

## **parkrun participation, impact and perceived social inclusion among runners/walkers and volunteers with mental health conditions**

**Abstract:** Engagement in recreation can positively impact the physical and mental health of those experiencing mental health challenges; however, the impact of engaging in other aspects of such recreation, such as volunteering, remain largely unexplored in this population. Volunteering is known to have a wealth of health and wellbeing benefits among the general population; therefore, the impact of recreational-based volunteering for those with mental health conditions deserves to be explored. The current study sought to examine the health, social and wellbeing impacts of parkrun engagement among runners and volunteers living with a mental health condition. Participants with a mental health condition ( $N = 1661$ ,  $M(SD)_{age} = 43.4 (12.8)$  years, 66% female) completed self-reported questionnaires. A MANOVA was conducted to examine the differences in health and wellbeing impacts between those who run/walk vs. those who run/walk and volunteer, while chi-square analyses examined variables of perceived social inclusion. Findings suggest that there was a statistically significant multivariate effect of participation type on perceived *parkrun* impact ( $F(10, 1470) = 7.13$ ;  $p < 0.001$ ; Wilk's  $\Lambda = 0.954$ , partial  $\eta^2 = 0.046$ ). It was also found that for those who run/walk and volunteer, compared to those who only run/walk, *parkrun* made them more feel part of a community (56% v 29% respectively,  $X^2(1) = 116.70$ ,  $p < 0.001$ ) and facilitated them meeting new people (60% v 24% respectively,  $X^2(1) = 206.67$ ,  $p < 0.001$ ). These results suggest that the health, wellbeing, and social inclusion benefits of parkrun participation are different for those who run and volunteer, compared to those who only run. These findings may have public health implications and clinical implications for mental health treatment, as they convey that it is not simply the physical engagement in recreation that may play a role in one's recovery, but also the volunteer aspect.

**Keywords:** physical activity, sport, community-based programming, volunteering, mental health, recovery, recreation, leisure

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1           As a way of moving beyond pathologizing mental illness, there is a burgeoning  
2 emphasis on mental health recovery. Mental health recovery is conceptualized as creating a  
3 worthwhile life through relationships, social roles, and renewed self-identity (Tew et al.,  
4 2012; Watts & Higgins. 2016). Considering this, recovery frameworks have been proposed,  
5 such as the CHIME, which subsumes Connectedness, Hope and Optimism about the Future,  
6 Identity, Meaning in Life and Empowerment (Leamy et al., 2011), or its extended, and  
7 service-user informed conceptualization, the CHIME-D, which also includes Difficulties  
8 (Stuart et al., 2017). Four domains of action have been proposed for clinicians as ‘best  
9 practice’ in recovery-oriented practice: “promoting citizenship, organizational commitment,  
10 supporting personally defined recovery, and working relationship” (Le Boutillier et al., 2011,  
11 p.1474). However, Slade (2012) contends that the highly valuable domain of promoting  
12 citizenship, through improving community integration and social inclusion, has been the least  
13 researched. Social inclusion may be challenging to define and the broad scope may limit  
14 research focus. Nonetheless, social inclusion may include social participation, social support  
15 and community involvement (Filia et al., 2019). Furthermore, researchers have stressed the  
16 importance of using multi-systemic interventions that promote social inclusion and have  
17 urged clinicians to move beyond individual therapies by understanding and facilitating  
18 community-level engagement (Rhodes & De Jager, 2014; Smyth et al., 2011). Identifying  
19 ways to promote social inclusion is an important strategy for mental health recovery.

20           Recreation or leisure may be contexts in which social inclusion is promoted (Fenton  
21 et al., 2017). Community-based recreation can be understood as, “formal and informal  
22 engagement in free-time activities with others in the community” (Gallant et al., 2020, p.  
23 328). Socially inclusive programs are those in which individuals feel included and welcomed,  
24 and socially inclusive community-based recreation can lead to broadened social networks and  
25 feelings of belonging for individuals with mental illness (Fenton et al., 2016, 2017; Webber

26 et al., 2017). Sells and colleagues (2006) coined the term ‘community arenas’ to describe  
27 recreation spaces in which those with mental illness can fully participate without having to  
28 worry about being defined by their mental health challenges. These arenas may be those  
29 intended primarily for individuals with mental illness or may be public or private leisure or  
30 recreation spaces/facilities (Sells et al., 2006). It is not the actual physical space that allows  
31 for a spectrum of recovery, but rather the view and understanding that those participating are  
32 not viewed as service-users or patients, but as active community members participating in  
33 recreation (Fenton et al., 2016). Some researchers have examined these ‘community arenas’  
34 in football (Benkwitz & Healy, 2019; Benkwitz et al., 2019; Jeanes et al., 2018; Taylor &  
35 Pringle, 2021) and in outdoor or nature-based programming for mental health (Cooley et al.,  
36 2021; Hubbard et al., 2020; Picton et al., 2020). They have found activity engagement in  
37 these arenas to be enjoyable and valuable for those with mental illness, highlighting the broad  
38 benefits of activity participation on mental health, however, they focus on the activity itself.  
39 Therefore, there remains a need to also understand other forms of engagement in these arenas  
40 in other ways that are not simply actively engaging in the activity at hand.

