

**The influence of neighbourhood equity on parkrunners in a British city.**

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8

9 **Original article**

10

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22

23

## 24 **The influence of neighbourhood equity on parkrunners in a British city**

25

### 26 **Abstract**

27 Physical activity benefits both physical and mental health. Specific events may augment  
28 participation in physical activity at a population level. Parkrun is a popular, free, weekly, timed  
29 5 km run or walk in city parks located across five continents. However, these events may be  
30 distributed inequitably, possibly reinforcing inequities in health. We tested the hypothesis that  
31 participation in parkrun is influenced by the socio-economic characteristics of both parkrunners  
32 and their park. Two parkruns 4.5 km apart were selected in the city of Sheffield in the United  
33 Kingdom. Defined by indices of multiple deprivation, Castle parkrun is located in an  
34 economically deprived neighbourhood and Hallam parkrun is in a prosperous area of the city.  
35 Parkrunners were defined by applying the same indices to the neighbourhood of home  
36 registration. Results: (1) the prosperous Hallam catchment area produced over five times more  
37 parkrun participants than Castle; (2) compared with Castle, Hallam parkrun attracted more  
38 participants from both catchment areas; (3) consequently, Hallam parkrun had seven times  
39 more participants than Castle parkrun. Conclusion: establishing parkruns in deprived areas is  
40 a necessary but not sufficient prerequisite for equity of participation.

41

42 **Key Words:** physical activity, inequities in health, participation, neighbourhood

43

### 44 **Lay Summary**

45 *Parkruns* are popular, free, weekly, timed 5 km runs or walks undertaken in city parks across  
46 the world. They contribute to both mental and physical health. But they may also reinforce  
47 inequities in health insofar as participation differs according to the socio - economic status of  
48 runners and the attraction of park venues. Our pilot study tests this proposition by comparing  
49 two parkruns in the British city of Sheffield; one located in the city's deprived East End, the  
50 other in the prosperous West End.

51

### 52 **INTRODUCTION**

53 There is compelling global evidence supporting the role of physical activity in the prevention  
54 of chronic disease (World Health Organisation, 2010). Participation in all forms of physical  
55 activity, including leisure and sporting opportunities, benefits an individual's physical and

56 mental health (Lee *et al.*, 2012). However, 39% of adults in the UK do not engage in sufficient  
57 physical activity to benefit (British Heart Foundation, 2017) and Worldwide, 3.2 million deaths  
58 each year are attributed to physical inactivity (World Health Organisation, 2013). An example  
59 of the mid-stream and proximal influences on health outcomes are shown in the energy balance  
60 model developed by colleagues (Whitfield *et al.*, 2015) and reproduced in Figure 1.

61

[Insert – Fig. 1]

62

63  
64 Critical to this simplified model are upstream (or distal) supportive physical and social  
65 environments (Bauman *et al.*, 2015). Globally, environments such as these are provided by  
66 the parkrun organisation which operates in 1,885 parks in over 20 countries. Parkruns are free,  
67 weekly, timed 5 km runs or walks in parks. Qualitative research has shown that the aspects of  
68 parkrun that attract participants are its accessibility, inclusivity, the provision of an opportunity  
69 for personal fulfilment as well as the support of others. Here ‘place’ is of critical importance:  
70 the pleasant environment of the park itself, free access and the supportive social environment  
71 of the parkrun event (Stevinson *et al.*, 2015).

72

73 Parkrun participation at a country level is probably influenced by the state of its development,  
74 with 17 of the current (2019) 20 host nations within the ‘very high’ ranking band on the United  
75 Nations Human Development Index and a median ranking of 15/189 (UN Development  
76 Programme, 2019). Though physical infrastructure in these developed nations probably  
77 provides the most supportive environments, this is not to deny the value of parkrun to lower  
78 ranked nations. In South Africa, for instance, the mean time to complete a 5 km parkrun is  
79 around 41 minutes, compared to around 29 minutes in the UK (parkrun South Africa, 2019;  
80 parkrun UK, 2019). With a smaller number of parkruns than the UK (222 c.f. 672) but larger  
81 average attendances (276 c.f. 206) the motivations for participating in South Africa are likely  
82 to be very different: many participants choose to walk in parkrun’s relatively safe venue set  
83 within the challenging environment of many South African cities.

84

85 Parkruns are nested within a hierarchy of socio-economic and cultural spaces: in divergent  
86 countries, differing urban areas and diverse neighbourhoods. These are potentially multiple and  
87 complex levels of influence on participation. (Seefeldt *et al.* 2002; Faskunger, 2012; Saffari *et al.*  
88 2018). The parkrun Research Board (based in the UK) has identified higher socio-economic  
89 status and neighbourhood as probable influences on registering and participating in parkrun –

90 on both joining and sustaining commitment (Beenackers *et al.*, 2012; Gidlow *et al.*, 2006;  
91 Hunter *et al.*, 2015).

