



Revaluing Parks and Green Spaces

Measuring their
economic and wellbeing
value to individuals

Green Spaces for Good



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This report provides a robust economic valuation of parks and green spaces in the UK as well as valuing improvements in health and wellbeing associated with their frequent use. This is the first research study on parks and green spaces to use welfare weighting methodology, allowing for more informed evidence-based policy decisions.

ABOUT US

Fields in Trust champions and supports our parks and green spaces by protecting them for people to enjoy in perpetuity. Because once lost, they are lost forever.

Parks and green spaces in the UK are under threat and it is up to all of us to stem this cycle of disappearance and decline. We believe that everyone, irrespective of who they are and where they live should have the right to enjoy and benefit from local parks and green spaces. Parks and green spaces are proven to help people stay physically and mentally well; places where we can all move, breathe, run and play. They are an important tool to drive social cohesion, combat loneliness and build community spirit.

Fields in Trust is an independent charity with over 90 years experience protecting parks and green spaces. We work with landowners, community groups and policymakers to champion the value of our parks and green spaces to achieve better protection for their future at both local and national level.

Fields in Trust

36 Woodstock Grove
London
W12 8LE

Charity No. 306070

www.fieldsintrust.org



**OVER 2,700
SPACES
HAVE BEEN
PROTECTED
SINCE 1925**



Revaluing Parks and Green Spaces: Summary



We know from numerous research studies that access to local, quality green space improves the physical and mental health and wellbeing of all sections of the community. Indeed, the Marmot Review, 2010¹ recommends that improving the availability of good quality green spaces across the social gradient will help reduce health inequalities. Yet despite wide recognition of their value there has been a significant decline in the quality of local parks in the intervening period.²

1.1 Establishing the Economic and Wellbeing Value

The provision of publicly accessible parks and green spaces is a policy issue at multiple levels of central and local government, devolved national administrations and local authorities. Parks and green spaces are typically free at the point of access and this access is usually unregulated; spaces where people can move, breathe, play and run.

However, these fundamental benefits historically made it difficult to quantify their impact in monetary terms, a crucial element of making a compelling business case to local authorities to support the ongoing funding and existence of parks and green spaces.

Fields in Trust is a UK-wide charity that actively champions parks and green spaces by protecting them in perpetuity; over 2,700 spaces have been protected since the organisation was founded in 1925.

It is the view of Fields in Trust that few public services have such a wide-ranging, positive impact on local communities as parks and green spaces on which to play. Unfortunately, such spaces tend to be valued within local budgets according to their maintenance costs rather than their true dividend to local communities which vastly exceeds such sums because of their multiple benefits. Parks and green spaces can:

- › **Contribute to a preventative health agenda**
- › **Reduce future Exchequer expenditure**
- › **Reduce health inequalities**
- › **Increase social cohesion and equality**

To further the case for revaluing parks and green spaces in terms of the contributions they deliver across diverse policy agendas including tackling obesity, mental health, wellbeing and loneliness, Fields in Trust commissioned Jump X Simetrica to perform new analysis and collect primary data specific to park and green space users in the UK.

This research was conducted in line with HM Treasury best-practice³ for valuing non-market goods, using two valuation methodologies: **Contingent Valuation** (stated preference to elicit an individual's Willingness to Pay) and **Wellbeing Valuation** (subjective wellbeing assigning equivalent monetary values to life satisfaction survey responses); and additional analysis to quantify partial health cost savings to the Exchequer. We have captured the value of the maintenance and continued existence of publicly accessible parks and green spaces, as well as the health and wellbeing value associated with frequent park use.

HEADLINE FINDINGS:



The Total Economic Value⁴ to an individual is

£30.24 PER YEAR

(£2.52 per month), and includes benefits gained from using their local park or green space and non-use benefits such as the preservation of parks for future generations.



The Wellbeing Value associated with the frequent use of local parks and green spaces is worth

£34.2 BILLION PER YEAR

to the entire UK adult population.



Parks and green spaces are estimated to save the NHS around

£111 MILLION PER YEAR

based solely on a reduction in GP visits and excluding any additional savings from prescribing or referrals.

¹Fair Society, Healthy Lives, Marmot Review, 2010 | ²HLF State of UK Public Parks, 2016 | ³HM Treasury The Green Book: Central Government Guidance on Appraisal and Evaluation, 2018

⁴TEV is a combination of use and non-use values based on a person's average Willingness to Pay

1.2 The Total Economic Value (use and non-use) of Parks and Green Spaces

Our primary survey (using a UK-wide representative sample of over 4,000 UK adult residents) elicited HM Treasury consistent stated preference valuation results using a hypothetical scenario of a change in the current provision of parks and green spaces. The survey was detailed enough to enable us to differentiate average Willingness to Pay values between various socio-demographic groups.

Using this methodology, we were able to establish, in economic terms, a value for parks and green spaces that captures the benefits from direct use of a park or green space to the individual and the non-use benefits (gained from the existence and preservation of parks and green spaces regardless of use).

Although people who visit their park less often than once a month still value the existence of parks and green spaces, frequent park users⁵ state significantly higher Willingness to Pay values for parks and green spaces (67% higher than non-frequent users and non-users).⁶ Further analysis of the data also revealed significant differences in values depending upon a variety of factors including geographical location, size of park, income and ethnicity. When welfare weighting

for income⁷ is applied the average Willingness to Pay for parks and green spaces increases significantly for Black, Asian, Minority Ethnic (BAME) and lower socio-economic groups. While considered best practice by HM Treasury Green Book, this study is the first to apply welfare weighting methodology to public parks and green spaces in the UK.

- › The Willingness to Pay value of parks and green spaces more than doubles for lower socio-economic groups when welfare weighted, **increasing from £2.00 to £4.32 per month.**
- › The Willingness to Pay value of parks and green spaces to BAME communities also increases significantly when welfare weighted **from £3.05 to £5.84 per month.**
- › Urban residents value parks and green spaces higher than the UK average Willingness to Pay value at **£2.89 per month**, and this value increases after welfare weighting **to £3.93.**

1.3 Motivations for Use of Parks and Green Spaces

Whilst there are different drivers for using parks and green spaces across different user groups, our survey demonstrates clear social motivations for using these spaces across all settings. Parks and green spaces are vital democratic spaces where people come together and interact and can play an important role in promoting social cohesion and integration, for example:

- › **A significant number of urban residents are motivated to use parks and green spaces as a 'home away from home' to socialise with friends, relax and picnic.**
- › **Rural residents primarily visit parks and green spaces for team sports or children's activities rather than individual pursuits.**
- › **A significantly higher proportion of park and green space users in our sample are part of a family (have dependent children) compared to non-users.**
- › **BAME respondents were twice as likely as white respondents to use parks and green spaces for team and individual sports and to meet friends.**

1.4 The Wellbeing Value of Parks and Green Spaces

Wellbeing Value is based on measurements of life satisfaction⁸ including physical and mental health benefits that stem from park usage. Using the same UK representative sample, we found that both wellbeing and self-reported general health are significantly higher for frequent park and green space users⁵ compared to non-users.

- › **An individual would need to be compensated by £974 a year to replace the life satisfaction they would have gained from using their local park or green space (more than once per month).**
- › **£974 is equivalent to approximately 9 days' pay for the average UK earner (£27,600).**
- › **Aggregated across the UK an estimated £34.2 billion worth of wellbeing benefits per year are delivered by frequent use of parks and green spaces.**

⁵ An individual who uses their local park or green space on average once a month or more | ⁶ Valuation scenario 1: Payment of a monthly subscription to an independent not-for-profit organisation set up to maintain and preserve all parks and green spaces in the local authority area | ⁷ Welfare weighting for income is a process by which the value of each £1 that an individual is willing to pay is equalised by income to account for the marginal utility of income – £1 spent by someone who earns less has higher value and conversely £1 spent by someone who earns more has less value affecting their ability to pay (budget constraint) when asked the valuation question | ⁸ Office of National Statistics measures (life satisfaction, happiness, sense of worthwhile) are evaluative subjective wellbeing measures incorporating all aspects of an individual's quality of life

1.5 Exchequer Cost Savings from Parks and Green Spaces

Finally, we present partial cost savings to the NHS through reduced GP visits associated with frequent use of local parks and green spaces.

- › **Parks and green spaces are estimated to save the NHS around £111 million per year based solely on a reduction in GP visits (in other words, we do not account for additional savings to the NHS associated with reductions in prescribing or referrals).**

We know that if more people use parks and green spaces on a regular basis this would improve their health and wellbeing and subsequently increase the level of savings to the Exchequer.

1.6 Revaluing Local Parks and Green Spaces

This report demonstrates that the value of parks and green spaces is substantial, based on two HM Treasury welfare consistent methodologies. While the values elicited in this study cannot be directly translated into cashable benefits, they have been conducted in strict adherence to HM Treasury Green Book guidance to represent the value of parks and green spaces to the local population, and therefore provide a crucial component of the overall business case in favour of these vital spaces. Additionally, we demonstrate the contribution that frequent park and green space use has on the preventative health agenda.

We believe it is the practical application of this valuation methodology at a local level that has the potential to make the most significant impact in terms of future planning, protection and funding of parks and green spaces.

We now aim to develop this research into a Local Level Valuation Model by applying the primary research findings and values to individual parks and green spaces and their surrounding demographics.

This will go some way to achieving the recommendation in the Ministry of Housing, Communities and Local Government's response to the Select Committee Inquiry into Parks and Green Spaces to create "a robust, transferable model to enable local authorities to assess the value of parks and green spaces."⁹

1.7 The Policy Implications for Parks and Green Spaces

Parks and green spaces are clearly valued highly by communities and provide an enormous amount of quantifiable benefit to their local population. This new data on the Total Economic Value (use and non-use) of parks and green spaces is demonstrable for the entire local population thus enabling local authorities for the first time to make a robust, evidence-led business case for the economic and wellbeing value of parks and green spaces to local communities.

This research will enable a strategic approach to the provision of parks and green spaces by identifying areas where investment will have the most significant impact on individuals. It presents a new and compelling argument that, in a difficult economic climate, the provision of parks and green spaces should be prioritised in areas with lower socio-economic groups and a higher representation of BAME communities given the disproportionately high level of benefits that these groups derive from parks and green spaces.

⁹ www.publications.parliament.uk/pa/cm201617/cmselect/cmcomloc/45/45.pdf

Context of the Research Study



2 Context of the Research Study

Parks and green spaces are arguably the most universal of all public services. The UK benefits from more than 27,000 public parks, sports fields, nature reserves, playgrounds and pocket parks! As publicly owned assets they have something to offer all sections of the community from pre-school children through to retired adults.

2.1 Evidence for the Health and Wellbeing Benefits of Parks and Green Spaces and Relevance to Policy Agendas

Publicly accessible green space has been at the heart of urban planning, community building, and health policies in the UK for over a hundred years. The Victorians saw public parks as a way to improve the health of those living in crowded urban centres, while the Garden City Movement of the inter war period saw open green spaces and quality recreation and sports grounds as part of a wider belief that good urban design would lead to well-developed citizens and a well-functioning society.²

The belief that parks and green spaces provide benefits to individuals and society has not changed substantively in the intervening years. We now have a growing body of empirical evidence which confirms that they provide direct benefits to those who use them and, importantly, indirectly to those who don't.

The importance of parks and green spaces to society is reflected in the political arena, where the provision of publicly accessible green space is a policy issue at multiple levels of central and local government; devolved national administrations and local authorities. A wealth of evidence shows that an active life is essential for physical and mental health and wellbeing³ and that access to local green spaces has a positive impact on health by encouraging people to be active every day. Evidence suggests that physical and mental health can be improved with greater access to green space⁴ and green and natural environments have the potential to reduce health inequalities.⁵

A World Health Organisation report⁶ evaluated the effects of green spaces on physical activity and their potential to reduce public health inequalities. It stated that "... access to public open space and green areas with appropriate recreation facilities for all age groups is needed to support active recreation". The provision of sufficient outdoor recreational spaces and green spaces will play an important role in helping public bodies achieve several health objectives, for example the Well-being of Future Generations Act (Wales) 2015.⁷

The most recent statistics⁸ show that more than one in five children at school reception age, and more than one in three children in Year 6 were measured as obese or overweight.

The government released its ten-year plan to reduce the rate of childhood obesity in 2016⁹ by encouraging primary school children to eat more healthily and stay active. Daily physical activity supported by parents and carers outside of school time is recommended and in Scotland the community-led Daily Mile campaign¹⁰ in schools and workplaces has been endorsed and supported by the Scottish Government. The Institute of Health Equality¹¹ found that older people live longer in areas where there is more green space close to their homes; children who live close to green spaces have higher levels of physical activity and are less likely to experience an increase in BMI over time whilst people living in the most deprived areas are ten times less likely to live in the greenest areas.

In December 2015, the Department for Culture, Media and Sport¹² published *Sporting Future: A New Strategy for an Active Nation*, this sets out the importance of sport and physical activity, which drives five key outcomes: physical wellbeing, mental wellbeing, individual development, social, community and economic benefits, with a focus on how sport can have a meaningful and measurable impact on improving people's lives. The strategy recognises the immense benefit of engaging under-represented groups that typically do little or no activity – including people in lower socio-economic groups.

Health and Wellbeing Boards were introduced as statutory committees of all upper tier local authorities in England under the Health and Social Care Act 2012, as forums for key leaders from the local health and care system to jointly work to improve the health and wellbeing of local people, reduce health inequalities and promote the integration of services. Crucially this locates responsibility for prevention and tackling health inequalities at a local level.

Evidence also suggests the need for local parks and green spaces in close proximity to where people live and spend their day, as well as large green spaces offering formal provision such as playing fields, and opportunities to experience contact with nature and relative solitude.¹³ Playing and learning outside is a fundamental part of childhood, and strong evidence from a four-year project commissioned by Natural England showed that learning

¹(Urban Parks Forum, 2001) | ²www.ukmaburbanforum.co.uk/documents/papers/allthinglidesign.pdf | ³Public Health England Getting everybody active every day, 2014 | ⁴Public Health England Improving access to green space, 2014, Health Equity Briefing 8 | ⁵NHS Health Scotland www.healthscotland.scot/health-inequalities/place-and-communities/place | ⁶World Health Organisation 2013, Physical activity promotion in socially disadvantaged groups: principles for action | ⁷www.gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en | ⁸NHS Statistics on Obesity, Physical Activity and Diet, England, March 2017 | ⁹Child Obesity Plan for Action, Department of Health, 2016 | ¹⁰www.beta.gov.scot/news/scotland-a-daily-mile-nation/ | ¹¹Natural Solutions to Tackling Health Inequalities, Institute of Health Equality, 2014 | ¹²www.gov.uk/government/uploads/system/uploads/attachment_data/file/486622/Sporting_Future_ACCESSIBLE.pdf | ¹³Urban green spaces and health, World Health Organisation Europe, 2016

outdoors results in children being happier, healthier and more motivated to learn.¹⁴ We know that regular contact with green spaces, such as the local park or playground, can have a beneficial impact on children's physical and mental health, and the government's recently released twenty five year environment plan 'A Green Future'¹⁵ includes steps to help people from all backgrounds (particularly those from disadvantaged areas), to engage with and spend time in green space to improve their health as part of their everyday lives – specifically scoping out how to better use the natural environment as a resource for preventative and therapeutic purposes to improve mental health.

The Northern Ireland Executive's current ten-year public health strategic framework 'Making Life Better'¹⁶ notes that people with poorer health often live in environments which support unhealthy lifestyles, for example, lacking in green space, with limited access to environments for walking or cycling, or for children to play, and more likely to pose a threat to health through higher rates of crime or risks from traffic.

The Scottish Government recognises that green space has substantial environmental and health impacts, but also links to other aspects, such as community cohesion, social connectedness and community resilience, and has set an

aim to "Improve access to local green space" in response to findings that in Scotland people living in the most deprived areas are less likely to live within a five-minute walk of their nearest green space than people in less deprived areas.¹⁷ Parks and green spaces improve community cohesion by offering shared spaces for community connections and to tackle social isolation (Cohen-Cline et al., 2015; Hartig et al., 2014; White et al., 2013). The Marmot Review, 2010¹⁸ recommends that improving the availability of good quality green spaces across the social gradient will help reduce health inequalities.

However, despite the evidence of the benefits of parks and green spaces and the policy demand for these benefits, local authorities do not have a statutory obligation to fund them. Funding cuts and skills shortages have led to a significant decline in the quality of parks in recent decades. Since 2014, 92% of park managers have seen cuts to their revenue budgets and 95% of park managers expect their budgets to be slashed further over the next three years.¹⁹ Fields in Trust's 2015 survey revealed that nearly all (95%) agree that parks and play areas should be protected from development, and two thirds (69%) state that the loss of parks would be detrimental to children's development. Half of respondents admitted that they would be less active if their local green space was built on.

2.2 Fields in Trust's Position

Fields in Trust actively champions parks and green spaces by protecting them in perpetuity; over 2,700 spaces have been protected since 1925. As social policy becomes more geared to acting earlier to build a society that prevents problems from occurring (rather than attempting to solve the more expensive consequences) parks and green spaces have an important role to play. The preventative approach of moving upstream to tackle social issues earlier, saves money and can avoid significant problems for communities and individuals. Fields in Trust recognise the importance of demonstrating the case for the financial contribution and the positive social return on investment for parks and green spaces in the context of this policy approach.

Ensuring that there is equitable provision of accessible parks and green space has been a key priority for Fields in Trust since the 1930s. Guidance For Outdoor Sport and Play²⁰ (originally published as the Six Acre Standard) is both respected and valued across the sector with 73% of Local Planning Authorities using this guidance or an equivalent level of provision according to a 2014 survey. The Guidance has been regularly updated and the current version takes account of revised planning frameworks across the devolved administrations.

Few public services have such a wide-ranging, positive impact on local communities as parks and green spaces on

which to play. Unfortunately, such spaces tend to be valued within local budgets according to their maintenance costs rather than their true dividend to local communities which vastly exceeds such sums because of their multiple benefits.

Parks and green spaces can:

- › **Contribute to a preventative health agenda**
- › **Reduce future Exchequer expenditure**
- › **Reduce health inequalities**
- › **Increase social cohesion and equality**

Changing the conversation to recognise the role parks and green spaces can play in timely and affordable health prevention rather than the expensive treatment is crucial to sustaining their future.

In autumn 2016, Fields in Trust submitted evidence to the House of Commons Communities and Local Government Select Committee Inquiry into the future of public parks.²¹ This included the position set out above and emphasised the importance of revaluing parks and green spaces for the health and wellbeing contributions they deliver, not just their maintenance costs, therefore ensuring public funding for parks and green spaces commensurate with their positive impact on communities.

¹⁴ Natural Connections Demonstration Project, Natural England 2012-2016 | ¹⁵ A Green Future: Our 25 Year Plan to Improve the Environment, DEFRA 2018

¹⁶ www.health-ni.gov.uk/sites/default/files/publications/dhssps/making-life-better-strategic-framework-2013-2023_0.pdf | ¹⁷ www.gov.scot/About/Performance/scotPerforms/indicator/greenspace

¹⁸ Fair Society, Healthy Lives, Marmot Review, 2010 | ¹⁹ www.hif.org.uk/state-uk-public-parks-2016 | ²⁰ Planning and Design for Outdoor Sport and Play, Fields in Trust 2015

²¹ www.fieldsintrust.org/Upload/file/CLG-Submission.pdf

2.3 House of Commons Communities and Local Government Select Committee Report: The Future of Public Parks

In February 2017 the Communities and Local Government Committee (CLGC)²² published a report into the value of parks and green space in the UK.²³ The report discussed the positive contributions that parks and green spaces provide to the everyday lives of communities, with recommendations around improving the provision of, and equality of access to, parks and green spaces linked to public health strategies.

Rejecting a call for a statutory obligation to provide parks, the CLGC strongly suggested that local authorities should collaborate with Health and Wellbeing Boards on the production of joint strategies as part of Local Plans, to articulate the contribution of parks to wider social objectives and set out how parks will be managed to maximise such contributions.

Parks and green spaces have traditionally been viewed as financial liabilities for local authorities, and the CLGC expressed a clear policy demand for valuation methodologies to be applied with the “development of robust and accessible transferrable models which local authorities can use to access the value of their parks” (House of Commons Communities and Local Government Select Committee Report: The Future of Public Parks 2017, para.39).

Being able to fully capture the broader value of parks to individuals in appropriate ways, balanced against the costs of provision, will be crucial in helping local authorities to prioritise and target investment more effectively. The ability to quantify in economic terms the contribution of parks and green spaces to the preventative public health agenda would mark a significant step forward.

In response to the recommendations in the CLGC report, the government has recently established an advisory group, the Parks Action Group, including the appointment of Helen Griffiths, Fields in Trust Chief Executive, alongside other representatives from the sector who are tasked with applying their expertise to inform a new cross-departmental group including officials from across government.

²² As of January 2018 Department of Communities and Local Government (DCLG) is known as Ministry of Housing, Communities and Local Government (MHCLG)

²³ publications.parliament.uk/pa/cm201617/cmselect/cmcomloc/45/45.pdf



Aims and Objectives

3 Aims and Objectives

To further the case for revaluing parks and green spaces in terms of the contributions they deliver across diverse policy agendas including tackling obesity, mental health, wellbeing and loneliness, Fields in Trust commissioned Jump X Simetrica to perform new analysis and collect primary data specific to park and green space users in the UK. Using methodologies consistent with HM Treasury Green Book Guidance (2018), we will establish a valid statistical link between parks and green spaces and health and wellbeing. HM Treasury's Green Book encourages a long-term analytical approach to the valuation of goods and services to ensure that government departments and executive agencies spend public funds on activities that provide the greatest benefits to society in the most financially efficient way.²⁴

Parks and green spaces are widely recognised as being good for individuals and communities (Nieuwenhuijsen and Khreis, 2017; UK National Ecosystem Assessment, 2011), but given the well documented risks to their future a more coherent business case needs to be made to ensure their ongoing protection.

Interestingly at the Office for National Statistics, and across the Government Statistical Service, 'The Beyond GDP initiative' is developing a set of measures that are more inclusive of environmental and social aspects to capture those things that tell us everything about our wellbeing that Gross Domestic Product (GDP) figures cannot.

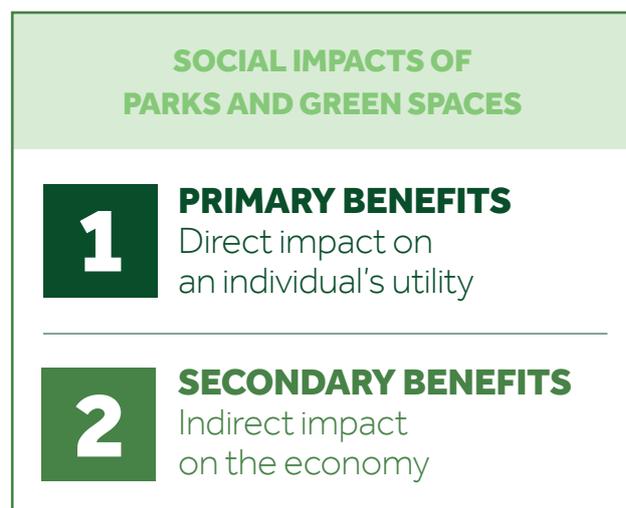
3.1 Measuring the Social Impact of Parks and Green Spaces

In order to value the beneficial outcomes to individuals and society that parks and green spaces provide, we must look to best practice methods of valuing 'non-market' goods. Non-market goods or services consist of those which are currently available to the public free of charge and therefore have no direct monetary indicator of the value that people hold in them. For instance, access to parks and green spaces are not traded on the market and are maintained and funded by local authorities as a community and social resource. Therefore, they provide a social benefit at a cost to the local authority. The purpose of this study is to estimate the value of parks and green spaces to society, to best inform social cost-benefit analysis behind future investment decisions (following best-practice methods outlined in Fujiwara and Campbell, 2011).

The economic value of something, as defined in the microeconomic theory that underlies HM Treasury's Green Book guidelines on cost-benefit analysis (CBA), is a measure of the change in human welfare or utility that results from it. Best-practice approaches to social impact measurement as set out in HM Treasury's Green Book and other guidelines across OECD governments²⁵ state that social impact includes both the value to individuals and businesses (primary benefits) and values to society more widely (secondary benefits).

Primary benefits are those that impact directly on an individual's utility, for example the health benefits from walking through a park or green space. Secondary benefits relate to induced impacts felt by society more widely. These include, though are not restricted to, impacts on the economy in the form of cost savings to the Exchequer, for instance a decrease in demand for health services linked to the physical health benefits of people exercising in parks and green spaces. Other benefits include ecosystem services

FIGURE 3.1 MEASURING THE SOCIAL IMPACT OF NON-MARKET GOODS OR SERVICES



flowing to people from clean air, the material and emotional costs avoided through flood prevention or buffering from storms and other extreme weather events. For instance, in natural capital accounting (COM, 2011; Daily et al., 1997; Natural Capital Committee 2013), the existing stock of parks and green spaces provide a range of ecosystem service benefits that flow to those who use them and are exposed to them (Gómez-Baggethun and Barton, 2013; MacKerron and Mourato, 2013; Tzoulas et al., 2007). These benefits may be quantified in terms of secondary benefits to society through health cost savings associated with clean air, the provisioning food services provided through pollination, or the material and emotional costs avoided through flood prevention or buffering from storms and other extreme weather events. In Section 6 we focus specifically on secondary health benefits.

²⁴ www.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf | ²⁵ European Commission. (2008). Guide to Cost-Benefit Analysis of Major Projects (p. 257). Brussels, Belgium: Evaluation Unit, DG Regional Policy, European Commission. www.ec.europa.eu/regional_policies/sources/docgener/guides/cost/guide2008_en.pdf; HM Treasury. (2011). The Green Book: Appraisal and Evaluation in Central Government. HM Treasury. www.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf OECD. (2006). Cost-Benefit Analysis and the Environment (p. 27). Paris, France: The Organisation for Economic Cooperation and Development. www.oecd.org/environment/tools-evaluation/36190261.pdf; World Bank. (2010). Cost Benefit Analysis in World Bank Projects. Washington DC: Independent Evaluation Group; World Bank

3.2 Our Approach to Valuing the Benefits of Parks and Green Spaces

We provide a robust set of values for the welfare benefits that UK parks and green spaces provide to the wider population. To better communicate the primary benefits of publicly available green space to communities - particularly to policy audiences - where possible we seek to assign a monetary value in line with economic welfare measures used in government evaluations. There are three key ways to value non-market social impacts which are consistent with HM Treasury's Green Book welfare evaluation methods: Stated Preference, Revealed Preference and Subjective Wellbeing (Fujiwara and Campbell, 2011).

1. STATED PREFERENCE METHODS:

Contingent Valuation or Discrete Choice Experiment surveys elicit use and non-use values for the continuation or improvement of non-market goods and services such as parks and green spaces (values may be associated with direct use, or with 'non-use' preferences for the existence and future provision of parks and green spaces; Bakhshi et al., 2015; Bateman et al. 2002).

2. REVEALED PREFERENCE METHODS:

Analysis based on actual prices that consumers pay to use or be close to a non-market good or service in parallel markets (Dunse et al., 2007; GLA Economics, 2003).

3. SUBJECTIVE WELLBEING:

Wellbeing Valuation which derives monetary values for non-market goods and services such as parks and green spaces, by estimating the amount of money required to keep an individual just as satisfied with life in the absence of their use of the good (i.e., to keep their wellbeing constant) (Dolan and Fujiwara, 2016). Wellbeing values constitute only "use value" given that they are associated with the frequency of use of the individuals' local park or green space.

Figure 3.2 summarises the valuation methods used in this research study. We apply contingent valuation (CV) and wellbeing valuation (WV) as two alternative and widely accepted methods of measuring the welfare benefits associated with park and green space usage. In addition, we carry out further analysis to isolate partial secondary health values derived from NHS cost savings²⁶ associated with improved health among park and green space users. Each of these valuation methods can contribute to natural capital accounting. Natural capital accounts pull in values for ecosystem services from many sources, including revealed preference house price differentials, Willingness to Pay CV studies, and secondary Exchequer values. Therefore, the values provided in this report could be used in natural capital accounting exercises, although CV and WV should not be used in combination due to double-counting.

Contingent Valuation (CV) (Section 5) estimates people's Willingness to Pay (WTP) to support the maintenance and preservation of their local parks and green spaces. This provides a value specific to the good

being surveyed (all parks and green spaces in the local area, or the site most commonly used within 1km of their home), and the payment mechanism through which people would pay (in this case an alternative payment mechanism to support local parks and green spaces through a subscription to a non-profit organisation). This mean WTP value that applies to all individuals, regardless of how often they use their local park or green space. We can also disaggregate WTP values by park users and non-users and other socio-demographic groups.

