somewhat arbitrarily (we also experimented with a 1-km radius, with more or less similar results). For practical purposes, it seems desirable to have more precise ideas as to why nearby nature would have a beneficial effect on human health and wellbeing and which

#### Keywords:

air quality, stress, physical activity

conditions it should satisfy. Based on the literature, several possible mechanisms were identified. These range from green space improving micro-climate, to local greenery facilitating contact between neighbourhood members. We will briefly introduce what we consider are three of the most likely mechanisms, including their evidence base, namely, improving air quality by catching fine dust, reducing stress and/or restoring attentional capacity, and stimulating physical activity. Furthermore, we will discuss the implications the three mechanisms are likely to have for the spatial planning of greenery in an urban context.

#### 4. Discussion.

It seems difficult for policy makers and practitioners to exploit the beneficial effects of nearby nature for human health, because it is not clear yet how much nature and of what type is needed to bring about a specific health effect. Space is a scarce commodity in an urban setting, and trade-offs have to be made; in politics, size matters. It also remains to be seen whether “all the good of green” can be realised by one and the same layout and type of greenery. Our preliminary analysis suggests that different mechanisms require different green structures and types of vegetation, and have different additional requirements. For example, to reduce fine dust levels, having lines of coniferous trees in the vicinity of (but not too close to) busy roads might be a good idea. But such areas may not be conducive to stress reduction (traffic noise) or physical activity (still poor air quality), therefore, focusing on one of the more prominent mechanisms might be a good idea. However, the relative importance of the different mechanisms is unclear. Even the optimal green structure per mechanism is not always clear, for example, greening building facades by using climbers and creepers requires very little space, however, its effectiveness in reducing stress has not yet been established. Perhaps offering nearby green oases of peace and tranquillity would have a much stronger effect. In other words: how important is the quality of the nature experience for it to have a restorative effect? More generally, are we able to move beyond showing the existence of significant effects in experimental settings, significant differences in cross-sectional studies, and significant relations in correlational studies, to assessing the long-term effect of the sizes of specific local greenery configurations in real-life settings?

#### Key concluding points.

- Within the Netherlands a positive relation between the amount of nearby green space and human health does exist, but ...
- The extent to which the amount of green space plays a causal role in this relationship is still unclear, and may be limited.
- Three of the most likely mechanisms are: improving air quality, reducing stress and stimulating physical activity.
- As far as we can tell, the above mechanisms differ considerably in their spatial implications: optimal green structures and types of greenery differ.
- Research comparing different types of green space is scarce, even more so when it comes to long-term health effects in, for example, a residential setting.



- In future research, a more functional look at urban green space seems desirable: what works, how well, for whom, and for what reason?
- More specifically, mechanism-specific measures regarding the presence of the relevant type(s) of green space should be developed and tested.
- Alternative explanations should not be overlooked, but actively researched (population density and cultural diversity, emission of air pollutants).

## References

De Vries, S., et al (2003) 'Natural environments - healthy environments? An exploratory analysis of the relation between nature and health', in *Environment & Planning A*, 35, 1717-1731.

Hartig T., et al (2003) 'Tracking restoration in natural and urban field settings', in *Journal of Environmental Psychology*, 23, 109-123.

Maas J., et al (2006) 'Green space, urbanity, and health: how strong is the relation?', in *Journal of Epidemiology and Community Health*, 60, 587-592.

Van den Berg, A., Hartig, T. and Staats, H. (2007) 'Preference for nature in urbanized societies', in *Journal of Social Issues*, 63(1), 79-96.

Harry Heft

Denison University

## The participatory character of landscape

### 1. The spectator mode of experience.

Writing in 1908, the American philosopher John Dewey described mainstream perceptual theorists of his day as being in the grip of a “kodak fixation.” Dewey was expressing here deep reservations about the adoption of a *photographic attitude* toward the nature of seeing, and more generally, knowing. He was very critical of approaches to perceiving that operate as if the individual confronts the world as a spectator, in effect, standing passively and detached from what is experienced – much in the way that photographers stand apart from their subject.

Take the case of the perception of landscape. A photograph of a landscape captures from a single observation point and in an instant of time, the array of forms before the camera lens. Likewise, an individual can adopt, momentarily, a similar attitude with respect to a landscape, “taking in” a particular view (although never quite achieving the stillness of a photograph). The extensive research literature concerning landscape perception – and more broadly, on environmental perception and aesthetics – adopts, with rare exceptions, a spectator mode of experiencing landscapes. This approach is so common, in fact, that it would seem that the stance of the detached spectator “taking in the view” is assumed by researchers as the prototypical manner that individuals experience environments.

Dewey (1890) famously argued, however, that perception does not involve the passive reception of stimulation; indeed, that perceiving is not a separate function from acting, but rather that perceiving and acting are co-ordinate functions, each necessarily supporting the other. On the one hand, perceiving requires movement of the eyes, head, or entire body to direct and facilitate the discovery of environmental information; and on the other hand, actions are guided by perceiving, they are not mere responses (Gibson, 1979). From this perception-action perspective, perceiving *in the context of action* is prototypical. Adopting the detached, passive stance of a spectator is the exception and, in all cases, it is limited by comparison.

These alternative modes of perceiving the environment might be supposed to give rise to different experiences. A contemporary philosopher proposed just that: when we are moving through the landscape, “nature becomes something quite different . . . [being] transformed into a realm in which *we live as participants, not as observers*” (Berleant, 2004, p. 83). In short, from a dynamic perceiving perspective, landscape is more than a composition of two-dimensional forms to be gazed upon in a detached manner; it is *an arena for action*.

### Keywords:

environmental perception,  
affordances, places

### 2. The perception of photographs.

Photographs offer the spectator a mode of experience *par excellence*. For this reason, we may gain understanding of the spectator mode of experience by considering

some of the literature on photography. Moreover, such a step is warranted because, as noted, research on environmental perception has employed photographs, or similar static displays, of landscape almost exclusively. Indeed, it would be a fair statement that the research literature on environmental perception is also a research literature on picture perception.

There are reasons to suspect that experiencing landscape through the mediation of a photograph, and experiencing landscape first-hand and dynamically, are substantively different. In her acclaimed work *On Photography*, Sontag (1977) observes that the feelings engendered when viewing photographs are dissimilar from those accompanying first-hand (unmediated) experiences of the subjects of those representations. She writes: “[P]hotographic images tend to subtract feeling from something we experience first hand and the feelings they do arouse are largely, not those we have in real life (p.68). Further, she remarks: “It is not reality that photographs make immediately accessible, but images” (p. 165). In her more recent book related to this topic, *Regarding the Pain of Others*, Sontag (2003) comments: “Photographs objectify: they turn an event or a person into something that can be possessed” (p. 81).

Some initial experimental findings are consistent with these views (Heft & Nasar, 2000; Heft & Poe, 2005). In both studies, participants viewed either static displays of a landscape or dynamic displays of the same landscapes (generated by camera movement along a path of locomotion), and in each case, they were asked to rate how much they like “to look at this landscape”. The static displays consistently received higher evaluations. At the very least, these findings identify dissimilar patterns of evaluative reactions for these two types of presentation. But why did participants like looking at the static displays more? One possibility is that asking individuals how much they like looking at something prompts the stance of a spectator and, in turn, an assessment of the “picturesque” in the case of landscape. It is rare that a dynamic view is considered “picturesque”.

Standing in contrast to perceptual research employing pictures and other types of static displays, there is an extensive research literature that examines various aspects of perceiving from a dynamic point of view. Most of this research stems from Gibson’s (1979) ecological approach to visual perception, and it points to the vastly different character of dynamic perceiving as compared to perception from a single observation point (see also Thiel, 1997).

### **3. Perception of landscape and the two modes of experience.**

The properties of landscape that have been examined most often in the environmental perception literature include complexity, coherence, legibility, relative mixture of natural as compared to designed features, and mystery. Setting aside mystery (which, I suggest, differs from the others in important ways, see Heft, 1995),

notice that the remaining properties all require one to adopt an *analytical stance* with respect to landscape. That is, in order to assess a landscape with respect to these properties, it is necessary to “step back”, as it were, from activity in the landscape, and to adopt a detached viewpoint. This attitude of detachment toward one’s subject has been pervasive in Western aesthetic theory over the past several centuries (Carlson, 2000); indeed, it made the discovery of techniques for creating realistic-looking drawings and paintings possible in the first place (Gombrich, 1969). This mode of detachment with respect to one’s subject matter also characterises much modern scientific practice.

The assertion that an analytical stance can be distinguished from experiencing the world as an active perceiver recurs throughout the 20th century literature on the phenomenology of perception (e.g., Heidegger, 1962; Merleau-Ponty, 1963). Further, experimental support for such a distinction has been demonstrated in a study of action-related judgments. Specifically, judgments as to whether an object is within reach were significantly more accurate in the course of action than from a reflective, analytical stance (Heft, 1993).

Perceiving landscape from a dynamic point of view involves perceiving what it affords for action. Landscape features can function as co-participants (albeit inanimate ones) in action, to the extent that they support or prompt certain actions and constrain others. Further, as we will see, affective dimensions of experience are likely to accompany perceiving landscape in the context of action.

However, the action-related properties of landscapes may be overlooked when a detached, analytical stance is adopted. After all, complexity, coherence, legibility, and a mixture of natural and designed features are **not** properties of landscapes as such. They are concepts *abstracted* from landscapes that we can use to try to impose some order on our *understanding* of landscape perception. That is, they are “once-removed” from immediate experience. Recognising this distinction between immediate qualities of experience and analytic properties, eminent thinkers such as William James (1890), Dewey (1920), and A.N. Whitehead (1925) all cautioned researchers to avoid mistaking a concept that has been derived from analysis for that which is being analysed in the first place. James referred to this error as “the psychologist’s fallacy”, and Dewey and Whitehead broadened it to “the intellectualistic fallacy”. What is the problem here? When researchers mistake the conceptual tools used in an analysis for the thing being analysed, the *intrinsic* particularities, the quiddities, of the phenomena of interest, can slip through their fingers. On this point, the following remark by the renowned naturalist Wendell Berry (2000) is apposite:

The language we use to speak of the world and its creatures, including ourselves, has gained a certain analytical power . . . but has lost much of its power to designate *what* is being analyzed . . . (p. 8)

These remarks are not intended to undermine the possible utility of variables such as complexity, coherence, etc., for shedding light on the correlates of environmental preference. It may be the case - and a body of research suggests so - that analytical variables such as these, derived from static displays of landscapes, are reasonably good predictors of landscape preference, especially for static displays. Landscape designers and architects can use this information to inform some design decisions. Still, we may be able to cast a much wider net that will highlight functional and affective properties of landscape if a participatory perspective is adopted.

#### **4. Participatory properties of landscapes.**

In the space remaining, let us consider two properties of landscapes from a dynamic view of perceiving.

*4.1 Affordances:* Gibson (1979) proposed the term “affordance” to refer to functionally significant properties of the environment taken relative to an individual. To illustrate, consider a path through a forest landscape that intersects a stream and continues on its other side, and a tree branch that lies across the stream. The tree branch will afford crossing the stream if it is wide enough to accommodate the hiker’s foot and dense enough to support his weight. These functional properties exist when attributes of both the hiker and of the branch are considered jointly; the branch as an affordance has *relational* properties. As this example illustrates, and as a body of experimental evidence (e.g., Mark, 1987) has shown, individuals perceive what the environment affords them. To offer a second example, consider a path as it leaves level ground and climbs a steep hillside. Depending on the individual, the hillside path might be experienced as climbable, or it might be experienced as a barrier to further travel.

Note that there is often an affective dimension to perceiving affordances. To return to the examples, one can imagine the feelings of satisfaction and self-efficacy that accompany crossing the stream on the branch, or successfully meeting the challenge of the steep climb; and alternatively, the feelings of frustration and annoyance when those same features are experienced as obstacles. The affective dimensions of perceiving affordances are just starting to be examined experimentally (Hodges & Lindheim, 2006), although some of the groundwork was developed by Dewey (1934).

*4.2 Places:* Places, as I define them, are perceptible regions of the environment that afford specific activities for an individual or a group. For example, an open area in a forest landscape where the ground surface is relatively horizontal and free of obtruding features (e.g., large rocks), that offers ample shade, and that is located near a source of water, would be a place that could afford setting up camp. Alternatively, a flat, grassy, and obstruction-free expanse in an urban park could serve as a place for an informal football match or a baseball game.

Like affordances, places are relational phenomena. Building on Barker's concept of behaviour setting (1968), places are comprised of both the actions of individuals and supportive environmental features. The differences between affordances and places are mostly related to matters of scale. Places are comprised of several affordances, and the particular set of affordances that makes up a place can support activities of an individual or a group.

Further, I propose that experiencing a locale as a place for some activity will have an affective dimension. The weary hiker experiences suitable places to set up camp with much relief and pleasure; whereas conversely, when looking for a place to set up camp, unsuitable places *appear* decidedly unappealing. Likewise, an open field to those who are looking for a place to play is a pleasing sight. Commenting on the exhilaration that children experience running in open expanses, Barker and Wright (1955) remark: "Open spaces seduce children" (p. 55 ).

#### Key concluding points.

- Research and theory concerning environmental perception have operated almost exclusively from an analytical stance of a detached, passive spectator of the landscape.
- Landscapes are also dynamically perceived, perhaps usually so, in the context of action.
- Perceiving landscape from a dynamic point of view involves perceiving what the landscape affords for action.
- Two participatory properties of landscapes are affordances and places.
- Affordances are functionally significant properties of the environment, considered relative to an individual.
- Places are regions in the environment comprised of a collection of affordances and affording specific activities for an individual or a group.
- There is an affective dimension accompanying the engagement of affordances and places.

#### References

- Barker, R.G. (1968) *Ecological Psychology*. Palo Alto: CA: Stanford University Press.
- Barker, R.G., & Wright, H.F. (1955) *Midwest and Its Children*. New York: Harper & Row.
- Berleant, A. (2004) 'The aesthetics of art and nature', in Carlson, A. and Berleant, A. (eds.) *The Aesthetics of Natural Environments*. Orchard Park, NY: Broadview Press, pp. 76-88.
- Berry, W. (2000) *Life is a Miracle: An Essay Against Modern Superstition*. Washington, D.C.: Counterpoint.
- Carlson, A. (2000) *Aesthetics and the Environment: The Appreciation of Nature, Art, and Architecture*. London: Routledge.
- Dewey, J. (1896) 'The reflex arc concept in psychology', in *Psychological Review*, 3, 357-370.
- Dewey, J. (1908) 'Does reality possess practical character?' (Reprinted in *The Middle Works of John Dewey, 1899-1924*. Carbondale, IL: Southern Illinois University Press, 1976-1883).
- Dewey, J. (1920) *Reconstruction in Philosophy*. New York: Henry Holt.

