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Marine wildlife as an important component of coastal visits: The role of perceived biodiversity and species behaviour

Mathew P. White[a,*], Abigail Weeks[a], Tom Hooper[b], Luke Bleakley[c], Deborah Cracknell[d], Rebecca Lovell[a], Rebecca L. Jefferson[b]

[a] European Centre for Environment & Human Health, University of Exeter Medical School, UK
[b] Centre for Conservation Science, Royal Society for the Protection of Birds (RSPB), The Lodge, Sandy, Bedfordshire SG19 2DL, UK
[c] Department of Psychology, University of Plymouth, UK
[d] National Marine Aquariums Ltd, UK

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ABSTRACT

Although the (perceived) biodiversity of a natural environment can influence people's actual, or predicted, restorative experiences, little is known about the generality of these effects or the importance of other aspects such as wildlife behaviour. The current research used an experimental approach (with photographs and videos of coastal scenes) to investigate these issues among a large heterogeneous UK sample (n=1,478). On average, coastal settings with higher perceived biodiversity were rated as offering greater restorative potential and were associated with higher willingness-to-visit. Men, and people with lower overall ratings, tended to be more sensitive to biodiversity levels, and older respondents believed coastal settings in general offered more restorative potential. Locations where a species was exhibiting High vs. Low fascination behaviours (e.g. murmurating vs. sleeping) were also rated more positively, highlighting the importance of wildlife behaviour on psychological outcomes, in addition to biodiversity. Implications for conservation and communication are discussed.

1. Introduction

1.1. Overview

The majority of the world's population now live in urban areas, often quite detached from the kinds of 'natural' settings humans have evolved in both physically and culturally over millennia ([1]; [15,43,50,55]). Although there are many benefits to individuals and societies from urbanisation, there may also be costs. Theories such as Attention Restoration Theory (ART, [42]) and Psychophysiological Stress Recovery Theory (PSRT, [67]), argue that busy, modern urban environments may deplete attentional and emotional resources leading to mental fatigue and negative mood. One potential antidote, the theories claim, is to spend time in the kind of natural environments to which humans are arguably more adapted because these environments: a) Put fewer demands on our limited attentional processes, allowing these cognitive resources to be 'restored' [40,41]; and b) Arouse less psychophysiological stress responses, because the environmental demands are less likely to outweigh inherent coping resources [68]. According to ART, this is possible because many natural settings offer 'softly fascinating' stimuli, the kind which capture and maintain attention without conscious effort (e.g. watching waves on the shore), while many urban stimuli demand 'directed' attention where people are forced to focus on something not intrinsically fascinating in order to achieve other goals (e.g. waiting for a gap in the traffic in order to cross a busy road).

However, it is also recognised that there is a wide variety of natural, and urban, environments and that there is still much to learn about the importance of specific environmental contents which may aid (or hinder) restorative processes [63,7,70]. The current study focused on a characteristic of many natural settings that has received relatively little attention to date, namely the presence and behaviour of wildlife. Although research suggests that some biomes [32], landscapes (e.g. [27]), vegetation density patterns (e.g. [8]) and levels of plant species richness [12,61] tend to be perceived as more 'restorative' than others, far less is known about the potentially restorative effects of different sorts of wildlife and their behavioural repertoires or how these factors relate to marine/coastal (as opposed to inland) locations.

Wildlife watching is a popular activity, possibly reflecting an innate connection with other species [22,23,28,43]. In England, for instance,

* Correspondence to: European Centre for Environment and Human Health University of Exeter Medical School Knowledge Spa Royal Cornwall Hospital Truro, TR13HD, UK.
E-mail address: mathew.white@exeter.ac.uk (M.P. White).

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it is estimated that 13% of all visits to natural places are motivated by the desire to see wildlife, resulting in some 372 million visits a year [52] and people adapt routines, such as commuting routes, in order to increase the potential to experience wildlife [4]. As a country with relatively little terrestrial mega-fauna, wildlife watching in England often means bird watching, and research has shown that visitors to urban and peri-urban parks tend to believe that the cognitive and emotional restoration opportunities offered by these places is greater when there is greater diversity in bird species ([24,29]; see also [56] on the potential importance of bird song, and [18] on wellbeing and bird feeding in domestic gardens). Assuming that the birds found in English parks and gardens are 'softly fascinating', in that they capture and maintain attention without being threatening, then bird watching would be consistent with restoration possibilities as outlined by ART. Nevertheless, although the idea that people tend to feel better in natural settings high in biodiversity is intuitively appealing, the evidence is mixed and conclusions constrained by methodological and geographical limitations [30,45,59,74,57].