Contingent valuation is the only method capable of capturing the Total Economic Value (TEV) of parks and green spaces and is composed of use value and non-use value associated with their social and wellbeing impacts. Use values include the direct use benefits of publicly accessible green space, for instance recreational and leisure, as well as relaxation and inspiration. However, parks and green spaces are also valued by those who do not directly use them. Non-use value includes indirect use benefits in the form of enhanced community image, social interaction or simply knowing that the park or green space exists, either now or in the future. (Pearce and O'zdemiroglu, 2002). Option value refers to benefits from a potential future use of the park or green space by those who do not currently use it.

Wellbeing Valuation (WV) (Section 6) is an alternative method of eliciting welfare changes, by directly asking people to rate their subjective wellbeing (life satisfaction) and general health. It estimates the overall evaluative measure of the total welfare benefits to regular park or green space users compared to non-users. Wellbeing Value is based on measurements of life satisfaction, which is an evaluative subjective wellbeing measure incorporating all aspects of an individual's quality of life, including physical and mental health benefits that stem from park usage.

Whilst Revealed Preference (RP) methods – which we do not apply here – also measure the same thing, it does not estimate the benefits associated with park and green space use, compared to non use, rather it estimates the welfare associated with proximity to parks and green spaces. Revealed preference values derived from accessible outdoor recreation areas are for example quantified in the Outdoor Recreation Value (ORVal) dataset.²⁷

Exchequer Cost Savings (Section 7) using general health measures obtained through the primary survey data to estimate partial cost savings to the Exchequer which are attributable to park and green space users associated with their higher self reported general health. Exchequer values associated with health benefits can be used additively alongside either CV or WV estimates without risk of double counting.

We address the different biases that can affect each approach in Appendices 11.2 and 11.4.

²⁶ By 'NHS savings' we mean savings to the National Health Services in England, Wales, Scotland and Northern Ireland | ²⁷ www.leep.exeter.ac.uk/orval/

FIGURE 3.2 VALUATION METHODS RELEVANT TO THIS RESEARCH STUDY



3.3 Literature Review

The choice of methodologies for this study was informed by a comprehensive literature review (outlined in full in Appendix 11.1). We assessed the advantages and disadvantages of each of the approaches in relation to parks and green spaces and we explain these in Appendix 11.2. In summary there were two main knowledge gaps from reviewing the existing literature:

- › Existing work to value parks and green spaces using stated preference methods is limited to Willingness to Pay values for individual parks, or else for all parks in a single city, with limited potential for transferability of values to other sites, or for aggregation to understand the value of parks and green spaces at a UK-wide level.
- › There have been no attempts to date to evaluate the benefits provided by publicly accessible parks and green spaces in the UK using the wellbeing valuation approach.

Based on the findings of our literature review we:

1. Designed a new primary survey to collect data on how people value the continued existence of parks and green spaces, including the frequency of use, characteristics of their local park or green space and the purpose of their visit (the approach to survey design and analysis is detailed in Appendix 11.3).
2. Estimated the primary benefits of parks and green spaces through contingent valuation (Willingness to Pay) questions (Section 5.1).

3. Applied social welfare weighting to Willingness to Pay values for parks and green spaces to account for differences in values among target demographic groups (Section 5.2).
4. Explored the wellbeing values associated with the use of parks and green spaces, using the same primary survey. We collected data that directly links an individual's use of a park or green space to their self-reported subjective wellbeing (Section 6.1), and health (Section 7.1), including the frequency of usage and the purpose for their visit.
5. Applied the wellbeing valuation method to estimate the primary benefits – in terms of life satisfaction – associated with regular park and green space usage (Section 6.2).
6. Finally, we explored new analysis that can be undertaken on the primary data to estimate partial cost savings to the Exchequer associated with self reported health of regular park and green space users (Section 7.2).

In Section 9 we show how this research could be developed further into a model Local Valuation Model by applying the values obtained in this research study to individual parks and green spaces.



Primary Survey Data Collection and Methodology

4 Primary Survey Data Collection and Methodology

In this section we outline the design of the primary survey, the nationally representative sampling approach, and the statistical analysis undertaken. Full detail on the primary survey data collection methodology is included in Appendix 11.3.

4.1 Survey Instrument

A single online survey was considered the most cost-effective way to collect primary survey data on how people value and benefit from parks and green spaces rather than individual online surveys or face-to-face user surveys at individual sites. The survey was developed in consultation with Fields in Trust and our academic associates at the London School of Economics. Question response options were designed to be comparable to existing datasets such as Defra's Monitor of Engagement with the Natural Environment survey (MENE).²⁸

The survey was designed to first identify whether the respondent has any publicly accessible park, green space or sports field near to the place they live (defined as being around 1km in distance or 20 minutes walk from their house). Within the survey we defined publicly accessible green space as the following categories, in line with Ordnance Survey Open Greenspace:

- › Any public park (including those with a children's playground or formal sports facilities);
- › Other green space areas that are publicly managed (for example managed wildflower meadows, nature reserves);
- › Pocket parks or children's playgrounds;
- › Sports fields open to the public.

We asked respondents not to consider national parks, private agricultural fields, private sports clubs, coastal beaches and public rights of way (e.g. coastal or river paths) in the definition of the park or green space we ask them to value.

For those who indicated they have visited any publicly accessible green space within 1km of their house in the past 12 months, we asked them to give the name of the publicly accessible green space that they most commonly use.²⁹ The name provided was then used throughout the survey to tailor the questions to each respondent and focus responses directly on their usage and value for that specific park.

The survey included questions specific to the respondent's designated local park or green space (within 1km of their house and that they use most commonly) such as frequency of visit, distance from home, size,³⁰ whether they pass through it on their way to work or can see it from their house and geographic or landscape characteristics.³¹ We asked about people's motivations for using their local park (the most common purpose), the person(s) who most commonly accompanies the respondent, their satisfaction with the quality of the park or green space, and any volunteering activities related to the park or green space. This provides a stronger link between a park or green space, its attributes, the individuals' usage of it, and the valuation data gathered.³²

4.1.1 Health and Wellbeing Questions

Once the relevant scenario had been established, the first part of the survey then seeks to establish the health and wellbeing value of frequent use of parks and green spaces. We asked the four Office for National Statistics (ONS) questions on subjective wellbeing (SWB):

- › **LIFE SATISFACTION:**
"Overall, how satisfied are you with your life?";
- › **HAPPINESS:**
"Overall how happy did you feel yesterday?";
- › **ANXIETY:**
"Overall how anxious did you feel yesterday?";

- › **SENSE OF PURPOSE:**
"Overall, to what extent do you feel the things you do in your life are worthwhile?"

SWB responses are on a scale of 0 to 10, where 0 is "not at all", and 10 is "completely". Conversely for the anxiety question a higher value indicates lower SWB: 0 = "not at all anxious"; 10 = "completely anxious"

- › **GENERAL HEALTH:**
We also ask the general health question used in ONS surveys using a five-point scale:
"In general, would you say your health is
Poor/Fair/Good/Very good/Excellent?"

²⁸ www.gov.uk/government/collections/monitor-of-engagement-with-the-natural-environment-survey-purpose-andresults | ²⁹ The choice of publicly accessible green space within 1km of the respondent's house and which they most commonly use was carefully designed. First, we avoid eliciting values for people's 'favourite' park or green space, because: i) this classification is subjective; ii) it is likely to lead to inflation of values | ³⁰ Size is estimated as number of minutes it takes the respondent to walk around or through the park or green space. | ³¹ We ask respondents to describe the landscape characteristics and features present at the park or green space using landscape categories provided by the UK National Ecosystem Assessment to ensure comparability with ecosystem service research and valuation models (e.g. MENE data). www.uknea.unep-wcmc.org/ | ³² We note that online surveys can be subject to recollection bias, which is possible in any situation where one collects self-reported data on usage (e.g. MENE). Experience sampling methods partially overcome these issues by surveying people in the moment and geolinking these responses to their precise location (see e.g. Fujiwara et al., 2017; Fujiwara and MacKerron, 2015).

4.1.2 Contingent Valuation (Willingness to Pay) Questions

The next section of the survey presented respondents with information about the state of publicly accessible parks and green spaces in the UK, the health and natural capital benefits parks and green spaces provide, and the current funding arrangements for publicly accessible green space at the local level. The valuation section was carefully designed to overcome known biases in stated preference methods (outlined in Appendix 11.4).

The contingent valuation (Willingness to Pay) scenarios were designed to uncover the value of the continued existence of parks and green spaces at two levels: 1) all parks and green spaces in the local authority area and 2) the park or green space within 1km that the respondent most commonly used (defined as their most commonly visited local park or green space).

In both cases, we presented a hypothetical scenario where the difficult financial situation has meant that local authorities in the UK have suffered cuts in funding while having to cope at the same time with increases in maintenance and operating costs. The hypothetical scenario was designed to be realistic to the current situation around public park provision, in order to elicit people's willingness to pay to avoid a deterioration in quality, reductions in access, and potential loss of parks and green spaces to private development. **We note that this is a hypothetical scenario designed to elicit Willingness to Pay values and does not represent a recommendation for implementing charging structures.**

› VALUATION SCENARIO ONE:

Payment of a monthly subscription to an independent not-for-profit organisation set up to maintain and preserve all parks and green spaces in the local authority area.

› VALUATION SCENARIO TWO:

Payment of a monthly subscription for their most commonly visited local park or green space (within 1km of their house), assuming that all other parks and green spaces in the local area continued to be funded as normal.

In both cases, we presented the same hypothetical scenario of cuts to local government funding, leading to deterioration in the quality of the local park or green space, risk of closure to the public, and possible sale for private development if alternative sources of funding are not secured.³³

We asked how much the park or green space would be worth, if anything, and asked respondents their willingness to pay a subscription to an independent organisation, presenting respondents with a range of values (payment card) from

£0-£75, with an "other" option for open-end responses.³⁴ Valuation scenario one was presented first, in order to ensure that respondents fully considered the availability of substitute parks and green spaces when answering valuation scenario two. This was important to ensure that the values obtained are consistent with welfare economic theory (consideration of alternatives that could be used in the absence of their local park or green space). However, it may also introduce a scope effect, whereby although individuals are asked to think about all parks and green spaces in their local authority area in valuation scenario one they think implicitly about the value of the small number of parks and green spaces which they actually use. Then, when respondents come to answer scenario two, we may find that they have already stated a large part of their maximum willingness to pay for the park or green space which they most commonly use in the previous question. This would lead to apparent "scope effects" (Carson, 1997), whereby the value obtained for many parks is not significantly greater than the value obtained for one park.

A crucial element of a contingent valuation scenario is that the good being valued should be "excludable" if the individual does not agree to pay (i.e. their continued benefit from the park or green space is contingent on their payment). We recognise that although the survey explicitly stated that all parks and green spaces would no longer be maintained and may be at risk of loss to development, it may be unrealistic that all parks and green spaces in the local authority would disappear if people gave a zero Willingness to Pay. Therefore, in stating their maximum WTP value, respondents may be taking into account the low risk that all parks and green spaces in their local authority area would close and, as such, the probability that the loss of funding would negatively affect them (given that other parks and green spaces would presumably still be available for them to use). This would suggest that the hypothetical scenario for closure of all parks and green spaces is less convincing, which provides less confidence in the external validity of valuation scenario one.

We therefore place more confidence in valuation scenario two, which describes payment of a monthly subscription for the single local park or green space most commonly used by an individual – given its excludability, realism and direct relevance to the welfare of the individual. It is these values that we recommend for application in evaluating the total economic benefits of parks and green spaces which are a very locally driven service. We expand on this further in Section 9.

³³ The continuation of all other parks and green spaces in the area ensures that substitute sites are sufficiently taken into account in the valuation, which allows for direct comparison with travel cost methods developed elsewhere (e.g. MENE). | ³⁴ N=3 for open-end responses (two individuals give a WTP value of £10 and one individual gives a WTP value of £1).

4.2 Sample Description

This section defines the survey sample and analytical approach adopted in this report. The primary survey was run on a nationally representative panel of 4,033 UK resident adult respondents (aged 16+) between 14th July and 10th August 2017.

The online primary survey allowed us to set quotas for gender, age and region using national UK averages from the Office for National Statistics' Annual Population Survey. This ensured representativeness between the results reported in this study and any wider policy implications to the UK population.

TABLE 4.1 SAMPLE SOCIO-DEMOGRAPHIC CHARACTERISTICS: PRIMARY SURVEY (2017)

| SOCIO-DEMOGRAPHIC CHARACTERISTICS (CONTROL VARIABLES FOR ANALYSIS) | PARK AND GREEN SPACE USERS (MEAN) | NON-USERS (MEAN) | TOTAL SAMPLE (MEAN) |
|--|-----------------------------------|--------------------|---------------------|
| Male (%) (reference = female) | 48.6% (1288/2648) * | 44.3% (613/1385) * | 47.1% (1901/4033) |
| Mean age | 47.0 * | 50.0 * | 48.0 |
| Mean household income (£) | £33728 * | £28576 * | £31980 |
| With children (%) (reference = other) | 32.6% (862/2643) * | 17.7% (245/1381) * | 27.5% (1107/4024) |
| Married / partnership (%) (reference = other) | 49.3%(1287/2609) * | 43.3% (596/1377) * | 47.2% (1883/3986) |
| Higher education (%) | 51.4% (1345/2618) * | 39.0% (537/1376) * | 47.1% (1882/3994) |
| CV and NHS cost savings | | | £1,872,900,000 |
| Employed (%) (reference = other) | 56.3% (1480/2630) * | 44.4% (610/1374) * | 52.2% (2090/4004) |
| Live in London (%) (reference = other) | 12.8% (339/2648) * | 7.8% (108/1385) * | 11.1% (447/4033) |
| BAME (reference = white) | 7.7% (201/2616) | 7.6% (105/1373) | 7.7% (306/3989) |
| Members of park/cons. org. (%) | 21.8% (576/2648) * | 12.9% (179/1385) * | 18.7% (755/4033) |
| Rural (reference = urban/suburban) | 20.4% (541/2643) | 20.2% (280/1378) | 20.4% (821/4033) |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). User defined as used park or green space once a month or more in past 12 months. Notes: Gross annual household income; averages computed using the midpoints of the income and age categories. Legend: * p<0.10 significant difference between user and nonuser samples (t-test).

PRIMARY SURVEY (2017):

Sample description

A higher proportion of park and green space users are of higher socio-economic and educational status than non-users. Park and green space users, on average, earn significantly more (£33,727) than non-users (£28,576).

Over half of the park and green space users have completed higher education (51%), a significantly higher proportion than among non-users (39%), while a higher proportion of park and green space users are in employment (56%), compared to 44% of non-users.

A higher proportion of park and green space users are part of a family, 33% of park and green space users have dependent children, compared to 18% of non-users.

A significantly higher proportion of park and green space users are married or in a relationship (49%) relative to non-users (43%). Park and green space users are younger, averaging 47 compared to the average age of 50 among non-users.

The majority of the sample (80%) is self-defined as urban (inner city and suburban residents) compared to rural residents who make up 20% of the sample. This grouping is based on previous literature that has focused on the value of urban green spaces to inner city and suburban residents (see Literature Review, Appendix 11.1).

We provide additional descriptive statistics tables from the primary survey outlining the differences in the characteristics of park and green space user groups in Appendix 11.9.

4.3 Frequency of Use

The largest proportion of respondents visit their local park or green space once or twice a month (22%), once a week (17%), or several times a week (21%). Only 7% visit every day or several times a day (Table 4.2). For reference, we compared these results to equivalent national-level data within the MENE dataset (Years 1-7). Overall, there was good comparability between the primary survey data and the national data, which increased the external validity of our analysis. Although we saw MENE respondents use open green space more often (74% of MENE respondents use their open green space once a month or more, compared to 66% of the primary survey sample), we must also account for the fact that open green space in MENE is defined in a different way to local parks and green spaces in our primary survey (MENE covers more open space destinations and therefore introduces an upward bias).

Based on this data, we define park and green space users in the following way throughout this report:

- › Park and green space users are defined as those who have visited their most commonly used local (<1km) publicly accessible park or green space at least once per month over the past 12 months.
- › Park and green space non-users are defined as those who have visited their most commonly used local park or green space less than once a month or not at all over the past 12 months.

This provided a sample split of 66% park users and 34% non-users. For the purpose of analysis, we are interested in the statistical significance of health, wellbeing and other outcome variables between park and green space users and non-users. We outline in full the design of the primary survey, the nationally representative sampling approach, and the statistical analysis undertaken in Appendix 11.5 and 11.6.

In terms of data cleaning, we include a screener question to exclude those who do not have any publicly accessible green space in their local area (defined as within 1km or within 20 minutes' walk of their house).³⁵

To ensure that the parks and green spaces being valued were consistent with the aims of the research study, we removed individuals with inconsistent answers for the following reasons: because they identified their local park or green space as one of the categories of green space excluded from the survey (e.g. canal; country park; beach; cricket club; paid park), or reported that no park or green space was present in the local area (i.e. answered the previous screener question incorrectly).³⁶ Full details of sample exclusions are available in the Appendix 11.7).

TABLE 4.2 FREQUENCY OF PARK AND GREEN SPACE USAGE (PRIMARY SURVEY 2017; MENE YEARS 1-7)

| FREQUENCY OF PARK AND GREEN SPACE VISIT | TOTAL OBSERVATIONS (PRIMARY SURVEY) | TOTAL OBSERVATIONS (MENE NATIONAL DATASET) |
|---|-------------------------------------|--|
| Never | 7.7% (312/4033) | 9.9% (6,971/70,466) |
| Once or twice | 13.6% (548/4033) | 8.0% (5,657/70,466) |
| Once every 2-3 months | 13.0% (525/4033) | 8.1% (5,689/70,466) |
| Once or twice a month | 21.5% (866/4033) | 19.5% (13,715/70,466) |
| Once a week | 16.7% (672/4033) | 20.6% (14,521/70,466) |
| Several times a week | 20.6% (829/4033) | 22.8% (16,044/70,466) |
| Every day | 5.2% (208/4033) | 9.0% (6,317/70,466) |
| More than once per day | 1.8% (73/4033) | 2.2% (1,552/70,466) |

National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). User defined as used park or green space once a month or more in past 12 months.

³⁵ We note that this may introduce a slight bias into our results, by excluding members of the population who live further away from parks and green spaces. These may be expected to benefit less from these parks and green spaces, given that they are able to use them less frequently, which would lead to a slight over-estimation of the final WTP value. Alternatively, it could also be that they value the parks and green spaces more when they do visit them, as they are willing to travel further to use them (following travel cost theory). ³⁶ Speedsters were removed for surveys completed in less than 5 minutes, based on the distribution of WTP responses and number of respondents within each 30 second interval.

Results of the Contingent Valuation: Willingness to Pay Values

5



5 Results of the Contingent Valuation: Willingness to Pay Values

KEY FINDINGS: The average value of publicly accessible parks and green spaces in the UK (use and non-use)

£2.52 PER MONTH (£30.24 PER YEAR) is the mean WTP value to support the maintenance and preservation of **THEIR LOCAL PARK OR GREEN SPACE** (most commonly visited park or green space within 1km). This incorporates both use and non-use values of both frequent and infrequent users/non-users. We recommend that this value is used for estimating the benefits of parks and green spaces to individuals at the local level.

£2.76 PER MONTH (£33.12 PER YEAR) is the mean WTP value to support the maintenance and continuation **OF ALL PARKS AND GREEN SPACES** in the local area (upper bound). This feeds into our estimate of the UK aggregate average annual Willingness to Pay value to maintain and preserve all parks and green spaces in the local area (see 5.1.4).

5.1 Mean Willingness to Pay (WTP) Values

The valuation section of the survey was designed to elicit a Willingness to Pay value through a hypothetical scenario where the current funding arrangements had been cut and the continued maintenance and preservation of peoples' local parks and green spaces were dependent on their paying a subscription to an independent not-for-profit organisation set up to maintain and protect parks and green spaces (section 4.1.2).

› VALUATION SCENARIO ONE:

Payment of a monthly subscription to an independent not-for-profit organisation set up to maintain and preserve all parks and green spaces in the local authority area.

› VALUATION SCENARIO TWO:

Payment of a monthly subscription to an independent not-for-profit organisation set up to maintain and preserve their most commonly visited local park or green space (within 1km of their house), assuming that all other parks and green spaces in the local area continued to be funded as normal.

Table 5.1 shows statistics for the contingent valuation sections of the survey. Full summary results tables (including additional WTP statistics and confidence intervals) are available in Appendix 11.8.

- › We found an average Willingness to Pay value of £2.60 per month to support the maintenance and preservation of all parks and green spaces in their local area.
- › In comparison, we found an average Willingness to Pay value of £2.52 per month to support the maintenance and preservation of the single most commonly visited local park or green space.

We previously would have expected to find that people hold a higher value for a larger set of parks and green spaces,

than for an individual park or green space which sits within this group (Carson, 1997; Powe and Bateman, 2003) and as such we would expect the WTP value for all local parks to be higher than the WTP value for their most commonly used local park. However, there is no significant difference between mean WTP value for all parks and green spaces in the local area (at £2.60/month) compared to the mean WTP value for a single local park (£2.52/month).³⁷

This appears to indicate that even though answering the question about all parks and green space in the local area (valuation scenario one) individuals were actually thinking about the park or green space they most commonly use.

It may also be that valuation scenario one is more prone to hypothetical bias (people do not really believe they would have to pay to keep benefitting from all parks and green spaces in the local area), because not all parks and green spaces in their local area would close (as outlined in Section 4.1.2).³⁸ In contrast, in scenario two, the risk of closure, redevelopment or loss of a specific park or green space (which they most commonly use) may be more directly perceived to impact on a person's welfare. The use of voluntary payment mechanisms may have provided individuals with the opportunity to freeride (Bateman et al., 2002). In other words, people may think they do not have to pay because others will contribute and the parks and green spaces will continue to be maintained and preserved and consequently give a low WTP figure, or not pay at all, and this would be more prevalent in valuation scenario one than scenario two.

As such, the WTP values for the single park or green space which people most commonly use may be a more accurate reflection of the welfare value of the park or green space to those individuals. We discuss aggregation values in section 5.1.4.

³⁷ We note that a similar proportion of respondents were willing to pay in principle for the individual most commonly visited local park or green space (60%), compared to paying for all parks in the local authority area (57%). ³⁸ We note from the data that when we ask the same WTP question of their local park or green space which they most commonly use, the mean WTP value is almost at the same level as the WTP value to support all parks and green spaces in the local area.

TABLE 5.1 MEAN WILLINGNESS TO PAY (WTP) SUMMARY STATISTICS

| | I. WTP VALUES FOR ALL PARKS AND GREEN SPACES IN THE LOCAL AREA | | | II. WTP VALUES FOR MOST COMMONLY VISITED LOCAL PARK OR GREEN SPACE | | |
|------------------|--|--------|-----------|--|--------|-----------|
| | Whole sample | Users | Non-users | Whole sample | Users | Non-users |
| N visitors | 3783 | 2472 | 1311 | 3824 | 2497 | 1327 |
| Mean (std. err.) | £2.60 | £3.03* | £1.81* | £2.52 | £2.98* | £1.64* |
| Low 95% | £2.45 | £2.81 | £1.63 | £2.37 | £2.77 | £1.48 |
| High 95% | £2.76 | £3.24 | £1.99 | £2.67 | £3.19 | £1.81 |
| Median | £1.25 | £1.75 | £0.00 | £1.25 | £2.25 | £0.00 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"); WTP all parks and green spaces in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). User defined as used park or green space once a month or more in past 12 months. Full summary WTP results table (including additional statistics and confidence intervals) available in Appendix 11.8.

5.1.2 Mean Willingness to Pay Values for Park and Green Space Users and Non-Users

Next we report Willingness to Pay values split between park and green space users and non-users.

Park and green space users have higher WTP values for the maintenance and preservation of parks and green spaces, compared to non-users:

- › Frequent park users state a significantly higher mean WTP value for parks and green spaces at **£3.03** (valuation scenario one) and **£2.98** (valuation scenario two).

- › Non-users still value the existence and preservation of parks and green spaces at **£1.81** (valuation scenario one) and **£1.64** (valuation scenario two).

This accords with our expectations that those who use their local park or green space more regularly would be those who gain the most personal benefits from it and therefore value it more highly.³⁹

It is however interesting to note that individuals hold value for parks and green spaces despite not using them frequently.

5.1.3 Drivers of Willingness to Pay Values

In line with best practice for contingent valuation (Bakhshi et al., 2015; Bateman et al. 2002), we conducted a detailed investigation into the drivers of WTP for parks and green spaces and how they vary by different socio-demographic groups, usage, and attitudes towards publicly accessible green space.

The results (reported below and in full in Appendix 11.8), confirm that higher WTP values are associated with theoretically consistent drivers. For instance, we would expect from the literature that Willingness to Pay should be higher for those with higher incomes (who have lower budget constraints on their donation amounts) and those who are engaged in parks and green spaces or the natural environment. The bullets opposite show the factors which are statistically significantly associated with WTP.

The fact that WTP is significantly and positively associated with these control variables – and in particular positively associated with income (Bateman et al. 2002) – provides greater confidence in the WTP values reported in Table 5.1. This provides additional confidence in the internal consistency and validity of our results.

WTP is on average higher for these groups

- + Frequency of park or green space usage
- + Household income
- + Higher education (WTP for all parks and green spaces only)
- + Membership of any park, community, or conservation group
- + Agreement: Concerned about damage to natural environment; Last visit to national park made me happier
- + Size of park (WTP for most commonly visited local park or green space)
- + Help related to local park or green space in past 12 months (WTP for single most commonly visited local park or green space only)
- + Perform regular exercise at local park or green space (WTP for single most commonly visited local park or green space only)

WTP is on average lower for these groups

- Living in a rural location was significantly and negatively associated with WTP.

³⁹ This finding is confirmed in the wider literature showing that higher values for heritage and environmental goods tend to be held by users compared to non-users (Andersson et al., 2012; Bakhshi et al., 2015; Fujiwara et al., 2015).

5.1.4 Mean UK Aggregate WTP Value to Maintain and Preserve all Parks and Green Spaces

To estimate the overall value of parks and green spaces to the UK as a whole, we aggregate the mean WTP values to the relevant population number. The most relevant value here is the WTP figure from scenario one: Willingness to Pay a subscription to maintain and preserve all parks in the local authority area. This value is scalable, since local authority areas have exclusive boundaries, and the sum of all individuals at local level equates to the UK population.⁴⁰

This provides an estimate of the overall value the UK resident population places on the maintenance and preservation of their local parks and green spaces.

We note that this is a hypothetical scenario designed to elicit Willingness to Pay values and does not represent a recommendation for implementing charging structures.

We stress that the WTP values elicited from valuation scenario one is likely to represent an underestimation of the full welfare benefits that individuals gain from the parks and green spaces in their local area, given the bias issues discussed above (Section 5.1.1).

Since the biases would tend to be downward (i.e. deflate the impact sizes) we would recommend using the upper bound confidence interval (CI) estimate for the WTP values of all local parks and green spaces when aggregating at a UK wide level. The upper-bound confidence interval figure of £2.76 per month.

THE UK-WIDE AGGREGATION IS CONDUCTED IN THE FOLLOWING STEPS:

- › First, total UK population figures were taken from the Annual Population Survey (APS) of the Office for National Statistics (ONS) of 53.2 million.⁴¹
- › Second, we annualise the monthly subscription values (full sample, including users and non-users) to make them commensurate with the present costs for maintenance of publicly accessible green space, outlined below. This provides an annual mean WTP value to maintain and preserve local parks and green spaces of £31.20 per year (£29.40 lower bound; £33.12 upper bound).
- › Third, we multiply the annualised mean WTP value for all parks and green spaces in the local area by the UK adult population.
- › We estimate lower and upper bound confidence intervals for all values (Table 52).
- › We recommend using the upper bound CI annual WTP for parks and green spaces £33.12. This provides a UK aggregate Willingness to Pay value of £1.8 billion for local parks and green spaces.

TABLE 5.2 UK AGGREGATION OF WILLINGNESS TO PAY VALUES FOR ALL PARKS AND GREEN SPACES IN THE LOCAL AREA

| | LOWER BOUND (95% CI) | WTP VALUE (£) | UPPER BOUND (95% CI) |
|-------------|----------------------|----------------|----------------------|
| Monthly | £2.45 | £2.60 | £2.76 |
| Annual | £29.40 | £31.20 | £33.12 |
| UK (annual) | £1,564,080,000 | £1,659,840,000 | £1,761,984,000 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. WTP all parks and greenspace in local area n=81. WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). User defined as used park or green space once a month or more in past 12 months.