41         Volunteering is a way that individuals can be engaged with activity in community  
42 arenas. Among those with mental illness specifically, those who volunteer self-report better  
43 health status compared to those who do not volunteer (Held et al., 2020). In a small sample of  
44 individuals with mental illness ( $N= 46$ ), those who volunteered reported greater levels of  
45 hope, better mental health outcomes, and greater medication adherence and condition  
46 management (Firmin et al., 2015). Volunteering has been proposed to have a therapeutic  
47 effect for those with mental illness (Fegan et al., 2014; Zakaria et al., 2021), by fostering  
48 feelings of productivity and self-satisfaction. Research examining volunteering and  
49 depressive symptoms revealed that social connectedness explains their relationship;  
50 highlighting that the social context in which the volunteering takes place may be just as

51 important for mental health as the volunteer role itself (Creaven et al., 2018). Nonetheless,  
52 community-based recreational programs where there are movement and volunteer  
53 components, have yet to be examined together for health and wellbeing benefits among  
54 individuals with mental health conditions. Community-based opportunities such as *parkrun*  
55 (written with a lowercase ‘p’ consistent with their branding) might offer an opportunity to  
56 holistically explore the two components of activity and volunteering.

57         The *parkrun* organisation offers free, 5-km, events wherein participants are  
58 encouraged to walk or run. The events are community-based and volunteer-led, and  
59 individuals can choose to participate as a runner/walker, a runner/walker who volunteers or a  
60 volunteer only. Approximately 20,000 individuals volunteer at *parkrun* each week in the UK,  
61 with around 175,000 volunteers each year (parkrun, 2021a). Briefly, volunteers may either be  
62 part of a permanent core team of Ambassadors or may take part on a more casual basis with  
63 no obligation (Hallett et al., 2020). These episodic or non-permanent roles include tail  
64 walking, marshalling, timekeeping and scanning barcodes, among others (parkrun, 2021b). In  
65 line with the organization’s welcoming and inclusive ethos, runners and walkers can engage  
66 in *parkrun* as often or as little as they like, with no obligations. In fact, *parkrun* actively  
67 encourages those of all speeds and abilities to participate (Hindley, 2020). As such, given the  
68 organizations’ structure provides opportunities for both running/walking and volunteering,  
69 *parkrun* could provide an opportunity to understand the unique and combined effects of  
70 running and volunteering participation on mental health recovery.

71         The purpose of the current study is to quantitatively explore the differences in  
72 *parkrun* participation impacts and perceived social inclusion outcomes among active  
73 participants (i.e., runners/walkers) and volunteers with mental a mental health condition. This  
74 raises the following specific research questions:

- 75 1. Do individuals who volunteer exclusively differ from runners/walkers who volunteer or  
76 runners/walkers (using demographic, health-related and *parkrun*-related measures)?  
77 2. Are there differences in perceived impact from running/walking at parkrun for those who  
78 run/walk and volunteer compared to those who run/walk exclusively?  
79 3. Are there differences in perceptions of social inclusion between those who run/walk and  
80 volunteer compared to those who run/walk exclusively?

81 We hypothesize that individuals who run/walk and volunteer will report more  
82 favourable *parkrun* impact outcomes compared to those who run/walk exclusively. We  
83 further hypothesize that there will be a relationship between participation type and perceived  
84 social inclusion.

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## Methods

### Participants and Procedure

89 This study is a secondary analysis of *parkrun*'s 2018 UK Health and Wellbeing  
90 Survey. Ethical approval for the initial study was granted by Sheffield Hallam University  
91 Research Ethics Committee. Additional approval for this study was granted by the *parkrun*  
92 Research Board and the University of Toronto ethics board (00040320). Full details of the  
93 initial survey have been detailed elsewhere (Quirk et al., 2021). Briefly, the original 2018  
94 study used an online survey which was emailed to all *parkrun* registrants in the UK over 16  
95 years of age. It included a range of questions relating to health, wellbeing, physical activity,  
96 parkrun participation, and impacts. The sample in this current cross-sectional study was  
97 drawn from the larger original study and includes anyone who self-reported a mental health  
98 diagnosis (currently or ever). Full details on the study's measures can be found in  
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100 *Supplementary File 1.*

### Data Analysis

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103           101 participants were removed prior to analysis as they had registered with *parkrun*  
104 but had not yet participated. Data were then screened for outliers and missing data prior to  
105 commencing analyses. Preliminary analyses included descriptive statistics (e.g., mean,  
106 standard deviations, frequencies, bivariate correlations) of the overall sample, as well as  
107 stratified subsample groups by runners/walkers vs volunteer vs runners/walkers who  
108 volunteer. At this point, volunteers were removed from subsequent analysis due to their small  
109 numbers.

110           Group differences on perceived impacts between a) runners/walkers and b)  
111 runners/walkers who volunteer were examined using MANOVA, using Wilks Lambda as the  
112 test statistic and partial eta squared to measure the effect size of the model. Cohen's *d* tests of  
113 effect size (small:  $d=0.2$ , medium:  $d= 0.5$ , large:  $d= 0.8$ ; Cohen, 1988) with 95% confidence  
114 intervals (CI) were run to compare means which statistically significantly differed in the  
115 univariate analyses. Chi-square analyses were used to assess group differences between a)  
116 runners/walkers and b) runners/walkers who volunteer for perceived social inclusion  
117 variables. Cramer's *V* was used as an estimate of effect size, with cut-offs varying depending  
118 on the amount of categories analysed (see Volker, 2006). For continuous variables that  
119 significantly differed between groups, post hoc testing was run with Tukey's HSD. For  
120 categorical variables that significantly differed between groups, chi square difference tests  
121 were run. All data were analysed using IBM SPSS Statistics (Version 26). Missing data was  
122 left in the dataset and analysed based on complete cases.

