

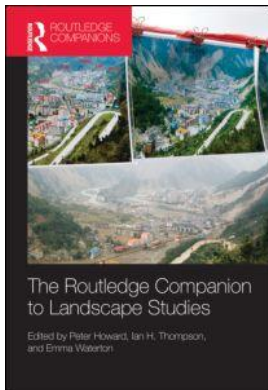
This article was downloaded by: 10.3.97.143

On: 30 Sep 2023

Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



The Routledge Companion to Landscape Studies

Peter Howard, Ian Thompson, Emma Waterton

Landscape perception and environmental psychology

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9780203096925.ch2>

Catharine Ward Thompson

Published online on: 06 Dec 2012

How to cite :- Catharine Ward Thompson. 06 Dec 2012, *Landscape perception and environmental psychology from: The Routledge Companion to Landscape Studies* Routledge

Accessed on: 30 Sep 2023

<https://www.routledgehandbooks.com/doi/10.4324/9780203096925.ch2>

PLEASE SCROLL DOWN FOR DOCUMENT

Full terms and conditions of use: <https://www.routledgehandbooks.com/legal-notices/terms>

This Document PDF may be used for research, teaching and private study purposes. Any substantial or systematic reproductions, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The publisher shall not be liable for an loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Experiencing landscape

Landscape perception and environmental psychology

Catharine Ward Thompson

UNIVERSITY OF EDINBURGH

This chapter sets a context for understanding how we engage with the world around us, particularly the outdoor and natural elements of the environment. It describes studies and research approaches that explore how we experience the landscape, on a number of levels, and the relevance of this to our attitudes, our behaviour, and indeed our wellbeing. A key element relates to evidence on the process of landscape perception – how we make sense of the environment and what it offers. It discusses theories and models which attempt to explain the bases of aesthetic response, preference and behaviour. It gives an overview of methods that have been effective in empirical research to help understand how people engage with the landscape in everyday life and techniques, methodologies or principles that might fruitfully be pursued in future to address gaps in our understanding. This is necessarily a brief overview and many themes are the subject of a considerable body of research which can only be touched upon here.

The nature of perception

The question of how our senses, mental processes and intellectual capacities allow us to understand the world around us has intrigued philosophers throughout history. At the heart of debates in the past 50 years or so lies the question of how we take data input received through our senses (e.g. light falling on receptors in the eye's retina) and transform this into the perception and experience of everyday objects such as trees or buildings. A major theoretical divide lies between those researchers who believe in a bottom-up approach, one that emphasizes the rich array of stimulus information from the world out there, and the top down or constructivist group of researchers who focus on cognitive activities of the brain (including the perceiver's expectations and previous information) in constructing the most likely account of what's out there. In simple terms, the issue is: how much of our perception is determined by information in the world beyond us and how much is determined by our own mental concepts and interpretations? While most theoretical models have a necessary role for both the external stimulus and our own emotional and cognitive processes in explaining perception, the debate is around questions of emphasis or priority.

In practice, there is a benefit in exploring approaches based on both theoretical stances. One proponent of a bottom-up approach, James Gibson (1966), believed that perception begins with the stimulus itself and focused on the complex array of information received, e.g. in vision, via the retina, as a person moves within their environment (Bruce et al., 2003). By contrast, constructivist researchers such as Gregory (1970) have emphasized the importance of knowledge and inference in perception, claiming the need for considerable cognitive input as we actively construct, in our minds, our perception of reality.

Gibson's work has been termed an 'ecological approach' in that it emphasizes the dynamic and reciprocal relationship between perceiver and environment (J. Gibson, 1979). Gibson, along with his wife Eleanor (E. Gibson, 2000), developed the term 'affordances' to describe cues in the environment which aid perception and facilitate behaviour; they are 'perceptual properties of the environment that have functional significance for an individual' (Heft, 2010, p. 18). This concept of environmental affordance has played an important part in the subsequent development of ideas around landscape perception and preference. Such an approach, by emphasizing the information available in the environment as a key element of landscape perception and response, is attractive to planners and designers because it opens up ways in which the physical environment might be managed or manipulated to support different human experiences and activities. The 'top-down' approach, by contrast, can be less helpful for environmental designers in that it places emphasis on the mind and cognitive processes of the individual, rather than on what the physical environment conveys *per se*.

Affordances, says Heft (2010), are not mental constructs that a perceiver subjectively imposes on the world, nor are they interpretations of a physical world 'in the head' of a perceiver; affordances are properties of the environment that are both objectively real *and* psychologically significant. Such an approach emphasizes the importance to perception of being *in* the world (physically engaged as organisms exploring our environment) rather than considering perception as a distanced, abstracted process of the mind. This resonates with phenomenological theories of landscape experience (Merleau-Ponty, 1962; see Chapter 4) that underline a body-centred engagement with the world. Affordance and phenomenological approaches are discussed further, later in this chapter. First, however, I will touch on a few examples of research around perception and cognition.

Cognitive psychology and landscape perception

The expanding field of cognitive science deals with the underlying processes that form the basis of environmental perception. Research by Purcell, drawing on the work of Rosch and colleagues (1976), developed evidence of a hierarchically arranged knowledge structure, a 'schema', under which representations of the environment are stored in memory. According to this, experience of a particular landscape represents a matching between sensory input from that instance and relevant attributes of the prototypical example stored in a person's schema. The hierarchy works at different levels of abstraction, for example from the scale of 'all natural landscapes' to 'all woodlands' to 'the understorey of a beech woodland'. Purcell has suggested that affective (emotional) responses reflect the discrepancy between a particular experience and the prototypical representations stored in the memory, arousing our autonomic nervous system and, depending on the degree of discrepancy, inducing pleasure or displeasure (Purcell, 1987).

Grush's (2004) 'emulation theory of representation', suggests that the brain constructs neural circuits which act as models of the body and environment; environmental perception results from the use of such models to form expectations of, and to interpret, sensory input. A key

element of the theory highlights the extent to which the outcome of the perceptual process is tuned to sensorimotor requirements. ‘The emulator represents objects and the environment *as things engaged with* [my italics] in certain ways as opposed to how they are considered apart from their role in the organism’s environmental engagements’ (Grush, 2004, p. 393).

Farina and Belgrano (2006) take cognitive science into the study of landscapes as habitats in developing what they call a ‘cognitive landscape ecology’. Their eco-field hypothesis is a way to describe landscape processes from an organism-centred perspective. The eco-field is a spatial configuration that carries a specific meaning. This meaning is perceived by an organism when a specific living function is activated. Each species, it is claimed, has a specific cognitive landscape, comprising all the eco-fields (spatial carriers of information) activated by all the living functions of a particular organism. The authors propose the concept as bridge between different scales and concepts (from niche, habitat and *Umwelt* (von Uexküll, 1992) to eco-field) in spatial ecology and in environmental psychology. Their concept is sympathetic to other ecological understandings of environmental perception such as those proposed by J. Gibson (1979), and to Appleton’s Prospect-Refuge theory (Appleton, 1975).

Landscape perception and landscape preference

Research which supports the idea of an embodied, dynamic experience as fundamental to landscape perception challenges attempts to understand human response to different landscapes by using static, two-dimensional images alone (Heft and Nasar, 2000). Much previous research in landscape perception and aesthetics has used static representations of the environment – usually photographs – to examine people’s responses to, and preferences for, different scenes. Empirical studies have shown that responses to colour photographic images can be similar to responses obtained from participants when located at the actual site from which the image was taken (Stamps, 1990). Yet experimental work by Heft and Nasar (2000) has shown that participants presented with different versions of the same, mostly woodland, landscape – one based on segments of a videotape showing slow movement through the landscape, the other a series of still scenes taken from each video sequence – respond in different ways. Some of the highest ratings in this study were for ‘turn’ segments in the landscape, where the greatest amount of information change (things revealed and things occluded) occurred.