Given the limitations stated in section 5.1, the WTP values obtained through scenario two provide the most robust estimates of the values that people hold in their local park or green space. To aggregate these values to the local level would require an estimate of the size of the local population within 1km of said park or green space. Existing national data, such as the 2011 Census and 2017 Ordnance Survey Open Greenspace could be used to extract local population data based on the postcode of a park or green space.

It may also be possible to identify the characteristics of the park or green space, its geographical description and the composition of the population surrounding it, in order to provide more accurate estimates of its value in a way that reacts to the different contexts of the local population, (see section 9).

⁴⁰Note that WTP values for the park or green space within 1km that is most commonly used is not exclusive, since respondents could use other parks and green spaces within 1km less frequently, or use parks and green spaces beyond 1km frequently. This presents the risk of double counting, leading to overestimation. ⁴¹The overall UK population is estimated to be 65.1m on 30th June 2015. Of these, 12.3m were aged 0-15 years old. APS estimates the UK population on 30th June 2015. We updated these estimates to 2016 figures using ONS projections of 0.7% UK population growth. This results in an estimated population size of 53.2m residents aged 16 and over. Source: www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2015#uk-population-continues-to-age

5.1.5 Willingness to Pay Values Based on Size of Park or Green Space

Table 5.3 shows the association between the size of the park and people's WTP for a single park or green space in the local area, when compared to a very small park (less than 5 minutes to walk through or round).⁴²

We apply WTP values from valuation scenario two, as these are directly linked within our primary survey to the variations in characteristics of individuals' local park or green space.

We also tested for differences in WTP values by attributes, over and above the mean WTP for their local park or

green space. This gives some early indications that certain facilities and features in parks are associated with significantly higher WTP values.

These include facilities which are linked to activities and hobbies, such as community growing spaces and fenced off dog parks as well as nature and heritage features. The presence of toilets is a perennial source of value. Full tables can be found in Appendix 11.8.

TABLE 5.3 WILLINGNESS TO PAY TO SUPPORT MAINTENANCE AND PRESERVATION OF MOST COMMONLY USED LOCAL PARK OR GREEN SPACE: PARK AND GREEN SPACE SIZE

| PARK OR GREEN SPACE SIZE (TIME IT TAKES TO TRAVEL THROUGH PARK) | WTP VALUES MOST COMMONLY VISITED LOCAL PARK OR GREEN SPACE (<1KM) (MONTHLY) | |
|--|--|--------------------|
| | COEFFICIENT | MEAN WTP VALUE (£) |
| Very small (less than 5 minutes) | 0.000 | NS |
| Small (5-10 minutes) | 0.093 | NS |
| Medium (10-20 minutes) | 0.823*** | £3.34 |
| Large (20-40 minutes) | 1.004*** | £3.52 |
| Extremely large (40+ minutes) | 1.625*** | £4.15 |
| Constant | 1.794*** | £2.52 |
| Observations | 3814 | - |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance. Reference group = Very small (less than 5 minutes). No control covariates used. NS = not significant.

Larger parks (medium, large and extremely large sized parks) are significantly associated with higher WTP values compared to a very small park:

› **Medium-sized park**
(10-20 minutes to walk through or round):
extra WTP of £0.82;

› **Large-sized park**
(20-40 minutes to walk through or round):
extra WTP of £1.00;

› **Extremely large-sized park**
(40+ minutes to walk through or round):
extra WTP of £1.63.

⁴² We define the size of the park by the number of minutes it takes to walk through or around the entire park.

5.2 Willingness to Pay Values among Key Socio-demographic Groups

In this section, we delve deeper into the benefits that parks and green spaces provide to different socio-demographic groups, in terms of their Willingness to Pay values from the primary survey. This involves an initial discussion of the social welfare of parks and green spaces, as they are relevant to policy evaluation.

The approach to evaluation in HM Treasury's Green Book states that a policy's overall impact on social welfare is the sum of the welfare changes experienced by each group in society. This is measured in monetary amounts, such as Willingness to Pay, which are assumed to represent changes in welfare or wellbeing. Yet it may be that some groups (e.g. lower income groups) gain greater welfare change from access to parks and green spaces than higher income groups, who may have access to private gardens, live in greener neighbourhoods, or are able to travel out of urban areas for work or holidays. In this example, it is still possible that lower income groups report a smaller mean level of WTP for parks and green spaces.

This is because parting with one pound (£1) is a greater sacrifice (and therefore a higher indication of value) for someone on a lower income than for someone on a higher income. This is recognised as one of the foundational laws of welfare economics: the law of diminishing marginal utility of income (Gossen, 1983), which states that the value that individuals put on each additional pound they receive or lose is higher for those on lower incomes. Specifically, the law implies that as income increases, the marginal value of a pound decreases.⁴³

Although welfare weighting is provided for within HM Treasury's Green Book guidance, it is not commonly pursued in contingent valuation studies, due to their focus on national average or aggregate values (a national average does not require welfare weighting if the objective is national representativeness). In this study, given that we are interested in local-level variations in the value of parks and green spaces, the relative welfare weighted values are of clear policy relevance.

The welfare weighting for local level values in this study represents a considerable advance on existing valuation studies of parks and green spaces in the UK and internationally.

In the tables within this section, column 1 shows the mean unweighted WTP values to support the maintenance and preservation of their local park or green space (most commonly visited within 1km, valuation scenario two), by socio-demographic characteristics. Column 2 shows the mean welfare (income) weighted WTP figures. Column 3 seeks to put these values in context, reporting mean levels of satisfaction with the local park or green space, measured on a scale of 1-5, where 5 is extremely satisfied. We test for differences in mean WTP values and satisfaction levels between the demographic categories (e.g. is mean WTP significantly different between males and females) and highlight all statistically significant results with an asterisk. In column 2 we highlight situations where WTP value increases after welfare weighting, and where WTP value decreases once welfare weighted.

Given that welfare weighted values are more appropriate for discussing differences in WTP values between socio-demographic groups, we report welfare weighted WTP in all instances in the remainder of this report (except where discussing mean WTP across the whole sample).

Below we develop the key findings for each of our key demographic groups. Full analysis tables of motivations for park or green space usage among different socio-demographic groups are provided in Appendix 11.10.

⁴³ Note that the wellbeing valuation approach (section 6) overcomes issues of diminishing marginal utility by directly eliciting measures of individual welfare in terms of SWB (e.g. life satisfaction), which are directly comparable between individuals without the need to translate utility into prices paid for goods.

5.2.1 Geographic Characteristics

TABLE 5.4 WILLINGNESS TO PAY VALUES (WEIGHTED AND UNWEIGHTED) FOR LOCAL PARK OR GREEN SPACE (MOST COMMONLY VISITED WITHIN 1KM) AND PARK OR GREEN SPACE SATISFACTION, BY GEOGRAPHICAL CHARACTERISTICS

| | UNWEIGHTED | WELFARE WEIGHTED | |
|---|---|---------------------|---|
| Geographical characteristics | WTP value most commonly visited local park or green space (1km) (monthly) | | Satisfaction with quality of local park or green space 1-5 (5 is extremely satisfied) |
| Rural | £2.19 (785) * | £2.76 (725) * | 4.26 |
| Urban (defined as urban or suburban) | £2.89 (1120) * | £3.93 (1033) * | 4.26 |
| Urban (London) | £4.45 (263) * | £4.03 (244) | 4.34* |
| Urban (Non-London) | £2.41 (857) | £3.89 (789) * | 4.24 |
| Purpose for park visit: Sport or personal recreation valuation scenario two | £3.11 (1955) | £3.99 (1805) * | 4.37* |
| Purpose for park visit: Other (Non-sport/personal recreation related) | £1.90 (1869) | £2.55 (1707) * | 4.08* |
| Owns outdoor space (e.g. garden, yard etc) | £2.58 (3457) * | £3.30 (3176) | 4.24 |
| Does not own outdoor space (e.g. garden, yard etc) | £1.87 (360) * | £3.19 (329) | 4.20 |
| London | £3.92 (421) * | £3.56 (387) | 4.33* |
| North East | £2.31 (174) | £3.00 (152) | 4.06* |
| North West | £2.20 (441) | £3.23 (409) | 4.29 |
| East Midlands | £2.54 (286) | £3.67 (267) | 4.26 |
| East England | £2.67 (337) | £3.89 (314) | 4.23 |
| West Midlands | £2.66 (338) | £3.80 (306) | 4.20 |
| Yorkshire & Humber | £1.68 (331)* | £2.25 (306) * | 4.11* |
| South East | £2.23 (552) | £2.73 (500) | 4.24 |
| South West | £2.56 (338) | £3.66 (309) | 4.30 |
| Scotland | £2.33 (318) | £3.35 (291) | 4.22 |
| Wales | £2.41 (192) | £3.29 (181) | 4.27 |
| Northern Ireland | £2.33 (96) | £3.09 (90) | 4.31 |
| Mean WTP value | £2.52 (3824) | £3.29 (3512) | 4.24 |

KEY: ■ SIGNIFICANT INCREASE WITH WELFARE WEIGHTING ■ REPRESENTS DECREASE WITH WELFARE WEIGHTING

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"); WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Number of observations drop when weighting for income due to missing responses regarding income. Lower socio-economic group defined as <= median sample income. Sport defined as doing personal sport/exercise or participating in team sports. Legend: * p<0.10 (t-test: WTP by socio-demographic characteristics).

WTP VALUES (WELFARE WEIGHTED)

Urban (including urban and suburban) respondents value parks and green spaces more highly than rural residents:

- › **The value of parks and green spaces increases considerably for urban residents once income weights are accounted for, increasing from £2.89 (unweighted) to £3.93 (welfare weighted).**
- › **The value of parks and green spaces to rural residents increases with welfare weighting by a smaller amount, from £2.19 (unweighted) to £2.76 (welfare weighted).**

This suggests that the benefits that parks and green spaces provide are valued differently by different groups. We note that there is a possibility that respondents from urban and rural areas might be identifying with a different type of park or green space, given the prevalence of different types of green space between these areas (Appendix Table 10.8).

- › The value of parks and green spaces decreases for London groups once income weighting is applied, decreasing from £3.92 (unweighted) to £3.56 (welfare weighted). In contrast, the value of parks and green spaces to respondents in other parts of the country increases once WTP values are welfare weighted:
 - East Midlands**
(£2.54, unweighted; £3.67, welfare weighted)
 - East of England**
(£2.67, unweighted; £3.89, welfare weighted)
 - West Midlands**
(£2.67, unweighted; £3.80, welfare weighted)
 - South West**
(£2.56, unweighted; £3.66, welfare weighted)

The value of parks and green spaces for urban groups based outside of London increases considerably once income weighting is applied, rising from £2.41 (unweighted) to £3.89 (welfare weighted). These results suggest that a large part of the higher WTP value for parks and green spaces within London stems from the income effect of higher London wages. Notable exceptions are Yorkshire & Humber (£2.25, welfare weighted) and the South East (£2.73, welfare weighted).

We explore respondents' motivations for using their parks and green spaces, to help explain the higher relative value of parks and green spaces to urban residents. For instance, urban residents see their local parks and green spaces as:

- › **An extension of the home "home away from home":** A higher proportion of urban residents use their parks and green spaces to meet friends (12%, compared to 8% of rural respondents) and picnic (17%, compared to 11% of rural respondents), and for personal sport (12%) and relaxation (33%), compared to rural residents (9% and 22% respectively). This is especially true of users of parks and green spaces in London.

- › A higher proportion of urban residents use their parks as a shortcut (18%) or to pass the time (30%), compared to those living in rural locations (14% and 23% respectively) which shows parks and green spaces as a component of the urban space, contributing to day-to-day engagement with the built environment.

In contrast, rural parks and green spaces provide a more limited and functional set of activities – children's activities, team sports, and dog-walking – which may be related to the lower relative values provided by rural groups (after welfare weighting). This leads to the conclusion that in rural areas parks serve a purpose but in urban settings they are much more integrated and fundamental to everyday life.

- › **FAMILIES:** We know that a higher proportion of park and green spaces users are part of a family. The results indicate that a higher proportion of people in rural areas use their parks and green spaces with their children, either to take children to the park (33%) or for children's sporting activities (10%), compared to urban/suburban residents (28% and 8% respectively).
- › **TEAM SPORTS:** A higher proportion of rural residents use their parks and green spaces for team sports (8%, compared to 5% of urban groups) (which links to the higher proportion of sports fields found in rural areas in Table 10.8). In contrast, urban users who tend to engage in individual pursuits like jogging (12%, compared to 9% of rural groups).
- › **DOG-WALKING:** Rural users also report walking the dog as a common motivation (30%), for using parks and green spaces compared to a lower proportion in urban areas (24%). This may be capturing wider trends in society: Londoners (as a representation of urban environment) are 2-3 times less likely to own a dog.

There is seemingly a clear wellbeing role for urban parks and green spaces in the lives of all demographics – the "home from home", relaxation and socialising. Parks and green spaces are a particularly essential and valued part of the fabric of urban society.

If the aim of parks and green space provision is to increase the welfare of citizens in society, these findings suggest that investment in parks and green spaces should be focussed on urban locations if the aim is to maximise the benefits that they provide to the population.

Conversely rural parks provide a more utilitarian function for walking the dog and team sports in line with existence of more playing fields in rural parks.

While there are different drivers for using parks and green spaces there are also clear, shared social motivations for use, reinforcing the position that parks and green spaces improve community cohesion by offering shared spaces for community connections.

5.2.2 Socio-economic Status

TABLE 5.5 WILLINGNESS TO PAY VALUES (WEIGHTED AND UNWEIGHTED) FOR LOCAL PARK OR GREEN SPACE (MOST COMMONLY VISITED WITHIN 1KM) AND PARK AND GREEN SPACE SATISFACTION, BY SOCIO-ECONOMIC GROUP

| | UNWEIGHTED | WELFARE WEIGHTED | |
|-------------------------------------|---|---------------------|---|
| Socio-economic status | WTP value most commonly visited local park or green space (1km) (monthly) | | Satisfaction with quality of local park or green space 1-5 (5 is extremely satisfied) |
| Higher socio-economic group | £3.32 (1519) * | £1.93 (1519) * | 4.29* |
| Higher socio-economic group (Urban) | £4.17 (421) * | £2.19 (421) * | 4.34* |
| Higher socio-economic group (Rural) | £2.62 (320) | £1.67 (320) * | 4.23 |
| Lower socio-economic group | £2.00 (1993) * | £4.32 (1993) * | 4.22* |
| Lower socio-economic group (Urban) | £2.16 (612) * | £5.12 (612) * | 4.23 |
| Lower socio-economic group (Rural) | £1.85 (405) * | £3.63 (405) | 4.30 |
| MEAN WTP VALUE | £2.52 (3824) | £3.29 (3512) | 4.24 |

KEY: ■ SIGNIFICANT INCREASE WITH WELFARE WEIGHTING ■ REPRESENTS DECREASE WITH WELFARE WEIGHTING

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Number of observations drop when weighting for income due to missing responses regarding income. Lower socio-economic group defined as <= median sample income. Legend: * p<0.10 (t-test: WTP by socio-demographic characteristics).

WTP VALUES (WELFARE WEIGHTED)

Lower socio-economic groups assign a higher relative value to parks and green spaces than higher socio-economic groups:

The importance of applying welfare weighting to WTP values is clearly demonstrated in relation to the value of parks and green spaces for lower socio-economic groups.

- › The value of parks and green spaces more than doubles for lower socio-economic groups when income weighting is accounted for, increasing from £2.00 (unweighted) to £4.32 (welfare weighted).
- › Conversely, the value of parks and green spaces to higher socio-economic groups decreases considerably from £3.32 (unweighted) to £1.93 (welfare weighted).

This suggests that whilst lower socio-economic groups may assign a lower value than their counterparts, once the relative value of the pound is taken into account they assign a higher relative value to parks and green spaces compared to higher socio-economic groups.

- › Controlling for location (distinguishing between urban and rural low-income groups) reveals that parks and green spaces have a substantially greater value to urban lower-income groups (£5.12) compared to rural lower-income groups (£3.63).

Whilst parks and green spaces provide greater relative value to lower income groups (especially those living in urban areas) once the effect of income on WTP is accounted for, the benefits that parks and green spaces provide do not appear to be recognised in the lists of motivations given by lower socio-economic groups:

- › Lower socio-economic groups appear to be less mindful of the activities that can be undertaken in parks and green spaces, with a significantly higher proportion reporting that they use their local park or green space as a shortcut (18%), or as a means to pass the time (30%), compared to those from higher socio-economic backgrounds (15% and 27% respectively).
- › In contrast, higher socio-economic groups appear to have “value added” motivations for using publicly accessible green space: “Value added uses include personal sport and exercise (14% compared to 9% of lower socio-economic groups), team sports (7% compared to 5% of lower socio-economic groups), and walking the dog (27% compared to 24% of lower socio-economic groups), these motivations were all selected by a significantly higher proportion of higher socio-economic groups compared to those from lower socio-economic backgrounds.

- › Higher socio-economic groups also tend to be motivated by their children’s sporting activities (11%), compared to lower socio-economic groups (7%).

All of these uses have well-documented health and wellbeing benefits. Yet they seem to motivate higher socio-economic groups (who the data shows already have higher wellbeing) more than lower socio-economic groups, who could most benefit from these “value-added” uses.

These findings may help to explain why people from lower socio-economic backgrounds statistically have a lower likelihood of being a park or green space user (Appendix Table 11.7). Yet they do not account for the higher value that lower socio-economic groups hold for parks and green spaces after welfare weighting.

5.2.3 Black, Asian and Minority Ethnic (BAME) Groups

TABLE 5.6 WILLINGNESS TO PAY VALUES (WEIGHTED AND UNWEIGHTED) FOR LOCAL PARK OR GREEN SPACE (MOST COMMONLY VISITED WITHIN 1KM) AND PARK OR GREEN SPACE SATISFACTION, BY ETHNIC GROUP

| Socio-demographic characteristic | UNWEIGHTED | WELFARE WEIGHTED | Satisfaction with quality of local park or green space 1-5 (5 is extremely satisfied) |
|------------------------------------|--|---------------------|---|
| | WTP value mostcommonly visited local park or green space (1km) (monthly) | | |
| BAME | £3.05 (290) * | £5.84 (266) * | 4.19 |
| BAME (Londoners) | £3.03 (103) | £4.04 (98) | 4.27 |
| BAME (Non-Londoners) | £3.06 (187) * | £6.89 (168) | 4.14* |
| BAME (lower socio-economic group) | £3.35 (145) * | £9.27 (145) * | 4.15 |
| BAME (higher socio-economic group) | £3.00 (121) | £1.73 (121) * | 4.24 |
| White | £2.46 (3495) * | £3.07 (3223) * | 4.25 |
| MEAN WTP VALUE | £2.52 (3824) | £3.29 (3512) | 4.24 |

KEY: ■ SIGNIFICANT INCREASE WITH WELFARE WEIGHTING ■ REPRESENTS DECREASE WITH WELFARE WEIGHTING

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses (“I do not believe I would really have to pay”): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Number of observations drop when weighting for income due to missing responses regarding income. Lower socio-economic group defined as <= median sample income. Legend: * p<0.10 (t-test: WTP by socio-demographic characteristics).

WTP VALUES (WELFARE WEIGHTED)

BAME groups value parks and green spaces more highly than white groups:

- › **The value of parks and green spaces increases considerably for BAME groups once income weighting is accounted for, increasing from £3.05 (unweighted) to £5.84 (welfare weighted).**
- › **In contrast, the value of parks and green spaces to white groups increases with welfare weighting by a small amount, from £2.46 (unweighted) to £3.07 (welfare weighted).**

This strongly suggests that the benefits that parks and green spaces provide are valued more highly by BAME groups than white groups, once the relative value of the pound is taken into account. In other words, they benefit more from the welfare improvements associated with park and green space usage than their white counterparts.

We note that the BAME welfare weighted sample is n=266 (when missing income observations are removed), which on its own does not pose sample size issues. However, when we begin to subgroup (e.g. London BAME groups n=98) sample sizes drop, which may have the predictive power of the statistical tests applied and reduce the representativeness of the subsample when extrapolated to the actual BAME population in London

When we further control for income (by distinguishing between lower and higher income BAME groups) we see that parks and green spaces have an even greater value to lower income BAME groups (£9.27; n=145) compared to higher income BAME groups (£1.73; n=121). We note that small sample sizes exist for these subsamples, so urge caution in the use of these figures.⁴⁴ Controlling for location (distinguishing between London and non-London BAME groups) reveals that parks and green spaces have a substantially greater value to non-London BAME groups (£6.89; n=168) compared to London BAME groups (£4.04; n=98). Again, we urge caution on the representativeness of these findings to the actual populations in questions, due to lower sample size.

One possible speculative conclusion here is that London is more geographically mixed with varied ethnic groups and both higher and lower socio-economic groups convening in the same area. Therefore, the provision of parks and green spaces is not dissimilar for white and BAME groups in London. In other cities, BAME groups may be more likely to live in inner city areas which traditionally have lower provision of parks and green spaces than the suburbs, which may account for the higher values BAME groups have for these scarcer parks and green spaces.

Section 5.2.1 showed that urban parks have a higher value and a much clearer role in urban communities. There are clear policy priorities to understand the factors that may account for the higher welfare weighted WTP value indicated by BAME groups (and particularly lower income BAME groups). This is all the more pressing given the higher value of parks and green spaces to urban populations, and the higher proportion of BAME groups living in urban areas.⁴⁵ There is a clear suggestion here that lower socio-economic, urban, BAME groups place a significant value on publicly accessible green space. Given certain limitations on sample sizes, this is certainly an area for further research if the provision of parks and green spaces are to be part of a contribution to the progressive and more cohesive society which central and local government; devolved national administrations and local authorities have identified.

BAME groups outside London actually have a higher WTP value after welfare weighting (£6.89) compared to BAME groups in London (£4.04). This could potentially be driven by the already well-distributed provision of green space within London (as indicated by the high satisfaction levels with parks and green spaces there).

In terms of motivations, BAME groups appear to use their parks and green spaces more socially than those from white ethnic backgrounds.

- › BAME groups use parks and green spaces for children's activities (14% compared to 8% of white groups), to meet friends (24% compared to 11% of white groups), and to have picnics (24% compared to 15% of white groups) significantly more than white groups.
- › A significantly higher proportion of BAME groups also report using parks and green spaces for team sports (11% compared to white groups (5%), as well as for personal sport (22%, compared to 10% of white respondents) and general relaxation (49% compared to 29% of white groups) or to pass the time (43% compared to 27% of white groups).

⁴⁴ Sample sizes for lower income BAME group = 145; higher income BAME group = 121 to £3.07 (welfareNG weighted).

⁴⁵ <https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/articles/ethnicityandnationalidentityinenglandandwales/2012-12-11>



6

Results of the Wellbeing Valuation Associated with the use of Parks and Green Spaces

6 Results of the Wellbeing Valuation Associated with the Use of Parks and Green Spaces

KEY FINDINGS: Wellbeing is significantly higher, on average, for park and green space users compared to non-users

Across three Office for National Statistics (ONS) questions on subjective wellbeing (SWB) measures (life satisfaction, happiness and sense of worthwhile) wellbeing is significantly higher on average for parks and green space users compared to non-users. Counterintuitively, anxiety is significantly higher for park and green space users but this may be due to anchoring bias in the SWB questions with respondents primed to think of 10 as better than 0 and therefore misinterpreting the anxiety scale.

Applying the wellbeing valuation method outlined in Figure 3.2 we find that **£974.00 is the equivalent amount of income per year** that an individual would need to replace the increase in life satisfaction derived from using their local park or green space more than once per month (lower bound estimate). **This is equivalent to £8.47 per visit** (based on the average number of park and green space visits in the user sample).

6.1 Park and Green Space Usage and Wellbeing

One of the major contributions of this primary research is that it allows us to measure the self-reported health and wellbeing of respondents and compare this alongside their self-reported use of parks and green spaces in order to estimate the wellbeing value. This section follows the wellbeing valuation method outlined in Figure 3.2, to provide an estimate of the overall welfare that individuals gain from park or green space usage, in a way that is consistent with welfare economic theory as set out in HM Treasury's Green Book.

We explore the links between parks and green spaces and health and wellbeing as measured through the four ONS SWB measures and a general health question. Table 6.1 outlines the mean wellbeing scores for each of the four ONS SWB measures from the primary survey, as well as self-reported general health (not reported in previous work by White et al. 2017).

Across three SWB measures (life satisfaction, happiness and sense of worthwhile) wellbeing is significantly higher on

average for parks and green space users compared to non-users. Park and green space users also report significantly higher levels of general health compared to non-users. We see that, counterintuitively, anxiety is significantly higher for park and green space users. However, this may be driven by anchoring bias in the SWB questions (with respondents 'primed' to think of 10 as better than 0, and misinterpreting the anxiety scale).

We investigate the extent to which frequency of park and green space usage in the last 12 months is associated with different levels of wellbeing in the primary survey, after controlling for the main determinants of wellbeing (Appendix Table 11.14).

The primary survey results show that higher levels of engagement with parks and green space is associated with higher levels of life satisfaction, happiness and a sense of worth (against a reference of those who never use their park or green space).

TABLE 6.1 PARK AND GREEN SPACE USERS AND NON-USERS: MEAN HEALTH AND WELLBEING SCORES (PRIMARY SURVEY 2017)

| | LIFE SATISFACTION (0-10) | HAPPINESS (0-10) | ANXIETY (0-10) | WORTHWHILE (0-10) | GENERAL HEALTH (1-5) |
|-------------------------------|--------------------------|------------------|----------------|-------------------|----------------------|
| Park or green space users | 6.84* | 6.86* | 3.86* | 6.85* | 3.17* |
| Park or green space non-users | 6.39* | 6.40* | 3.59* | 6.30* | 2.86* |
| Total | 6.68 | 6.70 | 3.77 | 6.66 | 3.06 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Legend: * p<0.10 significant difference between user and non-user samples (two-sided t-test).

6.2 The Wellbeing Value of Parks and Green Space Usage

The wellbeing valuation method is designed to derive monetary values for observed differences in life satisfaction between one state of life (regular park and green space use) and another (non-use of parks and green spaces).⁴⁶

First, we test for significant differences in subjective wellbeing between park and green space users and non-users, using multiple regression models, after controlling for other drivers of wellbeing (Appendix 11.5.6 Equation 2).

⁴⁶ For the purpose of wellbeing valuation, we need to define park and green space usage as a discrete binary state. In this study, park and green space usage is defined as using one's local park or green space at least once a month in the past year.

Table 6.2 shows that there is a positive association between park and green space usage and life satisfaction. Being a park or green space user (compared to being a park or green space non-user) is significantly and positively associated with:

- › **Life satisfaction** (+0.125 points on a scale of 0-10)
- › **Happiness** (+0.154 points on a scale of 0-10)
- › **Sense of worthwhile** (+0.164 points on a scale of 0-10)

TABLE 6.2 ASSOCIATION BETWEEN PARK AND GREEN SPACE USAGE AND SUBJECTIVE WELLBEING & HEALTH (Primary Survey 2017)

| | LIFE SATISFACTION (0-10) | HAPPINESS (0-10) | ANXIETY (0-10) | WORTHWHILE (0-10) | GENERAL HEALTH (1-5) |
|---------------------------|---------------------------------|-------------------------|-----------------------|--------------------------|-----------------------------|
| Park and green space user | 0.125* | 0.154* | 0.115 | 0.164* | 0.120*** |
| Constant | 3.032*** | 2.506*** | 11.135*** | 0.304 | 1.220** |
| Observations | 3108 | 3089 | 3056 | 3109 | 3399 |
| Adjusted R2 | 0.272 | 0.228 | 0.113 | 0.197 | 0.179 |

User defined as used their most commonly visited local park or green space once a month or more in past 12 months. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Legend: *** <1% significance; ** <5% significance; * <10% significance. Standard controls for health and SWB included but not reported here (see Appendix Table 10-15).

As outlined in Appendix (11.6), the wellbeing valuation method enables the difference in life satisfaction observed between park and green space users and non-users to be given an equivalent value in monetary terms – by estimating the amount of money required to keep individuals just as happy or satisfied with life in the absence of the non-market good, in this case the use of parks and green spaces (i.e., to keep their wellbeing constant). We derive estimates of the life satisfaction coefficient (Table 6.2) in terms of the equivalent amount of income (£) that an individual would need to replace the increase in wellbeing they get from using their park or green space once a month or more.

Therefore, we provide wellbeing value estimates associated with frequent use of parks and green spaces in Table 6.3, alongside lower bound (-1 standard deviation (sd) and upper bound (+1sd).⁴⁷

£974 is the equivalent amount of income per year that an individual would need to replace the increase in life satisfaction they get from using their local park or green space more than once per month -**lower bound estimate**. This is equivalent to £8.47 per visit (based on the mean number of park or green space visits in the user sample). £2,625 is the equivalent amount of income per year that

an individual would need to replace the increase in life satisfaction they get from using their local park or green space more than once per month - **upper bound estimate**. This is equivalent to £22.83 per visit.

