Article:
Hoyle, H.E. orcid.org/0000-0001-9036-4147 (2025) 'I'm a better version of me!' Increasing health equity through active green interventions: parkrun participants' motivators, preferences and well-being benefits. People and Nature. ISSN: 2575-8314

https://doi.org/10.1002/pan3.70118

Received: 14 March 2024 | Accepted: 23 July 2025

DOI: 10.1002/pan3.70118

People and Nature

RESEARCH ARTICLE

'I'm a better version of me!' Increasing health equity through active green interventions: *parkrun* participants' motivators, preferences and well-being benefits

Helen E. Hoyle

School of Architecture and Landscape, University of Sheffield, Sheffield, UK

Correspondence
Helen E. Hoyle
Email: h.e.hoyle@sheffield.ac.uk

Funding information
University of the West of England Vice Chancellor's Award

Handling Editor: Cecily Maller

Abstract

1. If equitable greenspace interventions are to be designed and delivered to motivate wider urban publics to experience the life-enhancing benefits of physical activity, it is essential to understand what motivates people to practise physical activity in nature, the perceived benefits and which greenspace characteristics are most preferred by whom, including deprived, inactive populations.
2. These gaps were investigated in collaboration with *parkrun*, a not-for-profit organisation offering free, weekly, timed 5-km runs or walks in public settings. Post *parkrun* questionnaires ($n = 246$) were conducted with participants at three UK events across a range of park settings with contrasting public health profiles: (i) Urban new town (Stevenage: socio-cultural and health profiles close to England benchmark); (ii) Inner London (Barking: ethnically diverse, economically deprived, inactive); and (iii) Rural Lakeland (Fell Foot: low ethnic diversity, income deprivation, healthier than benchmark).
3. Overall, *physical fitness* was the dominant initial motivator for *parkrun* participation ($n = 93\%$). *Fresh air and scenery* (+28%, $p < 0.001$); *Social reasons* (+25%, $p < 0.001$); *Volunteering* (+21%, $p < 0.001$) and *Stress relief* (+13%, $p = 0.004$) all increased significantly from initial to ongoing motivating factors.
4. These increases were all greater for women than men. '*Social reasons*' increased from initial to ongoing motivator in all settings including the deprived inner London setting (+30%, $p < 0.001$) where participants valued parkrun for its inclusivity.
5. Participants expressed strong preferences for natural over built settings for physical activity, with *greenspace* and *alongside water* most preferred. Microscale preferences for lakesides and views, related birds and wildlife and woodland settings were identified.
6. *Synthesis and applications*. These findings indicate that women and people in deprived, ethnically diverse settings might have most to gain from the holistic health benefits of exercising in nature, and *parkrun* as an active green health intervention. This has potentially transformative implications for addressing health

inequalities in the United Kingdom and more widely. Public health professionals might develop further active green interventions, increasing equitable access to outdoor natural settings among populations most in need. Governments and green infrastructure planners might prioritise funding and delivering parks and greenspaces. Landscape designers might incorporate waterside and woodland settings to optimise their active benefits.

KEYWORDS
green social prescribing, greenspace, health and well-being, health inequality, natural environment, *parkrun*, physical activity

1 | INTRODUCTION

Physical activity promotes a broad range of human health benefits and is widely accepted as a form of preventative health care (Frumkin et al., 2017). It maintains a healthy musculoskeletal system, supports positive mental well-being (World Health Organisation, 2016) and reduces the risk of coronary heart disease, stroke, cancer, obesity and type 2 diabetes (National Institute for Health Care Excellence (NICE), 2008, 2012). Natural environments including parks, woodlands and beaches provide key locations for physical activity (Hunter et al., 2015; White et al., 2016), with spending time in parks and green and blue spaces both physiologically and psychologically beneficial (Kaplan & Kaplan, 1989; White et al., 2016, 2017, 2019). A population-based cross-sectional study of physical activity in natural environments in England found the total social value of active visits to be £2.2b/year in Quality Adjusted Life Years (QALYs) (White et al., 2016).

There is an increasing body of evidence (Barton et al., 2016; Coon et al., 2011) that the benefits of exercising may be enhanced by the wider health benefits of spending time in nature (Frumkin et al., 2017; Hartig et al., 2014; Marselle et al., 2021; White et al., 2023). Four main 'pathways' between biodiversity and health are now recognised: (i) *reducing harm*, through reduced exposure to air pollution and pathogens; (ii) *restoring capacities* through stress reduction; (iii) *building capacities*, for example by facilitating physical activity and social cohesion, and; and (iv) *causing harm*, that is, the capacity for nature to threaten human health, through exposure to pathogens (Marselle et al., 2021). White et al. (2023) propose integration of these pathways through *biopsychosocial resilience*, a process by which individuals build biological, psychological and social resilience-related resources. Research has shown that spending time in natural environments is associated with an enhanced immune system (Kuo, 2015) and Robinson et al. (2024) propose a *biological pathway* linking nature and health focusing on positive immunity regulation resulting from exposure to diverse microbiota in natural spaces. Social connectedness is strongly related to health (National Health Service, 2022; Wickramaratne et al., 2022) and multiple studies have indicated that living in greener urban areas and using parks and greenspaces are associated with greater social cohesion.

Yet we live in a time of unprecedented interrelated global environmental and health crises. (Soga & Gaston, 2024). By 2050, 68% of the global population will live in urban areas (United Nations, 2018). Urbanisation results in the degradation and loss of ecological systems supporting human health (McKinney, 2002; Soga & Gaston, 2024), reduced direct contact with nature and therefore deteriorating public health and well-being (Soga & Gaston, 2016). Globally, the cost of mental ill health has been estimated to reach US$16 trillion by 2030 (Patel et al., 2018). In the UK mental ill-health cost the economy an estimated £94bn in 2015 (Organisation for Economic Co-operation and Development (OECD), 2018). Here, adult obesity rose from 15% in 1993 to 29% in 2017 costing approximately £73bn p.a. in lost productivity and medical costs related to physical health challenges (McKinsey Global Institute, 2014).

Decision makers across landscape planning and public health have become increasingly aware of the value of parks, greenspaces and wider urban green infrastructure (UGS) in addressing these challenges (Cardinali et al., 2023; Frantzeskaki, 2019; Hoyle & Cottrill, 2023; Public Health England, 2020). This was reinforced during the COVID-19 pandemic (Collins et al., 2022; Kang et al., 2022), which highlighted the need to conserve, manage and enhance these assets. Often owned and managed by local planning authorities, parks and greenspaces are generally free to enter and provide an opportunity and venue for physical activity (Shanahan et al., 2016). Parks provide an available informal venue for people who do not have sufficient time, income, confidence or inclination to participate in indoor gym-type or organised exercise classes (White et al., 2016). Walking is one such activity which has been associated with long-term commitment among participants (Hillsdon et al., 1995), with an extensive study of recreational park use across five European cities revealing *taking a walk* as the dominant physical park use, accounting for 47% of the physical uses (Fischer et al., 2018).

Yet provision of nature in urban areas is inequitable, with considerable evidence that deprived communities are also disadvantaged in terms of access to parks and greenspaces (Jennings et al., 2016; Li et al., 2016). In cities such as Glasgow and Bristol (UK), proximity to greenspaces for physical activity is higher among more deprived communities (Fairburn et al., 2005; Jones

et al., 2009), yet more deprived areas have lower quality greenspaces (Robinson et al., 2022), and people from more deprived communities participate in less leisure time physical activity compared with more affluent groups (Stalsberg & Pedersen, 2018; Withall et al., 2011). People (particularly women) in more deprived areas are more likely to experience mental ill-health and to be obese (Wildman, 2003). If equitable, inclusive parks and greenspaces and interventions are to be planned, designed and managed to motivate wider urban publics to participate in and experience the positive life-enhancing benefits of physical activity in natural environments, there are still significant gaps in knowledge which must be addressed. Planners and policymakers need to understand what motivates people to practise physical activity in a natural environment and which park or greenspace characteristics deliver the most benefits, so investment can be focused on these areas and natural interventions (Frumkin et al., 2017; Shanahan et al., 2016). If access to high quality parks and greenspaces supporting physical activity is to be made more equitable, public health professionals need to understand how motivations and benefits vary across populations according to socio-cultural characteristics (Frumkin et al., 2017), with a focus on more deprived, inactive populations. These gaps are addressed in collaboration with *parkrun*.

1.1 | Collaborating with *parkrun*

parkrun (with a lower case 'p') is a not-for-profit organisation offering free, weekly, timed 5-km runs or walks and 2-km junior parkrun events for 4- to 14-year-olds in public settings, dominantly parks and greenspaces. Initiated in 2004 as a single event in the United Kingdom, *parkrun* is now a global phenomenon operating within 22 countries including Malaysia, Namibia and South Africa. On 13 January 2024, 1874 *parkrun* events took place globally, with 349,874 participants, and 40,784 volunteers (Elliottline.com, 2024). *parkrun*'s mission statement is 'To transform health and happiness by empowering people to come together, to be active, social and outdoors', with a promise that it will remain 'free, for everyone, forever' (parkrun Global Limited, 2024), emphasising *parkrun*'s inclusivity of people from different backgrounds, especially those with typically lower activity levels in deprived areas, who might benefit most (Quirk et al., 2021). That *parkrun* participants perceive it as inclusive has been confirmed (Fullagar et al., 2020; Hindley, 2020; Stevinson et al., 2015), as has its success in encouraging groups with typically lower levels of activity, such as women, overweight people and older populations (Stevinson & Hickson, 2013) in some contexts. This is also the case in Australia (Cleland et al., 2019) and South Africa, where in a cross-sectional study of *parkrun* participants ($n = 1787$), most (53%) were female, with a median age of 50/ Key motivations to participate were health-related benefits, social connectedness and the availability of a safe and organised event (Chivunze et al., 2021).