- Dewey, J. (1934) *Art as Experience*. New York, Minton, Balch & Company.
- Gibson, J.J. (1979) *The Ecological Approach to Visual Perception*. Boston: Houghton-Mifflin.
- Gombrich, E. (1969) *Art and Illusion: A Study in the Psychology of Pictorial Representation*. Princeton, NJ: Princeton University Press.
- Heft, H. (1993) 'A methodological note on overestimates of reaching distance: Distinguishing between perceptual and analytical judgments', *Ecological Psychology*, 5, 255-271.
- Heft, H. (1996) 'The ecological approach to navigation: A Gibsonian Perspective', in Portugali, J. (ed.), *The Construction of Cognitive Maps*. Dordrecht: Kluwer Academic Publishers, pp. 105-32.
- Heft, H. and Nasar, J.L. (2000) 'Evaluating environmental scenes using dynamic versus static displays', in *Environment & Behavior*, 32, 301-322.
- Heft, H. and Poe, G. (2005) 'Pragmatism, environmental aesthetics, and the spectator approach to visual perception'. Paper presented at the Meetings of the American Psychological Association, Washington, D.C.
- Heidegger, M. (1962) *Being and Time*. New York: Harper.
- Hodges, B. and Lindheim, O. (2006) 'Carrying babies and groceries: The effect of moral and social weight on caring', in *Ecological Psychology*, 16, 93-111.
- James, W. (1890) *The Principles of Psychology*. Cambridge, MA: Harvard University Press.
- Mark, L. M. (1987) 'Eyeheight-scaled information about affordances: A study of sitting and stair-climbing', *Journal of Experimental Psychology: Human Perception and Performance*, 13, 362-370.
- Merleau-Ponty, M. (1963) *The Phenomenology of Perception*. (C. Smith, trans.) London: Routledge & Kegan Paul.
- Sontag, S. (1977) *On Photography*. New York: Farrar Straus & Giroux.
- Sontag, S. (2003) *Regarding the Pain of Others*. New York: Farrar Straus & Giroux.
- Thiel, P. (1997) *People, Places, and Path: Notations for a Participatory Envirotecture*. Seattle, WA: University of Washington Press.
- Whitehead, A.N. (1925) *Science and the Modern World*. New York: MacMillan.



**Patrik Grahn**

professor of landscape  
architecture

**Inga-Lena Bengtsson**

physician, psychiatrist &  
psychotherapist

**Lena Welén-Andersson**

occupational therapist

**Lillian Lavesson**

physiotherapist

**Liselotte Lindfors**

horticultural therapist

**Frederik Tauchnitz**

landscape architect

**Carina Tenngart**

landscape architect and  
doctoral candidate

All at the Swedish University  
of Agricultural Sciences,  
Department of Work  
Science, Business Economics  
and Environmental  
Psychology, PO Box 58,  
SE-230 53 ALNARP.  
Tel +46 40 415000

## **Alnarp rehabilitation garden: possible health effects from the *design*, from the *activities* and from the *therapeutic team***

### **1. Introduction.**

An interdisciplinary team is developing a therapeutic garden at the Swedish University of Agricultural Sciences, Alnarp campus. The therapy consists of a therapeutic *setting*, therapeutic *activities* and a therapeutic *team*. The garden offers nature and horticultural therapy treatment programmes for people diagnosed as having had depression and/or burn-out (vital exhaustion) for an extended period.

In autumn 2001, the garden was designed and laid out at Alnarp campus (Stigsdotter & Grahn, 2002, 2003). Today, the garden covers about two hectares and offers both nature-like areas with restorative qualities and more traditional cultivation areas with plant beds and qualities focusing on more demanding activities. The first patients arrived in July 2002, and to date, we have treated more than 140 patients. An interdisciplinary research programme is studying how the garden functions for these people.

The patients in Alnarp have been ill for a long time, on average, more than two years, and during that time, they have not been able to work or study. In the course of a treatment programme lasting for eight weeks, the patients will work and spend time in the garden, together with our therapists, four days a week, three and a half hours a day. The treatment team consists of a horticultural therapist, a landscape architect, an occupational therapist, a physical therapist, a physician and a psychotherapist. Following a mental collapse, a period of rehabilitation begins that is often extremely difficult. One must be able to communicate inwardly and outwardly, with other people and objects. But the body is perhaps not what it used to be, and in cases of a severe depression, feelings and thoughts are also not what they used to be. People suffering from vital exhaustion suddenly experience that they can no longer interact with their environment. Their memory has deteriorated, their concentration ability is very low, they have problems with body awareness and they experience aches and pains. Patients feel lost in their interactions when they believe they have no influence over anything; they feel like victims of an invisible power (Ottosson, 2001). All patients alternate between sadness and anger; they have difficulty putting up with other people and have feelings of despair. They are usually high-performing individuals who have earned top grades in school. And now they cannot manage anything.

Seen from a psychoanalytic perspective, many participants have lost contact early on with their genuine selves by solely existing for others. At an existential level, burn-out constitutes a type of life crisis. The participants' previous way of living has not enabled them to cope with the stressors they have experienced – perhaps they have even sought out such stressors in order to show that they are 'good enough'. Constant increases in stress without recovery have devastated the sensitive autonomic nervous system's ability to regulate stress naturally. Successful rehabilitation is based on being

### **Keywords:**

horticultural therapy,  
burn-out, activities, design,  
scope of meaning-theory

able to permanently leave behind one's previous, inadequate stress management patterns and to acquire new strategies that are more appropriate and sustainable (Maslach, 2001; Hallsten, 2001, Rylander et al, 2001).

## **2. Experiences of the garden and horticultural therapy since July 2002.**

In summary, two basic principles or phases are found to be the most fundamental in the healing process at Alnarp.

### *2.1 The first health phase: rest and contact*

Patients must re-establish contact and communication with their environment as well as build up their self-esteem, self and identity. This involves re-evaluating one's situation and finding a new orientation. At this stage, it may be advantageous to try to approach an individual through the physical world, which is somehow directly accessible for communication via all the senses. We have found that it is advisable to begin with things that are easiest to relate to – things that do not make too many demands, such as soil and water. Thereafter, patients can begin to relate to plants, and finally, they can relate to other people. Our studies indicate that nature experiences affect people greatly, to varying degrees, depending on the life situation they are in. The nature experience, as such, is affected by how much of the environment a person is able to take in and by how great his/her mental powers are.

The design of the garden is based on variation and contrasts, providing different garden rooms for different purposes. Most important is the fact that the garden contains areas for rest and contemplation, as well as for activities and work. Being able to alternate between these extremes has proven to be of great value. This allows therapists to meet more easily people's different needs. Such an environment must offer spaces for solitude as well as for social interaction. There must be open spaces, where one's gaze can wander into the distance, and enclosed spaces, where one can focus on specific details – nature-like areas, where weeds and wildflowers mingle, as well as formal areas with plants growing in ruler-straight rows. Here we can also find many sensual experiences that arouse the curiosity and interest of all visitors. Visitors can come close to the vegetation, stones and water, and thus they are able to touch things, taste berries and smell flowers. It has to be a safe area, filled with different smells, tastes, colours and forms.

The method involves taking the patient to the garden room that is best suited to his/her current state of mind and level of executive function. At the same time, the therapist tries to support the patient through appropriate activities and by gradually establishing contact, one step at a time. The more ailing and fragile a person is, the more he or she needs 'soft' experiences from nature. At the beginning, patients' mental powers are very weak. Any physical activity that can be undertaken tends to be private, like walking or picking berries. The first activities may consist of just managing to come out into the garden, being there, getting to know it and resting

there. The patients rest, cry and face their feelings of anger and eventually, joy. They spend time in the different garden rooms, beginning by picking fruit, nuts, etc., and gradually, they move on to cultivation, where sense experiences such as colours, smells, tastes, balance and perception of touch are stimulated.

After some weeks, the patient has somewhat greater mental powers, he/she is no longer as sullen and antisocial and the body tends to function better. A year and its seasons bear witness to the fact that there is a time for everything, which is an important concept. This is often a major adjustment for patients. At work and at home, they have been used to hurrying things along. Now, in the garden, they must yield to nature's own clock. Therapy begins by conveying a message to patients: that taking a pause from one's work is not wasting time. It is then that we exist in time, are present, can see the beauty of nature, the colours, hear the stream ripple, smell the earth and plants, taste the berries and water, be touched by the moment – we can experience things as they are. Sensual moments such as these – when one feels one exists – are moments of recuperation. If things go too fast, we lose our desire – something we must be frugal with. People suffering from burnout can practise stress management by, among other things, 'just being' – that is, experiencing nature with all their senses. Some important experiences that can be taken from the garden out into everyday life are: stopping work before it is finished, listening when your body tells you it is tired, lowering your ambition levels, reducing the number of obligations you have as well as letting the circumstances of the day determine what you do that day

At the end of this phase, it is clear that the patient's hard shell is beginning to 'crack', which affects the whole body, mentally and physically. This shell will have been built up when the patient was suffering from severe stress, and it will have been protecting him/herself from feelings, almost as if he/she had been 'at war'.

### *2.2 The second health phase: patients becoming more open*

Gradually, the activities will become somewhat more challenging. When psychological stress and affects, combined with deep, chronic muscle tension are released, old thinking and behaviour patterns are also changed. These old behaviour patterns are a manifestation of the way in which the individual was able to deal with his/her life experiences. When tensions are released, the individual can begin to feel. Feelings of abandonment and powerlessness can be changed to feelings of hope for the future. He/she begins to get in contact with and feel the difficult emotions that have been repressed. Our experience seems to indicate that the garden room and the activities there can help patients to dare to face their emotions and to accept the help that is offered to work through them – to begin to become the people they actually are.

The therapist can help to identify an activity or place in the garden that can facilitate the participant in this process. This may be anything from handicrafts to conversations that touch upon his/her innermost places. Here, the garden becomes the arena in

which this can take place. Treatment at Alnarp provides opportunities for healing, thinking things through, reorienting and practising new strategies. What therapists can do, with the help of the garden, is to set in motion health-promoting processes in order to begin the healing our bodies strive for and to foster the wherewithal to sustain healing. This may begin as a process of communication, where affects of guilt, shame, anger, anxiety, etc. disappear, to be replaced by affects of curiosity and happiness. This step needs to offer spaces and activities in and through which a person can reinforce his/her basic self-esteem and establish his/her own needs, to their finding a way of seeing their future more optimistically.

During the conversations in the garden, the individual's unique life and illness histories are tied together, allowing the participant to find some coherence in how and why he/she became ill. Thus, one important task during this process is to help the participant put these new experiences into words. Nature and the garden may also be used on a more symbolic/therapeutic level, such that nature becomes an arena for the person to come into contact with and give shape to his/her own unique symbolic language.

Step by step, more symbolic activities are introduced. At this stage, sowing is one of the activities that seems to have the greatest effect. Sowing a seed and caring for the sprout by watering, applying manure and weeding can cause the patient to consider caring for him-/herself – to realise that he/she is worth caring for. Perhaps at this point, the patient will start thinking about his/her clothing and personal hygiene. Subsequently, the patient may begin activities such as cultivation and handicrafts and perhaps begin to experiment. These activities are an important part of the process. Through creative and specific therapeutic methods, for example, image therapy and working with clay, inspired by nature, the participant is given the opportunity to use his/her personal symbolic language to visualise events and experiences in his/her life situation. Nature is full of metaphors and symbols, and these can constitute a link to the unconscious, thereby expediting the healing process. This, in turn, may help the person find new strategies for making everyday life more manageable.

### **3. Developing a new theory of the health effects.**

In Alnarp, we are now developing a *Scope of Meaning/Scope of Action theory*. It claims that the surrounding environment communicates with the visitor on many levels. The most important, fast and basic system is the non-verbal emotional tone, through sights, smells, sounds, etc (Stern, 1985; Grahn, 2005). The second system is a more cognitive structure of communication: reality constancy (Frosch, 1990). However, these two systems of communication are intimately connected in a scope of meaning (Grahn, 2005). The development of reality constancy starts from childhood, which facilitates the operations of the ego functions – those concerned with the whole environment. It arises in conjunction with the internalisation and stabilisation of environmental images (Frosch, 1990). According to this theory, every individual establishes a scope of meaning, in which certain structures are more permanent,

while others can more easily change in meaning (Grahm, 2005). This scope of meaning might be understood as a larger framework of different layers of reality constancies and innate memory-like pictures of varying degrees of permanence. This framework gives us the range of our Scope of Action. When a person is healthy and well, communication takes place quite easily. Everything fits into our schemes of constancies in our scope of meaning. However, it seems that when we are ill, we are more dependent on the non-human environment, to determine what our emotional tone is (Grahm, 2005; Searles, 1960; Shepard, 1982, 1998; Ulrich, 1999). In situations of crisis, the individual may need to revert to simpler relations, more stable and clearer reality constancies.

There seems to be some main characteristics that constitute the fundamental building blocks of nature. These characteristics manifest themselves through many different sensations – sight, hearing, locomotion, etc., and seem to communicate directly with the visitor and his/her Scope of Meaning and Scope of Action. Knowing more about them are of utmost importance in creating healing gardens and landscapes.

## References

- Frosch, J. (1990) *Psychodynamic psychiatry: theory and practice*. Madison: International Universities Press.
- Grahm, P. (2005) 'Om trädgårdsterapi och terapeutiska trädgårdar', in Johansson, M. and Küller, M. (eds.) *Svensk Miljöpsykologi*. Lund: Studentlitteratur, pp. 245-262.
- Hallsten, L. (2001) 'Utbränning. En processmodell' in *Svensk Rehabilitering*, 2001(3), 26-35.
- Maslach, C. (2001) *Utbränd. Om omsorgens personliga pris och hur man kan förebygga utbränning*. Stockholm: Natur & Kultur.
- Ottosson, J. (2001) 'The importance of nature in coping with a crisis: A photographic essay', in *Landscape Research*, 26, 165-172.
- Rylander, G., Nygren, Å. and Åsberg, M. (2001) 'Utmattningsdepression', in *Svensk Rehabilitering*, 2001(3), 4-7.
- Searles, H. (1960) *The Nonhuman Environment In Normal Development and in Schizophrenia*. Madison, CT: International Universities Press.
- Shepard, P. (1982) *Nature and Madness*. San Francisco: Sierra Club Books.
- Shepard, P. (1998) *The Tender Carnivore and the Sacred Game*. Athens: University of Georgia Press.
- Stern, D. (1985) *Spädbarnets interpersonella värld*. Stockholm: Natur & Kultur.
- Stigsdotter, U. A. and Grahm, P. (2002) 'What Makes a Garden a Healing Garden?', in *Journal of Therapeutic Horticulture*, 13, 60-69.
- Stigsdotter, U. A. and Grahm, P. (2003) 'Experiencing a Garden: A Healing Garden for People Suffering from Burnout Diseases', in *Journal of Therapeutic Horticulture*, 14, 38-48.
- Ulrich, R.S. (1999) 'Effects of Gardens on Health Outcomes: Theory and Research', in Cooper Marcus, C. and Barnes, M. (eds.) *Healing Gardens. Therapeutic Benefits and Design Recommendations*. New York: John Wiley & Sons, pp.27-86.

## Research methodology for understanding the impact of design on preschool physical activity

Nilda Cosco

College of Design, North  
Carolina State University

### 1. Introduction.

A methodological approach driven by theoretical constructs (concepts of behaviour setting, motivation, and affordance) offered the framework to interpret the results of a study on physical activity in preschool play areas (Cosco, 2006). Methods included accelerometry, the characterisation of preschool play areas using behaviour mapping processed with GIS software (ESRI), and video-tracking of individual children (processed with The Observer ©Noldus).

### 2. Theoretical framework.

#### 2.1 *The concept of affordance*

A child learns both about the functional properties of the environment and about herself by 'picking up' information. Learned environmental affordances guide the child's future behavioural responses in a particular environment (Gibson & Pick, 2000). The concept can be used for analysing and identifying similarities and differences among behaviour settings (e.g. play equipment, sand play area, pathways, gardens). The concept is also valuable for describing environments from a behavioural perspective (i.e. from the point of view of children's outdoor play in the case of the study of preschool play areas).

