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The 'healthy dose' of nature: a cautionary tale

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Abstract: Growing cross-disciplinary interest in understanding if, how, and why time spent with nature can contribute to human health and wellbeing has recently prompted efforts to identify an ideal healthy dose of nature; exposure to a specific type of nature at a specified frequency and duration. These efforts build on longstanding attempts to prescribe nature in some way, most recently in the form of so-called "green prescriptions". In this critical discussion paper, we draw on key examples from within the fields of health and cultural geography to encourage deeper and more critical reflection on the value of such reductionist dose-response frameworks. By foregrounding the relationally emergent

qualities of people's dynamic nature encounters, we suggest such efforts may be both illusory and potentially exclusionary for the many individuals and groups whose healthy nature interactions diverge from the statistical average or "normal" way of being. We suggest value in working towards alternative more-than-human approaches to health and wellbeing, drawing on post-humanist theories of social practice. We present two practice examples – beach-going and citizen science – to demonstrate how a focus on social practices can better cater for the diverse and dynamic ways in which people come to conceptualise, embody and interpret nature in their everyday lives. We close by reflecting on the wider societal transformations required to foster greater respect for embodied difference and diversity.

Key words: nature, green space, health, wellbeing, embodiment, green prescriptions, social practice.

1. Introduction

Since the 1980s, we have witnessed growing interest across varied research disciplines in understanding if, how, and why time spent with nature can contribute to human health and wellbeing (Frumkin et al., 2017). This body of work conceptualises nature in varied ways. For some, nature lies "out there" in the wilderness or countryside (Clayton and Opodow, 2003). For others, nature exists both within and beyond cities and towns but in designated settings, such as parks, gardens, woodlands and riverside trails, often referred to as natural environments, green or blue spaces (Hartig et al., 2014; Kuo, 2015). In each of these conceptualisations, nature is bounded and equated with place, assuming varying degrees of

separation from human life. Human geographers have long critiqued this notion of separation, the so-called "Nature/Culture divide" (Braun, 2005; Whatmore, 2006; Castree, 2014), recognising that humans and non-humans are intricately "entangled together in ways that co-fabricate worlds, spaces and encounters" (Bell et al., 2018: 136). Such critiques have spurred calls to move beyond the macro-category of nature to recognise how experiences of health and wellbeing emerge through dynamic more-than-human relations (Maller, 2018), for example with individual species, creatures, flows of weather, terrain, technology and tools. In this work, the locus of health, too, is redefined, from the individualised physical body of biomedicine (Fox, 2011), to a processual entity that emerges through complex more-than-human relationships and connectivities. These shifting relational configurations continually (re)shape people's capacities to affect and be affected in ways that produce moments of health and wellbeing (Gorman, 2018), or conversely experiences of illness, impairment or exclusion.

In this paper, we draw on such insights to interrogate the merits of contemporary efforts to identify and distil a so-called "healthy dose" of nature (Barton and Pretty, 2010; Shanahan et al., 2016; Southon et al., 2018). Using dose-response frameworks (Cox et al., 2017) derived from survey questions with "a limited set of multiple choice outcomes" (Maller, 2018: 24), it is suggested that accurate, healthy doses of nature can be identified, including: how long and how frequently people should engage with nature; and what type of nature is best for their health (Frumkin et al., 2017; Cox et al., 2017). We appreciate that the search for a healthy dose of nature stems from a desire to make it easier for people – be it within the medical profession or otherwise – to identify and support health-giving encounters with non-human life. However, in this discussion paper we share key examples

from within the domains of health and cultural geography to encourage deeper and more careful reflection on the value of doing so. We draw on our cumulative understanding of the nature-health field, including critical insights generated whilst conducting several research projects (empirical and review-based) over the last ten years that have examined multiple facets of people's experiences of health, wellbeing and impairment with nature in the varied contexts of everyday life (for example, Bell, Phoenix, Lovell, & Wheeler, 2014; 2015; Bell, Wheeler, & Phoenix, 2017; Bell, Foley, Houghton, Maddrell, & Williams, 2018; Foley, 2010, 2015, 2017; Kearns & Andrews, 2010; Collins & Kearns, 2007; Coleman & Kearns, 2015). Our aim here is not to provide an exhaustive review on the topic. Rather, by foregrounding the relationally emergent qualities of such interwoven more-than-human encounters, we aim to demonstrate why the drive to identify a pre-defined healthy dose of nature may be both illusory and potentially exclusionary for the many individuals and groups whose healthy nature encounters diverge from the statistical average or "normal" way of being.

