The magic of the mundane: the vulnerable web of connections between urban nature and wellbeing

Abstract: Cities are sites of human, ecological and institutional stress. The elements that make up the city – its people, landscapes and metabolisms – are engaged in continual processes of assemblage and disassembly, joining and pulling apart. Reporting the findings of a three-year multi-disciplinary deep case study, this paper examines the role of urban nature in mediating the relationship between stressed humans and stressed landscapes in a context of austerity-generated institutional stress in one city. From empirical findings it shows how urban nature contributes to mental wellbeing; and how institutional stresses linked to austerity policies shape efforts to reconnect humans and nature. Across five strands of research, it foregrounds the importance of everyday experiences of urban nature and practices of care and maintenance. It calls on researchers, policymakers and practitioners to pay closer attention to the 'magic of the mundane' in supporting human wellbeing; in caring for spaces and places; and in providing the services that link people and places.

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There is a wealth of research showing how the natural environment supports human wellbeing (for reviews, see World Health Organization 2016; Pritchard et al. 2019). Yet despite the concentration of the population in urban environments, investment in urban green spaces in the UK continues to decline (House of Commons Communities and Local Government Committee 2017). Surprisingly, little of the research published in recent years considers the benefits of urban nature for human wellbeing in conjunction with the local decisions and investments that determine the health of urban nature itself. This article seeks to bridge that gap.

The authors' research through the three-year Improving Wellbeing through Urban Nature (IWUN) project[1], focusing on Sheffield, a large city in northern England, is the first study to examine the relationships between urban nature and wellbeing through multiple lenses in the context of one city. Using a 'deep case study' approach (Yin 2009) to investigate urban complexities and interactions, it brings together landscape, experiences and practices and shows their interconnected contributions to mental wellbeing. Using multiple methods, it reveals how everyday encounters with the natural world underpin human mental and physical health; how simple policy interventions can improve the contexts for wellbeing; and how the beneficial effects of urban nature are vulnerable to institutional neglect. Such findings could not have been achieved through traditional multi-site comparisons.

This emphasis on context and collective effects focuses attention on the totality of the 'nature' found within a city as defined by its residents and decision-makers, the variety of its effects, and the issues this raises for policy and practice as well as for future research. We focus on nature not as a cause of wellbeing but as an environment within which wellbeing effects may be obtained: the healthier the overall environment, the higher the potential for wellbeing effects (Rabinowitz et al. 2018). In doing so we draw on the concept of affordances articulated by Gibson (1979) and Heft (1988) and more recent approaches to urban complexity using the lens of assemblage theory (DeLanda 2006; Dovey 2012).

This paper challenges the atomisation, essentialisation, and homogenisation of 'nature' and the notion that a 'dose of nature' (Shanahan et al. 2015) may be used instrumentally to achieve wellbeing in ways that relieve the public purse of demands on healthcare resources. Rather, we argue that the wellbeing effects of exposure to and connectedness with nature rely on a multiplicity of factors. We call for attention to the 'magic of the mundane', under-valued but essential everyday experiences, in supporting human wellbeing, arguing that policy and investment should focus on caring for the totality of the naturally occurring and humanly constructed green fabric that supports human wellbeing in the 21st century city.

The context: urban challenges and research background

We begin by considering briefly why urban nature matters. Its role in mitigating mental ill-health and supporting wellbeing is important (Villeneuve et al. 2012) because the urban environment spawns multiple stresses (Sundquist et al. 2004). Three dimensions are particularly relevant.

First, cities are sites of psychological stress and are linked to greater likelihood of poor mental health (Lederbogen et al. 2011; Gruebner et al. 2017). Mental illness is the largest cause of disability across the UK and is calculated to cost the economy £105.2 billion annually (Department of Health 2011). One in ten 5-15 year olds in Sheffield have a clinically recognisable mental health disorder (NHS Sheffield and Sheffield City Council 2019).

Second, cities are sites of ecological stress (IBPES 2019), but also offer opportunities to reinforce and restore connections and co-evolution between humans and the more-than-human world (Heynen et al. 2006; Alberti 2016). We use the term 'more-than-human' here to emphasise that 'nature' is heterogeneous, active, and independent of as well as influenced by human activity (see for example, Gorman 2017). This restoration of connections is important if the extensive loss of wildlife in the UK – a reduction of 56% since 1970 – is to be addressed (RSPB 2016). Cities provide important habitats for flora and fauna, and people are most likely to encounter 'nature' in urban parks and green spaces (Newman & Dale 2013).