UK research (Quirk et al., 2021) has shown that relative to more active participants from more affluent areas, previously inactive *parkrun* participants from the most deprived areas benefited most in terms of improved fitness, physical health, happiness and mental health, yet these groups are still underrepresented at *parkrun* events (Smith et al., 2021). There is a socio-economic gradient in access to *parkrun* events in Australia (Smith et al., 2022), with the most deprived groups living an average of 27 km from the event, and the least deprived an average of 6.6 km. UK research (Haake et al., 2022) has shown that access alone may not be enough, and there are barriers to participation (Quirk, 2024). In England, areas with higher percentages of Global Majority Heritage residents have lower participation rates independent of deprivation (Smith et al., 2020).

To date, several studies have focused on the impact of the *parkrun* setting on participation and participant experience, with some considering the surface type of the event (Gilburn, 2024; Grunseit et al., 2023), configuration of the course (Haake et al., 2022), number of laps (Grunseit et al., 2023) or event size (Gilburn, 2024). Few studies have focused on the role of the natural setting in participant experience. An exception is Rogerson et al. (2016), who compared affective response to *parkrun* participation in four contrasting UK settings: beach, grassland, riverside and heritage, finding significant improvement in mood, self-esteem and reduction in stress post *parkrun* across all settings, but no difference in response between settings, leading to the conclusion that physical activity in nature is beneficial, but the type of nature may not be important. In contrast, a study using data from all 58 5 k *parkruns* in Scotland (February 2019 to January 2020) concluded that the return rates of new participants were positively correlated with the amount of woodland and fresh water on the route (Gilburn, 2023).

Endorsed by the UK *parkrun* Research Board and in collaboration with three individual *parkrun* events in England, this research builds on existing knowledge to better understand: (i) What factors initially motivate people to practise physical activity in different natural environments, and do these motivators change for ongoing engagement? (ii) What are the perceived benefits of participation? (iii) Which park or greenspace characteristics are most preferred? and (iv) How do these motivations and benefits vary across populations with contrasting socio-cultural characteristics, with a focus on more deprived, inactive populations? Building on research by Gilburn (2023), this research focuses explicitly on the role of the aesthetics of nature, or 'scenery', as a motivator, and considers participants' responses to microscale variability in natural features within three *parkrun* courses in settings with contrasting public health profiles.

The findings will inform green infrastructure planners and practitioners about the types of nature preferred in greenspaces. Public health professionals will understand the potential benefits of activity in nature as a green social prescribing intervention. This has the potential to improve mental and physical health in deprived, ethnically diverse areas, reducing health inequalities and the economic costs of ill-health in the United Kingdom and more widely (McKinsey Global Institute, 2014; OECD, 2018; Patel et al., 2018).

2 | METHODS

2.1 | Study design: *parkrun* settings

Three *parkrun* events were purposively sampled to capture participant response to physical activity across a range of contrasting natural and built contextual settings with contrasting local public health profiles. These included (i) Urban new town (Stevenage); (ii) Inner London (Barking); (iii) Rural Lakeland (Fell Foot). Stevenage and Barking *parkruns* both take place in urban parks in the SE of England. Barking is in the London borough of Barking and Dagenham, 15 km to the east of central London and Stevenage is a New Town approximately 50 km north of central London. Fell Foot *parkrun* takes place in a rural English Lake District National Park setting in NW England, 400 km NW of London (Figure 1).

To gauge participant preferences for physical activity in different natural environments at the microscale, all three settings included a lake (with lake views), wooded areas and areas of open short mown grassland and the walking/running surface was dominantly asphalt. Settings with contrasting public health profiles were purposively selected to incorporate contrasting participant socio-cultural characteristics (Table 1). Stevenage *parkrun* was selected as the socio-cultural and health profiles are close to the England benchmarks. Barking, the inner London *parkrun* was sampled to access participants in a more ethnically diverse, relatively deprived, inactive setting where levels of childhood obesity were high, and communities are most at risk from mental and physical health challenges. This setting also demonstrates high levels of hospital admission for COPD and deaths from circulatory diseases under 75 years (Office for Health Improvement and Disparities, 2023). In contrast, Fell Foot, the rural Lakeland *parkrun*, takes place in a setting with relatively low ethnic diversity, income deprivation, levels of poverty among children and older people and childhood obesity levels compared with the England benchmark.

2.2 | On-site questionnaires

Post *parkrun* questionnaires (after Hoyle, 2021; Hoyle et al., 2017) were conducted in situ with *parkrun* participants at the three UK *parkrun* settings (Table 1). The in situ post *parkrun* approach was designed to capture people's immediate response to participating in physical activity in that specific setting. Data were collected on one occasion at each of the three *parkrun* settings, from January to mid-March 2020. At each event, the researcher was introduced to *parkrun* participants immediately before the start by the event director. It was explained that all *parkrun* participants (runners, joggers and walkers) would have the opportunity to complete a self-guided paper questionnaire self-reporting their experiences and perceptions immediately after completing the *parkrun*. The questionnaire was designed as a post parkrun survey (as opposed to pre and post parkrun) because parkrun starts promptly at 9 am in the morning, and most participants arrive minutes before the start, limiting the time available for data collection before the event. This applies particularly in the colder, darker mornings of the winter months when the survey took place. The intention was to repeat the process in spring and summer 2020 to capture possible seasonal variability in participant responses, but this was not possible due to the cessation of *parkrun* during the COVID-19 pandemic. The final data collection session took place on 13 March 2020, at the Rural Lakeland *parkrun*, the week before all *parkruns* were paused in the United Kingdom.

2.2.1 | Questionnaire design

The questionnaire was designed to capture motivating factors for *parkrun* participation, perceived benefits of participation and preferences for physical activity in different natural environments. Specific measures were directly related to the key research themes (Table 2). To assess initial motivators for *parkrun* participation and any changes with continuing engagement, two sequential questions were posed Participants were asked first, 'Why did you first start doing *parkrun*?', then, 'Why do you now come to *parkrun*?' (see Table 2). Participants were encouraged to tick all relevant categories. Participants were also asked via an open question what they most enjoyed about *parkrun*. General preferences for walking or running in different natural, built and indoor settings were measured via attitudinal statements, using a 5-point Likert scale. Natural settings included *greenspaces and parks*, *woodlands*, *by the sea*, *alongside lakes and rivers and in wild countryside areas*. Built settings were described as *along paths and roads through built-up towns and cities*, and indoor as *in the gym*. Preferences for walking and running on different surfaces were also captured (see Table 2). Microscale preferences for different types of nature within the *parkrun* were captured by asking participants to indicate their favourite and least favourite parts of the *parkrun* course they had just completed by marking these on a map. Participants' age, gender and ethnicity, educational qualifications and economic status were also recorded.

2.2.2 | Questionnaire data analysis

To identify key motivators for initial *parkrun* participation and those for ongoing engagement, the percentage of respondents self-reporting specific motivators for initial and then ongoing *parkrun* participation was calculated across all participants and settings and by setting type and participant socio-demographic characteristics. Specific non-White ethnic groups were aggregated as one group, Global Majority Heritage *parkrun* respondents, as the low representation of individuals within each non-White group limited further statistical analysis (Table 3). Repeated measures logistic regression was then carried out in IBM SPSS version 28 to identify first significant differences in the role of motivating factors from initial to ongoing motivators across all participants, and second, significant

BRITISH ECOLOGICAL SOCIETY People and Nature

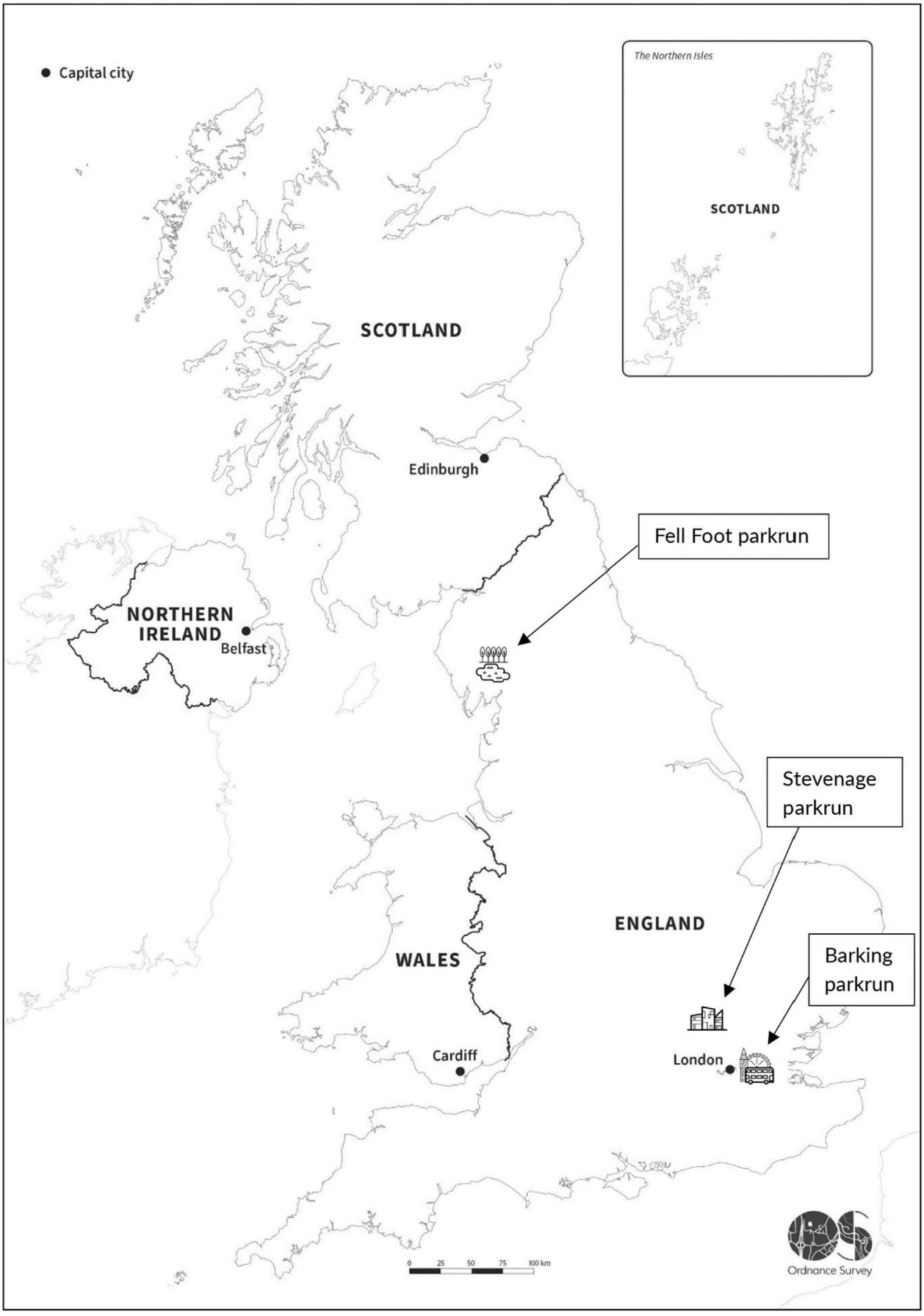

FIGURE 1 The location of Stevenage, Barking and Fell Foot *parkrun* events in England, United Kingdom.