When we aggregate wellbeing values across the park and green space-using UK adult population (35.1million) we estimate the wellbeing value of regular use of one's local park or green space between £34.2 billion (lower bound) and £92.2 billion (upper bound).

We should note that there a number of considerations that would lead us to conclude that the wellbeing values above may be an overestimation of the value of the existence of parks and green spaces to UK residents (Section 8.4 discusses these issues in more detail). The per visit wellbeing value associated with use of the most commonly used local park or green space from the primary survey (£15.77 per visit) is higher than previous estimates of the value of parks in the literature (Fujiwara et al. 2014). Since the biases would tend to be upward (i.e. inflate the impact sizes) we recommend using the lower bound estimate for the wellbeing value of parks and green spaces (£974 per year or £8.47 per visit) for regular park and green space users.

TABLE 6.3 WELLBEING ASSOCIATED WITH USE OF LOCAL PARK OR GREEN SPACE: WELLBEING VALUE ESTIMATION

| | LOWER BOUND (-1SD) | WELLBEING VALUE | UPPER BOUND (+1SD) |
|--|---------------------------|------------------------|---------------------------|
| Life satisfaction coefficient | 0.066 | 0.125 | 0.184 |
| Annual | £974 | £1,814 | £2,625 |
| Per visit | £8.47 | £15.77 | £22.83 |
| National aggregate (park or green space users) | £34,199,088,000 | £63,693,168,000 | £92,169,000,000 |

Life satisfaction is captured by the subjective wellbeing (SWB) question (on a scale of 0-10): Overall how satisfied are you with life nowadays? WV estimated using median national income level of £26,000. This provides a value for the park and green space user group (those who have visited their local park or green space at least once per month in the past year) of £1,814. We then estimate the mean visit frequency for the park and green space user group (115 times per year) and apply this figure to the wellbeing value to estimate a per visit value

⁴⁷ Lower and upper bounds based on standard deviation, following Krekel et al.(2016); White et al.(2013). We do not use confidence intervals in the case of wellbeing values as the estimation method (OLS regression) used to calculate wellbeing is based on a 90% confidence level threshold, which provides an unrealistic range of upper and lower bound values. (£1,814/115=£15.77). UK adult population estimated as 53.2million*0.66 (proportion of park and green space users in primary survey=£35.1million). Standard deviation of park user coefficient = 0.0059.



Analysis of Exchequer (Health) Cost Savings

7 Analysis of Exchequer (Health) Cost Savings

KEY FINDINGS: Parks and green space users report significantly higher levels of self-reported general health compared to non-users

Based on estimates of a reduction in GP visits by regular park users in the UK population, aggregate Exchequer cost savings to the NHS is: **£111 million per year (£3.16 per person)**

7.1 The Primary Health Benefits Associated with use of Parks and Green Space

Park and green space users in our primary survey report significantly higher levels of general health (+0.12 points on a scale of 1-5), compared to non-users (recall Table 6.1).

We find a new, significant and positive association between frequency of park and green space use and general health (Appendix Table 11.14). Note that general health is an overall measure of how an individual feels about their health. As such, it can include both physical and mental health aspects.

For external validity, we compare the primary survey data with data collected by MENE, by estimating models for daily and weekly frequency (following White et al., 2017). Comparing our primary survey results to those in the MENE dataset, we see a high level of consistency between the primary survey results and the MENE data (Table 7.1).

One of the most notable differences between the primary survey and MENE data is that the magnitude of the

association between general health and frequency of visit is considerably higher for those who visit their local park or green space more than once a day in the primary survey (0.515), compared to those who visit green space or outdoors locations more than once a day in the MENE dataset (0.209). This coefficient is quite high. However, we note that the number of those who use their park or green space more than once a day is quite small (n=73), in comparison to 1,552 in the MENE. As such, this result is likely to be driven by the presence of outliers to a significant extent in the primary survey, since small sample size gives undue influence to the effect of outliers on the measures of general health observed. When grouped on a weekly frequency level, we find that the coefficients for general health are closely matched between the two datasets.

In the primary survey we find that there is a clear pattern in the results: use and exposure to parks and green spaces are associated with higher self-reported general health.

TABLE 7.1 ASSOCIATION BETWEEN FREQUENCY OF ENGAGEMENT WITH PARKS AND GREEN SPACE AND GENERAL HEALTH: PRIMARY SURVEY AND MENE

| | MENE SELF-REPORTED GENERAL HEALTH (1-5) | | | PRIMARY SURVEY SELF-REPORTED GENERAL HEALTH (1-5) | | |
|--------------------------------|---|-------------|------------|---|-------------|------------|
| | Frequency treatment | Weekly dose | Daily dose | Frequency treatment | Weekly dose | Daily dose |
| Never | 0.062** | | | 0.000 | | |
| Visited once every 2-3 months | 0.068** | | | 0.085 | | |
| Visited once or twice a month | 0.114*** | | | 0.088 | | |
| Visited once a week | 0.148*** | 0.100*** | | 0.106 | 0.075*** | |
| Visited several times a week | 0.189*** | | | 0.126* | | |
| Visited every day | 0.201*** | | | 0.171* | | |
| Visited more than once per day | 0.209*** | | 0.076*** | 0.515*** | | 0.169** |
| Constant | 4.214*** | 4.278*** | 4.320*** | 1.268* | 1.334** | 1.330** |
| Observations | 16,434*** | 16,434 | 16,434 | 3104 | 3104 | 3104 |
| Adjusted R2 | 0.36 | 0.36 | 0.35 | 0.190 | 0.188 | 0.189 |

Legend *** <1% significance; ** <5% significance; * <10% significance. Heteroscedasticity-robust standard errors used in both models. Primary survey: National representative sample using age, gender, and region quotas. OLS regression. Primary survey regression controls reported in Appendix 11.11: MENE: regressions controls: Age, Gender, Ethnicity (BAME), Disability, Marital status, Employment status, Socio-economic grade, Physical exercise, Children in household, Household size, Home ownership, Car ownership, Dog ownership, Internet access, Email access, General health, Region of residence, Local deprivation indicator, Local population density, Interview month and Survey year. Reference = never visited park or green space in the past 12 months. To ensure that our MENE analysis more closely matched the object of the present study, we restricted the sample to urban areas only (n= 16,434) (given that a higher proportion of green space or outdoors locations are likely to be public parks or green spaces within urban locations, compared to rural locations, where a higher proportion of green space is composed of farmland).

7.2 The Secondary Health Benefits of Park and Green Space Usage

We estimate the secondary health benefits in terms of improvements in general health associated with park and green space usage by translating it into cost savings to the NHS in terms of reduced GP visit frequency (full methodology in Appendix 11.5.7). The results in Appendix Table 11.17 relate to the odds ratio of an individual reporting good or excellent health, controlling for other factors that might influence self-selection into good health. Given the odds ratio of 0.198 and a mean likelihood of being in good health of 67.28% (from sample data), being a park or green space user is associated with a 4.2 percentage points increase in the likelihood of reporting good health.

Fujiwara and Dolan (2014) found that people who report good health are 25.4% less likely to visit GPs six or more times per year. Under the assumption that:

- › people who visit the GP six or more times per year visit on average ten times per year;
- › people who visit less than six times per year visit on average two times per year; and
- › that each GP visit has an average cost of £37.00 to the NHS.

We can therefore calculate the predicted cost savings associated with park or green space usage. **Being a park or green space user is associated with a reduction in GP-related medical costs of £3.16 per person per year.** Note that GP costs represent only the partial health cost savings stemming from park and green space usage, and do not account for other savings to the Exchequer resulting from reduced referrals, operations, social care costs etc. We use the proportion of respondents within the primary survey who use their local park or green space at least once per month in our sample (66%) to estimate the equivalent number of UK adults who regularly use their local park or green space in the UK population (66% of 53.2million adults = 35.1 million).

We then aggregate NHS cost savings for the proportion of the UK population that use park and green spaces in Table 7.2.⁴⁸ Note that due to the calculation method used for estimated NHS cost savings it is not possible to estimate lower and upper bound confidence levels in this case.

- › **£111 million is the aggregate annual NHS cost savings for those who use their local park or green space more than once per month (£3.16 per person).**

As a policy recommendation, we can see that increasing the number of regular park and green space users across the UK would increase the extent of health and social care savings for example based on our survey results if the 34% of the UK population who do not currently use their parks



and green spaces regularly were encouraged to do so, at £3.16 per person per year, the savings to the NHS could amount to a further £57million in reduced GP visits alone.

This is likely to represent just a subset of the secondary health benefits of parks and green spaces and therefore this figure is likely to represent a considerable underestimation of the total cost savings to the Exchequer. It is outside the scope of this study to assess the other health and social care impacts due to lack of data. Other factors may include benefits to people's mental health and other physical health costs to the NHS beyond GP visits (for instance, the wider costs of obesity, diabetes, cardiovascular, and respiratory problems).

TABLE 7.2 SECONDARY (HEALTH) VALUES: REDUCTION IN GP-RELATED MEDICAL COSTS ASSOCIATED WITH PARK AND GREEN SPACE USAGE

| | GOOD HEALTH (ODDS RATIO) | REDUCTION IN GP RELATED MEDICAL COSTS |
|---------------------|--------------------------|---------------------------------------|
| Individual (annual) | 0.198 | £3.16 |
| UK (annual) | - | £110,916,000 |

Reduction in GP related medical costs calculated as increased likelihood to have good health multiplied by reduced likelihood of visiting GP six or more times a year (25.4%) reported in Fujiwara and Dolan (2014). This is then multiplied by 10-2=8 visits per year with an average cost of £37 $[(0.042 \times 0.254) \times (£37 \times 8)]$. UK adult regular park and green space users estimated as 66% of UK adult population. Full regression Appendix Table 107. We assume that GP visit costs are not significantly different between England and other nations, for the purposes of aggregation to the UK level.

⁴⁸The overall UK population is estimated to be 65.1m on 30th June 2015. Of these, 12.3m were aged 0-15 years old. APS estimates the UK population on 30th June 2015. We updated these estimates to 2016 figures using ONS projections of 0.7% UK population growth. This results in an estimated population size of 53.2m residents aged 16 and over. Source: www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2015#uk-population-continues-to-age

Aggregating Primary and Secondary Benefits



8 Aggregating Primary and Secondary Benefits

FIGURE 8.1 AGGREGATING PRIMARY AND SECONDARY VALUES

Contingent Valuation (CV) **£1.8 Billion per year**

Potentially an underestimate, due to limitation of CV survey for estimating overall value for all parks and green space in local area. We therefore aggregate upper bound figure (valuation scenario one).

CV method is designed for aggregation at local level (valuation scenario two) rather than to provide UK aggregate values.

Wellbeing Valuation (WV) **£34.2 Billion per year**

Potentially an over estimate, due to upward bias introduced by local area effects (use of park and green space likely to be correlated to overall quality of area).

Most reliable estimate of overall benefits that frequent park and green space use has on the wellbeing of the individual.

Secondary Health Values NHS Cost Savings **£111 Million per year**

Based on partial health savings related only to reduced GP visits (therefore underestimate of total health savings).

Combined primary & secondary values (CV+NHS savings) **£1.9 Billion**

Likely to be underestimate of overall benefits of parks and green spaces.

Combined primary & secondary values (WV+NHS savings) **£34.3 Billion**

Most reliable estimate of overall benefits of parks and green spaces.

In this section we look at both sets of primary values alongside each other and also combine primary values with secondary health values to give an overall aggregated value for the benefits parks and green spaces provide to the UK population. The purpose of aggregating values is to give an indication of the full set of benefits that parks and green spaces provide to individuals at the national level.

8.1 Capturing the Overall Benefits

The purpose of the present study is to understand the value that people hold for the local park or green space which they most commonly use and to tailor the survey to understand how this varies by the characteristics of this park and their own usage of it. We therefore recommend the application of values from the local park and green space elicited through valuation scenario two to better understand the interaction between costs and benefits of park provision at the local level.

In Section 5, the mean Willingness to Pay (WTP) value to support the maintenance and continuation of all parks and green spaces in the local area amounts to £2.60 per month, with an upper bound of £2.76 per month. This feeds into our estimate of the mean UK aggregate annual WTP value to maintain and preserve all parks and green spaces in the local area. We take the upper bound WTP value for the purpose of aggregation (£1.8 billion per year). As discussed, this only partially captures the existence value of the parks and green spaces in their local area. It is likely to be an underestimate based on survey biases (scope effects) and the specific nature of the CV question (payment to an independent organisation for maintaining and preserving all parks and green spaces in the local area).

In Section 6, we find that higher levels of engagement with parks and green space are associated with higher levels of life satisfaction (against a reference of those who never use their park or green space). £974.00 per year is the equivalent amount of income an individual would need to replace the increase in life satisfaction they get from using their local park or green space more than once per month (lower bound estimate). This is equivalent to £8.47 per visit (based on the mean number of park and green space visits in the user sample).

We take the lower bound wellbeing value associated with frequent use of parks and green spaces (£974.00 per year) for the purposes of aggregation due to the upward bias introduced by local area effects (use of park or green space likely to be correlated to overall quality of area).

For aggregation purposes, we take WV to be the most reliable estimate of the two valuation methods (CV and WV) in terms of capturing the overall benefits of park and

green space usage to the welfare of an individual. This is given that life satisfaction is an evaluative measure of the overall level of satisfaction that park and green space users report, compared to non-users; this comprises all aspects of an individual's evaluation of their overall satisfaction with life, incorporating the physical health, mental health, and visual amenity they gain from visiting or viewing the park or green space.

The wellbeing value is based on the discrete difference between two states of life: use of the local park or green space, and non-use. This essentially captures the existence versus the removal of a specific park or green space (the most commonly used with 1km) from an individual's life. This is a discrete difference which is designed to capture essentially the removal of park and green space usage from an individual's life (since we posit that the wellbeing benefit of using a park or green space less than once a month would be negligible).

Wellbeing values capture the overall benefits to regular park users⁴⁹ so **we recommend for the purposes of aggregation that the WV method provides a more robust estimate.**

Note that the two sets of valuation results cannot be directly compared. CV results represent an average of both those who use parks and green spaces, and those who do not. In addition, the scenario valued in the CV survey is a payment to help maintain and preserve their local parks and green spaces. Finally, we present secondary health benefits in terms of the cost savings to the NHS through reduced GP visits associated with use of the most commonly used park or green space in the local area. The annual cost savings to the NHS associated with park and green space usage is £3.16 per person, which equates to a UK aggregate figure of £111million per year.

When we combine the primary benefits (either CV or WV) with the secondary NHS cost savings, we find that parks and green spaces provide value of:

- › **£1.9 billion (CV+NHS cost savings) per year;**
- › **£34.3 billion (WV+NHS cost savings) per year.**

Table 8.1 presents the two sets of primary results developed through alternative methods of contingent valuation (CV) and wellbeing valuation (WV), as well as a set of secondary health values for NHS savings.

TABLE 8.1 AGGREGATING PRIMARY AND SECONDARY BENEFITS

| PRIMARY BENEFITS | LOWER BOUND | MEAN | UPPER BOUND |
|--|-----------------|-----------------|-----------------|
| Contingent valuation (CV): WTP to maintain and preserve all parks and green spaces in the local area (Section 5) | | | |
| Monthly (per person) | £2.45 | £2.60 | £2.76 |
| Annual | £29.40 | £31.20 | £33.12 |
| UK aggregate (annual) | £1,564,080,000 | £1,659,840,000 | £1,761,984,000 |
| Wellbeing valuation (WV): Benefits of park and green space usage on evaluation of overall life satisfaction (Section 6) | | | |
| Annual | £974 | £1,814 | £2,625 |
| Per visit | £8.47 | £15.77 | £22.83 |
| UK aggregate (park and green space users) | £34,199,088,000 | £63,693,168,000 | £92,169,000,000 |
| Secondary health values of park and green space usage: NHS cost savings through reduced GP visits (Section 7) | | | |
| Individual (annual) | NA | £3.16 | NA |
| UK aggregate (annual) | NA | £110,916,000 | NA |
| Combined primary and secondary values | | | |
| CV and NHS cost savings | | | £1,872,900,000 |
| WV and NHS cost savings | £34,310,004,000 | | |

KEY: ■ GREEN SHADING REPRESENTS PREFERRED LOWER/UPPER BOUND FIGURE BASED ON METHODOLOGICAL CONSIDERATIONS OUTLINED IN FULL IN SECTION 5 AND SECTION 6.

⁴⁹ For instance, when we restrict WTP results to the park and green space user sample only, we see that the WTP value is higher (£3.03, or £36.36 per year)

8.2 Comparing Values from Contingent Valuation (CV) and Wellbeing Valuation (WV)

Whilst very few studies have directly compared CV and WV studies (e.g. Bakhshi et al., 2015), those that have tended to find differences in values. This could be for a number of reasons as discussed in Appendix 11.2. Indeed, there is no reason to believe that the two different valuation methods should produce similar values because CV is based on what people say they want and WV is based on how people experience and feel about things (Fujiwara and Campbell, 2011). In CV people are asked directly about their valuation (WTP) for the good, whilst in WV it is estimated indirectly from their wellbeing data.

When we aggregate these primary benefits to a UK wide level, we see a considerable difference in the values estimated through the Contingent Valuation approach (£1.8 billion per year, estimated at upper bound), and the Wellbeing Valuation approach (£34.2 billion per year, at lower bound). Below we discuss in detail the methodological considerations relevant to each method and the comparisons that can be made between the values, and that factors that lead us to consider the external validity of the results compared to others in the literature.

8.2.1 External Validity: Contingent valuation

In terms of the CV method, a number of considerations lead us to the conclusion that this may be an underestimation of the value of the existence of parks and green spaces to UK residents.

First, evidence from house market data (revealed preference data) would tend to suggest that the CV values in this study are low.⁵⁰

According to the 2017 Vivid report, "London's public parks have a gross asset value in excess of £91 billion, with £55.9 billion of the value being associated with residential property prices in proximity to parks". This house price premia spread over the course of a number of decades of living in a property, may equate to an implicit annual benefit of many thousands of pounds in additional house price to live near a park or green space.

The values in the Vivid Economics report are significantly higher than the values in this research study. The report itself makes clear that: "All these estimates are based on a number of assumptions about the effects that urban parks have on Londoners and their preferences". It is important to address some of the limitations of house price methods, which are subject to bias resulting from disequilibrium between the housing market and the public good (parks), which is commonly caused by the low variety of private goods, slow adjustment of prices, incomplete information, and high transaction costs for moving house (see Krekel et al. 2016 for a full summary). These may be especially problematic in a highly inflated housing market like London.

Robust application of revealed preference methods also requires that other relevant factors that may drive house price value at the local level are controlled for, such as better schools and amenities (the Smith 2010 report on which Vivid calculations are based controls for distance from central London, listed buildings, proportion of council housing/income support, but not these other amenities).

This would lead to overestimation of the benefits associated with parks and green spaces.

As discussed above, areas with more green space are also likely to have numerous other amenities and beneficial characteristics which would also drive up house prices. This would suggest that the house price differentials in these studies cannot be solely attributed to the presence of local parks. However, even accounting for the confounding effect of other local amenities and characteristics we suspect that the impact of local green space on house prices is large and far larger than suggested by the WTP results here.

Further, despite providing information about the current level of local authority funding for parks and green spaces, it may be that respondents of our survey did not fully appreciate the amount of current funding and resource required to support the maintenance and preservation of publicly accessible green space, and that this leads to lower estimations of their personal WTP.

Finally, while the CV survey presents information on the health and wellbeing benefits that parks provide – designed to elicit the combined use and non-use benefits of the site – it may be that CV respondents do not internalise this information or fully appreciate the wider benefits that parks and green spaces give them, which could lead to their underestimation of the value.

For the purposes of this paper we do not perform national-level cost-benefit analysis (CBA) of the value of parks and green spaces due to limitations in the availability of reliable cost data at the national level.⁵¹

We instead recommend that CBA analysis be performed at the local area level, using cost per head estimates of the local authority spending for provision of parks and green spaces.

⁵⁰ A number of studies have consistently found that house prices near to parks can be up to 19% higher in Scotland (Dunse et al., 2007) or even 49% higher in Belfast (McCord et al., 2014). We must note that these house price studies tend to be very basic, simply comparing the unconditional house price means in areas with and without local parks without controlling for other differences in the areas.

⁵¹ The most recent figures available (compiled for HLF State of UK Public Parks, 2016) report net local authority spending on open space (which includes all types of public open spaces) for England only.

In Section 9 we identify the next steps for development of a Local Level Valuation model that is capable of distinguishing between values held by different groups in society, and for different types of publicly accessible green space provided at the local level.

This local-level, cost-benefit approach is particularly important and relevant in light of the welfare weighted

WTP findings in Section 5.2. As detailed in our findings, there are significant variations in the value of parks and green spaces based on local demographic and geographic characteristics. A local approach to cost benefit will be much more responsive to and accurate in its valuation of parks and green space to the community where costs and benefits are incurred and experienced.

8.2.2 External Validity: Wellbeing Valuation

The per visit wellbeing value associated with use of the most commonly used local park or green space from the primary survey (£8.47 per visit, lower-bound) is higher than previous estimates of the value of parks in the literature (Fujiwara et al. 2014). There are a number of possible reasons for this. In particular, the wellbeing value of parks and green spaces elicited here may be capturing the wider quality of the area in which people live (given that they are asked about their usage of a park or green space within 1km of their house).

Although we can control for differences between local authority areas, this is a broad geographical range. In order to control for these area effects, it would be necessary to control for levels of material deprivation at the local level where people live. It is not possible to do this within the primary survey. Although we do control for household income, this does not directly represent the overall affluence and greenness of the area where parks and green spaces are located.⁵² As such, the park and green space usage variable is likely to be inflated to some extent as it captures some of the wider neighbourhood quality and characteristic effects on wellbeing, which we are unable to fully control for in our primary analysis.

As a point of comparison, previous estimates of the wellbeing value of historic parks (Fujiwara et al. 2014) have shown that the value of regular visits to historic parks is £150 per year. This is considerably lower than the wellbeing value for frequent use of parks and green spaces estimated in the primary survey.

We hypothesize that the main reason for this difference is that visits to historic parks is not subject to area effects, given that people will generally not be living around the historic park and do not benefit from the overall affluence and greenness around it, whereas our study would be more subject to these local area biases. As such, the value of £150 is likely to be more representative of the wellbeing benefits that people gain from visits to and use of a historic park, without the interference of area effects.

In addition, there may be a selection effect, whereby people who use their local park or green space more often are already those who are happier or more satisfied with their lives to begin with. As a consequence, our wellbeing value for frequent use of parks and green spaces may be subject to endogeneity (i.e. the wellbeing result is driven by confounding factors related to the characteristics of those people who select into using parks and green spaces), meaning that the size of the wellbeing impact associated with our outcome of interest (park and green space usage) is further inflated.

⁵² Average annual household income as an indicator of the overall quality and affluence of an area is significantly higher among park and green space users (£34,000) than non-users (£29,000) (Table 41)



Conclusion and Next Steps

9 Conclusion and Next Steps

The new data collected in this report quantifies the value of parks and green spaces to individuals in the UK and will help direct future policy decisions and investment strategies relating to the continued provision of local parks and green spaces.

By adhering to HM Treasury best practice for valuing non-market goods we have represented the value of parks and green spaces in economic terms based on the health and wellbeing benefits they provide to individuals, as well as being the first research study to apply welfare weighting to Willingness to Pay values for local parks and green spaces allowing for more informed decisions about target interventions to those who will benefit from the greatest increase in welfare; irrespective of spending power.

The Total Economic Value to an individual (a combination of use and non-use values based on a person's average Willingness to Pay) is £30.24 per year (£2.52 per month) which includes benefits gained from using parks and green

spaces as well as non-use benefits for example a value attributed to the preservation of these vital spaces for future generations. One of the most significant findings of this research is the clear demonstration that when welfare weighting is applied, lower socio-economic groups and Black, Asian, Minority Ethnic (BAME) groups ascribe a much higher value to parks and green spaces than the national average. Lower socio-economic groups report a welfare-weighted value of £4.32 per month and BAME groups value parks and green spaces more than double the UK average at £5.84 per month. This is the first time that welfare weighting has been applied to individual values and represents a considerable advance on previous studies of parks and green spaces in the UK and internationally.

9.1 The UK Policy Environment

One of the stated aims in DEFRA's recently published 25-year plan to improve the Environment is to connect people with green spaces to improve health and wellbeing, recognising the need to focus on disadvantaged areas. Numerous policy areas such as the Child Obesity Plan for Action (Cabinet Office, Department of Health) and Welsh Government Well-being of Future Generations Act (2015) demonstrate that health problems disproportionately impact lower socio-economic groups. We know from evidence already referenced in this report that improving the availability across the social gradient of good quality local green spaces very close to where people live and spend their day will help reduce health inequalities. The continued decimation of our parks and green space services will, according to the findings of this report, more negatively impact the lives of lower socio-economic groups than other groups.

Reducing social isolation and increasing community cohesion are increasingly important agendas as evidenced by the appointment of a Minister for Loneliness in January 2018. This research shows that while there are different drivers for using parks and green spaces across different user groups there are also clear, shared social motivations for use reinforcing the position that parks and green spaces improve community cohesion by offering shared spaces for community connections and to tackle social isolation (Cohen-Cline et al., 2015; Hartig et al., 2014; White et al., 2013).

Our results show the Wellbeing Value associated with the frequent use of local parks and green spaces is worth an annual £34.2 billion to the UK population (the equivalent of £974 per individual), based on measurements of life satisfaction including physical and mental health benefits. This data, quantifies the significant physical and mental health and wellbeing benefits that individuals derive from regular use of local parks and green spaces.

Further analysis of the data estimates secondary benefits of frequent park use with an annual cost saving to the NHS worth £111 million, focusing only on one aspect of health (the fact that parks users are less likely to visit their GP). An extrapolation of this figure to take account of the costs of prescribing, referrals and further interventions means that the overall savings to the Exchequer would far exceed this initial figure.

Given the challenging financial position of local authorities, the possibility of exploring new models of ownership and management of parks and green spaces is being discussed at national level. Many of these models rely, to some extent, on volunteers to support these alternative management models. According to the government data sets Taking Part, Understanding Society and Community Life, BAME communities and lower socio-economic groups are respectively 9% and 11% less likely to volunteer than the national average. There is a real risk therefore that inequity in provision of good quality green space could be exacerbated in areas with high levels of BAME communities and lower socio-economic groups, despite these groups assigning a higher relative value than the national average. A reduction in service where arguably it is needed most.

These substantial and quantifiable health and wellbeing benefits make a robust, evidence-led business case for parks and green spaces to be considered in terms of their contribution to society rather than being assessed simply in terms of their cost. The data also enables us to show secondary benefits in terms of cost savings to the NHS, therefore partially quantifying the contribution that parks and green spaces make to the preventative health agenda. However, we believe the application of this methodology at a local level has the potential to make the most significant impact in terms of planning, protecting and funding the future security of parks and green spaces.

9.2 Working Towards a Local Valuation Model

Our primary survey identifies differences in average Willingness to Pay values between target demographic groups. It distinguishes between the value of benefits provided to those living in urban compared to rural areas, as well as to lower socio-economic groups and BAME groups.

Key variations include:

- › Geographic characteristics - rural and urban
- › Socio-economic status
- › Demographics of the local population
- › Size of the park or green space
- › Facilities and attributes of the park or green space

Early application of the Local Valuation Model Mean Willingness to Pay value is **£30.24 per year**



LARGE PARK in an URBAN area

Total adult population within
1 km of the park is **31,000**

54% of the total adult population
within 1 km of the park are BAME

Individual mean
Willingness to Pay value

£59.54 per year

(population and social weighted)



SMALL PARK in a RURAL area

Total adult population within
1 km of the park is **2,500**

10% of the total adult population
within 1 km of the park are BAME

Individual mean
Willingness to Pay value

£36.82 per year

(population and social weighted)

We now aim to develop this research into a Local Valuation Model by applying the primary research findings and values to individual parks and green spaces. Using the primary research sample of over 4,000 respondents as a base line this new model will enable us to generate an estimate of the health and wellbeing benefit of any park or green space using data specific to the community it serves. With reliable data on the maintenance and upkeep costs of parks and green spaces at the national or local level it would also be possible to perform a cost-benefit analysis.

Using the Local Valuation Model, local authorities will be able to see a clear demonstration of the value of any single park or green space to the local population and the value of their entire parks and green space portfolio. We believe that this quantification of the value that parks and green spaces provide to local communities is crucial to help change the conversation and provide a business case for their future protection and support.



