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ENVIRONMENT AND WELLBEING

Assessing the impact of environmental quality and pro-environmental behavior on wellbeing

Kate Laffan, Hans Czap, and Natalia V. Czap

Introduction

It has long been recognized that human wellbeing is inextricably linked with the natural world (Neller & Neller, 2009). Attention restoration theory (Kaplan, 1995) posits that time in nature reduces mental fatigue and restores the ability to focus, process information, and solve problems. Stress reduction theory (Ulrich et al., 1991) argues that nature facilitates recovery from stress. Biophilia hypothesis (Kellert & Wilson, 1995) suggests that humans have an innate need to seek connection with nature. In addition, the natural environment is recognized as an important factor of wellbeing by OECD's Better Life Index, Happy Planet Index, and Social Progress Index, among other frameworks.

In what follows, we review the evidence of the impact of pro-environmental action and environmental quality on wellbeing. While we recognize the importance of the built environment for wellbeing, in the interest of space, the current work focuses on natural environments.

Environment and wellbeing

Pro-environmental attitudes, behaviour, and information

A growing body of research explores the relationships between subjective wellbeing (SWB) and pro-environmental behavior (PEB) (see the meta-analysis by Zawadzki et al., 2020). Several studies also examine links between SWB and nature connectedness, pro-environmental attitudes and identity (Welsch & Kühling, 2018), and environmental concern and climate anxiety (Ogunbode et al., 2022).

The PEB/SWB literature focuses on whether PEB represents a sacrifice or a benefit too. Across three dimensions of SWB (evaluative, affective, and eudemonic), there exists evidence of positive associations with pro-environmental action, though the strength of these associations varies (Laffan, 2020). More specifically, PEBs are most closely related to eudemonic measures of SWB, which capture the purposefulness and meaningfulness of their activities (Zawadzki et al., 2020). Positive PEB/SWB associations are documented in both individualistic and more collectivist cultures (Capstick et al., 2022), albeit stronger ones are seen in the latter.

The relationships with particular behaviors vary according to the costs involved, the conscious/habitual nature of the behaviour, and the extent to which it is social and/or visible. Schmitt et al. (2018) find that those behaviors that are more costly in terms of money, time, or effort are those most closely linked to SWB, possibly because of more conscious engagement (Zawadzki et al., 2020), or greater perceived impact. Many public PEBs, like campaigning or volunteering, lead to connection with others (an important determinant of wellbeing) and thus result in higher SWB than actions done alone (Capstick et al., 2022).

Binder and Blankenberg (2017) find evidence that green identity is a better predictor of life satisfaction than PEB. Relatedly, Welsch and Kühling (2018) discover that pro-environmental self-image positively predicts life satisfaction. While a meta-analysis by Capaldi et al. (2014) showed the positive association between SWB and people's connectedness to nature, concern over the environment may detract from SWB. Environment-related distress, including negative emotions like fear, worry, guilt, and hopelessness, is encompassed in the terms eco and climate anxiety. The evidence on how to treat people with these conditions is in its infancy (see the review by Baudon & Jachens, 2021).

Several limitations apply to the existing literature. The work to date has been largely cross-sectional (Zawadzki et al., 2020), precluding a clear causal picture of the relationship between PEB and other variables of interest on one side and SWB on the other. Where longitudinal work has been carried out, the evidence indicates that there is likely a bi-directional relationship between PEB and SWB, with higher-SWB people being more likely to engage in PEB and PEB enhancing people's SWB (Prati et al., 2017). Further longitudinal and experimental work is needed to establish whether and under what conditions PEB and attitudes cause wellbeing.

Environmental quality and wellbeing

Environmental conditions are important predictors of SWB and other wellbeing outcomes. Local *noise pollution* is negatively associated with SWB (Van Praag & Baarsma, 2005), and it negatively impacts wellbeing through cardiovascular disease, cognitive impairment in children, sleep disturbance, tinnitus, and annoyance (World Health Organization, 2011).

Similar to noise pollution, high *air pollution* is associated with decreased SWB (MacKerron & Mourato, 2009). High air pollution also leads to more high-risk

pregnancies, fetal malformations and infant mortality (Currie & Neidell, 2005), and cardiorespiratory diseases (Fan et al., 2020). It causes anxiety (Power et al., 2015), depression (Lamers et al., 2011), and increases suicide risk (Kim et al., 2010). Poor air quality reduces outside leisure activities (Laffan, 2018), which removes a possible stress release (Chang et al., 2019) and reduces cognitive performance, which can lead to lower socioeconomic outcomes (Ebenstein et al., 2016). Modest air pollution levels, however, have relatively little impact on SWB (Li et al., 2019). While air quality is often not known, information disclosure of air pollution leads to decreased life satisfaction through cognitive (realization that pollution is a problem), avoidance (changed spending and behavior), and envy effects (toward other regions) (Zhu & Lin, 2022). At the same time, increased government transparency is associated with increased public satisfaction (Ma, 2017) and reduced pollution by firms (Wang et al., 2021).

Proximity to *green and blue spaces* lessens the negative impact of environmental stressors on wellbeing (Day, 2007; Welsch, 2006), facilitates behaviors positively linked to wellbeing such as physical exercise and social interaction (see the multi-study analysis by Barton & Pretty, 2010), improves health (De Vries et al., 2003), and decreases mortality from circulatory diseases (Mitchell & Popham, 2008). The wellbeing benefits of green and blue spaces are greater when places are perceived as safe and natural (Fisher et al., 2021) and more biodiverse (Wolf et al., 2017).

