



Research Paper

Who doesn't visit natural environments for recreation and why: A population representative analysis of spatial, individual and temporal factors among adults in England

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ABSTRACT

Contact with natural environments may be beneficial for various health and social outcomes but is often lower among groups who could benefit the most. Using data from > 60,000 adults in England, we explored the spatial (e.g. amount of local greenspace), individual (e.g. socio-economic status) and temporal (e.g. seasonality) predictors of infrequent contact and the reasons given for it. Replicating earlier, smaller studies, infrequent users were more likely to be; female, older, in poor health, of lower socioeconomic status, of ethnic minority status, live in relatively deprived areas with less neighbourhood greenspace and be further from the coast. Extending previous findings, we also identified regional, seasonal and annual effects. Although response on issues of time availability were important, being 'not interested' and 'no particular reason' were also common. Identifying the predictors of these justifications (e.g. area deprivation was predictive of 'not interested', but individual socio-economic status was predictive of 'no particular reason') sheds light on which demographic groups to engage in specific interventions designed to inspire greater interest in, and contact with, the natural world to offer more inclusive opportunities for positive experiences in nature.

1. Introduction

A growing body of evidence suggests that greater exposure to natural environments including urban parks, woodlands, nature reserves, national parks and the coast (often referred to as green and blue spaces) is associated with a range of positive health, wellbeing and social outcomes (Allen & Balfour, 2014; Cox et al., 2017; Frumkin, 2002; Hartig, Evans, Jamner, Davis, & Gärling, 2003; Hartig, Mitchell, de Vries, & Frumkin, 2014; World Health Organization., 2017). Although much of this evidence has been collected in highly developed urbanised countries, evidence is also beginning to emerge of similar patterns in the 'Global South' (Mukherjee et al., 2017). Despite these potential benefits however, there is also evidence that large sections of the population spend little or no time in these environments and are thus potentially forgoing, or remaining excluded from, these benefits (Dallimer et al., 2014; Kabisch, Qureshi, & Haase, 2015; Lee, Scott, & Floyd, 2001; Lin, Fuller, Bush, Gaston, & Shanahan, 2014; Natural England, 2015a; Roe, Aspinall, & Ward Thompson, 2016). For instance, social groups found to rarely or never visit green/blue spaces for recreation include those living in deprived areas (Burt, Stewart, Preston,

& Costley, 2013; CABE Space., 2010), and are often the very groups (e.g. lower income individuals) that may benefit the most from greater contact with the natural environment (Mitchell & Popham 2008; Parliamentary Office of Science and Technology, 2016; Wheeler, White, Stahl-Timmins, & Depledge, 2012).

However, Hitchings (2013) has cogently argued that relatively little research of any scale has been conducted into trying to better understand why individuals in these groups, or individuals more widely, do not use these spaces for recreation. For instance, he argues that although there is a growing body of important qualitative evidence on this topic (see below), quantitative work is more problematic because, "many field studies of how people relate to urban green spaces observe those found within them ... [which] in terms of research pragmatics ... is easier than ... calling in at their homes... [with] the feasibly very different wishes and requirements of those who currently stay away remain[ing] hidden from view" (p.99). The current research attempted to partially address this gap by analysing the responses of a large number of respondents who reported when interviewed at home that they rarely if ever visited natural environments.

Specifically, we used six years of data from the Monitor of

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Engagement with the Natural Environment (MENE) survey in England. We believe the MENE includes one of the most comprehensive, population level data on the reasons for using or not using, the natural environment for recreational activities of any similar survey in the world. This comprehensiveness allowed us to conduct richer statistical analyses than have been possible to date. For instance, we were able to use multivariate statistical techniques to simultaneously explore a range of spatial, individual and temporal factors which may help to characterise those of do and those who do not visit natural environments for recreational purposes regularly and to better understand the reasons given by infrequent visitors for not visiting more often.

We recognise that unlike the excellent body of rich, in-depth qualitative work in this area, our data are unable to explore the complex interplay of factors affecting visit frequency and how they relate to specific personal experiences or conditions. Nevertheless, by providing a population level picture we see our findings as complementary to this work by identifying patterns across population groups that are hard to detect in small scale qualitative studies. We begin by briefly reviewing some of the key reasons for infrequent visits to natural environments. In an empirical paper such as this, our aim was to introduce readers to some of the most important debates rather than conduct an exhaustive review of the literature. Further, although various terms are used in the field to describe the reasons people offer for not visiting nature, such as ‘barriers’ or ‘constraints’, these terms imply a latent desire to be in these spaces which is thwarted. As demonstrated previously however (e.g. [Hitchings, 2010](#)), this is not always the case and some individuals have no desire to be in these spaces in the first place, and thus limited access to them is neither a barrier nor a constraint. Consequently, we adopt the more neutral term ‘reasons’ throughout. Nevertheless to the extent that our results can detail on reasons why interested individuals do not visit more frequently, results from a sample of this size may help policy makers, practitioners and the research community identify, with more certainty, specific issues facing particular groups and therefore be able to instigate targeted interventions to support specific sectors of society achieve the access they desire (e.g. [Ambrose-Oji, 2009](#); [Koppen, Sang, & Tveit, 2014](#); [Morris et al., 2011](#); [O’Brien & Tabbush, 2005](#); [Seaman, Jones, & Ellaway, 2010](#)).

1.1. Key reasons for not visiting nature explored in earlier studies

Poor proximity from an individual’s home or work is often cited as a key reason for not incorporating routine visits to the natural environment in people’s day-to-day lives ([Akpınar, 2016](#); [Schipperijn et al., 2010](#)). Physical features such as road networks, challenging topography and limited path networks may also limit the ability of willing visitors to access these places ([Barbosa et al. 2007](#); [Dai 2011](#)). Even where there are well-connected path networks around and within local nature settings, the condition of these paths may limit use for certain groups, such as older adults with limited mobility or fear of falling ([Sugiyama, Thompson, & Alves, 2009](#)). There is also good evidence that proximity to natural spaces is related to income such that poorer areas are often more distal, with access a particular challenge for parents with small children, older adults and people living with impairment or disability ([Alves et al., 2008](#); [Ambrose-Oji, 2009](#); [Aspinall et al., 2010](#); [Burt et al., 2013](#); [McCormack, Rock, Toohey, & Hignell, 2010](#)). In other words, issues of physical access are often greatest for those who can least afford to circumvent them (e.g. travel costs) but who may gain particular benefits.

Physical access may also intersect with safety concerns, with fear of crime and physical and/or verbal abuse, often cited as potential reasons for why people avoid public greenspaces. These fears may arise from personal experiences, exposure to second-hand stories, anecdotes or media influences ([Morris et al., 2011](#); [Skår, 2010](#)). However, the issues are not clear cut [Ward Thompson, Aspinall, Bell, and Findlay \(2005\)](#), for example, highlight woodlands as a space in which teenagers feel they can ‘reassert their independence’ in contrast to wider public space

which is generally perceived as ‘for adults’. For other users, however, such as mothers with young children, young females or older adults, teenage behaviour in these places can be intimidating, reducing the frequency of visits ([S. Bell, Thompson, & Travlou, 2003](#); [Lloyd, Burden, & Kiewa, 2008](#)). In other words, one group’s demonstration of independence is another group’s source of safety concern. Incivilities within settings that are poorly maintained, and high in litter, dog fouling, dirty or unkempt areas, graffiti and vandalism can be interpreted as a sign of neglect, thereby undermining perceived safety ([McCormack et al., 2010](#); [Tzoulas & James, 2010](#)). There is evidence these fear can be mitigated by a positive perception of social integration in an area ([Seaman et al., 2010](#)).

