Table 1

Description of environmental measures

Domain	Measure	Range		Mean (SD) or percentage (n)
		Min	Max	
Objective characterized environment				
Home	Home has a garden (% Yes)			96.98 (8021)
Safety	Number of serious and fatal road traffic accidents in neighborhood (per km of road)	0	3.57	0.33 (0.38)
	Total crimes per 1000 population in area of residence	17	2368	63.81 (97.85)
	Density of streetlights in neighborhood (per km of road)	0	56.97	11.71 (12.49)
Deprivation	Index of Multiple Deprivation (Score)	1.86	47.23	13.64 (7.36)
Road network	Road density in neighborhood (km/km2)	0.69	20.20	10.17 (3.63)
	Proportion of roads in neighborhood that are A roads	0	1	0.06 (0.09)
	Junctions per km2 in the neighborhood	0.01	0.68	0.23 (0.12)
	Effective Walkable area in the neighborhood (ratio)	0.07	0.71	0.36 (0.12)
Pedestrian infrastructure	Density of all pedestrian infrastructure in neighborhood (ratio)	0	12.16	4.59 (1.01)
	Density of pavements in neighborhood (ratio)	0	5.43	2.31 (1.25)
Land use	Natural greenspace in neighborhood (% area)	0	98.90	36.83(29.12)
	Parks in neighborhood (% area)	0	96.75	1.48 (4.26)
	Buildings in neighborhood (% area)	0	29.36	8.08 (5.54)
	Herfindahl-Hirschman Index (Score)	1241.07	9681.07	2930.27 (1168.20)
Accessibility	Distance to nearest travel (transit) facility (km)	0.05	17.3	3.80 (3.24)
	Distance to nearest recreational facility (km)	0.01	6.04	1.50 (0.85)
	Distance to nearest place of interest (km)	0.26	9.16	2.39 (1.64)
	Distance to nearest town or city center (km)	0.05	19.76	5.28 (3.75)
Households	Detached houses in neighborhood (%)	0.89	97.32	45.97 (22.07)
	Semi-detached houses in neighborhood (%)	1.67	75.15	31.11 (14.82)
	Terraced houses in neighborhood (%)	0	71.56	14.00 (12.23)
	Flats in neighborhood (%)	0	82.80	8.67 (11.71)
	Households with one or more cars in neighborhood (%)	42.59	100	82.35 (10.11)
Perceptions from Environment and Physical Activity Questionnaire (higher score: more conducive to physical activity)				
	Access to services (Mean Score - 4 items)	1	4	2.96 (0.78)
	Street connectivity (Mean Score - 4 items)	1	4	2.86 (0.52)
	Walking and cycling facilities (Mean Score - 3 items)	1	4	2.44 (0.85)
	Aesthetics (Mean Score - 3 items)	1	4	2.89 (0.69)
	Pedestrian and traffic safety (Mean Score - 5 items)	1	4	2.59 (0.58)
	Detached houses in neighborhood (% Yes)			97.43 (8009)
	Terraced houses in neighborhood (% Yes)			51.79 (4228)
	Flats in neighborhood (% Yes)			35.43 (2897)

Table 2

Characteristics of the study sample

Measure	**Mean (SD) or percentage (n)**	
	Urban (5587)	**Rural (2690)**
Age (years)	67.8 (8.4)	66.4 (8.3)
Males	42.6 (2381)	44.0 (1184)
Workplace activity of workers (MET hours/week)	60.4 (47.7)	65.9 (50.0)
Dog Owner	14.4 (803)	27.3 (734)
Outdoor Recreational Activity* (MET hours/week)	8.7 (14.8)	9.9 (14.2)
Commuting activity (MET hours/week)**	3.0 (6.0)	2.1 (5.5)

*Includes pleasure walking, pleasure cycling and jogging activity

**only for working participants, n=2974

Table 3

The adjusted association between physical activity (MET hours/week), perceived and objective environmental measures in urban areas