92

93 Relevant to unlocking the nexus of influences on runners themselves are multi-level analytical  
94 tools developed by epidemiologists to explore the relative influence of neighbourhood  
95 ‘composition’ and ‘context.’ These seek to explain the relative influence on the health of  
96 individuals of (a) their embedded socio-economic and cultural attributes and (b) their  
97 neighbourhood context, always taking account of the wider determinants of health at a global,  
98 country and city level. The concepts of ‘composition’ and ‘context’ may also be applied  
99 ‘upstream’ to supportive environments which encourage participation and a healthy lifestyle  
100 (Figure 1).

101

102 Swedish studies, for example, have detected a small but significant ‘neighbourhood contextual  
103 effect’ on worry about neighbourhood disorder (Mellgren *et al.*, 2010) and the sense of security  
104 (Lindstrom *et al.* 2003) derived from the social capital of a neighbourhood. Within a different  
105 tradition led by Pierre Bourdieu, sociologists have applied the concept of *habitus* to a sense of  
106 place - ‘ingrained habits, skills and dispositions.’ It is the way that ‘individuals perceive the  
107 social world around them and react to it’ (Bourdieu, 1977). For many participants in parkrun,  
108 their neighbourhood is part of their social world and an important contributor to ‘sports habitus’  
109 which is formed in childhood and can be influenced by neighbourhood schools (Engstrom,  
110 2008).

111

112 In their analysis of a million adults in England, Farrell and colleagues find ‘local area  
113 deprivation is independently and strongly associated with inactivity, controlling for the local  
114 availability of physical recreation and sporting facilities.’ (Farrell *et al.*, 2014). Our article  
115 explores the influence of ‘place’ on participation with a pilot case study from the city of  
116 Sheffield, addressing the critical question of whether neighbourhood inequalities are associated  
117 with differential participation rates in parkrun.

118

119 Our study tested the hypothesis that participation in parkrun is influenced by:

- 120 1. The socio-economic characteristics of the parkrunners as a subset of the local population;  
121 and
- 122 2. The characteristics of the park and its immediate surroundings. A schematic model is  
123 shown in Figure 2.

124

125

[Insert – Fig. 2]

126

## 127 **METHODS**

128 Our delimited study focuses on descriptive statistics of participation and neighbourhood  
129 context for two parkruns in Sheffield, Castle and Hallam (Figure 3).

130

131

[Insert – Fig. 3.]

132

133 The socio-economic status of park settings was defined using the UK Government’s Index of  
134 Multiple Deprivation (IMD) for Lower Level Super Output Areas (LLSOA). These are the  
135 smallest units from which Population Census data is compiled and onto which official data on  
136 socio-economic context is mapped by the Office of National Statistics (ONS, 2016). The IMD  
137 scores for England’s 32,844 Lower Level Super Output Areas are grouped in deciles where *n*  
138 is approximately 3,300 and 1 = most deprived. Scores were calculated for both a combined  
139 IMD and for each of its seven domains (Department of Communities and Local Government,  
140 2015). Domains of population attributes are income, education, employment and health.  
141 Neighbourhood ‘contextual’ domains are crime, housing and the living environment. The  
142 LLSOAs containing Castle and Hallam parkruns have combined IMDs of 1 and 10  
143 respectively, while the median IMDs of the adjacent LLSOAs are 1 (*n*=8) and 9 (*n*=9)  
144 respectively.

145

146 Participants in parkrun register at their home address (although it is possible to run  
147 anonymously). This involves giving name, age, postcode, activity level and ‘home’ parkrun.  
148 The latter is the parkrun the registrant identifies with, either because it is the one they are likely  
149 to participate in most often, or because it is the closest to where they live. We assume a degree  
150 of correspondence between the characteristics of runners and their registered neighbourhood.

151

152 There are two methodological caveats. First, a few parkrunners will have moved away from  
153 their original registration address and second, parkrunners are in many ways exceptional and  
154 unlikely to exactly mirror the socio-economic composition of their neighbourhood population  
155 as expressed in the IMD domains of employment, income, education and health. On the other  
156 hand, they may experience the common neighbourhood context of crime, housing and living

157 environment, with Hallam participants enjoying better conditions than their Castle  
158 counterparts.

159

160 Participants at the Castle and Hallam parkruns were also classified as follows: (a) coming from  
161 the park LLSOA or an adjacent LLSOA (inner catchment area); (b) coming from the area of  
162 the city for which this parkrun is closest (catchment area) ; (c) registered in another parkrun  
163 catchment area less than 10 km away; and (d) registered over 10 km distant. The 10 km  
164 threshold was chosen to represent the approximate confines of the Sheffield City Region.