These issues highlight that efforts to promote shared values around access and use of the natural environment need to account for socio-cultural diversity in how people perceive, value and incorporate natural settings into their everyday lives and lifestyles ([Cutts, Darby, Boone, & Brewis, 2009](#); [Kaczynski, Wilhelm Stanis, Hastmann, & Besenyi, 2011](#); [Özgüner, 2011](#)). Visiting certain settings might not even occur to people if nature-based recreation is not part of their cultural background or where individuals have been subject to discrimination through their different norms of use in the past ([Byrne, 2012](#); [Hong & Anderson, 2006](#)). [Morris et al. \(2011\)](#), for instance, suggest that these ‘restricted horizons’, i.e. limited awareness or knowledge of opportunities for accessing local nature, are particularly important among low income groups, some of whom may lack experience of, or have limited confidence in, negotiating large or complex natural sites ([S. L. Bell, Phoenix, Lovell, & Wheeler, 2014](#)). [Lin et al. \(2014\)](#) support this, they found that a person’s orientation towards nature has more of an effect on visit frequency than the geographical location to a park.

Nonetheless, [Morris and O’Brien \(2011\)](#) argue that ‘facilitated access’ initiatives can enhance the use of community woodlands amongst less confident or excluded users. These initiatives emerged as an effective approach for enabling use amongst BAME (Black Asian and Minority Ethnic) groups (especially women in these groups), older adults (particularly those coping with recent bereavement) and those with no previous experience of visiting woodlands. One aim is to provide support for those who express fears of getting lost due to a lack of confidence or wayfinding knowledge within larger nature settings ([Ambrose-Oji, 2009](#)). Such visits may also promote opportunities to develop more ‘intuitive expertise’ of such environments, described by [Skår \(2010\)](#) as ‘the accumulation and incorporation within the thinking and skills of individuals’ (p.115), though this process can take time ([Finney & Rishbeth, 2006](#)).

Socio-cultural factors affecting nature visit frequency can also be experienced as a result of lifestyle norms and social expectations. For instance, in an analysis of the 2013–2014 MENE data, ‘a lack of time’ was one of the most frequently mentioned reasons, yet the average viewer in the UK watched over three hours of television per day in 2015 ([Natural England, 2015a](#); [Ofcom., 2017](#)). This suggests a need to understand how and why people prioritise nature interaction within their daily lives, given multiple and competing time pressures and interests. [Hitchings \(2010\)](#) touched on this in the context of working practices in London where employees were, for instance, reluctant to leave the building during the day (e.g. to eat lunch in the park), for fear of compromising productivity or focus (some did not even contemplate it as an option). Similarly, [S. L. Bell, Wheeler, and Phoenix \(2017\)](#) note the challenges of spending extended periods of time in nature in a culture that prioritises speed and productivity over ‘slowness’ or relaxation.

1.2. The current research

The current research built on this literature in four key ways:

- a) First, many previous studies into reasons for not engaging more with natural environments, ([Gidlow, Randall, Gillman, Smith, & Jones,](#)

2016; Hitchings, 2010; Irvine, Warber, Devine-Wright, & Gaston, 2013; Windhorst & Williams, 2015), have used relatively small samples, limiting generalisation. A key strength of the current work is that it draws on a large national dataset that allows inferences to be made at a national population level.

- b) Second, developing on the previous descriptive summaries of the MENE data in the policy literatures (Burt et al., 2013; Natural England, 2015a), we conducted a series of multivariate regressions which included a wide range of spatial, individual and temporal factors in the same models. This allowed us to tease apart the relative importance of predictive factors that tend to co-occur (e.g. socioeconomic status and ethnicity).
- c) Third, we imported spatial information about respondents' neighbourhoods (e.g. % greenspace) allowing us to explore access factors that had not previously been investigated using the MENE data.
- d) Finally, we were able to compare the predictors of a wide variety of reasons given for not visiting nature including two that might be amenable to intervention, namely 'not interested' and 'no particular reason'. If we could identify who is giving these kinds of responses, we may be able to develop more targeted interventions to support a greater interest in natural environments and a greater wish to visit, and protect, them (e.g. Annerstedt & Wahrborg 2011; Bragg & Atkins 2016).

In short, our aim was to build on the growing literature investigating the reasons people give for not engaging more frequently with natural environments using a large representative sample of the adult population of England. This enabled us to see not only how widespread previously identified factors are across an entire country but also provided us with the sample size to explore responses such as 'no particular reason' in greater depth than has been possible to date. To the extent that these sorts of reason occur with any frequency results would highlight the possibility that simply improving the quality of, or access to, public green spaces in terms of landscape design may be insufficient in encouraging diversity of access. Rather, a richer understanding of the values, cognitions and emotions experienced by diverse populations is needed during the landscape design process to optimise societal level benefits.

2. Method

2.1. Participants

Data were drawn from the first six waves (2009/2010 – 2015/2016) of the MENE survey. Commissioned by Natural England, a government body promoting public understanding, conservation and enjoyment of the natural environment, it forms part of an in-home face-to-face omnibus survey conducted across the whole of England and throughout the year to reduce potential geographical and seasonal biases (Natural England, 2017). As part of the UK's official statistics, significant effort is put into ensuring the sample is as representative of the adult English population as possible. Full details can be found in the annual Technical Reports (e.g. Natural England, 2017) with key features including: a) "a computerised sampling system which integrates the Post Office Address (PAF) file with the 2001 Census small area data at output area level. This enables replicated waves of multi-stage stratified samples"; b) "the areas within each Standard Region are stratified into population density bands and within band, in descending order by percentage of the population in socio-economic Grade I and II." c) "maximise the statistical accuracy of the sampling, sequential waves of fieldwork are allocated systematically across the sampling frame to ensure maximum geographical dispersion."; d) "to ensure a balanced sample of adults within the effective contacted addresses, a quota is set by sex (male, female housewife, female non-housewife); within the female housewife quota, presence of children and working status and within the male quota, working status."; and e) "the survey data is weighted to ensure that the

sample is representative of the UK population in terms of the standard demographic characteristics" (p.5). Data and technical reports are available on the Natural England website: <https://www.gov.uk/government/statistics/monitor-of-engagement-with-the-natural-environment-2015-to-2016>. Although some questions are asked weekly, the questions most relevant to the current analysis, i.e. visit frequency and reasons for not visiting, were only asked monthly, providing a total sample of $n = 63,890$. Since justification for infrequent visits were only asked of those who visited less than once a month, the sample for these analyses were based on responses from 16,812 participants.