For brevity, we are using the term "nature" in this paper, but we include humans in this macro-category, and take care to highlight the specific entities that co-constitute each dynamic socio-material-affective configuration referred to as "nature" throughout. After introducing the dose of nature concept in more detail, we suggest value in working towards an alternative more-than-human approach to health and wellbeing, drawing on theories of social practice (Shove, 2012; Maller, 2018). We present two practice examples – beach-going and citizen science – to highlight how a focus on social practices can better cater for the diverse and dynamic ways in which people come to conceptualise, embody and interpret nature in their everyday lives. We suggest the potential value of this approach in catalysing long-term, meaningful conversations that encourage people to explore how, if at all, they

could be recruited to nature-based practices that best meet their shifting individual and relational priorities over time. Such tailored insights may, in turn, enhance the promise of current protocols around "green prescribing", and catalyse wider societal transformations to foster greater respect for embodied difference and diversity.

2. From nature on prescription to notions of dose

Efforts to prescribe nature in some way – be it explicitly or otherwise – are not new. They are apparent, for example, in the Medieval promotion of monastic gardens for the rehabilitation of the sick (Ward Thompson, 2011), the medicinal inland spa, sea bathing and coastal convalescent homes of the late 1700s-1800s (Fox and Lloyd, 1938; Foley, 2010), the open air movement of the early 1900s (Walton, 2000), and the promotion of silent daily sunbathing in the early 20th century children's health camps (Kearns and Collins, 2000). More recently, we have seen growing enthusiasm for incorporating nature-based activities in social prescribing initiatives; a form of intervention designed to offer general practitioners a non-medical referral option, linking primary care patients to sources of support within the voluntary and community sector (Bragg and Leck, 2017; Swinburn et al, 1997). One form that social prescribing takes is "green prescribing" wherein patients are referred to activities that involve an interaction with more-than-human nature. These activities may include, for example, informal community gardening, bird watching and conservation volunteering initiatives, as well as more structured green care services, such as horticultural therapy and care farm projects (Bragg and Leck, 2017).

Through the critiques presented in this paper, we are *not* refuting the benefits of such efforts; rather, we are cautioning against the risk of reducing the richness of people's nature experiences to a standardised, homogenous dose. Much of the work that seeks to identify this healthy dose is underpinned by the assumption that all humans possess an innate connection to nature; an assumption that is informed largely by Wilson's (1984) Biophilia Hypothesis. Wilson contends that the human genome has been programmed through evolution to respond positively to other forms of life, and specifically to natural environments thought to confer survival through providing refuge, prospect and nourishment (Kellert, 2009). Whilst this work sometimes acknowledges that people from varied socio-economic or cultural backgrounds may require support to "realise the truth of the human-nature relationship" (Richardson, 2015: 605), it still conceptualises the relationship as a universal "truth".

Ideas of dose go further, seeking to identify a healthy mode of embodying and experiencing nature, based on somewhat narrow – normative – conceptions of health, wellbeing and what nature is or could be (Smith and Reid, 2017; Macnaghten and Urry, 1998). These limited conceptions are apparent in much of the existing literature on nature and human health (Frumkin et al., 2017). Many studies look for statistically significant associations at a population level, for example, between proximity to certain types or scales of designated green space in the living environment and health indicators such as perceived general health, perceived mental health, cause-specific mortality, pregnancy outcomes etc. (e.g. see reviews by: James et al., 2015; Gascon et al., 2016). Other studies rely on experimental approaches using controlled short-term exposures to particular types of (often virtual-visual)

nature, usually with somewhat homogenous samples (Thompson-Coon et al., 2011; Hartig et al., 2014; Ohly et al., 2016). The findings of such work are used to characterise the "normal" state of the group or population under study. Yet, this concept of an embodied norm only made its appearance in the early to mid-nineteenth century with the dawn of statistics and the bell curve. With this shift in thinking, bodies and bodily practices became increasingly standardised and homogenised, with those at the curve's extremes seen as abnormal or even deviant, creating "an imperative on people to conform, to fit in, under the rubric of normality" (Thomas, 2007: 67). While such insights can be useful to decision-makers tasked with designing and implementing policies that will benefit the greatest number of people, they fail to account for genuine embodied diversity in how people experience, move through and understand the world, or the emergent nature of these experiences at any one place or time (Shilling, 2008).