TABLE 1 Local Health Small Area Public Health Data and RAG (Red–Amber–Green) ratings for indicator values for the three *parkrun* settings in relation to the England benchmark.

			Setting type		
			Urban new town Stevenage 	Inner London Barking 	Rural Lakeland Fell Foot 
Indicator	**Period**	**England**			
Percentage population Global Majority Heritage (whose ethnic group is not 'White')	2011	14.6	12.3	41.7	1.6
Income deprivation, English Indices of Deprivation	2019	12.9	12.2	19.4	6.3
Child poverty, Income Deprivation Affecting Children Index (IDACI)	2019	17.1	17.3	23.8	7.0
Older people in poverty, Income Deprivation Affecting Older People Index (IDAOPI)	2019	14.2	13.5	26.1	7.4
Childhood (aged 10–11) prevalence of obesity (including severe obesity) 3-years data combined	2019/20–21/22	21.6	21.9	30.6	16.4
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) Standard admission ratio	2016/17–20/21	100	122.3	154.9	48.9
Deaths from circulatory diseases under 75 years, standard mortality ratio	2015–19	100	101.6	141.4	74.5
RAG (Red–Amber–Green) ratings for indicator values			Neutral	Unfavourable	Favourable

Source: Office for Health Improvement and Disparities (2023) Local Health—Small Area Public Health Data https://fingertips.phe.org.uk/profile/local-health/data.

TABLE 2 In situ questionnaire: Individual questions and attitudinal statements used to address participants (a) Motivators for *parkrun* participation; (b) perceived benefits of *parkrun* participation; (c) preference for specific park or GS characteristics as setting for physical activity and (d) nature-relatedness.

Research theme	Questionnaire measures (individual questions/attitudinal statements on a 5-point Likert scale)
Motivators for *parkrun* participation (Initial and ongoing) (All relevant categories)	*Initial motivations*: Why did you first start doing *parkrun*? Physical fitness/social with friends, family, meeting people/stress relief/fresh air and scenery/volunteer *Ongoing motivations*: Why do you now come to *parkrun*? Physical fitness/social with friends, family, meeting people/stress relief/fresh air and scenery/Volunteer
Benefits (open questions)	What do you enjoy most about *parkrun* in general? How did you feel about doing *parkrun* when you woke up this morning? How do you feel now the *parkrun* is over?
Preference for specific park or GS characteristics as settings for physical activity (Attitudinal statements on a 5-point Likert scale, from Agree strongly-Disagree strongly)	I like running or walking in green spaces and parks I like running or walking through woodlands I like running or walking by the sea I like running or walking along lakes and rivers I like running or walking in wild countryside areas I like running or walking on paths and roads through built-up towns and cities I like running or walking in the gym I prefer to walk or run on a tarmac path I prefer to walk or run on a natural surface such as bark chip or grass
Microscale preference for specific types of nature within the parkrun course	Please mark [on a map] your FAVOURITE and LEAST FAVOURITE parts of the course: Give reasons

differences in motivators and changes from initial to ongoing motivators by *parkrun* setting and participant *gender and ethnicity*.

To assess which park or greenspace characteristics *parkrun* participants most preferred generally as settings for physical activity and whether natural settings were preferred over built or indoor ones, participants' mean responses to these attitudinal questionnaire items were calculated.

Participants' responses to open questions about what they enjoyed most about *parkrun*, how they felt before and after the parkrun that day and their written justifications of favourite and least favourite parts of the *parkrun* course were analysed by thematic analysis (after Braun & Clarke, 2006; Braun & Clarke, 2014). After transcription of the open responses, this involved (i) data familiarisation, (ii) generating initial codes, (iii) devising themes, (iv) reviewing themes and (v) naming themes. The themes were then mapped to highlight relationships between the main themes and subthemes.

2.3 | Ethics statement

Ethical approval for this study was given by the University of the West of England (UWE Bristol) Ethics Committee (UWE REC REF No: FET.19.06.062). Information sheets and consent forms were shared with potential participants together with the questionnaire. Participants were required to sign the accompanying consent form stating that they had understood the information provided, had the opportunity to ask questions and that they were willing to take part. The project also gained ethical approval from the parkrun Research Board.

3 | RESULTS

3.1 | Participants' socio-demographic profile by *parkrun* setting

A total of 246 participants completed a post *parkrun* questionnaire across the three *parkrun* settings: (i) Urban new town ($n=110$); (ii) Inner London ($n=55$) and (iii) Rural Lakeland ($n=81$) (Table 3). The uneven number of responses across these settings somewhat reflects the variability in the number of *parkrun* participants across these events (Table 3), yet the highest number of participants ($n=110$, Urban new town) represents the lowest percentage of *parkrun* participants on the day (18.77%). The highest response rate was at the rural Lakeland *parkrun*, where 44.8% of *parkrun* participants completed a questionnaire. The apparent low response rate for the urban new town parkrun relates to the practical limitations of administering the questionnaire at the finish of the course. The large number of participants crossing the finish in rapid succession made it impossible for researchers to access all potential participants to invite them to complete a questionnaire. In the case of the other two events, the number of *parkrun* participants was smaller, and this did not apply.

The gender balance overall was relatively even (Table 3), with slightly fewer female (47.6%) than male (52.4%) respondents. This mirrors the gender balance by *parkrun* participation on the days of the data collection (Table S1).

Responses vary by gender across the three settings; however, this partially reflects the variation in *parkrun* participation. The gender balance of research participants in the urban new town setting

TABLE 3 Questionnaire participants' ($n = 246$) socio-demographic profile by *parkrun* setting (valid %[a]).

	parkrun setting			
	Urban new town Stevenage ($n = 110$) 	**Inner London Barking ($n = 55$)** 	**Rural Lakeland Fell Foot ($n = 81$)** 	**Total ($n = 246$)** 
Research participants as a percentage of *parkrun* participants by setting	110/586 (18.77%)	55/172 (31.98%)	81/181 (44.75%)	246/939 (26.2%)
Gender[b] (missing values = 19 respondents)	8	2	9	19
M	56 (54.9%)	35 (66%)	28 (38.9%)	119 (52.4%)
F	46 (45.1%)	18 (34%)	44 (61.1%)	108 (47.6%)
Age[b] (missing values = 24 respondents)	9	5	10	24
16–24	7 (6.9%)	3 (6%)	2 (2.8%)	12 (5.4%)
25–34	31 (30.7%)	8 (16%)	7 (9.9%)	46 (20.7%)
35–44	18 (17.8%)	11 (22%)	23 (32.4%)	52 (23.4%)
45–54	23 (22.8%)	11 (22%)	19 (26.8%)	53 (23.9%)
55–64	15 (14.9%)	11 (22%)	16 (22.5%)	42 (18.9%)
65+	7 (6.9%)	6 (12%)	4 (5.6%)	17 (7.7%)
Ethnicity[b] (missing values = 25 respondents)	11	3	11	25
British/Irish White heritage	92 (93%)	33 (63.5%)	68 (97.1%)	193 (87.3%)
Other White heritage	4 (4%)	5 (9.6%)	2 (2.9%)	11 (5.0%)
Total global majority heritage	3 (3%)	14 (26.9%)	0	17 (7.7%)
Mixed White/Black African	1 (1%)	0	0	1 (0.5%)
Asian Indian	1 (1%)	4 (7.7%)	0	5 (2.3%)
Asian Pakistani	0	1 (1.9%)	0	1 (0.5%)
Asian Bangladeshi	0	2 (3.8%)	0	2 (0.9%)
Asian other	0	1 (1.9%)	0	1 (0.5%)
Black African	1 (1%)	3 (5.8%)	0	4 (1.8%)
Black Caribbean	0	3 (5.8%)	0	3 (1.4%)
Educational qualifications[b] (missing values = 24 respondents)	10	4	10	24
None	1 (1%)	4 (7.8%)	1 (1.4%)	6 (2.7%)
GCSE/O levels/Scottish standard grades	16 (16%)	8 (15.6%)	5 (7%)	29 (13.1%)
A levels/Scottish higher grades/International baccalaureate	9 (9%)	7 (13.7%)	11 (15.5%)	27 (12.2%)
Degree	41 (41%)	23 (45.5%)	33 (46.5%)	97 (39.2%)
Masters' degree	25 (25%)	8 (15.6%)	15 (21.1%)	48 (21.6%)
Doctorate	8 (8%)	1 (1.9%)	6 (8.5%)	15 (6.7%)

TABLE 3 (Continued)

	parkrun setting			
	Urban new town Stevenage ($n=110$)	Inner London Barking ($n=55$)	Rural Lakeland Fell Foot ($n=81$)	Total ($n=246$)
Economic status[b] (missing values = 27 respondents)	12	4	11	27
Paid employment/ self-employed	81 (82.6%)	37 (72.5%)	54 (77.1%)	172 (78.5%)
Retired	9 (9.3%)	8 (15.7%)	9 (12.9%)	26 (11.9%)
Full-time student	5 (5.1%)	1 (2%)	2 (2.9%)	8 (3.7%)
Living with family	1 (1%)	1 (2%)	1 (1.4%)	3 (1.4%)
Unemployed/seeking work	0	4 (7.8%)	0	4 (1.8%)
Looking after family/home	1 (1%)	0	3 (4.3%)	4 (1.8%)
Long-term sick/disabled	0	0	0	0
Other	1 (1%)	0	1 (1.4%)	2 (0.9%)

[a]Valid percentages given due to missing values.