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**Results**

**Table 1.** Sample characteristics.

	<b>Overall Sample</b> <i>N</i> =1,661	<b>Runners/walkers</b> <i>N</i> = 977	<b>Runners/walkers who volunteer</b> <i>N</i> =645	<b>Volunteers</b> <i>N</i> =39
<b>Age (years) Mean (SD; n)</b>	43.43 (12.80;1,652)	41.89 <sup>a</sup> (13.37; 973)	45.66 <sup>a</sup> (11.55; 640)	45.62 (12.47; 39)
<b>Gender</b>	<b>N=1,263</b>	<b>N=714</b>	<b>N=518</b>	<b>N=31</b>
Female n (%)	828 (66%)	466 (65%)	338 (65%)	24 (77%)
Male n (%)	435 (34%)	248 (35%)	180 (35%)	7 (23%)
<b>Ethnicity</b>	<b>N=1,643</b>	<b>N=965</b>	<b>N=639</b>	<b>N=39</b>
White n (%)	1,566 (94%)	929 (95%)	600 (93%)	37 (95%)
Black, Asian, and Minority Ethnic n (%)	62 (4%)	32 (3%)	30 (5%)	0 (0%)
Rather not say n (%)	15 (0.9%)	4 <sup>ab</sup> (0.4%)	9 <sup>a</sup> (1%)	2 <sup>b</sup> (5%)
<b>Employment Status</b>	<b>N=1, 652</b>	<b>N=969</b>	<b>N=643</b>	<b>N=39</b>
Full-time paid employment	838 (51%)	503 <sup>b</sup> (51.5%)	323 <sup>c</sup> (50.1%)	12 <sup>bc</sup> (30.7%)
Full-time employment but currently on sick leave	52 (3%)	31 (3%)	19 (3%)	2 (2%)
Part-time paid employment	274 (17%)	145 (15%)	120 (19%)	9 (23%)
Fully retired	110 (7%)	63 (64%)	43 (7%)	4 (10%)
Student	118 (7%)	83 <sup>a</sup> (9%)	34 <sup>ac</sup> (5%)	1 <sup>c</sup> (3%)
Unemployed and not working	99 (6%)	65 (7%)	31 (5%)	3 (8%)
Other	161 (10%)	79 <sup>ab</sup> (8%)	73 <sup>ac</sup> (11%)	8 <sup>bc</sup> (21%)
<b>Number of physical health conditions: Mean (SD; n)</b>	1.02 (1.36; n=1,661)	0.99 <sup>a</sup> (1.32; n=977)	1.06 <sup>ac</sup> (1.37; n=645)	1.62 <sup>c</sup> (1.90; n=39)
<b>Mental Health Conditions</b>	<b>N=1,661</b>	<b>N=977</b>	<b>N=645</b>	<b>N=39</b>
Anxiety	856 (52%)	521 (53%)	316 (49%)	19 (49%)
ADHD	46 (3%)	32 (3%)	13 (2%)	1 (3%)
Alcohol or Drug Addiction	35 (2%)	26 (3%)	8 (1%)	1 (3%)
Alzheimer's/ Dementia	10 (0.6%)	3 (0.3%)	6 (0.9%)	1 (2.6%)
Autism/Asperger's	109 (7%)	73 (8%)	34 (5%)	2 (5%)