Such findings reinforce notions developed by Rachel and Stephen Kaplan (Kaplan and Kaplan 1989) about variables in the structure of the environment that are associated with landscape preference. Based on a series of studies into landscape perception, the Kaplans identified four key elements as predictors of preference: coherence, legibility, complexity and mystery. The legibility and mystery variables both point to the potential importance of navigation *through* the landscape (as opposed to simply viewing it as a static image) and mystery is particularly pertinent to the study just described, being a quality that draws the perceiver into the scene with the prospect of more information. A typical scene of high mystery might show a path turning out of sight in the distance around a group of trees. This quality was identified in built-environment contexts by urban designer Gordon Cullen (a ‘deflected vista’) and has been consistently associated with positive preference ratings (Cullen, 1961; Kaplan and Kaplan, 1989; Heft and Nasar, 2000).

A further theory developed by the Kaplans has been useful in exploring why people might prefer some kinds of natural environments over more urban or built environments. Attention Restoration Theory (ART) (Kaplan and Kaplan, 1989; Kaplan, 1995) suggests that directed attention, used in coping with complex patterns of daily life, including work, is a highly limited resource, easily exhausted if there are no opportunities for recovery. A ‘restorative’ environment

is one that offers support for recovery and the Kaplans identify four properties that characterize such an environment: ‘being away’, either physically or conceptually, from the everyday environment; ‘fascination’ – the ability of the environment to hold one’s attention effortlessly; ‘extent’, where there is enough scope in the environment to keep one engaged; and ‘compatibility’ with what one wants or is inclined to do. The Kaplans note that the natural environment can offer each of the four factors, and is particularly effective in supporting involuntary attention or fascination, hence restoration. Recent work by Hartig and colleagues has built on ART theory as well as Ulrich’s psycho-evolutionary model (Ulrich, 1983; Ulrich et al., 1991) in exploring the evidence for independent psychological and physiological responses – positive changes in a person’s brain and body – that are a direct impact of perceiving the natural environments (Hartig 2007).

Such research may offer insights into evolutionary and biological processes that underlie certain kinds of landscape preference. However, as in wider nature/nurture debates, it is important to recognize that preference is unlikely to be based simply on a biological or innate response to the environment. Bourassa’s model for this, based on Vygotsky’s pioneering early twentieth-century work on childhood cognitive development (see Bourassa, 1991, pp. 55–7) is a tripartite conceptualization – biological laws, cultural rules and personal preferences – as components of human response to the landscape. A key element of Vygotsky’s work was the contribution of social interaction to the development of cognition and Bourassa suggests that a person’s behaviour may, therefore, reflect ‘composites of biological and cultural constraints and personal idiosyncracies’ (Bourassa, 1991, p. 110).

Preference for particular landscape types

Researchers into landscape preference have drawn on evolutionary theory to speculate on whether there is an optimum landscape for our species, linking this to the landscapes where human beings are thought to have first developed (the Savannah Hypothesis) (Orians and Heerwagen, 1992). While such approaches might suggest an innate preference for savannah-type landscape characteristics (open grasslands with scattered groups of wide-canopied trees, for example), Bourassa’s work suggests cultural influences and childhood experience are potential moderators of any such response. Familiarity with certain landscapes might therefore be expected to play a role in preference. These different potential influences are well illustrated in a cross-cultural study by Herzog et al. (2000), using images of Australian natural landscapes with Australian and American participants belonging to different age and subcultural groups. The study found well-correlated patterns of preference across the groups, despite cultural differences. While there was a higher preference for familiar landscapes, both Australians and Americans were found to like river scenes best and open landscapes lacking good-sized trees or bushes in the near or middle distance, along with those showing remnants of human structures, the least. Primary school students had the highest preference for natural landscapes, secondary school students the lowest, with adults revealing the greatest variability in preference.

So do people prefer landscapes that are perceived as typical within a particular culture? In a series of studies that included comparisons between Australian and Italian participants, Purcell and colleagues (1994; 2001) found a much larger correlation between participants’ ratings of landscape images for their restorative value and preference, supporting ART theory, than between familiarity with the landscape and preference. Purcell’s earlier work (Purcell 1987) suggested that discrepancy from the prototypical landscape might be associated with increased preference, so long as the discrepancy was not too great. Hägerhäll (2001) looked at the relationship between landscape typicality and preference in the case of Swedish pastureland – a

traditional cultural landscape – and found a positive correlation between the two: the more ‘typical’ a pasture, the higher its preference rating. However, Herzog and Stark (2004) tested Hägerhäll’s results in different types of settings: those of positive value (parks) and of negative value (urban alleys). Preference was found to increase with typicality for positively valued settings and to decrease with typicality for negatively valued settings.

Han (2007) studied landscape settings ranging across the six major terrestrial biomes, seeking North American participants’ perceptions of beauty, preference and restoration. The findings indicated a preference for forested landscapes instead of grasslands, challenging the Savannah Hypothesis, but suggested that physical and structural landscape parameters (complexity, openness, water features) weighed more heavily than overall habitat type in shaping people’s preferences. However, a cross-cultural study by Kohsaka and Flitner (2004), using prize-winning forest photographs, found the perceptions of Japanese and German study participants to differ markedly, reflecting views of forests as commodities in Japan and the association of forests with mystery and romance in Germany.

A growing interest in landscapes that appear natural is partly driven by contemporary concerns for biodiversity. One question is whether less managed and/or more native vegetation is preferred in landscape scenes, as Herzog and colleagues’ (2000) study suggests. Kaplan and Austin (2004) researched people living in new residential developments on the urban fringe in the USA and found a perceived typology of manicured/landscaped areas, trees, gardens, mowed areas, forest, open fields, and wetlands. Preference for forests was found to be overwhelming, despite forests’ vulnerability to urban sprawl when new residential areas are developed. However, where people have direct experience of working on the land, their perceptions may be more complex. Gomez-Limon and Fernandez (1999) documented the contrasting landscape preferences among users of a formerly agricultural landscape in central Spain, where the abandonment of traditional agricultural uses has resulted in an ecological succession of trees and bushes. Landscape preferences differed markedly between different groups: livestock farmers preferred open landscapes, whereas managers and recreationists preferred landscapes with denser vegetation cover. In the US context, Kaplan (2007) found that urban workers expressed a clear preference for nearby natural vegetation, especially patches of less groomed areas with trees and pathways that allow walking.

Fear and safety in the landscape

Many studies have explored perceptions of safety and fear in landscapes as part of attempts to understand negative responses to certain landscapes. Appleton’s (1975) studies of landscape paintings identified two key elements of landscape settings which he considered important to aesthetics and human response: prospects, or vantage points from which one can see unhindered into the distance, and refuges, which offer shelter but are also potential hiding places in a setting. It has been suggested that these elements of the landscape may be particularly associated not only with preference but also with feelings of safety. Herzog and Kutzli (2002) studied perceived danger and fear using images of fields and forested landscapes with US students. They found that visibility and locomotor access were the two principal determinants of preference and fear. High visibility and good access made landscapes preferable, whereas poor visibility and access generated perceptions of fear. Poor access was the paramount predictor of feelings of danger and entrapment. However, fear is not simply the inverse of preference. After controlling for other indicators of visibility, mystery has a positive relation to preference, as suggested by the Kaplans (Kaplan and Kaplan, 1989). In a non-threatening context, concealment may be comforting but, when perceptions of danger are present, concealment may generate thoughts of

entrapment, thus reinforcing fear. The authors suggest that opportunity for locomotor access as well as visual access is important in locations where people may be anxious about safety.