Third, cities are sites of institutional stress. This is a particular challenge within the UK in the context of prolonged austerity. Lowndes and Gardner (2016) outline the challenge of 'super-austerity' in which municipalities must implement successive waves of public service cuts, 'compounding original impacts and creating dangerous (and unevenly spread) multiplier effects'. Reduced capacity within public services transmits the most severe impacts of austerity to the poorest sections of population (Hastings et al. 2017). These institutional stresses in turn lead to demands to justify activities in terms of value for money. Services such as green space management and the provision of green infrastructure are deemed worthy of investment if they can be shown to reduce the public cost of healthcare or environmental risks (Moore et al. 2018). Such logic helps to drive a research agenda devoted to identifying the economic worth of the more-than-human world (TEEB 2010).

This article signposts a new direction in research on cities, nature and wellbeing by focusing on multiplicity as well as specificity. It builds on extensive existing evidence, but considers it in terms of complexity and connectivity rather than by examining isolated elements. An overview of recent literature illustrates the current state of knowledge.

Access to nature is associated with psychological wellbeing and stress relief (Nutsford et al. 2013; van den Berg et al. 2016). Benefits can include short term spikes in wellbeing (Bowler et al. 2010; Mackerron & Mourato 2013) and the potential to increase resilience against stressful life events (Wells and Evans 2003; van den Berg et al. 2010). However, the proximity of green spaces on its own is not necessarily associated with mental wellbeing (Houlden et al. 2017). Quality of green spaces can have a stronger bearing on health outcomes than quantity (de Vries et al. 2013).

Mental wellbeing is also linked with social activity, including volunteering, in green spaces (Molsher & Townsend 2015). Green spaces can enable newcomers and migrants to feel a sense of belonging (Seeland et al. 2009). So-called 'green interventions', often involving volunteering activities, are beginning to be offered as social prescriptions in an attempt to tackle mental ill-health and reduce demands on healthcare providers (Bragg & Atkins 2016). Ecological health and human wellbeing are also connected (Taylor et al. 2018).

Findings such as those outlined above have been deployed to support the notion that a 'dose of nature' could be a cost-effective substitute for, or supplement to, modern medical interventions (Barton & Pretty 2010; Shanahan et al. 2015). One study suggests 120 minutes as an appropriate 'nature dose' (White et al. 2019). This line of inquiry is tempting because potential cost savings may be associated with 'doses of nature' or 'green prescriptions'. Yet it avoids the question of what works for whom in which circumstances (Pawson & Tilley 1997), instead assuming that findings from specific studies may be generalisable.

Literature that deals with complexity, relationships, and opportunities, rather than seeking to isolate linear causes and effects, may provide a more helpful framework in understanding relationships between urban nature and human wellbeing. The notion of nature connectedness offers a way to describe the complex relationships between humans and the natural environment: the more connected people feel to nature, the more likely they are to experience the more-than-human world in ways that support mental wellbeing (Nisbet et al. 2011; Pritchard et al. 2019). However, nature connections are not always shared between different cultural groups (Agustina & Beilin 2012) and connections with nature are not always positive (Milligan & Bingley 2007).

Literature on nature connectedness tends to show broad, rather than specific, benefits. Nature may support sense(s) of place or home (Jay & Schraml 2009; Rishbeth & Powell 2013) but it does not follow that people will feel a sense of community in an ecologically rich environment. The difficulty of isolating variables, however, should not be taken as a negation of the benefits identified in research. Research accuracy can suffer if confounding factors are not all included in analyses (York 2018), but place-specific decisions and investment choices must generally be made with incomplete knowledge.

The theme of this paper is that attention needs to be paid to the ways in which a city's more-than-human world provides a network of microfoundations for wellbeing; and that attention should simultaneously be paid to the decision-making processes that influence what can be constructed on those microfoundations. Rather than attempting to disaggregate the functions and effects of urban nature, we seek here to alert researchers, practitioners and policymakers to the urgent need to attend to the everyday fabric of formal and informal urban green spaces in its totality and diversity, in order to coordinate policy and action on mental health, biodiversity and species loss, the protection of public services and the landscape quality of cities.

