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Research Report

Connection with Nature in the UK during the COVID-19 Lockdown

by Tania Lemmey

In association with the Centre for National Parks & Protected Areas, University of Cumbria.

Centre for National Parks & Protected Areas

University of Cumbria

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Connection with Nature in the UK during the COVID-19 Lockdown

Executive Summary

Research focus

This study explores experiences of nature during the UK COVID-19 lockdown and associated changes in attitudes to nature, nature connection and pro-environmental behaviours.

Research methods

Data was collected by means of a bespoke online survey which was open to adults aged 18 years and over and resident in the UK during lockdown. Data collection took place from 29 May to 14 June 2020.

The mixed methods approach involved anonymous self-reporting of attitudes and behaviours using multiple choice options and rating scales, plus free text responses.

704 people participated, representing all adult age groups across England, Scotland and Wales. There was insignificant uptake from residents of Northern Ireland.

Key findings

- There has been a large increase in desire to spend time in nature among adults in the UK. 72% of women and 60% of men reported that they are more likely to spend time in nature in future, following lockdown.
- Lockdown saw all age groups spending more time in nature daily.
- 66% of the parents/guardians surveyed say their children have been spending more time than usual in nature during lockdown (only 16% report less time than usual).
- Listening to birdsong was the most common way adults noticed nature during lockdown (94% of respondents), followed by watching wildlife (87%) and taking time to notice bees or butterflies specifically (83%).
- More than a third of respondents had intentionally studied nature in detail during the UK lockdown, for instance by learning to identify trees or birds.
- UK adults have engaged with social media and other media in relation to nature more often than before lockdown, with the increases being greater among women than men.
- 77% of respondents had taken a photograph or video recording of nature during lockdown.
- There has a been a large increase in UK adults speaking about nature with friends and family during the lockdown (two-thirds of respondents report doing this more often).
- The results suggest experiences during lockdown may be associated with increased nature connectedness among the UK adult population. 95% agreed with the statement 'Spending time in nature is very important to me' and 99% agreed with the statement 'I find beauty in nature'.

Compared with before lockdown:

- 70% of respondents say they will be more likely to notice nature in their local area in future and only 0.1% say they will be less likely to.

- Most respondents who have a yard or garden say they are now more likely to encourage nature in their yard/garden in future and no respondents indicated they are less likely to do so.
- 57% of young adults aged 18-30 years say they are more likely to consider global environmental issues in future.
- Parents and carers in the UK are now considerably more likely to encourage their children to spend time in nature in future, according to the survey results.

Participant quotes

Noticing neighbourhood nature:

"the variety and extent has surprised me - been much more aware of surroundings and local wildlife"

"…there's a lot more species than I realised right on my doorstep. But I also realised that I'm not within walking distance of a park or green space."

"The wide variety of birds, plants and trees. I have started to study their history and how to identify them."

Memorable moments in nature:

"Sitting hearing no sound except for birdsong. No cars no planes, no people. Wonderful."

"Laying under a tree and realising I need to be amongst nature for my mental wellbeing."

"Exploring a new place locally"

Changing opinions about the natural world:

"Lockdown has made me appreciate nature even more than before."

"I have been encouraged by the way nature has begun to recover during lockdown. It is of supreme value."

"We need to work to preserve it, it's not going to just happen"

Significance

In combination with a review of media articles and related research, the survey data contributes to the understanding of people's experience of nature in the UK during the COVID-19 lockdown and changes in attitudes to nature arising from this time.

The work may be of interest in relation to nature conservation, climate change mitigation, environmental education, outdoor leisure, health and wellbeing and residential environments.

Shifts in public attitudes to nature may be informative in the implementation of any 'green recovery' from COVID-19 and the coronavirus restrictions.

Connection with Nature in the UK during the COVID-19 Lockdown

Introduction

The aims of this study are:

- to investigate experiences of nature since 23 March in the UK, and changes in attitudes to nature and perceived connection with nature resulting from this time.
- to consider the qualities of local experiences of nature during the UK coronavirus 'lockdown'.

The UK lockdown from 23 March 2020 in response to the spread of the novel coronavirus necessitated widespread changes in the patterns of daily life for UK residents. The types of permitted exercise and the stay-at-home guidance meant that the location, duration and purpose of time spent outdoors in nature is likely to have differed from usual during this time. This may have impacted on individuals' experiences of nature and connection with nature. Anecdotally and through various media channels, widespread attention to simple experiences of nature and appreciation of nature during the lockdown has been apparent.

This study investigates the qualities of people's experiences in nature during the lockdown and possible impacts of these experiences on individuals and society. The data collection via electronic survey explored changes in duration of time in nature, ways in which people have noticed nature, social activities relating to nature and connection with nature relating to this time. Anticipated pro-environmental behaviours resulting from the lockdown period were also surveyed. Some of the data collected is comparable with established data sets by using previously published measurement tools, such as the Nature Connection Index developed by Natural England.

The findings of the study may be informative for individuals and organisations with an interest in, for example: nature conservation, climate change mitigation, education, outdoor leisure, health and wellbeing, and residential environments.

Context

In the early months of 2020, the coronavirus outbreak expanded in the UK and from the evening of 23 March the UK government instructed everyone in the UK to stay at home, except for a few limited reasons (Johnson, 2020). In the ensuing weeks of the international health crisis and resulting economic and social difficulties, these concerns dominated the broadcast and print media. Nonetheless, items about nature also arose as a theme in current affairs reporting.

Initially, articles in the press highlighted nature's response to the new circumstances. Animals wandering deserted urban areas illustrated the contrast with previous busy streets where humans had dominated and were presented as good news (Gibbs, 2020; The Guardian, 2020). Some articles explored the benefits to wildlife further such as Helena Horton writing in the Telegraph who considered impacts of the lockdown on species of fish, birds, insects and mammals (Horton, 2020). The development of new studies of animal behaviour in Wales was reported, describing the unique situation as a 'massive experiment' (BBC News, 2020a). There were reports of cleaner air in cities and reduced greenhouse gases (BBC News, 2020b). The improved air quality led to impressive new views of the sky from cities worldwide (Robertson, 2020). Some commentators also looked to the future, speculating on whether such dramatically different sights could provoke a 'greener' response from humanity after the Covid-19 crisis (Fuller, 2020).

Another group of items began to appear in the media: focusing on personal experiences of nature. For instance, the BBC news article *Coronavirus: Lockdown leads to walkabout discoveries* tells the stories of several people across England who, during the lockdown, have discovered, explored or accessed for the first time the nature reserves or green spaces on their doorstep (Bevis, 2020). In the article *Noticing nature is the greatest gift you can get from lockdown* Lucy Jones, writing in The Guardian, discussed the wellbeing benefits of connecting with nature during this unique situation and proposed that 'there is comfort and reward to be found just by being curious about your surroundings' (Jones, 2020). Jones shared her own experiences: "it is only by being in lockdown that I have seen new treasures that I'd previously have overlooked." Furthermore, the article attracted over 500 comments online, with many people sharing their own experiences of nature and seemingly the joy, comfort or wonder these simple encounters had provoked. Experiences of nature in lockdown, particularly resulting from daily local walks, appeared to be prominent across social media platforms: in photographs and anecdotes. What have we noticed anew in our neighbourhood nature?

It is likely that people have valued the health and wellbeing benefits of time outdoors during lockdown, whilst other exercise and leisure opportunities have been drastically limited. However, the extent to which different demographic groups have experienced time in nature will have varied. For instance, around 2.5 million people in the UK were instructed to shield indoors throughout April and May 2020 (Kleinman, 2020). This study also explores factors such as age, geographical region and neighbourhood green space in relation to experiences of nature during lockdown. This provides scope to investigate equality of access to the benefits of time in nature during lockdown.

Those people who were not shielding were permitted, perhaps encouraged, to take one form of exercise outdoors each day such as walking or cycling, this being beneficial for physical health and fitness (NHS,

2019). The mental health benefits of time in nature are also evidenced by research and promoted in UK society (Mind, 2018; White, 2019) In the April 2020 interim dataset from the new People and Nature Survey for England, 88% of adults in England agree or strongly agree that "greenspaces are good places for mental health and wellbeing" (Natural England, 2020d). Specific to the lockdown situation, commentators discussed the health and wellbeing opportunities of time in nature, such as Madeleine Cuff writing for i-news who advised on specific ways to engage with nature in lockdown for mood and mindfulness benefits and hypothesises on the importance of nature during lockdown (Cuff, 2020). This study sets out to explore the significance of connecting with nature during this time for individuals across the UK.