165

166 The catchment areas of the seven parkruns in the Sheffield City Region were defined as the  
167 shortest linear distance to the centroid of each park (Figure 3). The median IMD of the Castle  
168 and Hallam Catchment areas were 2 and 8 respectively. The population of the Hallam and  
169 Castle catchments were estimated by summing the population of their constituent LLSOAs.

170

171

172 The data analyst for parkrun provided the following data:

- 173 1. An anonymized list of all participants in the two parkruns for 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup> and 26<sup>th</sup>  
174 May 2018;
- 175 2. The home (or ‘favourite’) parkrun, nearest geographical parkrun, and LLSOA IMD  
176 percentile for each participant, identified by postcode supplied at registration;
- 177 3. The number of parkrunners in Castle and Hallam’s catchment areas and the parkruns  
178 they attended.

179

## 180 **RESULTS**

181

### 182 **Number of participants at each parkrun**

183 Figure 4 shows how participation at the Hallam and Castle parkruns has evolved over time,  
184 with our snapshot of May 2018 located by a vertical line. During this month, the average  
185 number of participants over four events was 78 at Castle and 717 at the longer established  
186 Hallam. Although participation at both venues has increased over time, Hallam nevertheless  
187 recorded much higher participation at every phase of its development.

188

189

[Insert – Fig. 4]

190

191 Table 1 shows the following: (1) the number of parkrunners in the catchment areas of Castle  
192 and Hallam parkruns; and (2) the parkruns they participated in (Hallam, Castle and other). The  
193 results show that 1,433 unique individuals participated in Hallam parkrun, while 205  
194 participated in Castle parkrun. Thus, Hallam parkrun attracted 7.0 times as many parkrunners  
195 as Castle.

196

197

[Insert - Table 1]

198

### 199 **Number of parkrunners in each parkrun's catchment area**

200 The columns in Table 1 show that 1,377 individuals from the Hallam catchment area  
201 participated in a parkrun (anywhere) compared to 251 from the Castle catchment area. Thus,  
202 the Hallam catchment area produced 5.5 times as many parkrunners as the Castle catchment  
203 area. (It should be noted that the Hallam catchment population is approximately 8.5% larger  
204 than the Castle catchment area so that the ratio normalised by population would be 5.07  
205

205

### 206 **Attraction of each parkrun to parkrunners from the other's catchment area**

207 Table 1 also shows that Hallam parkrun attracted 913 parkrunners or 66% of its own catchment  
208 total of 1,377. In contrast, Castle parkrun attracted 73 parkrunners or 29% of its own catchment  
209 total of 251. Hallam parkrun was 2.3 times as attractive (66%/29%) to its own catchment area  
210 as Castle parkrun was to its.

211

212 Hallam parkrun attracted 28 parkrunners from Castle's catchment area or 11% of its catchment  
213 total of 251. In contrast, Castle parkrun attracted 48 parkrunners from Hallam's catchment area  
214 or 3.5% of its total of 1,377. Hallam parkrun was 3.2 times as attractive (11%/3.5%) to Castle  
215 catchment parkrunners as Castle was to Hallam catchment parkrunners. Thus, Hallam parkrun  
216 was 2 to 3 times more attractive than Castle parkrun to parkrunners from their catchment areas.  
217

217

### 218 **Travel distance to each parkrun**

219 Travel distance may also be important in choosing which parkrun event to attend. Figure 5  
220 shows that 9% of parkrunners at Castle came from its inner catchment area compared to 16%  
221 for Hallam. In total, 36% of Castle parkrunners came from its catchment area compared to  
222 64% for Hallam. Interestingly, the proportion travelling up to 10 km to each parkrun is  
223 approximately the same at Castle and Hallam at 83% and 81% respectively. The remainder of



224 parkrunners registered with home parkruns over 10 km distant, often as far as London, may  
225 be students, visitors or people who have moved since registration.

226

227 [Insert – Fig. 5]

228

## 229 **Participants**

230 Table 2 shows the median IMD and its domains of the participants at each parkrun compared  
231 to the median for the Sheffield population. Hallam participants were drawn from more  
232 prosperous neighbourhoods of the city with a composite median IMD decile of 9. Castle  
233 participants were registered in more deprived neighbourhoods with a median score of 3, below  
234 the median score of 5 for Sheffield’s population spread across a mosaic of 345 LLSOAs. The  
235 biggest difference is recorded in the education domain; 2 for Castle, 10 for Hallam parkrunners.

236

237 [Insert – Table 2]

238

## 239 **DISCUSSION**

240 The headline findings are of ‘place’ inequality between the venues and between participants.  
241 Although in many ways the City of Sheffield reflects national average scores on deprivation,  
242 our preliminary analysis shows differential participation in parkrun is linked to both the setting  
243 of the parks (socio-economic, environmental etc.) and the neighbourhood setting of  
244 participants’ registered addresses. A deeper analysis of the relationship between participants  
245 and parks reinforces the headline message. Without participants ‘borrowed’ from the Hallam  
246 catchment, participation in Castle would be reduced by almost a quarter. If parkrun  
247 participation reflects general levels of activity, or even inactivity, then our findings concur with  
248 those of Farrell and colleagues: ‘both education and household income are strongly associated  
249 with inactivity even when controlling for local area deprivation, the availability of physical  
250 recreation and sporting facilities.’