Theoretical framing

The backdrop to our research is an understanding of the city as material, social and political. Place, as Gieryn (2000) emphasises, is stuff: not just the stuff that appears on maps, but the stuff that grows, crawls and flies. In our deep case study city of Sheffield this encompasses the badgers living in an embankment originally created from industrial waste to provide a route for trams; the squirrels that have learned to take food from visitors in the city's Botanical Gardens; and the wildflower meadows sown on sites of demolished housing at the turn of the millennium. Environmental and social changes predetermine each other (Heynen et al. 2006); 'urban nature' encompasses complexity and potential, the co-evolution (Alberti 2016) of the human and more-than-human.

To provide a framing for complexity and potential, we draw on the understandings offered by assemblage theory of the city as a dynamic mix of the formal and informal. Dovey (2012) describes an assemblage as 'a socio-spatial cluster of interconnections between parts wherein the identities

and functions of parts and wholes emerge from the flows among them' (p353). Assemblages are 'provisional clusters of interconnections' (Porqueddu 2018).

We can thus understand cities and their landscapes as bundles of relationships and possibilities (Massey 2006). From this flows an understanding of relations between humans and 'nature' as hybrid and fluid, involving understandings and 'stories' of place generated by nonhuman species as well as humans (van Dooren & Rose 2012; Gorman 2017). Urban governance and planning, too, is understood as an assemblage of policies, rules and practices that travel and are reconstituted across and between localities (McFarlane 2009). People, places and policy are in constant states of tension and motion. Planners and urban designers, at their best, are 'guardians of the unpredictable' (Porqueddu 2018).

Within this mix human actors form understandings and relationships with the more-than-human world and with particular places that affect and sustain their sense of self (Jakubec et al. 2016), connectedness to nature (Lumber et al. 2017), and sense of place (Raymond et al. 2017). Raymond links the notion of a sense of place to affordance theory, affirming that the immediate perceptions and possibilities offered within a location are as important as long-term relationships, memories and connections. A sense of place, as Raymond emphasises, is a combination of the constantly-shifting attributes of a place and of the individuals who experience the place.

Affordance refers to the complementarity between person and environment (Gibson 1979; Roe & Aspinall 2011), and is now commonly seen in terms of the possibilities for action suggested by the environment. Heft (1988) shows how landscape features provide affordances, or potential, for different forms of play and physical activity. They do not cause children to play, but provide opportunities for them to do so. When we discuss the wellbeing effects of urban nature, therefore, we are considering the combinations of environments and human circumstances that afford possibilities of wellbeing, rather than seeking generalisable rules. Similarly, we are considering the multiplicity of potential causal mechanisms linking 'urban nature' and 'wellbeing' rather than seeking to isolate a single pathway, building on the notion of 'redundant causality' (DeLanda 2006: 37) - the increased likelihood of an outcome if there are many ways of reaching it. This is important when considering the mix of methods applied across our research and its range of findings.

Research methodology

The IWUN project examined the many ways in which 'urban nature' supports mental wellbeing. Sheffield, the case study location, is the UK's fifth largest city by area, with a rich heritage of green spaces but also high levels of urban deprivation. Natural environments (including part of the Peak District national park) form 70 per cent of land cover, with a total of 947 publicly accessible green or open spaces, 80 of which are public parks managed by Sheffield City Council.

IWUN aimed to identify the characteristics of natural environments that promote mental wellbeing; explore the diversity of values and beliefs that influence people's connections with nature; investigate the potential for assessing the value of natural environments in terms of health and wellbeing outcomes; examine the policy and governance frameworks needed to implement appropriate interventions; and work with stakeholders to translate such findings into practice.

IWUN involved five strands of simultaneous research. Full details of the methods employed are provided in the papers referenced below. The first was an epidemiological study (Brindley et al. 2018; Mears et al. 2019; Brindley et al. 2019; Mears et al., 2019b). We used a statistical approach to

examine the relationships between green spaces in Sheffield and health and wellbeing. To understand whether there were green space variables explaining health equalities, we accessed GP data for 345 areas of Sheffield, on self reported health, depression, and severe mental illness while controlling for confounding factors such as income deprivation, air pollution and numbers of smokers.

The second strand drew on narrative approaches (Andrews et al. 2008) to explore city dwellers' experiences of 'nature' and natural environments (Birch et al., under review). We carried out life course interviews with 55 adults and young people aged 17-86 years to explore how urban residents from diverse backgrounds (especially differentiated by age, gender, ethnicity and mental health) narrate their own histories and values around nature, health and wellbeing. Purposive sampling was used to include more Black, Asian and Minority Ethnic residents (n=32) and people living in areas classified as urban deprived (n=40) to help us hear from people previously considered as 'low users' of nature (Natural England 2015). This strand also included 24 'nature and wellbeing' arts-based workshops with a total of 35 participants, all of whom had lived experience of mental health difficulties.