In this study, the possibility of sustained changes in attitudes and behaviours resulting from experience of nature during the UK lockdown is also considered. Gaby Hinsliff, in The Guardian, makes a case for action, building on connection with nature and garden areas during the UK lockdown in the opinion piece *Lockdown has made us see the natural world anew – let's not waste it.* Hinsliff makes recommendations for areas such as health and gardening, farming, food production, urban planning, wild play and environmental campaigning, utilising the perceived new connection with "our surroundings we used to be too busy to take in". (Hinsliff, 2020)

As the UK lockdown eases there is considerable interest in a 'green recovery' as reported in the Ipsos report *Now What? Climate Change & Coronavirus* (Long *et al*., 2020). The authors also present 5 ways in which learning from COVID-19 may be applicable to climate change and discuss the results of recent international polls, concluding that the majority of people worldwide and in Great Britain support a 'green' economic recovery from COVID-19. This study could shed light on how experiences of nature during lockdown have affected environmental attitudes and behaviours.

To develop this study, several areas of existing knowledge need to be considered:

(i) UK residents' experiences in nature and environmental attitudes prior to the coronavirus outbreak.
(ii) Significance of engaging with nature for the individual.
(iii) Methods of surveying nature connection.
(iv) Any association between activities in nature and pro-environmental attitudes and actions.

Experiences in nature and environmental attitudes prior to lockdown

A major source of data regarding engagement with nature in England is the Monitor of Engagement with the Natural Environment (MENE) study which ran from 2009 to 2019, surveying adults and children. The focus is time spent in the natural environment. Additionally, the study looks at other ways of engaging with nature and at pro-environmental behaviours (Natural England, 2020b). Publications resulting from the MENE study include the *MENE summary report on nature connectedness* (Natural England, 2020a) and there is scope for further analysis of the publicly available data. The MENE has now been replaced by the People and Nature Survey for England, collecting data about: enjoyment and access to the 'natural environment'; impact on wellbeing; and people's understanding of and attitudes to nature (Natural England, 2020c).

Scotland's People and Nature Survey (SPANS), commissioned by Scottish Natural Heritage in 2013-14 and 2017-18 provides data on outdoor recreation type and frequency, perceived benefits of outdoor recreation and opinions on provision of greenspace for recreation in Scotland. Several special interest reports of findings from the SPANS are available, such as *Engagement with the Natural Environment* (Scottish Natural Heritage, 2014) and *The Benefits Associated with Visiting the Outdoors* (Scottish Natural Heritage, 2018).

The Wales Outdoor Recreation Survey (WORS) was a large survey of engagement with nature in Wales between 2008 and 2015. Reporting on the WORS data, Sue Williams presents aspects of outdoor recreation in Wales which could be compared with experiences during lockdown, such as percentage of outdoor visits close to home and types of outdoor activity. The report also provides insight into levels of pro-environmental behaviours in Wales and finds links between outdoor recreation and care for the environment (Williams, 2016). Since 2016, the WORS has been replaced by the National Survey for Wales. The National Survey for Wales considers participation in outdoor activities, motivation for participation and several aspects of attitude to nature such as concern for biodiversity and climate change (Natural Resources Wales, 2020).

The abundance of data from these large surveys in England, Scotland and Wales enables a picture to be built of UK residents' experiences of nature, ways of engaging with nature and environmental attitudes prior to the coronavirus outbreak. A 2018 report in Northern Ireland recommended the use of a public survey like SPANS or MENE to gauge "the recreational use of greenspaces and its impact on health and well-being" (Coldwell, Rouquette & Holt, 2018, p. 28). Such a study does not yet appear to be available regarding residents of Northern Ireland. However, Outdoor Recreation Northern Ireland commissioned a survey of the population in May 2020 regarding engagement with the outdoors during the COVID-19 lockdown specifically (Outdoor Recreation Northern Ireland & 56 Degree Insight, 2020).

Significance of engaging with nature for the individual

It is uncontroversial to state that time in nature, particularly participating in certain activities outdoors, can be beneficial to an individual's health and wellbeing. For example, nature may provide opportunities for physical activity, for relaxation and for learning. For example, the SPANS report *The benefits associated with visiting the outdoors* states that of those surveyed who visit the outdoors, 64% report improved physical health and 67% say it helped them de-stress, relax and unwind (Scottish Natural Heritage, 2018). A recent research publication using MENE data concludes that garden use is associated with both wellbeing and physical activity (de Bell *et al.*, 2020).

For wellbeing benefits, an important concept is connection with nature, rather than simply spending time in nature. The *MENE summary report on nature connectedness* concluded: "…nature connectedness is a significant factor in relation to wellbeing…" (p. 5) but it is also noted that "…nature connectedness does not simply mirror visit frequency and is clearly being influenced by other factors." (Natural England, 2020a, p. 12).

The study *Beyond knowing nature: Pathways to nature connection* explores how people gain a connected relationship with nature (Lumber, Richardson & Sheffield, 2017). The authors conclude: "Activities that involved contact, meaning, emotion, compassion and beauty were found to be both

indicators of, then pathways towards nature connectedness. There is a need to move beyond a superficial contact with nature or focussing exclusively on knowledge and identification, when fostering a relationship with nature." (p.21).

A recent report *Noticing Nature* also associated developing a connection with nature with wellbeing. Participants in the study diarised their perceived benefits of taking part in a 7-day 'noticing nature' challenge (National Trust & University of Derby, 2020). The reported benefits of noticing nature were categorised as: "mindful", "liberated", "togetherness" or, "self-worth" and more than half of participants said they would do something different because of taking part (p. 42).

In summary, knowledge of ways of connecting with nature and the links between nature connection and wellbeing can be used to inform the current study. It could be hypothesised that if lockdown has provided increased time in nature, opportunities to notice nature daily, or connection with nature, then corresponding wellbeing benefits may have resulted.

Association between activities in nature and pro-environmental attitudes and actions

A recent study investigates pro-environmental behaviour and its association with neighbourhood nature, nature visit frequency and nature appreciation, using data from the MENE survey (Alcock *et al.*, 2020). The authors conclude: "We found that people with higher appreciation of nature and those who spent more recreational time in natural settings were also more likely to report engaging in a range of pro-environmental behaviours" (pp. 8-9). Exposure to neighbourhood nature, specifically, was also associated with a greater level of participation in pro-environmental behaviours. These findings suggest that if the lockdown has changed recreational time in nature, exposure to neighbourhood nature then changes in participation in the associated pro-environmental behaviours might also be found.

The *Noticing Nature* report also studies factors linked with 'pro-nature conservation behaviours' and the significance of noticing nature relative to other factors such as time spent outdoors. The study found that nature connectedness and noticing nature are far more influential than time outdoors and knowledge about nature in people taking conservation action (National Trust & University of Derby, 2020). Accordingly, the extent of noticing nature and nature connectedness during lockdown warrants exploration with a view to the possible impacts on conservation behaviours.

Research findings during the UK lockdown

During the project timeframe, new studies of engagement with nature and attitudes to the environment resulting from UK lockdown have emerged. The findings of some of these are considered below.

On 10 June 2020, the BBC reported on a recent survey of 500 children and 1,500 parents, commissioned by a group of environmental and mental health organisations. "Almost 60% of the parents surveyed said their children "have taken more interest in nature" since the lockdown began and many felt more time outdoors connecting with the environment was one of the best things to come out of the lockdown period." (BBC Newsround, 2020). There were also found to be wellbeing benefits to adults of being outdoors with their children during lockdown, health benefits to some children of decreased air

pollution and a desire from two-thirds of parents for schools to include at least one lesson per day outdoors in future.

A study carried out in May 2020 in Northern Ireland reported on benefits of spending time outdoors during the lockdown: “84% of people reported feeling physical health benefits and 90% reported benefits related to mental health and wellbeing such as feeling more relaxed or revitalised” (56 Degree Insight, 2020).

A ‘green’ recovery?