By overlooking diversity in experience, we risk alienating people whose values or preferences do not conform to the prevailing "nature regime" (Howes and Classen, 2014). As noted by Shilling (2012: 251), "lived experience is not necessarily normative experience, and people's encounters with society are also mediated by feelings prompted by internal physiological processes, which may encourage them to feel 'ill at ease' with and oppose social norms". If time spent with nature as prescribed does not enhance people's physiological, psychological or social states in ways predicted by the statistical norm, then at best people may dismiss the suggested dose as irrelevant or inappropriate to their daily lives and lifestyles. At worst, they may feel alienated or marginalised through failing to live up to societal norms or expectations. Insisting on a universal dose of nature borders on what

Young (1990) describes as cultural imperialism, defined as "the universalisation of a dominant group's experience and culture, and its establishment as the norm. Those not in the dominant group are marked as deviant and inferior 'Others'" (Thomas, 2007: 75). In this way, the varied health-giving activities performed with nature by people at the margins of the bell curve may be rendered "out of place" or inappropriate, as defined by normative dose-response frameworks.

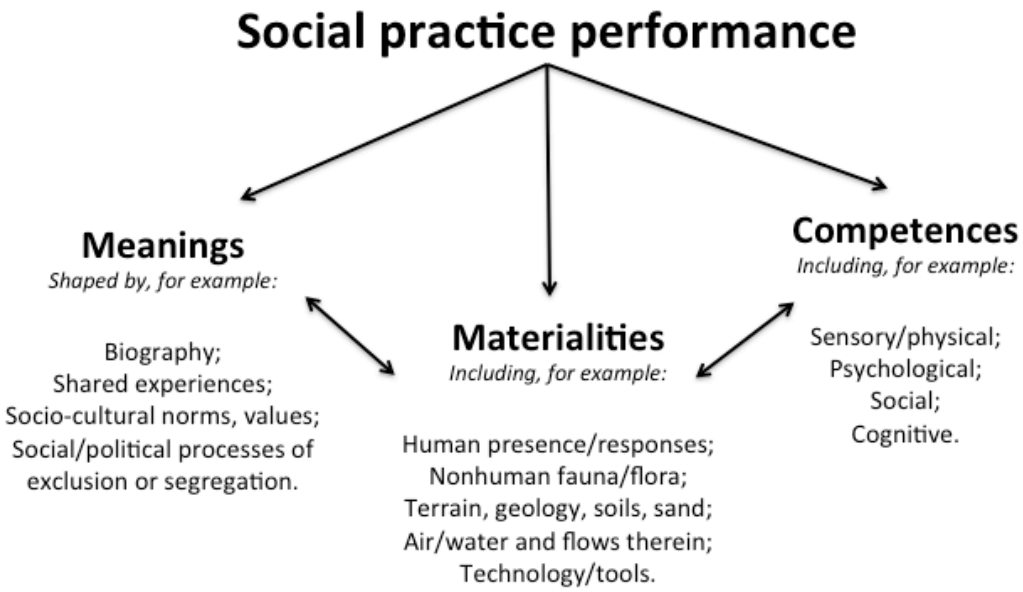
3. A social practice perspective

Recognising the normalising tendencies of dose-response frameworks, we suggest there is value in drawing on post-humanist theories of social practice to better engage with the highly relational and emergent qualities of experience (Conradson 2005) that are largely overlooked within current efforts to identify or prescribe a standardised healthy nature interaction. Social practices refer to recognisable activities performed routinely over time, such as gardening, bird watching and conservation volunteering (Maller, 2018). They involve both open and habitual patterns of more-than-human encounter (Shove et al., 2012), co-constituted by three dynamic, interconnected practice elements: (1) the materials, matter, bodies and technologies required to perform a practice (referred to as *materialities*); (2) the social and symbolic significance of practice performance at any particular time (*meanings*); and (3) the cultivation of the tacit or explicit embodied knowledge, techniques and skills required to do so (*competences*). As illustrated in Figure 1, practices may be co-constituted by varied materialities (e.g. other humans, mammals, birds, insects, plants, the weather, water, different terrains, etc.). The salience of these materialities can differ according to: the socio-cultural narratives, norms and earlier life experiences that shape individual and

collective meanings about what nature is and how best to engage with it; and the opportunities people have to develop the necessary competences, skills and techniques to perform practices in a ways that are personally and socially meaningful over time. A shift occurring within any one of the three overall practice elements can cause the performance of certain practices to unravel or, alternatively, to develop in new or unanticipated ways.

