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Perspective Essay

Enriching green exercise research

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ABSTRACT

There is a growing body of research that, under the banner of 'green exercise', considers the additional physical and psychological benefits that may be accrued by those who exercise in 'natural' environments. This essay considers the implications of how this research has been conducted to date and argues that it may be usefully enriched by a fuller examination of how exercise and environment come together in less controlled conditions. After outlining some ideas and approaches commonly found in this field, we contend that there are two problems here: firstly, the focus on 'green' – in so far as this defines the experience in certain visual terms – and, secondly, the focus on 'exercise' – in so far as this downplays diversity in physical experiences. In response, we argue that studies centred on how various environments are inhabited by various groups of exerciser could provide fresh ideas about how best to promote the benefits of green exercise. We make this argument because the implied vision of positive landscape design currently associated with this field is typified by flat surfaces that allow exercisers to visually consume vegetation without other stimulation. With reference to qualitative work on recreational running, we contend that this is not always the way to go.

1. A growing body of work

We know that regular exercise is good for people and we know that being near greenery can often bring them benefits. So should we combine the two? This is the core proposition explored by research on what has been dubbed 'green exercise', the aim of which has generally been to enumerate the effects of this activity and to use the results to advocate for its encouragement. This body of work has been growing. We already have been provided with a number of overviews (Bowler, Buyung-Ali, Knight, & Pullin, 2010; Gladwell, Brown, Wood, Sandercock, & Barton, 2013; Thompson Coon et al., 2011) and the evidence base supporting the argument for green exercise, when taken as a whole, seems increasingly robust.

These studies have identified various benefits. Green exercise has been shown to lower blood pressure (Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010; Pretty, Peacock, Sellens, & Griffin, 2005), to improve mood and self-esteem, and to help restore attention (Akers et al., 2012; Pretty et al., 2007; Rogerson & Barton, 2015). Greener environments have also been suggested to encourage greater levels of participation by overcoming issues of both boredom and perceived effort since the meditative effect of being in green environments serves to distract the exerciser from the apparent monotony and the awareness of physiological discomforts (Gladwell et al., 2013). Either way, the result would seem to be even greater benefit, if people find themselves exercising for longer in green environments.

The implications of this research for planners and landscape designers initially seem obvious. They should either safeguard the green environments in which exercisers are already found or put more people in a position to avail themselves of these benefits by providing more green places for exercise. In this essay, we contend that there is more to it than that. We argue that getting to grips with how to act on the findings provided by this valuable work requires turning to research approaches that have hitherto been uncommon in this field. More specifically, we argue that studies focused on the real world experience could provide valuable ideas about how green exercise is most effectively encouraged. We begin by taking stock of existing green exercise research to draw out the implications of how it has most commonly been conducted to date. As a provocation for further debate and a way of developing our position, it is contended that there are two problems here: firstly, the focus on 'green' and, secondly, the idea of studying 'exercise'. Then we turn to some alternative ways of tackling the topic.

2. Underpinning theory and predominant approaches

The anxiety motivating much green exercise research is that changing urban lifestyles are leading to reduced contact with 'nature' in ways that are making people less physically active and more mentally stressed. Psycho-evolutionary' theories of stress reduction (e.g. Ulrich,

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1983, 1986) particularly work with the idea of a growing mismatch between living conditions and the environments to which humans are physically and psychologically suited (Grinde & Patil, 2009). In a parallel argument, 'attention restoration theory', also suggests the experience of natural environments promotes mental recuperation (Kaplan, 1995; Kaplan & Kaplan, 1989). This is, in part, because looking at vegetation takes us away from our immediate concerns, but also because natural objects such as trees, leaves and vegetation have a unique capacity for mental refreshment. A more recent addition to the suite of theories attempting to define this process is the ecological dynamics approach, which – developing Gibson's (1979) analysis of visual perception – suggests that green environments provide particularly complex, challenging and intense 'affordances', which together prompt a set of beneficial emotions and feelings (Brymer & Davids, 2013; Brymer, Lecturer, Sharma-brymer, & Davids, 2015).

In view of the central focus on mental processes, it is unsurprising that green exercise researchers have often been drawn to psychological research protocols. Within this, for Barton, Wood, Pretty, and Rogerson (2016), most studies adopt one of three strategies: (i) comparing the outcomes of outdoor exercise in built environments and more 'natural' settings; (ii) comparing the outcomes of indoor and outdoor exercise; and (iii) using laboratory settings to examine the effects of changes to the visual environment (Barton, Wood, Pretty & Rogerson, 2016, p. 27–28). As an example of the first approach, Berman, Jonides, and Kaplan (2008) asked participants to walk in either an area of secluded parkland or on a busy road lined with offices before conducting tests "to explore how interactions with nature and urban areas would affect cognitive performance" (p.1208). Similarly, Brown, Barton, Pretty, and Gladwell (2014) asked office workers to walk a particular route during their lunch breaks twice per week. This was either in an urban setting, which "consisted of pavement routes through housing estates and industrial areas", or in an area "centered around trees, maintained grass, and public footpaths" (p.391). There is also work on the Japanese idea of 'forest bathing' that compares viewing a forest (or the experience of walking in one) with viewing or walking in an urban area (see Lee et al., 2011; Park et al., 2010).

