

What determines community level parkrun participation?

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Abstract

There is substantial heterogeneity in parkrun participation across different communities in England. Previous analysis has shown that communities that live further from the nearest parkrun, and communities in deprived areas have lower participation rates (Schneider et al. 2019).

This paper is the first to make use of data at the LSOA level, provided by parkrun and available through the ONS, to investigate the determinants of parkrun participation.

We find that deprivation, distance to nearest event and ethnicity are strong predictors of parkrun participation rates. This creates an opportunity for parkrun to increase participation through engagement with these communities.

Introduction

There is strong evidence from survey data that ethnic minority individuals in England are less likely to be physically active, and to engage in sport in general Sport England.

Previous analysis has been conducted investigating the factors associated with higher levels of participation Cleland et al., 2019. However, due to the biases associated with surveying only parkrun participants the findings have no external validity (i.e. estimating the relationship between education and number of runs once engaged with parkrun does not tell us about engagement with parkrun). The authors themselves note the limitation that “The sample was limited to a nonrandom sample of parkrun participants in one State of Australia and may not be generalizable to other parkrun populations.” (p.21).

Methods

Data from parkrun website (event locations), parkrun (participation), Office of National Statistics.

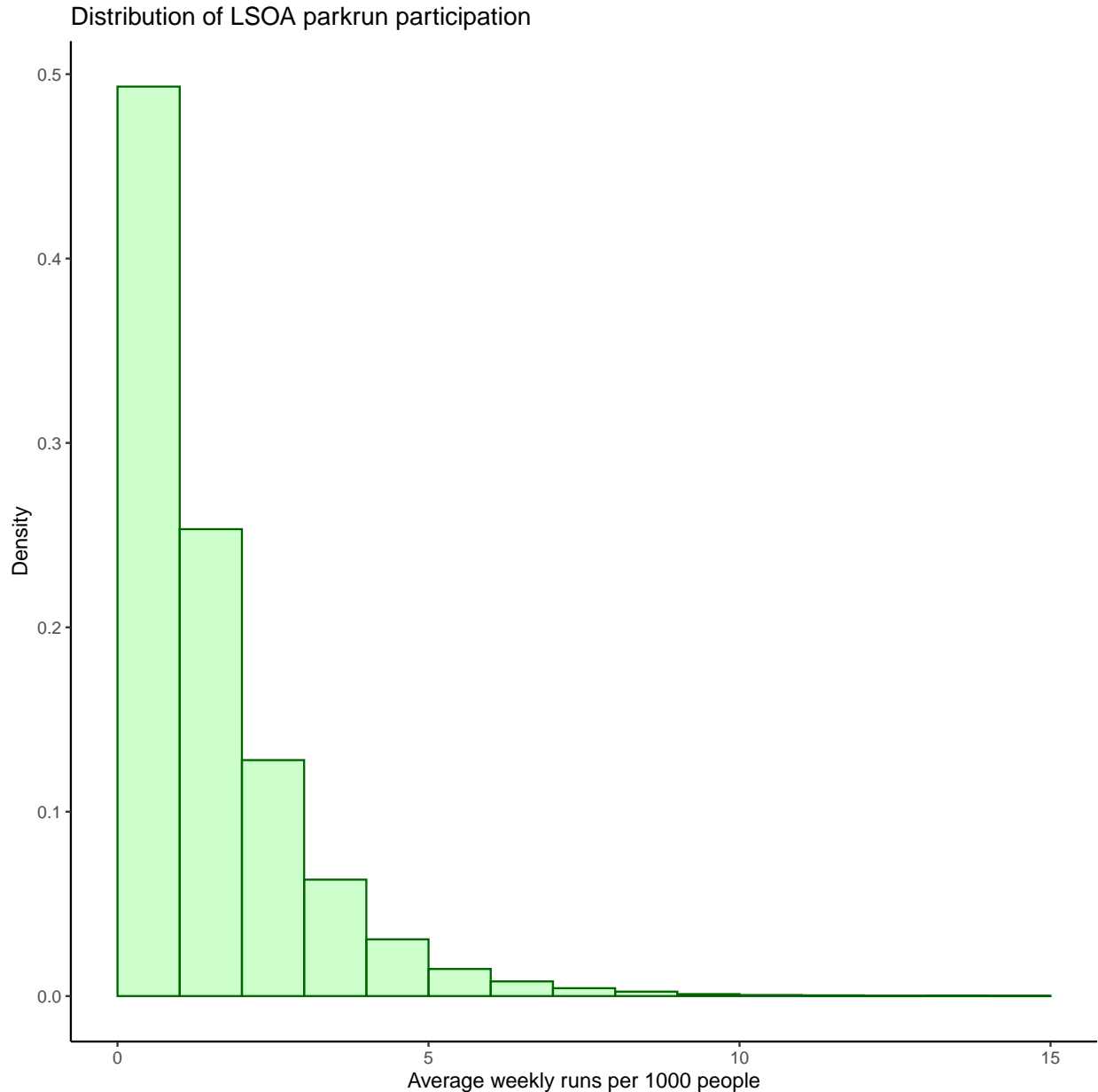
Merged datasets.