Bipolar	70 (4%)	39 (4%)	29 (5%)	2 (5%)
Depression	1,145 (69%)	657 <sup>a</sup> (67%)	465 <sup>a</sup> (72%)	23 (59%)
Eating Disorder	23 (1.4%)	16 (1.6%)	7 (1%)	0 (0%)
Learning Disability	122 (7%)	71 <sup>a</sup> (7%)	48 (7%)	3 (8%)
Panic Attacks	233 (14%)	136 (14%)	92 (14%)	5 (13%)
PTSD	153 (9%)	91 <sup>b</sup> (9%)	54 <sup>c</sup> (8%)	8 <sup>bc</sup> (21%)
Schizophrenia	14 (1%)	9 (1%)	5 (1%)	0 (0%)
OCD	3 (0.2%)	2 (0.2%)	1 (0.2%)	0 (0%)
<b>Mean mental health conditions (SD; n)</b>	1.70 (0.90; n=1,661)	1.72 (0.91; n=977)	1.67 (0.88; n=645)	1.68 (0.95; n=39)
<b>Health condition, disability, or illness</b>	<b>N=1,665</b>	<b>N=977</b>	<b>N=645</b>	<b>N=39</b>
Limited a Little	1454 (88%)	860 (88%)	569 (88%)	25 (64%)
Limited a Lot	207 (12%)	117 <sup>b</sup> (12%)	76 <sup>c</sup> (12%)	14 <sup>bc</sup> (36%)
<b>Mental Wellbeing (M, SD; n)</b>	21.49 (4.6; n= 1,560)	21.45 (4.7; n=919)	21.55 (4.5; n=603)	21.61 (4.7; n=38)
<b>Life Satisfaction (M, SD)</b>	6.13 (2.0; n=1,661)	6.1 (2.0; n=977)	6.19 (1.9; n=645)	6.05 (2.1; n=39)
<b>Subjective Health Status (M, SD; n)</b>	8.70 (4.1; n=1,612)	8.64 <sup>b</sup> (2.4; n=947)	8.69 <sup>c</sup> (2.3; n=626)	10.59 <sup>bc</sup> (4.1; n=39)
<b>Index of multiple deprivation</b>	<b>N=1,257</b>	<b>N=1,257</b>	<b>N=521</b>	<b>N=31</b>
Quartile 1	210 (17%)	123 (17%)	82 (16%)	5 (16%)
Quartile 2	289 (23%)	163 (23%)	120 (23%)	6 (19%)
Quartile 3	377 (30%)	212 (30%)	155 (30%)	10 (32%)
Quartile 4	381 (30%)	207 (29%)	164 (32%)	10 (32%)
<b>Club Status</b>	<b>N=1,263</b>	<b>N=714</b>	<b>N=518</b>	<b>N=31</b>
Attached	407 (32%)	135 <sup>a</sup> (19%)	267 <sup>ac</sup> (52%)	5 <sup>c</sup> (16%)
Unattached	856 (68%)	579 (81%)	251 (49%)	26 (84%)
<b>Mean number of parkruns run/walked per year (SD; n)</b>	12.81 (11.9; n= 858)	8.77 <sup>a</sup> (10.2; n= 404)	16.75 <sup>ac</sup> (12.2; n= 439)	5.72 <sup>c</sup> (6.9; n=15)
<b>Number of parkruns volunteered per year (M, SD; n)</b>	7.42 (9.9; n=503)	1.73 <sup>ab</sup> (4.2; n=54)	7.45 <sup>bc</sup> (9.2; n=426)	20.16 <sup>ac</sup> (17.5; n=23)
<b>Years Registered (M, SD; n)</b>	2.80 (2.5; n=1,263)	2.19 <sup>a</sup> (2.3; n=714)	3.66 <sup>ac</sup> (2.5; n= 518)	2.53 <sup>c</sup> (2.0; n= 31)

127 Note.  $p < 0.05$

128 a= Significant difference between runners/walkers and runners/walkers who volunteer

129 b= Significant difference between runners/walkers and volunteers only

130 c= Significant difference between runners/walkers who volunteer and volunteers only

131 **Descriptive Results**

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133 Descriptive statistics for the full analytical sample ( $N=1,661$ ) are presented in Table 1.

134 Briefly, participants were on average  $43.4 \pm 12.8$  years old, predominantly identified as

135 White (94%), female (66%), and with full time paid employment (51%). Depression (69%)

136 and anxiety (52%) were the most reported long-term mental health conditions in the overall

137 sample. 12% of participants reported their health condition, disability or illness as ‘limited a

138 lot’. 30% of the overall sample were from the least deprived areas according to the Index of

139 Multiple Deprivation, and 32% were club affiliated.

140 Table 1 also presents subgroup analyses which revealed significant differences on

141 some demographic and health-related variables: for instance, runners/walkers who volunteer

142 were significantly older than runners/walkers. Volunteers were less frequently in full-time

143 employment or studying, though were more frequently employed in the “Other” category.

144 Compared to the other two groups, volunteers had a higher number of physical conditions,

145 and there was a higher frequency of PTSD among volunteers. Volunteers reported their

146 conditions to limit them a lot (36%), more often than runners/walkers (12%) and

147 runners/walkers who volunteer (12%). Volunteers also reported worse subjective health

148 status compared to the other two groups, which, in combination with the aforementioned

149 results, suggests that overall volunteers were in poorer health compared to runners/walkers

150 and runners/walkers who volunteer.

151 The subgroups also differed on *parkrun*-related variables, as presented in Table 1.

152 Runners/walkers who volunteer were significantly more often part of a running club than the

153 other two subgroups and participated in significantly more *parkruns*, while volunteers (only)

154 have volunteered significantly more times, compared to their respective other groups. Finally,

155 runners/walkers who volunteer were registered with *parkrun* for significantly longer ( $3.66 \pm$

156  $2.48$  years) than runners/walkers ( $2.19 \pm 2.25$  years) or volunteers ( $2.53 \pm 2.02$  years). After

157 having run the descriptive statistics, those who identified as volunteers only ( $n=39$ ) were  
 158 removed from further analysis due to their small numbers, and the subsequent analyses  
 159 focused solely on runner/walkers vs. runners/walkers and volunteers.

160 **Main Results**

161 There was a statistically significant multivariate effect of participation type on  
 162 perceived *parkrun* impact ( $F(10, 1470) = 7.13; p < 0.001$ ; Wilk's  $\Lambda = 0.954$ , partial  $\eta^2 =$   
 163  $0.046$ ), based on a one-way MANOVA. Univariate analyses revealed that participation type  
 164 had a statistically significant effect on physical health ( $d = 0.15$ ), mental health ( $d = 0.18$ ),  
 165 fitness ( $d = 0.20$ ), happiness ( $d = 0.23$ ), time spent outdoors ( $d = 0.27$ ), and management of  
 166 their condition ( $d = 0.27$ ) with those who run/walk and volunteer reporting higher scores (see  
 167 Table 2).