#### 2.2 *Motivation*

Kinaesthetic stimulation, produced by spatial attributes, can be a powerful source of motivation to support children's physical activity. Research shows that exploration and attraction by novel stimuli were highly associated with characteristics of the objects within children's reach (Yarrow et al., 1975).

#### 2.3 *Behaviour setting*

The concept of behaviour setting (Barker, 1976) is closely related to the concept of affordance. Behaviour settings are ecological units where the physical environment and the behaviour are indissolubly connected. The concept is applied in design research for analysing human spaces by disaggregating their functional parts. The identification of specific behaviour settings in childcare outdoor play areas (i.e. climbing area, sand play area, water play, tricycle path, vegetable garden, etc.) and their association with different levels of physical activity is essential for understanding the impact of design on children's behaviour.

### 3. Methodology.

#### 3.1 *Accelerometry*

To establish which group of preschoolers exhibited greater amounts of physical activity while playing outdoors, selection of an objective measurement of physical activity levels was a key consideration for the study in question. An array of methods

#### Keywords:

preschool outdoor space,  
behaviour and environment,  
research methodology

is available to measure children's activity although some of them are clearly not appropriate for young children (e.g. self-report). Others provide only a general estimate of activity but no insight into patterns of activity (e.g. double labelled water) or are impractical and costly (e.g. indirect calorimetry). Because of the fast pace of children's activity, researchers agree that objective observational methods and the use of non-invasive devices such as pedometers and accelerometers are most appropriate (Rowlands et al., 1997; Welk et al., 2000).

Accelerometers were selected for the study presented here because they give accurate recordings of children's activity bouts with a time stamp enabling comparisons such as start-end time of activity by day, week, indoor-outdoor activity, morning and afternoon. They register motion in two spatial plane dimensions while attached to the waist of the individual. The device is non-invasive and provides reliable and valid estimates of physical activity (Sallis et al., 1990; Trost et al., 1998; Sirard & Pate, 2001; Jackson et al., 2003).

### *3.2 Behaviour mapping processed with GIS software*

Behaviour mapping is an unobtrusive, observational method for measuring actual space use. Although the technique has been previously used for investigating other types of children's environments (Björklid, 1979; Moore, 1978, 1986; Moore & Wong, 1997), this is the first time that behaviour mapping was applied to preschool environments using behavioural coding (gender, physical activity level, and use of wheeled toys). Behaviour mapping, processed using GIS software (ESRI) generated illustrative maps and a relational database that was employed to analyse the environmental attributes of each setting such as size, layout, and category of setting (Cosco, 2006).

### *3.3 Video-tracking of individual children (processed with The Observer ©Noldus)*

For many years, researchers have tried to understand children's patterns of activity in different settings and how they afford specific behaviours by asking children to lead guided tours to their favourite destinations, producing exhaustive descriptions of their activities, and/or inconspicuously tracking their behaviour. These types of techniques allow in-depth examination of behaviours in relation to the context. For the study presented here, video-taped sequences of outdoor play activities, performed by individual children, were used to reveal links between different levels of children's physical activity and environmental components, and the qualities of the place where the activity was performed. The software The Observer (Noldus) was used to analyse individual behaviour sequences. The Observer is a professional software package for the collection, analysis and presentation of observational data. Originally created to study animal behaviour, it can be used to study activities, postures, gestures, facial expressions, movements, and social interactions. Video episodes are imported into the computer and coded following a tailor-made configuration. Behaviour coding results were downloaded into a statistical package for further analyses.

The methodology used in this study can be applied to other contexts (e.g. parks, outdoor museum settings, streetscapes) and varied topics such as learning and social behaviour or user preferences.

The analyses of large data sets linking behaviour and environmental settings and components, remains a challenge. Results, reflections, and questions arising will be shared with the audience.

## References

- Barker, R. (1976) 'On the Nature of the Environment', in Proshansky, H., Ittelson, W. and Rivlin, L. (eds.) *Environmental Psychology: People and their Physical Settings*. New York: Holt, Rinehart & Winston.
- Björklid, P. (1979) *Children's Outdoor Environment*.
- Cosco, N. (2006) *Motivation to Move: Physical Activity Affordances in Preschool Play Areas*. Doctoral Thesis. Edinburgh College of Art / Heriot-Watt University.
- ESRI. *Geographic Information System GIS*. [cited 2006 February 25]; Available from: <http://www.esri.com>.
- Gibson, J. (1979) *The Ecological Approach to Visual Perception*. Boston: Houghton-Mifflin.
- Gibson, E. and Pick, A. (2000) *An Ecological Approach to Perceptual Learning and Development*. New York: Oxford University Press.
- Jackson, D., Reilly, J., Kelly, M., Montgomery, C., Grant, S. and Paton, J. (2003) 'Objectively Measure Physical Activity in a Representative Sample of 3- to 4-Year-Old Children', in *Obesity Research*, 11(3), 420-425.
- Moore, R. (1978) 'Meanings and Measures of Child/Environment Quality: Some Findings from the Environmental Yard', in Rogers, W. and Ittelson, W. (eds). *New Directions in Environmental Design Research*. Washington DC: Environmental Design Research Association.
- Moore, R. (1986) 'The Power of Nature: Orientations of Girls and Boys Toward Biotic and Abiotic Settings on a Reconstructed Schoolyard', in *Children's Environments Quarterly*, 3(3), 52-69.
- Moore, R. and Wong, H. (1997) *Natural Learning: Creating Environments for Rediscovering Nature's Way of Teaching*. Berkeley, CA: MIG Communications.
- Rowlands, A.V., Eston, R.G. and Ingledew, D.K. (1997) 'Measurement of physical activity in children with particular reference to the use of heart rate and pedometry', in *Sports Medicine*, 24(4), 258-272; 108.
- Sallis, J., Buono, M., Roby, J., Carlson, D. and Nelson, J. (1990) 'The Caltrac Accelerometer as a Physical Activity Monitor for School-age Children', in *Medicine Science and Sports Exercise*, 22(5), 698-703.
- Sirard, J.R. and Pate, R.R. (2001). 'Physical Activity Assessment in Children and Adolescents', in *Sports Medicine*, 31(6), 439-454; 113.
- Trost, S.G., Ward, D., Moorehead, S., Watson, P., Riner, W. and Burke, J. (1998) 'Validity of the Computer Science and Applications (CSA) activity monitor in children', in *Medicine Science and Sports Exercise*, 30(4), 629-633; 112.
- Welk, G.J., Corbin, C.B. and Dale, D. (2000) 'Measurement issues in the assessment of physical activity in children', in *Research Quarterly of Exercise Sport*, 71(2Suppl), S59-73.
- Yarrow, L., Rubinstein, J., et al. (1975) *Infant and Environment: Early Cognitive and Motivational Development*. New York: John Wiley & Sons.



Julienne Hanson and  
Ruth Conroy Dalton

Bartlett School of Graduate  
Studies, University College,  
London

## Feeling good and feeling safe in the landscape: a 'syntactic' approach

### 1. Introduction.

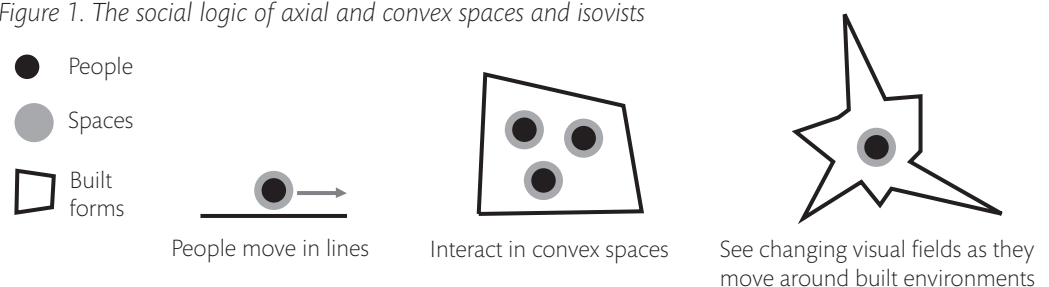
Space syntax is a theory and set of tools and techniques for the analysis of spatial configurations. It was developed at UCL in the late 1970s, as an approach to understanding human spatial organisation and to help architects and urban designers to simulate the likely social consequences of their projects. The fundamental proposition of space syntax is that a building or place can be broken down into spatial components, so that an analysis of the interrelations of the components will yield information about the *pattern* of space that is meaningful and functionally relevant. Over the past thirty years, space syntax has been successfully applied to resolve problems as diverse as master planning entire cities or revealing the imprint of culture in domestic settings.

With this in mind, this paper will explore opportunities and challenges of taking a syntactic approach to the spatial analysis of landscape. To the extent that people avoid walking through landscapes in which they feel apprehensive, understanding the spatial characteristics of such environments should enable landscape designers to create vital landscapes that support healthy lifestyles and avoid those conditions where people may feel insecure. The paper will focus on how the tools/techniques of space syntax can be adapted to understand the circumstances in which people feel motivated to explore their local landscape and the spatial factors that may deter people from incorporating walking into their everyday routines.

### 2. How space syntax works.

Space syntax is built on three classes of spatial unit, each associated with a different representation: axial lines, convex spaces and visual fields (isovists) (see Figure 1). Movement is essentially a *linear* activity, whereas social interaction requires a *convex* space in which all points can see all others. Finally, from any point in space, it is possible to construct a 360° visual field that describes the area and boundary that can be directly seen from that location. Following Benedikt (1979), space syntax normally uses the term *isovist* (related terms from landscape studies/geography would be *vista* and *viewshed*, discussed in detail by Conroy-Dalton & Bafna, 2003), to refer to these irregularly-shaped slices through the environment. Each of these representations describes some aspect of how people use and experience space practically. A central proposition of space syntax is that there is a link between these representations of space and those observable aspects of functionality.

Figure 1. The social logic of axial and convex spaces and isovists



#### Keywords:

space syntax, landscape  
analysis, healthy lifestyles

However, the space syntax approach to architectural/urban space is not just concerned with the properties of individual spaces, but with the relationships between the many spaces that form the spatial layout of a building/city. Space syntax uses the term *configuration* to refer to the way in which each space in a layout contributes to how all the spaces in the system affect one another. A fundamental notion of space syntax is that the layout of a network of spaces appears to be different when seen from different locations in the system.

### 3. The syntactic analysis of landscapes.

Practical applications of space syntax to landscape studies tend to be directed towards promoting the use of green routes and public parks in urban areas through people-aware design. For example, in 2003, Space Syntax Limited, a commercial spin-off company of the university-based research group at UCL, was commissioned to study the use of two Greenways on the outskirts of London. The key spatial factors that seemed to influence the observed levels of activity on the Greenways were integration, visibility and co-presence (Rose, 2003). Similarly, a detailed observation study of the use of a local Thames-side park in the heart of London (Savic & Rose, 2003), found that whilst routes at the perimeter of the park were well used, those in the heart of the park were less busy.

Studies of a similar nature have been carried out in several parts of the world (Baser, 2007; Grajewski & Psarra, 2001; Guler, 2007; Makhzoumi et. al., 2005, Papargyropoulou, 2006). A common theme in many of these studies is the relationship between visibility (what can be seen), accessibility (where people can go) and observed use and movement (where people actually are). An intriguing insight (Papargyropoulou, 2006) is that the spatial configuration of a parkland setting may be unique in respect of the freedom of choice that it offers its users in terms of where to go, what to look at and who else is co-present with the observer in the visual field.

With respect to issues of visibility, interesting work is being done to develop an algorithm to express the probability that a target object really can be seen from a given location in the landscape, a factor termed '*probabilistic visibility*' (Skov-Peteren & Snizek, 2007a, 2007b). Building upon an earlier study of the landscape of Queensland (Preston 2002), the authors propose that when analysing visibility in small-scale landscapes using visual fields, factors such as the ruggedness of the terrain, the presence of ground-level planting and even the weather and light conditions might interfere with visual contact. They have proposed, therefore, a measure of '*visibility decay*' that takes account of the physical distance between the viewer and the target, the relative transparency of the environment and the viewing angle; these ideas were tested empirically in a field study located in a beech forest setting.

### 4. Spatial analysis.

The question that this paper will begin to explore is whether the kinds of objective, configuration-based analyses, typically employed by space syntax researchers, can be

brought to bear on the problem of representing and understanding the role of the natural landscape. We shall attempt to demonstrate how certain space syntax techniques may begin to be adapted/extended as well as to outline a strategy for future research. It is proposed that there are, broadly, three ways in which space syntax methods may be applied to the study of natural landscapes; these can be characterised as 'assigning attributes to spatial units' (or the nodes in the graph-based representation), 'assigning attributes to the relationships between spatial units' (or the edges in the graph) and the use of multi-layered graphs. Some of the goals of these tactics are to be able to account for the seasonal variation found in the natural landscape, the imprecise nature of natural boundaries and the multiplicity of types of path and/or use.

The next step is to pilot the modified and extended 'syntactic' representations and measures described above, to see if any accord with people's reported experiences. It is clear that the way forward should include a synthesis of three types of expertise: an ability to objectively quantify natural spaces (contribution of space syntax), environmental/cognitive psychology methods of, for example, verbal protocols and other forms of self-reporting in order to attempt to elicit the types of affordances provided by the natural landscape, and knowledge of the landscape itself, providing structured methods of classification and evaluation. This paper ends with a plea for future, interdisciplinary collaboration, as this will provide the best opportunity to understand the reasons why people are reluctant to make full use of the natural environment, and hence feel both good and safe in the landscape.

## References

- Baser, B. (2007) 'A new landscape design strategy for creating continuous, perceptible and productive urban green: a case study of Kadikoy, Istanbul', in Proceedings of the Sixth International Space Syntax Symposium, 12-15 June, 2007.
- Benedikt, M. (1979) 'To take hold of space; isovists and isovist fields', in *Environment and Planning B*, **6**, 47-65.
- Conroy Dalton, R. and Bafna, S. (2003) 'The syntactical image of the city: a reciprocal definition of spatial elements and spatial syntaxes', in the 4th International Space Syntax Symposium, 17-19 June 2003, London, UK.
- Grajewski, T. and Psarra, S. (2001) *The evaluation of park layouts and their impact on the patterns of use and movement: Warley Woods, a case study*. Reading: Urban Parks Forum.
- Guler, G. (2007) 'Measuring the effects of the bridges on Istanbul's green system using space syntax and GIS tools', Le Notre Conference, Belgrade, 10-14 October, 2007.
- Makhzoumi, J. and Zako, R. (1999) 'Investigating the spatial pattern of Mediterranean rural landscapes', Poster presented to the Second International Space Syntax Symposium, Brazilia, 29 March-2 April.
- Papargyropoulou, P (2006) *Park interpretations: an exploration of the spatial properties and urban performance of Regent's Park, London and Pedion Areos Park, Athens*. M.Sc. Thesis, University College London.
- Preston, R. (2002) *Visual exposure of the landscapes in the Bremer River catchment and the Middle Brisbane River catchment*, <https://www.epa.qld.gov.au/publications/p00872.pdf>.
- Rose, A. (2003) *Greenways: walking at the urban fringe*. London: Space Syntax Limited.
- Savic, B. and Rose, A. (2003) *Potter's Field Park; a report on existing patterns of space use and spatial potentials*. London: Space Syntax Limited.
- Skov-Petersen, H. and Snizek, B. (2007a) 'Probability of visual encounters', in Gimblett, R.H. and Skov-Petersen, H. (eds.) *Monitoring, simulation and management of visitor landscapes*. Tucson, Arizona: University of Arizona Press.
- Skov-Petersen, H and Snizek, B. (2007b) 'To see or not to see; assessment of probabilistic visibility', 10th AGILE Conference, Aalborg, Denmark, 8-11 May, 2007.
- Synott, M. (2006) Personal communication [email].