2.2. Visit frequency

Respondents were informed that they were going to be asked about occasions when they had spent time 'out of doors', where "by out of doors we mean open spaces in and around towns and cities, including: parks, canals and nature areas; the coast and beaches; and the countryside including farmland, woodland, hills and rivers. This could be anything from a few minutes to all day long. It may include time spent close to your home or workspace, further afield or while on holiday in England. However, this does not include routine shopping trips or time spent in your own garden" (Natural England, 2017 p. 11). The key question for current purposes was: "thinking about the last 12 months, how often, on average, have you spent your leisure time out of doors, away from your home?" (Natural England, 2017 p. 44), with eight response options ranging from 'more than once a day' to 'never'. Interviewers were instructed to divide respondents, based on their response to this question into two groups, those who visited nature once a month or more (i.e. frequently) and those who visited less than once a month (i.e. infrequently), with subsequent questions determined by this categorisation. Our first analysis explored the predictors underlying this distinction (i.e. what factors predicted someone being a frequent vs. infrequent visitor).

2.3. Reasons for infrequent visits

Infrequent visitors, who visited less than once a month, were then asked "why have you not spent more (any) of your time out of doors?" Interviewers were instructed to code the open-ended responses into 23 different categories. Respondents could give multiple reasons therefore 16,812 respondents contributed a total of 22,019 reasons (Table 1). Here we focused on six of the top eight reasons, all of which were reported by more than 1,000 participants which we could loosely group into: i.e. scheduling issues 'too busy at work' and 'too busy at home', contextual issues 'poor health' and 'poor weather', and issues of preference 'no particular reason' and 'not interested'. We decided not to explore 'old age' and 'a physical disability' further in the current paper, despite them being in the top eight. Preliminary analysis showed that by far the strongest predictors of these reasons were 'age' and 'disability status' respectively. Our decision to not include further analysis of these issues here is not meant to suggest they are unimportant. Rather, further analysis of the current data within the current space constraints sheds little additional light on these factors beyond that already discussed in the literature.

2.4. Area level, spatial-geographical predictors

The MENE identifies respondents as residing in one of 32,482 small neighbourhood areas in England called Lower-layer Super Output Areas (LSOAs, average population c. 1500, mean size = 4 km²).

This enabled us to import data at the LSOA level from other sources (e.g. Office of the Deputy Prime Minister, 2005) in order to characterise an individual's local neighbourhood in terms of: a) the percentage of greenspace (stratified into five categories: 0–19.99% (ref); 20–39.99%; 40–59.99%, 60–79.99% and 80–100%); b) the distance of the population-weighted centroid to the coast (Wheeler et al., 2012; dichotomised here as 0–5 km vs. > 5 km (ref)); c) area level socio-economic

Table 1

Reasons respondents could select for not visiting natural environments at all/more often in the last 12 months.

Response categories (Yes/No)	N	%
<i>Too busy at work</i>	3404	20.2
<i>Poor health</i>	3107	18.5
<i>Too busy at home</i>	2662	15.8
<i>No particular reason</i>	2470	14.7
<i>Old age</i>	2334	13.9
<i>Bad/Poor Weather</i>	1638	9.7
<i>A physical disability</i>	1559	9.3
<i>Not interested</i>	1046	6.2
<i>Too expensive</i>	802	4.8
<i>No access to a car</i>	603	3.6
<i>Have young children</i>	450	2.7
<i>Have other caring responsibilities</i>	430	2.6
<i>Prefer to do other leisure activities</i>	428	2.5
<i>Don't like going on my own</i>	312	1.9
<i>This isn't something for me/people like me</i>	229	1.4
<i>Worried about safety/doesn't feel safe</i>	147	0.9
<i>Lack of suitable places to go/suitable paths</i>	103	0.6
<i>Lack of public transport</i>	99	0.6
<i>Don't know where to go/lack of information</i>	60	0.4
<i>Pregnant</i>	59	0.4
<i>I don't feel welcome/feel out of place</i>	36	0.2
<i>Don't know</i>	26	0.2
<i>Concerns about where allowed to go/restrictions</i>	15	0.1

Responses in italic investigated further below.

deprivation (Department of Communities and Local Government, 2008), divided into five quintiles from most to least deprived (ref); and d) broad geographical or 'Government Office Region' (GOR: nine categories including London (ref), North East, South West etc.). With respect to area deprivation the quintiles are based on data for all LSOAs across England in terms of a combined 'Total Deprivation Score' derived from seven different domains; 1) income deprivation, 2) employment deprivation, 3) education, skill and training deprivation, 4) health deprivation and disability, 5) crime, 6) barriers to housing and services, and 7) living environment deprivation. For instance, barriers to housing and services 'relate[s] to the physical proximity of local services, and 'wider barriers' which includes issues relating to access to housing such as affordability and homelessness' and the crime domain refers to 'the risk of personal and material victimisation at local level' (Department for Communities and Local Government, 2015 p. 26–27). Previous studies in the UK have shown that area deprivation, using this approach, moderates the degree to which proximity to natural environments (e.g. coast) is associated with self-reported health (e.g. Wheeler et al., 2012). Due to missing LSOA data, subsequent regression analyses were based on $n = 61,512$ for visit frequency, and $n = 16,092$ for reasons for not visiting.

2.5. Individual predictors

Individual level predictors included gender (female, male(ref)); age (young adulthood 16–34yrs (ref), mid-adulthood 35–64yrs, older adulthood 65 + yrs); socio-economic status (four categories from high to low: AB (ref), C1, C2, DE); ethnicity (White British vs. other (ref)); employment status (full-time (ref), part time, retired, in education, not working); marital status (married/cohabiting vs. single/widowed/divorced (ref)); long term illness/disability (yes vs. no (ref)); children within the household (yes vs. no (ref)); car ownership (yes vs. no (ref)); and dog ownership (yes vs. no (ref)).

2.6. Temporal predictors

In the current work, temporal factors refer to the time of sampling, rather than life-course. Temporal predictors included survey wave (wave 1, March 2009 – February 2010 = ref) and the season in which

Table 2

Respondent's demographic profiles by nature visit frequency.