Results from a large international survey on 16 - 19 April 2020 indicated that two-thirds of the British public consider climate change to be as serious a crisis as Covid-19. Furthermore, twice as many people agreed than disagreed that the Covid-19 crisis will lead to “more people fighting for changes to protect the environment” (Ipsos MORI, 2020). However, 46% of respondents in Great Britain agreed that “The government should focus on helping the economy to recover first and foremost, even if that means taking some actions that are bad for the environment” (Beaver, 2020).

Writing on the Natural England blog, the Head of Sustainable Development, Mike Burke summarises lessons learnt from the coronavirus pandemic thus far, regarding nature. These include the value of nature to society, importance of nature for personal wellbeing and inequality of access to nature across the UK. With regards to the latter, a plan for nature recovery in the North of England is discussed. Burke recognises the opportunities for the UK to make a ‘green recovery’ from the coronavirus outbreak and suggests that the crisis has shown that local communities “will act around a shared purpose if the imperative is strong enough” (Burke, 2020).

This research will explore aspects of UK adults’ experiences of nature and attitudes to the environment during the lockdown, with attention to new habits formed in this time, personal experiences of nature and links to environmental values.

Research Design

The research design and analysis were undertaken by the author with advice from Dr Chris Loynes, Reader in Human Nature Relations, Centre for National Parks & Protected Areas, University of Cumbria.

Ethical approval was sought and gained from the University of Cumbria prior to data collection.

Data collection was carried out via bespoke online survey. This was open from 29 May to 14 June 2020. The survey was distributed via the author and supervisor's social media networks with public sharing encouraged. There were 704 respondents.

The survey was intended for adults aged 18 years and over and resident in the UK during the UK coronavirus lockdown. Compliance with these criteria was encouraged by way of a participation statement and supplementary questions.

Methodology

In composing the survey questions, a mixed methods approach was chosen as most suitable. Quantitative data provided by multiple-choice responses to closed questions was desirable:

- to enable straightforward comparisons between demographic groups.
- to measure change in simple factors such as 'time spent in nature' before and during lockdown.
- to enable comparisons with established numerical data sets such as MENE data.

Qualitative data provided by free text responses to open questions was desirable:

- to provide a richer insight into individuals' experiences of nature during the lockdown.
- to enable reasoning and detail to aid interpretation of quantitative data.
- to reveal themes in participants' experiences of nature during the lockdown beyond those anticipated by the author.

The initial questions were of a demographic nature. Questions on gender, age and neighbourhood green space were included as their significance in nature connection was indicated in previous studies (Natural England, 2019b; Scottish Natural Heritage, 2014; Williams, 2016). A question on lockdown status was deemed relevant because UK government advice on spending time outdoors during the lockdown differed according to clinical vulnerability to COVID-19 and occupational need (Cabinet Office, 2020). A question on household composition was included to support investigation of children's use of the outdoors. Further demographic questions were excluded for brevity.

Questions on time spent in nature before and during lockdown, noticing nature, attitudes to nature and pro-environmental behaviours were included, being within the scope of the research aims and inspired by existing studies (Alcock *et al.*, 2020; National Trust & University of Derby, 2020; Natural England, 2020a). For instance, the recent *Noticing Nature* report identified seven significant 'noticing nature behaviours', such as watching wildlife; listening to birdsong and watching clouds and provides some data on the frequency of noticing nature behaviours in the sample studied (National Trust & University of Derby, 2020). Questions were devised to explore the prevalence of similar noticing nature behaviours during the coronavirus lockdown.

The Nature Connection Index (NCI) developed by Natural England for the MENE study was adopted to assess nature connectedness during lockdown. The six statements used to determine a value on the NCI include "I always treat nature with respect", "Being in nature makes me very happy" and "I feel part of nature" (Natural England, 2020, p.9). Responses on a 7-point scale of agreement/disagreement were combined using a point weighting index to generate a value from 0-100 on the NCI in accordance with the published procedure (Natural England, 2017). The response scales for other questions were generally 5-point scales to enable a simpler user experience. Three open questions were chosen to further explore participants' nature experiences and changes in attitudes to nature during the UK COVID-19 lockdown.

'Nature', 'the natural world' and 'time in nature' were not defined in the survey. Respondents were free to decide what qualified as time in nature for themselves and this did not appear to be problematic.

Limitations of the research methods:

Survey respondents were not a random sample of the UK adult population, nor weighted to UK demographics. Therefore, the resulting data cannot be interpreted as statistically representative of the UK adult population. An element of bias is inherent in the distribution method: it is likely that those with an existing interest in nature connections and/or linked with the social groups of the author will be over-represented among the survey respondents.

Further demographic detail may be significant in exploring nature connection in the UK during the Covid-19 lockdown. Specifically, neither ethnicity nor socio-economic status were surveyed, yet these have been linked with access to neighbourhood green space, inequality of access to this during lockdown, and with pro-environmental behaviours (Duncan, et al., 2020; Natural England, 2019b).

For the first two Nature Connection Index (NCI) indicator statements, the unrevised wording from a trial version of the NCI was used accidentally. The wording was strengthened from "I find beauty in nature" and "I treat nature with respect" to "I always find beauty in nature" and "I always treat nature with respect" in the final version of the NCI used by Natural England. However, it was noted that "the impact of strengthening the statement wording was limited" (Natural England, 2017, p. 22).

Due to the time constraints and ethical approval processes associated with conducting research during the COVID-19 lockdown, this survey was not open to children. Yet, the experiences of young people under 18 would be valid and welcome in understanding nature connection in the UK during the COVID-19 lockdown and any changes in attitudes to nature resulting from this time.

Some questions required respondents to report on past behaviours and to predict their future behaviours. The resulting data can be viewed as an indication of behaviour and attitude but may not be accurate.

All data required anonymous self-reporting by the respondents and so none is empirically verifiable; this limits the reliability of the data. However, there are strengths in the methodology which make reliability unlikely to be problematic, as discussed below.

Strengths of the research methods:

Questions were constructed with a neutral wording as far as possible, such as 'To what extent do you agree or disagree…' and 'Has your experience of lockdown changed your opinions about the world in any way?'. Questions were phrased without including assumptions, for example 'have you done any of

the following?' rather than 'which of the following have you done?'. Response scales had equal numbers of agree / disagree options and included a neutral option. Each of these methods seeks to avoid influencing the participant and as such the data collected has a high degree of reliability in representing the genuine opinions of the participants.

Participation was entirely voluntary and anonymous which also positively impacts reliability as there are no extrinsic incentives for a participant to rush, exaggerate or provide false information in completing the survey.

The survey took place during a period of significant restrictions or 'lockdown' imposed in response to the spread of coronavirus in the UK, thus the data gathered was, largely, contemporaneous to the experiences being investigated, which positively impacts reliability. The value of contemporaneous data is the justification for distribution of the survey via the author's social media channels. This was a pragmatic approach with limited timescale and resources.

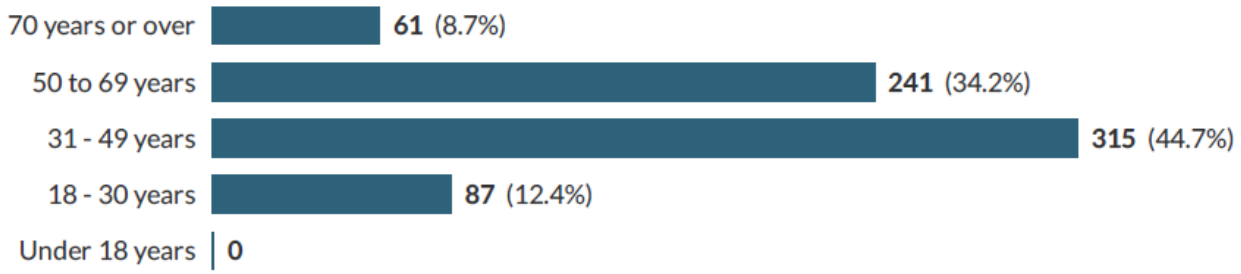
The survey response was large for its type and was shared widely beyond persons known to the author. This reduces biases by age, region and socio-economic group which are likely present in the author's immediate social media connections. The data set is sufficiently large for meaningful statistical analysis including, in some cases, when broken into demographic sub-groups.