[b]Missing values: missing data are not related to other variables, so the normal assumption of missing at random (MAR) was assumed.

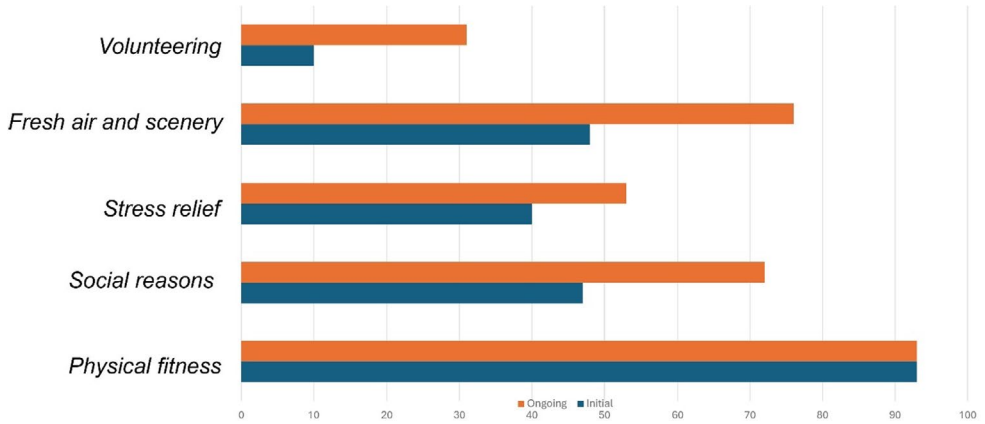

FIGURE 2 Percentage (%) overall respondents ($n=246$) self-reporting specific initial and ongoing motivating factors for parkrun participation. Significant increases from initial to ongoing motivators were all greater for women than men.

was closest to the overall response pattern, and that of *parkrun* participation overall, yet in the case of the inner London setting, there was a lower female than male response rate, with the opposite in the case of the rural Lakeland setting. This partially reflects attendance at the *parkrun* events on the day but not entirely. The data indicate that, of those attending, more males than females were prepared to take part in the research in inner London, with the opposite in the rural Lakeland setting. Only 7.7% of respondents overall were from non-White Global Majority Heritage communities, with no Global Majority Heritage respondents in the case of the rural Lakeland *parkrun*, where there is little diversity in the population (Table 1). In the case of the Inner London *parkrun*, public health data indicate that 41.7% of the population are from Global Majority Heritage groups (Table 1) yet only 26.9% of respondents were from Global Majority Heritage groups. Missing values for socio-demographic data are indicated (Table 3). The missing data are not related to other variables, so the normal assumption of missing at random (MAR) was assumed.

3.2 | What are the initial motivators for *parkrun* participation and do motivators change with ongoing engagement?

Physical fitness was the dominant initial motivating factor for *parkrun* participation overall ($n=93\%$, Figure 2, Table S2). Other factors gained less support as initial motivators (*Fresh air and scenery* (48%); *Social reasons* (47%); *Stress relief* (40%) and *Volunteering* (10%)). In the case of motivators for ongoing engagement, the role

of *Physical fitness* remained constant, yet there were highly significant increases in the role of *Fresh air and scenery* (+28%, $p < 0.001$); *Social reasons* (+25%, $p < 0.001$); *Volunteering* (+21%, $p < 0.001$); and *Stress relief* (+13%, $p = 0.004$) from initial to ongoing motivators (Figure 2).

3.2.1 | Differences in motivators by *parkrun* setting, gender and ethnicity

Further analysis by repeated measures logistic regression revealed significant differences in the role of motivators and changes from initial to ongoing motivators by *parkrun* setting and participant *gender and ethnicity*.

Social reasons

Social reasons were more important initially and increased more from initial to ongoing motivators in deprived Inner London (+30%, $p < 0.001$) and rural Lakeland (+31%, $p < 0.001$) *parkrun* settings, compared with the urban new town (+16%, $p = 0.015$) setting. The increase in *social reasons* from initial to ongoing motivating factors was significant for both women (+34%, $p < 0.001$) and men (+18% $p = 0.003$), yet it was significantly greater for women than men (+16%, $p = 0.05$). *Social reasons* increased most for British/Irish White Heritage (+29%, $p < 0.001$) participants, the only group where the increase reached significance. That the smaller changes for Global Heritage Majority (+6%, $p = 0.731$) and Other White Heritage (+25%, $p = 0.199$) participants did not reach significance partially reflects the small numbers of participants in these groups.

Stress relief

The increase in *Stress relief* from initial to ongoing motivator reported across all settings (+13%, $p = 0.004$) did not reach significance for any specific setting. It was borderline for urban new town ($p = 0.058$) and rural Lakeland ($p = 0.083$) settings, with no evidence of this in the deprived inner London setting ($p = 0.176$). Further consideration of the role of *Stress relief* by gender revealed that the overall increase in Stress relief from initial to ongoing motivator was driven by a significant increase among my female participants (+18%, $p = 0.009$), while the lower increase among men did not reach significance (+9%, $p = 0.150$). Global Majority Heritage respondents initially reported the lowest score for *Stress relief* as a motivator (35%), yet the increase for ongoing engagement (+24%, $p = 0.161$) was greatest for this group, higher than the increases for Other White Heritage (+5%, $p = 0.802$) and British/Irish White Heritage (+13%, $p = 0.012$) participants; yet for Global Majority Heritage respondents, this did not reach significance. A bigger effect size would be needed to generate significance in a group with such low numbers (7.7% participants overall).

Fresh air and scenery

The increase in the role of *Fresh air and scenery* from initial to ongoing motivator for parkrun participation was considerable, consistent and highly significant across all three parkrun settings: Urban new town (+28%, $p < 0.001$); Inner London (+26%, $p = 0.005$); and Rural Lakeland (+29%, $p < 0.001$). Focusing on *Fresh air and scenery* by gender, there was a highly significant increase from initial to ongoing motivator for both men (+22%, $p < 0.001$) and women (+33%, $p < 0.001$), with a significantly greater increase for women over men (+11%, $p = 0.05$) highlighting how women were dominantly driving this change. The role of *Fresh air and scenery* as an initial motivator (53%) was higher for Global Majority Heritage respondents than the mean for all respondents (48%), yet this remained more stable and increased less than for the other groups for ongoing engagement and did not reach significance: Global Majority Heritage respondents (+12%, $p = 0.486$), Other White Heritage (+35%, $p = 0.048$), British/Irish White Heritage (+30%, $p < 0.001$).

Volunteering

The increase in the role of *Volunteering* from initial to ongoing motivator was significant across all three settings. It was greatest in the rural Lakeland setting (+31%, $p < 0.001$), lowest in the urban new town (+15%, $p = 0.002$) and intermediate (+20%, $p = 0.010$) in the inner London setting. The increase was highly significant for both men (+20%, $p < 0.001$) and women (+26%, $p < 0.001$) and again greatest for women. The role of *Volunteering* as a motivator increased less for Global Majority Heritage (+12%, $p = 0.366$) and Other White Heritage (+11%, $p = 0.480$) participants compared with British/Irish White Heritage participants (+25%, $p < 0.001$), the only group where the increase reached significance.

3.3 | What are the self-reported benefits of *parkrun* participation?

Thematic analysis of participants responses to what they enjoyed most about *parkrun*, and how they felt before and after *parkrun* (after Braun & Clarke, 2006) generated four overlapping themes: (i) *social well-being and inclusivity*; (ii) *physical fitness*; (iii) *positive mood, endorphins and mental well-being*; and (iv) *fresh air and the aesthetics of nature* (Figure 3), with one overarching theme, *holistic health in nature*. When asked what they enjoyed most about *parkrun*, many participants across settings focused on the social dimensions and inclusivity of their *parkrun* event, reflecting the increase in the importance of social reasons as a motivator for participation reported above. Comments included:

> Friendly, collaborative, something our whole family can do', and 'Social connectedness with people.

Participants emphasised the inclusivity of *parkrun*; first, how people with different fitness levels were accepted and encouraged:

> It's just such a supportive community—that we recognise and clap everyone's effort to turn up. The inclusivity—we unite in the same struggle in overcoming our own individual battles.

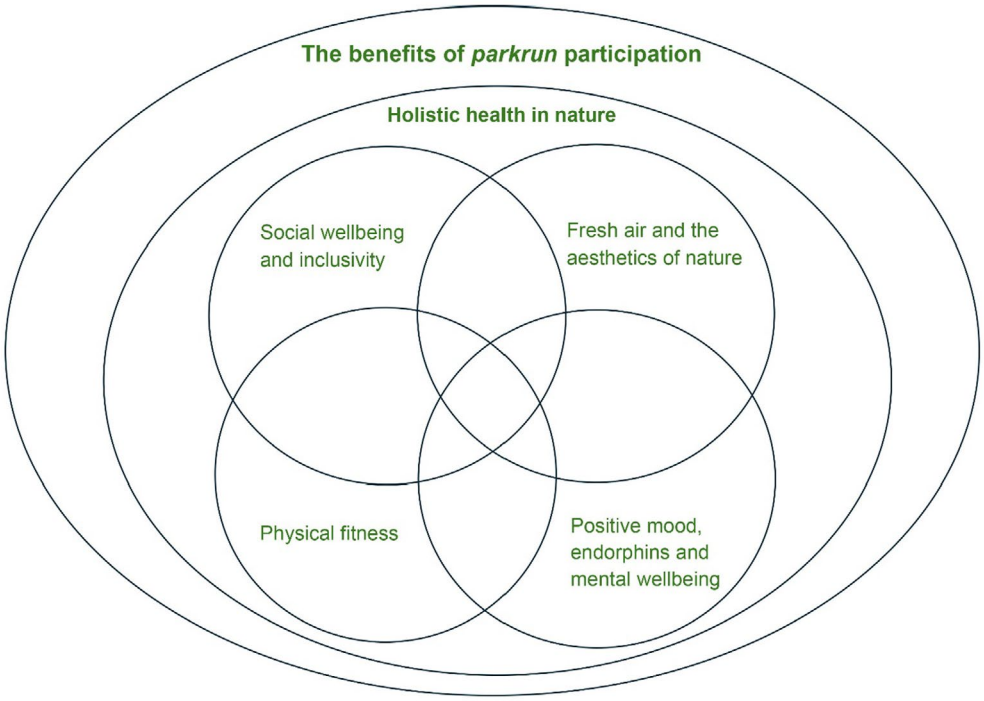

FIGURE 3 Thematic map showing the overlapping and reinforcing benefits of parkrun participation reported by participants.