	Less than monthly ($n = 16,812$; 26%)		At least monthly ($n = 47,079$; 74%)	
	N	% ^a	N	% ^a
<i>Area level</i>				
<i>Neighbourhood green space</i>				
1 (0–19.99%; ref)	5528	34	13466	30
2 (20–39.99%)	4437	28	11790	26
3 (40–59.99%)	2636	16	7308	16
4 (60–79.99%)	1624	10	5523	12
5 (80–100%)	1867	12	7333	16
<i>Coastal Proximity</i>				
0–5 km	14064	87	8104	18
> 5km (ref)	2180	13	37587	82
<i>Region</i>				
East Midlands	1511	9	3636	8
West Midlands	2096	13	4587	10
London (ref)	3909	22	7981	17
East of England	1352	8	5265	11
North East	803	5	2405	5
North West	2307	14	6200	13
South East	1959	12	7598	16
South West	1230	7	4788	10
Yorks & Humber	1645	10	4619	10
<i>Deprivation quintiles</i>				
1 (least deprived; ref)	2280	14	9879	22
2	2690	17	9739	21
3	3145	19	9301	20
4	3783	23	8715	19
5 (most deprived)	4346	27	8057	18
<i>Individual level</i>				
<i>Gender</i>				
Male (ref)	7418	44	22,111	47
Female	9394	56	24,968	53
<i>Age (yrs)</i>				
16–24 (ref)	1731	10	7122	15
25–44	4284	26	16,443	35
45–64	4846	29	13,800	29
65 +	5951	35	9714	21
<i>Socio-economic status</i>				
AB (ref)	1821	11	9742	21
C1	3542	21	13,296	28
C2	3336	20	9717	21
DE	8113	48	14,324	30
<i>Ethnicity</i>				
White British (ref)	12490	74	38164	81
Other	4322	26	9815	19
<i>Work status</i>				
Full time (ref)	4588	27	17647	37
Part time	1624	10	6654	14
Retired	6583	39	11,581	25
In Education	729	4	3234	7
Not Working	3288	20	7963	17
<i>Marital status</i>				
Married/cohabiting	8116	48	27868	59
Single/widowed/divorced (ref)	8696	52	19211	41
<i>Long-term illness/disability</i>				
Yes	5904	35	7906	17
No (ref)	10908	65	27868	83
<i>Children in household</i>				
Yes	3688	22	15,413	67
No (ref)	13124	78	31666	33
<i>Owns car</i>				
Yes	9566	57	35276	75
No (ref)	7246	43	11803	25
<i>Owns dog</i>				
Yes	2534	15	11876	25
No (ref)	14278	85	35203	75
<i>Temporal factors</i>				
<i>Season</i>				
Spring	4412	26	12296	26
Summer	4441	26	12350	26
Autumn	3972	24	10924	23

(continued on next page)

Table 2 (continued)

	Less than monthly (n = 16,812; 26%)		At least monthly (n = 47,079; 74%)	
	N	% ^a	N	% ^a
Winter (ref)	3987	24	11509	25
Wave/year				
1 (2009/10; ref)	3121	19	7986	17
2 (2010/11)	2889	17	7741	16
3 (2011/12)	2742	16	7845	17
4 (2012/13)	2864	17	7680	16
5 (2013/14)	2642	16	7910	17
6 (2014/15)	2554	15	7917	17

Note: ^a Within area/individual/temporal category column percentages rounded to the nearest integer; ref = reference category in subsequent regressions.

the interview was conducted (winter = ref).

2.7. Analytical approach

Seven multivariate binary logistic regressions were used to estimate the odds (and 95% confidence intervals, CIs) of: a) Being an infrequent visitor to natural environments (i.e. < once a month); and b) reporting the six reasons for this discussed above. Due to their large number, many hundred LSOAs contained only a single respondent rendering multi-level modelling with area modelled as a level one factor inappropriate. Analyses were conducted in SPSS version 23.

3. Results

The number of respondents categorised as infrequent (26%) vs. frequent (74%) visitors within each geographical, individual and temporal category is presented in Table 2. Nearly three-quarters of the adult English population reported visiting natural environments at least monthly. More crucially for the current paper, the odds of being an infrequent visitor as a function of spatial, individual and temporal factors are presented in Table 3. The odds are lower for individuals living in areas with more greenspace (e.g. OR = 0.84 for greenest vs. least green area), within 5 km of the coast (OR = 0.78 for 0–5 km vs. > 5 km), in East England, North East, North West, South East and South West (compared to London), but higher for areas of greater deprivation (e.g. OR = 1.54 for most vs. least deprived). At an individual level, females, older adults, those in lower SES status, those with a long-term illness/disability and those with a car were all more likely to report being infrequent visitors. Those of White British ethnicity (compared to all other categories), all categories of employment (compared to full-time employment), married/cohabiting individuals, those with children in the household and dog owners were all less likely to report being an infrequent visitor. Those interviewed in spring and autumn were more likely to report being infrequent visitors than those in winter, while after the first wave respondents were less likely to be infrequent visitors. Approximately 16% of the variance in visit frequency was accounted for by these predictors combined.

The key predictors of whether or not individuals reported time as a restricting factor (both work and home) can also be seen in Table 3. Although area level factors were relatively unimportant for reporting these reasons, individuals in the West Midlands were significantly less likely to report both types of time constraint than those in London. Those in the East Midlands and North West were also less likely to report being too busy at home than Londoners. Adults aged 65 years or older, those in lower SES groups, those not in full-time employment and those with an illness/disability were less likely to report being 'too busy at work'. People without a car and respondents in wave 4 (2012/13) were also less likely to report this reason, while those interviewed in summer and wave 6 (2014/2015) were more likely to report this as a reason. In terms of being 'too busy at home', those in part-time

employment or education, married/cohabiting individuals and those with children in the household were more likely to report this reason, while those in the lowest SES category, White British respondents, those with an illness/disability, and again those with a car, were less likely to report this reason. Again, the odds of reporting this reason were higher in summer (though also spring in this case) but lower in wave 4 (2012/13).

Poor health was more likely to be reported as a reason by people living close to the coast (perhaps reflecting the tendency in the UK for older adults to retire to the coast, [Depledge et al., 2017](#)), and living in the East of England, North East, South West, and Yorkshire/Humber regions. It was also more likely to be reported by older adults, those in the lowest SES group, those in part-time employment, retirement or not working, those with a car, and those living with a long-term illness/disability. Having children in the household was associated with lower odds of reporting this reason.

Poor weather (Table 4) was more likely to be reported as a reason by individuals living in the North West and North East (compared to London), and also by those not in full-time employment, by married individuals, those with children in the household and intriguingly, by individuals in waves 4–6 (2012/13–2014/15). Those in greener neighbourhoods were less likely to say that the weather restricted their visits to the natural environment, as were those in the West Midlands, those with a long-term illness/disability, those with a car, those with dog, and those interviewed in spring, summer and autumn (compared to winter) and in wave 3 (2011/12).

Perhaps some of the most interesting results concerned predictors of those who stated either 'not interested' or 'no particular reason'. The odds of reporting 'no particular reason' were generally lower among residents of greener areas and those living near the coast and in the South West but higher among those in the East and West Midlands. They were also higher among those in lower SES categories, not in full-time employment and among respondents in summer and autumn, but lower among females, older adults, those with a disability/illness, those with a car and those in waves 5 and 6 (2013/14–2014/15). Although there were some similarities in the predictors for 'not interested', there were also some notable differences. Specifically, females, older adults and those with a disability/illness were less likely to report being 'not interested', while those not in full-time employment were, again, more likely to report this reason. By contrast, area level greenspace, coastal proximity and region (with the exception of lower odds for the North East) were not important predictors, while regional deprivation emerged as a relatively strong predictor, although individual level SES and season were non-significant predictors. Moreover, in contrast to the null effects for 'no particular reason', married/cohabiting individuals, those with children in the household and those in wave 3 (2011/12) were all less likely to report being 'not interested' while those in wave 6 (2014/15) were 1.54 times more likely to report this reason than those in wave 1 (2009/10).

Finally, although the current set of predictors accounted for a relatively large amount of the variance in the odds of reporting being 'too busy at work' and 'poor health' (52% and 41% respectively), they were less effective at explaining being 'too busy at home' (14%), 'poor weather' (8%), 'no particular reason' (11%) or 'not interested' (6.2%). This suggests there are other dynamics that may be shaping these factors, which may be linked, for example, to life-course experiences and/or broader socio-cultural influences on people's sense of nature connection and the extent to which time spent in nature can be prioritised ([S. L. Bell et al., 2014](#); [Cleary, Fielding, Bell, Murray, & Roiko, 2017](#)).