168 **Table 2.** Univariate comparisons for the impact of running/walking at *parkrun* for  
 169 runners/walkers compared to runners/walkers who volunteer.  
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	<b>F</b> (1, 1,479)	<b>p</b>	<b>Runners/ walkers</b> <b>Mean (SD)</b>	<b>Runner/walkers who</b> <b>volunteer</b> <b>Mean (SD)</b>	<b>Cohen's d</b> <b>Effect size</b> <b>[95% CI]</b>
<b>Time spent outdoors</b>	26.47	<0.001	3.91 (0.67)	4.09 (0.66)	0.27 [0.17, 0.37]
<b>Condition Management</b>	25.74	<0.001	3.80 (0.67)	3.98 (0.66)	0.27 [0.17, 0.37]
<b>Happiness</b>	17.81	<0.001	3.88 (0.67)	4.03 (0.65)	0.23 [0.12, 0.32]
<b>Fitness</b>	13.92	<0.001	4.06 (0.63)	4.19 (0.64)	0.20 [0.10, 0.30]
<b>Mental Health</b>	12.63	<0.001	3.95 (0.66)	4.07 (0.67)	0.18 [0.08, 0.28]
<b>Physical Health</b>	9.44	0.002	3.97 (0.62)	4.07 (0.67)	0.15 [0.05, 0.26]
<b>Confidence</b>	3.96	0.048	3.76 (0.73)	3.84 (0.73)	0.12 [0.01, 0.21]
<b>Ability to be active in safe environment</b>	1.29	0.260	3.88 (0.74)	3.93 (0.76)	0.07 [0.03, 0.17]
<b>Personal achievement</b>	0.729	0.390	4.15 (0.69)	4.18 (0.69)	0.04 [0.05, 0.14]
<b>Overall lifestyle choices</b>	0.352	0.550	3.69 (0.70)	3.67 (0.73)	0.03 [0.07, 0.13]

171 *Note: N=1,481*

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173           There were significant differences between participation type and perceived social  
174 inclusion variables (see Table 3 for chi-square coefficients). Compared to runners/walkers, a  
175 greater percentage of runners/walkers who volunteer reported that *parkrun* made them feel  
176 part of a community (29% v 56% respectively, medium effect size= 0.27). A greater  
177 percentage of runners/walkers reported feeling that *parkrun* made no difference (26% v 13%,  
178 small effect size= -0.13). Compared to runners/walkers, a greater percentage of  
179 runners/walkers who volunteer reported that *parkrun* facilitated meeting new people (24% v  
180 60% respectively, large effect size=0.36), and enhanced their interest in joining a new club  
181 (13% v 29% respectively, small effect size= 0.19). Further, a greater percentage of  
182 runners/walkers who volunteer, compared to runners/walkers only, reported interacting with  
183 a greater number of others at the runs (43% v 12% respectively, large effect size= 0.37). This  
184 included both those known to the participants (78% v 62% respectively, small effect size=  
185 0.16), and those unknown (79% v 50% respectively, small effect size= 0.29).

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198 Table 3. Comparison of perceptions of social inclusion for those participating as  
 199 runners/walkers and runners/walker who volunteer.  
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Variable <i>n</i> (%):	Runners/ walkers N=972	Runners/walkers who volunteer N=413	X <sup>2</sup>	<i>p</i>	Cramer's V Effect Size	
					Value	Size
<b>Met New People</b>	238 (24%)	386 (60%)	206.67	<0.001	0.36	Large
<b>Feel Part of Community</b>	282 (29%)	359 (56%)	116.7	< 0.001	0.27	Medium
<b>Joined Group/Club</b>	129 (13%)	186 (29%)	60.68	<0.001	0.19	Small
<b>No Difference</b>	258 (26%)	83 (13%)	42.89	< 0.001	-0.16	Small
<b>Interact (0-1)</b>	466 (48%)	139 (22%)	223.45	0.001	0.37	Large
<b>Interact (2-3)</b>	389 (40%)	226 (35%)				
<b>Interact (4+)</b>	122 (12%)	280 (43%)				
<b>Interact Known</b>	613 (62%)	504 (78%)	42.95	< 0.001	0.16	Small
<b>Interact Unknown</b>	490 (50%)	509 (79%)	135.85	< 0.001	0.29	Small

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### Discussion

205 The current study sought to explore the impact of *parkrun* participation on those who  
 206 self-identify themselves with a mental health condition. We found significant differences in  
 207 impact on health condition, mental health, and wellbeing for those who run/walk vs. those  
 208 who run/walk and volunteer. As hypothesized, those who run/walk and volunteer reported  
 209 greater improvements, beyond those of simply running or walking. However, further research  
 210 is needed to understand whether these scores reflect that volunteering amplifies the  
 associations. Furthermore, social inclusion perceptions were different based on participation

211 type. Those who run/walk and volunteer were significantly more likely to feel part of a  
212 community, to have joined a group or club since starting at *parkrun*, and to interact more  
213 with others. Taken together, the findings from this study extend what is already known about  
214 activity engagement, health, and wellbeing for those with mental health conditions, and  
215 suggest that adding a volunteering component to one's activity engagement may add  
216 additional health, wellbeing, and social inclusion benefits.