Simple correlations and poisson regression. By combining data provided by parkrun on the location of events and the number of participants from each LSOA in England over a 12 month period with characteristics on each LSOA from ONS data (INSERT LINK) including population density, Index of Multiple Deprivation scores and ethnic make-up it was possible to answer questions at the community level.

32844 LSOAs with

Results

Participation in parkrun varies a lot between different communities (LSOAs). Around half of all communities average less than 1 run per week per 1000 people. Approximately a quarter average between 1 and 2 runs, and around an eighth between 2 and 3 runs.

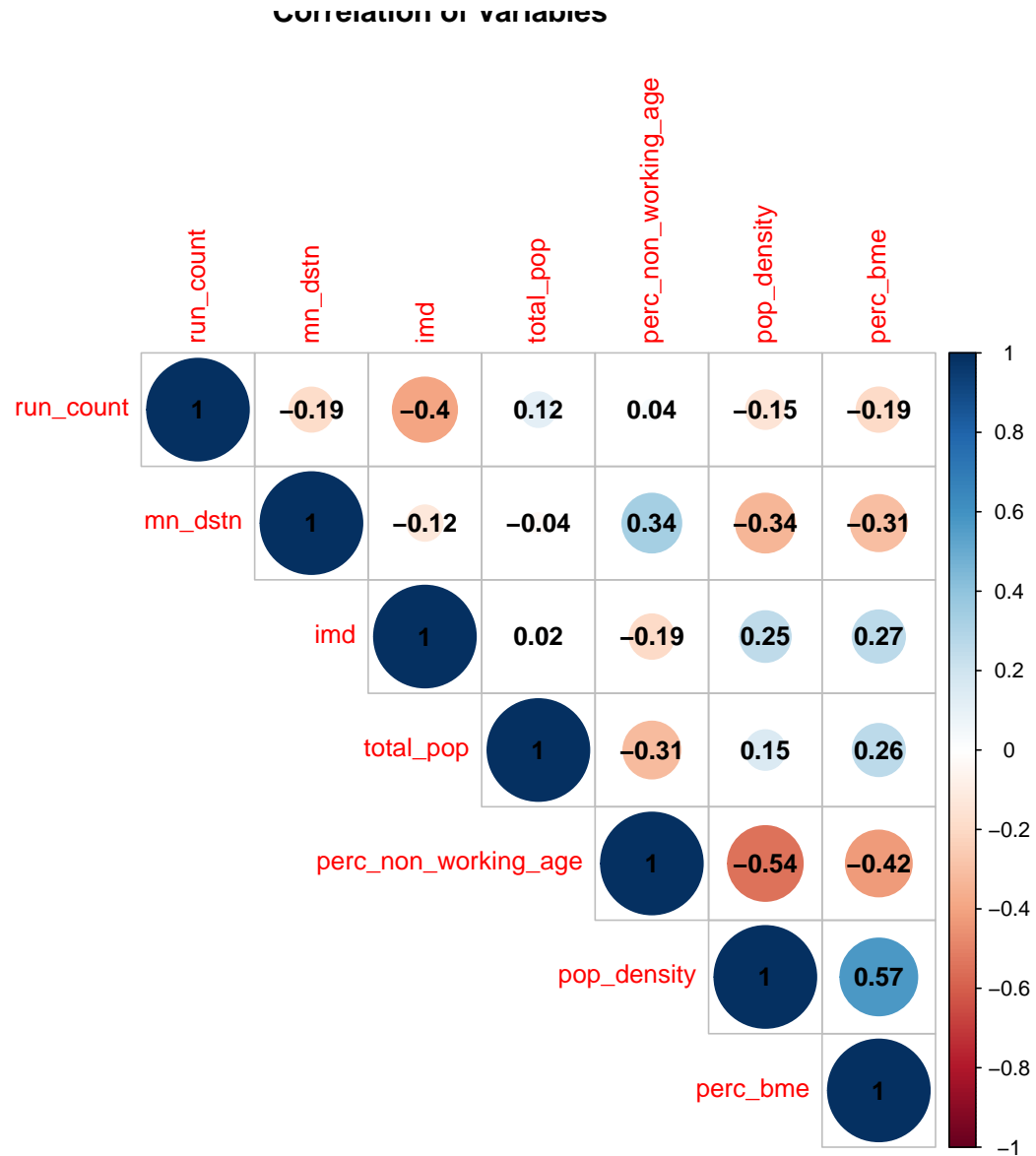


Correlation Matrix

We are interested in what the determinants of community level participation in parkrun are. The plot below show a correlation matrix for the different variables of interest. There is a negative correlation between participation (`run_count`) and deprivation (`imd`), distance to nearest parkrun (`mn_distance`), population density (`pop_density`) and percent BME (`perc_bme`). Percent BME was strongly positively correlated with population density, negatively correlated with percent non-working age, and moderately positively correlated

with IMD suggesting that areas with more BME residents are more densely populated, more deprived and have fewer older people.