Importantly, in the case of the Inner London *parkrun*, where the population and *parkrun* participants were more ethnically diverse, *parkrun* was valued as a safe, inclusive space where people from diverse backgrounds enjoyed physical exercise and positive social support:

> People are so friendly and supportive from a massive range of backgrounds. Smashes the stereotype perception that local Barking residents have no tolerance of diversity. Simply not true!', 'non-judgemental, friendly, inclusive.

Many respondents also noted an improvement in their physical fitness and/or mental health and well-being since they started doing *parkrun* on a regular basis. Three female participants described explicitly how they had been prescribed *parkrun* by a general medical practitioner, and how they valued it over a traditional medical intervention for depression, with one stating:

> as a long-term user of fluoxetine 20 mg (a medically prescribed anti-depressant) I find being outdoors and exercise better than drugs for managing mood. Nature! Greenery, water, trees!.

In the short term, when asked to reflect on how they felt in the morning before the *parkrun*, then how they felt after, some respondents reported reluctance to get up to do the *parkrun* yet the majority looked forward to the experience. The 'after' comments were dominantly positive with respondents repeatedly referring to feeling 'satisfied, happy', linked to a 'clear mind' and the sense of mood boosting endorphins and exhilaration: 'outdoor exercise and post run endorphins' as well as a sense of achievement that lasted through the weekend. One female participant stated: 'I'm a better version of me'. Participants also appreciated exercising in the fresh air and the aesthetics of nature, with one saying that after parkrun they felt: 'Fantastic, lovely to be out in a beautiful place'. The overarching theme, *holistic health in nature*, encompasses overlapping, reinforcing social, physical and mental benefits, and those gained from exercising specifically in an attractive natural environment. One female participant at Fell Foot *parkrun* most enjoyed:

> post-run swim, scenery, lake, trees, birds, flowers, hills, views. Social interaction and physical activity in the outdoors.

3.4 | Which park or greenspace characteristics do *parkrun* participants most prefer as settings for physical activity? Are natural settings preferred over built or indoor ones?

When asked about which park or greenspace characteristics they most preferred as settings for physical activity in general, respondents expressed a strong preference for natural over built or indoor environments (Figure 4). *Green spaces and parks* scored highest (4.79), followed by *along lakes and rivers* (4.74), *through woodlands* (4.49), *by the sea* (4.47) and *in wild countryside areas* (4.47). These scores were significantly higher than those for *built-up towns and cities* (urban) (3.01) and *in the gym* (1.95), which was seen as an unappealing setting for most.

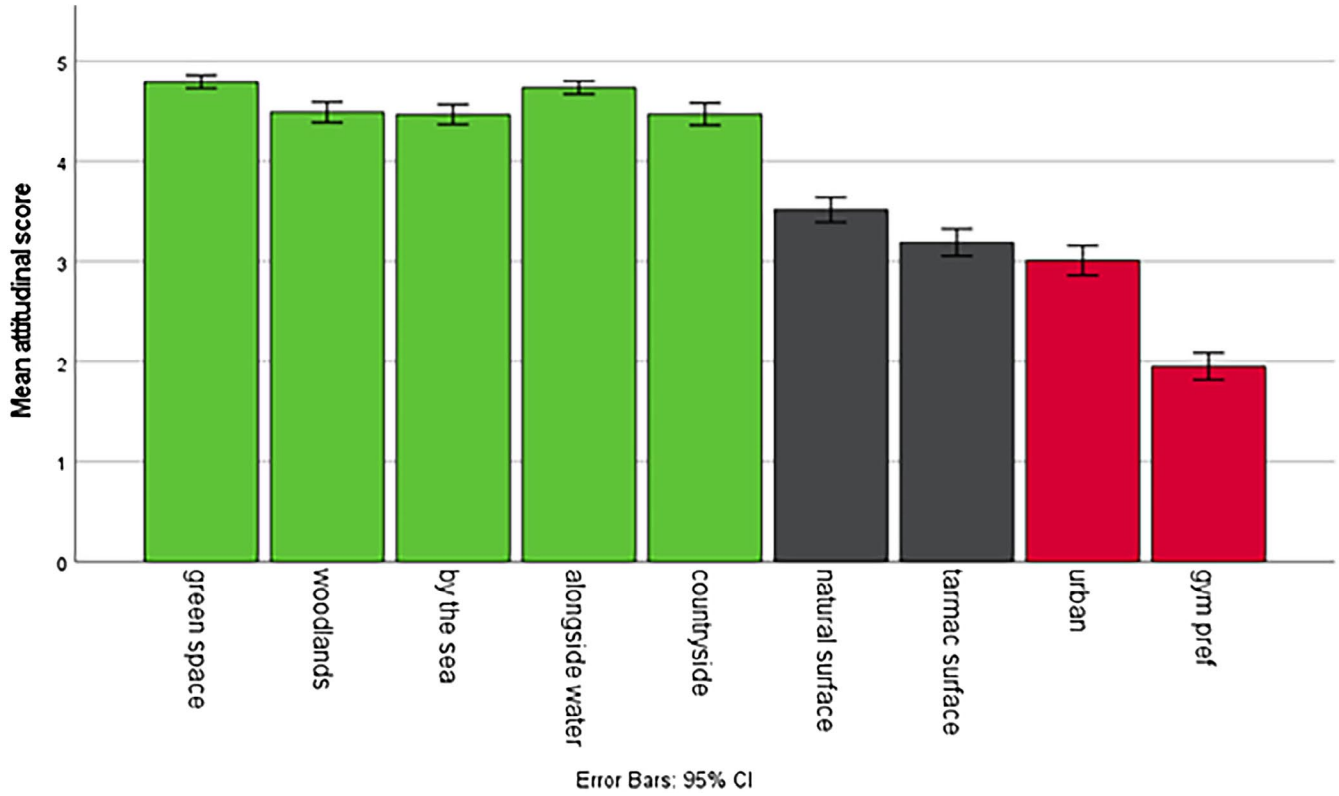

FIGURE 4 Questionnaire participants' ($n = 246$) preferences for different natural, built and indoor settings for physical activity.

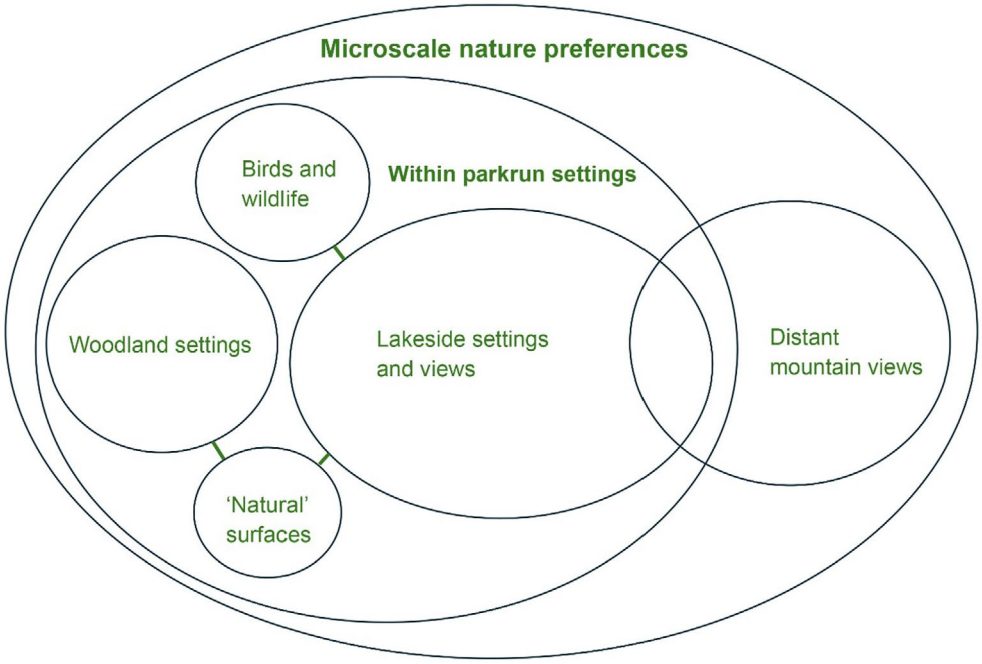

FIGURE 5 Thematic map showing participants' microscale nature preferences and the relationships between them.

Thematic analysis of microscale preference data in the form of participants' justifications for their favourite parts of their *parkrun* course they had just completed on that morning revealed two main themes directly related to the setting itself: *lakeside settings and views* and *woodland settings* (Figure 5). *Birds and wildlife* was a subtheme directly related to *lakeside settings and views*, and *natural surfaces* were another subtheme related to both lakeside and woodland settings. In the case of Fell Foot *parkrun*, in the rural Lakeland setting, the subtheme *distant mountain views* also emerged and was directly related to *lakeside settings and views*. References to the lake,

lake views and the opportunity to see related wildlife dominated in the case of all three *parkrun* settings.