Our third strand explored how urban natural environment characteristics deliver wellbeing benefits. It included a large-scale randomised controlled trial with data collection via a novel smartphone application (McEwan et al. 2019). The app included both an intervention based on noticing the good things in urban nature (Richardson and Sheffield 2017) and wider data collection of users' exposure to natural environments.

A fourth strand sought to identify feasible and acceptable green space interventions that could bring positive mental health outcomes for Sheffield's residents (Dobson & Dempsey 2018). We drew on the professional and tacit knowledge (Pozzali 2008) of stakeholders, engaging with 122 green space managers, members of voluntary and community groups, planners, public health professionals, local physicians and community members through events, focus groups and one-to-one interviews. The chosen interventions were:

- Improve access to green spaces, including walking and cycling routes
- Provide new or upgraded toilets and cafés in parks and woodlands
- Set and maintain a minimum standard of regular, sustained maintenance
- Employ additional parks staff to encourage outdoor activities and volunteering
- Provide additional support for voluntary and community organisations to animate green spaces

The fifth strand of our research (Dobson et al. 2019) aimed to generate a holistic framework to analyse the costs and benefits of the interventions selected by stakeholders (Vandermeulen et al. 2011). Harnessing the expertise and experience of professional and lay stakeholders, we first sought to identify and estimate the costs and benefits of the selected interventions, considering their impact on associated urban ecosystem services. We then sought to determine the extent to which cost-effective interventions may help to generate urban natural environments optimised for health and wellbeing effects.


Project findings: the magic and the neglect of the everyday

Across our five strands of research and mix of methods, we consistently found what we term the 'magic of the mundane': the effects of routine or incidental encounters with urban nature in

enhancing individuals' wellbeing and outlook on life. Such ordinary experiences, however, are resistant to simple policy interventions. They cut across disciplinary and bureaucratic boundaries, demanding an awareness of the mediating role of urban nature within a web of decision-making bodies and organisations.

Figure 1 provides a simplified illustration of just one of the processes that might activate experiences of urban nature contributing to improved wellbeing. In this example there are three organisational links in the chain: primary healthcare practitioners, link workers, and community-based organisations providing activities in green space. Each relies on different funding sources and has different lines of accountability. For a patient to benefit from a notional 'green prescription' all three links in the chain need to function effectively.

Fig. 1: Illustration of a 'green prescribing' process
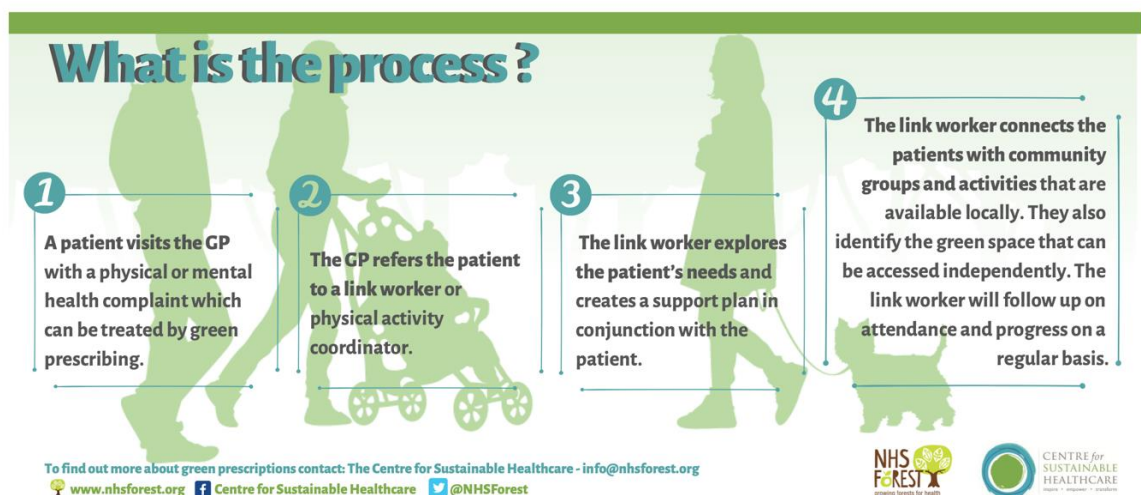
Source: IWUN/Centre for Sustainable Healthcare