	Model 1 IRR	95%CI	Model 2 IRR	95%CI	Model 3 IRR	95%CI	Model 4 IRR	95%CI	Std. IRR
Outdoor recreational activity									
Individual									
Age (years)	**0.983‡**	(0.976, 0.990)	**0.983‡**	(0.976, 0.990)	**0.986‡**	(0.979, 0.993)	**0.987‡**	(0.980, 0.993)	0.893
Gender									
Male (reference)									
Female	**0.818‡**	(0.747, 0.897)	**0.819‡**	(0.747, 0.897)	**0.826‡**	(0.754, 0.906)	**0.827‡**	(0.754, 0.907)	0.910
Workplace activity (MET hours/ week)	**0.997‡**	(0.995, 0.998)	**0.997‡**	(0.995, 0.998)	**0.997‡**	(0.996, 0.998)	**0.997‡**	(0.996, 0.998)	0.876
Owns Dog									
No (reference)									
Yes	**2.438‡**	(2.188, 2.717)	**2.446‡**	(2.196, 2.725)	**2.389‡**	(2.142, 2.664)	**2.397‡**	(2.149, 2.674)	1.359
Objective Environment									
Density of all pedestrian infrastructure in neighborhood			**0.950***	(0.908, 0.993)			**0.945***	(0.904, 0.989)	0.951
Perceived Environment									
Access to services (Mean Score – 4 items)					**1.188‡**	(1.093, 1.291)	**1.187‡**	(1.092, 1.290)	1.110
Aesthetics (Mean Score - 3 items)					**1.205‡**	(1.122, 1.294)	**1.208‡**	(1.125, 1.298)	1.134
AIC	33722		33718		33645		33640		
Change in AIC estimates (%)	-		0.01		0.23		0.24		
Commuting activity									
Individual									
Age (years)	**0.954‡**	(0.940, 0.969)	**0.956‡**	(0.940, 0.971)	**0.953‡**	(0.938, 0.968)	**0.953‡**	(0.938, 0.969)	0.743
Gender									
Male (reference)									
Female	0.989	(0.821, 1.191)	1.019	(0.837, 1.241)	1.038	(0.857, 1.258)	1.058	(0.868, 1.291)	1.029
Workplace activity (MET hours/ week)	1.002	(1.000, 1.004)	1.002	(0.999, 1.004)	1.002	(0.999, 1.004)	1.001	(0.999, 1.004)	1.073
Owns Dog									
No (reference)									
Yes	0.792	(0.622, 1.008)	0.865	(0.671, 1.116)	0.824	(0.643, 1.057)	0.862	(0.668, 1.112)	0.945
Objective Environment									
Density of streetlights in neighborhood (per km of road)			**1.014****	(1.055, 1.249)			**1.012****	(1.034, 1.232)	1.164
Junctions per km2 in the neighborhood			**0.251****	(0.093, 0.674)			**0.281***	(0.104, 0.760)	0.873
Effective Walkable area in the neighborhood (m2)			**2.485***	(1.137, 5.431)			2.076	(0.934, 4.614)	1.093
Buildings in neighborhood (%)			**1.043****	(1.017, 1.069)			**1.033***	(1.005, 1.060)	1.153
Distance to nearest town or city center (km)			**0.955***	(0.921, 0.991)			**0.955***	(0.920, 0.992)	0.955
Perceived Environment									
Access to services (Mean Score – 4 items)					**1.231***	(1.043, 1.452)	1.130	(0.954, 1.340)	1.071
Detached houses in neighborhood (Yes/No)					**0.398‡**	(0.288, 0.550)	**0.498‡**	(0.342, 0.725)	0.886
Flats in neighborhood (Yes/No)					**1.436‡**	(1.196, 1.724)	1.145	(0.931, 1.407)	1.070
AIC	6910		6872		6888		6870		
Change in AIC estimates (%)	-		0.55		0.32		0.58		

*p<0.05; **p<0.01; ‡p<0.001.; Std. IRR: standardized incidence rate ratio

Model 1: The association between physical activity and the individual level factors; Models 2: The associations between physical activity, objective environmental measures with adjustment for individual level factors; Model 3: The associations between physical activity and perceived environmental measures with adjustment for individual level factors; Model 4: The associations between physical activity and all the objective and perceived environmental measures with adjustment for individual level factors.

Table 4

The adjusted association between physical activity (MET hours/week), perceived and objective environmental measures in rural areas

	Model 1		**Model 2**		**Model 3**		**Model 4**		
	IRR	**95%CI**	**IRR**	**95%CI**	**IRR**	**95%CI**	**IRR**	**95%CI**	**Std. IRR**
Outdoor recreational activity									
Individual									
Age (years)	**0.983‡**	(0.976, 0.991)	**0.983‡**	(0.976, 0.991)	**0.986‡**	(0.978, 0.993)	**0.985‡**	(0.978, 0.993)	0.885
Gender									
Male (reference)									
Female	**0.863****	(0.773, 0.963)	**0.858****	(0.769, 0.957)	**0.869***	(0.777, 0.971)	**0.863****	(0.773, 0.964)	0.930
Workplace activity (MET hours / week)	**0.997‡**	(0.996, 0.999)	**0.997‡**	(0.996, 0.999)	**0.997‡**	(0.996, 0.999)	**0.997‡**	(0.995, 0.999)	0.875
Owns Dog									
No (reference)									
Yes	**2.144‡**	(1.920, 2.395)	**2.120‡**	(1.897, 2.370)	**2.183‡**	(1.947, 2.447)	**2.161‡**	(1.927, 2.423)	1.410
Objective Environment									
Effective walkable area in the neighborhood (m2)			**1.824***	(1.117, 2.980)			**1.767***	(1.077, 2.897)	1.060
Distance to nearest place of interest (km)			**1.042***	(1.001, 1.086)			1.036	(0.994, 1.081)	1.052
Flats in neighborhood (%)			**0.977****	(0.964, 0.990)			**0.975‡**	(0.962, 0.988)	0.918
Perceived Environment									
Aesthetics (Mean Score - 3 items)					**1.189‡**	(1.089, 1.298)	**1.191‡**	(1.092, 1.298)	1.130
AIC	17043		17029		17022		17008		
Change in AIC estimates (%)	-		0.08		0.12		0.21		
Commuting activity									
Individual									
Age (years)	0.999	(0.972, 1.027)	0.996	(0.970, 1.024)	No model		0.996	(0.970, 1.024)	0.977
Gender									
Male (reference)									
Female	0.793	(0.563, 1.118)	0.805	(0.573, 1.132)			0.805	(0.573, 1.132)	0.897
Workplace activity (MET hours / week)	**1.006****	(1.002, 1.009)	**1.001‡**	(1.003, 1.010)			**1.001‡**	(1.003, 1.010)	1.366
Owns Dog									
No (reference)									
Yes	**1.441***	(1.041, 1.996)	**1.527***	(1.101, 2.118)			**1.527***	(1.101, 2.118)	1.218
Objective Environment									
Density of all pedestrian infrastructure in neighborhood			**0.783****	(0.679, 0.902)			**0.783****	(0.679, 0.902)	0.754
AIC	2662		2658				2658		
Change in AIC estimates (%)	-		0.15				0.15		