At the Urban new town *parkrun*, participants commented that they appreciated 'running along water', with several referring to 'lake scenery', 'can enjoy the lake, the geese' and that 'taking in the lake calms you down'. At the Inner London parkrun participants' favourite parts of the course included 'scenery next to lake, clear view of route', 'view of the lake, birds, open spaces', with one commenting:

'I like the path near the pond, it gives me immense pleasure to run this route'. Whereas the participants in the two urban settings were more likely to comment on seeing nearby related birdlife along the lake, those at the Lakeland parkrun focused on more distant mountain views visible from the lakeside, with comments including: 'lakeside awesome scenery', 'great views of lake and mountains', 'open path along lakeshore, looking up to mountains'. At all three parkrun events participants also liked exercising alongside or through woodland settings, sometimes commenting positively on the related natural surface. They enjoyed being 'off road, through the trees', in the 'beautiful woodland'. Whereas 'least favourite' comments almost invariably referred to challenging parts of the courses, either due to uphill gradients or slippery terrain, in contrast, the 'favourite' comments dominantly reflected participants' appreciation of the scenic qualities of the parkrun course. The words 'scenery', 'scenic' and 'view' were often used to qualify the justification; 'scenic, away from houses', 'scenery next to lake', 'scenic finish' and 'nice view'.

4 | DISCUSSION

4.1 | What are the initial motivators for *parkrun* participation and do motivators change with ongoing engagement?

Findings that *Physical fitness* was the dominant initial motivator for *parkrun* participation, that *Social reasons* were important motivators of ongoing engagement and that social connectedness and inclusivity emerged as key benefits of *parkrun*, particularly in the deprived inner London setting, are consistent with previous research (Hindley, 2020; Peterson et al., 2022; Quirk et al., 2021; Stevinson et al., 2015). Peterson et al. (2022) reviewed 11 studies across the United Kingdom ($n=9$) and Australia ($n=2$), finding the main motivators for participation were to improve physical fitness and for social interaction. Social connectedness has also been highlighted as a key motivator for parkrun participation in South Africa, particularly in encouraging ongoing participation and further physical activity (Chivunze et al., 2021). The increasing number of participants drawn to volunteering at the three events is also in line with earlier findings (Stevinson et al., 2015) in relation to 'reciprocity', the opportunity to benefit oneself, while also supporting others. Yet novel findings suggest that participating in *parkrun* is more than a social run providing opportunities to volunteer. This UK study is the first to focus explicitly on the role of *Fresh air and scenery* as a motivating factor for *parkrun* participation, and to measure its changing role from an initial motivator to a motivator for ongoing engagement. The dominant increase in the role of *Fresh air and scenery* (+28%, $p<0.001$) from initial to ongoing motivator for participation across all settings indicates that the opportunity to exercise in nature, in a greenspace setting, and the aesthetics of nature within that setting are increasingly valued by participants across all three settings, with ongoing engagement. This is in line with other findings in relation to people walking through varied greenspace or planted settings in other contexts beyond *parkrun* (Hoyle, 2020; Hoyle et al., 2017, 2019).

4.2 | What are the self-reported benefits of *parkrun* participation?

In parallel with findings in relation to motivating factors, when asked what they enjoyed most about *parkrun*, four main overlapping themes emerged; *Social well-being and inclusivity*; *positive mood, endorphins and mental well-being*; *physical fitness* and *fresh air and scenery* (Figure 3). *Social well-being and inclusivity* dominated in all settings especially in the deprived ethnically diverse inner London setting. This is important because it highlights transferrable understanding with the potential to harness these social benefits, as well as the wider overlapping holistic health benefits of exercising in nature, in other deprived, diverse populations. The physical and mental health benefits of *parkrun* participation were reported. When highlighting the long-term mental well-being benefits of *parkrun* as a green prescription over a traditional medical prescription, the female participant cited earlier makes explicit links to specific types of nature experience, in the exclamation 'Nature! Greenery, water, trees!'. These findings reinforce the value of exercising in nature (Barton et al., 2016; Coon et al., 2011; Gilburn, 2023; Marselle et al., 2021; White et al., 2023) and specifically the aesthetics of nature, and its mentally restorative qualities (Hoyle et al., 2017, 2019), through the overarching theme identified here as '*holistic health in nature*.' The immediate *positive mood and endorphins* reported post-*parkrun* (Figure 3), echo earlier findings (Rogerson et al., 2016), that participating in a *parkrun* in English beach, grassland, riverside and heritage settings boosted self-esteem, lowered stress and improved mood pre- to post-*parkrun*, yet it is always possible that positive mood-boosting effects and the sense of achievement reported post-*parkrun* may reflect the impact of having completed exercise and the 5 k event, rather than the benefits of nature contact per se.

4.3 | Which park or greenspace characteristics do *parkrun* participants most prefer as settings for physical activity? Are natural settings preferred over built or indoor ones?

Findings (Figure 4) confirm earlier evidence for the value of physical activity in nature over built (Bodin & Hartig, 2003; Bowler et al., 2010) and indoor settings (Focht, 2009; Teas et al., 2007).

Participants most preferred *green spaces and parks* as general settings for walking or running, confirming their importance as venues for life-enhancing physical activity (Shanahan et al., 2016; White et al., 2016). Running and walking *alongside water* also rated highly among participants, supporting the restorative value of blue spaces (White et al., 2020).

This is the first study the authors are aware of to focus on participants' preference for microscale variability in greenspace characteristics within an individual *parkrun* course, with all three *parkrun* settings incorporating a lake, areas of woodland, open greenspace and asphalt surfaces. Microscale preference data confirmed an appreciation of running and walking in lakeside settings with views, often related to associated birds and wildlife, usually birds or through and alongside woodlands, while highlighting the value of the scenic, aesthetic qualities of nature. This highlights how specific types of green or blue nature setting are important in eliciting different human aesthetic and emotional responses (Hoyle, 2020; Hoyle et al., 2017, 2019). Participants in the two urban *parkrun* settings (Stevenage and Barking) appreciated nearby nature (Natural England, 2010), lakeside views of nearby birdlife, whereas in the case of Fell Foot *parkrun*, in the rural Lake District National Park, participants appreciated wider landscape scale vistas; distant mountain views, highlighting the importance of landscape scale in preference (Tveit, 2009). Previous research has documented how these preferences may be related to 'socio-cultural and geographical contextual factors', (Hoyle, 2020, p. 27), including gender, education, profession, nature-connectedness, as well as migration background in the case of Global Majority participants.

4.4 | How do these motivations and benefits vary across populations with contrasting socio-cultural characteristics, with a focus on more deprived, inactive populations?

Findings highlight significant differences between women and men in motivating factors for initial and ongoing participation. Increases in the role of *Fresh air and scenery*, *Social reasons*, *Stress relief* and *Volunteering* from initial to ongoing motivating factors were all greater for women than for men, showing women were dominantly driving the overall increases, particularly in the case of *Stress relief*, where for men, the change did not reach significance. This is in line with previous research findings that women perceived walking through designed planting of varying degrees of naturalness more mentally restorative than did men (Hoyle et al., 2019). It suggests that women may have most to gain from the multiple, synergistic benefits of physical activity in different natural environments (Hartig et al., 2014; Marselle et al., 2021; Robinson et al., 2024; White et al., 2023).

Global Majority Heritage respondents initially reported the lowest score for *Stress relief* as a motivator, but the increase from initial to ongoing motivator for this group was higher than for respondents in other groups. This indicates that, for Global Majority Heritage participants, ongoing participation in *parkrun* is a means to improving physical fitness and reducing mental stress. Notably, these differences did not reach statistical significance, partially reflective of the low number of participants within this group in the overall sample. In contrast, for Global Majority Heritage participants, the importance of *Social reasons*, *Fresh air and scenery* and *Volunteering* increased less from initial to ongoing motivating factors than in the case of British/Irish White Heritage participants. The role of Fresh air and scenery remained more stable and increased less than for the other groups for ongoing engagement. This might reflect the fact that Global Majority Heritage participants were dominantly in an inner London urban setting where Fresh air and scenery were less obviously accessible, or cultural differences, whereby Global Majority Heritage communities place less emphasis on the scenic value of nature (Schouten, 2005).

Most Global Majority Heritage respondents participated in the inner London *parkrun*, where participants may have the most to gain in terms of fitness, and improved physical and mental health (Quirk et al., 2021) (Table 1; Office for Health improvement and Disparities, 2023). In the case of the Inner London, *parkrun* public health data indicates that 41.7% population are from Global Majority Heritage groups (Table 1), yet only 26.9% questionnaire respondents were from these groups. This is in line with previously cited UK research showing that areas of higher Global Majority Heritage density have lower parkrun participation rates (Smith et al., 2020) independent of deprivation. These findings are important in themselves as they suggest these participants may experience barriers to accessing the 'holistic health in nature' benefits enjoyed by White and Other White participants. Barriers might include childcare responsibilities, insufficient time, an inconvenient start time, illness and injury (Reece et al., 2022). For Global Majority Heritage communities where English is not their first language, these may also related to language challenges in relation to the online registration process and need to generate a bar code to participate or broader differences in cultural norms (Gaines Jr. et al., 1997).

5 | LIMITATIONS

parkrun participants self-selected in making the decision to participate in physical activity in a park environment, so it cannot be assumed that their perceptions and experiences represent those of people who do not participate in *parkrun* or any other activity in a park or natural environment, for example, the inactive, or those who exercise in indoor gym environments. As recognised (Quirk, 2024), further research is needed with non-participants to better understand the barriers to participation among underrepresented groups. Further limitations relate to the interpretability and transferability of findings in relation to Global Majority Heritage participants. First, the aggregation of specific non-White ethnic groups into one category, Global Majority Heritage, means there are no findings relating to specific ethnic identities which had meaning for the participants themselves. Second, even when aggregated as one group, the relatively small proportion of Global Majority Heritage participants

overall limited statistical analysis and wider transferable application, so the results in relation to these participants need to be interpreted with caution. Finally, each *parkrun* course included microscale variability in greenspace characteristics incorporating lakeside, woodland and open greenspace. Microscale nature preferences within *parkrun* courses where these three characteristics are absent cannot therefore be inferred from these findings.