Landscape perception and environmental aesthetics

Debates on the nature of aesthetics and aesthetic landscape appreciation are necessarily informed by theories of landscape perception and preference. A corollary of the difference in approaches to perception ('bottom-up' or 'top-down') is the disagreement among landscape ecologists over the extent to which knowledge of the ecological significance of landscape patterns enters into aesthetic experience. In the context of concerns about conservation, climate change and sustainability, a key question is whether the theoretical mechanism is the same in all aesthetic responses, or whether there is something special or different about environmental aesthetics.

Fenner (2003), argues that aesthetic appreciation of natural environments, including landscapes, differs from the aesthetic appreciation of works of art as a result of some of the essential properties of nature, including the necessary involvement in nature of the fourth dimension – time – and therefore of change. The debate has important and far reaching repercussions not only for how landscape aesthetics are theorized but also for approaches to understanding how natural beauty is perceived: whether it is grounded in cognition (requiring intellectual processes of understanding) or affect (requiring only a direct, emotion-based response) (set out in more detail in Ward Thompson and Boyd, 1998). The debate in turn influences what methodologies are appropriate for the research and documentation of popular notions of natural beauty (landscape aesthetics *per se* are dealt with in more detail in Chapter 9).

However, a number of environmental aestheticians (e.g. Saito, 1998; Gobster, 1999) denigrate popular aesthetic preferences, commonly described as 'scenic beauty,' as superficial and malleable socio-cultural constructions. Grounded in seventeenth- and eighteenth-century painting and nineteenth-century Romanticism, such aesthetics, they claim, result in landscapes that are 'naturalistic' rather than natural, designed to be appreciated only visually. Gobster critiques methodological practices focused on visual evaluation of landscapes and the affective (like/dislike) responses of disengaged viewers, most often assessed through simple scalar reactions to photographs.

Heft and Nasar (2000) underline Gobster's methodological critique, arguing that 'the spectator stance' and the engaged, active perceiver stance are distinctive modes of experiencing the environment. Emphasis on personal engagement with the environment is more sympathetic to suggestions that environmental values are grounded in a sense of 'connectivity' with nature (Dutcher et al., 2007), rather than in a distanced, and visually dominated, aesthetic response. Dutcher describes such connectivity as 'the dissolution of boundaries and a sense of shared or common essence between the self, nature and others' (p. 474). This chimes with other environmental aestheticians (Gobster included) who argue for an 'ecological aesthetics' informed by the biocentric ethics of Aldo Leopold and his successors, including Naess's (1973) 'deep ecology'. (These theories are discussed further in Chapter 38).

Drawing on the work of Parsons and Daniel (2002), Gobster et al. (2007) focus on the possibility of an ecological aesthetic and the contribution of aesthetics to managing environmental change and people's response to such change. They suggest that some contexts elicit aesthetic experiences that have traditionally been called 'scenic beauty,' while other contexts elicit different aesthetic experiences, such as perceived care, attachment and identity. Their argument – in terms of the 'perceptible realm', i.e. the scale at which humans as organisms perceive landscapes, – reflects the *Umwelt*, the organism-centred view of the world discussed by Farina

and Belgrano (2006) in which signs, their meaning and interpretation are embedded (biosemiotics). Gobster et al. (2007) suggest that future landscape planning should attempt to align ecological goals with aesthetic experiences to achieve culturally and ecologically sustainable landscapes. Empirical work has shown that, alongside appreciation of urban green space for the functional, ecosystem services it can provide, aesthetic appreciation can provide a pathway to enhanced ecological awareness among urban citizens (Jim and Chen, 2006). Indeed, while research has shown that what we know about a landscape influences appreciation of it, there is also research to suggest that initial responses to real landscapes can be immediate, emotional, and perhaps unmediated by cognitive processes (Parsons, 1991).

Nonetheless, radical researchers, such as Barrett et al. (2009) propose the abandonment of 'aestheticism', and the reconceptualization of aesthetics as an economy of survival across different levels of ecological organization. They argue for the emergence of a new, integrative scientific paradigm to wed the medical, ecological, and social sciences, including an interface with the humanities. Godlovitch (1998) identifies the 'external outlook of nature', whereby nature is externalized as a thing apart from humanity, as a problem at the heart of the discourse about aesthetic valuation and abuse of nature. Ingold's (2007) anthropological approach, and some versions of Naess's (1973) deep ecology, suggest a different metaphysics, in which humans and the world are essentially part of one whole.

Related to the discussion of the ways in which environmental aesthetics determine attitudes towards nature, there is a growing appreciation of the role of aesthetic values in the shaping of ecological politics. Dunaway (2005) documents the ways in which images of nature (films and photographs) have both shaped, and been shaped by, perceptions and politics of nature in twentieth-century USA. Similarly Benediktsson (2007) illustrates the role of aesthetics in shaping radical environmental values. Taking his cue from Berleant's (2007) aesthetics of engagement, the author argues forcibly for a rehabilitation of aesthetics, including emotion, in a political geography of landscape.

Such debates are reflected in the difference between expert- and public perception-based approaches to environmental management and conservation practice and research. As Daniel (2001) notes, expert approaches are more prevalent in environmental management practice, whereas public perception-based approaches are more frequent in research. He reviews the ways both approaches have shaped systematic landscape quality assessment, and notes that both are unequal to the ecological and ethical challenges of the twenty-first century and the consequent emergence of biocentric philosophies. He advocates a merging of the two paradigms in a psychophysical approach, which affirms that 'landscape values result from the interaction between biophysical features of the landscape and associated human perceptual/judgemental processes' Daniel (2001, p. 278).

Environment and behaviour

As the evidence so far suggests, every act of perception is made in the light of context and experience. For each individual, the context includes whatever tasks they are currently engaged in and expectations of the future as well as experience of the past. As Aspinall (2010) has pointed out, if researchers asking participants questions about landscape preference do not give a context, the respondents will provide their own and they may be quite divergent. In asking whether people like or dislike certain scenes, for example, it is important to know whether these landscapes are being considered as a place outside one's front door, a place to visit only on rare, holiday trips, a scene to view from a car window, a nature reserve rarely visited by anyone, and so forth. As Purcell et al. (1994) have shown, responses will be different according to

context and will be coloured by motivational factors – what people want or hope to do – as well as emotional attachments to certain places. These considerations inform a transactional view of people’s relationship with the landscape, one that takes into consideration how well individuals’ needs, desires and aspirations are supported by their environment and how people respond to (and cope with) the environment in which they find themselves (Myers and Ward Thompson, 2003; Little, 2010).