Results Section 1: Demographic data

Age profile of respondents

There is a reasonable spread of responses across the age groups surveyed, as shown in Figure 1, when compared with the most recent UK population estimates (albeit not all the age groups used are directly comparable with UK census data). However, people in the UK aged 70 years or over are underrepresented among the survey respondents, at 8.7% of respondents as opposed to the estimated 13.5% of the UK population they make up (Office for National Statistics, 2020).

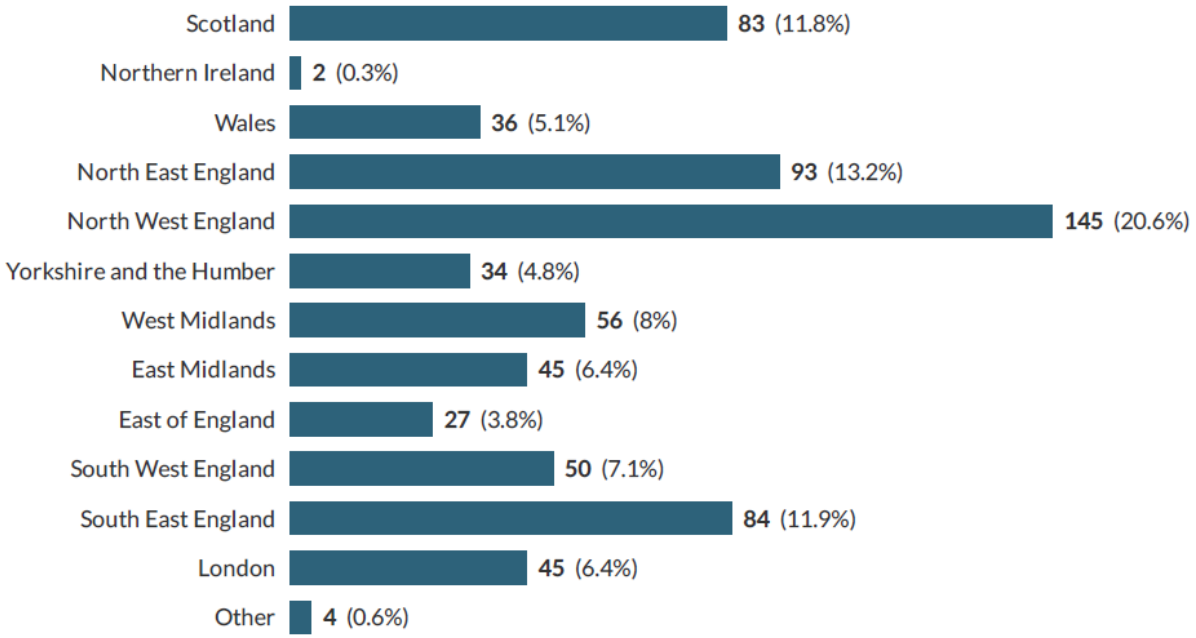
Figure 1. Age profile of respondents



Geographical region of residency

The residency profile of respondents is shown in Figure 2, below. Residents of Scotland were over-represented at 11.8% of survey respondents as opposed to 8.2% of estimated UK population. Residents of Wales were close to proportionally represented at 5.3% of respondents compared with 4.7% of the UK population. Residents of Northern Ireland did not participate in the survey in significant numbers and so will not be considered as a unique data set in the analysis. The spread of responses from the regions of England is wide, with responses from all regions and a bias towards the North West of England where the survey originated.

Figure 2. Residency profile of respondents



Gender profile of respondents

Approximately two-thirds (65%) of the survey respondents were women, which introduces a significant gender bias in the results in comparison to the population of Scotland, England and Wales, of whom 51% are female (National Records of Scotland, 2019; Office for National Statistics, 2018). 32% of respondents were men and 3% preferred to self-describe or preferred not to say.

Household Composition

Two-thirds (66%) of respondents lived in an all-adult household i.e. without under-18s. This is approximately representative of UK household composition as, according to 2019 estimates, 71% of UK households have no dependent children vs 29% which do include dependent children (Office for National Statistics, 2019a). These statistics however are not directly comparable with the survey data which was based on individuals rather than households and on age of children rather than dependency.

Of the 34% of respondents living in a household with children, 60% belong to households including children under 13 years of age, whereas the remaining 40% belong to households including adults and young people 13 years and over. The age categories were chosen because prior data shows a markedly low level of nature connection among young people aged 13-18 years (Natural England, 2020a).

Neighbourhood access to green space

Results for urban / rural classification of respondents' neighbourhoods are illustrated in Figure 3. The majority of respondents (59%) lived in urban, town or fringe locations with nearby green spaces. Village or rural residents accounted for 38% of respondents and only 4% of respondents lived in urban areas with little or no green space nearby. The apparently low proportion of respondents in the latter group may have been influenced by a broad interpretation of these terms, as neither were defined in the survey. In contrast, a recent survey by YouGov for the RSPB found that: 'Only 51% of people in households in England reported living within a 10-minute walk of any publicly accessible natural greenspace.' (RSPB and YouGov, 2020, p. 5) However, this report considers only England and specifies natural greenspace and a 10-minute walk limit.

Figure 3. Which best describes your neighbourhood and local green space?

Lockdown status

9% were isolating or shielding, 9% going out to work but social distancing, 82% staying at home but going out for exercise and essentials. No respondents selected 'carrying on with life as normal'. It has not been possible to compare these figures with a national data set, other than that they are aligned with the picture of high levels of compliance with the lockdown in the UK at the time of the survey (King's College London, 2020).

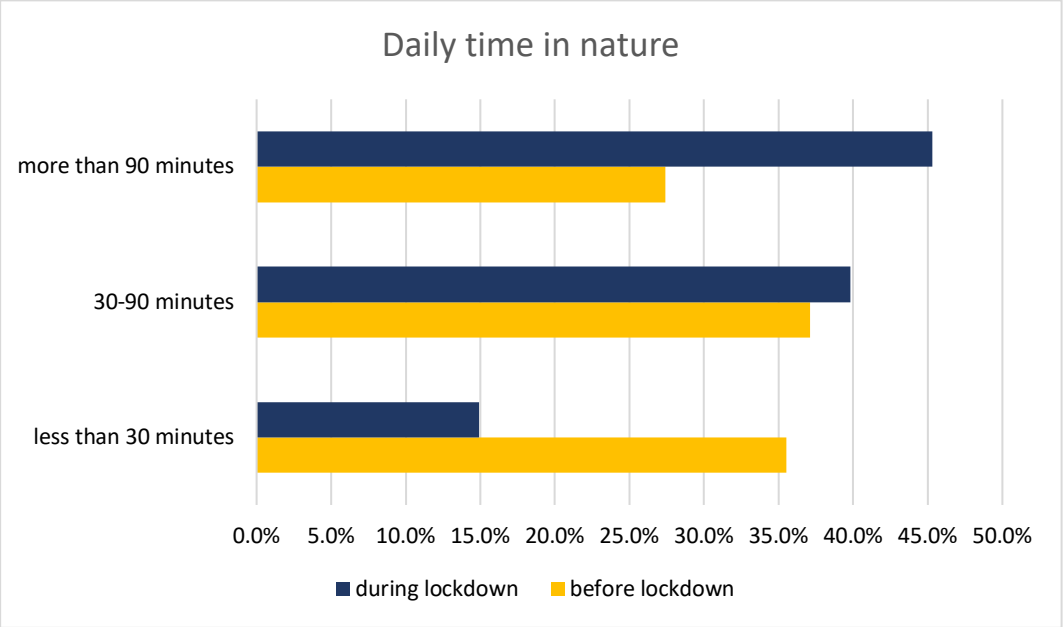
Results Section 2: Data from compulsory, closed questions

Time spent in nature

The percentage of respondents spending more than one-and-a-half hours per day in nature increased from 27% before lockdown to 45% during lockdown.

The proportion of respondents spending less than 30 minutes per day in nature reduced from 35.6% before lockdown to 14.9% during lockdown.

Figure 4. Daily time in nature



Time spent in nature by age

Both before and during lockdown, there were differences in daily time spent in nature with age: generally, younger adults reported less daily time in nature than older adults over both time periods.

During lockdown, 62% of the over 70s reported more than 90 minutes per day in nature during lockdown contrasting with 28% of 18-30-year-olds.