The second approach compares indoor and outdoor exercise. Focht (2009), for example, studied the effect of brief walks on affective responses, enjoyment and adherence to exercise. He asked participants to walk for 10 min on a laboratory treadmill and 10 min in an outdoor setting at a self-selected intensity. He found that the outdoor experience led to improvements in the affective responses and enjoyment of his participants. Ryan et al. (2010) similarly compared the 'vitalizing effects' of walking in an outdoor environment instead of indoors. In their study, an experimenter silently guided participants on a short 15-min walk – either indoors or outdoors. The indoor walkers "were led through a series of underground hallways and tunnels that were devoid of living things, although there were various objects, posters, and changing colors" (p.162). Meanwhile, their outdoor counterparts "walked on a largely tree-lined footpath along a river" (p.162). Their results suggested that walking outdoors results in greater 'vitality' than walking indoors. Another example is the study by Kerr et al. (2006) comparing the emotional effects of running in laboratory and 'natural' environments. They had two groups of runners, competitive and recreational, run 5 km on a laboratory treadmill and on a tree-lined footpath alongside roads. The outdoor path ran alongside lakes, through woods and playing fields, and there was only light traffic on the roads (p. 349).

The third approach is particularly focused on what participants see. In one of the first studies of green exercise, participants jogged on a treadmill for 20 min facing projections of a range of outdoor scenes (Pretty et al., 2005). To examine physiological effects, the heart rate of participants was monitored continuously and their blood pressure was measured pre- and post-exercise. Psychological effects were measured by filling out questionnaires on mood and self-esteem before and after the exercise event. Another study examined "the extent to which color, as a primitive visual feature, contributes to the green exercise effect" (Akers et al., 2012, p. 8661). Here it was hypothesized that seeing a vegetated environment would result in a positive mood and reduced perceived effort. To test this out, participants cycled on exercise bikes while facing "video footage of a rural cycling course" that was selected for "the high percentage of green foliage in the screen" (Akers et al., 2012, p.8662). The participants watched the video three times: in an unedited mode, with a red filter applied, and with an achromatic filter. The aim was to evaluate the potential effect of the 'green' colour of vegetation.

Common to all three approaches, and consistent with the positivistic ambitions of this broader research style, is the deliberate manipulation of predefined features of the experience whilst others are held constant or 'controlled'. This is a widespread approach. But the idea that can flow from this strategy in terms of the specific interests of this journal is that planners should probably aim to reproduce conditions that were originally only part of an attempt to implement an appropriately 'scientific' test. In other words, the vision of positive design that these studies are most commonly drawn to is one in which a series of well-maintained flat or undulating pathways take runners and walkers past attractive, and seemingly unchanging, vistas of trees, plants and grassland. We argue that, whilst this may sometimes be the right objective, other ways of studying exercise in natural environments could lead to some different ideas.

3. The trouble with 'green'

In their reviews of green exercise research, both Bowler et al. (2010) and Thompson Coon et al. (2011) discuss how what is considered a 'natural' environment differs from study to study. They also highlight how the characteristics of chosen environments are not often described in great detail. In some studies, for example, the 'natural' environment is simply described as an outdoor 'green' environment (Bowler et al., 2010). Notwithstanding this lack of detail, what is evident in this body of research is how 'nature' generally features as a set of environmental features that are there to be looked at. Furthermore, 'green spaces' are also largely investigated as a relatively unchanging and unvaried backdrop for potential exercise. In some studies, the natural environment is quite literally a picture (e.g. Akers et al., 2012; Pretty et al., 2005). In the 'forest bathing' studies mentioned above, participants are mostly asked to view the trees of the forest or to look at 'nature' whilst they are walking. Sight dominates the discussion. Other senses are mentioned in passing or ignored. In this way, 'nature' experience becomes a visual encounter with 'green'. Some strategy was, of course, necessary to transform 'nature', famously dubbed one of the most complicated words in the English language (Williams, 1973), into a manageable research object. But this strategy can also lead to a particular vision of the most desirable environments for green exercise.

In an extreme example of this, exercising research subjects looking at the color green (rather than living vegetation) is taken as a proxy for testing out the effects of exercise in nature (Akers et al., 2012). Though this is a practical strategy, the implication is that public health promoters might want to encourage exercise in rooms or places painted green if that is all that is required to deliver the benefits that these studies reveal. Similarly, other studies of the response to vegetated scenes can, for example, support an argument for virtual environments that immerse people in seemingly vegetated spaces (Depledge, Stone, & Bird, 2011). If, for example, ageing societies find actual green environments difficult to negotiate physically, putting people on treadmills facing videos of landscapes could be seen as entirely sensible. Either way, such scenarios point to the potential irony of how studies that were originally designed with a view to encouraging outdoor activity could feasibly have the opposite effect if used to justify the replication of indoor experiences that were originally merely part of a strategy for finding a suitably 'scientific' means of testing the effects of exposure. For now though, and pulling back from such visions of where