6 | CONCLUSIONS, IMPLICATIONS FOR POLICY AND PRACTICE AND FURTHER RESEARCH

Physical fitness was the dominant initial motivator for *parkrun* participation across all settings, yet for ongoing engagement, there were significant increases from initial to ongoing motivating factors for *Fresh air and scenery* (+28%, $p<0.001$); *Social reasons* (+25%, $p<0.001$); *Volunteering* (+21%, $p<0.001$) and *Stress relief* (+13%, $p=0.004$). All these increases from initial to ongoing motivating factors were greater for women than for men. *Social reasons* increased significantly as a motivator in all settings, notably within the deprived inner London setting (+30%, $p<0.001$) where participants valued parkrun for its inclusivity. *Stress relief* increased most as a motivator among Global Majority Heritage participants, although this did not reach significance (+24%, $p=0.161$). The highly significant increase in importance of *Fresh air and scenery* from initial to ongoing motivator across all three parkrun settings: Urban new town (+28%, $p<0.001$), Inner London (+26%, $p=0.005$) and Rural Lakeland (+29%, $p<0.001$) are in line with findings that participants preferred green exercise in natural environments over exercise in built settings or indoors, with particular appreciation of *parks and greenspaces* and *alongside water*. Findings in relation to participants' responses to variability at the microscale within a varied *parkrun* course show they most appreciated the aesthetic and psychological benefits of opportunities to exercise next to water and through woodlands.

These findings suggest that women and people in deprived ethnically diverse settings might have most to gain from *parkrun* as an active green health intervention over clinically prescribed medication. This has meaningful and potentially transformative implications for addressing health inequalities more widely. Public health policymakers and practitioners might focus on developing further active green interventions beyond *parkrun* to increase equitable access to and engagement with outdoor natural settings among populations most in need.

Governments and green infrastructure planners might prioritise funding and delivering life-enhancing parks and greenspaces to enable the holistic health benefits of physical activity in nature. Within park settings, landscape designers and managers should be aware of the aesthetic and psychological benefits of opportunities to exercise next to water and through woodlands.

The low number of participants from Global Majority Heritage ethnicities, even within the deprived, ethnically diverse inner London setting, confirms that further research is urgently needed to understand the motivations, perceptions and break down the barriers experienced by underrepresented groups who do not participate in *parkrun* or other physical activity programmes in nature, enabling them to access the synergistic benefits of physical activity in natural environments reported. If co-designed with women and Global Heritage communities in deprived areas, this has the potential to reduce health inequalities by making the holistic health benefits of physical activity in nature more accessible to the populations most in need.

AUTHOR CONTRIBUTIONS

The author conceived the ideas and designed the methodology, collected and analysed the data and wrote the manuscript.

ACKNOWLEDGEMENTS

This research was funded by a University of the West of England (UWE Bristol) Vice Chancellor's Early Career Research Award. The authors thank all research participants and event leaders at Stevenage, Barking and Fell Foot parkrun UK events, and the parkrun Research Board for endorsing this research. The authors also thank Jean Russell for her invaluable advice on statistical methods and analysis.

CONFLICT OF INTEREST STATEMENT

Nothing to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in ORDA at http://doi.org/10.15131/shef.data.29635460.

ORCID

Helen E. Hoyle https://orcid.org/0000-0001-9036-4147

REFERENCES

Barton, J., Bragg, R., Wood, C., & Pretty, J. (2016). *Green exercise: Linking nature, health and well-being*. Routledge.

Bodin, M., & Hartig, T. (2003). Does the outdoor environment matter for psychological restoration gained through running? *Psychology of Sport and Exercise*, *4*, 141–153.

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, *10*, 456.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Braun, V., & Clarke, V. (2014). What can "thematic analysis" offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-Being*, *9*, 26152.

Cardinali, M., Beenackers, M. A., van Timmeren, A., & Pottgiesser, U. (2023). Preferred reporting items in green space health research. Guiding principles for an interdisciplinary field. *Environmental Research*, *228*, 115893.

Chivunze, E., Burgess, T. L., Carson, F., & Buchholtz, K. (2021). Motivation and behaviour change in parkrun participants in the Western Cape Province, South Africa. *International Journal of Environmental Research and Public Health*, *18*(15), 8102.

Cleland, V., Nash, M., Sharman, M. J., & Claflin, S. (2019). Exploring the health-promoting potential of the "parkrun" phenomenon: What

factors are associated with higher levels of participation? *American Journal of Health Promotion*, *33*(1), 13–23.

Collins, C., Haase, D., Heiland, S., & Kabisch, N. (2022). Urban green space interaction and wellbeing—investigating the experience of international students in Berlin during the first COVID-19 lockdown. *Urban Forestry & Urban Greening*, *70*, 127543.

Coon, J. T., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental Science & Technology*, *45*(5), 1761–1772.

Elliottline.com. (2024). parkrun STATS. https://www.elliottline.com/parkrun

Fairburn, J., Walker, G., & Smith, G. (2005). Investigating environmental justice in Scotland: Links between measures of environmental quality and social deprivation.

Fischer, L. K., Honolda, J., Cvejićd, R., Delshammare, T., Hilbert, S., Lafortezzah, R., Nastrand, M., Nielsenj, A. B., Pintard, M., van der Jagt, A. P. N., & Kowarika, I. (2018). Beyond green: Broad support for biodiversity in multicultural European cities. *Global Environmental Change*, *49*, 35–45.

Focht, B. C. (2009). Brief walks in outdoor and laboratory environments: Effects on affective responses, enjoyment, and intentions to walk for exercise. *Research Quarterly for Exercise and Sport*, *2009*(80), 611–620.

Frantzeskaki, N. (2019). Seven lessons for planning nature-based solutions in cities. *Environmental Science & Policy*, *93*, 101–111.

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, P. H., Jr., Lawler, J. J., Levin, P. S., Tandon, P. S., Varanasi, U., Wolf, K. L., & Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives*, *125*, 075001.

Fullagar, S., Petris, S., Sargent, J., Allen, S., Akhtar, M., & Ozakinci, G. (2020). Action research with parkrun UK volunteer organizers to develop inclusive strategies. *Health Promotion International*, *35*(5), 1199–1209.

Gaines, S. O., Jr., Marelich, W. D., Bledsoe, K. L., Steers, W. N., Henderson, M. C., Granrose, C. S., Barájas, L., Hicks, D., Lyde, M., Takahashi, Y., Yum, N., Ríos, D. I., García, B. F., Farris, K. R., & Page, M. S. (1997). Links between race/ethnicity and cultural values as mediated by racial/ethnic identity and moderated by gender. *Journal of Personality and Social Psychology*, *72*(6), 1460–1476. https://doi.org/10.1037/0022-3514.72.6.1460

Gilburn, A. (2024). Green exercise, blue spaces and active leisure events: the performance of new participants is associated with their response to event characteristics. *Journal of Global Sport Management*, 1–20. https://doi.org/10.1080/24704067.2024.2327073

Gilburn, A. S. (2023). Predictors of successful return to parkrun for first-time adult participants in Scotland. *PLOS Global Public Health*, *3*(8), e0001786. https://doi.org/10.1371/journal.pgph.0001786

Grunseit, A. C., Huang, B.-H., Merom, D., Bauman, A., Cranney, L., & Rogers, K. (2023). Patterns and correlates of participation in a weekly mass participation physical activity event, parkrun, in Australia, 2011–2020. *Journal of Physical Activity & Health*, *21*, 155–163. https://doi.org/10.1123/jpah.2023-0532

Haake, S., Quirk, H., & Bullas, A. (2022). Parkrun and the promotion of physical activity: Insights for primary care clinicians from an online survey. *British Journal of General Practice*, *72*(722), e634–e640. https://doi.org/10.3399/BJGP.2022.0001

Hartig, T., Mitchell, R., DeVries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, *35*, 207–228 Environ 15 (9): 510–516. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hillsdon, M., Thorogood, M., Anstiss, T., & Morris, J. (1995). Randomized controlled trials of physical-activity promotion in free-living populations—A review. *Journal of Epidemiology and Community Health*, *49*(5), 448–453.

Hindley, D. (2020). More than just a run in the park: An exploration of parkrun as a shared leisure space. *Leisure Sciences*, *2018*, 1–21.

Hoyle, H. (2020). What is urban nature and how do we perceive it? In N. Dempsey & J. Dobson (Eds.), *Naturally challenged: Contested perceptions and practices in urban green spaces. Cities and nature*. Springer.

Hoyle, H. (2021). Climate-adapted, traditional or cottage-garden planting? Public perceptions, values and socio-cultural drivers in a designed garden setting. *Urban Forestry & Urban Greening*, *65*, 12736.

Hoyle, H., & Cottrill, W. (2023). Engaging children in diverse communities in co-producing an arboretum-meadow: Professional partner perspectives. *Urban Forestry & Urban Greening*, *81*, 127847 Beyond the 'usual suspects'?

Hoyle, H., Hitchmough, J. D., & Jorgensen, A. (2017). All about the 'wow factor'? The relationships between aesthetics, restorative effect and perceived biodiversity in designed urban planting. *Landscape and Urban Planning*, *164*, 109–123. https://doi.org/10.1016/j.landurbplan.2017.03.011

Hoyle, H., Jorgensen, A., & Hitchmough, J. D. (2019). What determines how we see nature? Perceptions of naturalness in designed urban green spaces. *People and Nature*, *1*, 167–180.

Hunter, R. F., Christian, H., Veitch, J., Astell-Burt, T., Hipp, J. A., & Schipperijn, J. (2015). The impact of interventions to promote physical activity in urban green space: A systematic review and recommendations for future research. *Social Science & Medicine*, *124*, 246–256.

Jennings, V., Larson, L., & Yun, J. (2016). Advancing sustainability through urban green space: Cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health*, *13*(2), 196. https://doi.org/10.3390/ijerph13020196

Jones, A., Hillsdon, M., & Coombes, E. (2009). Greenspace access, use, and physical activity: Understanding the effects of area deprivation. *Preventive Medicine*, *49*, 500–505.

Kang, N., Bell, S., Ward Thompson, C., Zheng, M., Xu, Z., & Sun, Z. (2022). Use of urban residential community parks for stress management during the COVID-19 lockdown period in China. *Frontiers in Psychology*, *13*, 816417. https://doi.org/10.3389/fpsyg.2022.816417

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.