Figure 1. The performance of varied social practices with nature

(informed by Shove et al.'s (2012) elements- based practice approach)



When multiple practices become linked into "practice complexes" (as illustrated below in the context of beach-going), the unravelling of one practice – or practice element – can have implications for the continued performance of other intersecting practices (Shove et al, 2012). As described by Maller (2018), for example, practices that constitute the complex of gardening may include soil preparation, seed sowing, weeding, pruning, pest management,

watering and harvesting. The performance of these interlinked practices involves particular materialities (e.g. specific flora, fauna, soils, trowels, water buckets), competences (e.g. learning how to use and adapt different tools to varied soil types, different plants and under shifting seasonal conditions), and meanings (shaping decisions regarding which flora and fauna to nurture and which to remove). Disruptions to the performance of any one of these practices (e.g. the inability to weed due to hardened ground or the onset of a hand injury) will have implications for the continued performance of others. These disruptions may include, for example, the unravelling of pest management practices or a compromised harvest.

Theories of social practice offer a useful approach for exploring how and why people become imbricated within varied more-than-human entanglements, and how such imbrications can lead to experiences of health, wellbeing or otherwise (Conradson, 2005). These theories recognise that people's encounters with(in) particular settings can change over time according to the habits we develop and the relationships we enter into, both in the moment of encounter and through the life course; sensorially, emotionally, materially and cognitively (Shilling, 2008). Some relational configurations may be therapeutic or enabling (Duff, 2011; Gorman, 2017a), whilst others may be unsettling, exclusionary or even disabling (Hall and Wilton, 2017). Such relational understandings move us beyond static notions of bounded spaces such as parks, gardens or woodlands where one simply has to visit to "receive" health or wellbeing benefits (Milligan et al., 2004). By privileging "ongoing process, doing and performance" (Maller, 2018: 71), theories of social practice therefore encourage us to engage with the "transformative potential of the entire field of relations

with which beings of all kinds interact" (Ingold, 2011: 61); that is, to explore how experiences of health and wellbeing emerge within the dynamic more-than-human entanglements that we embody, negotiate and move with on a routine basis.

To illustrate this contention in more tangible terms, we examine two social practice complexes that might at first glance seem appropriate as healthy nature doses based on the findings of existing research: beach-going and citizen science. In each case, however, we highlight how and why varying more-than-human materialities may become salient as health-giving or otherwise for different people; a process shaped by the meanings people hold about what nature is and whether or why it matters (often linked to their current and earlier life circumstances), and people's embodied knowledge, skills and opportunities (competences) for tuning into and engaging with these materialities in the – sometimes challenging – contexts of their everyday lives.

Beach-going practices

Coastal areas have long captured the human imagination; in part for logistical purposes (trade and transport) and resources (e.g. fishing, tourism, recreation); in part through associations with Romantic notions of the Sublime; and in part for their perceived therapeutic value, from the medicinal sea bathing advocated in Victorian and Edwardian times (Andrews and Kearns, 2005) to the inter-war open air movement and the desire for outdoor pursuits, sports and physical fitness (Fox and Lloyd, 1938; Lencek and Bosker, 1998; Walton, 2000; Foley, 2010). Contemporary research suggests visits to coastal settings are

still associated with relaxation (White et al., 2013), physical activity (Witten et al., 2008; White et al., 2014), and decreased risk of anxiety or depression (Nutsford et al., 2016).

Acknowledging the variety of feelings engendered in and through coastal encounters (Bell et al., 2015), it is important to recognise the "complex of connected and co-dependent practices" (Maller, 2018: 118) that constitute beach-going. These may include, for example: beach cleaning (Wyles et al., 2017), rock-pooling, sandcastle building (Ashbullby et al., 2013), buggy fit (Bell et al., 2017), surfing (Anderson, 2012), diving (Throsby, 2013), scuba-diving (Straughan, 2012), running and cliff walking (Game and Metcalfe, 2011) and sea swimming (Phoenix and Orr, 2014; Foley, 2015, 2017). Many of these beach-going practices are co-constituted by shared elements, including the agency of myriad materialities; from grains of sand to the sound and motion of the waves, salty spray, seaweed, the coastal breeze, the pleasures and risks of sunshine (Collins and Kearns, 2007), and the seemingly ceaseless interaction between sky, sea and land (Game and Metcalfe, 2011). These materials resonate differently for different people depending on their current and past life circumstances, their bodily constitution, and the embodied skills and competences they have for moving fluidly within such configurations. For example, Throsby (2013: 15) describes the immersive pleasures of sea swimming as a "daily hard reset" from the intrusive demands of everyday life, highlighting the tactile caress of water as comforting and supportive. However, opportunities to tune into such pleasures depend on being familiar and able to cope with the vagaries of the sea, learning new technical skills, sensory capacities and "muscular consciousness" to feel comfortable negotiating ever more complex, unpredictable rhythms, for example with different weather conditions, currents and tides. Reflecting such findings, Foley (2017) examines how repeated individual and communal open air swimming practices