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Appendices



11.1 Literature Review of Current Methodologies and Valuations of Parks and Green spaces

11.1.2 Stated Preference

Contingent Valuation (CV) is the most common form of stated preference study used to estimate the value placed on the urban parks and green spaces and provides examples of best practice for CV survey design. However, to date CV studies of parks and green spaces have been confined to individual parks. For example, Brandli and Prietto (2014) use CV to elicit local residents' willingness to pay for proposed improvements to an urban park located within Passo Fundo in Brazil, through a property tax. The study found that residents living closest to the park had higher WTP values, on average. A notable exception is a study by Lo and Jim (2010), who use a face-to-face CV survey. Respondents were asked to specify the maximum Willingness to Pay value for a compensatory greening programme, in order to offset the loss of urban green space area in Hong Kong.

These studies demonstrate that it is possible to construct a convincing hypothetical scenario for preservation of parks and green spaces, either at the individual or local level, through a funding mechanism provided by the local population. What has not been attempted previously is to conduct a large-scale survey at the national level. No previous studies have attempted to elicit respondent-specific information on the characteristics of the park being valued. Finally, although previous research has explored urban green space accessibility for deprived socio-economic groups (Comber et al., 2008), to date no one has compared the relative values that different groups in society hold for the maintenance or preservation of their local parks and green spaces.

11.1.3 Revealed Preference

Revealed preference (RP) studies in this area exploit hedonic pricing to establish an amenity value of nature as reflected implicitly in-house prices (e.g. Gibbons et al., 2013), or apply a travel cost method to assess outdoor recreational values based on willingness to travel to a park or green space (The Outdoor Recreation Valuation Tool: Short Case Study 2, 2016). Gibbons et al. (2013) conducted a hedonic pricing study for the UK National Ecosystem Assessment and found that on average, a one percent increase in the amount of green space in a ward was responsible for £2,020 (approximately one percent) of the value of a house in England. In addition, that study shows that increasing distance to natural amenities is unambiguously associated with a fall in house prices in England (thus supporting the hypothesis that home buyers are paying for accessibility to these natural features). Specifically, the authors found that a one kilometre increase in distance to rivers lowered house prices by £1,811. Other studies have examined the relationship between proximity to green space and property premiums.

Dunse et al. (2007) showed that relative to a property located 450 metres away from a park, a property located on the edge of a park could potentially attract a premium of between 0.44% to 19% within the city of Aberdeen. Similarly, a study of house prices in London, found that on average a 1% increase in the amount of green space in a ward can be associated with a 0.3 to 0.5% increase in house prices (GLA Economics, 2003).

One of the most notable contributions in this area is ORVal (The Outdoor Recreation Valuation Tool: Short Case Study 2, 2016), which draws on the MENE dataset. In order to be consistent with HM Treasury's Green Book methods, the metric used to value park or green space usage must take into account any use of or values held for other substitute parks and green spaces. While, in contingent valuation, this can be achieved through carefully designed survey script and questions eliciting usage of alternative parks and green spaces, ORVal places a value on all forms of parks in the UK⁵³ by taking the data on visits to green spaces from the MENE data and attaching a value to the travel time, accounting for the range of alternative natural sites that an individual could have travelled to instead.⁵⁴ This provides an estimate of the annual value of the welfare change associated with visits to different types of park classification for each LSOA in England.

One disadvantage of the Orval approach is that the values obtained relate to the recreation or amenity value people hold in green space sites (estimated through the time they spend to travel to that site within the ORVal model). The ORVal approach is unable to estimate of the Total Economic Value (Pearce and O'zdemiroglu, 2002) of parks and greenspace, in terms of the broader set of non-use values they may hold in existence of the park or green space (regardless of whether they themselves use it).

⁵³Parks are defined as 'areas of accessible green space within well-defined boundaries over which visitors usually have freedom to wander at will'. Each recreation site is described by various aspects of its physical characteristics; particularly the site's dimensions, landcovers, designations and points of interest. | ⁵⁴The ORVal method applies discrete choice travel cost Random Utility modelling approach that focuses on an individual's choice of which of the array of different green spaces to visit rather than how many trips to take to a particular greenspace. ORVal uses the visit data, where 82,524 respondents provide information on their recreation activity over 7 days, so that each respondent contributes 7 different observations to the data.

11.1.4 Subjective Wellbeing Valuation (SWB)

To date there have been no studies which have applied a wellbeing valuation approach to the link between parks and green spaces and SWB. The closest study to date (D. Fujiwara et al., 2014) estimates the wellbeing value associated with visits to historic parks and gardens using questions from the UK Taking Part survey of 14,000 respondents. Visiting historic parks or gardens in the past 12 months is estimated to have a wellbeing value of £150 per year (although the result for visits to this type of heritage feature was not significant within the model). The data does not contain any information on visits to other types of parks and green space.

The first challenge is to find studies in which the use of parks and green space is measured explicitly, as opposed to indirect evidence where it is inferred (e.g. from location data that puts people in proximity to green space and therefore assumes usage).

White et al. (2017) provide one of the key studies in this area. They analyse the association between visit frequency (to natural environments) and subjective wellbeing using Defra's Monitoring of Engagement in the Natural Environment (MENE) dataset, a national survey for England which captures how people engage with nature and captures the four ONS subjective wellbeing measures.⁵⁵ The outcome assessed in the MENE dataset is engagement with nature, and outdoor visits to any open space (green space/outdoors location, excluding routine shopping trips and time spent in private gardens).⁵⁶ This is a broad definition, which includes a range of other landscape types beyond public parks and green spaces (including, for instance, coasts and beaches, farmland, woodland, hills and rivers).

White et al. (2017) is the first study to look at the relationships between wellbeing outcomes and: i) neighbourhood exposure; ii) visit frequency; and iii) a specific visit; in the same analysis. Of particular interest to the present study is the evidence on visit frequency. White et al. (2017) find that individuals who visited natural environments daily were almost twice as likely to report high levels of eudemonic wellbeing (sense of purpose/worthwhile) than those who never visited. Furthermore, the authors find that visiting nature yesterday was associated with a higher likelihood of reporting high levels of positive experiential wellbeing (happiness) yesterday. The paper finds novel evidence of an exposure-response relationship between visit frequency and all four ONS wellbeing measures.

Where White et al. (2017) stopped was in applying a monetary valuation to these results. White et al. (2017) provide no analysis of the association between use of greenspace and general health measures within the MENE dataset.

For the purpose of evaluating the benefits of parks and green spaces we note that the MENE data used by White et al. (2017) offers several limitations:

- 1 The greenspace variable in MENE is a blunt instrument for evaluating public parks and green spaces: MENE only allows evaluation of the broad category of green space outdoor locations.⁵⁷ This means that we cannot attribute the wellbeing uplift observed in White et al. (2017) to parks and greenspace without ignoring the impacts a range of other natural environments that people may be visiting.
- 2 The predictive power of the MENE models is limited by the lack of key socio-demographic drivers of wellbeing, specifically household income. Consequently, it is not possible to apply wellbeing valuation to obtain a monetary estimate for the benefits to health and wellbeing that green spaces/outdoor locations provide.
- 3 MENE is restricted to England whereas we are interested in the benefits that parks and green spaces provide to the UK as a whole.

Elsewhere, Bertram and Rehdanz (2015) explore the association between urban green space and life satisfaction (on a 0-10 scale) using a survey of 485 people living in the city of Berlin, investigating four transmission channels: amount of green space available; distance to nearest greenspace (defined as urban green space bigger than 5ha); frequency of visits; and view onto green space from home. The study uses sites designated as 'green urban areas', which includes public green areas for predominantly recreational use such as gardens, zoos, parks, or castle parks. Importantly, it excludes private gardens, cemeteries, and patches of natural vegetation or agricultural areas enclosed by built-up areas without being managed as green urban areas. The study finds no significant linear association between the amount of green space and life satisfaction. Instead, they find significant hump-shaped association between the amount of and distance to green space on life satisfaction in the squared model. This implies that additional urban green space first increases life satisfaction but tends to decrease life satisfaction above a certain threshold.

Bertram and Rehdanz (2015) explore monetising this association by deriving the implicit marginal rate of substitution (MRS) between green space and individual income. Based on median greenspace availability and median income, the implicit MRS is EUR 33.51 per person per hectare per month, ranging from EUR 0.33 for lower income and high green space availability to EUR 73.45 for higher income and low greenspace availability.

⁵⁵ The Monitoring Engagement with the Natural Environment (MENE) survey is funded by Natural England, with support from DEFRA and the Forestry Commission, collecting information about the ways that people engage with the natural environment. It also captures the 4 ONS subjective wellbeing measures. 800 respondents are interviewed each week, providing at least 45,000 interviews each year. |

⁵⁶ The main treatment variable, represents how many outdoor visits the respondent has made on average over the past 12 months. As the questionnaire suggests: '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. It may include time spent close to your home or workplace, further afield or while on holiday in England. However, this does not include routine shopping trips or time spent in your own garden.' |

⁵⁷ The definition of 'green space/outdoor locations' includes a range of other landscape types beyond public parks and green spaces (including, for instance, coasts and beaches, farmland, woodland, hills and rivers).

There are limitations of this study: First it is based on a sample of people living in one city only (not in the UK) and is not representative of regional coverage and age demographics, as well as concerns of selection bias due to the large number of missing observations. Second, it is a primary survey carried out on a sample of 485 observations. This limits the predictive power of the analysis for disaggregation of heterogeneous effects between green space and socio-demographic groups and the characteristics of that green space. Third, the MRS values which are estimated for lower income groups are not weighted by their relative income levels, and may therefore underestimate the value that parks and green spaces provide to the welfare of those groups (for further discussion of income weighting, see Section 5.2).

Krekel et al. 2016 use the German Socio-economic Panel to estimate the effect of urban land use on residential wellbeing, employing within estimators individual and city fixed-effects to address concerns about endogeneity.⁵⁸ The effect of increasing the distance to green urban areas by 100m (given a mean distance of 279m), is small, decreasing life satisfaction by 1% of a standard deviation. The results are non-linear, with increasing the distance to green urban areas significantly decreasing life satisfaction at a decreasing rate. Subgroup analysis shows that the effects of the distances to and the coverages of both green urban and abandoned areas on life satisfaction are up to five times greater for older residents. Krekel et al. estimate marginal Willingness to Pay (MWTP) using the income coefficient within the same model (meaning these values are subject to considerable endogeneity of income), finding that residents have an average Willingness to Pay value of 455Euros to decrease the distance between households and green urban areas by 100 m (given a mean distance of 279 m).

Krekel et al. calculate the optimal values of distances to green urban areas. The optimal value of the distance between households and green urban areas is estimated as an average of 0m. However, measurement error is introduced in the definition of 'green urban areas' to include zoos, castles, and suburban natural areas used as parks, and the absence of parks <0.25 ha. The authors cannot account for simultaneity (self-selection of respondents within the measurement period), which reduces the strength of the causal estimate.⁵⁹

More broadly, Social Return on Investment (SROI) based approaches have been employed in order to establish the value of the city of Edinburgh's parks (City of Edinburgh Council, 2014) and the health and crime reduction benefits of Land Trust parks (The Land Trust, 2017). Natural capital accounting has also been exploited to estimate the health and wellbeing benefits of Sheffield's parks (Smale, 2016) as well as the benefits of river (Mayes Brook) restoration in Mayesbrook Park (Everard et al., 2011).

⁵⁸ The authors argue that city of residence fixed-effects reduces simultaneity, as the effect is identified by between-city movers, who are less likely to move for reasons related to different land use categories in their surroundings. | ⁵⁹ Although the authors conduct robustness checks to show that the effect of simultaneity is minor in the case of the GSEP

11.1.5 Detailed Literature Review

| Reference | Key Results | Valuation Method ⁶⁰ | Type of Exposure | Dataset ⁶¹ | Value |
|--|---|--|--|--|---|
| Everard et al. (2011) | Value of Mayesbrook Park restoration. | Natural capital accounting | N/A | N/A | £7:1 |
| Smale (2016) | ROI from Sheffield's parks. Approximately 60% of the benefits of parks attributed to physical and mental wellbeing. | Natural capital accounting | N/A | N/A | £36:1 |
| City of Edinburgh Council (2014) | Value of City of Edinburgh's parks. | SROI | N/A | N/A | £9:1 |
| Perceptions Survey and Social Value Study (2015) | Value of health benefits from The Land Trust. | SROI | Park visits | Dedicated survey, April-May 2015 (N=384 respondents: park visitors only) | £30.30:1 |
| Perceptions Survey and Social Value Study (2015) | Value of crime reduction benefit from The Land Trust. | SROI | Park visits | Dedicated survey, April-May 2015 (N=384 respondents: park visitors only) | £23.30:1 |
| Perceptions Survey and Social Value Study (2015) | Amenity value of Land Trust work. | CV: WTP | Hypothetical scenario | Dedicated survey, April-May 2015 (N=384 respondents: park visitors only) | £2.56:1 |
| Natural England (2009) | Value of expanding WHI (Walking the Way to Health Initiative) programme over 3 years. | HV: QALY based (life-cost averted model, i.e. treatment cost saved by NHS) | N/A | N/A | £1:7.18 cost-benefit ratio |
| Natural England (2009) | Hypothetical value of providing the population of England with equitable good access to green space. | HV: Life-cost averted saving to NHS | N/A | N/A | £2.1bn per annum |
| London Playing Fields Foundation (2015) | Value of Douglas Eyre Sports Centre playing field, based on the Centre's sporting activities. | HV: Cost to the society of health-related problems avoided | N/A | N/A | £1030 per participant £4.8m total value |
| Mourato et al. (2010) | Value of health and wellbeing benefits associated with use of and proximity to natural spaces. | HV: QALY based | View over green space from the house; Use non-countryside green space at least monthly | Dedicated survey, August 2010 (N=1851 respondents) | £135-£452 per person for view over green space; £112-£377 per person for use of non-countryside green space |
| White et al. (2013) | Life satisfaction and mental health (GHQ score) gains associated with living in urban areas with more green space. | WV | Green space coverage | BHPS | Wellbeing gain from living in an area with higher levels of green space approximately a third of that from being married, or a tenth of that from being employed vs. unemployed |

⁶⁰ For an explanation of the abbreviations used please see footnote below the table. | ⁶¹ For an explanation of the abbreviations used please see footnote below the table.

| Reference | Key Results | Valuation Method ⁶⁰ | Type of Exposure | Dataset ⁶¹ | Value |
|--|--|---|-------------------------|--|---|
| White et al. (2017) | Worthwhile and happiness gains associated with visiting nature regularly/recently. | WV | Visit frequency | MENE | Wellbeing gain from weekly nature visits similar to that from being married |
| Fujiwara et al. (2014) | Wellbeing value associated with visits to historic parks and gardens. | WV | Park visits | UK Taking Part | £150 per year for visiting historic parks or gardens in the past 12 months |
| The Outdoor Recreation Valuation Tool: Short Case Study 2 (2016) | Welfare values generated by Millennium and Doorstep Greens. | RP: travel cost method | Visits to green spaces | MENE | £50.3 m per Year |
| Mourato et al. (2010); Gibbons et al. (2013) | Amenity value of nature (i.e. increase in overall wellbeing associated with living close to desirable natural areas and environmental resources) in England, as reflected in house prices. | RP: hedonic pricing | Greenspace coverage | Nationwide housing transactions in England, 1996-2008 | £377 per 1% share of broadleaved woodland within 1km square; £2020 per 1% share of greenspace in ward |
| GLA Economics (2003) | Value of green spaces in London, as reflected in house prices. | RP: hedonic pricing | Green space coverage | ONS home sale prices, 2001 | 0.3-0.5% price increase per 1% share of greenspace in ward |
| Dunse et al. (2007) | Value of park proximity in Aberdeen, Scotland, as reflected in house prices | RP: hedonic pricing | Distance to greenspace | Property sales within 800 m of five city parks | 0.44% to 19% premium for property located on the edge of a park relative to one located 450 metres away |
| McCord et al. (2014) | Value of greenspace proximity in Belfast, Northern Ireland, as reflected in house prices. | RP: hedonic pricing | Distance to greenspace | Land and Property Services residential sales in Belfast, 2011 (N=3,854 transactions) | Up to 49% price premium |
| Perino et al. (2011) | Distance sensitive marginal value function of urban green space. | RP: hedonic pricing; CV; Expert interview | Distance to greenspace | Meta-analysis (5 studies) | 0.941% decrease in marginal value per 1% increase in the distance to the centre of the green space |
| Comber et al. (2008) | Green space access in an English city (Leicester) analysed using a network analysis in a geographical information system (GIS). | N/A | Greenspace distribution | Geographical information system (GIS), Population of Leicester | The spatial distribution of access to green space is uneven amongst different groups of society in Leicester. |
| Abdallah et al. (2017) | Inequality in life satisfaction across local authorities in Great Britain. | N/A | Greenspace use | APS | Engagement in heritage activities and the use of green space for health or exercise is associated with lower inequality at local authority level. |

⁶⁰ For an explanation of the abbreviations used please see footnote below the table. | ⁶¹ For an explanation of the abbreviations used please see footnote below the table.

INTERNATIONAL EVIDENCE:

| Reference | Key Results | Valuation Method ⁶⁰ | Type of Exposure | Dataset ⁶¹ | Value |
|----------------------------|--|--------------------------------|--|--|---|
| Ambrey and Fleming (2014) | Implicit WTP for public green space in resident's local area in Australia's capital cities obtained via wellbeing valuation (life-satisfaction approach). | WV | Greenspace coverage | HILDA + geographic data | UD 81,678 per household per year for a 1ha increase in green space AUD 1,168 per household per year for 1% (143 m ²) increase in green space |
| Bertram and Rehdanz (2015) | Implicit WTP for public green space in Berlin, Germany. Relationship has inverted U-shape. Positive effect of green space is largest for an area coverage of 11%. | WV | Greenspace coverage; Distance to greenspace | Dedicated survey, September 2012 (N=485 respondents) | €33.51 per person per 1 ha per month (based on median green space availability and median income) €764 per average household per 1 ha per year |
| Brander and Koetse (2011) | Value of urban open space in the US. | RP: hedonic pricing | Distance to greenspace | Meta-analysis (12 studies) | 0.1% house price increase per 10m decrease in distance to open space |
| Brander and Koetse (2011) | Value of urban open space in the US. | CV | Greenspace characteristics | Meta-analysis (38 studies) | 1550 US\$/ha/year for open space with average characteristics. |
| Haefele et al. (2016) | Average annual willingness to pay for all US National Park Service Lands and Programmes (includes non-use and existence values). | CV: WTP | Hypothetical scenario | Dedicated survey, 2013-15 (N=708 respondents) | \$1445 per household |
| Brandli and Prietto (2014) | Local residents' willingness to pay (through a property tax) for proposed improvements to an urban park located within Passo Fundo in Brazil. | CV: WTP | Hypothetical scenario | Dedicated survey (N=338) | Residents living closest to the park had higher WTP values, on average. |
| Lo and Jim (2010) | Local resident's willingness to pay for a compensatory greening programme at the city level, to offset the loss of urban green space area in Hong Kong. | CV: WTP | Hypothetical scenario | Dedicated survey (N=495) | Monthly average payment of HK\$77.43 (approximately £7.55) per household for five years. |
| Loomis et al. (2000) | Willingness to pay for an increase in ecosystem services along Platte River, US (dilution of wastewater, natural purification of water, erosion control, habitat for fish and wildlife, and recreation) through a higher water bill. | CV: WTP | Hypothetical scenario | Dedicated survey (N=100 respondents) | \$252 per household per year |
| Latinopoulos et al (2016) | Willingness to pay of local residents for the provision of a large metropolitan park in Thessaloniki (Greece). | CV: WTP | Hypothetical scenario | Dedicated survey (N=600) | Mean WTP values range between £3.55 and £7.00 |
| Lindsey and Knaap (2007) | Willingness to pay for greenway projects in a publicly designated greenway in Indiana. | CV: WTP | Hypothetical scenario | Dedicated survey (N=876) | Mean WTP of \$23.00 |

Footnotes: Valuation method abbreviations: CV (contingent valuation), HV (health valuation), RP (revealed preference), SROI (social return on investment), WTP (willingness to pay), WV (wellbeing valuation). Data source abbreviations: APS (Annual Population Survey), BHPS (British Household Panel Survey), HILDA (Household, Income and Labour Dynamics in Australia), MENE (Monitor of the Engagement with the Natural Environment), ONS (Office for National Statistics).

⁶⁰ For an explanation of the abbreviations used please see footnote below the table. | ⁶¹ For an explanation of the abbreviations used please see footnote below the table.

11.2 Approach to Valuation of Publicly Accessible Green Space within this Report

Understanding the value provided to individuals and society by the wide-ranging services that parks and green spaces provide is complex, since most park or green space services are free at the point of use. There are four key ways to value non-market social impacts (Fujiwara and Campbell, 2011):

1 Stated Preference Methods (Contingent Valuation Discrete Choice Experiments);

11.2.2 Stated Preference

There are two forms of stated preference (SP) valuation:

Contingent valuation (CV) elicits the monetary value of non-market goods and services by directly asking people what value they attach to them (Bateman et al. 2002). CV surveys create a hypothetical situation where continued access to, use of, or preservation of the public good in question (in this case parks and green spaces) is contingent on the Willingness to Pay value that people hold for it. A sample of people (representative of the population of interest) are directly asked to report their maximum **Willingness to Pay (WTP)** to access or maintain, or minimum willingness to accept (WTA) a change in the level of provision of the good or service.

In CV value is attached to a clearly defined good, in this case local parks and green spaces, or a specific park or green space in their local area that individuals use most commonly.

Use and non-use values: The key methodological advantage of CV over other non-market valuation approaches is that it can measure values and benefits that would not be revealed under market conditions, such as non-use values. Individuals may hold non-use values for parks and green spaces, regardless of whether they use them or not (Mourato and Mazzanti, 2002), and these can only be captured through CV methods. Importantly, CV also offers the opportunity to measure benefits associated with changes that have not yet happened, that is, future changes (such as those related to changes in the funding of publicly accessible greenspace or threats from urban development).

Total economic value of the existence of parks and green spaces: The Total Economic Value (TEV) of a park or greenspace is divided between **use value** and **non-use values** associated with their social and wellbeing impacts. Use values include the direct use benefits to visitors of publicly accessible green space, for instance recreational, and leisure, as well as relaxation and inspiration. Indirect use benefits could arise in the form of enhanced community image, and social interaction. Option value refers to benefits from a potential future use of the park or green space by those who do not currently use it. However, parks and green spaces can be valued even by

2 Revealed Preference Methods (actual prices that consumers pay in parallel markets);

3 Subjective wellbeing (Wellbeing Valuation);

4 Health values

As part of our initial research design we assessed the advantages and disadvantages of each of the approaches:

those who do not directly use them. Non-use values can come from simply knowing that others will benefit, either now, or in the future. Non-use value may also be derived from simply knowing that the park or green space exists (Pearce and O'zdemiroglu, 2002).

By making respondents consider a hypothetical scenario in which the publicly accessible green space(s) would be under threat of deterioration or closure, it is possible to elicit the full value of the site(s) to the individual, in terms of their use and non-use values. Careful design of the survey ensures that respondents are considering their budget constraints and the existence of other publicly accessible green spaces (substitutes). This provides Willingness to Pay (WTP) / Willingness to Accept (WTA) values which are consistent with the foundations of welfare economics (Hicks and Allen, 1934), and can be used in cost-benefit analysis at the individual and national level.

A practical advantage of CV is that it has a significantly longer history of research in economics. In particular, the rise in popularity of stated preference methods in the early 1980s was accompanied by a very active debate and critical assessment of the merits and limitations of the techniques and their underlying conceptual framework (Arrow and Solow, 1993; Carson, 2012; Hausman, 2012). As a consequence, a lot more is currently known about the problems of this particular method, ways of testing for them and techniques for addressing them (Bakhshi et al., 2015; Champ and Bishop, 2001; Murphy et al., 2005).

Against these advantages, there are a number of well-known potential biases in CV that can be problematic if not adequately addressed in the survey instrument and analysis (Bateman et al. 2002; Dolan and Fujiwara, 2016; Pearce et al., 2006). These include: insensitivity to scope, where WTP is insensitive to the scope of the proposed change; protest values, where respondents have a principled objection to providing a monetary value; and strategic bias, where respondents seek to 'game' the study by providing values that they think will influence an actual resource allocation or policy decision.

The criticism of CV that has perhaps received greatest attention is hypothetical bias (Arrow and Solow, 1993; Champ and Bishop, 2001; Hausman, 2012), where individuals' stated WTP may be significantly larger than actual WTP value due to the hypothetical nature of the survey. This arises mostly when a voluntary payment mechanism is used. As outlined in Section 4.1, we apply a range of tools (including entreaty scripts and certainty questions) to correct for this (following Bakhshi et al., 2015).

The second SP approach - Discrete Choice Experiments (DCE) - is applied by economists in situations that are multi-dimensional in nature and where it is important to find the value attached to the various dimensions of

interest. Respondents are presented with a series of scenarios, grouped into 'choice sets' that describe the alternatives on offer. For instance, these may be different combinations of features and facilities available at a park or green space. Respondents are then asked to identify their most preferred scenario, amongst the scenarios contained in a choice set. Willingness to pay (or to accept) is therefore inferred indirectly by analysing the choices and trade-offs made between the various attributes. DCE is not applied in the current study because the method is more relevant for eliciting preferences for changes in the attributes of a single park or green space, rather than the total economic value of sites, as we aim to do in the present study.

11.2.3 Revealed Preference

Revealed preference (RP) methods uncover estimates of the value of non-market goods by using evidence of how people behave when presented with real economics choices. The basic idea is that non-market goods affect the price of market goods in other markets and that price differentials in these markets can provide estimates of WTP and WTA.

The **travel-cost method** has been used extensively to elicit mainly recreation benefits. The welfare to the individual is estimated from the actual travel expenses incurred when visiting a specific park or green space site (McFadden, 1974; Termansen et al., 2013). However, the travel cost method only allows us to capture the recreation or amenity value people hold in green space sites. As such RP cannot provide an estimate of the Total Economic Value (Pearce and

O'zdemiroglu, 2002), in terms of people's direct use values for parks and green spaces, and the broader set of non-use values associated with its existence.

The **hedonic pricing method** elicits the value of a non-market good as part of the attribute bundle of a market good e.g. house property prices which may vary due to proximity to parks and green spaces (Brander and Koetse, 2011; Gibbons et al., 2013; McFadden, 1977). However, this method is reliant on the assumed link between the value of a park or green space, and the proxy market around it (such as house prices). This assumes that the housing market does not have high transaction costs which present a barrier to preference satisfaction (which it does) and that the analyst is able to control for other local area factors which may drive house price variation.

11.2.4 Subjective Wellbeing (SWB)

Subjective wellbeing (SWB) is an increasingly established form of policy evaluation that measures the impact of an intervention or policy in terms of the changes in wellbeing produced, as measured directly from people's self-reports over a range of measures, including life satisfaction, happiness, anxiety and sense of purpose (the "four ONS SWB measures"). The thinking behind this method is that ultimately all government policy has the objective of improving the nation's welfare, and that this can be measured in a more holistic way through directly elicited measures of wellbeing, rather than economic proxies for welfare such as gross national product (GNP) (Dolan and Fujiwara, 2016; Layard, 2009; O'Donnell et al., 2014).⁶²

SWB can be estimated by looking at how experiencing certain outcomes, such as regular usage of parks and green spaces in the past 12 months, is associated with differences in people's quality of life, compared to those who do not use parks and green spaces regularly, through the four ONS subjective wellbeing measures. In this way, SWB is capable of capturing the indirect benefits which

people in and around parks and green spaces may not be directly aware of, such as the physical benefits of cleaner air, or the psychological benefits of exposure to natural environments, but which nevertheless be picked up in the overall wellbeing (Welsch, 2007).

It has been demonstrated that wellbeing can be valued in monetary terms using the Wellbeing Valuation (WV) method (Fujiwara, 2013; Fujiwara and Campbell, 2011). In WV, SWB is assumed to provide a direct measure of an individual's welfare and hence a key assumption is that welfare is now observable as measured by SWB. This allows us to estimate the equivalent amount of income they could trade off to maintain their welfare constant, if they were no longer able to benefit from the outcome (in this case parks and green spaces).