Kuo, M. (2015). How might contact with nature promote human health? Promising mechanisms and a possible central pathway. *Frontiers in Psychology*, *6*, 1093. https://doi.org/10.3389/fpsyg.2015.01093

Li, X., Zhang, C., Li, W., & Kuzovkina, Y. A. (2016). Environmental inequities in terms of different types of urban greenery in Hartford, Connecticut. *Urban Forestry & Urban Greening*, *18*, 163–172. https://doi.org/10.1016/j.ufug.2016.06.002

Marselle, M. R., Hartig, T., Cox, D. T. C., de Bell, S., Knapp, S., Lindley, S., TrigueroMas, M., Bohning-Gaese, K., Braubach, M., Cook, P. A., de Vries, S., HeintzBuschart, A., Hofmann, M., Irvine, K. N., Kabisch, N., Kolek, F., Kraemer, R., Markevych, I., Martens, D., … Bonn, A. (2021). Pathways linking biodiversity to human health: A conceptual framework. *Environment International*, *150*, 106420. https://doi.org/10.1016/j.envint.2021.106420

McKinney, M. L. (2002). Urbanization, biodiversity, and conservation. *Bioscience*, *52*(10), 883–890.

McKinsey Global Institute. (2014). Overcoming obesity: An initial economic analysis. Discussion paper. https://www.mckinsey.com/~/media/mckinsey/business%20functions/economic%20studies%20temp/our%20insights/how%20the%20world%20could%20better%20fight%20obesity/mgi_overcoming_obesity_full_report.ashx

National Health Service. (2022). 5 steps to mental wellbeing. https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/five-steps-to-mental-wellbeing/

National Institute for Health Care Excellence. (2008). Physical activity and the environment. NICE Public Health Guidance 8.

National Institute for Health Care Excellence. (2012). Walking and cycling: Local measures to promote walking and cycling as forms of travel. NICE Public Health Guidance 41.

Natural England. (2010). Nearby Nature—Accessible Natural Greenspace. http://www.ukmaburbanforum.co.uk/docunents/other/nature_nearby.pdf

Office for Health improvement and Disparities. (2023). Local Health—Small area public health data. https://fingertips.phe.org.uk/profile/local-health/data

Organisation for Economic Co-operation and Development (OECD). (2018). Factsheet on promoting mental health. http://www.oecd.org/els/health-systems/OECD-Factsheet-Mental-Health-Health-at-a-Glance-Europe-2018.pdf

parkrun Global Limited. (2024). parkrun Volunteer Hub: Mission statement. https://volunteer.parkrun.com/hc/en-us/articles/16758303640338-1-1-Mission-Statement

Patel, V., Saxena, S., Lund, C., Thornicroft, G., Baingana, F., Bolton, P., Chisholm, D., Collins, P. Y., Cooper, J. L., Eaton, J., Herrman, H., Herzallah, M. M., Huang, Y., Jordans, M. J. D., Kleinman, A., Medina-Mora, M. E., Morgan, E., Niaz, U., Omigbodun, O., … UnÜtzer, J. (2018). The lancet commission on global mental health and sustainable development. *Lancet*, *392*(10157), 1553–1598.

Peterson, B., Withers, B., Hawke, F., Spink, M., Callister, R., & Chuter, V. (2022). Outcomes of participation in parkrun, and factors influencing why and how often individuals participate: A systematic review of quantitative studies. *Journal of Sports Sciences*, *40*(13), 1486–1499.

Public Health England. (2020). Improving access to greenspace: a new review for 2020. https://assets.publishing.service.gov.uk/media/5f202e0de90e071a5a924316/Improving_access_to_greenspace_2020_review.pdf

Quirk, H. (2024). Engaging underrepresented groups in community physical activity initiatives: A qualitative study of parkrun in the UK. *BMC Public Health*, *24*(1), 804.

Quirk, H., Bullas, A., Haake, S., Goyder, E., Graney, M., Wellington, C., Copeland, R., Reece, L., & Stevinson, C. (2021). Exploring the benefits of participation in community-based running and walking events: A cross-sectional survey of parkrun participants. *BMC Public Health*, *21*, 1–15.

Reece, L., Owen, K., Graney, M., Jackson, C., Shields, M., Turner, G., & Wellington, C. (2022). Barriers to initiating and maintaining participation in parkrun. *BMC Public Health*, *22*(1), 1–9.

Robinson, J. M., Breed, A. C., Camargo, A., Redvers, N., & Breed, M. F. (2024). Biodiversity and human health: A scoping review and examples of underrepresented linkages. *Environmental Research*, *246*, 118115.

Robinson, J. M., Mavoa, S., Robinson, K., & Brindley, P. (2022). Urban centre green metrics in Great Britain: A geospatial and socioecological study. *PLoS One*, *17*(11), e0276962.

Rogerson, M., Brown, D. K., Sandercock, G., Wooller, J. J., & Barton, J. (2016). A comparison of four typical green exercise environments and prediction of psychological health outcomes. *Perspectives in Public Health*, *136*(3), 171–180.

Schouten, M. G. C. (2005). *Spiegel van de natuur: het natuurbeeld in cultuurhistorisch perspectief*. KNNV Uitgeverij.

Shanahan, D. F., Franco, L., Lin, B. B., Gaston, K. J., & Fuller, R. A. (2016). The benefits of natural environments for physical activity. *Sports Medicine*, *46*(7), 989–995.

Smith, J. L., Reece, L. J., Rose, C. L., & Owen, K. B. (2022). Improving access to public physical activity events for disadvantaged communities in Australia. *BMC Public Health*, *22*(1), 15.

Smith, R., Schneider, P., Bullas, A., Haake, S., Quirk, H., Cosulich, R., & Goyder, E. (2020). Does ethnic density influence community participation in mass participation physical activity events? The case of parkrun in England. *Wellcome Open Research*, *5*, 9.

Smith, R. A., Schneider, P. P., Cosulich, R., Quirk, H., Bullas, A. M., Haake, S. J., & Goyder, E. (2021). Socioeconomic inequalities in distance to and participation in a community-based running and walking activity: A longitudinal ecological study of parkrun 2010 to 2019. *Health & Place*, *71*, 102626.

Soga, M., & Gaston, K. J. (2016). Extinction of experience: The loss of human-nature interactions. *Frontiers in Ecology and the Environment*, *14*(2), 94–101. https://doi.org/10.1002/fee.1225

Soga, M., & Gaston, K. J. (2024). Global synthesis indicates widespread occurrence of shifting baseline syndrome. *Bioscience*, *74*(10), 686–694.

Stalsberg, R., & Pedersen, A. V. (2018). Are differences in physical activity across socioeconomic groups associated with choice of physical activity variables to report? *International Journal of Environmental Research and Public Health*, *15*, 922.

Stevinson, C., & Hickson, M. (2013). Exploring the public health potential of a mass community participation event. *Journal of Public Health*, *36*(2), 268–274.

Stevinson, C., Wiltshire, G., & Hickson, M. (2015). Facilitating participation in health-enhancing physical activity: A qualitative study of parkrun. *International Journal of Behavioral Medicine*, *22*, 170–177.

Teas, J., Hurley, T., Ghumare, S., & Ogoussan, K. (2007). Walking outside improves mood for healthy postmenopausal women. *Clinical Medicine: Oncology*, *1*, 35–43.

Tveit, M. (2009). Indicators of visual scale as predictors of landscape preference; A comparison between groups. *Journal of Environmental Management*, *90*(Issue 9), 2882–2888.

United Nations. (2018). Revision of world urbanisation prospects. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html

White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., Bone, A., Depledge, M. H., & Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Reports*, *9*(1), 1–11.

White, M. P., Elliot, L. R., Taylor, T., Wheeler, B. W., Spencer, A., Bone, A., Depledge, M. H., & Fleming, L. E. (2016). Recreational physical activity in natural environments and implications for health: A population based cross-sectional study in England. *Preventive Medicine*, *91*, 383–388.

White, M. P., Elliott, L. R., Gascon, M., Roberts, B., & Fleming, L. E. (2020). Blue space, health and well-being: A narrative overview and synthesis of potential benefits. *Environmental Research*, *191*, 110169.

White, M. P., Hartig, T., Martin, L., Pahl, S., van den Berg, A. E., Wells, N. M., Costongs, C., Dzhambov, A. M., Elliott, L. R., Godfrey, A., Hartl, A., Konijnendijk, C., Litt, J. S., Lovell, R., Lymeus, F., O'Driscoll, C., Pichler, C., Pouso, S., Razani, N., … van den Bosch, M. (2023). Nature-based biopsychosocial resilience: An integrative theoretical framework for research on nature and health. *Environment International*, *181*, 108234.

White, M. P., Pahla, S., Wheeler, B. W., Depledge, M. H., & Fleming, L. E. (2017). Natural environments and subjective wellbeing: Different types of exposure are associated with different aspects of wellbeing. *Health & Place*, *45*, 77–84.

Wickramaratne, P. J., Yangchen, T., Lepow, L., Patra, B. G., Glicksburg, B., Talati, A., Adekkanattu, P., Ryu, E., Biernacka, J. M., Charney, A., Mann, J. J., Pathak, J., Olfson, M., & Weissman, M. M. (2022). Social connectedness as a determinant of mental health: A scoping review. *PLoS One*, *17*(10), e0275004. https://doi.org/10.1371/journal.pone.0275004

Wildman, J. (2003). Income related inequalities in mental health in Great Britain: Analysing the causes of health inequality over time. *Journal of Health Economics*, *22*(2), 295–312.

Withall, J., Jago, R., & Fox, K. R. (2011). Why some do but most don't. Barriers and enablers to engaging low-income groups in physical activity programmes: A mixed methods study. *BMC Public Health*, *11*, 1–13.

World Health Organisation. (2016). Urban green spaces and health. Technical report World health Organisation Copenhagen: WHO regional office for Europe. https://www.who.int/europe/publications/i/item/WHO-EURO-2016-3352-43111-60341

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Table S1. *Total parkrun participants on the days of data collection by setting and gender **(valid %).

Table S2. Respondents' initial and ongoing motivations for *parkrun* participation by setting type and participant socio-cultural characteristics.

How to cite this article: Hoyle, H. E. (2025). 'I'm a better version of me!' Increasing health equity through active green interventions: *parkrun* participants' motivators, preferences and well-being benefits. *People and Nature*, *00*, 1–18. https://doi.org/10.1002/pan3.70118