We could flesh out this illustration by including the potential impacts of the five recommended interventions discussed above. Experiences of urban nature may be enhanced or prevented if there are suitable routes to and from green spaces – if a person has to cross a busy arterial road to go into a park, they might not bother. So highway engineers and transport planners have a role to play. If there is nowhere sheltered to sit and enjoy a coffee or no toilet facilities in the park, the visitor might not stay very long. Providing such facilities requires a partnership between parks managers and the operator of a café, who might only provide a service if they can make a profit. Regular sustained maintenance requires a team of parks staff with the time and resources to provide a high standard of care; without it, a park may become unkempt and attract antisocial activities. If parks staff are on hand and engaged in organising activities and events, new visitors may be attracted and gain wellbeing benefits. Similarly, support for community-based organisations may enable vulnerable or isolated people to enjoy their local green space.

This brief outline of a few of the people and organisations who activate everyday experiences highlights another factor. Ordinary experiences are adversely affected by barriers erected by and between the institutions that dominate urban life: municipal governments, planning authorities, healthcare providers, and civil society organisations. All of these, through neglect, communication failures, or a lack of capacity, can contribute to the decline of urban green spaces or the exclusion of particular groups. Three interconnected themes stand out from our research.

Everyday experiences matter

The first finding is that everyday experiences matter in terms of human wellbeing. Our randomised controlled trial using a smartphone app found that noticing good things in urban nature over seven days resulted in increases in mental wellbeing and connectedness with nature. These 'good things' were everyday experiences - the view of a tree or sky, a flower in a wall or a squirrel in a park. Participants' improvements in mental wellbeing were sustained when they were surveyed one month later. Participants with mental health difficulties showed clinically significant improvements in mental wellbeing between baseline and follow-up (McEwan et al. 2019b).

Analysis of the app data showed that among people prompted to notice nature, improvements in nature-connectedness were greater for people who had spent time outdoors as a child. Nature connectedness scores also improved more among participants who spent less time outdoors in the last year, and among those who had lower baseline nature connectedness. Increased nature connectedness was found to be a predictor of increased wellbeing. The research provides experimental evidence that an app to prompt noticing the good things about urban nature has potential as a wellbeing intervention, particularly for those less engaged with nature. Measures of perceived and actual biodiversity, and the relationship to positive emotions, revealed that participants responded much more positively to urban green spaces that support greater diversity of wildlife.

Participants in our workshops revealed both the magic and the neglect of the everyday in various ways. This was the case across ethnic and socioeconomic groups. One participant, 'Karen', described the scrubland seen on her daily journey as 'always different. It ebbs and flows like the sea'. Noticing the seasonal change of the roadside gave her a positive experience. Very rarely did people report 'epiphany' moments in connection to nature. Yet relatively mundane places and experiences, such as sitting under a tree, watching leaves in a park, or holding a twig in a pocket attained symbolic significance (Evered 2016: 691) as they offered opportunities to reflect on 'life problems' and to gain a sense of 'what is real' and manageable. Workshop conversations, diaries, photos and artwork illustrated how, in times of mental ill-health, nature helped people feel safe, unjudged and connected to the more-than-human worlds (Whitehouse 2017) of trees, pigeons, hills, water and seasons.

Our work with stakeholders investigating decision-making and prospective interventions reinforced the importance of everyday encounters with nature in generating feelings of wellbeing. The head of therapy at a health trust spoke of her joy at seeing spring flowers or noticing frosty landscapes; a health academic emphasised the value of physical exercise in natural environments in creating a 'sense of perspective, that idea that we're part of something that's much bigger than ourselves'.

Alongside specific improvements in psychological wellbeing, we found that experiences of urban nature contributed to the overall quality of participants' lives. Thematic analysis of the qualitative data from our smartphone experiment revealed ten themes relating to participants' observations of

good things in urban nature (McEwan et al. in press). The dominant theme was wonder at encountering wildlife. Within this theme many 'good things' related to encountering wildlife and enjoying birdsong. The second main theme was gratitude for trees. Participants noticed changes of season, for example, especially on journeys to work. The third was the awe evoked by colourful, dramatic skies and views across the city. The minor remaining themes included: green planting in urban spaces; flowering plants; fields and grassland; water; nature's beauty; feelings of awe; feeling calm or relaxed. Participants were also asked about their worst experiences during the seven days of the experiment. Main themes included uncared for green spaces (e.g. litter); and poor quality or artificial green space with limited wildlife, trees and diversity of planting.