The WV approach is based on real experiences and not – as in stated preference approaches – on how people imagine they might be affected by a change. In wellbeing analysis, it is possible to look at people's actual experiences of engaging

⁶² This approach has been used extensively in research by the UK Government (e.g. the Department for Culture, Media and Sport (DCMS), Department for Work and Pension (DWP), Cabinet Office), and the Government of Canada (Public Health Agency Canada) (Latif, 2012)

with a park or green space when they are living life as they normally do, and attach values to these conditions. In this sense WV is more akin to a revealed preference technique. This has an additional advantage of eliminating focusing illusion issues (where people overstate the value they hold for the good being valued because they are asked to focus specifically on it for the purpose of the survey), by assessing the importance of a factor in someone's life without having to ask them to attribute a value to that factor.

A disadvantage of the WV approach is that it heavily relies on statistical analysis, which when employed on non-experimental data makes it difficult to assess cause and effect. The essential step in WV involves estimating the causal impact on subjective wellbeing of the non-market good or service in question and of income (which, as we will see, allows wellbeing impacts to be translated into monetary terms). This involves a number of problems, including selection bias, reverse causality and measurement error.

A common outcome is that values estimated using WV tend to be too high because the income coefficient (the impact of income on life satisfaction) is lower than the true impact of income on people's life satisfaction, because income is strongly correlated with other factors which also improve wellbeing, such as education and health (Dolan et al., 2008; Powdthavee and van den Berg, 2011).

It can also be difficult to pinpoint accurately the results in the statistical analysis. For example, a positive association for living near a park or green space could be used to value

access to the park using WV, but it could have many other interpretations too. It has been shown previously that park and greenspace coverage is associated with more affluent and less deprived areas (Ambrey and Fleming, 2014; White et al., 2013). Indeed, The Institute of Health Equality (IHE), 2014 found an unequal distribution of parks and green spaces and states "the most affluent 20% of wards in England have five times the amount of green space as the most deprived 10%". Therefore, both distance to and usage of a specific park or green space is likely to be inflated to some extent by local area affects (the wider neighbourhood quality) as they impact on wellbeing.

In addition, there may be a selection effects, whereby people who use their local park or green space more often are already those who are happier or more satisfied with their lives to begin with. For instance, park and green space users may:

- › **Be more physically active and healthy**
- › **Engage more in the natural environment**
- › **Have stronger connections to their friends and family**
- › **Have more leisure time**

All of these factors are strongly related to higher levels of wellbeing (Dolan et al., 2008; Helliwell, 2003; Kahneman et al., 2003). Consequently, our wellbeing value associated with frequent use of parks and green spaces may be subject to endogeneity due to selection bias, meaning that the size of the wellbeing impact associated with our outcome of interest (park or green space usage) could be inflated (we discuss these issues further in Section 8).

11.2.5 Health Values

Parks and green spaces also contribute to society through their positive impacts on health. Health outcomes are commonly measured through surveys of individuals' self-reported general health (Grant et al., 2009; Strine et al., 2008). Health is commonly measured for NHS policy evaluation using Quality Adjusted Life Years (QALY)⁶³ and the same method has been applied to valuing the health benefits of exposure to parks and green space (Mourato et al., 2010).

There are two ways to detect evidence of the benefits of parks and green spaces on individuals in the population: Exposure and direct use.

Green space coverage is used as an indicator of exposure to green space within a person's local area (Ambrey and Fleming, 2014; Bertram and Rehdanz, 2015; White et al., 2013). This method assumes that a higher proportion of greenspace at the local level is linked to both the diffuse benefits that green spaces provide (in terms of cleaner air, visual amenity), as well as improved access to parks and greenspace which lead to direct use values (such as the

associated improvements in physical and mental health). Proportional coverage is also able to capture the benefits of parks and green spaces in local areas that people may walk through on their way to work or school.

The disadvantage of the green space coverage approach is that its precision depends on how green space is defined. Within UK government datasets, green space coverage is evaluated using satellite maps which are unable to distinguish between public and private green space.⁶⁴ Proportion of private green space (gardens etc) is an indicator of living in a more prosperous area, which itself is expected to be strongly associated with wellbeing. As such green space coverage studies to date provide a blunt instrument for capturing the benefits of publicly accessible green space.

Of more interest to the question of how green space directly impacts on wellbeing is evidence of the actual usage of parks and green space. Data on frequency of use can be used to assess the statistical association between

⁶³ QALY values are based on an underlying contingent valuation of the EQ-5D questions, which assess health states on five different dimensions people consistently identified as having the biggest impact on health-related quality of life: whether a patient was mobile, whether they could look after themselves, to what extent they could do the things they usually did, how much pain or discomfort they were in, and how much anxiety or depression they were suffering from. ⁶⁴ In July 2017, the Ordnance Survey released greenspace coverage data which allows for this distinction. We are not aware of any studies that have exploited this data source yet.

use of publicly accessible green space provides and the welfare improvements it provides, reported as either their willingness to travel to it, willingness to pay to access or support it, or associated levels of health and wellbeing (White et al., 2017). This is the approach that we apply in the present study.

The above section highlights a number of comparative advantages and disadvantages associated with non-market valuation approaches which precludes any prior judgement on which works 'best' when applied to the valuation of publicly accessible greenspace. Previous research has found that subjective wellbeing is more suitable to measuring long term impacts and emotional benefits (confidence, self-esteem, sense of achievement) whereas stated preference and revealed preference are

more appropriate to more short-term events, visits, moments e.g. a visit to a museum (Bakhshi et al., 2015). Revealed preference methods are commonly used for valuing housing, labour and recreation data, but are reliant on the suitability of the proxy market chosen and are unable to capture the total economic value of non-market goods (Fujiwara and Campbell, 2011). We note that CV and WV provide two distinct ways of estimating economic value based on two substantively different approaches to measuring human welfare: preferences and SWB respectively. As such, we would not expect them to give the same results – for example, it may be that people desire things that do not impact positively on their SWB, or else do not factor in the wider non-use benefits that parks and green spaces provide (for instance, to their air quality and psychological mood).

11.3 Primary Survey Instrument and Analysis Approach

SCREENER

The survey instrument used in the study is included below, a full copy is available on request.

You are invited to participate in an online survey on parks, green spaces and playing fields in your local area. This research project is being conducted by Simetrica on behalf of Fields in Trust.

Your participation in this survey is voluntary. You may refuse to take part in the research or exit the survey at any time.

The survey will take approximately 10 minutes. Your responses will be kept confidential and we do not collect

identifying information such as your name, email address or IP address.

This data will be used only for this research. We will store this data only for the time necessary for the analysis.

Clicking on the "I agree" button below indicates that:

- › you have read the above information
- › you voluntarily agree to participate
- › you are at least 16 years of age

I agree

I disagree

The following questions will give you the opportunity to tell us more about you before we start. Please answer openly and truthfully.

Are you currently resident in the UK?

- Yes No
 Rather not say

What is your age group?

- Under 16 16-19
 20-24 25-29
 30-34 35-39
 40-44 45-49
 50-54 55-59
 60-64 65-69
 70-74 Over 75
 Rather not say

What is your gender?

- Male Female
 Other Rather not say

Where about in the UK are you currently living?

- North East
 North West
 Yorkshire and the Humber
 West Midlands
 East Midlands
 South West
 South East
 East of England
 London
 Wales
 Scotland
 Northern Ireland
 Rather not say

Would you describe the place you currently live as:

- Rural (village or hamlet)
 Suburban (edge of a town or city)
 Urban (inner town or city)
 Don't know / rather not say

GENERAL PARK

In this survey, we are interested in how you value parks and green spaces around you. We would like to ask you some questions about the place you live and your use of publicly accessible greenspace.

We consider as public greenspace: any public park (including those with a children’s playground or formal sports facilities), other greenspace areas that are publicly managed (for example managed wildflower meadows, nature reserves), pocket parks or children’s playgrounds, sports fields open to the public. Note, this does not include national parks, private agricultural fields, private sports clubs, coastal beaches, or paths and public rights of way (e.g. coastal or river paths).

Thinking of the above definition, do you have any publicly accessible park, greenspace, or public sports field within your immediate local area (e.g. around 1km distance, or 20 mins walk from your house).

- Yes
- No
- Don’t know / Rather not say

How many public parks, green spaces, or sports fields are located near you (around 1km from your house)?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10+

Have you visited any of these publicly accessible green spaces in the past 12 months?

- Yes
- No
- Don’t know / Rather not say

USAGE

Please choose the one public park, greenspace, or sports field that you most commonly use, within this 1km distance from your house. Please tell us the name of this publicly accessible greenspace. If you do not know the name, simply write “local park”.

Remember, that this should not include national parks, private agricultural fields, private sports clubs, coastal beaches, or paths and public rights of way. This should be one of the parks located around 1 km from your house, and should be the publicly accessible greenspace that you most commonly use.

Now thinking about the last 12 months, how often, on average, have you visited:

- More than once per day
- Every day
- Several times a week
- Once a week
- Once or twice a month
- Once every 2-3 months
- Once or twice
- Never

Is ----- visible to you:

- From your home
- On a common route to work / school / other journey

Not visible unless specifically travelling to

Don’t know / rather not say

Do you have to pay to access

- Yes
- No
- Don’t know / Rather not say

How much do you pay, as an individual, per visit to ----- ?

How would you describe

----- ?

Please select the single most appropriate description below:

- Public park
- Sports / playing field open to the public
- Open greenspace (publicly managed)
- Nature reserve / wildflower meadow
- Town / village green
- Pocket park / children’s playground
- Other

Please provide a description of

----- ?

**How do you usually travel to
from your house?**

- Car
- On foot
- Bicycle
- Public transport
- Other

If answer is "Other" please specify other form of transport:

**How long do you usually travel to
get to**

- Less than 5 minutes
- 5-10 minutes
- 11-20 minutes
- 21-30 minutes
- More than half an hour

How big is

**Please provide an estimate of how
long it takes to walk around or
through the park or greenspace.**

- Very small
(under 5 minutes to walk around/through)
- Small
(5-10 minutes to walk around/through)
- Medium
(10-20 minutes to walk around/through)
- Large
(20-40 minutes to walk around/through)
- Extremely large
(40+ minutes to walk around/through)

**Which of the following features are
present in**

Please select all that apply.

- Open fields
- Formal gardens / flower beds
- Trees, woodland or forest
(including community woodland)
- Water feature (e.g. lake, pond, fountain)
- Heritage feature / historic building
/ archaeology
- Path, cycleway or bridleway
- Wildflower meadow / nature reserves
- Cemetery
- Scenic feature / viewpoint
- War memorial
- None of the above
- Don't know / rather not say

**Which of the following facilities are
present in**

Please select all that apply.

- Sports fields/facilities e.g. sports
pitches, courts, greens, wickets
- Children's playground
- Bar / cafe / restaurant
- Pavilion / bandstand / performance
stage / village hall
- Toilets
- Community growing space /allotments
- Dog park (fenced off)
- Green gym
- None of the above
- Don't know / rather not say

**Which of these facilities have you
used in the past 12 months?**

- Sports fields/facilities e.g. sports
pitches, courts, greens, wickets
- Children's playground
- Bar / cafe / restaurant
- Pavilion / bandstand / performance
stage / village hall
- Toilets
- Community growing space /
allotments
- Dog park (fenced off)
- Green gym
- None of the above
- Don't know / rather not say

**How would you describe the landscape
or geography that most accurately
describes**

**his should be the dominant land use
type that can be found at the site.**

- Semi-natural grassland
- Mountains, Moorland and heaths
- Open waters, wetland and floodplains
- Woodland
- Managed parkland
- Mixed woodland and grassland
- Don't know / rather not say

**Does
have a Green Flag award?**

(this is a Green Flag that is flown in some part of the site
to recognises well-managed parks and green spaces)

- Yes
- No
- Don't know / Rather not say

PURPOSE

**In general, for what purpose do you
visit**

- Personal recreation
(e.g. walking, rambling)
- Walking the dog
- Personal sport / exercise
(e.g. running, green gym, using
facilities for individual sports)
- Children's sporting activities
- To enjoy wildlife / be in a natural
environment
- Relaxation (e.g. sit and think, read,
listen to music)
- Meet friends (e.g. see people
for a chat/coffee)
- Team sports (e.g. football, tennis, cricket)

- Bringing children to the park
(e.g. children's play area)
- Picnic / eating lunch
- To volunteer / help out /
Park Friends Group
- As a short-cut
- To pass the time
- Other
- Don't know / rather not say

**If answer is "Other" please specify
your primary purpose for visiting?**

**Do you participate in Park Run
(in any park)?**

- Yes, as a runner

- Yes, with a child (Junior Park Run)
- Yes, as a volunteer
- No

**Thinking of who accompanies you
when you visit, are you most commonly:**

- On your own
- With child / children
- With other family members
- With friend / friends / partner
- Going to meet other park users
- As part of an organised group
(eg school, wildlife group)
- With a sports team / group
(e.g. jogging group / walking club)
- Other

Do you perform any regular physical exercise at your local park? By regular exercise, we mean at least once a week.

- Yes
- No
- Don't know / Rather not say

Do you perform any regular physical exercise at a location other than your local park? This may include a gym or organised sport centre.

- Yes
- No
- Don't know / Rather not say

Have you helped out / volunteered at all in relation to _____ in the last 12 months?

- Yes
- No
- Don't know / Rather not say

If answer is "Yes" please say what kind of volunteering was involved:

- Monitoring / conserving its wildlife
- Planting trees / flowers
- Organised groups or events
- Volunteered in sport
- Volunteered in school / children's activities

- Cleaning / picking up litter
- Repairing fences / buildings/ other buildings
- Park Run
- Other

Overall, how satisfied are you with the quality of _____?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied
- Don't know / rather not say

AGREEMENT

We would like to know how much you agree or disagree with the statements.

Thinking of your last visit to _____, how much do you agree or disagree with the following statements?

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| It made me feel calm and relaxed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It made me feel more active | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It made me feel happier | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It made me feel connected to nature | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It made me feel connected to my community | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How much do you agree or disagree with the following statements?

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Spending time out of doors (including my own garden) is an important part of my life | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am concerned about damage to the natural environment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There are many parks and green spaces I may never visit but I am glad they exist | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Having publicly accessible green spaces close to where I live is important | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Are you a member of any park, community, or environmental organisation?

- Member of a local park group
- Member of the National Trust or English Heritage
- Member of local community group
- Member of other park, community, or environmental organisation
- None of the above

Public spending is allocated to several areas. In your opinion, what are the TOP 5 areas where public funds should be spent?

Select 5 or "Don't know / rather not say"

- Education
- International aid/development
- Sport
- Environment

- Defence
- Health care
- Transport
- Arts, culture and heritage
- Public order and safety
- Housing
- Community / local government
- Don't know / rather not say
- The economy
- Pensions

HEALTH AND SWB

We would like to ask some questions about your feelings on aspects of your life.

For each of these questions I'd like you to give an answer on a scale of 0 to 10, where 0 is 'not at all' and 10 is 'completely'.

Overall, how satisfied are you with your life nowadays?

| | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> |

Overall, how happy did you feel yesterday?

| | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> |

Overall, how anxious did you feel yesterday?

| | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> |

Overall, to what extent do you feel that the things you do in your life are worthwhile?

| | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> |

WTP ALL

We will now provide you with information about the publicly accessible parks and green spaces in your local area (defined as your local council area). We will then ask a separate set of questions about

There are more than 20,000 public parks and open green spaces in Britain. These range from traditional public parks and gardens with many facilities and amenities, to village greens, small neighbourhood parks, playgrounds, sports fields and patches of publicly managed urban greenspace.

Evidence shows that access to greenspace is positive for physical health and mental wellbeing: The benefit of doing exercise in a natural environment is often greater than the same activity indoors. Time spent relaxing outside can improve wellbeing and reduce the negative effects of urban noise and traffic. Access to public parks and green spaces contributes to local communities by providing a venue for events and festivals, as well as a place to meet neighbours and for children to play. Parks and green spaces provide wildlife habitats supporting many species of trees, plants, and wildflowers and the pollinators, such as bees, that rely on them. Parks and greenspace improve air quality and can provide natural drainage which helps prevent flooding, while wooded areas provide important carbon storage, reducing the impacts of climate change.

How familiar, if at all, were you with this information beforehand?

- | | |
|--|--|
| <input type="checkbox"/> Not familiar at all | <input type="checkbox"/> Slightly familiar |
| <input type="checkbox"/> Moderately familiar | <input type="checkbox"/> Very familiar |
| <input type="checkbox"/> Extremely familiar | |

Public parks and green spaces are currently funded by local councils, who maintain them, ensure they are kept free of dog excrement and litter, and keep children's playgrounds repaired and in service.

Parks and green spaces are not a statutory service that local authorities are legally obliged to provide. Funding cuts have led to a significant decline in their quality in recent decades.

The State of UK Public Parks report (State of UK Public Parks, 2016) found that 92% of park managers had seen budget cuts over the past three years and 95% were expecting more reductions to their budgets over the next three years.

Parks are also at threat of closure and redevelopment: 50% of park managers reported that they had sold parks and green spaces or transferred their management to others over the last three years.

The difficult financial situation has meant that many local authorities in the UK have suffered cuts in funding while having to cope at the same time with increases in maintenance and operating costs. In the unlikely event that funding ceases to be provided, parks and green spaces in your

local area would need to find alternative ways to support their activities and secure their long-time future.

For the next set of questions, please imagine a situation where local government funding for parks and green spaces in your local council area has been cut. If continued funding cannot be secured, then the quality of all parks and public greenspace would deteriorate, some would have to be closed to the public, and in the worst cases the land would be sold for private development.

To protect public parks, green spaces, and sports fields from degradation and to prevent their conversion to private development, an independent organisation would be created to maintain, manage, and preserve the public parks and green spaces in your local area. The organisation would be regulated by the local council and operated in a not-for-profit way with all funding used for management and preservation of all parks and greenspace in your local area in perpetuity (i.e. if payments stopped at any point in the future, the parks and green spaces would be at risk of closure).

In this situation, we would like to ask you how much the publicly accessible parks and greenspace in your local area would be worth to you and your family, if anything.

Do you feel you can promise us to answer the questions that will follow as truthfully as possible?

- Yes, I promise to answer the questions in the survey as truthfully as possible
- No, I cannot promise this

Would you be prepared to pay a monthly subscription to support the maintenance and protection of the public parks and green spaces in your local council area, even if only a small amount?

- Yes
- Maybe
- No

What is the maximum you would be willing to pay for your household, as a monthly subscription to an independent not-for-profit organisation, to support the maintenance and protection of public parks and green spaces in your local council area? This payment would be used to maintain the public parks and greenspace in your local area, keep them open to the public, preserve their environmental quality, and protect them from private development in perpetuity. You could cancel the subscription at any time.

Studies have shown that many people answering surveys such as this one say they are willing to pay more than they would actually pay in reality. So please think about this question as if it were a real decision and you were actually making a payment for real. In answering this question, please focus solely on how much public parks and greenspace in your area are worth to you, if anything. This may include the direct benefit you get from the parks and greenspace in your area, as well as the value you place in the natural environment there.

Please be realistic – consider your household budget and remember that there may be other things you would like to

spend your money on, including supporting other parks and green spaces. Please do not agree to pay an amount if you think you cannot afford it, if you feel you have paid enough already, or have other things to spend your money on, and other ways to fund the maintenance of parks and greenspace.

- £0.00
- £0.01
- £0.05
- £0.10
- £0.25
- £0.50
- £0.75
- £1.00
- £1.50
- £2.00
- £2.50
- £3.00
- £3.50
- £4.00
- £5
- £6
- £7
- £8
- £9
- £10
- £11
- £12
- £15
- £18
- £20
- £22
- £25
- £30
- £40
- £50
- £60
- £75
- Other amount
- Don't know / rather not say

If answer was "Other amount (£)" please specify?

How certain are you that you would really pay this subscription amount if asked?

Please indicate as a percentage where 0% is 'not at all certain' and 100% is 'completely certain'.



Which of the reasons below best describes your being prepared to pay a subscription to support the public parks, green spaces and sports fields in your area? (Choose one only)

- I like visiting/I enjoyed my visits to parks in my area
- Visiting park or green spaces is an important part of my everyday life
- I think visitor enjoyment and/or the facilities offered at parks in my area could be improved if they had more funds
- Parks in my area are important sites of environmental value that should be protected
- I don't believe that I would really have to pay
- Other (please specify) _ _ _ _ _
- Don't know

People have different reasons for saying they would not be willing to pay to support their local parks / green spaces.

Which of the reasons below best describes why you chose not to pay? (Choose one only)

- I have more important things to think about than parks and green spaces
- I cannot afford to pay to maintain parks and green spaces
- I think parks and green spaces should be free for all, I don't agree with charging the public
- I am already contributing to parks and green spaces through my taxes
- I need more information to answer this question
- I do not feel confident stating a value that I would be willing to pay in the current uncertain political climate
- I would rather pay additional council tax to support and maintain parks and greenspace
- Other (please specify) _ _ _ _ _
- Don't know

WILLINGNESS TO PAY - NEAREST

In this next section we would now like to ask you some questions specifically about _____

In an alternative scenario, imagine that funding was only removed for your local park or greenspace

All other parks in the area would continue to be funded as normal.

If continued funding for

_____ cannot be secured, then the quality of the site would deteriorate, it may have to be closed to the public, and the land put at risk of sale for private development.

In the situation that local government funding for

_____ has been cut, an independent organisation would be created to maintain, manage, and preserve it.

The independent organisation would be responsible only for _____

to prevent its deterioration in quality (of facilities and the natural environment), and protect it from closure and sale for private development.

The organisation would be regulated by the local council and operated in a not-for-profit way with all funding used for management and preservation of

_____ in perpetuity (i.e. if payments stopped at any point in the future, _____ would be at risk of closure).

All other parks in your local area would remain open and continue to be managed as they are now.

In this situation, we would like to ask you how much

_____ would be worth to you and your family, if anything.

Do you feel you can promise us to answer the questions that will follow as truthfully as possible?

- Yes, I promise to answer the questions in the survey as truthfully as possible
- No, I cannot promise this

If you were given the choice, would you be prepared to pay a monthly subscription to support the maintenance and protection of _____ even if only a small amount?

- Yes Maybe No

What is the maximum you would be willing to pay for your household, as a monthly subscription to support the maintenance and protection of

_____ This payment would be used to maintain

_____ only, to keep it open to the public, preserve its environmental quality, and protect it from private development in perpetuity. This is a completely separate question to any previous payments you indicated you would pay. You could cancel the subscription at any time.

Studies have shown that many people answering surveys such as this one say they are willing to pay more than they would actually pay in reality. So please think about this question as if it were a real decision and you were actually making a payment for real.

In answering this question, please focus solely on how much

_____ is worth to you, if anything.

This may include the direct benefit you get from using the park, as well as the value you place in the natural environment there.

Please be realistic – consider your household budget and remember that there may be other things you would like to spend your money on.

Please do not agree to pay an amount if you think you cannot afford it, if you feel you have paid enough already, or have other things to spend your money on, and other ways to fund the maintenance of parks and greenspace.

- £0.00 £0.01 £0.05 £0.10 £0.25 £0.50
- £0.75 £1.00 £1.50 £2.00 £2.50 £3.00
- £3.50 £4.00 £5 £6 £7 £8
- £9 £10 £11 £12 £15 £18
- £20 £22 £25 £30 £40 £50
- £60 £75 Other amount
- Don't know / rather not say

If answer was "Other amount (£)" please specify?

How certain are you that you would really pay this subscription amount if asked?

Please indicate as a percentage where 0% is 'not at all certain' and 100% is 'completely certain'.



Which of the reasons below best describes your being prepared to pay a subscription to support

(Choose one only)

- I like visiting / I enjoyed my visit to
- Visiting is an important part of my everyday life
- I think visitor enjoyment and/or the facilities offered at could be improved if it had more funds
- is an important site of environmental value that should be protected
- I don't believe that I would really have to pay
- My willingness to pay is not just for visiting but also an expression of my support for all public parks and green spaces in my area
- is already run by volunteers
- Other (please specify)
- Don't know

People have different reasons for saying they would not be willing to pay to support their local park or greenspace.

Which of the reasons below best describes why you chose not to pay? (Choose one only)

- I have more important things to think about than
- I cannot afford to pay to maintain
- I do not think is of good enough quality to deserve my donation
- I think parks and green spaces should be free for all, I don't agree with charging the public
- I am already contributing to parks and green spaces through my taxes
- I need more information to answer this question
- I do not feel confident stating a value that I would be willing to pay in the current uncertain political climate
- I would rather give up my time to help manage the park than donate
- I would rather pay additional council tax to support and maintain
- Other (please specify)
- Don't know

DONATE TIME

In the scenario above, if continued funding for was removed, and an independent organisation created to maintain, manage, and preserve the park, we asked if you would be willing to pay a subscription to support the maintenance of the park.

Imagine that you could also volunteer some of your time on top of your monetary donation.

Would you be willing to volunteer some of your time each month to help support and maintain

- Yes, I would be willing to donate some of my time, in addition to the monthly subscription
- No, I would not be willing to donate any of my time to the management of the park

In the scenario above, if continued funding for was removed, and an independent organisation created to maintain, manage, and preserve the park, we asked if you would be willing to pay a subscription to support the maintenance of the park. Imagine that you could volunteer some of your time to help manage and maintain the park, which would keep it open to the public, preserve its environmental quality, and protect it from private development in perpetuity.

Would you be willing to volunteer some of your time each month to help support and maintain

- Yes, I would be willing to donate some of my time to the management of the park
- No, I would not be willing to donate any of my time to the management of the park

How many hours per month do you think you would be willing to volunteer to help manage and maintain

- 0 1 2 3 4 5 6 7 8
- 9 10 11-15 16-20 More than 20
- Other amount Don't know / rather not say

DEMOGRAPHICS

We would like to ask you a few questions about yourself to help us understand the profile of our respondents. The survey is anonymous, and all information provided is strictly confidential. It will be used for statistical purposes only.

How many children under the age of 16 live in your household?

- No children 1 child 2 children
 3 children 4 children 5 children
 6 children 7 children 8 children
 9 children 10 or more children
 Rather not say

Of those children living in your household, how many are aged under 5 years old?

- No children 1 child 2 children
 3 children 4 children 5 children
 6 children 7 children 8 children
 9 children 10 or more children
 Rather not say

What is your legal marital status?

- Single and never married or never in a legally recognised Civil Partnership
 Married
 A Civil Partner in a legally recognised Civil Partnership
 Separated but legally married/ in a civil partnership
 Divorced/dissolved civil partnership
 Former Civil Partner
 Widowed/ surviving civil partner
 Co-habiting Rather not say

What is your highest educational level or qualification?

- No formal educational qualifications
 Primary education O level/GCSE/GCE
 A level/HNC/HND/etc Professional qualification
 College/University degree
 Higher degree (Master's, Doctorate)
 Rather not say

Which of the following best describes your current work status?

- Self-employed
 Employed full-time (>30hrs/week)
 Employed part-time
 Student
 Looking after the family/home
 Retired from paid work
 Temporarily sick or injured
 Long-term sick or disabled
 Unemployed
 Rather not say

What is your ethnicity?

- Asian / Asian British
 Black / African / Caribbean / Black British
 Mixed / Multiple ethnic groups
 White British
 White Other
 Other ethnic group
 Rather not say

In general, would you say your health is...

- Excellent
 Very good
 Good
 Fair
 Poor
 Rather not say

Do you consider yourself to be a disabled person?

- Yes
 No
 Don't know/rather not say

Which of the following best describes your total annual household income before tax?

- £0–14,999
 £15,000–19,999
 £20,000–29,999
 £30,000–39,999
 £40,000–49,999
 £50,000–59,999
 £60,000–79,999
 £80,000–99,999
 £100,000–£149,999
 £150,000 +
 Rather not say

Do you have any outdoor space (e.g. a garden/yard) within your property (the house you rent or own)?

- Yes, private outdoor space
 Yes, shared outdoor space
 No outdoor space

How would you describe this outdoor space?

- Mostly green (lawn, trees, plants)
 Mostly covered surface (driveway, patio, or yard)
 Mixed (green and covered surface)
 Don't know/rather not say

How often do you usually see or get in touch with friends?

- Most days
 At least once a week
 At least once a month
 Less often than once per month

Please could you provide the first half of your postcode (e.g. L23)?

This information will be used for analysis purpose only, to check the representativeness of our sample. The survey is anonymous and you will not be re-contacted. This information is entirely confidential.

GENERAL HEALTH QUESTIONS

Finally, we would like to ask some questions about your feelings on aspects of your life. There are no right or wrong answers. For each of these questions I'd like you to give an answer on the scale provided.

Have you recently been able to concentrate on whatever you're doing?

- More than usual
- Same as usual
- Less than usual
- Much less than usual
- Rather not say

Have you recently lost much sleep over worry?

- Not at all
- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently felt that you were playing a useful part in things?

- More than usual
- Same as usual
- Less so
- Much less
- Rather not say

Have you recently felt capable of making decisions about things?