Time spent in nature by gender

Before lockdown, the percentage of women spending less than 30 minutes per day in nature was greater than that of men. Likewise, a higher percentage of men spent more than 90 minutes per day in nature. During lockdown, this difference was reversed with 47% of women spending more than 90 minutes per day in nature in comparison to 42% of men, and a slightly lower proportion of women than men spending less than 30 minutes in nature.

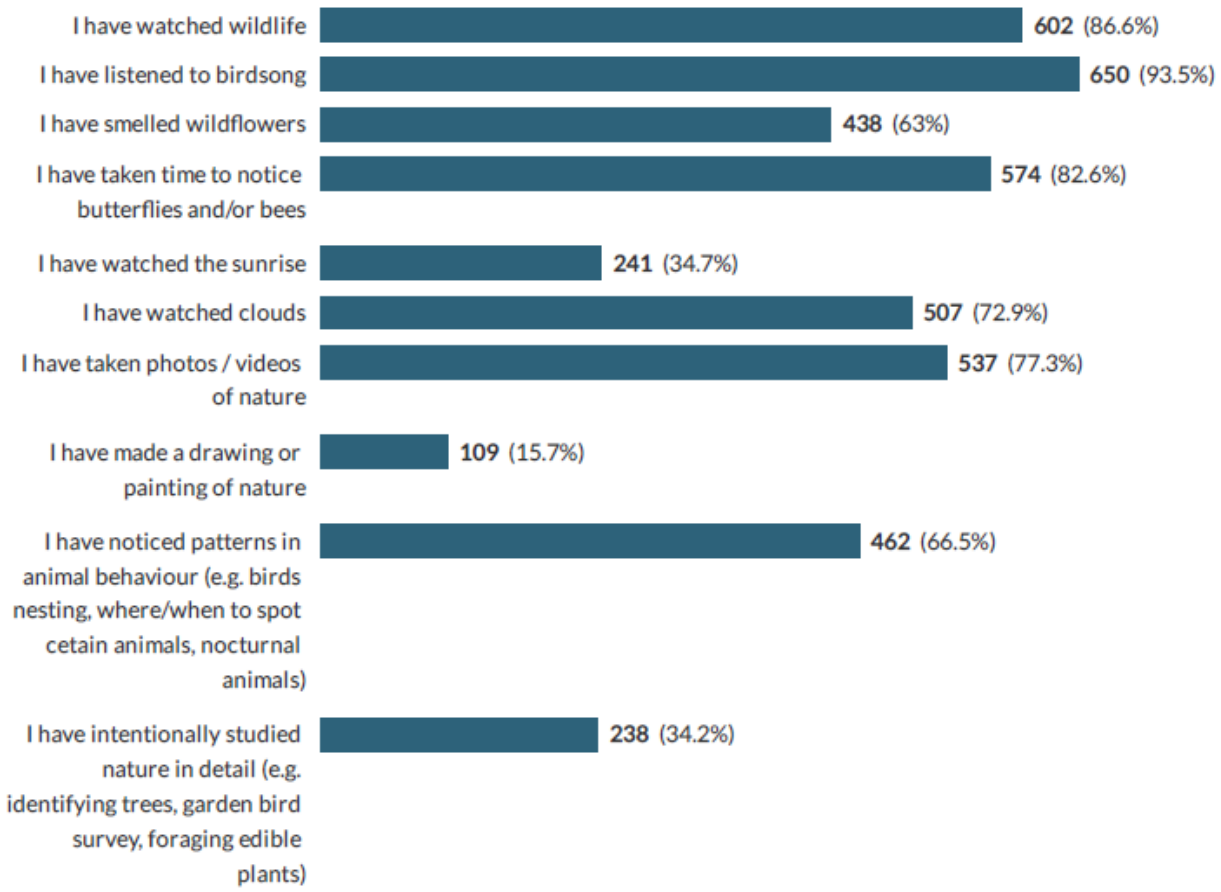
In summary:

- **Lockdown saw all age groups spending more time in nature daily than they reported doing beforehand.**
- **Age remained a factor, as it was before lockdown, with people aged 70 years and more spending the most daily time in nature during lockdown and people aged 18-30 years the least.**
- **Lockdown saw women, especially, spending more time in nature.**

Noticing Nature Behaviours

Participants were asked: 'During the UK lockdown, have you done any of the following? Please select all that apply.' Responses were as follows:

Figure 5. Noticing nature behaviours



The top five noticing nature behaviour from the choices given were as follows. Overall, 94% of respondents had listened to birdsong and 87% had watched wildlife during the UK lockdown. 83% had taken time to notice bees or butterflies and 77% had taken a photograph or video recording of nature. 73% had watched clouds.

Other behaviours reported by over half of respondents were 'I have noticed patterns in animal behaviour' (67%) and 'I have smelled wildflowers' (63%).

More than one-third of respondents agreed 'I have intentionally studied nature in detail (e.g. identifying trees, garden bird survey, foraging edible plants)' during the UK lockdown.

Noticing nature by age group

Of the noticing nature behaviours listed above, the proportion of respondents reporting each was lowest in the 18 – 30 years age group, with the exception of 'I have taken photos/videos of nature' which was least commonly reported in the 70 years or over age group.

18 – 49-year-olds were more likely than those aged 50 or over to report making a painting or drawing of nature during lockdown. One in five of the under-50s said they had done this.

Noticing nature by neighbourhood context

Some noticing nature behaviours differed between respondents' neighbourhood contexts. For instance, 92% of those living in a village or rural location had watched wildlife, compared with only 50% of those in urban areas with little or no green space nearby. The only noticing nature behaviour where urban residents with little or no green space nearby did not have the lowest participation was 'I have watched clouds.' For all other noticing nature behaviours, the greatest participation by percentage was reported by those resident in a village or rural location, followed by the those whose neighbourhood was 'urban, town or fringe with nearby green space', and least for those living in urban areas with little or no green space nearby.

Noticing nature by 'lockdown status'

Noticing nature behaviours were also compared with 'lockdown status' of individuals: that is, whether they selected 'isolating/shielding indoors', 'staying at home but going out for exercise and essentials', 'going out to work', or 'carrying on with life as normal' as the best description of their habits during lockdown. The lowest participation, by percentage, in the noticing nature behaviours occurred in the group who were going out to work, with the exception of having watched the sunrise, which was least common among those who were staying at home but going out for exercise and essentials.

For most of the noticing nature behaviours, the group who were isolating/shielding indoors had the highest reported participation rate. These included 'I have taken time to notice butterflies and/or bees', along with having watched the sunrise, watched clouds and noticed patterns in animal behaviour. Some noticing behaviours were most highly represented in the group who were staying at home but going outside for exercise. These were having taken photos / videos of nature and having smelled wildflowers.

In summary:

- **A large majority of people in all age groups reported having noticed nature in lockdown.**
- **Listening to birdsong was the most common way in which adults noticed nature during lockdown, with watching wildlife and taking time to notice bees or butterflies also reported by more than four in five people surveyed.**
- **The extent to which people noticed nature was linked to age group, neighbourhood context and 'lockdown status'.**
- **Younger adults, aged 18-30, were least likely to participate in most of the noticing nature behaviours.**
- **Adults who were going out to work noticed nature less than others.**
- **Perhaps surprisingly, those shielding/isolating indoors had the highest percentage participation in noticing nature behaviours.**
- **Neighbourhood was strongly linked with noticing nature during lockdown: residents of urban areas with little or no access to green space had the lowest participation rate in every one of the noticing nature behaviours and residents of villages or rural locations had the highest.**

Nature and Culture

Nature on social media

39% of women and 25% of men say they have posted more often about nature on social media during lockdown. (Only 4% and 3% respectively have posted less about nature during lockdown, while 19% of women and 31% men say they never do so).

56% of respondents say they have enjoyed / liked other people's social media posts more often during lockdown and only 1% have done so less often.

Nature in other media

36% of women and 24% of men report engaging more with other media (books, TV/radio programme, podcasts) about nature during lockdown. Again only 3% overall say they have engaged less with other media about nature.

Conversations about nature

72% of women and 59% of men (67% of respondents overall) report speaking about nature with friends or family more often during lockdown, with only 3% and 2% respectively doing this less or never during lockdown.