The interviews and workshops revealed few problematic nature experiences and negative associations with green space. For 'Becky', an undeveloped area near home was described as a 'wasteland'. The glass and litter she encountered on walks near home was enough to persuade her to use her car rather than walk her toddler to a local park. In one instance, a change of the everyday routine - the closure of a city centre supermarket - caused an older resident to cease visiting a garden which used to be part of her shopping experience. A handful of negative stories conveyed through local media, friends and family would sometimes raise fears that particular green spaces could be associated with antisocial behaviour or serious crime. While these findings highlight the precarity of everyday nature-contact in the city, more commonly experienced by people living in areas of urban deprivation, positive everyday experiences far outnumbered the negative. Only two of the 35 workshop participants with mental health difficulties and only five of the 55 life course interview participants did not find nature beneficial for their wellbeing.

The everyday matters in design and practice

A second set of findings is that the everyday matters in terms of design and professional practice. As part of our epidemiological research we conducted a small-scale ecological study of green spaces in Sheffield, using health data from the 2011 UK Census and green space quality data from field surveys conducted by Sheffield City Council. These were compared with user-generated data from social media (Flickr photograph tags and Twitter comments). Overall, analysis showed that cleanliness of green space is associated with better general health in the surrounding population (Brindley et al. 2019).

This finding was reinforced through our work with stakeholders and practitioners. Of the five interventions selected by stakeholders as most likely to contribute to wellbeing, two related to design in terms of the provision of facilities (toilets and cafés, and walking and cycle routes to connect green spaces with surrounding neighbourhoods) and three related to practice: regular sustained maintenance, the provision of parks staff, and support for community and voluntary organisations to animate green spaces. Similarly, our work on cost-benefit analysis, which examined all the above interventions with the exception of sustained maintenance, showed that these were cost-effective ways of increasing the wellbeing benefits of urban nature: all were everyday interventions that did not require additional specialist knowledge or skills, or high levels of capital investment (Dobson et al. 2019). The relationship between action to care for and animate green spaces and improvements in residents' mental health is not direct or consistent, but is a necessary part of the assemblage through which a network of high quality green spaces and a flourishing human population both emerge. As one voluntary sector worker told us: 'It's not that the toilet improves people's mental wellbeing, it's that the toilet allows them to do the activity that will improve their wellbeing.'

The everyday is vulnerable

Third, we found that the everyday fabric of urban green spaces and the activities within them that contribute to wellbeing are consistently underfunded and under-appreciated by decision-makers. This matters because, as our own and previous research has underlined, poor quality green spaces have negative effects on wellbeing (Lee & Maheswaran 2010; de Vries et al. 2013).

This is not because decision-makers disbelieve the evidence linking urban nature and wellbeing. Rather, our work with stakeholders and practitioners uncovered a series of 'logics of inaction' (Dobson & Dempsey 2019) that the professionals and community workers involved in urban green spaces struggled to overcome. Two of these related to contested evidence: decision-makers would not act because in their view the case for cost-effectiveness had not been adequately made. The others related to priorities and processes: action was not taken because investment was deemed unaffordable (a financial logic of inaction); investment did not sufficiently contribute to the wider economy (an economic logic); green spaces were a lower social priority than homelessness or child protection (a civic or ethical logic); funding decisions were dependent on other decision-makers (an organisational logic); and, finally, a perception that investment in green spaces only benefited small sections of the population (an equalities logic).

The dominant logic of inaction in an era of austerity is financial. Investment in green spaces is downgraded to an optional extra, as this exchange between two local authority planners in one of our focus group discussions indicate:

> Ethan: It's the economy so it's, let's get it going and everything else can come second, and it really tries to come second because there isn't space for third...

> Finn: Often the green stuff is in the third category, just either doesn't happen or it's so watered down that it's meaningless.

Our work to investigate the costs and benefits of interventions underlined the difficulty of making the case for investment purely on value-for-money grounds. The impact of a simple intervention such as a new café and toilet in a park proves difficult to translate into a financial calculation. While costs are relatively easy to estimate, assessing the benefits is trickier. There are direct benefits in terms of revenue that the franchisee generates from sales. This requires assumptions about the average spend of café users, allowing for seasonal variations and local economic circumstances. There will be wider social benefits if the park is used more, but these are difficult to determine in advance because information about park usage is sketchy and resources for post-implementation monitoring are minimal. The scale of monitoring needed to discover the level of increased physical exercise or mental wellbeing that results from the provision of a café and toilets, and the duration of those benefits, is beyond the means of most park services.