## Prioritising factors influencing visits to greenspace: conjoint analysis

### 1. Introduction.

Understanding people's preferences is a key towards anticipating their likely behaviour. This paper presents results from a study on older people's visits to local parks and discusses one appropriate methodology (i.e. conjoint analysis) for such research.

The field of preference and choice has been widely researched and, in this introduction, we wish to emphasise two simple consequences which seem to arise from this work, which researchers need to take seriously. These consequences seem rather obvious and well known but research is still undertaken which ignores them. Consider, for example, a study on landscape preference. A photograph of, say, a landscape or a building may be shown by a researcher, and a person asked, "How much do you like this landscape?" - with a suitable scale included for the response. This doesn't seem to be a particularly constructive approach, for two reasons. Firstly, and very relevant to a major theme of this conference in which current views on affordances will be presented (Heft, 2001), we need to take on board the fact that our preferences and perceptions are closely integrated with our actions. Answers to the question: "How much do you like this landscape?" will be very different when qualified by some aspect of behaviour, for example, as a place to:

- live in
- view from a window
- go for a walk in with a friend
- spend a holiday
- retire to
- etc, etc.

Secondly, and related to the first, is the issue of context. The psychological literature on decision making emphasises time and again, the importance of context in influencing choice (e.g. Plous, 1993). The way a decisional alternative is presented or 'framed' influences the response of the interviewee. It seems that choices are made relative to some reference point (often provided by the frame), and secondly, that alternatives are likely to be assessed in terms of gains and losses against the reference (e.g. Kahneman & Tversky, 1979). In practice, this means that the evaluation of an element of the environment made in isolation can be very different from the evaluation of the same element in different environmental or choice contexts - a point well demonstrated for colour preference by Whitfield (1990). And as a corollary, the sum of evaluations of isolated elements in an environment may not equate to an evaluation of the total environment itself. We also need to remember that there can be violations of the transitivity law in preference. That is, while A might be preferred to B, and B preferred to C, it does not always follow that A is preferred to C. It is therefore this more complex, contextually derived and relative, rather than absolute, notion of choice or preference, which underpins likely behaviour.

Peter A. Aspinall,  
Catharine Ward  
Thompson and Susana  
Alves

OPENspace Research Centre,  
Edinburgh College of Art and  
Heriot-Watt University

**Takemi Sugiyama**

Cancer Prevention Research  
Centre, School of Population  
Health, The University of  
Queensland

**Roger Brice and Adrian  
Vickers**

Adelphi Research Group,  
Bollington UK

### Keywords:

preference, choice, decision  
making, conjoint analysis,  
greenspace, parks

It is the decision-making background out of which the early conjoint approach arose (Luce & Tukey, 1964). Its advantages are that alternatives for preference and choice are presented together for comparison. Each alternative option differs on several attributes in any comparison, which makes the choice seem more natural and closer to choice behaviour in real situations.

## 2. Methodology.

As part of the collaborative EPSRC I'DGO project (OPENspace with Salford and Oxford Brookes Universities), a study was undertaken to explore older people's preferences for visiting parks. Following a literature search, 15 different attributes were selected as likely to be relevant to the pleasantness/unpleasantness of the visit. For example, the hypothetical parks were considered to be at different distances from the home of the respondent; they had different characteristics (e.g. views, planting, maintenance); different facilities (e.g. café, toilets); and different route features for getting there (e.g. pavement quality, traffic density, benches).

From a methodological perspective, we were faced with a large number of attributes on which the parks differed. There were two possibilities. One was to use adaptive conjoint, frequently used in one-to-one interviews, while the other was to use a partial profile design of choice-based conjoint which could be presented in questionnaire format. Choice-based conjoint studies appear to be more frequently used by researchers and are seen as more rigorous, so this option was chosen.

There were two constraints which we imposed on the choice task – firstly, that it would involve a series of paired comparison tasks and ,secondly, that no more than four attributes would be presented at a time for any park in any comparison task. Given these constraints, we ran the Sawtooth technology software program ([www.sawtooth.com](http://www.sawtooth.com)) to determine:

- a. how many paired comparison tasks we needed in any version of the conjoint questionnaire given to an individual respondent
- b. what were the combinations of attributes in any task
- c. how many different versions of the questionnaire we needed to meet an efficiency criterion of over 90%.

The software indicated that any respondent would be required to answer 15 paired comparison tasks, and that we would need 15 versions of the questionnaire to meet the efficiency criterion. We generated 25 sets of questionnaires and selected the best 15 which seemed to have a balance of uncertainty over the choice, and no internal contradictions regarding attributes. Finally, two extra hold-out tasks were added to each version of the questionnaire as a validity check – see below. Having selected 15 versions of the questionnaire, the question presented to each respondent for each task was - "If either of these two parks was in your neighbourhood, which one would you be more likely to visit?"

227 people responded to the study which meant that any version of the questionnaire was answered by around 15 people.

### 3. Results.

In the conference presentation, several different types of output available from the analysis will be presented.

#### 3.1 General overview

The attributes and their relative importances across all respondents show that the top two issues are nuisance factors (i.e. signs of vandalism, youngsters hanging around, dog fouling) and facilities (i.e. café, toilets). Different profiles of importance will be produced for any segmentation of the data by demographic variables. For example, the profile for people living with someone shows facilities at the top of the list. However, for people living alone, facilities drops to fifth place on the list.

#### 3.2 Trade-offs

Comparisons of relative importance can be made both within and between attributes. Relative importance is assessed by means of relative differences between levels of attributes. For example, illustrations will be shown of how the difference between light and medium traffic is less than that between medium and heavy. In other words, a shift from heavy to medium levels of traffic is perceived as more important than to a shift from medium to light traffic.

The same logic applies for comparisons between attributes. For example, reducing traffic from heavy to medium will be shown to be more important for people than lining paths with trees or providing a pavement part of the way. However, none of these changes is as important as the removal of nuisance factors (e.g. signs of vandalism or youngsters hanging around). A similar output illustrating sensitivity analysis will be shown.

#### 3.3. From group means to individual utilities

One major development over recent years within a conjoint approach has been on methods to generate not simply average utilities across groups but individual utilities across all respondents. In particular, the Hierarchical Bayesian approach has emerged as the front-runner for this purpose (see [www.sawtooth.com](http://www.sawtooth.com)). One characteristic of a Bayesian analysis is to assess how obtained evidence changes a prior distribution of probabilities to produce a posterior distribution. In this instance, it is assumed that respondents are random draws from a population distribution of part-worth utilities. The analysis produces a posterior estimate of each individual's part-worths by modifying the prior distribution by the particular choices each individual makes.

In the parks study, multidimensional preference analysis is used to graphically represent this. The attribute importances are locations in space while respondents' preferences are represented as vector directions going out from the centre of the figure.

### 3.4 Market simulations

At the end of the analysis, a summary of overall findings will be presented through the market simulator. This enables different profiles of parks across all levels of all attributes to be dialled up and compared with each other for share of preference. As a consequence, it is possible to see the impact on share of preference between parks from changes to any environmental feature. This practical option will be demonstrated.

## 4. Methodological footnote.

In this final section, certain methodological issues arising from our experience of choice-based conjoint will be presented.

- a. Firstly, there is the question of validity, which was explored by hold-out cards included in the questionnaire. These provide opportunities to test the conjoint model (generated from the non-hold-out tasks) against the actual choices made on the hold-out tasks. Of course, the definitive test for validity is a comparison of predicted against actual behaviour. The evidence on this from conjoint studies applied to consumer purchases is encouraging.
- b. Secondly, with regard to reliability, we have carried out two independent studies on two different groups of people with glaucoma – one in Edinburgh (N=109) and one in Aberdeen (N=76) (Aspinall et al, 2005, Aspinall et al, 2007). In this case, people were given a profile of two patients and asked which they thought was in the worse state of health. Both studies used the same five attributes, each at the same three levels, however, the presentation order of attributes on the paired comparison task cards was different and the actual paired comparisons tasks themselves were different.
- c. Interaction effects - these are particularly important because in a partial profile design, only certain interaction effects can be analysed. However, Hierarchical Bayesian analysis allows all simple interactions to be assessed. Interactions from the park study will be shown.
- d. Prohibition issues – this is where researchers constrain certain combinations of attributes from occurring in any task presentation. A typical case in marketing is where, following the software generation of tasks, a luxury item may occur at a minimum price. In the park study, we simply selected different sets of task presentation from the 25 generated.
- e. Design efficiency – a graph of efficiency will be presented.
- f. Presentation mode - we have also experimented with a different approach. In a study on preference for new build housing for the Joseph Rowntree Foundation, we used a mix of images and text to present alternative houses (Leishman et al,

2004). While there were 12 attributes under investigation, only five were explicitly given in text – the other seven were embedded in the images (e.g. variation in garden size). This seems an interesting option for further conjoint research although at this stage, we do not know whether attributes presented visually will be disproportionately valued in relation to a text presentation.

## References

- Aspinall, P., Hill, A. et al (2005) 'Quality of life in patients with glaucoma: a conjoint analysis approach', in *J Vis Imp Res.* 7(1), 13.
- Aspinall, P., Johnson, Z., Azuara-Blanco, A., Montarzino, A., Brice, R. and Vickers, A. (2007) 'Evaluation of quality of life and utilities in people with glaucoma', in *Int. J. Ophthal. Vis.Science* (in press).
- Heft, H. (2001) *Ecological psychology in context*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Kahneman, D. and Tversky, A. (1979) 'Prospect theory: An analysis of decisions under risk', in *Econometrica*, 47, 313-327.
- Leishman, C., Aspinall, P., Munro, M. and Warren, F. (2004) *Preference for new build houses*. York: Joseph Rowntree Foundation.
- Luce, R.D. and Tukey, J.W. (1964) 'Simultaneous conjoint measurement', in *Journal of Mathematical Psychology*, 1, 1-27.
- Plous, S. (1993) *The Psychology of Judgement and Decision Making*. NY: McGraw-Hill.
- Sawtooth Technology ([www.sawtooth.com](http://www.sawtooth.com)).
- Whitfield, T.W.A., and Wiltshire, T.J. (1990) 'Color psychology: a critical review', in *Genetic Social and General Psychology Monographs*, 116, 385-411.



Robin C. Moore  
North Carolina State  
University

## **Healthy urban outdoors for children and families: theory, methods and measures**

### **1. Introduction.**

Dramatic changes in the lifestyles of children and families have occurred in the technologically developed regions of the world in the last thirty years or so, which are now deepening their global effect on human culture. Recent reports from the WHO European Region provide a comprehensive review of scientific literature (WHO, 2007), an analysis of case studies of collaboration between transportation and public health sectors to promote walking and cycling (WHO, 2006), and a comprehensive meta-analysis of the role of residential environments in preventing sedentary lifestyles (Schoeppe & Braubach, 2007).

### **2. Sedentary lifestyles.**

The rapid rise in overweight and obesity is a well-documented health issue, now reaching down into early childhood populations. In the United States, more than 10 percent of two- to five-year-olds are obese and more than 20 percent are overweight or at risk of being overweight (Ogden et al., 2002). Alarming negative health consequences highlighted by public health professionals have caught the attention of the media and general public, even suggesting that US children born today may start dying before their parents (Olshansky et al., 2005). Almost a fifth (18%) of US children under 19 years old are already overweight (Centers for Disease Control, 2007). The situation in the UK is similar (Health Survey of England, 2004) and in some European countries even worse. In Spain 13.9 percent of individuals aged two to twenty-four are obese and 26.3 percent are overweight (European Environment and Health Committee, 2005).

A rapidly expanding scientific literature is growing around these issues, which strongly suggests a causal link to a new metabolic energy imbalance in individuals. Too much daily energy is being ingested (too much, too high caloric foods and drinks) and insufficient energy is being expended (too much sedentary, indoor time). People are getting fat too fast, too early in life. Either “calories in” have to lessen or “calories out” have to increase – especially in childhood when habits of life are learned. Neurological research suggests that age 10 to 12 may be the levelling off point for learning such habits (Waber et al., 2007). Once an adolescent is overweight, it is difficult to reverse the condition (WHO, 2004).

### **3. Nature’s therapeutic impact.**

Besides overweight and obesity, research is beginning to identify other childhood health ailments such as attention functioning disorders that may be associated with children’s lessening time outdoors in contact with nature (Faber Taylor et al., 1998; Grahn et al., 1997). Recently labelled in the lay literature as “nature deficit disorder” (Louv, 2005), there is growing scientific evidence that daily experience of nature –

#### **Keywords:**

children, families, design  
research, outdoor  
environments

even nature “borrowed” through windows, may have a therapeutic effect on the social, emotional, and mental functioning of individuals (Wells & Evans, 2003; Wells, 2000; Kuo, Bacaicoa, & Sullivan, 1998).

#### **4. The impact of inequality.**

Long-standing, multiple socioeconomic inequalities in communities, which directly affect children, add a layer of complexity in researching the issue of children’s sedentary lifestyles and for developing policy responses. Social epidemiologist, Richard Wilkinson (2005) presents substantial evidence that low-income populations are disproportionately impacted by the negative health attributes of their daily environments – measured not so much in absolute terms of poverty, but as the perceived relative gap between rich and poor within the community. Income distribution is correlated to health. Growth of social capital appears to follow a similar pattern. Using US data from Putnam’s *Bowling Alone* (2000), Wilkinson (2005) shows that US states with a more equitable mix of rich and poor have higher levels of social participation. Morrow (2003) extends the theory of social capital using the distinction between social and cultural capital developed by Bourdieu (1984) and applies it to research of children’s shared neighbourhood space, specifically exploring children’s social networks, local identity, attitudes towards institutions, and community and civic engagement. Results suggest implications for the design of streets, pathways, open space, and facilities for meaningful children’s play, where children can develop their own culture beyond the nuclear family.

#### **5. The nutrition gap.**

The “nutrition gap” is of particular concern. Poor communities tend to have less access to fresh food and thus have less chance of achieving a healthy, balanced diet. This is an area where landscape planners and architects could make a substantial contribution to a) connect farms and their produce to institutions that provide meals for children such as childcare centres and schools; and b) design nutritional landscapes of food-producing plants in outdoor spaces used by children so that they grow up once again understanding what fresh food is and where it comes from. Learning about different types of food, food sources, and good nutritional habits can be motivated by hands-on gardening experience (Lineberger & Zajicek, 2000, Morris et al., 2002).

#### **6. Applied design research.**

Applied research is urgently needed to help guide design innovations and interventions in response to the new public health issues. Even though the research literature is growing, it is limited and mainly conducted within the epidemiological traditions of public health (research designs with relatively large sample sizes, highly controlled quantitative data, elaborate statistical analyses, high levels of generalizability). The large majority of studies are cross-sectional analyses of existing environmental conditions and/or impact studies of programmatic rather than physical environment interventions. Thus far, few studies have focused on the built

environment at a level of physical differentiation where findings useful to designers and design-policy might result. The types of pre-post, natural, quasi-experimental studies that might provide design evidence are rare.