In summary:

- **During lockdown, UK adults have engaged with social media and other media in relation to nature more often, with the increases being greater among women than men.**
- **There has been a large increase in UK adults speaking about nature with friends and family during the lockdown.**

Nature Connection Index

Participants were asked to rate their agreement/disagreement with each of 6 statements on a 7-point scale (scores of 5, 6 or 7 are considered agreement, 4 is neutral and 3, 2 and 1 are disagreement).

99% agreed with the statement 'I find beauty in nature'.

99% agreed with the statement 'I treat nature with respect'.

98% agreed with the statement 'Being in nature makes me very happy'.

95% agreed with the statement 'Spending time in nature is very important to me'.

94% agreed with the statement 'I find being in nature really amazing'.

85% agreed with the statement 'I feel part of nature'.

The statements were used to calculate the Nature Connection Index (NCI) using the points weighted method described by Natural England in analysis of MENE data (Natural England and other parties, 2017, p. 30).

In summary:

- **The mean NCI score was 81.5. The median was 85.5 and may be more appropriate, being less influenced by outliers.**

- **The median NCI by home nation of respondents was 95 for Wales, 90 for Scotland and 84 for England.**
- **By gender, the mean was 84 for men, 90 for women and 67 for those who preferred to self-describe (the latter was a small group).**

Future behaviours

Participants were asked: 'Compared with before the lockdown, how likely are you to do the following things in future?'

Spending time in nature in future

67% of respondents say they will be more likely to spend time in nature after lockdown, and none say they will be less likely to.

72% of women and 60% of men report that they are more likely to spend time in nature in future.

71% of 31-49-year-olds report they are more likely to spend time in nature in future, following lockdown. This is the highest percentage of any age group.

In summary:

- **The lockdown period appears to be linked to a large increase in desire to spend time in nature among adults in the UK.**
- **Two-thirds of adults say they will be more likely to spend time in nature in future.**
- **Women and 31-49-year-olds are particularly likely to spend more time in nature in future.**

Supporting environmental charities

Overall, 38% of respondents are more likely to support environmental charities in future than they were before lockdown, with less than 1 % being less likely to.

42% of women report they are more likely or much more likely to support environmental charities in future, compared with 31% of men.

Noticing nature

Overall, 70% of respondents say they will be more likely to notice nature in their local area in future and only 0.1% say they will be less likely.

The lowest proportion by neighbourhood category was 'urban area with little or no green space nearby' yet even here, 54% say they will be more likely to notice nature in their local area in future, and none said they would be less likely.

Global environmental issues

Overall, 54% of respondents say they will be more likely to consider global environmental issues in future and only 0.4% say they will be less likely.

The highest proportion by age to be more likely to consider global environmental issues in future is the 18-30 age group, at 57%.

There was some variation between regions in the UK. The highest percentage of respondents by region reporting they would be more likely to consider global environmental issues in future was the South East of England (60%) and the lowest was Scotland (45%).

Encouraging garden nature

In each part of the UK surveyed, a majority of respondents who have a yard or garden say they are now more likely to encourage nature in their yard/garden in future, ranging from 50-75% by location, with no respondents indicating they are less likely to do so.

In summary:

- **Compared with before lockdown, adults in the UK are now more likely to: support environmental charities; notice nature; consider global issues and encourage nature in their gardens/yards.**
- **57% of young adults aged 18-30 years say they are more likely to consider global environmental issues in future.**
- **A majority of those surveyed expect to notice nature more frequently in their local area in future and this is even the case for urban dwellers with little or no green space nearby.**
- **Nature-friendly gardening may have seen a big rise in popularity during the UK lockdown.**

Children's Time in Nature

During lockdown, 66% of the parents/guardians surveyed say their children have been spending more time than usual in nature, whereas only 16% say their children have been spending less time than usual in nature.

The proportion whose children were spending more time in nature was highest in Yorkshire & the Humber (85%), the West Midlands (80%) and East Midlands (79%) and lowest in London (33%). In most locations, some respondents said their children were spending less time in nature, the greatest percentage being in Scotland where 28% said their children were spending less time in nature.

Overall, for respondents who have children, 66% were more likely to encourage their children to spend time in nature in future, rising to 100% of those with children in urban areas with little or no green space nearby.

A high percentage of parents and guardians indicating they are more likely to encourage their children to spend time in nature in future (78%) is found in the group who say their children have been spending 'much more time in nature than usual' during lockdown.

No respondents reported being less likely to encourage their children to spend time in nature in future.

In summary:

- **In all regions of the UK children were, on average, spending more time in nature during lockdown. However, a minority of children were spending less time in nature, especially in Scotland.**
- **Arising from the period of lockdown, parents and guardians in the UK are now considerably more likely to encourage their children to spend time in nature in future.**

Results Section 3: Data from optional, open questions

Have you noticed or learnt anything new about nature in your neighbourhood during lockdown? (Question 12)

376 respondents stated something new that they had learnt or noticed about nature during lockdown. In these responses the following major themes were seen:

- 59% mentioned birds, and common themes were birdsong and other bird behaviours.

  "Have heard cuckoos and woodpeckers that I have never noticed hearing before."

- 32% mentioned other animals, of which half referred to wild mammals and at least a third referred to insects.

  "More wildlife noticeable in the city. Saw a stoat in the park."

  "Spotted orange tip butterflies for first time."

- 28% mentioned plants, and common themes were noticing plant growth or life cycles and learning to identify plants.

  "Local wild flowers and plant ID on walks…"

  "I have observed the pattern of plants growing and blooming."

- 27% noted the abundance or variety of birds, plants or other wildlife, or described nature thriving.

  "How much is thriving in our hedgerows and how much wildlife is accessible."

  "I didn't realise how much wildlife was on our doorstep and just how many different types of birdsong you can hear!"

- 13% wrote about landscapes, the majority of these relating that they had found somewhere new to visit nature.

  "I've found whole areas of green space and woodland I never knew existed."

- and 12% wrote about reduction in traffic, increased quiet or peacefulness.

  "The perfume from May blossom is much more noticeable without traffic pollution."

Other themes mentioned by several respondents included:

- noticing an increase in wildlife where verges and parks had been left unmown during lockdown.
- foraging for edible plants for the first time.
- making a nature friendly garden or pond.
- noticing clear skies or clean air.
- and feeling of being connected with nature or noticing the interconnectedness of nature.

A few respondents also mentioned a decrease in abundance of a specific species and linked this to changes in human activity during lockdown.

Can you describe a memorable moment you have experienced in nature, during the lockdown? (Question 23)

456 people responded to this question. In analysing the descriptions of a memorable moment in nature the following major themes emerged and the percentage of responses which included this theme is noted.

- Birds or birdsong (48%).

  "The birdsong in my local woodland, at dusk. Just amazing."

- Trees or other plants (19%).

  "Walking along a bridlepath through an arch of trees with the light creating an amazing variety of contrasting shades and colour."

- Sightings of wild mammals (19%).

  "Watching foxes and roe deer use the fields and walk up the road opposite our house in daylight as everything was so quiet."

- Phenology, growth or life cycles (18%).

  "Watching plants growing each day on the same walk."

- Animals other than wild mammals (15%), mostly insects such as bees, butterflies and beetles.

  "Finding slowworms in my garden… Watching ants in my plum blossom…Noticing more species of bees..."

- A social experience of nature (14%) e.g. watching children enjoy nature, discussing nature.

  "Seeing a tidal bore for the first time at the estuary. We stopped and admired it, walked along with it, took videos and spoke to friends and family about it."

  "Lying in the long grass with my 4 yr old daughter and have her say "shh, listen Mammy, nature is singing"."

- An aquatic habitat or swimming/paddling in water (12%).

  "Swimming in the river with my young children for the first time. They were so happy and it was such a simple thing. We noticed dragonflies and tiny minows and saw so much more than we ever have from walking along the river bank."

- A landscape or views (12%), including of sunsets, sunrises and stars.

  "Star gazing as a family and watching the sunset."

Other themes which were mentioned in fewer descriptions include:

- Peace, quiet, solitude or lack of traffic.
- Interacting with wild animals.
- Discovery of a new place or seeing something in nature for the first time.
- A profound sense of connection with nature.

Has the lockdown experience changed your opinions about the natural world in any way? (Question 30)

Some responses indicated no change in opinion about nature or were not related to the question. These were removed from the set of valid responses.