The case of the café illustrates the value of an assemblage approach, which focuses on the characteristics and effects of totalities, rather than linear relationships between variables. Typical investment cases depend on a return on investment accruing to the investor. Our own analysis shows both the difficulty of identifying a return on investment accurately and the diffuse nature of the return, with a wide variety of indeterminate benefits accruing to individuals and organisations across a locality. Thinking of green spaces as part of an urban assemblage emphasises their dynamic role in contributing to the whole: without them, their benefits would have to be provided in another way.

Discussion: connections, context, complexity and continuity

Our consideration of the 'magic of the mundane' leads us to four observations on the interactions between humans and urban nature that could provide a framework for developments in research, policy and practice.

Connections

The first concerns the importance of connections, as highlighted by the insights of assemblage and affordance theories. Our research has highlighted the multiplicity of connections between the human and the more-than-human worlds and the mesh of links between those connections and improved mental wellbeing. Noticing nature, being in natural environments, and having access to those environments through appropriate physical routes and infrastructure, as well as through socially and culturally relevant activities and events, all help to embed humans in the environment, and when carefully designed can help establish connectedness with nature. Early life experiences and communal experiences in which the enjoyment of nature is shared with others are also important. The issue is not to isolate one 'best' connection, but to create 'redundant causality' (DeLanda 2006).

It is not enough for nature to be 'there'. Guidelines that specify an ideal proximity of green space to people's homes may be a starting point, but it is awareness, accessibility and especially *use* of those spaces that matters. Our research shows the importance of biodiversity and interest within green spaces, enabling encounters with the natural world; the importance of attentive and properly-funded management and maintenance; and the need for activities within green spaces that reflect the diversity of potential users and encourage people to use the spaces where they live. In a digitally connected world, the potential for enhancing experiences of nature through apps and digital mapping should be further explored.

Green space management and governance should therefore consider how to develop what we call 'habitats for connection', spaces that bring together natural and social diversity and are maintained and animated to maximise their affordances. This demands a set of skills and knowledge covering ecology, governance and community development that are underdeveloped within UK and much international practice. Integral to such an approach is the creation of improved connections between public services. Healthcare, local government, education and civil society all have roles to play in ensuring urban green spaces fulfil their potential for wellbeing. A model of green space governance that relegates management to a third or fourth-tier responsibility within a hard-pressed municipality risks fracturing the partnerships and collaborative working required to create socially accessible and equitable, biodiverse and welcoming urban green spaces.

Contexts

Second is the importance of context. The wellbeing effects of urban nature cannot be reduced to a one-size-fits-all prescription or dose (Dobson 2018; Bell et al. 2019). Our research, especially on cultures and values and with practitioners and stakeholders, has highlighted the diversity of connections with nature and their dependence on location-specific factors - including the character of a green space, population demographics, and governance arrangements.

There is a difference between identifying a benefit and prescribing an action with the expectation of producing that benefit. Our work has identified a wide range of benefits, from the

instantaneous feelings of joy that come from noticing nature and being in natural spaces, to the incremental increase in wellbeing through repeated experiences that reinforce associations between the natural world and a sense of place (be it a sense of 'home' or a sense of an individual's own place in the world). Our work has also identified interventions that can mediate individuals' engagement with the natural environment. The role of the interventions is not directly to produce wellbeing effects, but to increase the affordances offered in any location.

Here the people-centred philosophy of social prescribing (Bickerdike et al. 2017) offers a helpful model. Social prescribing within the UK National Health Service pivots on the role of community-based link workers whose job is to listen to the patient and signpost them towards activities that may help them. Unlike traditional clinical prescribing, it offers patients a greater degree of choice and agency. Places and spaces therefore need to be managed to afford diverse wellbeing benefits. Activities within them should offer multiple pathways to wellbeing within the local cultural, social, ecological and institutional context. Such an approach echoes the concept of redundant causality: there are many ways to arrive at an outcome within different contexts.

Complexity

The third observation concerns the importance of complexity. In practical terms, a simple experience such as delight at birdsong is not reducible to a simple intervention. It may depend on a combination of effective green space and environmental management and regulation; access to good quality public green spaces; security and safety arrangements to overcome psychological and cultural barriers; knowledge of wellbeing benefits among healthcare practitioners; and link workers who can signpost health service users to experiences that may improve their wellbeing, and support them in accessing such experiences. That may be appear an unnecessarily extended articulation of the enjoyment of birdsong, an experience that may be achieved simply by walking down the road. But the road itself, and the process of walking along it, is also an assemblage of many different elements and interests (Dovey 2012).