217 *parkrun* participation has a range of health and wellbeing benefits for the general  
218 population, and clinicians could convey these benefits to their patients (Fleming et al., 2020).  
219 However, the current findings of the correlation between impact and participation type, with  
220 those who run/walk and volunteer more frequently reporting greater *parkrun* participation  
221 impacts, may have additional practical and clinical implications. As Slade (2012) contends, to  
222 improve community integration and social inclusion for those with serious mental illness,  
223 clinicians ought to support service users to create connections and to embed themselves  
224 within inclusive communities. In this way, the role of the clinician is not simply to administer  
225 treatments, but also to promote service user recovery more broadly (Slade, 2012). This may  
226 be done through prescriptions or referrals to *parkrun*. Similarly, Rhodes & De Jager (2014)  
227 have emphasized that community-based initiatives may be adjunct and simultaneous recovery  
228 tools with traditional individual therapy for individuals with mental health conditions. In their  
229 systematic review of narrative studies, Rhodes and De Jager (2014) found that participants  
230 mentioned professionals in their recovery journeys, but also noted family and community as  
231 being even more vital to their recovery. Indeed, the wider community is already being  
232 utilised in many contemporary therapies for serious mental illness, such as Multisystemic  
233 Therapy for young offenders (Littell et al., 2021), Multi-Family Therapy for anorexia,  
234 psychosis, and mood disorders (Asen & Scholz, 2010), and community-based Open Dialogue  
235 Treatment for acute psychosis (Bergstrom et al., 2017). Though it would not be advisable to

236 recommend *parkrun* running and volunteer participation as a sole treatment, perhaps  
237 clinicians could view it as a community-based initiative that could augment service-users'  
238 ongoing care plans. As urged by Slade (2012), clinicians could take an active role in  
239 facilitating service-users' social inclusion in the initiative. The fact that *parkrun* is free,  
240 inclusive and in locations all over the UK and therefore convenient, may further facilitate the  
241 uptake of *parkrun* participation among service-users whose clinicians recommend it.

242         In addition to the physical activity aspects of the runs that are emphasized by the  
243 clinicians, the volunteer aspect is also deserving of clinical attention. Ballard and colleagues  
244 (2021) reviewed the use of community volunteering in mental health treatment approaches.  
245 They concluded that incorporating community volunteering into treatment for adolescent  
246 depression holds promise, and may strengthen communities (Ballard et al., 2021). The  
247 authors explained that volunteering clearly links with tenets of cognitive behavioural therapy,  
248 behavioural activation and positive psychology. Fegan and Cook (2014) also examined the  
249 therapeutic potential of volunteering, highlighting its potential to serve as a pathway to paid  
250 work for those experiencing mental health conditions. They recommended that mental health  
251 clinicians create care plans to incorporate volunteering opportunities into recovery-oriented  
252 services (Fegan & Cook, 2014). Therefore, our findings add to a growing momentum to  
253 utilize volunteering in mental health services and add a unique focus on recreational-based  
254 volunteering. Future research may also seek to compare whether recreation/leisure-based  
255 volunteering compared to other forms of volunteering have different impacts on mental  
256 health recovery. Furthermore, some mental health services have supported volunteering  
257 schemes wherein the service-user is supported to volunteer at the mental health hospital itself  
258 or in the local community (e.g., Oxleas NHS Foundation Trust's coordinated volunteer  
259 schemes). The emergence of *parkruns* on the grounds of mental health trusts (Bethlem Royal  
260 Hospital in South London and Fulbourn Hospital in Cambridgeshire to date) therefore

261 presents a unique opportunity whereby trusts may look to incorporate *parkrun* volunteering  
262 into established supported volunteering schemes.

263         While it has been established that participation (i.e., running) can impact social  
264 inclusion and thereby overall parkrun experiences (Davis et al., 2021), the current study  
265 suggests that volunteering, in addition to participating in organised community sport or  
266 recreation, may strengthen those factors even more. Indeed, among those with disabilities  
267 (including mental health conditions), social contacts, social support and community  
268 integration are all understood to be key factors in social participation in organised community  
269 sport (Klenk et al., 2019). The CHIME-D model of recovery positions Connectedness as an  
270 element that supports recovery, and our findings suggests that the combination of both  
271 running and volunteering may be the most effective way to foster such connectedness, in the  
272 context of parkrun. That being said, a small number of individuals in the present study  
273 reported solely volunteering or being ‘pure volunteers.’ Overall, those who volunteered only  
274 were in worse health, as evidenced by poorer self-rated health and by a higher number of  
275 conditions. It is possible that those who are volunteers only do not feel physically well  
276 enough to run, which was often the case in a broader parkrun study of those who volunteer  
277 (i.e., not just those with a mental health condition; Haake et al., 2022). Volunteering therefore  
278 may provide a way for individuals to engage with their communities and may even act as a  
279 gateway towards combined volunteering and running participation.