produce an embodied and emotional "therapeutic accretion" over time, offering "a means of emplacing oneself outside the flow of everyday life" (Foley, 2017: 48), gradually building the competences required to "transform the unhealthy land body into a healthy sea-body" (Foley, 2015: 224).

Yet, there are complex socio-material-affective dynamics that shape people's opportunities for such transformations; dynamics that will not be addressed by naively prescribing a dose of twenty minutes of sea swimming a day in the name of health. We illustrate this complexity with the findings of research exploring the beach-going (or non-going) experiences of individuals and groups who have come to associate the coast with less positive meanings through racial exclusion and disproportionate exposure to risky materialities (Lobo, 2014; Bank, 2015; Hollenbeck, 2016). Drawing on ethnographic research conducted in Darwin, Australia, for example, Lobo (2014: 102) highlights whiteness as a "racialising force" that debilitates and stresses Aboriginal bodies at the beach. For Lobo's participants, stares, humiliating remarks, threats and gestures of intimidation generated experiences of discomfort and alienation rather than relaxation or restoration through beach-going. This finding demonstrates the role of adverse human encounters in diminishing or foreclosing the potential for positive transformational experiences with the coast's shifting materialities, with presentational concerns singling out certain bodies or ways of being as transgressive or "out of place" in relation to those that dominate a particular time or setting (Shilling, 2008, 2012). Reflecting on such experiences, Leder (1990) introduced the notion of "social dysappearance": when the gaze of another is judgemental, antagonistic or objectifying, one's body can emerge problematically into the foreground of consciousness.

Such changes may render the body as "Other", evoking unwanted sensations of bodily attention and surveillance (Butler and Bowlby, 1997).

Care is needed in relying on simple dose-response frameworks when processes of Othering have become entrenched through generations of social and political exclusion. For example, Hollenbeck (2016) highlights how the legacy of historic racism in the United States (Wiltse, 2010) continues to constrain beach-going practices amongst African-American residents of Liberty City, Miami, through the intergenerational transmission of fear. Local African-American residents were restricted from visiting many beaches in South Florida until 1965 (and beyond), such that visiting these beaches without a permit led to fines, physical force and/or imprisonment. From 1945 to the mid-1960s, they were granted permission to visit one beach – Virginia Key Beach – but this was narrow, steep and exposed to treacherous waters and undertows. As a result, many who tried to engage in sea swimming drowned off Virginia Key Beach. Intergenerational stories of beach-going were therefore dominated by both physical risks (fear of drowning along their designated beach) and social risks (fear of violent persecution for visiting "whites-only" beaches). These stories reinforced a legacy of fear and inexperience, with Hollenbeck's (2016) participants repeatedly explaining that "Black folks don't" visit the beach, even since de-segregation. In this way, Hollenbeck's work highlights how both human and non-human materialities and meanings (in the form of socio-political narratives shaping beach use, access and norms) have catalysed the demise of beach-going as a salient social practice complex amongst Liberty City residents. This demise would be challenging to reverse through simply prescribing a dose of sea swimming or rock pooling to the children or grandchildren of families who suffered under years of brutally oppressive racial segregation.

In highlighting these varied experiences of beach-going, we demonstrate the importance of attending to the shifting materialities, meanings and competences that support (or compromise) the performance of particular social practices over time. This example (of beach going) is informative in helping us to understand how or why such practices come to support experiences of health, wellbeing or otherwise amongst specific individuals, groups and generations; more so than reductive efforts designed to identify normative population-level dose-response frameworks.

Citizen science and conservation practices

The practice of citizen science (otherwise known as community-based monitoring or community-based conservation) also has a rich history, in which volunteer data collectors work with scientists across diverse fields, both for leisure purposes and a more altruistic drive to help wildlife and contribute to science (Dunkley, 2018). Given the growing interest in the health and wellbeing benefits of participating in these schemes (Koss and Kingsley, 2010; Dunkley, 2018), here we highlight how a healthy dose of citizen science largely assumes shared access to specific materialities (tools, technology and the presence or absence of different species of interest), competences (visual skilling) and collective meanings concerning the perceived value of different species and the habitats they rely on. We suggest that performing such practices – and developing the embodied skills and competences required to do so – may be more salient or indeed, feasible, amongst some people than others. We also venture beyond the citizen science literature to illustrate how privileging certain species (and their habitats) over others in the name of conservation may

serve to undermine the emotional gains and sense of companionship engendered through everyday relations with less ecologically valued flora or fauna.

