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Feelings of restoration from recent nature visits

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ABSTRACT

Exposure to natural environments can help restore depleted emotional and cognitive resources. However, investigation of the relative impacts of different natural environments among large samples is limited. Using data from 4255 respondents drawn from Natural England's *Monitoring Engagement with the Natural Environment* survey (2009–2011), we investigated feelings of restoration (calm, relaxed, revitalized and refreshed) recalled by individuals after visits to different natural environments within the last week. Controlling for demographic and visit characteristics we found that of the broad environmental categories, coastal visits were associated with the most restoration and town and urban parks with the least. In terms of specific environmental types two "green space" locations (woodlands/forests and hills/moorland/mountains) were associated with levels of restoration comparable to coastal locations. Urban playing fields were associated with the least restoration. Restoration was positively associated with visit duration (a potential dose–response effect), and visits with children were associated with less restoration than visits alone. There was little evidence that different activities (e.g. walking, exercising) were associated with differences in restoration. The data may improve our understanding of the "cultural eco-system services" provided by different natural environments and help decision makers keen to invest scare resources in those environments most associated with psychological benefits.

1. Introduction

1.1. Overview

Natural environments can help restore depleted emotional and cognitive resources (Kaplan & Berman, 2010; Ulrich, 1983). Compared to urban scenes, sounds and experiences, green spaces such as parks and woodlands, and blue spaces such as rivers and the coast, can help "re-charge" people's attentional capacities (e.g. after studying: Felston, 2009; Hartig & Staats, 2006), reduce psycho-physiological stress (Ulrich et al., 1991) and enhance mood and positive affect (Bowler, Buyung-Ali, Knight, & Pullin, 2010). Moreover, natural places such as woods, hills, lakes and the sea are more likely to feature among lists of people's favourite places than urban streets or shopping malls (Korpela & Hartig, 1996; Korpela, Ylen, Tyrvainen & Silvennoinen, 2010; Regan & Horn, 2005) and receive more positive ratings in experimental studies looking at preferences for and perceived restorativeness of images of different environment types (e.g. Han, 2007; Shafer & Brush, 1977; White et al., 2010).

The current paper aims to complement this work by using a large dataset of recent visits to natural environments to address two key questions. First, are visits to different types of "natural" setting (e.g. urban parks, playing fields, farmland, woodlands, beaches, rivers, etc.) associated with different emotional responses, in particular feelings of restoration such as calmness, relaxation, refreshment and revitalization? Due to the difficulty in collecting large amounts of data on specific visits to specific places, previous work has tended to focus on either comparing reactions to a range of different settings using photographic images in the lab (Han, 2007; Shafer & Brush, 1977; Ulrich, 1981) or reactions to two broad categories of environment (i.e. "urban" vs. "rural") when conducting field experiments (e.g. Berman, Kaplan & Jonides, 2008; Hartig, Evans, Jamner, Davis & Gärling, 2003). By using a large dataset of actual visit experiences over a three year period, we were able to bring these two approaches together and thus incorporate the ecological validity of field studies with the ability to compare a

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large range of environment types usually only possible in lab settings.

The need for this kind of work is well articulated by Velarde, Fry and Tveit (2007) in their extensive review of 31 papers looking at the health and well-being effects of different landscape types. Specifically, they concluded that "the review has revealed that in studies comparing the health outcomes of visual exposure to different categories of landscapes, the categories compared were generally very coarse (p.208) … Little, if any, research has been carried out at a scale fine enough to assess which components or characteristics of specific landscapes constitute the most important drivers of human health benefits. Further research is needed to identify these key elements of healthy landscapes" (p.210).

Our second question concerned the possibility that any differences we may see across different types of natural environment may be due to sociodemographic differences in visitors, visit characteristics such as group composition, distance travelled, or the types of activity people engage in. Previous research, for instance, suggests that aquatic environments may be associated with particularly high levels of emotional restoration (Barton & Pretty, 2010; Ulrich, 1981; Velarde et al., 2007; White et al., 2010). However, it may be that it is the activities aquatic environments afford (e.g. swimming or playing in the sand), or the type of individuals and groups they encourage (e.g. families, older adults) that explain greater levels of restoration rather than any particular properties of the environment *per se*. This could also be relevant for the results of lab-based studies if photos arouse memories or expectations of activities in certain environments.