- More than usual
- Same as usual
- Less so
- Much less
- Rather not say

Have you recently felt constantly under strain?

- Not at all

- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently felt you couldn't overcome your difficulties?

- Not at all
- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently been able to enjoy your normal day-to-day activities?

- More than usual
- Same as usual
- Less so
- Much less
- Rather not say

Have you recently been able to face up to problems?

- More than usual
- Same as usual
- Less so
- Much less
- Rather not say

Have you recently been feeling unhappy or depressed?

- Not at all
- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently been losing confidence in yourself?

- Not at all
- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently been thinking of yourself as a worthless person?

- Not at all
- No more than usual
- Rather more
- Much more
- Rather not say

Have you recently been feeling reasonably happy, all things considered?

- More than usual
- Same as usual
- Less so
- Much less
- Rather not say

Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?

- Most people can be trusted
- Can't be too careful
- Depends
- Don't know / rather not say

FIELDS IN TRUST

Have you heard of Fields in Trust before? (Fields in Trust are a national charity which safeguards recreational spaces and campaigns for better statutory protection for green spaces)

- Yes
- No
- Don't know / rather not say

Is your local park

managed by Fields in Trust?

- Yes
- No
- Don't know

Would you like to provide any final comments?

11.4 Biases and Order Effects

TABLE 11.1 COMMON BIASES IN CONTINGENT VALUATION SURVEYS

| Bias | Problem | Cause | Value type most affected | Remedies |
|------------------------|---|--|--------------------------|---|
| Hypothetical bias | Systematic overstatement of WTP | Valuing distant, complex & unfamiliar goods & services, where people may not have well-defined prior preferences | Non-use | -Entreaties -Budget & substitute reminders -Uncertainty filters -Adequate information provision |
| Insensitivity to scope | Stated welfare measures do not vary proportionally to the scope of the provided benefit | Poorly designed and administered surveys: -Use of vague descriptions of the good -Failure to adequately convey information | Use | Top-down approach: Respondents first asked to value the larger good/service, and subsequently asked to allocate a proportion of that value to the smaller component goods/services |
| Framing bias | -Implausible/unrealistic scenarios -Substitutes not explicitly stated in the survey | Accuracy & plausibility of scenarios inadequate to engage respondents in revelation of truthful preferences | Use / non-use | Use of reminder statements to ensure that respondents give full consideration to substitute goods Online surveys: -Presentation of information -Tailor information to respondents' needs -Measure time spent reading information -Test understanding -Enable use of images, film, sound |
| Focussing bias | People focus only on the salient aspects of the good/service in preference elicitation and this may not reflect in how people would actually experience these conditions or states in real life | What respondents focus on in preference question is not what they would focus their attention on in actual experience, where lots of other phenomena vie for attention | Use / non-use | Surveys should not over-emphasize the importance of each service -Parks and green spaces should be discussed in the wider context of people's lives and experiences |

11.5 Analysis

11.5.1 Estimation of Willingness to Pay Values

We calculate non-parametric mean and median WTP values across the survey sample, and within subgroups of user types and socio-demographic backgrounds. Those who say they would not be willing to pay in principle for each question are indicating that they do not value parks and green spaces enough to make a payment to support their continuance, and so we consider these individuals to have made a £0 bid in the estimation of mean WTP (as standard in contingent valuation; Bakhshi et al., 2015; Bateman et al. 2002). This ensures that those who do not hold any value in the non-market good are included in the estimation process, and helps to avoid unrealistic and overestimated mean WTP figures.

We calculate non-parametric mean and median WTP values from the mid-point between the amount chosen on the card and the next amount up.⁶⁵

We investigate how WTP values for parks and green spaces vary by different socio-demographic groups, park or green space usage, and attitudes towards publicly accessible greenspace, using multivariate regressions.

The following regression model was used as the base for all the WTP analyses:

$$\text{EQUATION 1: } WTP_i = \alpha + \beta_1 X_i + \epsilon_i$$

where WTP_i is the amount the individual i has stated they are willing to pay, α is the deterministic factor and ϵ is the error term containing unobserved factors that determine Willingness to Pay. In X_i we control for the observed determinants of Willingness to Pay (Bateman et al. 2002).

These include those that are theoretically expected to affect WTP (such as income) as well as other factors that are known from the literature to have an effect (e.g. positive attitudes towards parks and the natural environment). This allows us to verify that WTP is associated with theoretically consistent drivers of value in ways that accord with prior expectations and previous findings from the literature (Bateman et al. 2002). In the final analysis, we aggregate the annual WTP figure by multiplying it by the UK adult population (53.2million).

⁶⁵ Use of payment ladder elicitation approach means that for a person who, say, chose the value £10 (when the next value is £15) we can say that they are willing to pay £10 but not £15. However, we do not know where their willingness to pay sits in between the end points of £10.00 to £14.99. To address this Bateman et al. (2002) recommends using the mid-point, i.e. in this case this would be £12.50.

11.5.2 Social Welfare Weighting

Where there are substantial differences in income between different societal groups, HM Treasury's Green Book recommends using welfare weights (also known as distributional weights) to adjust the mean WTP values of these groups to account for the diminishing marginal utility of income (see Section 5.2). Fujiwara (2010) provides a full methodological description of welfare weights. In short, this guidance states that welfare weights are calculated by taking the median household income of the UK (taken from ONS 2016 data)⁶⁶ and dividing it by an individual's income.

An individual's stated WTP is then multiplied by their welfare weight to provide a set of 'welfare weighted WTP values', which are equalised by income, for use when comparing the welfare benefits that parks and green spaces provide to different groups in society. WTP values from lower income groups will receive a higher welfare weight. This allows policy recommendations to target interventions to the groups which will benefit from the greatest increases in welfare; irrespective of spending power.

11.5.3 Preference-Based Valuation: Statistical Methodology (adapted from Bakhshi et al., 2015)

The preference satisfaction account of welfare states that "what would be best for someone is what would best fulfil his desires" (Parfit, 1984, p.4). It rests on a set of rationality assumptions.⁶⁷ These assumptions allow us to map choices over a number of binary options on to a well-defined utility function which demonstrates that people behave as if they are maximising some utility function. Through these rationality assumptions preference satisfaction and welfare become synonymous with each other.

Traditional economic theory holds that utility is not observable, but measures of welfare change and monetary value can in theory be elicited from the expenditure function as follows.

The individual's primary problem is to find the solution to the (direct) utility function:

1 $\max_x U(X, Q)$

which is to find the optimal level of consumption of market goods (X) to maximise utility (U) given a budget constraint and a certain level of non-market goods provision ($Q=Q^0$). Under the duality principle the indirect utility function derived from the direct utility function can be represented through the expenditure function:

2 $E=E(p_x, Q, U')$

which shows how expenditure changes as a function of the prices of market goods and provision of the non-market good, such that the individual continues to maximise utility, U' .

The expenditure function circumvents the problem of unobservable utility as it allows us to calculate the amount of money we need to give or take away from the individual to make her equally well-off after the policy or provision of the non-market good. This is the difference ($E_{post} - E_{pre}$), where E_{post} = the level of expenditure after the change in the non-market good (here assume the quality or quantity of the non-market good has decreased) and E_{pre} = the level of expenditure before the change in the non-market good. Thus, in this example the difference ($E_{post} - E_{pre}$) is the amount of money required to compensate the individual for the drop in the non-market good.

Under different formulations of the expenditure function, the difference ($E_{post} - E_{pre}$) is the CS or ES of the change in Q . CS and ES are often rephrased in terms of **Willingness to Pay (WTP) or Willingness to Accept (WTA)** and Table 11.2 describes the relationship between these concepts of value.

TABLE 11.2 THE RELATIONSHIP BETWEEN CS, ES, WTP AND WTA

| | Compensating Surplus (CS) | Equivalent Surplus (ES) |
|--------------|-----------------------------|-----------------------------------|
| Welfare gain | WTP for the positive change | WTA to forego the positive change |
| Welfare loss | WTA the negative change | WTP to avoid the negative change |

⁶⁶ www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/adhoc/006868grosshouseholdincomebyincomebandfinancialyearending2016

⁶⁷ These assumptions are (i) completeness (individuals are able to express a preference for any good or say they are indifferent between any pair of goods); (ii) transitivity (individuals who prefer (or are indifferent to) good x over good y, and who prefer (or are indifferent to) good y over good z, must also prefer (or be indifferent to) x over z); and (iii) reflexivity (individuals are indifferent between x and x). Note that for the purposes of valuation we need to add two further assumptions (Freeman 2003): (i) non-satiation (that preferences are never fully satiated such that the individual always places a positive value on more consumption); and (ii) substitutability (if the quantity (or quality) of one good decreases it is possible to increase the quantity (or quality) of another good sufficiently to make the individual indifferent between the two states of the world).

11.5.4 Health and Wellbeing: Primary Benefits

We perform a number of stages of analysis on the primary survey data, including comparison of results to those found in national-level datasets (MENE).

We undertook multiple regression (ordinary least square (OLS)) analysis to test for statistical associations between park or green space usage and health and SWB. Regression analysis allows us to simultaneously explore a relationship between multiple variables, controlling for many other factors (known as control variables) in the data that may also affect wellbeing. This allows us to isolate the association between changes in a variable of interest, such as use of greenspace, on an outcome, like health or wellbeing. Technically regression analyses capture association, rather than impact or causality, since we cannot exclude the full range of unobserved factors that may have a causal effect on people. Thus, cause and effect relationships are approximated using statistical methods such as regression analysis, as causation cannot be directly inferred. Notwithstanding, multiple regression analysis of the type employed here has been used extensively in the academic and policy evaluation literatures and so the analysis is informative for policy purposes.

The subjective wellbeing/health regression is estimated as:

$$\text{EQUATION 2: } Outcome_i = \alpha + \beta_1 M_i + \beta_2 GSf_i + \beta_3 X_i + \epsilon_i$$

where $Outcome_i$ is a subjective wellbeing variable (life satisfaction; happiness; anxiety; sense of purpose/worthwhile) or general health variable for individual i ; M_i is income; GSf_i is represented by a set of dummy variables for frequency of greenspace engagement in the past year (ranging from never (reference group) to more than once a day); and X_i is a vector of other determinants of life satisfaction.

The main determinants of wellbeing are controlled for (see Fujiwara and Campbell (2011) for review): age, gender, health, income, marital status, education, parental status, employment status, social networks, as well as local area factors which are likely to drive wellbeing, such as whether

the individual has their own private garden, fixed effects for local council area, to pick up differences in the material deprivation or affluence of an area (at a broad geographical range), and the quality of the park or green space, captured through satisfaction with the park or green space. In the general health model, we include a control for those who do regular exercise outside of the park or green space.

We use Equation 2 to compare the results on park or green space usage in our primary survey, to the self-reported general health measures in the MENE dataset.

When investigating health effects, we analyse the two sets of data (MENE and the primary survey) to find out the optimum level of park or green space usage frequency, by estimating models for daily and weekly frequency.

We use three variations of the model in Equation 2, which differ in the way usage of greenspace is defined, as follows:

- 1 The first model contains an indicator variable for each of the seven greenspace use frequency categories, except for "once or twice a year," which is the reference group. For each respondent, at most one of these six indicator variables will be equal to 1. The coefficients are to be interpreted as the average correlation with health of moving from visiting once or twice a year to visiting with the frequency listed in the row heading⁶⁸
- 2 The second model is identical to the above, with $GS_i = 1$ if the respondent visited a park or green space at least once a week and $GS_i = 0$ otherwise. The coefficient is to be interpreted as the average correlation with health of moving from visiting less than once a week to visiting at least once a week.
- 3 The third model is like the second, with the exception that it has $GS_i = 1$ if the respondent visited a park or green space at least once a day and $GS_i = 0$ otherwise. The coefficient is to be interpreted as the average correlation with health of moving from visiting less than once a day to visiting at least once a day.

11.5.5 Wellbeing Valuation

We estimate the health and SWB associated park or green space usage using a variation of the basic model (Equation 2):

$$\text{EQUATION 3: } Outcome_i = \alpha + \beta_1 M_i + \beta_2 GS_i + \beta_3 X_i + \epsilon_i$$

In which GS_i usage is represented by a variable denoting whether the individual has used their local park or green space at least once a month over the past year.

We take the life satisfaction coefficient to estimate the wellbeing associated with park or green space usage, using

the wellbeing valuation method (Appendix 11.6).

This provides an annual value per individual for use of their most commonly used local park or greenspace.

We estimate a per visit value by dividing this figure by the mean visit frequency within the park or green space user subsample. In the final analysis, we aggregate the annual WV figure by multiplying it by the UK adult park or green space using population (taking the proportion of survey respondents who report using their local park or greenspace at least once per month).

⁶⁸Equation 2 transforms into the following: $H_i = \alpha + \beta_1 M_i + \beta_2 \sum_{j=1}^6 Y_{ij} + \beta_3 \sum_{k=1}^m X_{ik} + \epsilon_i$

11.5.6 Health: Secondary Benefits

It is possible to estimate how improvements in general health associated with park or green space usage translate into cost savings to the NHS in terms of reduced GP visit frequency (this method was used previously to value the secondary benefits of libraries in Fujiwara et al., 2015).⁶⁹ The value in terms of savings to the National Health Service (NHS) and the exchequer can be estimated using a logistic version of the

general health regression in Equation 2, which provides a log-odds ratio of an individual reporting good to excellent health if they use their local park or green space once a month or more. This information can be used to assess the extent to which park or green space usage leads to reductions in NHS cost savings noting the assumptions made during the process 7.2.

11.6 Wellbeing Valuation: Statistical Methodology (adapted from Bakhshi et al., 2015)

The premise of the **wellbeing valuation (WV)** approach is to estimate measures of welfare change (compensating surplus (CS) and equivalent surplus (ES)) from data on people's experiences as measured by their SWB.

In WV, SWB is assumed to provide a direct measure of an individual's welfare and hence a key assumption is that welfare is now observable as measured by SWB. This allows us to estimate compensating and equivalent measures of value using the direct utility function (where utility is now some measure of SWB) without recourse to the duality principle and the expenditure function:

1 SWB(Q, M)

Where SWB(.) is a direct SWB function in which Q = the non-market good and M = income. In its most basic format, the value (here CS) of the non-market good in the WV method is estimated as:

2 SWB(Q⁰, M⁰) = SWB(Q¹, M¹ - CS)

Where superscripts 0 and 1 respectively signify conditions before and after provision of the good, Q, which in this exposition is assumed to have a positive impact on utility.

Measures of welfare change can be estimated from the marginal rates of substitution (MRS) between the non-market good and money in the SWB function and this is estimated empirically, by for example using the coefficients from a regression model.

At the simplest level, the CS (or value) of an outcome like park or green space usage can be derived as:

3 CS = β₂ / β₁

Formally, values (CS and ES) can be measured as follows using the WV method. Using the indirect utility function, CS for a non-market good (i.e., a good that has a positive effect on welfare) can be stated as follows

4 v(p⁰, Q⁰, M⁰) = v(p¹, Q¹, M¹ - CS)

where v(.) is the indirect utility function; M = income; Q = the good being valued (ie, visits to the park or green space); p = prices. The 0 superscript signifies the state before Q

is consumed (or without the good) and the 1 superscript signifies the state after consumption (or with the good). In our analysis in this paper Q refers to use of local park or green space.

In practice in WV using an 'observable' measure of welfare (i.e., self-reported wellbeing rather than preferences) it is possible to estimate the marginal rate of substitution between M and Q to measure CS using the *direct utility function* u (.):

5 u(Q, M, X)

where X is a vector of other determinants of welfare (u). Empirically what we measure is:

6 LS(Q, M, X) where LS = life satisfaction.

In other words, we use life satisfaction as the measure of wellbeing or utility. Equation (6) is usually estimated by applying regression analysis to panel or cross-sectional survey data to measure the impact of non-market goods on life satisfaction. Here we use the data collected from the primary survey and run the following life satisfaction function (cross-sectional data):

7 LS_i = α + β₁ln(M_i) + β₂Q_i + β₃X_i + ε_i

where we use a logarithmic format for income to capture the diminishing marginal utility of income.

Substituting equation (7) into (4):

8 LS_i(α + β₁ln(M_i⁰) + β₂Q_i⁰ + β₃X_i⁰ + ε_i) = (α + β₁(ln(M_i¹ - CS)) + β₂Q_i¹ + β₃X_i¹ + ε_i)

and solving for CS gives,

9 CS = M⁰ - e^[ln(M⁰) - β₂ / β₁]

Equation (9) is the derivation of compensating surplus (CS) using a measure of SWB (here life satisfaction). It provides an estimate of the value people place on Q using the WV approach. Here M⁰ is assumed to be sample mean income and the term e[.] accounts for the logarithmic format of the income variable in the income model, which was employed to account for the diminishing marginal utility of income.

The ratio element from equation (3) (β₂/β₁) is retained in (9).

⁶⁹ Using the British Household Panel Survey (BHPS), Fujiwara and Dolan (2014) find that people in good health are 25.4 per cent less likely to visit GPs frequently (six or more times per year). For GP visit costs we use the conservative lower-bound estimate of £192 per hour (or £3.20 per minute). The BHPS data does not provide details of the actual number of visits over the highest visit category (six per year) and so as in Fujiwara and Dolan (2014) we make the simplifying assumption that those visiting GPs six or more times per year visit on average ten times per year. The average length of a GP surgery consultation is 11.7 minutes which works out to a cost of £37 per GP visit.

Fujiwara (2013) and Fujiwara and Dolan (2014) show that there are a number of advantages in estimating the impact of income on SWB separately in a second model (ie, deriving an estimate for β_1 outside of equation (9)). The main technical issue involved in estimating equation (9) is that we have a robust estimate of the causal effect of income and the non-market good (park or green space usage) on life satisfaction. In other words, we require unbiased estimates of β_1 and β_2 . This has been especially problematic for income. The income variable in life satisfaction models suffers from endogeneity due to reverse causality and selection effects and measurement error, which all tend to lead to a downward bias in the income coefficient in models like equation (9). Since the income coefficient acts as the denominator in the calculation of value (as shown in equation (9)), this leads to an upward bias in the value of non-market goods using the WV method. As a result, we have sometimes seen implausibly high values for non-market goods in the WV literature in the past. For example, in some studies the value of employment was estimated to be about £23,000 per month in addition to wage income⁷⁰ and the costs associated with drug and alcohol problems to be around £9 million per year.⁷¹

Estimating the wellbeing impact of income separately allows us to use methods dedicated to establishing the causal effect of income. Here we use data from the British Household Panel Survey (BHPS) on lottery winners to estimate the causal effect of income using an instrumental variable (IV) approach. Instead of incorporating park or green space usage into the IV model for lottery winners, using two separate models permits us to estimate equation (3) for the whole sample (hence maximising sample size for engagement at the cultural institution) and to estimate the income model for lottery players only (hence deriving a more robust estimate of the causal effect of income). This is the Three Stage Wellbeing Valuation (3S-WV) approach (Fujiwara, 2013; Fujiwara and Dolan, 2014), which involves estimating the impact of engagement at the cultural institution on life satisfaction (β_2) from equation (9) and the impact of income on life satisfaction (β_1) separately, but using a nationally representative sample. This is the same WV methodology that we apply in Fujiwara et al. (2014) "Quantifying and Valuing the Wellbeing Impacts of Culture and Sport" for the value of sports and cultural activities and in Fujiwara et al. (2014) "Heritage and Wellbeing" for the value of heritage participation.

A main issue regarding the use of results from two separate models in estimating monetary values is that samples from the different models need to be matched or at least be reasonably similar (which is of course something that comes naturally if the β coefficients in (9) come from the same regression model as in equation (8)). The usage model in equation (8) will be representative of the UK population (see the discussion on sampling frame above). IV methods, however, under two staged least squares (2SLS) do not use data on the whole survey sample as regression methods do. Instead, 2SLS estimates are the causal effect for a generally unidentifiable complier (to the instrument) sub-group, known as the local average treatment effect for compliers. Since we cannot observe who the compliers are here, we cannot say anything about the distribution of their background characteristics, which makes it hard to extrapolate results from our income model to other sample groups.⁷²

We, therefore, use the control function method with the IV rather than 2SLS. With lottery data, the control function derives the sample average effect of income rather than the local average effect. And since, as suggested by (Apouey and Clark, 2009), a large proportion of the UK population play lotteries (about 70%) the results from our income model should be reasonably generalisable. Indeed, we find that when comparing differences in characteristics (such as age, income and educational background) between small to medium-sized lottery winners and the general population there are very few variables that are statistically different. We, thus, assume that the results from the income model and the cultural engagement model (equation (8)) are both representative of the UK population (the BHPS data are also representative of the UK). Hence the results can be used together to estimate the value of visits to the cultural institution in equation (9).

In sum, valuation figures in (9) are estimated using two separate models, whereby the effect of park or green space usage on life satisfaction (β_2) is estimated from a model like (9) or (7) and the effect of income (β_1 in equation (9) or (7)) is estimated separately in the income model to ensure that it has a more robust causal interpretation. A full description and rationale for the approach can be found in (Fujiwara, 2013) and (Fujiwara and Dolan, 2014).

⁷⁰ (Clark and Oswald, 2002). | ⁷¹ (Powdthavee and van den Berg, 2011). | ⁷² It can, however, probably be assumed that there are no 'never-takers' in this IV set-up, which narrows down the external group to which we are extrapolating the LATE.

11.7 Survey Sample Exclusions

TABLE 11.3 EXCLUSIONS FROM SURVEY (BY CATEGORY TYPE)

| Type | Observations |
|-------------------------------------|--------------|
| Initial sample | 4665 |
| Pilot observations | 78 |
| Duplicate GIDs | 8 |
| Survey not completed | 22 |
| Speedsters | 65 |
| Paid parks | 282 |
| Removed from sample | 141 |
| Excluded follow up answers (WTP) | 152 |
| After (including speedsters) | 4098 |
| After (excluding speedsters) | 4033 |

Note: 152 respondents selected "I don't believe that I would really have to pay" as a reason for their stated WTP. We excluded their WTP amounts from analysis. 141 respondents were removed from the sample due to inconsistent/unintelligible answers.

11.8 Detailed Analysis Tables: Willingness to Pay (WTP) Values for Parks and Green Spaces

TABLE 11.4 DESCRIPTIVE STATISTICS: PROPORTION OF RESPONDENTS WILLING TO PAY IN PRINCIPLE

| | i. WTP value for all parks and green spaces in local area | | ii. WTP value for nearest park or green space | |
|--------------|---|-------------|---|-------------|
| | N. | % | N | % |
| Yes | 448 | 11.11% | 737 | 18.27% |
| Maybe | 1868 | 46.32% | 1671 | 41.43% |
| No | 1717 | 42.57% | 1625 | 40.29% |
| Total | 4033 | 100% | 4033 | 100% |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. User defined as used park or green space once a month or more in past 12 months.

TABLE 11.5 WTP VALUES SUMMARY STATISTICS (FULL TABLE)

| | Whole sample | WTP all parks and green spaces in local area: Users | WTP all parks and green spaces in local area: Non-users | Green space: Whole sample | Green space: Users | Green space: Non-users |
|--|-------------------|---|---|---------------------------|--------------------|------------------------|
| N visitors | 3783 | 2472 | 1311 | 3824 | 2497 | 1327 |
| Mean (std. err.) | £2.60 (£0.08) | £3.03 (£0.11) | £1.81 (£0.09) | £2.52 (£0.08) | £2.98 (£0.11) | £1.64 (£0.09) |
| Low 95% | £2.45 | £2.81 | £1.63 | £2.37 | £2.77 | £1.48 |
| High 95% | £2.76 | £3.24 | £1.99 | £2.67 | £3.19 | £1.81 |
| Median | £1.25 | £1.75 | £0.00 | £1.25 | £2.25 | £0.00 |
| Max | £75.0 | £75.0 | £55.0 | £75.0 | £75.0 | £55.0 |
| Zeros (total sample) | 46.4% (1756/3783) | 41.8% (1033/2472) | 55.1% (723/1311) | 43.3% (1656/3824) | 37.3% (932/2497) | 54.6% (724/1327) |
| Zeros (if Yes/ Maybe WTP in principle) | 1.0% (39/3783) | 1.1% (27/2472) | 0.9% (12/1311) | 0.8% (31/3824) | 0.7% (17/2497) | 1.1% (14/1327) |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. User defined as used park or green space once a month or more in past 12 months.

TABLE 11.6 FACTORS ASSOCIATED WITH WILLINGNESS TO PAY VALUES

| | i. WTP values for all parks and green spaces in area | ii. WTP values most commonly visited local park or green space (1km) |
|---|---|---|
| Frequency of park usage in past 12 months (0 = never; 7 = more than once a day) | 0.225*** | 0.199*** |
| Midpoint age | 0.040 | -0.012 |
| Age squared, using age midpoint | -0.000 | 0.000 |
| Gender | 0.084 | 0.103 |
| Log income, using income midpoints) | 0.829*** | 0.801*** |
| BAME | 0.614 | -0.040 |
| Degree and above | 0.465*** | 0.186 |
| Employed | 0.000 | 0.000 |
| Unemployed | -0.293 | -0.599* |
| Student | 0.543 | 0.783 |
| Retired | 0.234 | 0.099 |
| Inactive / unpaid family worker | -0.013 | -0.048 |
| Single | -0.073 | -0.215 |
| In relationship | 0.000 | 0.000 |
| Out of relationship | 0.143 | 0.103 |
| Widowed | 0.800** | 0.468 |
| Dependent children | 0.345 | 0.306 |
| East Midlands | -0.811 | -0.847* |
| East of England | -0.778 | -0.788 |
| London | 0.000 | 0.000 |
| North East | -1.062** | -0.928* |
| North West | -0.953** | -1.394*** |
| Northern Ireland | -0.925 | -1.291** |
| Scotland | -0.634 | -1.169** |
| South East | -1.232*** | -1.346*** |
| South West | -0.690 | -0.814* |
| Wales | -0.791 | -0.969* |
| West Midlands | -0.822 | -0.661 |
| Yorkshire and the Humber | -1.290*** | -1.626*** |
| Rural location | -0.453*** | -0.338** |
| Member of any park, community, or conservation group | 1.318*** | 0.695** |
| Last visit to local park or green space made me happy | 0.452*** | 0.479*** |
| Concerned about damage to the natural environment | 0.463*** | 0.407*** |
| Number of parks and green spaces/sports fields located nearby | | -0.054 |
| Proximity to local park or green space | | 0.114 |
| Size of local park or green space | | 0.189*** |
| Visibility of local park or green space from home | | 0.354 |
| Provided help/volunteered for local park or green space in past 12 months | | 4.105*** |
| Exercise regularly at local park or green space | | 0.729*** |
| Constant | -11.345*** | -10.457*** |
| Observations | 3125 | 2969 |
| Adjusted R-squared | 0.073 | 0.129 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. User defined as used park or green space once a month or more in past 12 months. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance.

11.9 Primary Survey Statistics: Characteristics of Parks and Green Spaces and Their Users

Characteristics of park and green space users: Logistic regressions

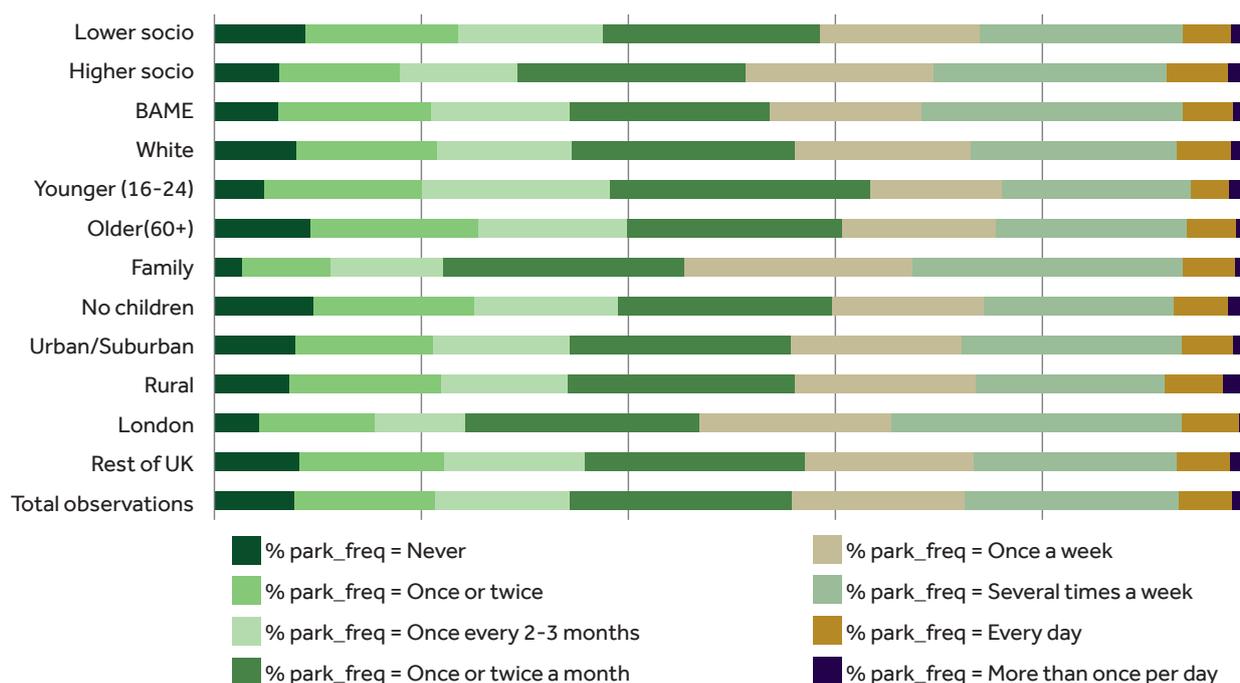
- › Those from lower socioeconomic background statistically have a higher likelihood of being non-users (using their local park/greenspace once every 2 months or less), holding other factors constant.
- › Higher socioeconomic groups have a higher likelihood of using their local park or green space frequently (once a month or more).
- › Families (those with dependent children) also have a statistically higher probability of being classed as park or green space users, compared to those without dependent children.
- › There are no significant differences in park and green space use frequency between older and younger groups.