Such considerations offer a useful bridge to exploring the relationship between environment and behaviour. Appleton has put it very succinctly: for any individual considering their landscape context, a key notion is ‘what’s in it for me?’ (Appleton, 1975). Researchers such as Tuan (1974) and Norberg-Schultz (1980) have emphasized a phenomenological approach to landscape perception, responsive to place and context while emphasizing the body at the centre of the experience: Merleau-Ponty’s ‘lived space’ (Merleau-Ponty, 1962) (see Chapter 4 for more on phenomenology). An approach sympathetic to such notions is offered by the work of George Kelly (1955), whose personal construct psychology offers a way of enabling pre-conscious factors to be raised to the level of consciousness so that they can be recorded and inform our understanding of response to place. This approach takes as its premise the idea that we mediate reality through ‘constructions’ which influence how we perceive reality and how we respond to it. The construct system is like a pair of spectacles that not only filters information (e.g., what we see and how we see it) but also influences our future expectations. Researchers who draw on this approach (e.g. Little, 1983) have emphasized the importance of asking people for their views and responses, rather than simply observing them, in researching engagement with the environment.

From a different disciplinary perspective, social anthropologists such as Ingold describe the anthropological approach as seeking ‘a generous comparative ... understanding of human being and knowing in *the one world we all inhabit*’ (my italics; Ingold, 2007, p. 69). A key point for Ingold is understanding commonalities as well as difference, and recognizing the value of engagement with people and place. He is sympathetic to Gibson’s theories of perception and affordance and some of his language reflects that of Heft (2003), who calls for a refocused interest in immediate experience, approached through a phenomenological framework. Heft points out that affordances are multidimensional and located within the flow of immediate experience, development, and socio-cultural processes. The focus on how environments are experienced dynamically by users in the course of action offers potentially valuable insight in understanding behaviour. Perceiving and acting are intertwined, according to Heft (2010) as we engage, in movement and in time, with the environment.

Wayfinding – navigating the landscape

The Heft and Nasar (2000) study demonstrated how environmental perception is contingent, i.e. it evokes a conditional response plan made in preparation for various future circumstances, including the unanticipated. Such research also points to the value of attempts to understand how we navigate our way through the landscape, partly because it may help to explain more fundamental processes of perception.

Wayfinding is concerned with the ability to identify one’s location and arrive at destinations in the environment, both cognitively and behaviourally (Prestopnik and Roskos-Ewoldson, 2000) or, put more simply, spatial problem-solving (Passini, 1996). There appear to be two principal strategies for wayfinding: the first assumes an understanding of the spatial structure of the environment, where people rely on the spatial relationships between key locations to navigate (such a mental map may, initially, be derived from having viewed a real map); the

second is based on comprehension of a sequence of particular places and the routes that connect them, which are used to navigate. Users unfamiliar with an environment may start with one strategy and switch to the other as they become familiar with a place.

Passini (1996) has suggested that the ‘expected image’ is an important concept in wayfinding: we expect or anticipate what to look for and this affects what we are actually able to perceive from the environment. Many studies have highlighted how landmarks can play a key role in navigating both familiar and unfamiliar territory. Foo et al. (2005), looked at how humans perceive known routes in the landscape. They studied whether people integrate known routes into a cognitive map that includes measured, quantified representations of the landscape – a metrically accurate spatial knowledge – or whether they rely on a geometrically weaker, landmark navigation strategy. A key conclusion is that humans, like honeybees, depend on landmarks when they are available, as the simplest, most reliable navigation strategy. Such findings reinforce the value of concepts developed by urban designer Kevin Lynch in describing how people navigate complex urban environments, and in particular his identification of landmarks as a key element (Lynch, 1960).¹

Research methodologies in landscape perception and experience

Empirical studies on the perception of landscape are overwhelmingly focused on visual dimensions. There is, nonetheless, considerable diversity in the detailed methodology used, reflecting different disciplinary traditions. For example, Sanesi et al. (2006) illustrate the differing approaches and research methods applied by urban foresters and environmental psychologists to landscapes in Italy.

Visual research methods

Most recent research in landscape perception and aesthetic valuation consists of gauging the affective responses (usually expressed in terms of like/dislike, or equivalent) of participants exposed to images of landscapes, usually in settings removed from the actual landscape under evaluation. Although the use of static images is open to criticism, as outlined earlier, much research continues to use them. This is partly because methods using images (rather than immersion in the real landscape) are easier to administer with a large sample of participants, but also because the opportunities offered by digital manipulation of landscape images (whether based on photographs or computer-generated models) are increasingly sophisticated and amenable to a range of research questions and landscape scenarios (Karjalainen and Tyrväinen, 2002). However, there is debate as to whether these different representations of landscape can be considered as equal in their potential to elicit affective response in viewers. In a study comparing preferences of people who rated the same scenes, reproduced by different visualization methods, Daniel and Meitner (2001) found very low correlation between ratings of images produced with different reproduction methods. This study raises important questions about the representational validity of computer-generated landscape visualizations. However, digitally processed images continue to be used in a wide range of projects (e.g. Ode et al., 2009).

A number of researchers have focused on the development of indicators that can be used for assessing ‘landscape character’, as a way of including aspects of landscape experience in categorizations to inform the fields of landscape management, planning and monitoring (e.g. Countryside Agency and Scottish Natural Heritage, 2002). This has been given new impetus by the Council of Europe’s 2000 European Landscape Convention (ELC), which was ratified by the UK in 2006. Since the ELC requires the identification and assessment of landscapes with

the active participation of stakeholders, as well as the setting of objectives for landscape quality with the involvement of the public, there is particular interest in methods that take into account the role of landscape aesthetics and experience in determining people's response to conservation and change. Ode et al. (2008) provide a useful overview of the use of theories of landscape perception and preference to develop indicators for capturing and assessing the visual character of landscape. Their work draws on the Kaplans' (Kaplan and Kaplan, 1989) preference theories, among others, and includes a wide array of indicators, reflecting landscape coherence, stewardship, historicity, complexity, imageability, visual scale, disturbance and naturalness. In this northern-European study, perceived naturalness seems to be an important indicator of preference (Ode et al., 2009).

Non-visual methods: questionnaires, interviews and accompanied visits

An increasing number of studies document landscape preferences, values and uses through questionnaires, interviews and a variety of ethnographic methods, which permit closer interaction between researchers and research participants without relying on the kind of visual methods described above. Galindo and Hidalgo (2005), for example, explored preference for urban parks and open spaces in Spain, in relation to attractiveness and mental restoration, using a self-completed questionnaire. An exploration of landscape perceptions and preferences in rural Scotland by Myers and Ward Thompson (2003), used semi-structured interviews based on personal construct psychology (Kelly, 1955) to elicit a transactionalist understanding of the way personal experience and socio-cultural context influence landscape perceptions and engagement with place (Myers and Ward Thompson, 2003). Drawing on the same theories, other research has used focus groups followed by a broader questionnaire survey to understand people's response to place, and to green or natural environments in particular (Bell et al., 2004; Ward Thompson et al., 2004).

An approach developed by Little (1983) that draws on similar theoretical foundations involves the concept of personal projects – a set of goal-oriented, self-generated activities a person is doing or thinking of doing. They range from trivial, everyday routines to ambitious, long-term endeavours. The idea of personal projects emphasizes the ecological aspects of activity in context. Use of personal projects in a questionnaire offers a unique way of investigating the transactional relationship between person and environment (Sugiyama and Ward Thompson, 2007a; Little, 2010).

A different approach, strongly grounded in affordance theory, relies on behaviour observation to analyze how people interact with the environment. 'Behaviour settings' were initially proposed by Barker (1976) as environmental contexts in which a certain behaviour pattern can be repeatedly observed, i.e. environments which support or elicit certain behaviour. Behaviour settings provide a useful basis for subdividing a physical landscape under study so that environment and behaviour can be directly linked. Moore and Cosco (2007; 2010) have demonstrated the value of a behaviour setting approach to behaviour mapping, providing a sound empirical method for exploring how people engage with the world through direct observation. Such an approach can be supported by interviews and other methods to explore the reasons and perceptions behind certain behaviour patterns. Nonetheless it has value in its own right in providing evidence for landscape preference expressed through bodily engagement rather than words.