The perception of accessibility and biodiversity matters more for wellbeing than the objective quality of the space (Ruckelshauß, 2020). That relationship is also sensitive to what aspect of SWB is measured. For instance, the ease of access to blue space is more strongly associated with the reduction of negative outcomes (mental distress) than with a boost in positive ones (feeling of happiness) (White et al., 2013). Furthermore, the relationship depends on the time spent and whether the space is used for physical activity or social interaction (Carrus et al., 2015).

Water quality affects humans through multiple channels, from health and survival (e.g., drinking water in developing countries) to recreational activities (e.g., swimming and boating) and commerce (e.g., fisheries) (Keeler et al., 2012). Research on developing countries is focused on the adverse effects of poor water quality and scarcity that threatens health and survival. Those who are dissatisfied with their water quality rate their lives more poorly (Rzepa & Pugliese, 2012), because of adverse health effects, negative economic implications (Pinto et al., 2020), and food insecurity (Cullen-Unsworth et al., 2014). Water insecurity affects mental wellbeing (Maxfield, 2020). *Water scarcity* also impacts wellbeing indirectly through reduced female employment and school attendance (Arceo-Gómez et al., 2020). The research on water and wellbeing in developed countries focuses more on the blue spaces discussed earlier. It shows that subjective water quality can be more important for wellbeing than objective measures (Gunko et al., 2022), and learning about water management increases wellbeing (Lehtoranta & Louhi, 2021).

Heterogeneity of environmental quality impact on wellbeing

The impact of environmental quality on SWB is often heterogeneous. For instance, people with more education and older individuals are affected more by noise (Yang et al., 2022). The impact also depends on mitigating factors, including the signal-to-background ratio, the preference for outdoor activities, the perceived lack of compensating benefits, and proclivities for opening windows (Lercher & Kofler, 1996).

Along the same lines, studies demonstrated that single parents and the less educated (Ambrey & Fleming, 2014), older residents and males (Krekel et al., 2016), and single residents (Bertram & Rehdanz, 2015) benefit more from green space. Welfare damages of invasive species are more pronounced for individuals in poor health and communities with a high share of racial and ethnic minorities (Jones, 2020). On the other hand, other research finds no difference by income, age, gender (Bertram & Rehdanz, 2015), and parental status (Krekel et al., 2016).

The impact of water on wellbeing differs in developed and developing countries. In high-income countries it was demonstrated that water quality is a less important determinant of life quality at the lower income level (Gunko et al., 2022), while water scarcity has generally not been a subject of investigation. In low-income countries, where water insecurity is a big issue, parents report more severe scarcity than their children, but girls report slightly worse water insecurity than fathers (Maxfield, 2020).

Nature-based interventions

The impact of environmental interventions on wellbeing is represented by nature-based interventions. Closely related concepts are Green Care and Ecotherapy; see Steigen et al. (2016) and Roberts et al. (2020) respectively for a literature review. These interventions can be categorized into approaches that alter the lived environment (parks and gardens) and those that affect behaviors (activities in nature) (Shanahan et al., 2019). Others classify these therapies into wilderness therapy, adventure therapy, horticulture therapy, forest rehabilitation therapy, and animal-assisted therapy (Lewis et al., 2022).

The evidence is generally supportive of the effectiveness of these approaches for improved mental and physical health and general wellbeing (see, e.g., reviews by Maller et al. (2005) and Lewis et al. (2022)). However, at this point, results have to be interpreted with caution, as there are many methodological issues with existing studies, ranging from selection bias, relatively small sample sizes, and lack of control groups to confounders (Lewis et al., 2022; Roberts et al., 2020).

Discussion and actionable points

PEB is positively associated with life satisfaction, positive affect, and eudemonic measures of wellbeing and thus benefits both the individuals and the environment. However, concerns over environmental problems like climate change and

biodiversity loss may reduce wellbeing. This will likely worsen with the intensifying environmental crises.

Both environmental goods (e.g., greenspace and proximity to the coast) and environmental bads (e.g. noise, pollution, invasive species) affect wellbeing. The impact is heterogenous: disadvantaged individuals and communities with racial and ethnic minorities have the least access to goods, while being affected the most by the bads. Environmental bads also impact wellbeing indirectly through physical and mental health, food insecurity, and low outdoor recreation and exercise. While SWB is affected by objective environmental quality, subjective evaluation, which is sometimes inaccurate, is often more important.

Drawing on the research linking wellbeing with environmental quality, behaviors, and concerns, we offer the following actionable points:

- Policy-makers should emphasize the wellbeing benefits of pro-environmental action, rather than presenting it as a sacrifice.
- Experts need to develop evidence-based guidance for interventions to treat eco-anxiety.
- Researchers and policy-makers have to recognize that the impact of environmental quality on wellbeing extends beyond its indirect impacts through health.
- Policy-makers need to prioritize combating environmental injustice given that disadvantaged communities have less resources to improve environmental quality yet would benefit the most from it.
- Policy-makers need to communicate good environmental conditions clearly and highlight the work done to improve these.
- Given the interdependencies between wellbeing and nature, enhancing environmental quality and encouraging sustainable behavior are urgent policy imperatives.

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