4. Discussion

The aim of the current study was to extend recent research into the reasons people give for not visiting natural environments very often ([Ambrose-Oji, 2009](#); [Koppen et al., 2014](#); [Morris et al., 2011](#); [O'Brien & Tabbush, 2005](#)), using results from a large English survey. As well as

Table 3

Logistic regressions of area, individual and temporal factors predicting those who do not visit nature at least once a month and the top three reasons given for not visiting more frequently.

	Visit frequency		Three most frequent reasons given for not visiting more often					
	Visits < Once a month		Too busy at work		Poor health		Too busy at home	
	OR	95% CIs	OR	95% CIs	OR	95% CIs	OR	95% CIs
<i>Area level</i>								
<i>Neighbourhood green space</i>								
1 (0–19.99%; ref)	–	–	–	–	–	–	–	–
2 (20–39.99%)	0.95 [*]	0.90–0.99	1.00	0.88–1.13	1.12	0.98–1.27	.93	0.83–1.04
3 (40–59.99%)	0.98	0.92–1.04	1.12	0.96–1.30	1.03	0.89–1.20	.98	0.85–1.13
4 (60–79.99%)	0.86 ^{***}	0.80–0.92	1.12	0.93–1.35	1.09	0.92–1.29	1.02	0.86–1.20
5 (80–100%)	0.84 ^{***}	0.78–0.90	0.98	0.79–1.23	1.15	0.97–1.36	.93	0.78–1.10
<i>Coastal Proximity</i>								
0–5 km	0.78 ^{***}	0.74–0.83	1.11	0.94–1.31	1.16 [*]	1.01–1.33	1.06	0.91–1.22
> 5km (ref)	–	–	–	–	–	–	–	–
<i>Region</i>								
East Midlands	1.08	0.99–1.17	0.82	0.67–1.01	1.24 [*]	1.00–1.54	.71 ^{***}	0.59–0.86
West Midlands	1.09 [*]	1.01–1.18	0.77 ^{**}	0.64–0.93	1.03	0.84–1.25	0.64 ^{***}	0.54–0.76
London (ref)	–	–	–	–	–	–	–	–
East of England	0.76 ^{***}	0.70–0.83	0.97	0.79–1.20	1.34 [*]	1.07–1.68	0.86	0.71–1.04
North East	0.82 ^{***}	0.74–0.91	0.97	0.73–1.30	1.83 ^{***}	1.44–2.32	0.95	0.74–1.21
North West	0.88 ^{***}	0.82–0.95	1.06	0.88–1.27	1.13	0.93–1.37	0.81 [*]	0.69–0.96
South East	0.79 ^{***}	0.73–0.85	0.96	0.79–1.16	1.01	0.82–1.25	0.93	0.78–1.11
South West	0.75 ^{***}	0.68–0.82	1.01	0.79–1.28	1.55 ^{***}	1.24–1.94	0.81	0.65–1.00
Yorks & Humber	0.93	0.85–1.01	1.20	0.97–1.48	1.33 ^{**}	1.08–1.63	0.89	0.74–1.07
<i>Deprivation quintiles</i>								
1 (least deprived; ref)	–	–	–	–	–	–	–	–
2	1.07 [*]	1.00–1.14	0.98	0.81–1.17	0.87	0.73–1.03	1.05	0.89–1.24
3	1.22 ^{***}	1.14–1.30	1.06	0.89–1.27	0.89	0.76–1.06	1.14	0.97–1.34
4	1.33 ^{***}	1.25–1.43	1.09	0.91–1.30	0.82 [*]	0.69–0.98	1.03	0.87–1.21
5 (most deprived)	1.54 ⁺	1.44–1.66	0.93	0.78–1.13	0.93	0.78–1.10	.97	0.82–1.15
<i>Individual level</i>								
<i>Gender</i>								
Male (ref)	–	–	–	–	–	–	–	–
Female	1.14 ^{***}	1.10–1.19	0.99	0.89–1.09	0.92	0.83–1.01	1.60	1.46–1.77
<i>Age (yrs)</i>								
16–34 (ref)	–	–	–	–	–	–	–	–
35–64	1.44 ^{***}	1.37–1.52	1.12 [*]	1.00–1.26	3.04 ^{***}	2.34–3.95	1.19	1.06–1.34
65 +	2.18 ^{***}	1.99–2.39	0.73 [*]	0.55–0.98	2.97 ^{***}	2.19–4.03	0.74	0.59–0.93
<i>Socio-economic status</i>								
AB (ref)	–	–	–	–	–	–	–	–
C1	1.37 ^{***}	1.28–1.47	0.90	0.77–1.06	1.02	0.83–1.24	0.98	0.84–1.15
C2	1.75 ^{***}	1.63–1.87	0.82 [*]	0.70–1.06	1.08	0.88–1.32	0.87	0.74–1.02
DE	2.04 ^{***}	1.91–2.18	0.68 ^{***}	0.57–0.80	1.24 [*]	1.04–1.48	0.80 ^{**}	0.68–0.93
<i>Ethnicity</i>								
White British	0.68 ^{***}	0.64–0.72	0.92	0.81–1.04	1.10	0.94–1.28	0.89 [*]	0.79–1.00
Other (ref)	–	–	–	–	–	–	–	–
<i>Work status</i>								
Full time (ref)	–	–	–	–	–	–	–	–
Part time	0.81 ^{***}	0.75–0.87	0.48 ^{***}	0.42–0.54	1.60 ^{**}	1.17–2.19	1.44 ^{***}	1.26–1.66
Retired	0.68 ^{***}	0.61–0.75	0.01 ^{***}	0.01–0.02	4.75 ^{***}	3.70–6.09	0.63 ^{***}	0.51–0.78
In Education	0.91 ^{***}	0.85–0.97	0.13 ^{***}	0.11–0.17	0.94	0.40–2.21	1.33 ^{**}	1.08–1.65
Not Working	0.91 [*]	0.84–0.99	0.03 ^{***}	0.02–0.04	4.37 ^{***}	3.48–5.48	0.97	0.84–1.11
<i>Marital status</i>								
Married/cohabiting	0.89 ^{***}	0.85–0.93	1.02	0.92–1.14	1.01	0.90–1.12	1.34 ^{***}	1.21–1.49
Single/widowed/divorced (ref)	–	–	–	–	–	–	–	–
<i>Long-term illness/disability</i>								
Yes	1.95 ^{***}	1.86–2.05	0.60 ^{***}	0.51–0.70	8.56 ^{***}	7.62–9.61	0.43 ^{***}	0.38–0.49
No (ref)	–	–	–	–	–	–	–	–
<i>Children in household</i>								
Yes	0.76 ^{***}	0.72–0.80	0.99	0.88–1.10	0.70 ^{***}	0.58–0.85	1.33 ^{***}	1.20–1.48
No (ref)	–	–	–	–	–	–	–	–
<i>Owns car</i>								
Yes	1.52 ^{***}	1.45–1.59	0.84 ^{**}	0.75–0.95	1.12 [*]	1.01–1.25	0.74 ^{***}	0.66–0.82
No (ref)	–	–	–	–	–	–	–	–
<i>Owns dog</i>								
Yes	0.60 ^{***}	0.57–0.64	0.97	0.84–1.11	0.88	0.76–1.01	0.91	0.80–1.03
No (ref)	–	–	–	–	–	–	–	–