Engaging in citizen science via species monitoring requires the development of specific observational skills, or "visual skilling" (Ellis, 2011). Nurturing these skills involves both the systematic, often time-consuming process of discerning the identity of a species through its distinct diagnostic characteristics (e.g. stem texture, leaf shape, phyllotaxy etc), and more captivating "moments of flash recognition of a species-in-its-environment" (Ellis, 2011: 770); a form of pattern recognition known as "jizz" (Lorimer, 2015). Amateur naturalists are often mentored in learning these skills by a supportive network of experienced biological recorders, supporting visual skilling in line with "professional perceptual standards" (Ellis, 2011: 771). Species identification is guided by a range of qualities, described by Lorimer (2007) as "ecological charisma": the detectability of an organism by the human senses – its size, colour, shape, speed, degree of movement, aural characteristics, seasonality, migration patterns, day-night ecology, and distribution on land, sea or air. Whilst Dunkley (2018: 9) highlights such ecological observation activities as a "safety valve" in older age, as a passion that people can still pursue with declining mobility, the focus on *visual* skilling over other modes of perception raises questions about its inclusivity amongst the broader population. Indeed, as noted by Ellis (2011), belonging to the biological recording community cannot be taken for granted, with mentors "keen to draw comparisons, generally in hushed tones, between those who learned quickly and were considered to have a 'good eye' as an innate capacity, and those who simply lacked the aptitude for skilled vision" (2011: 780), swiftly dismissing those "who don't make the grade" (2011: 781). This ocular-centric approach to species monitoring and volunteer mentoring

may well overlook the skills of those who necessarily prioritise their wider senses, such as people living with visual impairment, perhaps keen (and able) to identify bird species by the subtleties of their calls, or plant species by their unique textures, shapes and scents.

Species monitoring efforts are often used to identify and support the conservation status of habitats that support ecologically valued species and ecosystems. Whilst the ecological benefits of such efforts may be hard to refute, greater attention is needed to the social consequences of such interventions for the vulnerable communities they affect. This imperative is now acknowledged in relation to the detrimental relocation and fragmentation of indigenous populations following widespread "wilderness" national park designations since the 19th Century (Howitt, 2001). However, detrimental relocation and fragmentation of under-valued populations is seemingly still happening, albeit at a smaller scale, in our everyday towns and cities. This process is apparent in Mokos' (2017) ethnographic study of the challenging social consequences of ecological restoration efforts along the Ventura River in southern California. In 2004, the California River Parkways Act catalysed efforts to create a Ventura River Parkway, justified on the grounds of ecological enhancement and the transformation of the waterways as settings for community health and recreation. Yet, such efforts overlooked the integral role of these waterways for the health of members of the public who are typically stigmatised, de-humanised and excluded; the longstanding and peaceful presence of a homeless camp. Mokos highlights this river-bottom homeless encampment as a protective space for its residents. The setting offered them a rare sense of belonging, a place of respite from constantly carrying possessions around the city; moments of relative freedom for people whose most private actions are routinely on public display, shamed and pathologised; a supportive social environment characterised by relations of care

with like-minded others; and a chance for peace and experiences of more-than-human companionship with local animals and plants.

Contrary to the ecologically prized species the environmental groups were keen to protect through ecological restoration of the waterway, encampment residents described valued interactions with animals and plants more typically denigrated as pests or "vermin". Facing the same future of eviction in the name of ecological restoration, residents of the river-bottom camp empathised with the stigmatised experiences of rats, birds and possums coming in daily for meals, and coyotes howling in the dark. The emotional qualities of these more-than-human encounters demonstrate two broader forms of non-human charisma described by Lorimer (2007): *aesthetic* charisma, the aesthetic characteristics of an organism's appearance and behaviour that evoke strong human emotional responses (in this case empathy rather than fear or disgust); and *corporeal* charisma, the visceral and emotional interspecies epiphanies and pleasure engendered through the occurrence and accumulation of direct embodied interactions over time. Yet these daily doses of charismatic nature for people in the river-bottom encampments – characterised by companionship, empathy and peace – were to be replaced by more normative nature doses, prioritising both the aesthetic preferences of other local residents deemed more civilised, moral or "human", and the survival of more ecologically valued non-human species (Mokos, 2017).