Again, we shift the focus here from particularity - the single most important factor - to the potential offered by multiplicity. Complexity theory stresses the importance of emergence, in which novelty arises through the interaction of different actants and agents. That novelty may be evolutionary, social, institutional - or a combination of all of them (Alberti 2016). Within complex systems, change is the consequence of interactions rather than actions and is therefore contingent and unpredictable and characterised by diversity and heterogeneity (Wolfram & Frantzeskaki 2016).

The wellbeing benefits of urban nature are emergent as well as immediate. Short-term feelings of awe and wonder are outcomes of longer term processes that include the urban economics of land acquisition and use; the ecosystem services provided by soil, tree cover and watercourses; the governance of space and regulation of who can use it and how; and the politics of choices about the scale and location of public services and investments of public money. This is why an analysis of the health benefits of urban nature cannot be divorced from a critique of the political impacts of 'austerity localism', which removes resources from local public services while devolving responsibilities (Featherstone et al. 2012).

Continuity

Fourth, our research has highlighted the importance of continuity. Our work on cultures and values has underlined the role of early life experiences in establishing connections with nature (Milligan & Bingley 2007). Our work with stakeholders and practitioners has revealed the need for sustained, consistent investment to support the care of green spaces and the activities that take

place within them. While immediate benefits are observable through a seven day experiment and through arts-based nature and wellbeing courses, the capacity of a city to provide those benefits depends on continuous investment in green spaces and the people who maintain them; support for community organisations that offer therapeutic activities; and funding for link workers and facilitators to manage and monitor social prescribing. Our research strands should not be taken in isolation. They reveal the interaction of different factors over an extended timescale in supporting the mental health of the participants in our research.

Conclusion

Overall, our findings offer an indication of promising paths for future research and practice. They emphasise the importance of engaging with the messy and complex, and doing so through deep engagement with the people and spaces connected with a particular location. They highlight the need to examine relationships and interactions, bringing together landscape, personal wellbeing, public policy and professional practices to counter the psychological, institutional and ecological stresses of urban life.

Underlying our most 'simple' finding that noticing nature can improve wellbeing is a series of interconnected findings. They relate to equality: people do not have the same opportunities to notice nature, either because of their personal circumstances, cultures or backgrounds, or because of the way the nature around them is (or is not) cared for. The moment of engagement with the natural world in a park or green space may have a backstory in a lifetime of experiences and struggles. Our findings also relate to the priorities of public policy: despite knowing that connections with nature can help people with mental health problems, we have found numerous 'logics of inaction' that stifle progress and prevent investment. Our findings relate, too, to the challenges in linking improvements in personal wellbeing with the financial indicators that govern public bodies' investment choices. The search for a clinching financial argument to justify investment in green spaces on the basis of savings in mental healthcare costs is likely to prove at best frustrating, and at worst futile.

What flows from this is the need for a changed approach to research, policymaking and practice. Our conclusion for research is that more attention should be paid to the dynamic complexities of interactions between places, people and policies. Whether our disciplinary lens is landscape architecture, medicine, planning or psychology, wellbeing is socially, environmentally and politically mediated. Research needs to focus on potential and be comfortable with uncertainty and fluidity.

Our conclusion for policy is that it is easier to prevent beneficial outcomes by withdrawing investment than to guarantee beneficial outcomes by applying investment. Policy, too, needs to be comfortable with risk and uncertainty. Current concerns with efficiency and value for money need to be moderated through an acknowledgement of the importance of redundant causality. There is value in creating a superfluity of paths to wellbeing. An important aspect of our project was the creation of simple, easy-to-read briefings for a range of policymakers and practitioners to show how this could be done.[2]

Our conclusion for practice, echoing the first two, is that the 'magic of the mundane' is more than just a slogan. Unexpected changes are possible when the ordinary is considered special. An intervention as uninspiring as a toilet in a public park may enable people to enjoy the outdoor

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[2] See http://iwun.uk/findings/

environment in comfort. For people with mental health difficulties, an arts workshop might offer ways of coping, providing valuable connections with nature and the wider world. A green cycling route might change a person's commuter journey so that they arrive at work refreshed rather than gloomy.

These are all possibilities. We do not, and cannot, predict that they will happen or that they can be generalised. Our research indicates, however, that they are more likely to happen with appropriate investment and less likely if the ordinary fabric of urban green space and the care of the more-than-human world is neglected.

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