(continued on next page)

Table 3 (continued)

	Visit frequency		Three most frequent reasons given for not visiting more often					
	Visits < Once a month		Too busy at work		Poor health		Too busy at home	
	OR	95% CIs	OR	95% CIs	OR	95% CIs	OR	95% CIs
<i>Temporal factors</i>								
<i>Season</i>								
Spring	1.07*	1.01–1.12	1.14	1.00–1.31	0.99	0.87–1.13	1.27***	1.12–1.44
Summer	1.05	0.99–1.11	1.21**	1.05–1.39	1.01	0.88–1.16	1.14*	1.00–1.30
Autumn	1.06*	1.01–1.12	1.05	0.92–1.22	1.04	0.91–1.20	1.13	0.99–1.29
Winter (ref)	–	–	–	–	–	–	–	–
<i>Wave/year</i>								
1 (2009/10; ref)	–	–	–	–	–	–	–	–
2 (2010/11)	0.93*	0.87–1.00	0.88	0.75–1.04	1.02	0.87–1.21	.94	0.81–1.09
3 (2011/12)	0.86***	0.81–0.92	0.95	0.80–1.12	0.95	0.81–1.12	.98	0.84–1.13
4 (2012/13)	0.89***	0.84–0.95	0.84*	0.71–0.99	1.02	0.87–1.20	.85*	0.74–0.99
5 (2013/14)	0.78***	0.73–0.84	1.08	0.91–1.28	1.22	1.04–1.43	1.05	0.91–1.22
6 (2014/15)	0.74***	0.69–0.79	1.40***	1.18–1.65	1.21	1.03–1.42	.88	0.75–1.03
Constant	0.14		1.94		0.005		0.307	
Nagelkerke R ²	0.16		0.52		0.41		0.147	
N	61512		16091		16092		16092	

Note: OR = Odds ratios; CI = Confidence Intervals; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

exploring the profiles of infrequent visitors, we investigated the spatial, individual and temporal correlates of six of the most frequently stated responses including time-related (work and home), contextual (poor health and weather), and preference-based (not interested and no particular reason) factors. On average, about a quarter of the population were categorised as infrequent visitors to natural environments (less than once a month), though the likelihood of being an infrequent visitor did fall consistently over the six years of the study. This is consistent with Natural England's publication finding a 'significant increase in the proportion of the population who claimed to visit the natural environment once a week' (Hill, 2017). In support of previous research into the physical factors for people visiting the natural environment (Gidlow & Ellis, 2011; Morris et al. 2011; Natural England 2015a), we also found that people with less local greenspace, and those living in more deprived neighbourhoods were more likely to be categorised as infrequent visitors. The positive relationship between the frequency of visiting the natural environment and the proximity of people's homes to the coast was a new insight, although previous work has shown that people who live near the coast are more likely to make more frequent coastal visits (White, Wheeler, Herbert, Alcock, & Depledge, 2014).

Individual level predictors of being an infrequent visitor also largely replicated previous findings, with gender, age, SES, ethnicity, employment, marital and health status all playing a role, alongside practical considerations such as the presence of children in the household and car and dog ownership (Irvine et al., 2013; Refshauge, Stigsdotter, & Cosco, 2012). Given that the survey question asked about visits in the last 12 months, season of interview should not theoretically play a role; that it did should warn future researchers to take note of temporal factors when asking these kinds of questions as people probably use heuristics and more recent temporal horizons to assess longer-time frames. Although we have no explanation for why people were more likely to report being infrequent visitors when interviewed in spring or autumn (compared to winter), at least controlling for season meant we could have greater confidence in the results of the other predictors.

Results concerning the predictors of some of the main reasons for not visiting natural environments more frequently were also instructive. Spatial factors, such as the amount of local green space and neighbourhood deprivation, had little influence on time-related issues. Instead, individual level factors (e.g. employment status and children) were more commonly associated with a perceived lack of time. Given the average amount of screen time (Ofcom, 2017; ONS., 2006), there is

a need for research to better understand the individual, social and cultural factors that might be influencing people's daily time allocations, e.g. screen time vs. nature time (or choosing screen nature over actual nature). We recognise, however, that busy/demanding modern lifestyles may reduce people's perceived capacity to integrate visits to natural environments within their routine and that the ready availability of in-home entertainment may be viewed as a 'necessity' rather than a choice.

That poor weather was significantly less likely to be offered as a reason for infrequent visits in greener neighbourhoods, among dog owners and those with a long-term illness/disability was intriguing. Further, that poor weather was not associated with SES at either the area or individual level suggests that the expense of appropriate clothing is not an issue, or it may point to the relative insignificance of weather conditions in comparison to the other structural, social and/or psychological challenges that such groups encounter in their lives on a routine basis. That people were less likely to report poor weather as a reason in all seasons except for winter suggests biases in people's ability to recall the last 12 months as a whole, rather than more recent time frames. We are unsure why people not in full-time employment or those living with a partner were also more likely to report weather as a reason, and there seems to be a need for more in-depth qualitative work to investigate these issues further.

That poor health was given as a reason for infrequent nature visits by individuals living in several regions outside of London, reflects regional inequalities in health (Marmot & Bell, 2012; ONS., 2015). This reason was also more prevalent in coastal communities which reflects a generally older, less healthy population at the English coast (Depledge et al., 2017). The suggestion that poor health may compromise nature visits highlights the need to understand and promote more inclusive, engaging nature experiences that respect and cater for diverse health conditions and contribute to quality of life despite such conditions. Thus efforts to improve access, through the provision of accessible paths, toilets, off-road scooters and site interpretation, should be accompanied by more tailored initiatives designed to provide appropriate assistance. Such support would need to facilitate people with illness or impairment to negotiate these settings safely and in a way that promotes interest, pleasure and meaning rather than exacerbating feelings of illness, impairment, exclusion or disability. This type of support is often provided by third sector organisations. In the UK context, examples include: a) accessible rambling for people living with physical impairments (e.g. <http://disabledramblers.co.uk> and <http://www.countrysidemobility>).

Table 4

Logistic regressions of area, individual and temporal factors predicting three further highly cited but potentially alterable reasons for not visiting natural environments more frequently (No particular reason; Poor weather; Not interested).