Many current studies use what are viewed as relatively cost-effective methods for large sample sizes (self-report instruments administered via telephone, the internet, and other remote methods). Inclusion of individuals under the age of 18 is exceedingly rare. Few studies have used direct observation, environment-behaviour methods and/or in-depth, face-to-face interviews to understand the effect of the daily spaces occupied by children (institutional environments, including care centres and schools, and public outdoor environments such as plazas, parks, playgrounds, and open space).

### **7. Theoretical constructs.**

The purpose of this paper is to share recent research using behavioural methods to investigate environment-behaviour associations in designed settings in public or semi-public spaces. The hope is to contribute to the development of an evidence-based paradigm in urban landscape design, inspired by the evidence-based paradigm already in health facility design. Application needs to be broadened to cover healthy behaviour in the daily spaces of community life. Generalizability appears promising across typologies of spaces designed for children and families, which also may embrace the “risk factors” orientation of public health.

The paper will first review the theoretical constructs of territoriality (Moore, 1989; Moore & Young, 1978; Hart, 1979), behaviour setting (Barker, 1976) and affordance (Gibson, 1979). Second, it will describe and critique applications of behavioural methods and measures to recent research conducted by the Natural Learning Initiative in parks, playgrounds, children’s museums, and botanical gardens. The results demonstrate a range of variability of levels and types of use in a range of designed behaviour settings by various user groups – with application to both site and setting design.

Discussion will focus on future application in both design programming in participatory community contexts as well as technical applications in design to achieve more predictable support of healthy lifestyles of young users. The profound value of children’s outdoor play will be reasserted.

### **Key concluding points.**

- Children are facing severe lifestyle-generated health issues.
- Landscape and urban design can be viewed as a health intervention and preventive measure in the management of children’s environments.
- Design of the daily environments of children and families are most likely to be effective targets for change – especially outdoor environments.

- The new health problems resulting from lifestyle changes require new, innovative, dramatically different solutions than in the past.
- Solutions must be evidence-driven. Applied environment-behaviour research to achieve this is urgently required.

## References

- Barker, R. (1976) 'On the Nature of the Environment', in Proshansky, H., Ittelson, W., Rivlin, L. (eds.), *Environmental Psychology: People and their Physical Settings*. New York: Holt, Rinehart & Winston, pp.12-20.
- Bourdieu, P. (1984) *Distinction: A Social Critique of the Judgement of Taste*. London: Routledge.
- Centers for Disease Control and Prevention (CDC). National Center for Health Statistics. (2007) 'Prevalence of Overweight Among Children and Adolescents: United States, 2003-2004'. [http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/overwght\\_child\\_03.htm](http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/overwght_child_03.htm) [January 2007]
- European Environment and Health Committee (EEHC) (2005). 'Spain: The NAOS Strategy: A Strategy for Nutrition, Physical Activity and Obesity Prevention.' [http://www.euro.who.int/eehc/implementation/20051129\\_2](http://www.euro.who.int/eehc/implementation/20051129_2).
- Faber Taylor, A., Wiley, A., Kuo, F. and Sullivan, W. (1998) 'Growing Up in the Inner City: Green Spaces as Places to Grow', in *Environment and Behavior*, 30, 3-27.
- Gibson, J. (1979) *The Ecological Approach to Visual Perception*. Boston: Houghton-Mifflin.
- Grahn, P., Mårtensson, F., Lindblad, B., Nilsson, P. and Ekman, A. (1997) 'Ute på Dagis' (Out in the preschool), in *Stad and Land* 145.
- Hart, R. (1979) *Children's Experience of Place*. New York: Irvington Publishers.
- Health Survey for England. The Health of Children and Young People, Department of Health, Editor. (2004) National Statistics Website. Accessed December 30, 2005: <http://statistics.gov.uk/>.
- Kuo, F., Bacaicoa, M. and Sullivan, W. (1998) 'Transforming Inner-City Landscapes: Trees, Sense of Safety, and Preference', in *Environment and Behavior*, 30, 28-59.
- Lineberger, S. and Zajicek, J.M. (2000) 'School Gardens: Can a hands-on teaching tool affect students' attitudes and behaviors regarding fruit and vegetables?', in *HortTechnology*, 10, 23-27.
- Louv, R. (2005) *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books.
- Moore, R. and Young, D. (1978) 'Childhood Outdoors: Toward a Social Ecology of the Landscape', in Altman, I. and Wohlwill, J. (eds.), *Human Behavior and Environment* (Vol. 3: *Children and the Environment*, 83-130). New York: Plenum Press.
- Morris, J. L., Neustadter, A. and Zidenberg-Cherr, S. (2002) 'Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables', in *Journal of the American Dietetic Association*, 102, 91-93.
- Morrow, V. (2003) 'Improving the Neighborhood for Children: Possibilities and Limitations of "Social Capital" Discourses', in Christensen, P. and O'Brien, M. (eds). *Children in the City: Home, Neighborhood and Community*, London: Routledge Falmer.
- Ogden, C., Flegal, K., Carroll, M. and Johnson, C. (2002) 'Prevalence and Trends in Overweight Among US Children and Adolescents, 1999-2000', in *Journal of the American Medical Association* 288(14), 1728-1732.
- Olshansky, S. J., Passaro, D., Hershow, R., Layden, J., Carnes, B., Brody, J., Hayflick, L., Butler, R., Allison, D. and Ludwig, D. (2005) 'A Potential Decline in Life Expectancy in the United States in the 21st Century', in *New England Journal of Medicine* 352(11), 1138-1145.
- Putnam, R. (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- Schoeppe, S. and Braubach, M. (2007) *Tackling Obesity by Creating Healthy Residential Environments*. Copenhagen: WHO Regional Office for Europe. <http://www.euro.who.int/Document/E90593.pdf> [August 2007].

Waber, D. P., DE Moor, C., Forbes, P.W., Alml, C.R., Botteron, K.N., Leonard, G., Milovan, D., Paus, T. and Rumsey, J. (2007) 'The NIH MRI study of normal brain development: Performance of a population based sample of healthy children aged 6 to 18 years on a neuropsychological battery', in *J Int Neuropsychol Soc.* 13(5), 729-746. Epub.

Wells, N. M. (2000) 'At Home with Nature. Effects of "Greenness" on Children's Cognitive Functioning', in *Environment and Behavior* 32(6), 775-795.

Wells, N. M. and Evans, W. (2003) 'Nearby Nature: A Buffer of Life Stress Among Rural Children', *Environment and Behavior* 35(3), 311-330.

WHO (Regional Office for Europe), (2004) *Young people's health in context: selected key findings from the Health Behaviour in Schoolaged Children study*. Copenhagen: WHO Regional Office for Europe. (<http://www.euro.who.int/document/mediacentre/fs0404e.pdf> [August 2007].

WHO (Regional Office for Europe), (2006) *Collaboration Between the Health and Transport Sectors in Promoting Physical Activity: Examples from European Countries*. Copenhagen: WHO Regional Office for Europe. <http://www.euro.who.int/Document/E90144.pdf> [August 2007].

WHO (Regional Office for Europe), (2007) *A European Framework to Promote Physical Activity for Health*. Copenhagen: WHO Regional Office for Europe. <http://www.euro.who.int/Document/E90191.pdf> [August 2007].

Wilkinson, R. (2005) *The Impact of Inequality: How to Make Sick Societies Healthier*. London: The New Press.

## **The school journey: towards a socialising institution - a case study in Tehran**

In Tehran, there has been a growing trend towards vehicular travel modes for the school journey, which in turn, makes the streets less safe and as a result, more children are driven to school to ensure their safety. This study sheds light on the influential factors in this vicious cycle to better understand its limitations and the potential, via social networking en route to school, that might catalyse more sustainable transport modes.

In two neighbourhoods (home-zone vs. car-dependent), children aged 11 and 13 demonstrated their demands for independent mobility on the school journey. Their perception of traffic and stranger danger, also, was compared with that of their parents by applying qualitative methods (Hart, 1979; Chawla, 2002; Johansson, 2003).

The results show that age is the most influential factor but gender, parents' socio-demographic characteristics, and urban design are also important. Moreover, in this context, the school journey seems to be a unique social opportunity for some of the accompanying mothers. This could be a starting point to intervene in the fore-mentioned cycle by re-establishing the school journey as a social network, from which more sustainable travel modes could then be encouraged.

Hart, R. (1979) *Children's Experience of Place*. New York: Irvington.

Chawla, L. (2002) *Growing Up in an Urbanising World*. Glasgow: Bell & Bain Ltd.

Johansson, M. (2003) 'Social dangers as constraints for pro-environmental travel modes – the perception of parents in England and Sweden', in *Medio Ambiente y Comportamiento Humano*, 4 (1), 49-69.

Ehsan Ahmadi

School of Environmental Studies, Nagoya University

Gen Taniguchi

School of Engineering, Nagoya University

### **Keywords:**

independent mobility, school journey, stranger danger, traffic danger, Tehran

---

## **How can the neighbourhood environment make a difference to the health of older people?**

This study examines older people's preferences for local open spaces by means of a choice-based conjoint (CBC) analysis approach. CBC analysis allows the examination of the joint effects of multiple environmental attributes on choice. We examined what general attributes (e.g. trees/plants, facilities, traffic) were preferred for a local open space and whether socio-demographic characteristics differentiated older people in their preferences. A sample of 237 older people in the UK each evaluated different versions of 14 paired comparisons of open space environmental attributes. The results indicated that lack of nuisance, presence of amenities, and a densely planted park with tree-lined paths were the most preferred attributes. When considering personal characteristics, level of mobility and social living arrangements differentiated the sample into two groups and influenced their preferences. We conclude that certain characteristics of the outdoor environment have an important role in supporting health and wellbeing through their influence on outdoor use.

Susana Alves, Catharine Ward Thompson and Peter Aspinall

OPENspace Research Centre, Edinburgh College of Art and Heriot-Watt University

Takemi Sugiyama

Cancer Prevention Research Centre, School of Population Health, University of Queensland

### **Keywords:**

open space, older people, preference, choice-based conjoint analysis, quality of life

**Katharine Beaney**  
ScHARR, University of  
Sheffield

**Professor Steve  
Sharples**  
School of Architecture,  
University of Sheffield

**Dr Elizabeth Goyder**  
ScHARR, University of  
Sheffield

**Keywords:**  
green space, city centre  
living, urban environment

### **City centre living and wellbeing: an exploratory study of the relationship(s) between green spaces and wellbeing for the residents of Sheffield city centre**

Despite claiming to be the 'greenest city in England', Sheffield city centre is relatively deprived in terms of the amount of green space. A pilot study was conducted as a precursor to a larger mixed method study that would explore various aspects of relationships between green space and wellbeing. Thirteen residents of the city centre completed a self-administered posted questionnaire.

The majority of the residents were at least fairly satisfied with local green space. Although perceptions of particular aspects of quality and quantity of green spaces tended to be more negative, most residents perceived that green spaces were important to the area. All except one resident was a user of local green space. General usage patterns echo results obtained from previous research in terms of travel time and use for walking.

Answers to open questions revealed concerns over litter and general management/maintenance of local green space as well as wider concerns about the behaviour of other users.

---

**Dr Anne C. Bell**  
Evergreen

### **Active by design: methods for investigating the relationship between school ground design and children's physical activity**

This presentation highlights the findings of a pilot study investigating research methods appropriate for an in-depth exploration of the relationship between school ground design and the quantity and quality of children's physical activity. Researchers have adapted and combined a variety of methods, including direct observation, student-guided walks, student mapping and student interviews in order to explore the intensity, type, pattern and location of activities while probing related social and motivational dimensions from the perspectives of students.

The pilot study was conducted at an elementary school in Toronto, Canada, with a wide variety of school ground design features. Of particular interest are the play patterns associated with 'green' design elements (gardens, trees, rocks, logs, wildlife habitats), compared to more conventional features such as asphalt, turf playing fields and manufactured play equipment. The data emerging from the study also provides insight into the potential contribution of school ground greening to school-based health strategies to promote active, healthy play.

**Keywords:**  
school grounds, physical  
activity, methods, green design

## **The meaning of the outdoor environment to residents at nursing homes**

Anna Bengtsson

Swedish University of  
Agricultural Sciences

Although studies prove the importance of being outdoors to health and wellbeing (Rodiek, 2002), outdoor environments at nursing homes are seldom used. One reason is that the design of the outdoors does not fit the users' specific needs. It is hard to find studies concerned with understanding the outdoor environment as lived and experienced by nursing home residents, and what this means for outdoor design (Bengtsson & Carlsson, 2005).

The purpose of this study was to describe the meaning of the outdoor environment to residents at nursing homes. Qualitative interviews and focus group interviews were conducted with residents, next of kin and staff at three nursing homes.

The findings of the respondents' experiences are first reported in themes and then interpreted and discussed in relation to other studies. The reader is thus able to convert the results to relevant contexts, for example, the working contexts of designers and nursing personnel.

Rodiek, S. (2002) 'Influence of an Outdoor Garden on Mood and Stress in Older Persons', in *Journal of Therapeutic Horticulture*, 13,13-21.

Bengtsson, A. and Carlsson, G. (2005) 'Outdoor Environments at Three Nursing Homes: Focus Group Interviews with Staff', in *Journal of Housing for the Elderly*, 19(3/4), 49-69.

### **Keywords:**

outdoor environment, older people, health design, universal design, landscape architecture

---

## **Patterns of pedestrian flows and static occupancy of the Diag of University of Michigan, City of Ann Arbor, examined by Space Syntax analysis**

Chien-Chi Chiang

Landscape Architecture  
program, School of Natural  
Resources and Environment,  
University of Michigan

Space Syntax analysis relates patterns of space use in public spaces to the morphological properties of urban grids (Hillier, et al., 1990; Campos, 1999). This study examines the effects of the spatial properties formed by the layout of landscape design (e.g. footpath design, and the location of flowerbeds and benches) in the Diag (University of Michigan), on the pattern of static occupancy (i.e. sitting or standing). The flowerbeds, planting, and formal seats were identified as barriers to people's movement. Axial line analysis (Hillier & Hanson, 1984) and visibility graph analysis (Turner, et al., 2001) were utilised, respectively, to evaluate levels of natural movement and visibility properties. The snapshot technique, observation, and informal interviews were used to understand the distribution and levels of pedestrian flows and static activities. This preliminary study demonstrates that Space Syntax can be a useful tool for exploring space use and function on a local scale.

Hillier, B. and Hanson, J. (1984) *The Social Logic of Space*. New York: Cambridge University Press.

Hillier, B. et al. (1993) 'Natural movement: Or, configuration and attraction in urban pedestrian movement', in *Environment and Planning B: Planning and Design*, 20(1), 29-66.

Turner, A. et al. (2001) 'From isovists to visibility graphs: A methodology for the analysis of architectural space', in *Environment and Planning B: Planning and Design*, 28(1), 103-121.

Arruda Campos, M. B. (1999) 'All that meets the eye: Overlapping isovists as a tool for understanding preferable location of static people in public squares', in *Space Syntax Second International Symposium*, Brasilia: Universidade de Brasilia.