251

252 Further analysis links participation to the intersection of travel and socio-economic  
253 circumstances. Whilst the majority of participants in Hallam parkrun (64%) are drawn from its  
254 catchment area, only 36% of Castle parkrunners live within its catchment. The majority of  
255 Castle runners, from beyond the park’s catchment area, has a combined IMD of 3, which is

256 below the Sheffield average (5), and far below that of Hallam (9). This is also the average  
257 IMD of the LLSOAs within 10 km of Castle park, which appears to be the threshold for travel  
258 in Sheffield (less than half an hour by car). This evidence suggests that establishing parkruns  
259 within areas of high deprivation may not, of itself, be sufficient to change local behaviour  
260 around physical activity.

261

262 This supports our hypothesis that parkrun participation is influenced both by where parkrunners  
263 live and the park they use. Both contribute separately to a sports habitus, expressed according  
264 to Engstrom (2008) as ‘choice or taste for various sports, forms of exercise and outdoor (life)  
265 activities.’ However, home neighbourhoods - both their environment and their schools - are  
266 also generative of the sports habitus embedded in individual participants during their early  
267 life-course. In the UK, as in many other countries, neighbourhood schooling has a profound  
268 influence on educational performance. Neighbourhood context therefore helps shape  
269 population composition. And, as table 2 shows, the most significant difference in parkrunners  
270 attending the Hallam and Castle events is educational outcome. Both neighbourhood context  
271 and population composition combine to determine sports habitus and influence participation in  
272 communal exercise. ‘In reality, according to Bourdieu in his seminal article Sport and Class’  
273 (1978) ‘it is the relation to one’s own body, which distinguishes the working classes from the  
274 privileged classes.’

275

276 Socio-economic factors appear paramount in explaining the differential attraction of the Castle  
277 and Hallam events. However, further granular analysis of the park venues may add a multiplier  
278 effect. Castle is run over three laps compared with Hallam’s two. Castle has a significant hill  
279 which may be off-putting for runners seeking personal best times. The Castle venue is at the  
280 top of a hill while Hallam is in a valley, so walking or running to the Castle venue is more  
281 demanding. For drivers, on-street parking near Castle is limited, and the park lacks a vibrant  
282 café for rest, recuperation and socialising. An additional factor could be the longevity of  
283 Hallam parkrun, inaugurated three years and 153 events prior to Castle. Early registrants to  
284 parkrun had no choice but to choose Hallam. Of those living closest to Castle, familiarity with  
285 Hallam may have prevailed.

286

287 Our delimited analysis has not sought to nest motivation and volition within the wider socio-  
288 economic determinants of city life. From their review, Machaczek and colleagues suggest that  
289 motivational-based interventions might be least successful in the communities where it is most

290 needed, particularly economically deprived communities (Machaczek *et al.*, 2018). More  
291 primary research will provide a richer more nuanced picture of their dynamic interaction.  
292 Further analysis of the IMD domains may illuminate the causal chain in Figure 1 linking  
293 supportive environments via lifestyle to physical activity then health. For example, though  
294 ‘education’ is a ‘composition’ domain reflecting the embedded status of neighbourhood  
295 populations, it is often the product of neighbourhood schools which differentially create a  
296 ‘sports habitus’ leading to physically active lifestyles.

297

## 298 **CONCLUSION**

299 Our pilot study highlights how parkrun participation is influenced both by where parkrunners  
300 live and the location of parkrun events. An affluent catchment area population produced over  
301 five times more parkrunners than the population of a more deprived catchment area. This  
302 differential was increased to a factor of seven by adding in the relative attraction of each park  
303 setting. The challenge for policymakers and decision-takers is that parkrun appears to reflect  
304 and maybe reinforce differential levels of physical activity linked to socio-economic context,  
305 contributing to greater inequities in health status.

306

307 With the aim of promoting greater equity, Sport England declared in 2018 an intent to invest  
308 £3 million (USD 3.75m) to increase ‘the number of parkrun events by one third in socially  
309 deprived areas in England over the next three years’ (Sport England, 2018). However, the  
310 backcloth of deep-rooted socio-economic inequalities will probably persist in the short and  
311 medium term. The evidence marshalled in our study suggests that investing in ‘deprived’  
312 venues is a necessary but not sufficient prerequisite for greater equity of participation. The  
313 dynamic between people and place is complex. A finely tuned sports habitus may hold the  
314 key.

315

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