1.2. Psychological restoration at the coast

As far as we are aware, all research investigating the relationships between (perceived) biodiversity and psychological restoration to date has been conducted in urban parks (e.g. [12,24,29]). The current work extends this line of research to coastal settings. In England alone, some 8 million people live within 3 miles of the coast, and proximity is highly related to visit frequency [73]. Coastal sites are among the most stress-reducing of all natural environments [71] and 'wildlife watching' on coastal visits is consistently perceived to improve mood among both lay visitors and marine experts [75]. Further, in Australia, Maguire, Miller, Weston & Young [48] found that people considered the pristineness of the beach, including opportunities for watching wildlife, to be important when choosing a beach to visit. Combined, these findings suggest that many people do consider the opportunity to view wildlife when choosing a coastal setting to visit and that seeing nature in coastal settings is potentially important for restoration-related outcomes. With respect to the 'charismatic' properties of marine animals, Jefferson et al. [39] used an online survey with 1,047 participants, and found that participants showed more interest in 'charismatic' marine species such as seals, puffins and seahorses than other species such as oysters, kelp or anemones. Although, 'charismatic' was not clearly defined, the presence of seals suggests that behaviour may be key since they are not particularly aesthetic to look at when compared to the far more colourful puffins and seahorses.

1.3. Current research

In sum, the present study extends earlier work in four key ways. First, a large, demographically diverse sample of the English adult population was used to explore how natural settings with different levels of (perceived) biodiversity may be more or less restorative in terms of promoting positive emotions and helping restore one's depleted emotional resources. Previous work in this area has tended to explore how restorative visitors find the places they are in as a function of different levels of biodiversity (e.g. [12,24,29]). Although important, visitors to these places tend not to be representative of the population [2] and people in socio-economically deprived neighbourhoods are less likely to have access to biodiverse spaces [33], making generalising to the population problematic.

As it was not possible to expose a large heterogonous sample of individuals, including those with potentially little interest in the topic, to a range of real settings, following Jefferson et al. [39], the study used an online experimental protocol and asked people to imagine how they believe they would think and feel in a range of settings presented as photographs and short video clips. The study is thus concerned with *perceived restorative potential* rather than actual restoration of depleted cognitive/emotional resources. Although photos and videos are only proxies of real experiences, previous work into landscape preferences finds the two are highly correlated suggesting they are useful tools for research [64,65]. Moreover, wildlife documentaries may be the only time many people get to see some species, and thus videos of wildlife may be more reflective of many people's actual experiences of some species [51].

Further, our study did not attempt to assess the actual biodiversity of the scenes used (c.f. [24,29]). Although our scenes were carefully selected by two ecologists at the Royal Society for the Protection of Birds (RSPB) to represent a range of biodiverse settings, no claims are made about the relationship between actual biodiversity and perceived restorative potential. Rather our research speaks to people's perceptions of biodiversity, animal behaviour, and these psychological outcomes. Although a potential limitation, earlier work also found that perceived biodiversity may be a better predictor of psychological outcomes than actual biodiversity, reflecting the fact that many lay people will only be using heuristics to assess a location's biodiversity and that it is these perceptions which are likely to be the proximal factor influencing beliefs and experiences [24].

Our second contribution was to address the issue that it is hard to study the effect of wildlife behaviour on perceived restorative potential *in situ*. Animals do not perform on command, and the chances of a visitor witnessing a particularly 'fascinating' behaviour on any given visit may be slim. By contrast, our experimental approach enabled us to show all respondents the same behaviours that had been pre-tested as either high or low in intrinsic 'fascination'. We reasoned that no matter how much perceived biodiversity there was, if the species that were visible were not doing anything particularly 'fascinating' (e.g. sleeping), then these locations would be rated as less restorative than ones where the wildlife was performing behaviours that effortlessly capture and maintain attention (e.g. flocking/mumurating). This suggestion will come as no surprise to keepers of wildlife in captivity, who know about people's preference for feeding time at the zoo, or wildlife film makers who sift through hours of footage of a species in order to broadcast short segments of high fascination behaviours.

Third, our measures of perceived restorative potential focused on the more affective, rather than cognitive, aspects of restoration and were thus perhaps more linked to Ulrich's [67] PSRT than Kaplan & Kaplan's [42] ART. Specifically, our indices of perceived restorative potential were adapted from several previous photographic studies [19,27,6,72] and participants were asked to imagine themselves in each scene and rate how it might make them feel in terms of: a) 'Mood' (including both valence and arousal); and b) 'Recovery' as operationalised by helping them to feel refreshed/revitalised following a draining/tiring day. The valence and arousal dimensions of mood are consistent with Russell's [58] circumplex model of affect which argues that affective states fall along the perimeter of a circle with two-orthogonal dimensions of valence (positive/negative) and arousal/activation (low/high). For instance, one can be in a positive mood with high arousal (excited) or low arousal (calm), or a negative mood with high arousal (angry) or low arousal (depressed). Previous work in an aquarium setting using the same items used in the current study, suggested that as biodiversity of an exhibit increased, affective responses also showed increases on both dimensions, indicative of more energised/excited states [20]. Finally, the survey also asked participants how willing to visit the site they would be as an indicator of general behavioural preference [72].

Our fourth contribution was to focus on coastal settings, as opposed to urban parks and gardens [12,18,24,29]. Coastal settings are arguably characterised by many other features that might invoke soft fascination, whether or not wildlife was present. If the restorative potential of coastal settings could be shown to be influenced by perceived levels of biodiversity and wildlife behaviour, this would be a relatively strong test of the hypotheses because this is already one of the most restorative environments available [71].