### **Keywords:**

static occupancy, natural movement, spatial behaviour, space syntax, landscape design



**Barbara Degenhardt  
and Matthias  
Buchecker**

Swiss Federal Research  
Institute for Forest, Snow and  
Landscape Research WSL  
Group Social Sciences in  
Landscape Research

**Keywords:**

determinants of local  
outdoor recreation,  
landscape management,  
work stress, behavioural  
resources, forest and open  
countryside

**Relevance of work loads and strains to local outdoor recreation**

Local outdoor recreation (LOR) areas in near-natural landscapes are important for recovery and recreation. However, these areas are diminishing in peri-urban regions in Western Europe in general. As little is known about the determinants of LOR-behaviour and because work is an important part of many people's daily lives, this study examines which relative impact work loads and work-related strains have on LOR, compared to socio-economic and environmental behavioural resources (Hobfoll, 2001). From the case city of Frauenfeld (Switzerland), 656 inhabitants (29% response rate) returned a postal questionnaire and a local map of their: LOR-behaviour (e.g. goals, companionship, characteristics of ways), work loads (e.g. concentration demands, pressure), strains (e.g. emotional exhaustion, reduced concentration) and behavioural resources (e.g. quality residential area, local knowledge, self-efficacy). The results will be presented and discussed in the poster and will provide input data for a GIS-based local outdoor recreation suitability map.

Hobfoll, S. E. (2001). 'The influence of culture, community, and the nested-self in the stress process: Advancing Conservation of Resources Theory', in *Applied Psychology: An International Review*, 50(3), 337-369.

**Dr Patrick  
Devine-Wright**

Manchester Architecture  
Research Centre, School of  
Environment and  
Development, University of  
Manchester

**Displacement, NIMBYism and the siting of energy technologies**

Although the NIMBY (Not In My Back Yard) concept is often used to account for public opposition to the siting of technologies such as wind farms or high voltage electricity pylons, it has been strongly critiqued as an appropriate basis for explanation, on empirical and political grounds. I propose that so-called 'NIMBY' responses are motivated, in part, by perceived threats to place-related emotional attachments and identity processes, inducing negative health consequences such as feelings of anxiety, uncertainty, anger, grief and loss; and eliciting a range of coping responses, including resistant behaviours. This proposition anchors literature in technology acceptance and risk to the concept of place, and extends previous work on disruption to place attachment. A conceptual model of technology-induced displacement is described, operating at multiple levels of analysis and encompassing beliefs, emotion, communication and action, illustrated by qualitative data drawn from case studies of controversial energy technology siting in Wales and Scotland.

**Keywords:**

NIMBYism, displacement,  
windfarms, electricity pylons

## **Doorstep-to-nature: uses of landscape design in promoting healthy activity from the doorstep outward**

Insufficient physical exercise is contributing to the obesity epidemic. Landscape design can stimulate people to get outside and become more active. We conducted focus groups with mothers of young children in metropolitan NYC to assess their views on exercise and how the landscape stimulates exercise. Active learning concepts were applied to landscape design elements to identify the physical activity potential of basic design features (size, level changes, views, hardscaping and paths, formal and informal exercise equipment). We developed a landscape design assessment grid, incorporating their responses and existing evidence from design specifications for exercise facility components. Parents report insufficient opportunities for exercise in their immediate neighbourhood. They are further constrained by cultural views of "exercise" prioritising programmed exercise. The "doorstep-to-nature" grid, therefore, includes both programmed or structured exercise opportunities and unprogrammed activities, as well as the exercise potential for circulation or linkage areas.

Burdette, H.L. and Whitaker, R. C. (2005) 'A National Study of Neighborhood Safety, Outdoor Play, Television Viewing, and Obesity in Preschool Children', in *Pediatrics*, 116(3), 657-662.

Glassman, M. et al. (2007) 'How Early Does Obesity Start?: A Study of Obesity Levels in a Low-income Latino Community'. Presented at the Eastern Regional Medical Society meetings, March 2007.

Hubert, H. B., Snider J., and Winkleby M.A., (2005) 'Health status, health behaviors, and acculturation factors associated with overweight and obesity in Latinos from a community and agricultural labor camp survey', in *Preventive Medicine*, 40(6), 642-651.

Saelens, B. E. et al. (2003) 'Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation', in *Am J Public Health*, 93(9), 1552-1558.

Sally E. Findley, Melissa Stockwell and Jan Johnsen

Mailman School of Public Health and Continuing Education Program, Columbia University

### **Keywords:**

childhood obesity, play spaces, activity potential of landscape features, cultural views of exercise, landscape influence on activity levels

---

## **Social and spatial functions of everyday landscape and their relevance to residential quality in periurban areas**

Residents of periurban areas have been found to increasingly withdraw from their everyday landscape. Previous studies suggest that this is a consequence of unfulfilled needs related to not only spatial matters, but particularly to social aspects. A representative survey was conducted in three typical commuter communities in Switzerland (n = 1096) with different degrees of urbanisation. The residents' basic landscape-related residential needs and perceived residential quality were assessed. Needs could be empirically divided into four factors. Nature and restoration were most relevant to overall residential quality. In addition, the residents' needs structure changed with the urbanity of the residential environment: the less urban a community, the more important were the social dimensions of a residential quality. In the most urban area, needs were articulated the least well, but the evaluation of the traditional architecture was related to quality ratings. Residents of the typical periurban community were most polarised with regard to their residential needs.

Jacqueline Frick and Matthias Buchecker

Swiss Federal Research Institute WSL

### **Keywords:**

residential quality, urbanisation, public space, social dimensions of well-being, periurban landscapes

Xing-Yuan Fu

School of Landscape

Architecture, Edinburgh

College of Art

## **Prospect or affordance: threshold for Chinese outdoor environmental use**

Designers believe that good environmental design improves the quality of life. Prospect and affordance, two important aspects of the environment, may be big influences on people's real use of outdoor space. This study aims to compare the effects of both prospect and affordance on people's use of the outdoor environment, through an investigation of the relationship between the frequency of outdoor environmental use and the residents of high-rise flat residential areas' (HRFRAs) preferred environment.

This survey focuses on the central communal garden of three HRFRAs in Beijing, China, summer 2006. Responses from 437 subjects were collected on site.

Analysis of the responses showed that natural elements and facilities are at the top of the residents' decision hierarchy, above prospect. This result implies that relatively, affordances has a more important effect than prospect on residents' real use in the context of Chinese HRFRAs.

### **Keywords:**

prospect and affordance,  
hierarchy, high-rise flat  
residential areas, central  
communal garden

Appleton, J. (1996) *The experience of landscape*, Chichester: John Wiley & Sons, rev.edn, pp.14; 58.

Gibson, J.J. (1979), *The ecological approach to visual perception*, Boston: Houghton Mifflin, p.127.

Kearney, A. R. (2006) 'Residential development patterns and neighbourhood satisfaction—impacts of density and nearby nature', in *Environment and Behaviour*, 38(1), 112-139.

Ward Thompson, C. et al. (2004) *Open space and social inclusion: Local woodland use in central Scotland*, Edinburgh: Forestry Commission Scotland.

---

Hazreena Hussein

School of Landscape

Architecture, Edinburgh

College of Art

## **Sensory gardens: assessing their design and use**

This study will consider the design and use of sensory gardens by evaluating the garden features that are utilised by users, especially children with special needs in special schools. They have been observed experiencing and engaging with the multi-sensory environment. Preliminary site studies were carried out in fourteen sensory gardens around the United Kingdom, recording the personal observations of the usability of these gardens and conducting individual interviews with teachers and key experts. Further data collection has included in-depth interviews and behavioural mapping. Environmental affordance theory will be studied in conjunction with this study. The findings will then be developed into design recommendations for sensory gardens in relation to the selected case studies.

Heft, H. (1999) 'Affordances of children's environment: A functional approach to environmental description', in *Children's Environments Quarterly*, 5, 29-37.

Brandt, R.M. (1972) *Studying behavior in natural settings*. New York, London: Holt; Rinehart and Winston.

Bell, S. (2006) 'Scale in children's experience with the environment', in Spencer, C. and Blades, M. (eds.) *Children and their Environments - Learning, Using and Designing Places*. Cambridge: Cambridge University Press, pp.13-25.

### **Keywords:**

sensory garden, children,  
behavioural mapping,  
affordances

## **Movement in relation to space – different designs support different types of walks in a garden**

Evidence shows that green spaces are the most powerful factor in the promotion of physical activity. Research also shows that physical activity is the most important factor in alleviating stress. The aim of this research is to contribute to the knowledge of the environment-behaviour relations (Rapoport, 2005) that need to be considered when working in the field of environmental and therapeutic design.

Participatory observation with 19 patients (diagnosed with burn out), involved in a rehabilitation programme in a therapeutic garden (Stigsdotter & Grahn, 2003), was conducted over seven months. Alfonzo's hierarchy of walking needs was used to describe the walking decision-making process. Alfonzo stresses the importance to future empirical research of investigating the relationship between the physical environment and walking, hypothesising that different elements of the urban form may only be significant for a particular type of walk (Alfonzo, 2005).

This research found six types of walks. These take place in environments with different characteristics, depending on people's needs and intentions.

Alfonzo, M.A. (2005) 'To walk or not to walk. The hierarchy of walking needs', in *Environment and behaviour*, 37, 808-836.

Rapoport, A. (2005) *Culture, Architecture, and Design*. Chicago: Locke Science Publishing Company, Inc.

Stigsdotter, U.A. & Grahn, P. (2003) 'Experiencing a Garden – A Healing Garden for People Suffering from Burnout Diseases', in *Journal of Therapeutic Horticulture*, 14, 38-48.

**Carina Tenngart  
Ivarsson**

Department of Work  
Sciences, Economy and  
Environmental Psychology,  
Swedish University of  
Agricultural Sciences

### **Keywords:**

field study, observation,  
walking needs, therapeutic  
design, physical activity

---

## **Making green spaces healthier: health impact assessment guidance**

Previous studies have demonstrated the important links between health and greenspaces, in relation to mental, physical and community health (Land Use Consultants, 2004). To maximise these benefits, it is important that health considerations are built into the planning, design and management of greenspaces, and that the health role of greenspaces is considered in strategies, plans and projects.

Health Impact Assessment (HIA) is an established process that helps to identify the potential health and equity impacts of policies, programmes and projects. HIA guidance has been developed for housing (Douglas, Thomson & Gaughan, 2003) and transport, and new guidance is now being developed for greenspace, to maximise the role of greenspaces in improving health.

This poster summarises the findings of a critical literature review which provides an evidence base for that guidance, and presents summary information on case studies and guidance. It concludes with a discussion of the future use and development of the guidance.

Land Use Consultants (2004) *Making the links: greenspace and quality of life*. Scottish Natural Heritage Commissioned Report No.060 [ROAME No. F03AB01].

Douglas M., Thomson H. and Gaughan M. (2003) *Health Impact Assessment of Housing Improvements: A Guide*. Glasgow: Public Health Institute of Scotland.

**Eilidh Johnston**  
Greenspace Scotland

**Karen Croucher**  
The Centre for Housing  
Policy, University of York

### **Keywords:**

greenspace, HIA, health,  
mental health

### Nadia Lalak

Environment, Behaviour &  
Society Research Group,  
Faculty of Architecture,  
Design & Planning,  
University of Sydney

### Testing a model of enhanced restoration

Empirical evidence (e.g. Hartig et al, 2003) confirms that interactions with nature provide opportunities for restoration of directed attention (Kaplan & Kaplan, 1989).

This field experiment tests a model of enhanced restoration (Lalak, 2007) that proposes that active engagement with nature enhances the restorative outcome.

The experiment utilises a pretest-posttest multigroup design. Following a naturally fatiguing activity, the volunteers (n = 100) are randomly assigned to one of four groups: 1) control group, 2) active CA/passive PE, 3) passive CA/active PE, 4) active CA/active PE, where CA is Cognitive Awareness, PE is Physical Encounter. The experimental interventions are designed to increase awareness of/and engagement with nature.

Three computerised tests score directed attention as the objective measure of restoration. A subjective measure of directed attention is through a Likert-type scale. To test the hypotheses, data analysis using two-way ANOVA repeated measures will be performed between, as well as within, groups.

Hartig, T. et al. (2003) 'Tracking restoration in natural and urban field settings', in *Journal of Environmental Psychology*, 23, 109-123.

Kaplan, R. & Kaplan, S. (1989) *The Experience of Nature: A Psychological Perspective*. Cambridge: Cambridge University Press.

Lalak, N. (2007) 'Toward a model of enhanced restoration'. Full refereed paper published in Proceedings of the 38<sup>th</sup> Annual Conference of the Environmental Design Research Association (EDRA, Sacramento, 30 May- 3 June 2007).

#### Keywords:

enhanced restoration,  
directed attention, nature

---

### A. Maritza Landázuri

Facultad de Estudios  
Superiores, UNAM

### Terence R. Lee

School of Psychology.  
University of St Andrews

### Serafín J. Mercado

Facultad de Psicología,  
UNAM

### Alejandra Terán

Facultad de Estudios  
Superiores, UNAM

### Green areas and housing's inhabitability

There is evidence that caring for green areas in the interior and exterior of a dwelling can become a source of daily pleasure and tranquillity. The purpose of this study was to explore people's emotional reactions to interior green areas and flowers and to the immediate external environment of their dwellings; specifically, to the environment perceptible from the inside. Residents of Mexico City and St Andrews were interviewed. The sample was a non-probabilistic intentional one consisting of 70 families with people in the age range 16 to 60. A descriptive analysis and a multivariate linear regression were carried out to analyse the influence of culture in people's interaction with green areas and flowers vis-à-vis the inhabitability of the house as measured through their emotional states. The results support the evidence [OR 'view'] that culture does not have a significant effect, but the presence of green areas or flowers does.

Barnett, O. W., Fagan, R. W and Booker, J. M. (2005). 'Hostility and stress as mediators of aggression in violent men', in *Journal of Family Violence*, 6(3), 217-241.

Kaplan, R. (2001). 'The nature of the view from home: psychological benefits', in *Environment and Behaviour*, 33, 507-542.

Kruk, M. R. et al (2004). 'Fast positive feedback between adrenocortical stress response and a brain mechanism involved in aggressive behaviour', in *Behavioral Neuroscience*, 118(5), 1062-1070.

Mehrabian, A. and Russell, J. A. (1974). *An Approach to Environmental Psychology*. Cambridge, MA: MIT Press.

#### Keywords:

restorative environments,  
green areas, housing and  
inhabitability

## **Is the grass greener on the other side of town? An examination of the accessibility, quality, and use of public play spaces in London, Canada**

This study aimed to examine whether publicly-provided play spaces for children, such as parks, are adequately and equitably distributed throughout the mid-sized city of London, Canada, and to examine the relationship between park accessibility, quality, and use. Accessibility was gauged by mapping all public parks and schoolyards in a geographic information system (GIS) and comparing their spatial distribution against neighbourhood socio-economic characteristics. Comprehensive environmental surveys were conducted at each park (n=208) to document quality-related elements (e.g. safety features, playground facilities, aesthetics). A basic census undertaken at a cross-section of parks (n=30), of varying quality, helped to quantify usage. Contrary to expectations, there was no obvious socio-spatial inequity with respect to the distribution and quality of public play spaces in London; however, there are several areas in the city where children do not have easy access to formal play spaces. As expected, levels of usage appear to be associated with park quality.

