Review

Activity, exercise and the planning and design of outdoor spaces

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ABSTRACT

This paper reviews research into the relationships between attributes of outdoor environments and levels of activity and exercise in populations using those environments. It takes an environmental designer's view of relevant and effective research and research approaches that can provide evidence for policy and practice. The paper has a tripartite structure, examining theories, research methods, and findings that contribute to understanding links between physical activity and the planning and design of outdoor spaces. It considers concepts, methods and evidence relevant to adults', older adults' and children's activities and identifies those that appear to offer greatest potential for future research. It also identifies gaps in our understanding, the need for well-conceptualized models of environment–behaviour interactions to elucidate these, and the importance of collecting and presenting evidence in ways that are sympathetic to design practice. If evidence is to lead to effective and salutogenic changes in our physical environment, then findings that translate readily into a design framework will be most beneficial.

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1. Introduction

This paper is aimed at those with an interest both in the design of physical environments that might encourage less sedentary and more active lifestyles, and in the research needed to provide supporting evidence. It does not attempt to replicate the growing number of systematic reviews and other broad overviews of evidence on the relationships between physical environment and health (e.g., Frank, Engelke, & Schmid, 2003; Humpel, Owen, & Leslie, 2002; Kaczynski & Henderson, 2007; New York City, 2010; Owen, Humpel, Leslie, Bauman, & Sallis, 2004; Sallis, 2009; Transportation Research Board, 2005). Rather, it arises from a landscape architect's perspective on what kinds of research might be useful for designers and the opportunities and challenges inherent in undertaking such work. For those unfamiliar with this domain, it provides an introduction to relevant theories and methods used in researching links between physical activity and the planning and design of outdoor spaces. It then considers findings that draw on these methods, and the gaps in our knowledge, in the hope of encouraging further research to improve our understanding of what designs work best in promoting and enhancing healthy activity in people's daily lives.

2. Background

The recently reawakened policy interest in environmental design and its potential contribution to health arises partly from the current health crises in the western world – rising levels of obesity, Type 2 diabetes, cardio-vascular disease, cancer, and mental illness – and their consequences for the cost of health-care. Many such illnesses are not the result of exposure to pollutants or organic disease vectors but are in part the consequence of availability and choice in what food people eat, or how and where they spend their leisure time, in addition to the increasingly sedentary nature of most jobs and work contexts in the developed world. Recent research suggests that sedentary behaviour is an independent risk factor for health, above and beyond the effect of low levels of physical activity (Sugiyama, Healy, Dunstan, Salmon, & Owen, 2008). All of this indicates that individual preference and decision-making, as well as the nature of the socio-ecological context in which they occur (Evans & Stoddart, 1990; Sallis & Owen, 2002), have a large part to play in improving public health.

In a study on how to enhance population-level health in England, Wanless (2004) modelled three scenarios based on the extent to which people successfully engaged in protecting and promoting their own health and become more engaged in managing their own care. The gap between the best and worst scenarios was around £30 billion by 2022/23, or half of National Health Service (NHS) expenditure at the time. Hence, on economic grounds

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alone, public policy should be increasingly focused on what interventions might enhance such public engagement in health.

In this context, there has been a renewed interest in the role of the physical environment and the particulars of place in public health (Cummins, Curtis, Diez-Roux, & Macintyre, 2007; Macintyre, Macdonald, & Ellaway, 2008; Ward Thompson, 2010b). Environmental interventions to enhance public health, so central to early health improvements in urban areas from the nineteenth century onwards, had become marginalized in the pharmaceutically focused and high-technology world of post-war 20th century medicine (Morris & Robertson, 2003). The renewed interest in physical environment is now focused on identifying and understanding *salutogenic environments*, that is, environments that support healthy behaviours and responses, recognising that such environments may have more permanent and population-wide effects than other forms of public health interventions targeted at individuals (Owen et al., 2004; Saelens, Sallis, Black, & Chen, 2003).

In Scotland, the 'Good Places, Better Health' public health initiative (Scottish Government, 2008) has involved the development of a model for environment and health (Morris, Beck, Hanlon, & Robertson, 2006) that attempts to identify what kinds of environmental intervention are possible and desirable, and where the most effective point of intervention might be. While changes in the design and management of work, education, leisure and home-based environments, which is where people spend most of their time, may offer opportunities to reduce sedentary behaviour, there is also considerable interest in ways that the outdoor environment, particularly the public realm, may be designed to offer opportunities for physical activity and encourage more active lifestyles.