Crucially many researchers have suggested that the value of natural environments as a health resource may, at least in part, be due to their ability to encourage physical activity (Bauman, Smith, Stoker, Bellew & Booth, 1999; Coombes, Jones & Hillsdon, 2010; Giles-Corti & Donovan, 2002; Humpel, Iverson, Owen, Leslie & Bauman, 2004) and promote positive social interactions (Kuo, Sullivan, Coley & Brunson, 1998; Maas, van Dillen, Verheij, & Groenewegen, 2009). Though evidence in support of these associations remains mixed (e.g. Mytton, Townsend, Rutter & Foster, 2012), evidence in support of positive associations between emotional well-being and both exercise (Biddel & Mutrie, 2008) and positive social relationships (Dolan, Peasgood & White, 2008) is extensive. Consequently, by also including sociodemographic visitor characteristics (e.g. age, gender, socio-economic status) and visit characteristics (e.g. activities engaged in, presence of others) in our analyses we were able to investigate whether any differences in feelings of restoration across different natural environments remained when these factors were taken into account.

Our analysis was based on data collected as part of a national survey of the English adult population conducted between 2009 and 2011 by Natural England called the *Monitoring Engagement with the Natural Environment* (MENE) survey. The survey focused exclusively on visits to open, natural spaces rather than urban built up environments (e.g. shopping districts), but did include open spaces such as parks in towns and cities. We recognize that the term "natural" is relative in a country like England where there are few, if any, areas undeveloped by people, and thus the focus is on environments dominated by natural elements such as trees, grass, rivers, and so forth. In particular, we focused on a sub-set of the data where individuals were asked to describe their feelings of restoration associated with one particular visit to a natural environment in the last week. Next we briefly review some of the relevant literature in terms of emotional restoration across different natural environments, the effect of sociodemographic variables and activities in natural spaces and the role of proximity to green space.

1.2. Emotional restoration from different natural environments

Of the two most prominent theories of restoration from nature in the literature, attention restoration theory (ART, Kaplan & Kaplan, 1989) and psychophysiological stress recovery theory (PSRT, Ulrich et al., 1991), emotional restoration is perhaps more usually associated with the latter. Although both theories share common features, research using the ART framework is more often associated with how natural environments can restore depleted cognitive resources, while research using the PSRT framework is more concerned with how natural environments might help people recover emotionally and physiologically from the stresses and strains of everyday, especially urban, living. Clearly, cognition and emotion with respect to reactions to natural environments are inter-related (Ulrich, 1983), but for present purposes our approach focuses on how people feel after visits to different natural environments rather than the restorative effects it may have on their cognitive capacities.

A range of previous research has explored emotional restoration across different environments in both laboratory and field settings (Bowler et al., 2010; for an early review see Ulrich, 1983). Rather than attempt to review this literature here we instead discuss a number of key studies that appear directly relevant to the current research. For instance, using a lab based paradigm, Ulrich (1981) presented students with 180 photographic images that were grouped into three broad categories: Urban (without vegetation or water), nature dominated by vegetation, and nature including water. Using the ZIPERS (Zuckerman, 1977) for measuring affective states before and after viewing the images, Ulrich found that sadness was significantly higher following exposure to urban than nature/water scenes and marginally higher than exposure to nature/vegetation scenes. A similar pattern emerged for feelings of 'fear-arousal' suggesting that natural environments, especially those with water, were better at reducing the kind of negative emotional states associated with urban environments.

A very different approach to comparing the restorativeness associated with different environments was adopted by Korpela et al. (2010; see also Korpela, Ylen, Tyrvainen and Silvennoinen, 2008). These authors used a postal survey with 1089 Finns to examine the self-reported restoration associated with "favorite" places including indoor/outdoor urban areas, built green spaces, waterside environments (beaches and harbours); extensively managed natural areas (forests, river valleys, wetlands); and exercise and activity hobby areas (e.g. allotments, playgrounds and running trails). Restoration was measured by the level of agreement with emotion related items such as "I feel calmer after being here", as well as more cognitive items such as "my concentration and alertness clearly increase here". The top three self-rated restorative environments were exercise areas, waterside environments, and managed natural areas. Although there was no significant difference between self-reported restorativeness for these three environments, all were significantly more restorative than indoor/outdoor urban areas and green spaces in built environments. It should also be noted that even though urban green spaces were rated less restorative than the top three environments they were still rated positively in absolute terms, as we might expect from research on stress reduction in relation to urban green space (e.g. Grahn & Stigsdotter, 2003).

A third approach was adopted by Barton and Pretty (2010) who collected data on individuals' emotional states (using the Profile of Mood States) before and after specific visits to natural settings including 'urban green spaces', 'countryside/farmland', 'forests and woodlands', 'waterside' environments and 'wild habitats'. Meta-analysis of ten studies using this approach found a highly significant improvement in positive affect following the visits (effect size,