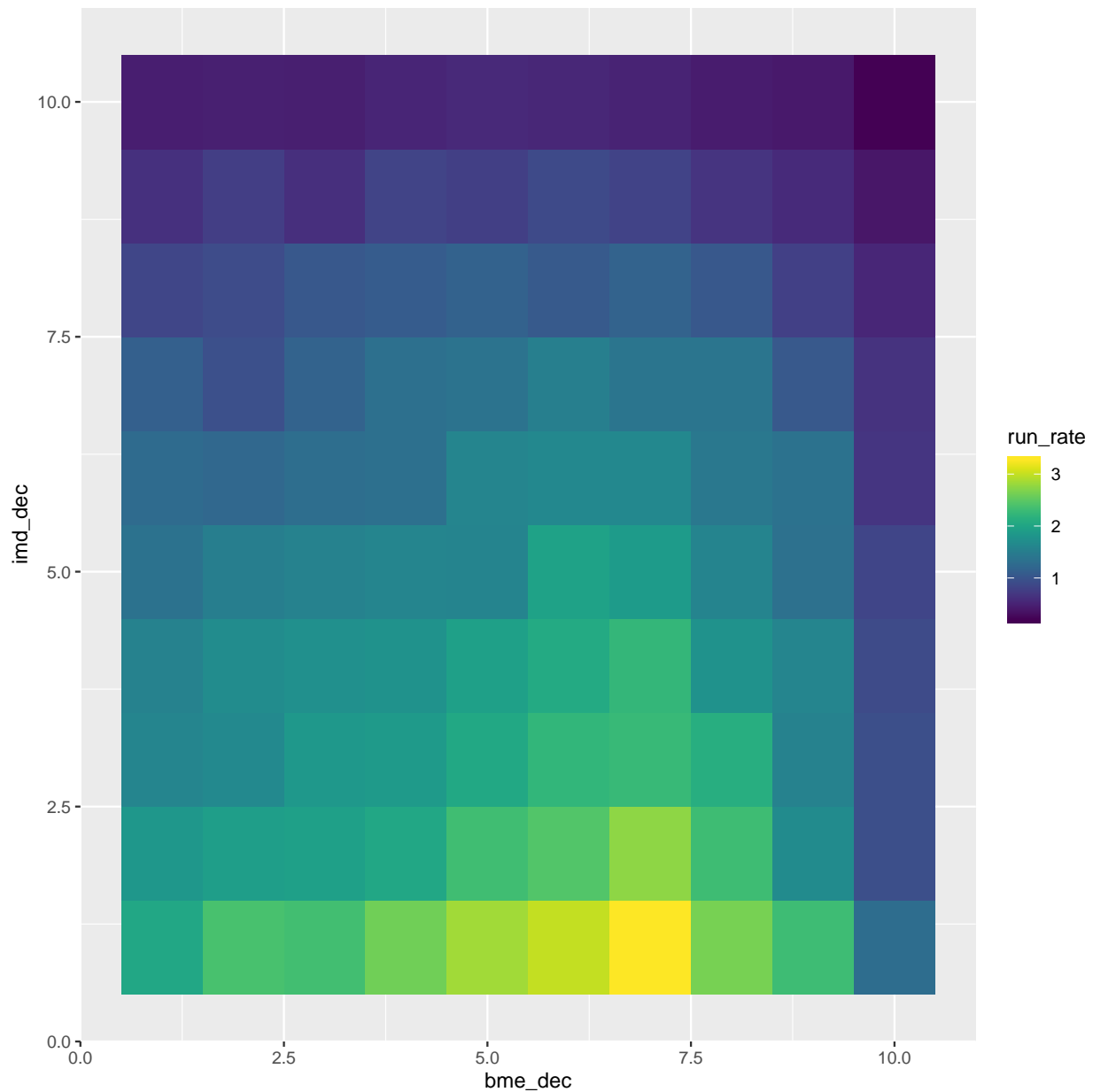
```
[1] 1 5 6 7 8 9 10 11
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Colour plot

Since we are particularly interested in how participation in parkrun varies by the percent of the population reporting as being Black and Ethnic minority, as well as more and less deprived we split our 32844 communities (LSOAs) into deciles based on the two variables. This creates 100 groups (10*10 combinations). The plot below shows the mean participation rate for each of these 100 groups of LSOAs, where 10 represents most deprived and most BME and 1 least deprived and BME, as a colour on the plot.

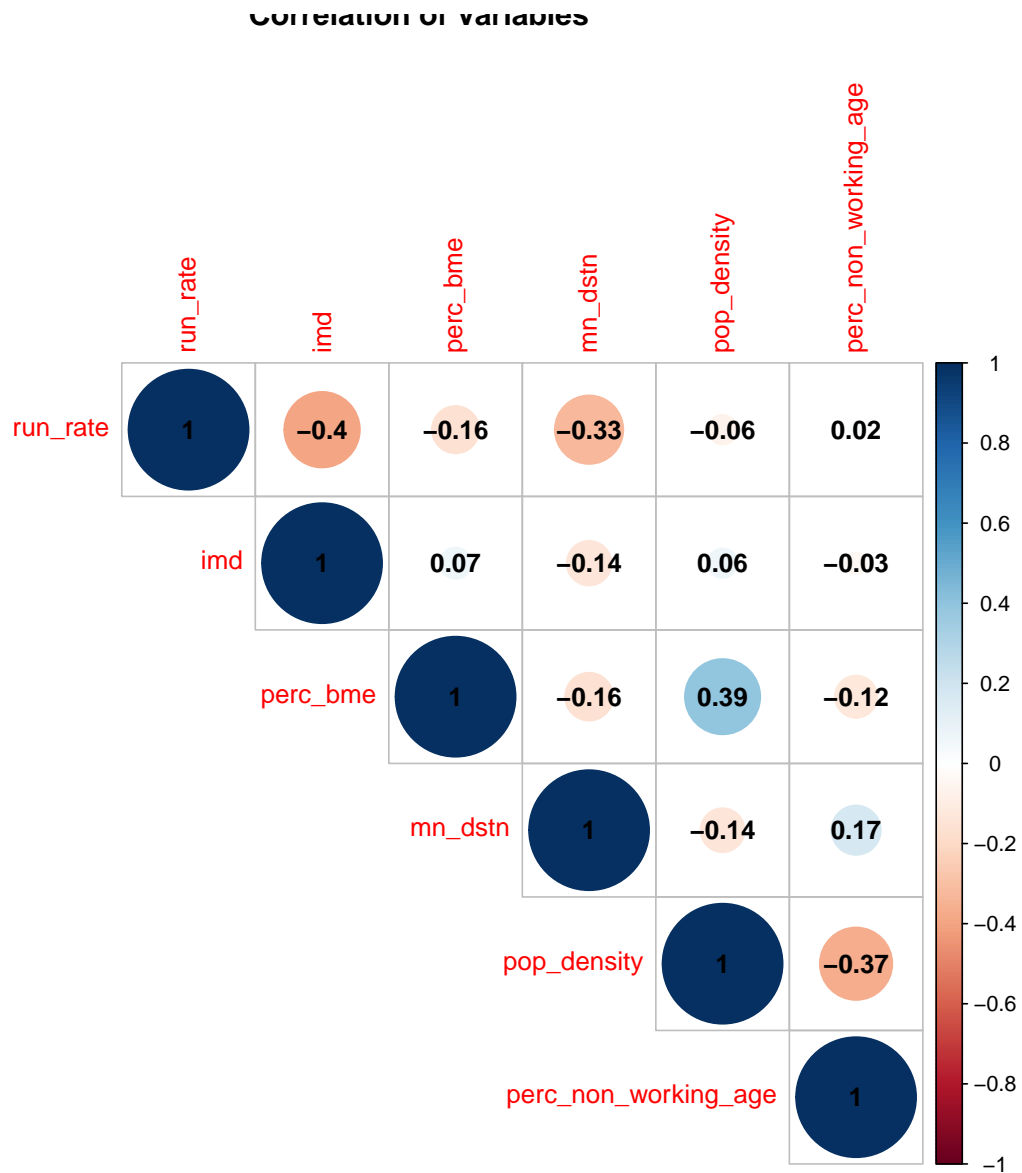
The plot shows that participation is lowest in areas with the highest deprivation, and that there is a complex relationship between ethnicity and participation, with higher participation in areas with moderately high percentage BME, but lower participation in areas with very high BME populations.



In order to control for confounders, we created a partial correlation matrix. This estimates the correlation between the variables in the analysis holding all other variables constant.

Looking at the top row, even when controlling for other variables such it is clear that participation rate is still strongly negatively correlated with deprivation and distance and moderately negatively correlated with percent BME.

Partial correlation matrix



Poisson Model