Extended interviews, accompanied walks and other kinds of participation-based methodologies offer the added benefit of contextualizing the research *in situ*. These can help the researcher to understand the immediate and multi-sensory aspects of engagement with the landscape.

Ethnographic research attempts to elicit an understanding of people's response to their environment by accompanying them in normal activities within that landscape and recording their (ideally unprompted) comments, reactions and responses in as much detail as possible; however, the observer attempts to remain 'apart' and not to influence the phenomena being described. Such an approach is exemplified in Scott et al.'s (2009) participant-led research, using ethnographic and phenomenological approaches to record different groups' real-world experience of landscape. They found that 'allowing people to share their perceptions and experience in the landscapes they are frequenting and talking about greatly enhances the analysis' (p. 417). However, Ingold (2007) has challenged such a dispassionate and distancing approach, recommending instead anthropology as a practice of observation 'grounded in participatory dialogue' (p. 87). Given that much debate about landscape perception arises in the course of planning for change, where different perspectives are nonetheless focused on the same landscape, the same place inhabited by all involved, such an anthropological approach offers a useful conceptual way forward.

Many researchers promote a multi-method approach to understanding landscape perception (e.g. Ward Thompson et al., 2004; Thwaites and Simkins, 2007), recognizing that this may offer a more rounded understanding of patterns and the reasons behind patterns in perception. Regardless of the methodological stance, a range of information and communication technology (ICT) tools have recently offered new opportunities for research techniques. Computer-based questionnaires and other tests allow surveys to be undertaken online and participants to be enlisted at a distance. Image manipulation and digital modelling, as mentioned earlier, allow alternative landscape scenarios to be presented to participants for their response. Geographic information systems (GIS) facilitate spatially based modes of recording and analyzing people's landscape perceptions, including the 'softGIS' methods promoted by Kytta and colleagues (Kytta et al., 2004; 2011). Disposable and digital cameras, voice and video recorders have assisted participant-led data collection, making it easier to employ research methods that combine visual and non-visual approaches. In addition, analysis of comments and discussions recorded by participants has been facilitated by computer software such as NVivo, that can assist in coding text and in discourse analysis.

Landscape perceptions and experiences for different population groups

The empirical evidence on perceptions and experience of the landscape for different groups within the population is based on a range of theoretical stances and methodologies. Space does not permit more than the briefest of pointers to some relevant research.

Children and young people

The theory of affordances (J. Gibson, 1979) has informed much work to understand the experience of, and intangible benefits from, particular environments, especially for children. Kytta (2002) has researched the affordances in children's environments, comparing areas with varying degrees of urbanization. Along with physical affordances, she proposed the identification of social affordances, a concept particularly valuable in studying places preferred by teenagers. Said and Abu Bakar (2005) researched the affordances of streams and rivers as children's outdoor play spaces in Malaysia and identified physical, cognitive and social interactions as the basis for perceived affordances. Roe (2009) expanded the theory of affordances to include the emotional cues that a particular setting, in this case a forest, can afford for young people at risk. Wells and Evans (2003) found that nearby nature can function as a buffer that moderates the

impact of stressful life events, such as family relocation, on children's well-being. Bell et al. (2003) and Ward Thompson et al. (2008) explored the uses and meanings of forests and woodlands for children and teenagers in Central Scotland. These studies have underlined the key role of childhood experience in people's relationship with the environment in later life, as has the work of Bixler et al. (2002).

Women

Many studies on the use of open public space have shown that women have different experiences in the outdoors from men, particularly when they are alone (Burgess, 1998). Burgess showed that the physical quality of enclosure characteristics of woods and forests was experienced by women in a more negative way. However, she identified social factors (encounters with strangers, the significance of verbal abuse and flashing) as key to perceptions of risk, and the role of communication networks in disseminating and amplifying people's anxieties about personal safety. Krenichyn (2006) showed that family, friends and acquaintances could provide support for feelings of safety and enjoyment in New York city parks and that aesthetic elements of the park were highly valued.

People from Black and Minority Ethnic (BME) Groups

Interest in the different landscape perceptions and experience of BME groups is comparatively recent in research but there is a growing literature (e.g. Woolley and Amin, 1999; Agyeman, 2001; Rishbeth, 2001). In the US, Gobster (2002) examined outdoor recreation use patterns and preferences among racially and ethnically diverse users and found that BME park users came from farther away, more often by car, used the park less frequently and were more likely to visit in large, family-oriented groups. In the UK, Rishbeth (2004) found that Asian and African minority ethnic groups were less likely to be attracted to 'wildness' compared to white British participants. A study of deprived English urban communities found perceptions of urban green space as a restorative place to retreat and relax, offering breathing space from the stresses of everyday life, to be a common theme across all cultures and ages. However, green spaces with attractive views and their use for relaxation appeared to be less relevant to BME groups than to white British, while good maintenance was more important to BME groups (CABE, 2010).

Tolia-Kelly (2004) identified the ability of landscape to trigger memories of something familiar that can help facilitate a sense of belonging and locate minority ethnic groups in new contexts, helping form some psychological continuity between old and new self-identity. Powell and Rishbeth (2011) identified 'being away' as a particularly important concept, related to the need for anonymity amongst first-generation migrants, where urban landscapes further away from home offered opportunities to experiment or test out new life options.

Older people and disabled people

Much recent research with these groups utilizes the 'social model of disability': the understanding that disability is a construct of a disabling society (Blackman et al., 2003) which, instead of accommodating the physical and mental difference of its constituents, bases expectations (including how things are communicated, constructed and maintained) on the assumption that all its members are similarly able-bodied and able-minded. Research has largely focused on issues of use, access to, and inclusive design of green spaces rather than perception and

signification of these spaces by older people and people with disabilities (e.g. Kweon et al., 1998). Drawing on a personal projects methodology, Sugiyama and Ward Thompson (2007b) have introduced the concept of ‘environmental support’: a link between perception of environments that make it easy and enjoyable to go outdoors and older people’s quality of life. The appeal of places such as local parks and tree-lined streets in offering aesthetic and multi-sensory engagement with nature are an important component of environmental support.

Gaps in our understanding and opportunities for future research

Reviews of research on landscape perception and aesthetics (Ward Thompson and Boyd, 1998; Ward Thompson and Travlou, 2009) identified a continuing reliance on evaluation of photographic or static images in empirical studies of environmental perception and an emphasis on the visual aspects of the landscape experience, almost to the exclusion of other senses. The dearth of non-visual aspects of landscape perception and engagement remains noticeable, despite much interest in phenomenological theory and ethnographic methods. Empirical research on the significance of sound is rare, and studies on the role of smell in landscape perception are almost non-existent (Porteous, 1985; Porteous and Mastin, 1985; and Carles et al., 1999, remain rare exceptions). Although recent participatory approaches to recording landscape experience show considerable potential (e.g. as promoted by landscape designers Thwaites and Simkins, 2007), there is a continuing need for the development of methodologies focusing on as broad a sensory range as possible. Interviews and comparative methods will continue to play an important role, supplemented by methods that elicit in-depth, participant-led observations. Auditory aspects of landscape perception, for example, can potentially be researched with only minor modification of current methodologies, using sound instead of image. Haptic and multi-sensory responses to microclimate are another dimension of experience that are rarely taken into account in empirical research and yet remain a powerful part of landscape perception in the real world.