Janet Loebach, Martin Holmes, Jason Gilliland  
Department of Geography,  
University of Western  
Ontario

### **Keywords:**

parks, recreation, public play spaces, accessibility, GIS

---

## **Local identities, memories and experiences as inspirers of urban silviculture**

Cities in Finland have relatively abundant woodland areas inside the city structure. Many suburbs are called forest suburbs or forest towns. Their history is bound to the urban development and housing programmes after the 1940s. The surrounding nature was intended to provide environmental qualities and to enhance the wellbeing of the residents. Urban forests are still part of the city image and structure, but less prevalent in current urban visions. This case study examines the everyday meanings and practices of forest suburb environments. It includes field interviews undertaken with residents in two areas of Helsinki and one in Tampere. The aim is to increase social and cultural information within the field of urban silviculture. Everyday practices and knowledge could enrich the planning and management aims of urban woodlands. Whereas urban woodlands are usually considered in terms of forestry concepts, here they are approached as part of local culture and lived landscape.

Kirsi Mäkinen  
University of Helsinki,  
Department of Forest  
Ecology

Lefebvre, H. (1991). *The Production of Space*. Blackwell. Oxford.

Gustavsson, R., et al. (2005), 'Management of Urban Woodland and Parks – Searching for Creative and Sustainable Concepts', in Konijnendijk, C. et al. (eds.) *Urban Forests and Trees*. Springer, Berlin Heidelberg. pp. 369-397.

Lappi, T-R. (2004). 'Narratives of the Town. Everyday knowledge and planning discourses in Jyväskylä', in Åström, A-M, Korkiakangas, P. & Olsson, P. (eds.) *Memories of my town. The identities of town dwellers and their places in three Finnish towns*. Studia Fennica Ethnologica 8. SKS Helsinki, pp.127-149.

### **Keywords:**

field interview, forest suburb, local identity, place, silviculture

## Ayca Mehlig

Department of Landscape  
Architecture, Ankara  
University

## Turkish migrants living in Limburg and Lahn in Germany: is place attachment a function of cultural background?

This paper discusses place attachment in multicultural societies in urban landscapes, and whether cultural background influences their attachment. The subject group was mainly Turkish migrants living in Limburg for whom their place preferences, perceptions and behaviours were reviewed in terms of place attachment theories. The data was gathered by face-to-face interviews and evaluated, together with site observations in the region. The majority of the studies on place attachment have attempted to understand 'attachment for residential settings', such as home or neighbourhood. Despite this evidence, it is anticipated from this study's findings, that it will be possible to argue for, and present a new perspective on, place attachment, from rather different cultural backgrounds and through outdoor leisure experience in urban landscapes.

Kyle, G. T., Mowen, A. J. and Tarrant, M. (2004) 'Linking place preferences with place meaning: An examination of the relationship between place motivation and place attachment', in *Journal of Environmental Psychology*, 24, 439-454.

Kyle, G.T., et al (2004) 'Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting', in *Journal of Environmental Psychology*, 24, 213-225.

Rishbeth, C. and Finney, N. (2006) 'Novelty and Nostalgia in Urban Greenspace: Refugee Perspectives', in *Tijdschrift voor Economische en Sociale Geografie*, 97(3), 281-295.

Ryan, R. (2005) 'Exploring the effects of environmental experience on attachment to urban natural areas', in *Environment and Behaviour*, 37(1), 3-42.

### Keywords:

place attachment, culture,  
perception, behaviour, urban  
landscapes

## Ian C. Mell and Tamer Ahmed

Department of Architecture,  
Planning and Landscape,  
University of Newcastle

## Landscape characteristics, policy guidelines and quality of life: the UK and Egypt - different contexts, same targets

Landscape characteristics and cultural preferences heavily influence human quality of life, wellbeing and overall liveability. Research currently under way in the UK and Egypt has begun to discuss this issue and debate how liveability is influenced by both the natural and the built environment.

Through a review of current UK and Egyptian planning and development policy, questions of liveability and quality of life will be made. Using the contemporary landscape classifications of 'landscape' and 'green' infrastructures, comparisons will be made between the policies and planning implementation of the two nations.

The aim of this paper is to outline how social, ecological and economic drivers affect, firstly, landscape change and, secondly, individual and collective quality of life. Within this review, the role of public and private institutions will be outlined to ask how different cultures contextualise their development of sustainable and attractive places.

Egyptian Environmental Affairs Agency (2001) The National Environmental Action Plan of Egypt 2002/2017. EEAA, Cairo. [http://www.eeaa.gov.eg/english/reports/neap/Neap\\_Eng-last.pdf](http://www.eeaa.gov.eg/english/reports/neap/Neap_Eng-last.pdf)

Davies, C. et al. (2006) Green Infrastructure Planning Guide Project: Final Report. NECF, Annfield Plain.

Office of the Deputy Prime Minister (2003) *Sustainable communities: building for the future*. ODPM, London. [http://www.odpm.gov.uk/pub/872/SustainableCommunitiesBuildingfortheFutureMaindocumentPDF2121Kb\\_id1139872.pdf](http://www.odpm.gov.uk/pub/872/SustainableCommunitiesBuildingfortheFutureMaindocumentPDF2121Kb_id1139872.pdf)

van Kamp, I. et al. (2003) 'Urban environmental quality and human well-being: Towards a conceptual framework and demarcation of concepts; a literature study', in *Landscape and Urban Planning*, 65, 5-18.

### Keywords:

infrastructures, planning,  
wellbeing

## **Spatial decision support tools for the strategic assessment of green space provision**

The development of public health and wellbeing agendas (e.g. Grahn and Stigsdotter, 2003; Owen et al., 2004) is supported by green space audits in Scottish local authorities. Requirements include data on the extent, content, quality, and equality of access to green spaces for strategic planning of provision, investment priorities and maintenance (Scottish Executive, 2003).

Decision Support Tools, in a Geographic Information System, were developed with Aberdeen City Council to aid the strategic planning and design of green spaces (Laing et al., 2006). Outputs include data on distances for every property to different types of green space (i.e. city-, local-, neighbourhood-parks, forests and nature reserves), linked to results of a survey of green-space use.

The tools are used to test the sensitivity of thresholds in policies which support access to facilities by disadvantaged groups. The methods have now been implemented by Edinburgh City Council for its strategic planning and inputs to the council's Community Planning Framework.

Grahn, P. and Stigsdotter, U.A. (2003) 'Landscape planning and stress', in *Urban Forestry and Urban Greening*, 2, 1-18.

Laing, R. et al. (2006) 'Urban green space: the incorporation of environmental values in a decision support system', in *IT in Construction*, 11, 177-196.

Owen, N. et al. (2004) 'Understanding Environmental Influences on Walking: Review and Research Agenda', in *American Journal of Preventive Medicine*, 27, 67-76.

Scottish Executive (2003) 'Planning and Open Space', *Scottish Executive Planning Advice Note 65*. Scottish Executive.

David Miller

The Macaulay Institute,  
Aberdeen

Richard Laing

The Robert Gordon  
University, Aberdeen

Paula Horne and Jane  
Morrice

The Macaulay Institute,  
Aberdeen

### **Keywords:**

green space, Geographic  
Information Systems,  
Aberdeen, Edinburgh,  
planning

---

## **Development of a 'walkability' tool to use to identify relationships between the physical environment and walking patterns of sedentary individuals within the west of Glasgow**

The 'Walking for Wellbeing in the West' (WWW) study in Scotland, aims to assess whether pedometers, in conjunction with physical activity counselling, can increase and maintain independent walking behaviour over 12 months in sedentary adults.

The physical environment has been shown to be associated with people's walking behaviour (Owen et al., 2004) so WWW project participants' perceptions of the physical environment have been recorded using questionnaires, and will be explored in relation to self-reported walking patterns. Objective measures of neighbourhood environmental characteristics and quality relevant to walking have also been recorded, using an audit tool especially developed for the British context, and through GIS-derived data (Leslie et al., 2005). The recording and mapping of potential indicators of 'walkability' will be used in analysis to identify relationships between the physical environment and participants' walking patterns. This poster presents information on the objective audit tool and GIS mapping methods developed.

Leslie, E. et al. (2005) 'Residents' perceptions of walkability attributes in objectively different neighbourhoods: a pilot study', in *Health & Place*, 11, 227-236.

Owen, N. et al. (2004) 'Understanding environmental influences on walking', in *American Journal of Preventative Medicine*, 27, 67-76.

Catherine Millington  
and Catharine Ward  
Thompson

OPENspace Research Centre,  
Edinburgh College of Art

### **Keywords:**

physical environment,  
walking, physical activity,  
walkability, GIS



**Steve Mitrione and  
Rebecca Krinke**

College of Design,  
Department of Landscape  
Architecture, University of  
Minnesota

**Clare apartments: design and evaluation of a therapeutic landscape  
for people living with HIV disease**

A therapeutic garden for people with HIV disease has been developed, illustrating the process by which a therapeutic garden can be analysed to determine its safety and effectiveness.

Stress can adversely affect people with HIV disease (Cole et al, 2001). It is hypothesised that therapeutic gardens can decrease stress and improve health in individuals with HIV. The design is based on current therapeutic garden design guidelines and stress-response research (Ulrich, 1999). Four therapeutic spaces have been created that each relate to a specific theory of stress reduction and amelioration of the disease process.

The methodology for analysing the garden has also been developed, utilising a prospective analysis of health indicators for HIV, before and after installation of the garden, to determine its effectiveness.

The unique paradigm in this project couples research to the design process. Research and data developed out of the design installation have created new design guidelines that can be further utilised to improve the understanding and effectiveness of therapeutic gardens.

**Keywords:**

HIV, therapeutic garden,  
research, design

Cole, S.W. et al. (2001) 'Impaired Response to HAART in HIV Infected Individuals With High Autonomic Nervous System Activity', in *Proc. Nat. Acad. Sci.* 98, 12695-12700.

Ulrich, R. (1999). 'Effects of Gardens on Health Outcomes: Theory and Research', in Cooper Marcus, C. and Barnes, M. (eds.) *Healing Gardens: Therapeutic Benefits and Design Recommendations*. John Wiley, NY pp. 27-86.

**Helena Nordh and  
Gary Fry**

Department of Landscape  
Architecture and Spatial  
Planning, Norwegian  
University of Life Sciences

**Quantifying restorative qualities in urban green environments**

Most of the research linking health and landscapes focuses on very sharply contrasting landscapes such as highly urban versus pastoral images. Research has shown that natural environments have a positive effect on people's health compared to urban environments. We believe, however, that restoration is not confined to rural landscapes. Certain smaller-scale, urban landscapes may also have restorative potential. Nor is the issue simply green (nature) or not green (urban) for experiencing restoration. There is likely to exist a variety of levels of restorative quality.

It has been shown that people living in green areas or visiting public parks perceive themselves as healthier, less aggressive and less stressed. To be able to design restorative environments, we must be able to identify and quantify the landscape characteristics that are restorative. This study will analyse urban green areas for these characteristics to identify the structures and elements of special importance for restoration.

**Terry Hartig**

Institute for Housing and  
Urban Research and  
Department of Psychology,  
Uppsala University

**Keywords:**

landscape preference,  
restorative quality, urban  
green structure, mini-parks,  
visual elements

## Exploring the relationship between landscape spatial structure and landscape preference through visualisation techniques

The concept of naturalness describes how close a landscape is to a perceived natural state. Scenes interpreted as natural have been linked to reductions in stress, mental fatigue and improvements in concentration (e.g. Rohde & Kendle, 1994; Maller et al., 2005). Indicators have been suggested to describe the degree of naturalness of a landscape (Tveit et al., 2006).

The relationship between landscape preference and three indicators of naturalness, level of succession, woodland fragmentation and shape complexity, was tested using visualisations of 27 landscapes containing pasture and broadleaved woodland. Seven hundred and three respondents rated nine images related to how much they liked the landscape.

Strong relationships were identified between preference and indicators of succession and fragmentation, and a weaker relationship with shape complexity. Indicators using spatial structure had a stronger contribution to preference than demographic factors.

The results are aiding public engagement in land management and the evolution of landscapes under the European Union Rural Development Programme.

Maller, C., et al. (2005) 'Healthy nature healthy people: 'contact with nature' as an upstream health promotion intervention for populations', in *Health Promotion International* 21, 45-54.

Rohde, C.L.E. and Kendle, A.D. (1994) 'Human well-being, natural landscapes and wildlife in urban areas: A review.' *Research Report No. 22*: Reading, English Nature.

Tveit, M.S., Ode, Å. and Fry, G. (2006) 'Key concepts in a framework for analysing visual landscape character', in *Landscape Research* 31, 229-255.

Åsa Ode

Department of Landscape  
Architecture, Swedish University  
of Agricultural Sciences

David Miller and  
Pernette Messenger

Macaulay Land Use Research  
Institute

Gary Fry and Mari  
Sundli Tveit

Department of Landscape  
Architecture and Spatial  
Planning, Norwegian  
University of Life Sciences

### Keywords:

landscape preference, visual  
indicators, naturalness,  
visualisation

---

## Understanding change in place: spatial knowledge acquired by visually impaired users through change in footpath materials

Throughout time, man has travelled to new places and experienced unfamiliar territories, often without fear of what lies ahead. However, in today's world, many environments outside of our everyday paths of travel can be challenging and intimidating. This research sets out to investigate the role typical footpath materials play in communicating information about the local environment to the user. While illustrating the importance of detecting changes in materials, it argues that landmark cues should be available to all users. Within this research, a theoretical framework is developed to explain the relationship of material and meaning, and a methodological design is used to elicit these values. By doing so, it produces a means of evaluating existing and future use of construction materials as a part of larger information systems.

This research will have a practical importance from the standpoint of determining which combinations of footpath construction materials are best recognisable, identifiable, and able to be utilised in way-finding by visually impaired college students within an urban university campus setting.

Andrew P. Payne

North Carolina State  
University

### Keywords:

wayfinding, textures,  
sidewalks, construction  
materials, visually impaired

**Jo Peacock**

Centre for Environment and  
Society, University of Essex

**Connecting with wilderness landscapes: effects on health and wellbeing**

People seek a variety of values when visiting wildernesses, including a desire for tranquillity, natural beauty or escaping the stresses of urban life. There is much anecdotal data which reports the positive effects of wilderness experiences, but there is surprisingly little quantitative data.

This cross-cultural, international study involving UK and South African students quantified the health benefits derived from participating in wilderness trails. The experience was based on total simplicity and involved sleeping under the stars, back packing, observing wildlife and learning about the environment.

Participants completed questionnaires immediately before and after participating in the trails. Individuals' self-esteem was significantly enhanced and they felt more connected to their surrounding natural environment. The beauty of the scenic environment was a fundamental part of the experience and they enjoyed interacting with wildlife and spending time outside in the fresh air. The narrative consistently referred to the enjoyment of sharing the experience with others.

Mayer, F. S. and Frantz, C. M. (2004) 'The connectedness to nature scale: A measure of individuals' feeling in community with nature', in *Journal of Environmental Psychology*, 24, 503-515.

Pretty, J. et al. (2007) 'Green Exercise in the UK Countryside: Effects on Health and Psychological Well-Being, and Implications for Policy and Planning', in *Journal of Environmental Planning and Management*, 50(2), 211-231.

Pretty, J. et al. (2005) 'The mental and physical health outcomes of green exercise', in *International Journal of Environmental Health Research*, 15(5), 319-337.

Rosenberg, M. (1989) *Society and the Adolescent Self-Image*. Middletown, CT: Wesleyan University Press.

**Keywords:**

connectedness-to-nature,  
health, self-esteem, social  
capital, wilderness

**Simon Rennie**

Central Scotland Forest Trust

**Sustainably regenerating derelict land through community involvement and landscaping**

The Greenlink, linking the communities of the Motherwell North Social Inclusion Partnership to the former Ravenscraig Steelworks and Strathclyde Country Park, is a model of sustainable regeneration. These communities are amongst the most excluded and deprived in Scotland, with income poverty, health problems and limited access to recreation.