Poisson models are commonly used to estimate count data, where values are constrained by 0. In this case, because it is not possible for a community to have negative participation we use a Poisson regression.

The results of the poisson regression are not notoriously easy to interpret, but show that areas with a higher percent of residents who are non-White-British have lower participation rates, even when controlling for the effect of deprivation and distance to events. The effect is smaller than deprivation and distance, but still sizeable and significant. The model explains a moderate percentage of the variation.

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Call:
glm(formula = run_count ~ imd + mn_dstn + perc_bme, family = poisson(link = "log"),
    data = scaled_df, offset = log(total_pop))

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-42.127   -6.675   -1.900    3.823   46.513

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -2.7983239  0.0006064 -4614.7  <2e-16 ***
imd          -0.5315137  0.0007063  -752.5  <2e-16 ***
mn_dstn      -0.4242098  0.0007148  -593.5  <2e-16 ***
perc_bme     -0.3203611  0.0007516  -426.3  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)

    Null deviance: 3703296  on 32843  degrees of freedom
Residual deviance: 2297949  on 32840  degrees of freedom
AIC: 2490104

Number of Fisher Scoring iterations: 5

[1] 0.3794865

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Discussion

Previous analysis has shown that participation in physical activity generally, and parkrun in particular, is lower in deprived communities.

This paper has investigated the relationship between participation, distance and deprivation. Our findings show that some of the negative effect of deprivation on participation can actually be attributed to differences in participation by ethnicity.

We find that communities with higher percentages of ethnic minority residents were less likely to participate in parkrun, even when controlling for deprivation. Since percentage ethnic minorities and deprivation are positively correlated, it is likely that some of the effect attributed to deprivation in previous analysis (Schneider et al. 2019) is in part attributable to ethnicity. In short, the socioeconomic gradient in parkrun participation is shallower than previously thought, but the ethnic gradient revealed.

That communities with a higher percentage of ethnic minority residents have lower participation rates in parkrun may not be a public health problem in and of itself. Different communities may freely choose to take part in different types of physical activity for many reasons. But given physical activity levels in these communities are also lower, it seems there is an opportunity for parkrun to develop methods of reaching groups who have low rates of engagement, with huge public health potential.

References