	No particular reason		Poor weather		Not interested	
	OR	95% CIs	OR	95% CIs	OR	95% CIs
<i>Area level</i>						
<i>Neighbourhood green space</i>						
1 (0–19.99%; ref)	–	–	–	–	–	–
2 (20–39.99%)	0.98	0.88–1.19	0.86*	0.75–0.98	0.91	0.77–1.07
3 (40–59.99%)	0.85*	0.74–0.98	0.83*	0.71–0.99	0.96	0.79–1.18
4 (60–79.99%)	0.89	0.75–1.06	0.96	0.79–1.16	1.03	0.81–1.31
5 (80–100%)	0.74***	0.62–0.88	0.80*	0.65–0.99	0.88	0.68–1.15
<i>Coastal Proximity</i>						
0–5 km	0.80**	0.68–0.95	0.89	0.75–1.06	1.04	0.84–1.28
> 5km (ref)	–	–	–	–	–	–
<i>Region</i>						
East Midlands	1.25*	1.04–1.50	1.10	0.88–1.37	0.76	0.58–1.00
West Midlands	2.13***	1.83–2.49	0.74**	0.60–0.92	0.81	0.63–1.03
London (ref)	–	–	–	–	–	–
East of England	0.97	0.79–1.19	1.14	0.90–1.44	0.99	0.74–1.31
North East	0.90	0.68–1.18	1.37*	1.05–1.80	0.64*	0.44–0.95
North West	1.00	0.84–1.19	1.41***	1.17–1.70	0.92	0.72–1.16
South East	0.96	0.79–1.16	1.00	0.80–1.24	0.98	0.76–1.28
South West	0.79*	0.62–1.00	0.93	0.71–1.20	0.90	0.66–1.23
Yorks & Humber	1.01	0.83–1.23	0.94	0.75–1.18	0.86	0.66–1.13
<i>Deprivation quintiles</i>						
1 (least deprived; ref)	–	–	–	–	–	–
2	1.06	0.89–1.26	0.89	0.73–1.08	1.16	0.89–1.50
3	1.07	0.90–1.27	0.98	0.81–1.19	1.33*	1.03–1.71
4	1.07	0.90–1.26	0.95	0.78–1.15	1.33*	1.03–1.72
5 (most deprived)	1.07	0.90–1.27	1.04	0.85–1.26	1.52**	1.18–1.97
<i>Individual level</i>						
<i>Gender</i>						
Male (ref)	–	–	–	–	–	–
Female	0.84***	0.77–0.93	1.07	0.95–1.19	0.69***	0.60–0.79
<i>Age (yrs)</i>						
16–34 (ref)	–	–	–	–	–	–
35–64	0.71***	0.63–0.81	0.92	0.79–1.07	0.85	0.71–1.03
65 +	0.65***	0.52–0.81	0.88	0.68–1.14	0.64**	0.47–0.88
<i>Socio-economic status</i>						
AB (ref)	–	–	–	–	–	–
C1	1.16	0.97–1.38	1.13	0.93–1.38	0.96	0.74–1.25
C2	1.24*	1.04–1.49	0.98	0.80–1.20	1.13	0.87–1.47
DE	1.32**	1.10–1.54	1.05	0.87–1.27	1.18	0.92–1.51
<i>Ethnicity</i>						
White British (ref)	–	–	–	–	–	–
Other	0.97	0.86–1.10	0.89	0.77–1.03	1.14	0.96–1.37
<i>Work status</i>						
Full time (ref)	–	–	–	–	–	–
Part time	1.19*	1.01–1.41	1.43	1.18–1.74	1.61***	1.26–2.06
Retired	1.43***	1.16–1.76	1.80**	1.41–2.03	1.85***	1.38–2.49
In Education	1.62***	1.31–2.00	1.48**	1.12–1.95	2.29***	1.71–3.06
Not Working	1.61***	1.39–1.86	1.47***	1.23–1.76	2.00***	1.62–2.48
<i>Marital status</i>						
Married/cohabiting	0.94	0.85–1.04	1.24***	1.10–1.40	0.81**	0.70–0.94
Single/widowed/divorced (ref)	–	–	–	–	–	–
<i>Long-term illness/disability</i>						
Yes	0.31***	0.28–0.36	0.60***	0.52–0.69	0.42***	0.35–0.50
No (ref)	–	–	–	–	–	–
<i>Children in household</i>						
Yes	0.81	0.72–0.92	1.33***	1.15–1.53	0.63***	0.52–0.76
No (ref)	–	–	–	–	–	–
<i>Owns car</i>						
Yes	0.77***	0.69–0.85	0.80***	0.71–0.91	0.87	0.75–1.01
No (ref)	–	–	–	–	–	–
<i>Owns dog</i>						
Yes	1.13	0.99–1.28	0.73***	0.62–0.87	1.00	0.82–1.21
No (ref)	–	–	–	–	–	–
<i>Temporal factors</i>						
<i>Season</i>						
Spring	1.02	0.90–1.16	0.76***	0.67–0.87	0.97	0.81–1.16
Summer	1.19**	1.04–1.35	0.38***	0.33–0.45	0.90	0.74–1.08
Autumn	1.24**	1.09–1.41	0.49***	0.85–1.27	1.04	0.86–1.24
Winter (ref)	–	–	–	–	–	–
<i>Wave/year</i>						
1 (2009/10; ref)	–	–	–	–	–	–

(continued on next page)

Table 4 (continued)

	No particular reason		Poor weather		Not interested	
	OR	95% CIs	OR	95% CIs	OR	95% CIs
2 (2010/11)	1.11	0.96–1.28	1.04	0.85–1.27	0.95	0.76–1.19
3 (2011/12)	1.04	0.89–1.20	0.66***	0.53–0.83	0.76*	0.60–0.96
4 (2012/13)	1.08	0.93–1.25	1.60***	1.33–1.92	0.88	0.71–1.10
5 (2013/14)	0.66***	0.56–0.77	2.16***	1.81–2.57	1.00	0.80–1.25
6 (2014/15)	0.63***	0.53–0.75	1.79***	1.49–2.15	1.54***	1.25–1.89
Constant	0.30		0.15		0.08	
Nagelkerk R ²	0.11		0.08		0.05	
N	16092		16,092		16092	

org); b) horticultural interventions for those with enduring mental health conditions (e.g. <http://www.sagesheffield.org.uk>); and c) inclusive garden design (e.g. <http://www.thrive.org.uk/>). We recognise, however that specialist schemes may not be able to support all individuals with an interest in experiencing nature despite poor health or impairment; greater consideration is therefore needed regarding opportunities to better accommodate embodied diversity within more widespread, mainstream green space interventions that aim to promote population health and well-being.

Over 20% of infrequent visitors suggested they were either not interested or had no particular reason. One possibility is that spending time in nature is not a salient part of their cultural background, upbringing, daily lives or current practices, perhaps even ‘falling out’ of the lives of earlier generations for reasons unbeknown to them. For instance, before the end of segregation, some beaches in the US state of Miami, were designated as for either “whites” or “blacks” with those designated for Afro-Caribbean Americans often associated with higher risk (e.g. strong currents). Consequently, parents avoided taking their children to these locations and family norms to visit the beach for recreation became less well established (Hollenbeck, 2016). It will be interesting to see how current efforts to increase people’s ‘connection to nature’ in the UK affect the likelihood of reporting a lack of interest for infrequently visiting nature in the coming years (Bradshaw, Stewart, & Thomas, 2017; Hunt et al., 2017; Natural England, 2015b). Although these two reasons may look similar, they had a different profile of predictors; ‘not interested’ was associated with area level deprivation, whilst ‘no particular reason’ was associated with individual level SES. Tailored interventions that engage with communities living within particularly disadvantaged areas may thus be valuable for increasing interest, while interventions that work with people in particular types of employment (the basis behind the SES categorisation used here) may be more pertinent for generating meaningful opportunities to visit that resonate with their specific life circumstances, wellbeing priorities and needs. These findings could be integrated with future qualitative and longitudinal work to explore these possibilities in greater detail, although it should also be recognised that not wanting to engage with nature is a perfectly reasonable choice and there is a need to respect these preferences rather than assume people will become interested “if only we show them how”.