The area's limited use and neglect is a result of environmental decay, extensive fly tipping and vehicle-dumping. However, it is rich in biodiversity with mature woodlands and extensive flora and fauna.

The project has delivered improvements and benefits by enhancing and creating socially and economically productive land; establishing sustainable transport links; creating training and employment opportunities; involving community and voluntary representatives in formulating and delivering the project; promoting healthy lifestyles; improving public safety and reducing the fear of crime

**Keywords:**

sustainability, regeneration,  
community involvement

The Greenlink is a surfaced, 5km, lit cycleway and pathway with a well-maintained landscape enjoyed by cyclists, dog walkers, joggers, adults and children.

## Collaborative planning of urban forests - promoting the health of residents?

To promote the health of residents through urban forest planning, information is needed on the values residents relate to their living environments (Tyrväinen et al., 2005). In the Helsinki metropolitan area, collaborative practices are used in order to incorporate this social information into urban forest planning (Sipilä & Tyrväinen, 2005). How, in fact, can this information be used? What is the role of collaboration, from the perspective of quality of life, as a means of influencing the environment on the one hand, and as a social process on the other?

In the project 'Greendecision - Integrating ecological and social information in urban planning' (Academy of Finland, 2006-08), we study these questions in relation to the Helsinki metropolitan area. The goal is to develop and test methods to evaluate collaborative planning processes. Preliminary results will be presented based on semi-structured interviews carried out with 33 planners, decision makers, residents and landowners.

Sipilä, M. and Tyrväinen, L. (2005) 'Evaluation of Collaborative Urban Forest Planning in Helsinki, Finland', in *Urban Forestry and Urban Greening*, 4(1), 1-12.

Tyrväinen, L., et al. (2005) 'Benefits and uses of urban forests and trees', in Nilsson, K., Randrup, T.B. and Konijnendijk, C.C. (eds.) *Urban Forests and Trees in Europe A Reference Book*. Springer Verlag, pp. 81-114.

Maija Sipilä and Liisa Tyrväinen

Finnish Forest Research  
Institute

### Keywords:

collaborative planning, social information, urban forest planning, quality of life, expertise

## Associations of neighbourhood greenness with physical and mental health: what are the underlying mechanisms?

Studies have shown the associations between access to 'green' environments and health, but there is a limited understanding of the mechanisms of this association. We explored whether walking and social factors account for the relationship between greenness and health. A postal survey was conducted in Adelaide, Australia to collect the data on physical and mental health scores (SF-12), perceived neighbourhood greenness, walking for recreation and for transport, social coherence, and social interaction (n=1,833). It was found that perceived neighbourhood greenness was positively associated with participants' physical and mental health scores. Walking for recreation seemed to explain the association between greenness and physical health; while recreational walking and social coherence were found to account for the link between greenness and mental health. However, the latter relationship was not fully explained by these two factors, suggesting that other mediating variables, such as the restorative effects of nature, may be involved in this relationship.

de Vries, S., et al. (2003) 'Natural environments - healthy environments? An exploratory analysis of the relationship between greenspace and health', in *Environment and Planning A*, 35(10), 1717-1731.

Grahn, P. and Stigsdotter, U.A. (2003) 'Landscape planning and stress', in *Urban Forestry and Urban Greening*, 2(1), 1-18.

Takano, T., Nakamura, K., and Watanabe, M. (2002) 'Urban residential environments and senior citizens' longevity in megacity areas: The importance of walkable green spaces', in *Journal of Epidemiology and Community Health*, 56(12), 913-918.

Takemi Sugiyama

University of Queensland,  
Brisbane, Australia

Eva Leslie

Deakin University, Geelong,  
Australia

Billie Giles-Corti

University of Western  
Australia, Perth, Australia

Neville Owen

University of Queensland,  
Brisbane, Australia

### Keywords:

nature, health, walking, social coherence

Penny Travlou and  
Jenny Roe

OPENspace Research Centre,  
Edinburgh College of Art

## Free-range teenagers? The role of wild adventure space in young people's lives

This poster will be based on findings from a scoping review commissioned by Natural England (2006), together with further analysis of five focus groups carried out with young people (ages 11-16) across England to explore the physical, social and emotional affordances of 'wild adventure space'.

The purpose of the scoping review was to investigate the proposition that 'wild adventure space' can play an important role in meeting the developmental needs of young people in England.

The evidence gathered demonstrates that experience of the outdoors and wild adventure space has the potential to confer a multitude of benefits on young people's physical development, emotional and mental health and wellbeing, and their social and educational development, which may have long-lasting effects into adulthood. This will be explored conceptually in relation to the theory of affordances as developed by Gibson (1979), Heft (1988), Clark and Uzzell (2002), and Kyttä (2006).

Clark, C. and Uzzell, D. L. (2002) 'The affordances of the home, neighbourhood, school and town centre for adolescents', in *Journal of Environmental Psychology*, 22: 95-108.

Gibson, J.J. (1979) *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Heft, H. (1988) 'Affordances of children's environments: a functional approach to environmental description', in *Children's Environments Quarterly*, 5(3): 29-37.

Kyttä, M. (2006) 'Environmental child-friendliness in the light of the Bullerby Model', in Spencer, C. and Blades, M. (eds) *Children and their Environments: Learning, Using and Designing Spaces*. Cambridge: Cambridge University Press, pp. 141-158.

### Keywords:

wild adventure space,  
affordances, risk,  
developmental needs

Deborah A. Upington

Oregon State University

## Children's preference for preschool environments

As children move from home to preschool, they may feel uncomfortable in unfamiliar surroundings (Bagot, 2004). Evidence indicates a child's sense of identity is tied to their environment (Korpela, 2002). Adults and children may have differing perceptions of a place; research regarding children's settings has become increasingly focused on improving these environments (Curtis et al, 2004; Evans and Fuller, 1998). Children's perceptions should guide these studies; one must use age-appropriate measures (Bagot, 2004).

Our objective was to determine child-preferred elements in a preschool setting. Attention Restoration Theory (Kaplan, 2001) suggests one may prefer novel spaces that support attention restoration over plain or busy environments. The central hypothesis was that a variety of vegetation will provide a comfortable space. Twenty participants, (ages 3 to 5) were shown photographs of differing landscapes and asked which they preferred. Findings supported the hypothesis; most children preferred certain landscaped areas and open spaces.

Bagot, K. (2004) 'Perceived Restorative Components: A Scale for Children', in *Children, Youth & Environments*, 14(1), 120-140.

Evans, P. and Fuller, M. (1998) 'Children's Perceptions of their Nursery Education', in *International Journal of Early Years Education*, 6 (1).

Kaplan, S. (2001) 'Meditation, Restoration, and the management of mental fatigue', in *Environment and Behavior*, 33 (4), 480 - 506.

Korpela, K.M., et al. (2001) 'Restorative experience and self-regulation in favorite places', in *Environment and Behavior*, 33 (4), 572 - 589.

### Keywords:

children, restorative,  
preference, preschool

**Summary Papers and Poster Abstracts**

Ahmadi, Ehsan	45	Leslie, Eva	59
Ahmed, Tamer	54	Lindfors, Liselotte	24
Alves, Susana	35, 45	Little, Brian R.	3
Aspinall, Peter A.	7, 35, 45	Loebach, Janet	53
Beaney, Katharine	46	Mäkinen, Kirsi	53
Bell, Anne C.	46	Mehlig, Ayca	54
Bell, Simon	7	Mell, Ian C.	54
Bengtsson, Anna	47	Mercado, Serafin J.	52
Bengtsson, Inga-Lena	24	Messenger, Pernette	57
Brice, Roger	35	Miller, David	55, 57
Buchecker, Matthias	48, 49	Millington, Catherine	7, 55
Bull, Fiona C.	11	Mitrione, Steve	56
Chiang, Chien-Chi	47	Moore, Robin C.	40
Conroy Dalton, Ruth	32	Morrice, Jane	55
Cosco, Nilda	29	Nordh, Helena	56
Croucher, Karen	51	Ode, Åsa	57
de Vries, Sjerp	15	Owen, Neville	59
Degenhardt, Barbara	48	Payne, Andrew P.	57
Devine-Wright, Patrick	48	Peacock, Jo	58
Findley, Sally E.	49	Rennie, Simon	58
Frick, Jaqueline	49	Roe, Jenny	7, 60
Fry, Gary	56, 57	Sharples, Steve	46
Fu, Xing-Yuan	50	Sipilä, Maija	59
Giles-Corti, Billie	59	Southwell, Katherine	7
Gilliland, Jason	53	Stockwell, Melissa	49
Goyder, Elizabeth	46	Sugiyama, Takemi	7, 35, 45, 59
Grahn, Patrik	24	Sundli Tveit, Mari	57
Hanson, Julianne	32	Taniguchi, Gen	45
Hartig, Terry	2, 56	Tauchnitz, Frederik	24
Heft, Harry	18	Tenngart Ivarsson, Carina	24, 51
Holmes, Martin	53	Terán, Alejandra	52
Horne, Paula	55	Travlou, Penny	60
Hussein, Hazreena	50	Tyrväinen, Liisa	59
Johnsen, Jan	49	Upington, Deborah	60
Johnston, Eilidh	51	Vickers, Adrian	35
Krinke, Rebecca	56	Ward Thompson, Catharine	7, 35, 45, 55
Laing, Richard	55	Welén-Andersson, Lena	24
Lalak, Nadia	52		
Landázuri, Ana M.	52		
Lavesson, Lillian	24		
Lee, Terence R.	52		

---

Aberdeen	55	forest suburb	53
accessibility	53	free traits	3
activities	24	Geographic Information Systems (GIS)	53, 55
activity cycles	2	green areas	52
activity potential of landscape features	49	green design	46
aesthetic chills	3	green space/ greenspace	35, 46, 51, 55
affordances	18, 50, 60	health	51, 58, 59
air quality	15	health design	47
behaviour	54	health promotion	11
behaviour and environment	29	healthy lifestyles	32
behavioural mapping	50	HIA	51
behavioural resources	48	hierarchy	50
burn-out	24	high-rise flat residential areas	50
central communal garden	50	HIV	56
childhood obesity	49	horticultural therapy	24
children	40, 50, 60	housing and inhabitability	52
choice	35	independent mobility	45
choice-based conjoint analysis	45	infrastructures	54
city centre living	46	landscape analysis	32
collaborative planning	59	landscape architecture	47
community involvement	58	landscape design	47
conjoint analysis	35	landscape influence on activity levels	49
connectedness-to-nature	58	landscape management	48
construction materials	57	landscape preference	56, 57
cultural views of exercise	49	landscape quality	7
culture	54	local identity	53
decision making	35	measurement	11
design	24, 56	mediation	2
design research	40	mental health	51
determinants of local outdoor recreation	48	methods	46
developmental needs	60	mini-parks	56
directed attention	52	moderation	2
displacement	48	natural movement	47
Edinburgh	55	naturalness	57
electricity pylons	48	nature	52, 59
enhanced restoration	52	NIMBYism	48
environmental perception	18	observation	51
environmental support	7	older people	45, 47
expertise	59	open space	45
families	40	outdoor environment	47
field interview	53	outdoor environments	40
field study	51	parks	35, 53
forest and open countryside	48	perception	54

---

periurban landscapes	49	supportive environments	11
personal projects	3, 7	sustainability	58
physical activity	11, 15, 46, 51, 55	Tehran	45
physical environment	55	textures	57
place	53	therapeutic design	51
place attachment	54	therapeutic garden	56
places	18	time	2
planning	54, 55	traffic danger	45
play spaces	49	universal design	47
preference	35, 45, 60	urban design	11
preschool	60	urban environment	46
preschool outdoor space	29	urban forest planning	59
prospect and affordance	50	urban green structure	56
public play spaces	53	urban landscapes	54
public space	49	urbanisation	49
quality of life	59	visual elements	56
recreation	53	visual indicators	57
regeneration	58	visualisation	57
research	56	visually impaired	57
research methodology	29	walkability	7, 55
residential quality	49	walking	55, 59
restoration	2	walking needs	51
restorative	60	wayfinding	57
restorative environments	52	wellbeing	54
restorative quality	56	wild adventure space	60
risk	60	wilderness	58
school grounds	46	windfarms	48
school journey	45	work stress	48
scope of meaning-theory	24		
self-esteem	58		
sensory garden	50		
sidewalks	57		
silviculture	53		
social capital	58		
social coherence	59		
social dimensions of wellbeing	49		
social information	59		
space syntax	32, 47		
spatial behaviour	47		
spatial structure	7		
static occupancy	47		
stranger danger	45		
stress	15		



**Peter Aspinall, Professor Emeritus, School of Built Environment, Heriot-Watt University, Co-Director, VisionCentre3 and Associate Director, OPENspace research centre, Edinburgh College of Art**

Psychologist, innovator in methods to relate personal and environmental factors to quality of life.

**Simon Bell, Associate Director, OPENspace research centre, Edinburgh College of Art, and Associate Professor, Estonian University of Life Sciences, Tartu**

Landscape architect and forester, expert in forest landscape planning and design, outdoor recreation design and visual impact assessment

**Fiona Bull, Reader, Co Director (Research), British Heart Foundation Centre, University of Loughborough**

Sports scientist and public health expert, and leading researcher on built and natural environment influences on physical activity.

**Nilda Cosco, Director, Center for Universal Design, Education Specialist, Natural Learning Initiative, College of Design, North Carolina State University**

Educational psychologist, expert on play in early childhood development and the impact of outdoor environments on health outcomes for children.

**Patrik Grahn, Professor of Landscape Architecture, Department of Work Science, Business Economics and Environmental Psychology, Swedish University of Agricultural Sciences, Alnarp**

Landscape architect, leading researcher on links between landscape and health.

**Julienne Hanson, Professor of House Form and Culture, Bartlett School of Graduate Studies, University College London**

Architect, co-originator of Space Syntax analytic techniques and research methodologies to explore spatial aspects of the environment.

**Terry Hartig, Associate Professor in Applied Psychology, Institute for Housing and Urban Research, Uppsala University**

Applied psychologist, leading researcher on environments and natural settings for stress relief and restoration.

**Harry Heft, Henry Chisholm Chair in the Natural Sciences, Department of Psychology, Denison University**

Environmental psychologist with expertise in the development of Gibson's theory of affordances, behaviour settings, and environment-behaviour research.

**Brian Little, Distinguished Research Professor, Department of Psychology, Carleton University and Visiting Professor of Personality Science, McGill University**

Psychologist, pioneer of Personal Projects Analysis with his students at Oxford, Carleton and Harvard Universities, to study people and their context.

**Robin Moore, Professor of Landscape Architecture, Director, The Natural Learning Initiative, North Carolina State University**

Architect and urban planner, authority on the design of children's play and learning environments, user needs research, and participatory public open space design.

**Sjerp de Vries, Senior Social Scientist, Alterra, Green World Research, Wageningen University and Researchcenter (WUR)**

Sociologist, pioneer in use of GIS to research the relationship between green space and health.

**Catharine Ward Thompson, Research Professor of Landscape Architecture, Director, OPENspace research centre, Edinburgh College of Art**

Landscape architect, leading researcher using personal construct theory and landscape analysis to explore access to the environment for different excluded groups.