280         The current study’s strengths include a large sample size and a unique sample of  
281 parkrunners with a mental health condition. However, this secondary analysis was cross-  
282 sectional in nature and largely included self-reported, rather than objective measures. Only  
283 75% of those who completed the survey could be matched to the *parkrun* data held at  
284 registration, so some variables (e.g., gender) have disproportionate rates of missing variables.  
285 While the original survey was advertised and available to all parkrunners over the age of 16



286 in the UK, ultimately those who self-selected to complete this research may be those who  
287 have benefitted the most from the impacts of *parkrun*, so this bias must be considered. The  
288 participants responded to the impact items with 5 response options that were treated as  
289 continuous variables in the current study. However, it is possible that the meaning between  
290 the responses is not equal between each response option which may introduce bias in the  
291 reporting. Nevertheless, this study is original in exploring the health, wellbeing and social  
292 impacts of both *parkrun* running and volunteering among those with mental health conditions  
293 and has implications for mental health recovery research and promotion. However,  
294 prospective data and research is necessary to understand whether volunteering amplifies these  
295 impacts. These impacts may be particularly important for this population, who may  
296 experience social exclusion in other areas of their lives (Bashir et al., 2013). Webber and  
297 Fendt-Newlin (2017) reported limited evidence that supported community engagement  
298 interventions offering the strongest social network gains for those with mental health  
299 problems. Therefore, the findings from the current study add to and extend the current limited  
300 evidence base, with *parkrun* representing a community engagement intervention, which may  
301 be supported by the individuals' clinical team. Indeed, these findings also lend support to  
302 Datillo's (2018) model of education for inclusive leisure services, which advocates for  
303 inclusive leisure services through the promotion of physical, psychological, and social  
304 engagement for all.

305         While physical activity and recreational pursuits have long been recognised as  
306 beneficial for the physical and mental health of those with mental ill-health (Stubbs et al.,  
307 2018), and with clinicians recognising the benefits of physical activity on mental health  
308 (DeJonge et al., 2020), this study also provides evidence that volunteering might also be an  
309 important role for individuals to gain further benefits. Our findings therefore have important  
310 clinical implications, as they may support clinicians in endorsing or recommending

311 volunteering in the same way that they might refer to physical activity. These results also  
312 have implications for messaging for parkrun- that volunteering is just as important, and even  
313 if you feel too unwell or aren't physically able to run or walk, you can still participate  
314 through volunteering. Nonetheless, care and attention must be directed at the management  
315 and oversight of volunteers to safe and inclusive experiences. Otherwise, there is a risk that  
316 volunteering may reproduce the exclusionary features found in society more broadly (Fegan  
317 & Cook, 2014). Stuart and colleagues (2020) outlined a series of features that should be  
318 emphasized to promote volunteer wellbeing, with "Connected" and "Inclusive" being  
319 particularly relevant to the current study. Therefore, the parkrun organisation (and other  
320 recreation and community-based programming) could take steps to ensure that volunteer  
321 opportunities are fostering these important elements. Examples of this could include the  
322 hosting of volunteer social events, where volunteers can connect with volunteer managers  
323 and fellow volunteers or ensuring that volunteers have regular check-ins with their managers  
324 and have opportunities to express any concerns or suggestions they may have for the  
325 organization. Creating a parkrun environment in which those with mental health conditions  
326 feel welcome, included, and supported to run *and* volunteer will enable participants to benefit  
327 most from the program, which may ultimately benefit their broader communities as well.

328 **Conclusion:**

329 Findings suggest that there was a statistically significant multivariate effect of participation  
330 type on perceived parkrun impact. It was also found that for those who run/walk and  
331 volunteer, compared to those who only run/walk, parkrun made them more feel part of a  
332 community and facilitated them meeting new people. These results suggest that the health,  
333 wellbeing, and social inclusion benefits of parkrun participation are different for those who  
334 run and volunteer, compared to those who only run. These findings may have clinical and  
335 public health implications for mental health treatment, as they convey that it is not simply the

336 physical engagement in recreation that may play a role in one's recovery, but also the  
337 volunteer aspect. Further research is warranted to examine the longitudinal nature of the  
338 associations between volunteering and social, health and wellbeing impacts.

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## Measures

The presence of a mental health condition was ascertained by a series of options following the question: “*Are your day-to-day activities limited because of a health condition or disability which has lasted, or is expected to last, at least 12 months? Include conditions related to old age, sensory deficits, mobility problems, developmental conditions, learning impairments and mental health*” followed by a list of 56 health conditions. Any participant who answered ‘yes, limited a lot’ or ‘yes, limited a little’ to one of 13 mental health conditions (based on the International Classification of Diseases Version 11 (ICD11, World Health Organization, 2019) mental, behavioural, and neurodevelopmental disorders classification) were included in the sample. These were anxiety, ADHD, alcohol or drug addiction, Alzheimer’s/dementia, Autism/Asperger’s, bipolar, depression, eating disorder, learning disability, panic attacks, PTSD, schizophrenia and OCD. Individuals could note the presence of multiple conditions.