Another significant gap in research is the landscape perception of people with physical and learning disabilities. Ethnographic and participant-led methods have contributed to a greater understanding of patterns of access to and use of different landscapes by people with disabilities, but we still know very little about what these landscapes signify for their users. People with learning disabilities, in particular, remain a group virtually ignored from landscape perception research, and this despite the copious literature on the therapeutic potential of green and other open spaces.

Theories and methodologies that build on understandings of people’s transactional relationship with place offer potential for the future. Personal construct theory (PCT) (Kelly, 1955), personal projects (Little, 1983) and similar projective approaches offer ways to elicit an understanding the different perspectives that various sectors within society bring to their experience of and response to the landscape. Life histories approaches can also offer valuable insights here (Uzzell et al., 2010). New ICT methods also make it easier to relate individual experience to place in a way that can subsequently be analyzed using quantitative methods. The use of softGIS by Kytä et al. (2011) is one such example that permits the recording of multiple interactions between research participants and given landscapes, and then allows for interrogation of the data in relation to other spatial phenomena, such as the location of green or natural space.

It is important that research designs, and the guidance and decision-making that stems from the results, reflect the significant theoretical and methodological advances in landscape perception in recent years. It is noticeable that many practical landscape assessment tools and guides are only poorly related to aesthetic and perception theory. The theory gap also reflects a failure to

join up the different strands of relevant research relating aesthetics, perception, experience, behaviour and response to environment.

In the context of developing research, policy and practice, there is scope for a better alignment of theories on the visual, historical and cultural contributions to landscape experience with aesthetic theory and environmental or ecological aesthetics. Ingold's (2007) anthropological approach also offers a valuable way forward, sympathetic and responsive to many of the theoretical issues raised by environmental aestheticians. In the context of global anxieties about environment and the natural world, issues of ethics cannot be divorced from aesthetics and this also merits greater attention in future research.

At a more practical level, some gaps in research relate to coverage of different dimensions in the landscape. It is interesting to note how little discussion there is in the aesthetic literature on seascapes and, where they are covered (e.g. Hill et al., 2001), they are dealt with separately from other kinds of landscape assessment. Equally, there are many gaps in the coverage of urban landscape perceptions. Attention has been paid to views of nearby nature and immersion in natural environments as part of research on restorative environments, e.g. by Hartig (2007) and Kaplan (2007). However, research where the context for the viewer is largely an everyday built urban environment, with the natural or green landscape no more than part of a distant visual scene at best, merits further research.

Finally, the growing interest in relationships between health and the landscape adds a vital dimension to explorations of landscape perception. This is a burgeoning area for empirical research and highlights opportunities for using objective, physiological measures as well as subjective measures of landscape experience. Concepts such as affordance and personal construct and life history approaches to methodology can be useful here too, pointing to the ways in which the landscape might offer different, health-enhancing opportunities for engagement with the environment for different people and at different stages in their lives.

Acknowledgements

I am grateful to my colleagues Peter Aspinall and Penny Travlou on whose advice and input I have leant in preparing this chapter.

Note

- 1 Space does not permit a more detailed exploration of the considerable literature on wayfinding and cognition, much of it focused on human navigation of buildings and the urban environment, but Ward Thompson et al. (2005) illustrate how an understanding of wayfinding theory can be drawn upon to improve navigation for visitors in a countryside context.

References

- Agyeman, J. (2001) 'Ethnic minorities in Britain: short change, systematic indifference and sustainable development'. *Journal of Environmental Policy & Planning* 3: 15–30
- Appleton, J. (1975) *The Experience of Landscape*. London: Wiley and Sons
- Aspinall, P. (2010) 'On environmental preference: applying conjoint analysis to visiting parks and buying houses'. In Ward Thompson, C., Aspinall, P. and Bell, S. (eds) *Open Space: People Space 2: Innovative Approaches to Researching Landscape and Health*. London: Routledge, pp. 179–208
- 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
- Barrett, T.L., Farina, A. and Barrett, G.W. (2009) 'Positioning aesthetic landscape as economy'. *Landscape Ecology* 24(3): 299–307

- Bell, S., Ward Thompson, C., and Travlou, P. (2003) 'Contested views of freedom and control: children, teenagers and urban fringe woodlands in Central Scotland'. *Urban Forestry and Urban Greening* 2: 87–100
- Morris, N., Findlay, C., Travlou, P., Montarino, A., Gooch, D., Gregory, G. and Ward Thompson, C. (2004) *Nature for People: the Importance of Green Spaces to East Midlands Communities*. English Nature Research Report no. 567. Peterborough: English Nature
- Benediktsson, K. (2007) 'Scenophobia, geography and the aesthetic politics of landscape'. *Geografiska Annaler Series B-Human Geography* 89B(3): 203–17
- Berleant, A. (2007) 'Aesthetics and environment reconsidered: reply to Carlson (Allen Carlson)'. *British Journal of Aesthetics* 47(3): 315–18
- Bixler, R.D., Floyd, M.F. and Hammitt, W.E. (2002) 'Environmental socialization: quantitative tests of the childhood play hypothesis'. *Environment and Behavior* 34(6): 797–818
- Blackman, T., Mitchell, L., Burton, E., Jenks, M., Parsons, M., Raman, S. and Williams, K. (2003) 'The accessibility of public space for people with dementia: a priority for the 'open city''. *Disability and Society* 18(3): 357–71
- Bourassa, S. (1991) *The Aesthetics of Landscape*. London and New York: Belhaven Press
- Bruce, V., Green, P.R. and Georgeson, M.A. (2003 [1996]) *Visual Perception: Physiology, Psychology, and Ecology* (3rd edn). Hove: Psychology Press
- Burgess, J. (1998) 'But is it worth taking the risk? How women negotiate access to urban woodland: a case study', in Ainley, R. (ed.) *New Frontiers of Space, Bodies and Gender*. London: Routledge, pp. 115–28
- CABE (2010) 'Community green: using local spaces to tackle inequality and improve health'. London: CABE. Available at <http://www.cabe.org.uk/publications/community-green> (accessed 11 September 2012)
- Carles, J.L., Lopez Barrio, I. and Vicente de Lucio, J. (1999) 'Sound influence on landscape values'. *Landscape and Urban Planning* 43(4): 191–200
- Countryside Agency and Scottish Natural Heritage, (2002) *Landscape Character Assessment: Guidance for England and Scotland*. Cheltenham: Countryside Agency
- Cullen, G. (1961) *The Concise Townscape*. New York: Van Nostrand Rienhold
- Daniel, T.C. (2001) 'Whither scenic beauty? Visual landscape quality assessment in the 21st century'. *Landscape and Urban Planning* 54(1–4): 267–81
- and Meitner, M.M. (2001) 'Representational validity of landscape visualizations: The effects of graphical realism on perceived scenic beauty of forest vistas'. *Journal of Environmental Psychology* 21(1): 61–72
- Dunaway, F. (2005) *Natural Visions: The Power of Images in American Environmental Reform*. Chicago, IL: University of Chicago Press
- Dutcher, D.D., Finley, J.C., Luloff, A.E. and Buttolph Johnson, J. (2007) 'Connectivity with nature as a measure of environmental values'. *Environment and Behavior* 39(4): 474–93
- Farina, A. and Belgrano, A. (2006) 'The eco-field hypothesis: toward a cognitive landscape'. *Landscape Ecology* 21(1): 5–17
- Fenner, D.E.W. (2003) 'Aesthetic appreciation in the artworld and in the natural world'. *Environmental Values* 12(1): 3–28
- Foo, P., Warren, W.H., Duchon, A., and Tarr, M.J. (2005) 'Do humans integrate routes into a cognitive map? Map-versus landmark-based navigation of novel shortcuts'. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 31(2): 195–215
- Galindo, M.P. and Hidalgo, M.C. (2005) 'Aesthetic preferences and the attribution of meaning: environmental categorization processes in the evaluation of urban scenes'. *International Journal of Psychology* 40(1): 19–26
- Gibson, E.J. (2000) 'Where is the information for affordances?'. *Ecological Psychology* 12(1): 53–56
- Gibson, J.J. (1966) *The Senses Considered as Perceptual Systems*. Boston, MA: Houghton Mifflin
- (1979) *The Ecological Approach to Visual Perception*. Boston, MA: Houghton Mifflin
- Gobster, P.H. (1999) 'An ecological aesthetic for forest landscape management'. *Landscape Journal* 18 (1): 54–64
- (2002) 'Managing urban parks for a racially and ethnically diverse clientele'. *Leisure Sciences* 24: 143–59
- , Nassauer, J.I., Daniel, T.C. and Fry, G. (2007) 'The shared landscape: what does aesthetics have to do with ecology?'. *Landscape Ecology* 22(7): 959–72
- Godlovitch, S. (1998) 'Offending against nature'. *Environmental Values* 7(2): 131–50
- Gomez-Limon, J. and Fernandez, J.V.D. (1999) 'Changes in use and landscape preferences on the agricultural-livestock landscapes of the central Iberian Peninsula (Madrid, Spain)'. *Landscape and Urban Planning* 44(4): 165–75

