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

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

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

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

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

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

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

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

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

Methods

Participants and Procedure

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

Data Analysis

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

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

Results

Table 1. Sample characteristics.

	Overall Sample *N*=1,661	**Runners/walkers** *N*= 977	**Runners/walkers who volunteer** *N*=645	**Volunteers** *N*=39
Age (years) Mean (SD; n)	43.43 (12.80;1,652)	41.89[a] (13.37; 973)	45.66[a] (11.55; 640)	45.62 (12.47; 39)
Gender	**N=1,263**	**N=714**	**N=518**	**N=31**
Female n (%)	828 (66%)	466 (65%)	338 (65%)	24 (77%)
Male n (%)	435 (34%)	248 (35%)	180 (35%)	7 (23%)
Ethnicity	**N=1,643**	**N=965**	**N=639**	**N=39**
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[ab] (0.4%)	9[a] (1%)	2[b] (5%)
Employment Status	**N=1, 652**	**N=969**	**N=643**	**N=39**
Full-time paid employment	838 (51%)	503 [b] (51.5%)	323[c] (50.1%)	12[bc] (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[a] (9%)	34 [ac] (5%)	1[c] (3%)
Unemployed and not working	99 (6%)	65 (7%)	31 (5%)	3 (8%)
Other	161 (10%)	79[ab] (8 %)	73 [ac] (11%)	8[bc] (21%)
Number of physical health conditions: Mean (SD; n)	1.02 (1.36; n=1,661)	0.99[a] (1.32; n=977)	1.06[ac] (1.37; n=645)	1.62[c] (1.90; n=39)
Mental Health Conditions	**N=1,661**	**N=977**	**N=645**	**N=39**
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[a] (67%)	465[a] (72%)	23 (59%)
Eating Disorder	23 (1.4%)	16 (1.6%)	7 (1%)	0 (0%)
Learning Disability	122 (7%)	71/ (7%)	48(7%)	3 (8%)
Panic Attacks	233 (14%)	136 (14%)	92 (14%)	5 (13%)
PTSD	153 (9%)	91[b] (9%)	54[c] (8%)	8[bc] (21%)
Schizophrenia	14 (1%)	9 (1%)	5 (1%)	0 (0%)
OCD	3 (0.2%)	2 (0.2%)	1 (0.2%)	0 (0%)
Mean mental health conditions (SD; n)	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)
Health condition, disability, or illness	**N=1,665**	**N=977**	**N=645**	**N=39**
Limited a Little	1454 (88%)	860 (88%)	569 (88%)	25 (64%)
Limited a Lot	207 (12%)	117[b] (12%)	76[c] (12%)	14[bc] (36%)
Mental Wellbeing (M, SD; n)	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)
Life Satisfaction (M, SD)	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)
Subjective Health Status (M, SD; n)	8.70 (4.1; n=1,612)	8.64[b] (2.4; n=947)	8.69[c] (2.3; n=626)	10.59[bc] (4.1; n=39)
Index of multiple deprivation	**N=1,257**	**N=1,257**	**N=521**	**N=31**
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%)
Club Status	**N=1,263**	**N=714**	**N=518**	**N=31**
Attached	407 (32%)	135[a] (19%)	267[ac] (52%)	5/[c] (16%)
Unattached	856 (68%)	579 (81%)	251 (49%)	26 (84%)
Mean number of parkruns run/walked per year (SD; n)	12.81 (11.9; n= 858)	8.77[a] (10.2; n= 404)	16.75[ac] (12.2; n= 439)	5.72[c] (6.9; n=15)
Number of parkruns volunteered per year (M, SD; n)	7.42 (9.9; n=503)	1.73[ab] (4.2; n=54)	7.45[bc] (9.2; n=426)	20.16[ac] (17.5; n=23)
Years Registered (M, SD; n)	2.80 (2.5; n=1,263)	2.19[a] (2.3; n=714)	3.66[ac] (2.5; n= 518)	2.53[c] (2.0; n= 31)

Note. p <0.05

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

b= Significant difference between runners/walkers and volunteers only

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

Descriptive Results

Descriptive statistics for the full analytical sample (*N*=1,661) are presented in Table 1. Briefly, participants were on average 43.4 ± 12.8 years old, predominantly identified as White (94%), female (66%), and with full time paid employment (51%). Depression (69%) and anxiety (52%) were the most reported long-term mental health conditions in the overall sample. 12% of participants reported their health condition, disability or illness as 'limited a lot'. 30% of the overall sample were from the least deprived areas according to the Index of Multiple Deprivation, and 32% were club affiliated.

Table 1 also presents subgroup analyses which revealed significant differences on some demographic and health-related variables: for instance, runners/walkers who volunteer were significantly older than runners/walkers. Volunteers were less frequently in full-time employment or studying, though were more frequently employed in the "Other" category. Compared to the other two groups, volunteers had a higher number of physical conditions, and there was a higher frequency of PTSD among volunteers. Volunteers reported their conditions to limit them a lot (36%), more often than runners/walkers (12%) and runners/walkers who volunteer (12%). Volunteers also reported worse subjective health status compared to the other two groups, which, in combination with the aforementioned results, suggests that overall volunteers were in poorer health compared to runners/walkers and runners/walkers who volunteer.

The subgroups also differed on *parkrun*-related variables, as presented in Table 1. Runners/walkers who volunteer were significantly more often part of a running club than the other two subgroups and participated in significantly more *parkruns*, while volunteers (only) have volunteered significantly more times, compared to their respective other groups. Finally, runners/walkers who volunteer were registered with *parkrun* for significantly longer (3.66 ± 2.48 years) than runners/walkers (2.19 ± 2.25 years) or volunteers (2.53 ± 2.02 years). After

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

Main Results

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 $\eta^2 = 0.046$), based on a one-way MANOVA. Univariate analyses revealed that participation type had a statistically significant effect on physical health ($d = 0.15$), mental health ($d = 0.18$), fitness ($d = 0.20$), happiness ($d = 0.23$), time spent outdoors ($d = 0.27$), and management of their condition ($d = 0.27$) with those who run/walk and volunteer reporting higher scores (see Table 2).

Table 2. Univariate comparisons for the impact of running/walking at *parkrun* for runners/walkers compared to runners/walkers who volunteer.

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

Note: N=1,481

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

Table 3. Comparison of perceptions of social inclusion for those participating as runners/walkers and runners/walker who volunteer.

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

Discussion

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

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

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

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

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

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

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

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

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

Conclusion:

Findings suggest that there was a statistically significant multivariate effect of participation type on perceived parkrun impact. 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 and facilitated them meeting new people. 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 clinical and public health 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. Further research is warranted to examine the longitudinal nature of the associations between volunteering and social, health and wellbeing impacts.

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