TABLE 11.7 LOGISTIC REGRESSION: LOG LIKELIHOOD OF PARK OR GREEN SPACE USAGE (ONCE A MONTH OR MORE)

| Socio-demographic characteristics | Park or green space user |
|-----------------------------------|--------------------------|
| Equal or below median income | -0.098 |
| BAME | -0.362** |
| Young 16-24 | -0.157 |
| Dependent children | 0.734*** |
| Rural location | 0.087 |
| London resident | 0.529*** |
| Degree and above | 0.397*** |
| Employed | 0.280*** |
| Married/couple | 0.135* |
| Constant | 0.133 |
| Observations | 3583 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). User defined as used park or green space once a month or more in past 12 months. Notes: Logistic regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance for difference in odds ratio of user / non-user group. Logistic regressions isolate the odds ratio of different groups in society being regular parks and green spaces users (once a month or more), while holding constant other factors which may drive selection into park or green space usage.a

FIGURE 11.1 FREQUENCY OF PARK AND GREEN SPACE USE BY SOCIO-DEMOGRAPHIC TARGET GROUPS



Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. User defined as used park or green space once a month or more in past 12 months.

Park and green space characteristics

- › Majority defined their local publicly accessible greenspace as a 'public park' (44%). 'Publicly managed open greenspace' was the next most common classification (17%), followed by 'sports / playing field open to the public' (13%).
- › Behind this top 3 of most common types of publicly accessible greenspace, 'pocket parks / children's playgrounds' were more commonly selected than 'nature reserves/wildflower meadows' or 'town/village greens'.
- › Rural locations: a higher proportion of publicly accessible green spaces are classified as 'town/village greens' (9%) or 'nature reserves / wildflower meadows' (10%).
- › Higher proportion of sports or playing fields (21%) and pocket parks and children's playgrounds (18%). The latter is surprising, given that pocket parks are more commonly located in inner urban areas, but may stem from misinterpretation of the term 'pocket park', or from a higher prevalence of children's playgrounds in rural areas (it is not possible to separate the two within our results).

TABLE 11.8 PARK OR GREEN SPACE TYPES BY LOCATION

| Description of park or green space | Rural | Suburban | Urban | Total observations |
|---|--------------------|---------------------|---------------------|----------------------|
| Nature reserve / wildflower meadow | 9.6% (79/821) | 7.2% (144/2012) | 5.0% (59/1188) | 7.0% (282/4033) |
| Open greenspace (publicly managed) | 13.2% (108/821) | 18.4% (371/2012) | 17.7% (210/1188) | 17.2% (692/4033) |
| Pocket park / children's playground | 18.3% (150/821) | 11.6% (233/2012) | 9.4% (112/1188) | 12.3% (498/4033) |
| Public park | 25.3% (208/821) | 45.6% (917/2012) | 55.0% (653/1188) | 44.2% (1782/4033) |
| Sports / playing field open to the public | 20.7% (170/821) | 12.4% (250/2012) | 8.8% (105/1188) | 13.1% (527/4033) |
| Town / village green | 9.0% (74/821) | 2.9% (59/2012) | 2.7% (32/1188) | 4.1% (165/4033) |
| Other | 3.9% (32/821) | 1.9% (38/2012) | 1.4% (17/1188) | 2.2% (87/4033) |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Multiple choice question: Respondents choose single option.

TABLE 11.9 PARK OR GREEN SPACE LANDSCAPES BY LOCATION

| Managed parkland | Mixed woodland | Semi-natural grassland | Mountains, moorland and heaths |
|---|--|---|---|
| <p>Managed parkland composes the majority of publicly accessible greenspace reported in the survey (59%).</p> <p>This proportion varies significantly with a lower proportion of managed parkland in rural (53%) compared to urban locations (61%).</p> | <p>Mixed woodland and grassland is the second most common habitat contained in publicly accessible greenspace (13%).</p> <p>This proportion does not differ between rural and urban locations (13%).</p> | <p>Semi-natural grassland is the third most common habitat contained in publicly accessible greenspace (11%).</p> <p>A significantly higher proportion of publicly accessible greenspace is characterised as semi-natural grassland in rural locations (15%) compared to suburban (10%) and urban locations (9%).</p> | <p>Mountains, moorland and heaths is the least most common habitat contained in publicly accessible greenspace (1%).</p> <p>We note that these refer to the geography and vegetation characteristic of heaths and mountains, rather than the presence of mountains within publicly accessible greenspace.</p> |

TABLE 11.10 WILLINGNESS TO PAY VALUES TO SUPPORT MAINTENANCE AND PRESERVATION OF MOST COMMONLY USED LOCAL PARK OR GREEN SPACE: FEATURES

| Feature | WTP value most commonly visited local park or green space (1km) (monthly) |
|--|---|
| Cemetery | -0.297 |
| Formal gardens/flower beds | 0.274 |
| Heritage feature/historic building/archaeology | 0.733** |
| Open fields | 0.132 |
| Path, cycleway or bridleway | -0.235 |
| Scenic feature/viewpoint | 0.401 |
| Trees, woodland or forest (including community woodland) | 0.186 |
| Water feature (e.g. lake, pond, fountain) | 0.330 |
| Wildflower meadow/nature reserves | 0.619** |
| Constant | 1.987*** |
| Observations | 3824 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance. Reference group = none of the listed park or green space features. No control covariates used.

TABLE 11.11 WILLINGNESS TO PAY VALUES TO SUPPORT MAINTENANCE AND PRESERVATION OF MOST COMMONLY USED LOCAL PARK OR GREEN SPACE: FACILITIES

| Facility | WTP value most commonly visited local park or green space (1km) (monthly) |
|---|---|
| Bar/café/restaurant | 0.207 |
| Children's playground | -0.340* |
| Community growing space/allotments | 2.031*** |
| Dog park (fenced off) | 1.130*** |
| Green gym | 0.510 |
| Pavilion/bandstand/performance stage/village hall | 0.183 |
| Sports fields/facilities e.g. sports pitches, courts, | -0.013 |
| Toilets | 0.715*** |
| Constant | 2.197*** |
| Observations | 3824 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance. Reference group = none of the listed park or green space facilities. No control covariates used.

TABLE 11.12 WILLINGNESS TO PAY VALUES TO SUPPORT MAINTENANCE AND PRESERVATION OF MOST COMMONLY USED LOCAL PARK OR GREEN SPACE: MOTIVATIONS

| Purpose of visit | WTP value most commonly visited local park or green space (1km) (monthly) |
|---|---|
| As a short-cut | 0.128 |
| Bringing children to the park (e.g. children's play area) | 0.007 |
| Children's sporting activities | 0.843** |
| Meet friends (e.g. see people for a chat/coffee) | 0.153 |
| Personal recreation (e.g. walking, rambling) | 0.707*** |
| Personal sport/exercise (e.g. running, green gym, using facilities for individual sports) | 0.414 |
| Picnic/eating lunch | 0.167 |
| Relaxation (e.g. sit and think, read, listen to music) | 0.373* |
| Team sports (e.g. football, tennis, cricket) | 0.672 |
| To enjoy wildlife/be in a natural environment | 0.618** |
| To pass the time | -0.004 |
| To volunteer/ help out/ Park Friends Group | 0.967 |
| Walking the dog | 0.624*** |
| Constant | 1.575*** |
| Observations | 3824 |

Sample restricted to residents in UK (incl. Northern Ireland) aged 16 and over. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). WTP responses removed for inconsistent follow-up responses ("I do not believe I would really have to pay"): WTP all parks and greenspace in local area n=81; WTP nearest park or green space n=71. Note: All WTP values are calculated as the midpoint interval between the selected payment amount in the payment card and the next highest response on the payment card (except for £0). All WTP figures include non-WTP in principle coded as £0. All WTP figures are exclusive of respondents excluded for inconsistent follow-up responses. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. *** <1% significance; ** <5% significance; * <10% significance. Reference group = none of the listed motivations. No control covariates used.

11.10 Primary Survey: Motivations for Park and Green Space Usage

TABLE 11.13 SOCIO-DEMOGRAPHIC GROUPS: MOTIVATIONS FOR VISITING THE PARK OR GREEN SPACE

| | Overall proportion (Total sample) | Lower socio | Higher socio | BAME | White | Younger (16-24) | Older (60+) | Family | No children |
|---|-----------------------------------|-------------|--------------|--------|--------|-----------------|-------------|--------|-------------|
| As a short-cut | 16.90% | 18.1%* | 15.4%* | 15.7% | 17.0% | 20.6%* | 18.2%* | 13.4%* | 18.2%* |
| Bringing children to the park (e.g. children's play area) | 29.10% | 29.8% | 28.6% | 34.0%* | 28.8%* | 23.4%* | 25.5%* | 58.6%* | 17.9%* |
| Children's sporting activities | 8.50% | 6.5%* | 11.1%* | 13.7%* | 8.0%* | 6.3%* | 6.1%* | 20.1%* | 4.1%* |
| Meet friends (e.g. see people for a chat/coffee) | 11.70% | 11.9% | 10.8% | 24.2%* | 10.6%* | 28.8%* | 8.8%* | 13.7%* | 10.9%* |
| Personal recreation (e.g. walking, rambling) | 40.30% | 40.0% | 41.2% | 45.1%* | 40.0%* | 39.6% | 46.1% | 34.4%* | 42.6%* |
| Personal sport/exercise (e.g. running, green gym, using facilities for individual sports) | 11.20% | 9.2%* | 13.7%* | 22.2%* | 10.3%* | 23.2%* | 4.4%* | 15.9%* | 9.4%* |
| Picnic/eating lunch | 15.80% | 15.7% | 15.8% | 23.9%* | 15.1%* | 21.4%* | 9.4%* | 24.0%* | 12.7%* |
| Relaxation (e.g. sit and think, read, listen to music) | 30.80% | 32.0% | 29.8% | 49.0%* | 29.3%* | 39.8%* | 23.6%* | 30.8% | 30.9% |
| Team sports (e.g. football, tennis, cricket) | 5.80% | 5.0%* | 7.0%* | 10.8%* | 5.4%* | 7.8%* | 5.1%* | 9.4%* | 4.4%* |
| To enjoy wildlife/be in a natural environment | 24.10% | 23.9% | 24.1% | 23.9% | 24.0% | 28.8%* | 23.5%* | 23.3% | 24.4% |
| To pass the time | 28.60% | 30.2%* | 27.3%* | 42.8%* | 27.4%* | 34.6%* | 25.8%* | 28.8% | 28.6% |
| To volunteer/help out/Park Friends Group | 1.20% | 1.2% | 1.5% | 2.0% | 1.2% | 0.6% | 1.9% | 1.4% | 1.2% |
| Walking the dog | 25.20% | 24.2%* | 27.4%* | 9.5%* | 26.5%* | 27.5% | 20.5% | 27.6%* | 24.3%* |
| Other | 3.00% | 3.1% | 2.7% | 2.6% | 3.0% | 0.4%* | 5.1%* | 1.4%* | 3.6%* |

Sample restricted to those who have used their designated park or green space in the past 12 months (n=3,721). National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Multiple choice question: respondents choose all relevant options. Legend: Significant results reported at 90% confidence level

11.11 Detailed Analysis Tables: Primary Survey - Health and Wellbeing

TABLE 11.14 ASSOCIATION BETWEEN FREQUENCY OF PARK OR GREEN SPACE USAGE AND SUBJECTIVE WELLBEING AND HEALTH (PRIMARY SURVEY 2017, FULL TABLE WITH CONTROLS)

| | Life satisfaction (0-10) | Happiness (0-10) | Anxiety (0-10) | Worthwhile (0-10) | General Health (1-5) |
|--|--------------------------|------------------|----------------|-------------------|----------------------|
| | b | b | b | b | b |
| Never | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Once or twice | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Once every 2-3 months | 0.070 | 0.040 | 0.157 | 0.156 | 0.085 |
| Once or twice a month | 0.108 | 0.128 | 0.116 | 0.181 | 0.088 |
| Once a week | 0.244** | 0.262* | 0.136 | 0.323** | 0.106 |
| Several times a week | 0.124 | 0.143 | 0.199 | 0.244* | 0.126* |
| Every day | 0.248 | 0.293 | 0.668** | 0.284 | 0.171* |
| More than once per day | 0.158 | -0.084 | 0.247 | 0.121 | 0.515*** |
| Midpoint age | -0.017 | 0.008 | -0.072*** | 0.003 | -0.002 |
| Age squared, using age midpoint | 0.000* | 0.000 | 0.000 | 0.000 | -0.000 |
| What is your gender? | -0.118* | -0.049 | -0.244** | -0.030 | -0.135*** |
| Log income, using income midpoints) | 0.219*** | 0.156** | -0.173** | 0.153** | 0.163*** |
| BAME | -0.015 | 0.154 | 0.051 | 0.140 | 0.070 |
| Degree and above | -0.139** | -0.079 | 0.045 | -0.060 | 0.063 |
| Employed | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Unemployed | -0.804*** | -0.700*** | 0.242 | -0.837*** | -0.113 |
| Student | 0.249 | 0.047 | -0.200 | 0.084 | -0.015 |
| Retired | 0.412*** | 0.459*** | -0.739*** | 0.193 | -0.037 |
| Inactive / unpaid family worker | -0.248* | -0.359** | 0.004 | -0.136 | -0.774*** |
| Single | -0.639*** | -0.544*** | -0.016 | -0.461*** | -0.005 |
| In relationship | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Out of relationship | -0.527*** | -0.639*** | 0.145 | -0.477*** | -0.102 |
| Widowed | -0.500*** | -0.478** | 0.077 | -0.360* | -0.031 |
| Poor | 0.000 | 0.000 | 0.000 | 0.000 | |
| Fair | 0.867*** | 0.859*** | -0.739*** | 0.839*** | |
| Good | 1.474*** | 1.435*** | -1.327*** | 1.259*** | |
| Very good | 1.937*** | 1.920*** | -1.819*** | 1.873*** | |
| Excellent | 2.258*** | 2.241*** | -1.687*** | 2.353*** | |
| Dependent children | 0.006 | -0.112 | 0.060 | 0.115 | 0.090* |
| Rural location | 0.006 | -0.063 | 0.046 | 0.056 | 0.063 |
| Generally speaking, would you say that most people can be trusted, or that you c | 0.205*** | 0.218*** | -0.210*** | 0.262*** | 0.127*** |
| How often do you usually see or get in touch with friends? | 0.231*** | 0.284*** | -0.042 | 0.323*** | 0.098*** |
| Satisfaction with park (satisfied or extremely satisfied) | 0.476*** | 0.541*** | -0.085 | 0.516*** | |
| Owns private garden/outdoor space | 0.120 | 0.133 | -0.099 | 0.048 | |
| Do you perform any regular physical exercise at a location other than your local | | | | | 0.349*** |
| daily | | | | | |
| weekly | | | | | |
| Constant | 3.063*** | 2.526*** | 11.154*** | 0.276 | 1.268** |
| Observations | 3108 | 3089 | 3056 | 3109 | 3104 |
| Adjusted R-squared | 0.271 | 0.227 | 0.113 | 0.196 | 0.190 |

National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Notes: OLS regression model. Heteroscedasticity-robust standard errors used. Legend *** <1% significance; ** <5% significance; * <10% significance. Reference is visitors who went to a park or green space once or twice in the past 12 months. Controls for each local authority based on respondent postcode for local area fixed effects (included but not reported here due to space constraints).

TABLE 11.15 ASSOCIATION BETWEEN PARK AND GREEN SPACE USAGE AND SUBJECTIVE WELLBEING AND HEALTH (PRIMARY SURVEY 2017, FULL TABLE WITH CONTROLS)

| | Life satisfaction (0-10) | Happiness (0-10) | Anxiety (0-10) | Worthwhile (0-10) | General Health (1-5) |
|--|--------------------------|------------------|----------------|-------------------|----------------------|
| | b | b | b | b | b |
| Used local park at least once/month in past 12 months | 0.125* | 0.154* | 0.115 | 0.164* | 0.081* |
| Midpoint age | -0.016 | 0.009 | -0.070*** | 0.004 | -0.002 |
| Age squared, using age midpoint | 0.000* | 0.000 | 0.000 | 0.000 | -0.000 |
| What is your gender? | -0.119* | -0.050 | -0.244** | -0.028 | -0.135*** |
| Log income, using income midpoints) | 0.218*** | 0.155** | -0.175** | 0.151** | 0.162*** |
| BAME | -0.021 | 0.145 | 0.054 | 0.131 | 0.075 |
| Degree and above | -0.136** | -0.077 | 0.050 | -0.055 | 0.065 |
| Employed | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Unemployed | -0.804*** | -0.699*** | 0.249 | -0.837*** | -0.114 |
| Student | 0.249 | 0.044 | -0.200 | 0.088 | -0.010 |
| Retired | 0.416*** | 0.466*** | -0.741*** | 0.198 | -0.042 |
| Inactive / unpaid family worker | -0.249* | -0.360** | 0.003 | -0.137 | -0.775*** |
| Single | -0.633*** | -0.536*** | -0.006 | -0.455*** | -0.006 |
| In relationship | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Out of relationship | -0.533*** | -0.651*** | 0.140 | -0.487*** | -0.094 |
| Widowed | -0.503*** | -0.481** | 0.072 | -0.362* | -0.031 |
| Poor | 0.000 | 0.000 | 0.000 | 0.000 | |
| Fair | 0.864*** | 0.855*** | -0.739*** | 0.838*** | |
| Good | 1.475*** | 1.435*** | -1.327*** | 1.264*** | |
| Very good | 1.936*** | 1.917*** | -1.815*** | 1.874*** | |
| Excellent | 2.262*** | 2.235*** | -1.669*** | 2.356*** | |
| Dependent children | 0.013 | -0.103 | 0.061 | 0.128 | 0.088* |
| Rural location | 0.006 | -0.065 | 0.046 | 0.053 | 0.067 |
| Generally speaking, would you say that most people can be trusted, or that you c | 0.205*** | 0.218*** | -0.209*** | 0.261*** | 0.127*** |
| How often do you usually see or get in touch with friends? | 0.233*** | 0.286*** | -0.039 | 0.325*** | 0.101*** |
| Satisfaction with park (satisfied or extremely satisfied) | 0.478*** | 0.542*** | -0.076 | 0.527*** | |
| Owns private garden/outdoor space | 0.111 | 0.126 | -0.094 | 0.038 | |
| Do you perform any regular physical exercise at a location other than your local | | | | | 0.347*** |
| Constant | 3.032*** | 2.506*** | 11.135*** | 0.304 | 1.277** |
| Observations | 3108 | 3089 | 3056 | 3109 | 3104 |
| Adjusted R-squared | 0.272 | 0.228 | 0.113 | 0.197 | 0.188 |

User defined as used park or green space once a month or more in past 12 months. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Controls for each local authority based on respondent postcode for local area fixed effects (included but not reported here due to space constraints). Legend: *** <1% significance; ** <5% significance; * <10% significance.

TABLE 11.16 ASSOCIATION BETWEEN GENERAL HEALTH AND FREQUENCY OF PARK AND GREEN SPACE USAGE: PRIMARY SURVEY

| | Frequency | Daily | Weekly |
|--|-----------|-----------|-----------|
| | b | b | b |
| Never | 0.000 | | |
| Once or twice | 0.000 | | |
| Once every 2-3 months | 0.085 | | |
| Once or twice a month | 0.088 | | |
| Once a week | 0.106 | | |
| Several times a week | 0.126* | | |
| Every day | 0.171* | | |
| More than once per day | 0.515*** | | |
| Midpoint age | -0.002 | -0.002 | -0.003 |
| Age squared, using age midpoint | -0.000 | -0.000 | -0.000 |
| What is your gender? | -0.135*** | -0.132*** | -0.137*** |
| Log income, using income midpoints) | 0.163*** | 0.162*** | 0.163*** |
| BAME | 0.070 | 0.069 | 0.073 |
| Degree and above | 0.063 | 0.068* | 0.065 |
| Employed | 0.000 | 0.000 | 0.000 |
| Unemployed | -0.113 | -0.118 | -0.116 |
| Student | -0.015 | -0.015 | -0.013 |
| Retired | -0.037 | -0.042 | -0.044 |
| Inactive / unpaid family worker | -0.774*** | -0.776*** | -0.775*** |
| Single | -0.005 | -0.011 | -0.007 |
| In relationship | 0.000 | 0.000 | 0.000 |
| Out of relationship | -0.102 | -0.100 | -0.095 |
| Widowed | -0.031 | -0.032 | -0.031 |
| Poor | | | |
| Fair | | | |
| Good | | | |
| Very good | | | |
| Excellent | | | |
| Dependent children | 0.090* | 0.100* | 0.089* |
| Rural location | 0.063 | 0.064 | 0.067 |
| Generally speaking, would you say that most people can be trusted, or that you c | 0.127*** | 0.125*** | 0.126*** |
| How often do you usually see or get in touch with friends? | 0.098*** | 0.103*** | 0.101*** |
| Satisfaction with park (satisfied or extremely satisfied) | | | |
| Owns private garden/outdoor space | | | |
| Do you perform any regular physical exercise at a location other than your local | 0.349*** | 0.351*** | 0.348*** |
| daily | | 0.169** | |
| weekly | | | 0.075* |
| Constant | 1.268** | 1.330** | 1.334** |
| Observations | 3104 | 3104 | 3104 |
| Adjusted R-squared | 0.190 | 0.189 | 0.188 |

User defined as used park or green space once a month or more in past 12 months. Notes: OLS regression model. Heteroscedasticity-robust standard errors used. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). Controls for each local authority based on respondent postcode for local area fixed effects (included but not reported here due to space constraints). Legend: *** <1% significance; ** <5% significance; * <10% significance.

TABLE 11.17 LOGISTIC REGRESSION: ODDS RATIO OF GOOD HEALTH AMONG PARK OR GREEN SPACE USERS

| | Odds ratio |
|--|------------|
| | b |
| Good or excellent health (self-reported scale 1-5) | |
| Used local park at least once/month in past 12 months | 1.347*** |
| Midpoint age | 0.986 |
| Age squared, using age midpoint | 1.000 |
| What is your gender? | 0.709*** |
| Log income, using income midpoints) | 1.634*** |
| BAME | 1.022 |
| Degree and above | 1.123 |
| Employed | 1.000 |
| Unemployed | 0.673* |
| Student | 1.019 |
| Retired | 0.824 |
| Inactive / unpaid family worker | 0.203*** |
| Single | 0.988 |
| In relationship | 1.000 |
| Out of relationship | 0.723** |
| Widowed | 0.818 |
| Dependent children | 1.297** |
| Rural location | 1.187 |
| Generally speaking, would you say that most people can be trusted, or that you c | 1.224*** |
| How often do you usually see or get in touch with friends? | 1.253*** |
| Observations | 3226 |

User defined as used park or green space once a month or more in past 12 months. Notes: Logistic regression model. Heteroscedasticity-robust standard errors used. National representative sample using age, gender, and region quotas. Sample excludes speedsters (n=65), those who indicated that their parks required an entry fee (n=282), and those giving invalid names for their local park (n=141). . Controls for each local authority based on respondent postcode for local area fixed effects (included but not reported here due to space constraints). Leg end: *** <1% significance; ** <5% significance; * <10% significance.

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Will Watt

PRODUCT DIRECTOR AT JUMP

After studying Law, Will worked in publishing at the NME magazine and then as Publisher of Viz comic. Will then moved into digital communications with the launch of BBC Green a pioneering joint venture that turned into a major sustainability initiative for the Prince of Wales involving M&S, Eurostar, B&Q and other leading brands. At Join In, a London 2012 volunteering legacy charity, Will conceived and developed all of Join In's creative, communications and campaigns including the #BigThankYou campaign as part of the 2014 and 2015 BBC Sports Personality of the Year Awards. Will also conceived Join In's Hidden Diamonds research into the value of sports volunteers in the UK which has since become a case study in the 'What Works Centre for Wellbeing' aimed at ensuring independently assessed evidence helps shape Government decision-making. This was followed up with leading behavioural science research on how to recruit and retain volunteers. Both of these pieces of work built on the work carried out by Daniel Fujiwara at Simetrica.

Dr. Ricky Lawton, BA, LL.M, MSc, PhD Economics DIRECTOR OF ECONOMICS AND EVALUATION AT JUMP AND HEAD OF RESEARCH AT SIMETRICA

Ricky is an economist and leads on economic valuation and impact evaluation research, including experimental design, econometric analysis and quantitative and qualitative survey design. Ricky specialises in causal analysis and non-market valuation through preference methods (contingent valuation, choice modelling, and revealed preference), geolinking analysis, and wellbeing valuation methods. Ricky has led research for the UK Government (Department for Digital, Culture, Media and Sport, Department of Transport and the Cabinet Office); third sector (Arts and Humanities Research Council and Arts Council England); and private sector social impact evaluation (Danone, Siemens and Sainsburys), leading to the publication of research in high-ranking academic journals. Prior to joining Simetrica, Ricky was seconded to work with the Wellbeing Team at the Cabinet Office. Ricky has a PhD in Environmental Economics and Policy and an MSc in Environmental Economics from University of York, an LL.M in Law and Policy from University of Canterbury, and a BA in History from University of York.

Daniel Fujiwara, BSc, MSc, Mphil Economics DIRECTOR AT SIMETRICA

Daniel is the founding Director of Simetrica. He is an economist specialising in policy evaluation and social impact measurement and has over 15 years of experience working in government and in international organisations. Daniel has previously held senior economist positions within the UK Government (Department for Work and Pensions, the Cabinet Office and the Ministry of Defence) and the Tanzania Ministry of Finance as well as research positions at the United Nations and the Australian National University. He was a senior adviser on non-market goods valuation to the UK Government and was lead author on the latest version of the HM Treasury Green Book guidance on non-market valuation techniques (2011). In 2012 Daniel was awarded the John Hoy Memorial Prize in Economics for his contribution to policy evaluation in the UK Government. Daniel has led a large number of valuation studies. He was co-principal investigator (with Hasan Bahkshi) on the Arts, Humanities and Research Council's study on measuring economic value in cultural institutions, which involved large scale online and face-to-face stated preference valuation surveys of the Natural History Museum and Tate Liverpool (Bahkshi et al., 2015). Daniel led the Arts Council England's stated preference study of library services in England (Fujiwara, Mourato and Lawton, 2015). In 2012 Daniel led a large scale Contingent Valuation study on adult learning courses for the Department for Business Innovation and Skills (Dolan and Fujiwara, 2012) and Contingent Valuation studies on training schemes for the Government of Ireland. Daniel has produced stated preference survey instruments for numerous other consultancy firms such as PWC. Daniel has also conducted a wide range of valuation research using wellbeing valuation methods for the Department of Digital, Culture, Media and Sport, English Heritage, Highways England, Government of Australia, the Airports Commission and the Food and Agriculture Organisation. He has published widely in the area of social impact and is a referee for a number of academic journals. Daniel holds a BSc and MSc in Economics and an Mphil in Social Policy. He is a Research Member of the Centre for Economic Performance at the London School of Economics and Political Science and Research Associate at the Centre for Quality of Life at the Chinese University of Hong Kong.

CONTRIBUTORS:

Dr. Philip Ball, Dr. Iulian Gramatki, Augustin Lagarde, Cem Maxwell, Agnieszka Szydłowska



Green Spaces for Good