The 285 responses which indicated a change in opinion about nature were analysed further. The strongest themes emerging were as follows:

- Reinforced or increased affinity with nature, enjoyment of nature or valuing of nature (41%).

  "Lockdown has made me appreciate nature even more than before."

- Reinforced or increased environmentalism or awareness of environmental issues (29%).

  "We need to work to preserve it, it's not going to just happen."
  "It's made me want to be greener."

- Greater appreciation of local nature or access to it (14%).

  "What lockdown had made us appreciate is our local area. We are often too quick to get in the car and drive to the Lakes, Yorkshire or Peak District, but we'll definitely be exploring closer to home more often."

- Optimistic outlook for nature, having seen nature 'doing well without us' (12%).

  "Covid-19 and the response to it e.g. reduction in CO2 has made me feel more confident that we can change things for the better and more people will now be on board and willing to put the environment first."

- Realised the value of nature for mental health/wellbeing (11%).

  "It's confirmed how important being in nature is for our family's physical and mental wellbeing."

- Pessimistic outlook for nature, lockdown has revealed how badly humans impact nature (6%).

  "I feel despondent because I think, by and large, the structural changes we need will not happen. After lockdown people will forget."

Discussion

Time spent in nature

Results indicated an increase in time spent in nature daily during the lockdown period, which is supported by the findings of the People and Nature Survey for England in the latest data release at the time of writing: "Since the coronavirus restrictions began, 36% of adults reported spending more time outside" (Natural England, 2020e).

The People and Nature Survey for England revealed that in April and May 2020 26% and 22% of people respectively had made no visits to green and natural spaces in the previous month (Natural England, 2020d; Natural England, 2020e). However, this appears not to include their own gardens. Therefore, this data does not necessarily contradict the lower figure of 14.9% of UK adults spending less than 30 minutes per day in nature reported in the current study. Here, location was unspecified and so could include gardens and yards.

Indeed, the People and Nature Survey for England in May 2020 found that 87% of people who had access to a private or shared garden, allotment or outdoor space agreed that having this access was important to them (Natural England, 2020e). This is corroborated by some respondents in the current study who link their garden access to resilience during the coronavirus lockdown:

"Feel really strongly about unequal access to nature. I'm shielded and have a big garden, without this resource the situation would have been unbearable instead of being mostly positive. My kids have space to run, climb trees, hide, explore - but lots didn't (and don't have) and that's not fair."

It should be noted that the stricter lockdown period in the UK, commencing 23 March 2020 and easing during June 2020 coincided with springtime and also with a particularly prolonged period of fine weather for the UK (Met Office Press Office, 2020). This weather provided favourable conditions to spend time outdoors in nature. Therefore, considering the 'time in nature' data alone it is unreasonable to draw conclusions about any causal relationship between the lockdown occurring and the time spent in nature increasing. However, some of the free text responses clearly describe this occurring:

"It's given me more time to be in nature for me and my children, to notice more things, although I've always appreciated nature."

"Just glad I have had more time to spend in the natural world."

"I am already heavily invested in wildlife, so the change for me has been the time I have been able to dedicate to it."

"I have been able to garden every day for a longer time than I would have usually."

Noticing nature behaviours

This study found that during lockdown a large majority of respondents had noticed nature, in particular listening to birdsong (94%), watching wildlife (87%) and noticing bees and butterflies (83%).

This contrasts hugely with behaviours prior to lockdown as reported in February 2020 in the *Noticing Nature* report (National Trust & University of Derby, 2020). Among adults surveyed for *Noticing Nature*, 62% infrequently or never listened to birdsong, 78% infrequently or never watched wildlife and 62% infrequently or never took the time to notice butterflies and/or bees, over the period of one year (p.47).

The *Noticing Nature* report found that 80% of adult participants infrequently or never took photos / drew or painted a picture of a natural view, plant, flower or animal (National Trust & University of Derby, 2020). Yet, the results of the current study show that 77% of respondents had taken photos / videos of nature during lockdown.

Additionally, the May data from the People and Nature Survey for England indicated 33% of adults in England had reported an increase in the amount of time they spent on 'noticing nature / wildlife' since the coronavirus restrictions began (Natural England, 2020e).

Thus, it is reasonable to conclude that noticing nature behaviours among UK adults have increased significantly since the coronavirus restrictions were implemented. This is exemplified in certain comments from participants in the current survey:

"…there's a lot more species than I realised right on my doorstep."

"I've noticed how much of a haven for wildlife the cemetery is, even though it doesn't look "wild"."

"I have had time to notice the wildlife more within my garden and their behaviours."

"I've definitely noticed more plants on my walks."

"Really taking the time to recognise the arrival of Spring through all the senses!"

Furthermore, given that the behaviours reported in the *Noticing Nature* study covered a full year, in combination with the results of the current study, the increase in noticing nature among UK adults does appear to be linked specifically to the lockdown and not only to seasonal variations and weather. However, it should be noted that these two studies used different population samples and the survey distribution methods may have introduced bias.

Nature and culture

The results of the current study show that during lockdown UK adults have engaged with social media and other media, in relation to nature, more often. Further research into social media trends would be useful to explore which particular nature-related social media content has proliferated.

This study has found that two-thirds of respondents report speaking about nature more often with friends and family during the lockdown. Further analysis or research might indicate whether there is any link between this rise in informal nature discussion and environmentalism.

Nature connection index

Analysis of MENE data using the Nature Connection Index (NCI) revealed 'nature connectedness is a significant factor in relation to wellbeing and pro-environmental behaviours. In data gathered from the MENE in 2013 – 2018, the median NCI was 59, with scores above and below this classed as high and low nature connectedness respectively (Natural England, 2020a).

For respondents in the current study, 83% were attributed an NCI of above 59. Furthermore, the median NCI was 84 in England, 90 in Scotland and 95 in Wales. As such, the nature connectedness among this sample of 704 UK adults during the Covid-19 lockdown was considerably higher than among adults in England across five years of the Monitor of Engagement with the Natural Environment. This suggests experiences during lockdown may be associated with an increased nature connectedness among the UK adult population.

However, further evidence is required to evaluate whether the clear difference in NCI between the two studies is due to lockdown experiences or to other factors such as sample bias: for instance, under 18s were included in the MENE study, and 13 - 18-year-olds had the lowest NCI scores of any age group. Also, the calculation of NCI for the current study may have been somewhat affected by the wording difference noted on page ten of this report.

Certain descriptive comments indicate a link between the participants' experiences of nature during lockdown and the nature connectedness indicators (as per the NCI). Some examples are given in Table 1, below.

Table 1. Matching NCI indicators with free text descriptions.

NCI indicator statement	Selected responses to free text questions
I find beauty in nature	**"Finding new places of absolute beauty in our doorstep that we hadn't know about…"**(Q23 - memorable moment) **"Birdsong is so varied and sounds beautiful."** (Q12 - things I've learnt / noticed)
I treat nature with respect	**"[Lockdown] made us stop and think about the damage we are causing with emissions, plastic in our seas, etc. Hopefully make us try harder to preserve it."** (Q30 - how lockdown changed opinion) **"I always did feel very strongly about the natural world however time spent in nature during the lockdown has made me want to do more to help it."** (Q30 - how lockdown changed opinion) **"I think it has shown me that the world can recover if it is given the time and respect she deserves."** (Q30 - how lockdown changed opinion)
Being in nature makes me very happy	**"It [the scent of pine trees] is such an emotive smell and made me feel so happy".** (Q23 - memorable moment) **"It has confirmed what a support greenery is to me, easily as good as a happy pill."** (Q30 - how lockdown changed opinion)
Spending time in nature is very important to me	**"Laying under a tree and realising I need to be amongst nature for my mental wellbeing. I want to do more to protect it."** (Q23 - memorable moment)
I find being in nature really amazing	**"Riding my bike early one morning a deer ran parallel along the track with me for a short period of time before crossing the path in front of me. It was like we were running through the woodland together - amazing!"** (Q23 - memorable moment) **"When I came over the little hill to see it I actually gasped out loud. The entire vale covered in blue is always an amazing sight, but on this occasion it actually took my breath away."** (Q23 - memorable moment)
I feel part of nature	**"Could hear all the birdsong whilst my baby was kicking in my stomach - felt very peaceful and 'part' of nature at that moment, a real lift to my spirits."** (Q23 - memorable moment) **"One day I looked at the garden and saw it as a microcosm of the planet, living in a cycle; drawing water from the earth, needing pure elements and food and sunlight. I felt that I was the same as all those plants, fitting into the same ecosystem, eating and cultivating and acting as part of the planet (and not against it)."** (Q23 - memorable moment)

Future behaviours

This study finds that a majority of the respondents report that they are more likely to spend time in nature in future, compared with before lockdown. Analysis of the free text responses provides some insight into possible reasons for this, such as: reinforced or increased affinity with nature; enjoyment of nature or valuing of nature; greater appreciation of local nature and realising the value of nature for mental health / wellbeing; all attributed to their experience of lockdown.