The health value of physical exercise has long been recognized and more recently reinforced through recommended minimum levels of healthy activity in many countries (e.g., Department of Health, 2004, 2011; Pate et al., 1995; U.S. Department of Health and Human Services, 2008). Such steps are set against well-documented evidence that populations in many countries are increasingly *in*active. Self-reported activity levels in the US, the UK and Australia for 2007–2008 show that less than half the population, and in many cases less than 30%, are achieving recommended levels of activity (Australian Government Department of Health & Ageing, 2010; CDC, 2010; NHS, 2010). A considerably more alarming picture is painted by objective measures from accelerometry: data on English adults in 2008 showed that only 6% of men and 4% of women achieved the recommended physical activity level (NHS, 2010).

There is evidence that interventions to increase moderate level physical activity by promoting activities such as walking, which require no specialist facilities, are associated with longer-term changes in behaviour than those which require specialist facilities, such as sports pitches or gyms (Department of Health, 2004). There is further interest in walking since it is available to young and old, rich and poor, and requires no skills or training. If it is possible to create attractive streets, parks and other outdoor spaces that encourage and facilitate physically active behaviours such as walking, such interventions have attraction as 'upstream' interventions likely to benefit health at a population level (McIntyre, 2008). For this reason, there is particular interest in how the design and management of everyday environments might support and encourage physical activity.

Alongside this interest in links between design of the environment and healthy activity levels, there has been a growing emphasis on the need to address health inequalities within and between communities as a core requirement for achieving sustainability (Marmot, 2010). Marmot's study recognized that the UK, alongside many other developed countries, still suffers from huge health inequalities that are in turn the result of other forms of inequity within society. The most notable of these is inequity in socio-economic status, and poorer communities often suffer as well from poorer quality physical environments and other forms of deprivation. If the environment has an influence on people's health, and if we can identify the key features of the environment that make a significant difference, then it is necessary to consider equity of access to health-supportive environments in order to address health inequalities. This realisation ties in to the broader concept of environmental justice (Pearce, Richardson, Mitchell, & Shortt, 2010), and the implication is that those who do not have access to salutogenic environments are likely to suffer from a comparative lack of opportunity to lead healthy lifestyles, in turn contributing to poorer health. Thus, equity of access to environments that engender good health is a key element of sustainability, and understanding what elements of the environment are significant in contributing to health is of key importance in this regard.

In order to address such issues, this paper concentrates on the public, outdoor realm, by which I mean places that are freely available (at least in theory) to be accessed by anyone, regardless of who owns or manages the environment. It starts off by considering relevant theories and, secondly, appropriate research methods that have drawn on these theories. It then presents findings that relate to different scales and elements of the outdoor environment: the neighbourhood scale of open space (networks of streets, parks, etc., relevant to the 'walkable' urban environment), followed, at a more detailed level, by parks and natural open space, streets and squares, and children's playgrounds. These foci emerge from my interest as a landscape architect, and therefore are biased towards parks and green or natural open space but also relate to important themes within the activity and health literature. Finally, there is a discussion of gaps, challenges and opportunities for further, robust and appropriately targeted research to inform design practice.

3. The theoretical context

3.1. Ecological approaches to environment and health

Public health policy has generally adopted a model of the relationship between environment and health that reflects, *inter-alia*, Bronfenbrenner's human ecology theory, (Bronfenbrenner, 1979, 2005), where the individual is located within nested ecological systems (Dahlgren & Whitehead, 1991; Scottish Government, 2008). Bronfenbrenner pioneered childhood studies that examined the role of multiple levels of the environment on human behaviour and development, from the intimate home and family-related micro-system, through the meso-system of the immediate physical, and socio-cultural context to the macro-system of broader environment, culture, society, politics, and so on (Bronfenbrenner, 1979, 2005). Following the early 20th century ideas of Vygotsky on childhood cognitive development, Bronfenbrenner's work underlined how the individual can exert an influence over his or her environment and, at the same time, how the environment exerts an influence on the individual.

A number of approaches to environment–behaviour research have developed versions of this ecological model, reflecting similar understandings of the transactional nature of the relationship between person and place (Ittelson, 1973; Myers & Ward Thompson, 2003). A central idea here is that people's stage and role in life, their goals and objectives, will influence their assessment of a place and how well it supports or frustrates these goals; and in turn, the environment influences what goals and objectives seem possible or attractive. Bandura's (1989) social cognitive theory took this view further, to emphasise the way that people's behaviour is a response to what they learn from watching what others do in the context of particular physical and social environments. Such concepts have an