We share this example to illustrate the importance of accommodating and respecting the varied ways in which people come to relate to and value different aspects of nature in line with their own embodied life circumstances and histories. Paying greater attention to the subtleties of charismatic appeal (venturing beyond the dominant visual aesthetic to consider, for example, sonic, olfactory or haptic charisma – see, for example, Gorman,

2017b), and recognising charisma as a relational quality emerging between different bodies, opens out an abundance of possible therapeutic encounters with non-human organisms. Exploring the emotional geographies of individuals with an autistic spectrum disorder (ASD), for example, Davidson and Smith (2009) highlight the importance of nonhuman autistic friendships, forged with domestic dogs and cats (which are widely recognised as charismatic for both aesthetic and corporeal reasons) but also with earthworms, pigeons, grass, trees and so forth. These – less typically charismatic – nonhumans made minimal interpersonal demands but supported a sense of reciprocal connection and companionship otherwise rarely experienced amongst people living with ASD. Only by respecting these varied nature relations, can we challenge the tendency for society to devalue or marginalise alternative ways of sensing or being in the world as somehow "less than" or "lacking" (Saerberg, 2010). The focus on social practice, rather than reductionist dose-response frameworks, supports such efforts by highlighting how and why different materialities become meaningful amongst people with different forms of embodied knowledge, skills and competences.

4. Nature, health and wellbeing: widening the horizon

Drawing on the three elements of practice discussed thus far – materialities, meanings and competences – we suggest value in working with people over time, instigating meaningful conversations that explore how, if at all, they could be recruited to nature-based practices that best meet their shifting individual and relational priorities. Such efforts could address the growing tendency to present "health as much simpler than it actually is" (Wolf, 2010: 84). Advocates of "personalised medicine" are increasingly recognising the need for

clinicians to engage in "a new type of conversation" with patients (NHS England, 2016: 13), promoting:

*"…a move away from a "one size fits all" approach to the treatment and care of patients with a particular condition, to one which uses new approaches to better manage patients' health and target therapies to achieve the best outcomes in the management of a patient's disease or predisposition to disease" (*NHS England, 2016: 6).

This enthusiasm for personalised medicine – directed largely at disease prevention or cure – is primarily driven by advances in genomic medicine, and has led to growing concerns about new trade offs between health and social justice. As noted by Roberts (2010: 62), contemporary genomic advances "stem from a medical model that attributes problems caused by social inequities to each individual's genetic make up and that holds individuals, rather than the public, responsible for fixing these inequities". This is particularly challenging in the context of disability; for example, to what extent do people (particularly those born with alternative sensory/physical/cognitive modes of perception and mobility) want to be genetically "cured" of embodied difference in order to conform to dominant standards of normality? Care is needed to ensure these moves towards personalised medicine support both health *and* social justice by respecting those who embrace "impairment as part of human diversity and difference… in direct opposition to the assumptions associated with a medical perspective of impairment" (Beauchamp-Pryor, 2011: 7). In advocating a progression from a "one size fits all" approach and supporting deeper conversations that acknowledge and challenge inequitable social structures, the broader concept could usefully

be employed to explore "what a reasonably free and dignified life would look like for everyone, regardless of their ability to measure up to norms of health" (Kirkland, 2010: 198). These alternative ways of thinking might, in turn, encourage people to engage more critically with the varied ways in which people may or may not come to perform and benefit from diverse nature-based practices through the life course.

Importantly, such conversations regarding the value and importance of embodied differences in and of nature are needed at multiple scales and with varied individuals and groups across society. At the *individual* level, such efforts may promote temporary experiences of health or wellbeing, facilitating for example moments of stress relief or relaxation. Alternatively, they may lead to more transformational experiences that sustain experiences of health and wellbeing over a longer time-frame, for example, through effects on the microbiome or by nurturing the development of specific skills, knowledges and bodily awareness to better tune into, explore and negotiate varied forms of nature. Opportunities to engage with diverse natures in this way may be interdependent, co-produced through a form of *shared* sociality, be it with like-minded friends or family, health or recreational professionals or even absent or imagined others (described as a form of "spiritual sociability" by Phoenix and Orr, 2017: 280). As discussed above in the context of "therapeutic accretion", such experiences can build strength and skill, and instil confidence to engage with and relate to nature in different ways, perhaps coming to feel "in place", at least momentarily, in settings previously characterised by alienation or discomfort. In doing so, people will find varied ways of embodying and moving with more-than-human nature that may deviate from the norm. With this in mind, transformations are also needed at the

societal level that challenge dominant scripts about how to sense and make sense of the diverse materialities of nature. Such emancipatory transformations would recognise both embodiment and nature as "irreducibly plural" (Shilling, 2012: 98). They would encourage people to feel at ease with(in) bodies of difference, and allow people to resist and challenge the devaluation of bodies that cannot or do not replicate socially dominant ways of understanding, relating to and negotiating different forms of nature over time.