4.1. Study limitations

Despite the representativeness of the overall survey for England, we recognise several limitations. Firstly, this was an in-home interview and thus had various demand characteristics. Since the survey is about visiting the natural environment, social desirability bias may have encouraged people to report making more visits than they actually did. If so, this would lead to an overestimation of the proportion of the population who visit nature frequently. Moreover, the reasons these people might have given for not visiting more often might have been different from those who openly acknowledged infrequent visits, but because the former group were not asked this question we have no data

on this. Indeed, it may be that the distribution of reasons for not visiting more frequently than once a week differ from those explored here (< monthly) and research could explore this issue using different thresholds in future.

As already noted, asking people to recall visits over the last 12 months can lead to unreliable recall (Schwarz, Kahneman, & Xu, 2009). The evidence of a seasonal effect in the present findings supports this suggestion, because there should be no seasonal effect if people have recalled all 12 months accurately. In a survey as large as the MENE it might be more sensible to ask about visits in the past four weeks (a time frame considered to produce reasonably accurate answers for many health-related surveys, e.g. General Health Questionnaire, Goldberg & Hillier, 1979) and then explore seasonal effects by referring to the interview date.

Due to space constraints we were unable to explore the less frequently stated reasons. Many of these are potentially interesting avenues for more in-depth exploration and interventions e.g. ‘This isn’t something for me/people like me’ and ‘Don’t like going on my own’. As we wanted to explore the same large set of spatial, individual and temporal factors in all regressions (to aid comparability of results), we limited analyses to only six reasons stated by at least 1000 individuals (> 6%). Although many reasons were not that common in the current dataset, they could be applicable to many thousands of people nationwide. Similarly, further exploration of the influence of ethnicity was considered, however there was limited data to allow for a robust statistical analysis (< 10% non-White British).

We also recognise that the spatial variables imported into the dataset (e.g. greenspace coverage and coastal proximity) were relatively simplistic metrics; greenspace, for instance, was simply operationalised as the percentage of local land cover designated as ‘greenspace’ and there was no metric to account for the type, quality or accessibility from people’s homes to any of this greenspace, despite all of these factors being found to be important in previous work (Marselle, Irvine, Lorenzo-Arribas, & Warber, 2015; Tyrväinen, Mäkinen, & Schipperijn, 2007). Similarly, the coastal measure was based on a straight-line distance to the coast from the population-weighted centroid of the local area. Future work could build on this by calculating the road/path network distance to key environments, such as the coast or woodlands within the UK (Koppen et al., 2014), and more clearly differentiate different types of coastal setting (e.g. managed, cliff/beach, urban/rural etc.) as these have quite different visit profiles (e.g. Ambrose-Oji, 2009; Elliott, White, Taylor, & Herbert, 2015). For instance, in Norway, Koppen et al. (2014) mapped different recreational landscapes and used network analyses to identify the accessibility for different populations based on housing location. Demonstrating an approach that might be useful more broadly for town planners, they recognised that different user groups have different thresholds or critical travel distances which affects their ability to engage with recreational landscapes and calculated actual distance rather than linear distance. On a related point, the current data say little about the potentially poor quality of local greenspaces, in terms of access, amenities, biodiversity etc., being a factor in people not wanting to visit them and future surveys may want

to include these kinds of consideration.

Finally, we also acknowledge that the current findings reflect the recent situation among adults in England and we are uncertain how well they generalise to populations in other countries, to children, or to future generations. Similar work in other countries, preferably also including children and longitudinal work over time, would help address these shortcomings and broaden our understanding of these issues globally.

4.2. Study implications

Although many of our findings replicate earlier work, a key strength of our study is the large representative nature of the sample, which offered several advantages. First it allowed us to observe annual trends, identifying a year on year decrease in the total number of infrequent visitors to the types of natural environments included in the survey. This trend was far less visible in the raw data (Table 2) than in the adjusted data (Table 3) and thus only emerged after controlling for a range of other factors, representing a distinct advantage over previous descriptive work (Natural England, 2015b). Second, it enabled us to examine how frequently certain reasons are cited across the population of England. Although previous work has identified similar reasons for not visiting nature more often, it has been unclear how common these are at the population level, and thus which issues to prioritise in current and future intervention efforts. Third, and relatedly, being able to conduct relatively extensive multivariate analyses helped us unpack the relative importance of different factors previously identified simply as “important”. For instance, two of the strongest predictors of being an infrequent visitor, that were similar in size, were being in the lowest vs. highest SES category (OR = 2.04) and having a long-term disability (OR = 1.95). Both were considerably more important than, say, being female (OR = 1.14) or living in the West Midlands (compared to London, OR = 1.09), despite these also being significant.

In a situation of scarce resources, such insights might help decision-makers focus and tailor their interventions within areas and amongst populations where they could have the largest impact. For example, living in the West Midlands was the strongest predictor (OR = 2.13) of infrequent visitors citing ‘no particular reason’ for their lack of engagement with the natural environment types included in the survey; working with these communities to identify more appealing nature experiences in their local area may therefore be effective in reducing this reason in this location. Similarly, one of the strongest predictors of feeling ‘too busy at home’ to engage with these natural environments was having children in the household (OR = 1.33). Thus rather than targeting a region (as with the ‘no particular’ reason), interventions with respect to this reason might instead aim to work with parents of young children to identify appropriate forms of support that would help them to access local parks and other greenspaces in ways that could potentially benefit both parents and children alike.

Given the tendency for many people to feel ‘too busy at work’ to engage with nature, there is perhaps a need to facilitate the integration of more time-efficient nature experiences into the working day, be it through greening work commutes and offices (Haaland & van den Bosch, 2015; Žlender & Ward Thompson, 2017), promoting a better outdoor break culture within office environments (Hitchings, 2010), or offering more virtual forms of nature ‘access’ within offices themselves, promoting at least fleeting moments to tap into the more restorative properties of nature within the workplace (Kaplan, 1993). Initiatives such as the National Health Service Forest scheme in the UK (<http://nhsforest.org/>), has seen tree planting increase value added to the areas surrounding hospitals, providing an opportunity for staff as well as patients to benefit from the greening of landscapes, also reflecting the historic importance of hospital gardens (Thwaites, Helleur, & Simkins, 2005).

5. Concluding comments

To conclude, the present research compliments the growing body of mainly qualitative work investigating who does and does not visit natural environments for leisure and recreation and the reasons why infrequent visitors say they do not visit more often. Although many of the predictors and reasons will be familiar to those in the field, the large sample size in the current analysis allowed us to explore the relative importance of different spatial, individual and temporal factors in a way that is seldom achievable, and to identify sub-groups for whom specific reasons for not visiting nature more often are particularly salient. Although designers of interventions to encourage greater contact with natural environments need to be mindful of the limitations of this self-report data, they could nonetheless look to the predictive power of the different predictors of the different reasons in order to identify groups who it might be most effective to engage in specific tailored interventions.

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