The People and Nature Survey for England data release for May 2020 reported: 'Forty one per cent of adults have reported that 'nature and wildlife is more important than ever to my wellbeing'' (Natural England, 2020). Originating from the period of UK coronavirus restrictions, this also supports the conclusion that UK adults may now value nature more highly because of their experiences in lockdown.

A key finding of the MENE study from 2009 to 2019 was that there is a gap between concern for the environment, shared by 90% of adults in England, and the proportion who routinely take more than one pro-environmental action. For example, roughly a quarter of adults in England reportedly usually bought eco-friendly products and brands, and 10% donated to an environmental charity or signed environmental petitions (Natural England, 2019b). However, a majority of adults surveyed for the current study say they are more likely to support environmental charities in future and a majority say they are more likely to encourage nature in their yard/garden in future, compared to before lockdown. This suggests a greater appetite for taking certain pro-environmental actions, albeit not directly comparable with the actions surveyed in the MENE study. It could suggest a movement to narrow the gap between concern for nature and action for nature.

Furthermore, 29% of free-text answers to question 30 indicate a reinforced or increased environmentalism or awareness of environmental issues, some of which detail specific pro-environmental behaviours. For example, in response to 'Has the lockdown experience changed your opinions about the natural world in any way?' comments included:

"Need to help tackle climate change."

"Made me see what can actually really be achieved with a little effort. There is no need to return to commuting 5 days a week. With a bit of lateral thinking more people can work remotely and we can substantially reduce the amount of traffic & subsequent air pollution."

"I need to keep the momentum going to reach as many students as possible to hopefully make an impact on student understanding of the power of nature, how it can sustain us all but needs to be respected to ensure its protection…"

"Yeh, I want to wildify my back garden and put up loads of bird feeders and bird boxes!"

"Such a precious resource that needs our care. So the most important thing I learned was to keep sharing nature connections on social media through photos and short films makes it all powerful."

Evidently, some comments expressed desire for societal change as well as commitment to individual pro-environmental actions. This is interesting in the context of the very large-scale societal response to the coronavirus pandemic across society. Clearly, appreciation of nature during lockdown has changed some attitudes and is a catalyst for pro-environmental behaviour for some people. However, the likelihood of societal change for the environment on the scale of cooperation seen with coronavirus restrictions is questionable. Environmentalism may even be hampered by the knock-on effects of the pandemic, on finances, relationships and jobs, for example, which people may prioritise. Recent opinion

poll data gathered in May 2020 indicates a somewhat conflicting level of pro-environmental attitudes in the UK (Beaver, 2020). Over 80% of British people surveyed agreed that 'I have a responsibility to ensure my generation does not destroy the planet for the next generation' but over 40% agreed that 'Protecting the environment is far down my list of priorities right now'. However, a study by the RSPB and YouGov reported that 77% of respondents "agreed with the suggestion that the Government should invest in nature protection as part of any economic recovery plans" (RSPB and YouGov, 2020, p. 7)**.** In June 2020, Climate Assembly UK reported: "93% of assembly members 'strongly agreed' or 'agreed' that, "As lockdown eases, government, employers and/or others should take steps to encourage lifestyles to change to be more compatible with reaching net zero."." (Climate Assembly UK, 2020). In July 2020, the UK government provided some vision of a 'green recovery' nationally, and also internationally as host of the UN Climate Change Conference, scheduled for November 2020 (Goldsmith, 2020).

Children's time in nature

The current study shows an increase in children's time in nature during lockdown compared to before it. Further analysis would be beneficial to investigate any differences in children's time in nature according to age of children involved, geographical region, neighbourhood characteristics and NCI of parents/carers.

It is also understood that nature connectedness varies markedly with age in childhood and adolescence, as evidence in the MENE study (Natural England, 2020a). Although under-18s were not included in the current study it would be worthwhile to investigate any changes to their nature connectedness as a result of experience of lockdown by other means.

The MENE study *Children's Report* concluded that "Parents, guardians and other family members are an important influence on children's engagement with nature" (Natural England, 2019a, p. 10). The results of the current study indicate that parents and carers in the UK are now considerably more likely to encourage children to spend time in nature in future.

Conclusions

Reliability of the findings is supported by the large sample size, question wording and data collection contemporaneous with the UK lockdown period. Furthermore, the sample is broadly representative of the UK population across age groups; across England, Scotland and Wales; and across household compositions. This research is independent of political and commercial influence. Limitations arise from the *ad hoc* survey distribution method, resulting from which: women are over-represented; there is a lack of significant participation from Northern Ireland; people living in urban areas without access to nearby green space may be under-represented; and those with an existing interest in nature connection may be over-represented.

In summary, the key findings of this research based on 704 individual responses across the UK are as follows.

The lockdown period appears to be linked to a large increase in desire to spend time in nature among adults in the UK with two-thirds of respondents reporting that they will be more likely to spend time in nature in future. Women and 31-49-year-olds are especially likely to spend more time in nature in future, according to their responses.

A large majority of adults across all age groups noticed nature during lockdown, in contrast with a previous study over the course of a year (National Trust & University of Derby, 2020). There appears to have been a significant increase in participation in noticing nature behaviours during the coronavirus restrictions. A majority of those surveyed expect to notice nature more frequently in their local area in future and this is even the case for urban residents with little or no green space nearby. Those people who were going out to work during the period 23 March to 11 May 2020 noticed nature less than others. Perhaps surprisingly, those people who reported their lockdown status as 'shielding/isolating indoors' had the highest percentage participation in many of the noticing nature behaviours surveyed. Listening to birdsong was the most common way in which adults noticed nature during lockdown, with watching wildlife and taking time to notice bees or butterflies also reported by more than four in five people surveyed. These experiences also featured prominently in the free text responses. Younger adults, aged 18-30 years, were least likely to participate in most of the noticing nature behaviours.

The results suggest that experiences during lockdown may be associated with increased nature connectedness among the UK adult population. A large majority agreed with the statements 'I feel part of nature' and 'Spending time in nature is very important to me'. Free text comments indicate that some people have especially realised the value of nature for mental health and wellbeing during the lockdown. This idea has been given some attention in the media during the coronavirus restrictions and is supported by other contemporaneous studies (Natural England, 2020d). When considering their experiences of nature during the lockdown, 98% of respondents, agree that 'Being in nature makes me very happy'.

During lockdown, UK adults have engaged with social media and other media in relation to nature more often than before, with the increases being greater among women than men. There has also been a large increase in UK adults speaking about nature with friends and family during the lockdown. Arising from the period of lockdown, parents and carers in the UK are now considerably more likely to encourage their children to spend time in nature in future, according to the survey results. Along with the substantial changes to the education of most young people during the coronavirus restrictions this indicates possible opportunities for outdoor learning and environmental education going forwards.

The results indicate a greater appetite for taking pro-environmental actions. Compared with before lockdown, adults in the UK are now more likely to: support environmental charities; consider global environmental issues and encourage nature in their gardens/yards. 57% of young adults aged 18-30 years say they are more likely to consider global environmental issues in future. Nature-friendly gardening appears to have seen a big rise in popularity during the UK lockdown. Free text comments expressed desire for societal change as well as commitment to individual environmental actions. This is interesting in the context of the very large-scale response to the coronavirus pandemic across society and political discussion of a 'green recovery' from coronavirus.

Further research may focus upon statistical analysis of the survey data and assessment of the longevity of the behavioural and attitudinal changes in relation to nature reported here. There is also scope for further comparison with data from national surveys in Scotland, Wales and Northern Ireland and expansion of the research themes to include the experiences of under 18s.

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