5. Concluding remarks

There are various epistemic communities – the media, politicians, artists, writers, researchers, environmental advocacy groups – each putting forward specific assertions of what nature is and how it should be perceived and experienced, creating assorted culturally coded notions of nature (Castree, 2014). Through dominant social and cultural practices, it has been argued that we are persistently taught how to read and react to nature (Kitchin, 1998), rather than allowing ourselves to understand and come to know nature through our own active embodiments. As noted by Carolan (2008), our particular ways of being-in-the-world – or "dwelling" (Ingold, 2000) – make available certain embodiments over others, which may align with or deviate from these dominant cultural representations of nature.

Scholars are now taking this coding further through recent moves to identify and define a so-called "healthy dose" of nature, including the duration, frequency and type of encounter that will "best" promote people's health and wellbeing (Barton and Pretty, 2010; Shanahan et al., 2016; Cox et al., 2017). On the one hand, such efforts are being driven by the policy imperative to restate the value of nature to health in the "quantitative language of

economics" (Correia et al., 2016: 2). On the other hand, they are encouraged by the growing enthusiasm for prescribing nature-based activities – e.g. care farming, horticultural therapy, prescription trails – as a non-medical referral option for general practitioners (Bragg and Leck, 2017; Wessel, 2017). Although sympathetic to the motivations underpinning such thinking, and based on the arguments presented in this paper, we suggest the need for caution in *uncritically* or universally prescribing these doses across the population without engaging with people's unique and relational embodied priorities. As noted by Wessel (2017), a key lesson from the US National Park Prescription Initiative (Park Rx) was the importance of developing and refining individualised plans over time, tailored to specific patient needs and interests.

Normalising certain modes or forms of nature engagement over others risks overlooking or even devaluing the multiplicity of ways to be well in nature, thereby hindering efforts to promote more inclusive forms of nature access and engagement that better accommodate social, cultural and bodily diversity. Instead it may be more productive to equip general practitioners (and/or allied health professionals, such as the link workers or community connectors currently involved in social prescribing initiatives) with the questions they need to initiate meaningful discussions with patients. These questions should focus on the types of nature-based practices that may promote opportunities for positive transformations and connections in the context of each patient's embodied knowledge, competences, socio-cultural values and meanings, and wider life circumstances and histories. Whilst such conversations require time – an increasingly scarce commodity within national health services facing declining levels of public investment – it may well be time well spent if it

reduces the growing demand for health care services in the longer term (Mental Health Foundation, 2016; Baker, 2018).

Organisations tasked with the challenging remit of both protecting and enabling people to enjoy and connect with nature – whether environmental land managers, conservation charities, urban planners or landscape architects – need to understand how best to accommodate diverse sensory, physical and psychological needs within their site management, visitor communications and community engagement. Such efforts may involve reaching out beyond their usual visitor groups to organise in situ accompanied visits (Forestry Commission Scotland, 2013) with people with varied embodied needs, priorities and interests under different seasonal and social conditions. By experiencing a setting together, designers and managers may be more likely to appreciate what different people are tuning into and why, and where alternative forms of interpretation and infrastructure are needed to support navigation, orientation and enjoyment of the site (Bell, 2018). Relevant site staff (e.g. staff in learning, management, marketing, or volunteer coordination roles) could also be supported in completing short-term placements with local social charities to build awareness of the needs or interests of less typical visitors, for example, disability-specific charities or those supporting people in challenging social circumstances (e.g. homelessness).

Catering for embodied variation (human and non-human) is important both to support habitat diversity but also to counter ideas that certain natures are not “for” bodies that do not conform to the “average” in appearance or practice. If we are to fully understand and enable the links between nature (charismatic or otherwise) and human

wellbeing in a meaningful way, we need to appreciate the plurality of embodied human experience and therefore the plurality of ways to be well in the world.

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