- Gregory, R. (1970) *The Intelligent Eye*. New York: McGraw-Hill
- Grush, R. (2004) 'The emulation theory of representation: motor control, imagery, and perception'. *Behavioral and Brain Sciences* 27(3): 377–96
- Hägerhäll, C.M. (2001) 'Consensus in landscape preference judgements'. *Journal of Environmental Psychology* 21: 83–92
- Han, K.T. (2007) 'Responses to six major terrestrial biomes in terms of scenic beauty, preference, and restorativeness'. *Environment and Behavior* 39(4): 529–56
- Hartig, T. (2007) 'Three steps to understanding restorative environments as health resources'. In Ward Thompson, C. and Travlou, P. (eds) *Open Space: People Space*. London: Taylor & Francis, pp. 163–79
- Heft, H. (2003) 'Affordances, dynamic experience, and the challenge of reification'. *Ecological Psychology* 15(2): 149–80
- (2010) 'Affordances and the perception of landscape: An inquiry into environmental perception and aesthetics'. In Ward Thompson, C., Aspinall, P. and Bell, S. (eds) *Open Space: People Space 2: Innovative Approaches to Researching Landscape and Health*. London: Routledge, pp. 9–32
- and Nasar, J.L. (2000) 'Evaluating environmental scenes using dynamic versus static displays'. *Environment and Behavior*, 32, 301–22
- Herzog, T.R. and Kutzli, G.E. (2002) 'Preference and perceived danger in field/forest settings'. *Environment and Behavior* 34(6): 819–35
- Herzog, T.R. and Stark, J.L. (2004) 'Typicality and preference for positively and negatively valued environmental settings'. *Journal of Environmental Psychology* 24(1): 85–92
- Herzog, T.R., Kaplan, E.J., and Crooks, C.L. (2000) 'Cultural and developmental comparisons of landscape perceptions and preferences'. *Environment and Behavior* 32(3): 323–46
- Hill, M., Briggs, J., Minto, P., Bagnall, D., Foley, K. and Williams, A. (2001) 'Guide to best practice in seascape assessment'. Maritime Ireland / Wales INTERREG Report, available at <http://www.ccw.gov.uk/landscape-wildlife/protecting-our-landscape/seascapes.aspx> (accessed 11 September 2012)
- Ingold, T. (2007) 'Anthropology is not ethnography'. Radcliffe-Brown Lecture in Social Anthropology. *Proceedings of the British Academy* 154, 69–92
- Jim, C.Y. and Chen, W.Y. (2006) 'Perception and attitude of residents toward urban green spaces in Guangzhou (China)'. *Environmental Management* 38(3): 338–49
- Kaplan, R. (2007) 'Employees' reactions to nearby nature at their workplace: the wild and the tame'. *Landscape and Urban Planning* 82(1–2): 17–24
- and Austin, M.E. (2004) 'Out in the country: sprawl and the quest for nature nearby'. *Landscape and Urban Planning* 69(2–3): 235–43
- and Kaplan, S. (1989) *The Experience of Nature: A Psychological Perspective*. New York: Cambridge University Press
- Kaplan, S. (1995) 'The restorative benefits of nature: toward an integrative framework'. *Journal of Environment Psychology* 15: 169–82
- Karjalainen, E. and Tyrväinen, L. (2002) 'Visualization in forest landscape preference research: a Finnish perspective'. *Landscape and Urban Planning* 59(1): 13–28
- Kelly, G.A. 1955, *The Psychology of Personal Constructs*. New York: W.W. Norton & Co.
- Kohsaka, R. and Flitner, M. (2004) 'Exploring forest aesthetics using forestry photo contests: case studies examining Japanese and German public preferences'. *Forest Policy and Economics* 6(3–4): 289–99
- Krenichyn, K. (2006) "The only place to go and be in the city": women talk about exercise, being outdoors and the meanings of a large urban park'. *Health and Place* 12: 631–43
- Kweon, B.C, Sullivan W.C. and Wiley, A.R. (1998) 'Green common spaces and the social integration of inner city older adults'. *Environment and Behavior* 30: 832–58
- Kyttä, M. (2002) 'Affordances of children's environments in the context of cities, small towns, suburbs and rural villages in Finland and Belarus'. *Journal of Environmental Psychology* 22: 109–23
- , Kaaja, M. and Horelli, L. (2004) 'An internet-based design game as a mediator of children's environmental visions'. *Environment and Behavior* 36, 127–51
- , Kahila, M. and Broberg, A. (2011) 'Urban infill policy and the perceived quality of the environment'. Special Issue 'GIS Technologies and Applications in Urban Design and Planning' of *Urban Design International* 16(1), 19–35
- Little, B.R. (1983) 'Personal projects: a rationale and method for investigation'. *Environment and Behavior*, 15(3), 273–309