*p<0.05; **p<0.01; ‡p<0.001.; Std. IRR: standardized incidence rate ratio

Model 1: The association between physical activity and the individual level factors; Models 2: The associations between physical activity, objective environmental measures with adjustment for individual level factors; Model 3: The associations between physical activity and perceived environmental measures with adjustment for individual level factors; Model 4: The associations between physical activity and all the objective and perceived environmental measures with adjustment for individual level factors.

Table 5

A comparison of relative importance of the matched objective and perceived environmental characteristics

Corresponding objective an perceived environmental measures		**Urban (Model 5)** Std. IRR (95% CI)				**Rural (Model 5)** Std. IRR (95% CI)			
Objective (O)	**Perceived (P)**	**O**		**P**		**O**		**P**	
Outdoor recreational activity									
Distance to nearest place of interest	Access to services	**1.046***	(1.004, 1.089)	**1.143‡**	(1.087, 1.204)	**1.108‡**	(1.046, 1.174)	**1.111‡**	(1.047, 1.178)
Effective Walkable area in the neighborhood	Street connectivity	0.970	(0.927, 1.102)	1.041	(0.997, 1.087)	**1.061***	(1.008, 1.117)	**1.108‡**	(1.047, 1.172)
Density of all pedestrian infrastructure	Walking and cycling facilities	**0.933****	(0.896, 0.972)	**1.084‡**	(1.038, 1.132)	1.024	(0.966, 1.086)	0.970	(0.920, 1.022)
Number of serious and fatal road traffic accidents	Pedestrian and traffic safety	0.989	(0.947, 1.032)	1.002	(0.958, 1.047)	1.007	(0.952, 1.066)	**1.057***	(1.002, 1.116)
Density of detached houses	Detached houses	0.999	(0.957, 1.042)	0.981	(0.948, 1.014)	1.007	(0.953, 1.063)	1.031	(0.982, 1.081)
Density of terraced houses	Terraced houses	1.014	(0.967, 1.063)	1.001	(0.956, 1.049)	1.021	(0.965, 1.080)	1.016	(0.959, 1.076)
Density of flats	Flats	1.024	(0.981, 1.069)	0.998	(0.950, 1.048)	**0.926****	(0.884, 0.971)	0.972	(0.920, 1.027)
Commuting activity									
Distance to nearest place of interest	Access to services	**0.838***	(0.747, 0.962)	1.075	(0.974, 1.200)	1.061	(0.913,1.229)	1.170	(0.976, 1.412)
Effective Walkable area in the neighborhood	Street connectivity	**1.228‡**	(1.128, 1.334)	0.946	(0.864, 1.034)	1.135	(0.954, 1.361)	1.006	(0.854, 1.186)
Density of all pedestrian infrastructure	Walking and cycling facilities	1.054	(0.966, 1.144)	1.020	(0.928, 1.121)	**0.774****	(0.653, 0.912)	0.883	(0.727, 1.056)
Number of serious and fatal road traffic accidents	Pedestrian and traffic safety	**1.314‡**	(1.208, 1.428)	1.045	(0.958, 1.144)	0.957	(0.815, 1.120)	0.842	(0.701, 0.998)
Density of detached houses	Detached houses	**0.758‡**	(0.688, 0.832)	**0.894‡**	(0.851, 0.944)	0.971	(0.820, 1.147)	0.963	(0.848, 1.089)
Density of terraced houses	Terraced houses	**1.404‡**	(1.347, 1.566)	0.933	(0.843, 1.032)	1.044	(0.907, 1.202)	0.983	(0.837, 1.155)
Density of flats	Flats	**1.286‡**	(1.172, 1.379)	**1.106***	(1.000, 1.099)	0.890	(0.775, 1.021)	1.102	(0.932, 1.312)

*p<0.05; **p<0.01; ‡p<0.001.; Std. IRR: standardized incidence rate ratio

Model 5: the associations between physical activity and the corresponding objective and perceived environmental measures with adjustment for individual level factors