### ***Participant Characteristics***

**Demographics.** Respondents were also asked to provide their *parkrun* ID number to enable their survey responses to be matched to the *parkrun* database that holds their *parkrun* registration details (e.g. gender, postcode, activity level at registration) and participation information (e.g. number of *parkruns* completed and years registered). Demographic data included date of birth, gender, ethnicity, employment and socioeconomic status. Gender was assessed as Male or Female. Participants were asked to indicate which of 17 options best described their ethnicity, with an additional option of “Other ethnic group”, and a further option of “I’d rather not say”. Responses were then collapsed into Black, Asian, and Minority Ethnic, White, or Prefer not to Say. Employment was identified as full-time paid employment (self-employed, currently on maternity or paternity leave), full-time paid employment but currently on sick leave, part-time paid employment, fully, retired, student, unemployed and not working, or ‘other’ which includes homemakers, those who indicated they would rather not say, and those who are retired but still in paid employment. By using the postcodes given by participants at *parkrun* registration, socioeconomic status was assessed using the index of multiple deprivation (IMD). Specifically, the IMD uses Lower Level Super Output Areas (LSOA), which represent the units from which Population Census data is created, and onto which socio-economic contextual data is mapped by the Office of National Statistics (Office of National Statistics, 2017). IMD scores were classified into four quartiles (Q1-Q4) ranging from the most deprived areas (Q1) to the least deprived (Q4).

### ***Health and Wellbeing Measures***

***parkrun* data.** When sufficient personal details were provided to enable data matching, additional data was exported from the *parkrun* database. This included the following: postcode provided at *parkrun* registration; date of *parkrun* registration; club status at registration (attached or unattached), and total number of *parkruns* completed since registration.

**Life satisfaction, subjective health status and mental wellbeing.** Participants were asked “*Overall, how satisfied are you with your life nowadays?*” with possible responses rated on a 10-point visual analogue scale where 0 is “not at all”, and 10 is “completely.” This measure is adopted from one of four personal wellbeing questions in the UK’s Office of National Statistics (ONS) Annual Population Survey (ONS, 2018). Subjective health status was measured using the EuroQoL EQ-5D-5L (Brooks & Group, 1996) which asks participants to describe their health that day on five dimensions (mobility, self-care, ability to undertake usual activities, pain, anxiety/depression). These dimensions are scored from no problems (1) to extreme problems (5), with possible scores ranging from 5-25. This scale has been found to be valid and reliable in a variety of settings and populations (Feng et al., 2021). The Short Warwick-Edinburgh Mental Well-being scale (SWEMWBS) (Tennant et al., 2007)



asks: “*Below are some statements about feelings and thoughts. Please tick the box that describes your experience of each over the last 2 weeks.*” Seven statements are listed asking individuals about their experiences of: feeling optimistic, feeling useful, feeling relaxed, dealing with problems well, thinking clearly, feeling close to people, able to make up my own mind about things. The seven dimensions are scored from none of the time (1) to all of the time (5), with possible scores ranging from 7 to 35. The SWEMWBS is valid and reliable among general populations, as well as service-users with diagnosed mental illness (Vaingankar et al., 2017).

**Perceived impact of running/walking at parkrun.** The perceived impact of parkrun was measured using the following: “*Thinking about the impact of parkrun on your health and wellbeing, to what extent has running or walking at parkrun changed?*” Respondents (runners/walkers or runners/walkers who volunteer) were presented with a list of 15 potential impacts in the original survey. In the current study, based on the literature and our hypotheses, ten of these impacts were analysed (“*your physical health*”, “*your mental health*”, “*your happiness*”, “*the amount of time you spend outdoors*”, “*your ability to be active in a safe environment*” “*your sense of personal achievement*”, “*your overall lifestyle choices*”, “*your confidence*”, “*your fitness*” and “*your ability to manage your health condition, disability, or illness?*”). Participants were asked to rate each one on a 5-point scale: much worse (1), worse (2), no impact (3), better (4), much better (5). The answer choices were displayed in randomised order to help reduce response bias. The final choice was “other” and, if selected, respondents were asked to specify the impact. For the current analysis, responses were re-coded into continuous variables.

### ***Perceptions of Social Inclusion***

**Social Interactions and Relationship Opportunities.** In the present study, the following questions collectively refer to an individuals’ perception of social inclusion, though previous parkrun papers have referred to them separately as Social Interactions and Relationship Opportunities respectively. Two questions were used to ascertain participants’ social interactions and relationship opportunities at parkrun using the following: “*Who do you usually interact with at parkrun? i.e., those you attend and communicate with at parkrun. Please tick all that apply*” followed by a list of options (family, friends, partner, neighbours, colleagues, members of their sports club, members of their non-sports club, strangers, other parkrun participants). The total number of interactions were calculated for each individual (0-9), and further recoded into 0-1, 2-3 and 4 or more. Additionally, interactions were coded as Unknown (the count for *strangers* plus *other parkrun participants*) and Known (the count for all others). Lastly, participants were asked: “*In terms of relationships, what opportunities has parkrun opened up for you? Please tick all that apply.*” The following response options were offered: “*I have met new people of a similar background*”; “*I have met new people of a different background*”; “*I feel closer to my existing friends or family*”; “*I feel part of my community*”; “*I have joined a sports club*”; “*I have joined a non-sports club, organisation or group*”; “*It has made no difference to me*”; and “*It has allowed me to spend time on my own.*” Joined a Club (yes/no to joined a sports club or non-sports club) and Met New People (yes/no to met new people of a similar background or met new people of a different background) were created and used as variables.