- (2010) 'Opening space for project pursuit: affordance, restoration and chills'. In Ward Thompson, C., Aspinall, P. and Bell, S. (eds) *Open Space: People Space 2: Innovative Approaches to Researching Landscape and Health*, London: Routledge, pp. 163–78
- Lynch, K. (1960) *The Image of the City*. Cambridge, MA: MIT Press
- Merleau-Ponty, M. (1962) *Phenomenology of Perception*, Colin Smith (trans.). London: Routledge & Kegan Paul
- Moore, R. and Cosco, N. (2007) 'What makes a park inclusive and universally designed? A multi-method approach'. In Ward Thompson, C. and Travlou, P. (eds), *Open Space: People Space*. London: Taylor & Francis, pp. 85–110
- and Cosco, N. (2010) 'Using behaviour mapping to investigate healthy outdoor environments for children and families: conceptual framework, procedures and applications'. In Ward Thompson, C., Aspinall, P. and Bell, S. (eds) *Open Space: People Space 2: Innovative Approaches to Researching Landscape and Health*. London: Routledge, pp. 33–73
- Myers, M.S. and Ward Thompson, C. (2003) 'Interviews and questionnaires'. In Bell, S. (ed.) *Crossplan: Integrated, Participatory Landscape Planning as a Tool for Rural Development*. Edinburgh: Forestry Commission pp. 17–29
- Naess, A. (1973) 'The shallow and the deep, long-range ecology movement: a summary'. *Inquiry* 16: 95–100
- Norberg-Schultz, C. (1980) *Genius Loci: Towards a Phenomenology of Architecture*. New York: Rizzoli
- Ode, A., Tveit, M.S., Fry, G. (2008) 'Capturing landscape visual character using indicators: touching base with landscape aesthetic theory'. *Landscape Research* 33(1): 89–117
- Fry, G., Tveit, M., Messenger, P. and Miller, D. (2009) 'Indicators of perceived naturalness as drivers of landscape preference'. *Journal of Environmental Management* 90(1): 375–83
- Orians, G.H. and Heerwagen, J.H. (1992) 'Evolved responses to landscapes'. In J.H. Barkow, L. Cosmides, and J. Tooby (eds) *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. New York: Oxford University Press pp. 555–79
- Parsons, R. (1991) 'The potential influences of environmental perception on human health'. *Journal of Environmental Psychology* 11(1) 1–23
- and Daniel, T.C. (2002) 'Good looking: in defence of scenic landscape aesthetics'. *Landscape and Urban Planning* 60(1): 43–56
- Passini, R. (1996) 'Wayfinding design: logic, application and some thoughts on universality'. *Design Studies* 17, 319–31
- Porteous, J.D. (1985) 'Smellscape'. *Progress in Human Geography* 9(3): 356–78
- and Mastin, J.F. (1985) 'Soundscape'. *Journal of Architectural and Planning Research* 2(3) 169–78
- Powell, M. and Rishbeth, C. (2011), 'Flexibility in place and meanings of place among first generation migrants'. *Tijdschrift voor Economische en Sociale Geografie*, DOI: 10.1111/j.1467-9663.2011.00675.x
- Prestopnik, J.L. and Roskos-Ewoldsen, B. (2000) 'The relations among wayfinding strategy use, sense of direction, sex, familiarity and wayfinding ability'. *Journal of Environmental Psychology* 20(2), 177–91
- Purcell, A.T. (1987) 'Landscape perception, preference and schema discrepancy'. *Environment and Planning B, Planning and Design* 14, 67–92
- , Lamb, R.J., Peron, E.M., Falchero, S. (1994) 'Preference or preferences for landscape'. *Journal of Environmental Psychology* 14, 195–209
- , Peron, E.M. and Berto, R. (2001) 'Why do preferences differ between scene types'. *Environment and Behavior* 33 (1), 93–106
- Rishbeth, C. (2001) 'Ethnic minority groups and the design of public open space: an inclusive landscape?'. *Landscape Research* 26: 351–66
- (2004) 'Ethno-cultural representation in the urban landscape'. *Journal of Urban Design* 9(3): 311–33.
- Roe, J. (2009) 'The Restorative Power of Built and Natural Environments'. PhD thesis, Edinburgh: Heriot-Watt University
- Rosch, E.H., Mervis, C.B., Gray, W.D., Johnson, D.M., Boyes-Braem, P. (1976) 'Basic objects in natural categories'. *Cognitive Psychology* 8382–439
- Said, I. and Abu Bakar, M.S. (2005) 'Landscape for children to play and learn: a conceptual comparison between natural stream and playground'. *Jurnal Teknologi B*, 42 (B): 1–10
- Saito, Y. (1998) 'The aesthetics of unscenic nature'. *Journal of Aesthetics and Art Criticism* 56(2): 101–11
- Sanesi, G., et al. (2006) 'Comparison of two different approaches for assessing the psychological and social dimensions of green spaces'. *Urban Forestry and Urban Greening* 5(3): 121–29
- Scott, A., Carter, C., Brown, K. and White, V. (2009) 'Seeing is not everything': exploring the landscape experiences of different publics'. *Landscape Research* 34(4): 397–424

- Stamps, A.E. (1990) 'Use of photographs to simulate environment: a meta-analysis'. *Perceptual and Motor Skills* 71: 907–13
- 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*. London: Taylor & Francis pp. 153–62
- and Ward Thompson (2007b) 'Outdoor environments, activity and the well-being of older people: conceptualising environmental support'. *Environment and Planning A*, 39: 1943–60
- Thwaites, K. and Simkins, I. (2007) *Experiential Landscape: An Approach to People, Place and Space*. London and New York: Routledge
- Tolia-Kelly, D.P. (2004) 'Landscape, race and memory: biographical mapping of the routes of British Asian landscape values'. *Landscape Research* 29(3): 277–92
- Tuan, Y.-F. (1974) *Tophophilia: A Study of Environmental Perception, Attitudes and Values*, Englewood Cliffs, NJ: Prentice-Hall
- von Uexküll, J. (1992 [1934]) 'A stroll through the worlds of animals and men: a picture book of invisible worlds'. *Semiotics* 89: 319–91
- Ulrich, R.S. (1983) 'Aesthetic and affective responses to natural environment'. In Altman, I. and Wohlwill, J.F. (eds), *Behavior and the Natural Environment, Human Behavior and Environment: Advances in Theory and Research*, Vol. 6, New York: Plenum, pp. 85–125
- , Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A. and Zelson, M. (1991) 'Stress recovery during exposure to natural and urban environments'. *Journal of Environmental Psychology*, 11: 201–30
- Uzzell, D., Gatersleben, B. and White, E. (2010) 'Using the Life Histories Approach to understand the development of outdoor preferences and practices'. Report for the Outdoors and Health Network, ESRC grant no. RES-355-25-0040, available at <http://www.outdoorshealthnetwork.co.uk/project-outputs>, (accessed 11 September 2012)
- Ward Thompson, C., and Boyd, F. (1998) 'Review of Research in Landscape and Woodland Perceptions, Aesthetics and Experience'. Literature review and report for Forestry Commission, May 1998, available at <http://www.forestresearch.gov.uk/forestry/HCOU-4U4JMQ> (accessed 11 September 2012)
- Ward Thompson, C. and Travlou, P. (2009) *A Critical Review of Research in Landscape and Woodland Perceptions, Aesthetics, Affordances and Experience*. Report for Forestry Commission, Edinburgh: OPEN-space research centre
- , Aspinall, P., Bell, S., Findlay, C., Wherrett, J. and Travlou, P. (2004) *Open Space and Social Inclusion: Local Woodland Use in Central Scotland*, Edinburgh: Forestry Commission
- , Findlay, C. and Southwell, K. (2005) 'Lost in the countryside: developing a toolkit to address wayfinding problems'. In Martens, B., and Keul Alexander, G. (eds) *Designing Social Innovation: Planning, Building, Evaluating*, Göttingen: Hogrefe and Huber Publishers, pp. 38–45
- , Aspinall, P. and Montarzino, A. et al. (2008) 'The childhood factor – adult visits to green places and the significance of childhood experience'. *Environment and Behavior* 40(1): 111–43
- Wells, N.M. and Evans, G. (2003) 'Nearby nature: a buffer of life stress among rural children'. *Environment and Behavior* 35(3): 311–30
- Woolley, H., and Amin, N. (1999) 'Pakistani teenagers' use of public open space in Sheffield'. *Managing Leisure* 4: 156–67