

Supplementary Information: Large-scale physical activity data reveal worldwide activity inequality

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Supplementary Table 1: Summary of dataset statistics for the 46 countries with more than 1000 subjects (693,806 subjects in total; Methods). Countries are ordered by number of subjects in sample. Country-level analyses are restricted to these 46 countries. Percentages are in parentheses. NA refers to missingness in data. Table continued on next page with additional columns.

Country Name	#subjects	Mean Steps	Activity Inequality	#male	#female	#genderNA	Median Age	#AgeNA
United States	388124	4774	0.303	94707 (48.9)	98971 (51.1)	194446 (50.1)	34	168610 (43.4)
United Kingdom	55110	5444	0.288	15144 (54.8)	12508 (45.2)	27458 (49.8)	33	23557 (42.7)
Canada	26895	4819	0.303	7022 (49.2)	7250 (50.8)	12623 (46.9)	34	10962 (40.8)
Australia	26644	4941	0.304	6858 (51.4)	6479 (48.6)	13307 (49.9)	34	11075 (41.6)
Japan	20386	6010	0.248	6696 (76.2)	2090 (23.8)	11600 (56.9)	38	9016 (44.2)
China	17427	6189	0.245	7553 (61.3)	4769 (38.7)	5105 (29.3)	28	5097 (29.2)
Germany	12234	5205	0.266	4740 (72.8)	1775 (27.2)	5719 (46.7)	34	4666 (38.1)
India	11148	4297	0.293	4092 (79.0)	1086 (21.0)	5970 (53.6)	33	4818 (43.2)
France	8185	5141	0.268	2833 (67.2)	1384 (32.8)	3968 (48.5)	33	3435 (42.0)
Russia	7911	5969	0.262	2071 (59.9)	1385 (40.1)	4455 (56.3)	28	3104 (39.2)
Spain	6723	5936	0.261	2496 (70.8)	1027 (29.2)	3200 (47.6)	36	2538 (37.8)
Netherlands	6239	5110	0.261	2092 (64.1)	1171 (35.9)	2976 (47.7)	35	2311 (37.0)
Mexico	5695	4692	0.279	1497 (65.0)	806 (35.0)	3392 (59.6)	32	2831 (49.7)
Italy	5567	5296	0.275	1724 (68.3)	801 (31.7)	3042 (54.6)	36	2528 (45.4)
Singapore	5411	5674	0.249	1567 (62.3)	947 (37.7)	2897 (53.5)	35	2273 (42.0)
Sweden	5177	5863	0.246	1309 (52.1)	1202 (47.9)	2666 (51.5)	34	2277 (44.0)
South Korea	5022	5755	0.247	1235 (66.5)	621 (33.5)	3166 (63.0)	33	2270 (45.2)
Taiwan	4821	5000	0.262	987 (64.6)	540 (35.4)	3294 (68.3)	34	2404 (49.9)
Hong Kong SAR China	4754	6880	0.222	1288 (62.0)	789 (38.0)	2677 (56.3)	33	2015 (42.4)
Turkey	4711	5057	0.264	1197 (54.5)	1000 (45.5)	2514 (53.4)	31	2106 (44.7)
Thailand	4615	4764	0.272	1026 (62.9)	604 (37.1)	2985 (64.7)	32	2438 (52.8)
Norway	4256	5246	0.252	1061 (52.3)	967 (47.7)	2228 (52.3)	30	1803 (42.4)
United Arab Emirates	4138	4516	0.281	1315 (66.1)	673 (33.9)	2150 (52.0)	33	1723 (41.6)
Brazil	3999	4289	0.272	1127 (71.3)	453 (28.7)	2419 (60.5)	33	1946 (48.7)
Denmark	3924	5263	0.262	1000 (57.1)	750 (42.9)	2174 (55.4)	33	1804 (46.0)
Saudi Arabia	3837	3807	0.325	1153 (64.8)	626 (35.2)	2058 (53.6)	29	1650 (43.0)
Malaysia	3787	3963	0.288	937 (53.5)	814 (46.5)	2036 (53.8)	30	1589 (42.0)
Belgium	3051	4978	0.276	881 (61.9)	542 (38.1)	1628 (53.4)	33	1299 (42.6)
New Zealand	2941	4582	0.301	706 (49.3)	727 (50.7)	1508 (51.3)	33	1235 (42.0)
Philippines	2892	4008	0.298	550 (51.7)	513 (48.3)	1829 (63.2)	31	1476 (51.0)
Ireland	2758	5293	0.285	718 (50.3)	709 (49.7)	1331 (48.3)	33	1159 (42.0)
South Africa	2718	4105	0.284	900 (65.3)	479 (34.7)	1339 (49.3)	35	1124 (41.4)
Ukraine	2420	6107	0.252	507 (56.6)	388 (43.4)	1525 (63.0)	27	1015 (41.9)
Indonesia	2326	3513	0.283	760 (67.4)	368 (32.6)	1198 (51.5)	31	925 (39.8)
Switzerland	2251	5512	0.263	820 (64.9)	444 (35.1)	987 (43.8)	37	774 (34.4)
Czech Republic	2132	5508	0.248	708 (71.2)	286 (28.8)	1138 (53.4)	32	929 (43.6)
Poland	2128	5249	0.269	643 (63.5)	370 (36.5)	1115 (52.4)	31	901 (42.3)
Israel	1489	5033	0.272	458 (65.0)	247 (35.0)	784 (52.7)	34	650 (43.7)
Finland	1488	5204	0.266	388 (50.5)	381 (49.5)	719 (48.3)	31	612 (41.1)
Romania	1422	4759	0.283	380 (64.0)	214 (36.0)	828 (58.2)	31	653 (45.9)
Portugal	1418	4744	0.276	431 (64.8)	234 (35.2)	753 (53.1)	34	614 (43.3)
Egypt	1213	4315	0.303	290 (72.0)	113 (28.0)	810 (66.8)	26	647 (53.3)
Greece	1159	4350	0.295	455 (74.2)	158 (25.8)	546 (47.1)	36	452 (39.0)
Hungary	1151	5258	0.273	357 (67.1)	175 (32.9)	619 (53.8)	30	519 (45.1)
Chile	1060	5204	0.263	270 (64.0)	152 (36.0)	638 (60.2)	31	525 (49.5)
Qatar	1049	4158	0.291	370 (71.4)	148 (28.6)	531 (50.6)	33	413 (39.4)

Supplementary Table 1: Summary of dataset statistics for the 46 countries with more than 1000 subjects (693,806 subjects in total; Methods). Countries are ordered by number of subjects in sample. Country-level analyses are restricted to these 46 countries. Percentages are in parentheses. NA refers to missingness in data. (Continued from page 2.)

Country Name	#BMI [15, 18.5)	#BMI [18.5, 25)	#BMI [25, 30)	#BMI [30, 35)	#BMI [35, 40)	#BMI [40, inf)	#BMI NA	#obese
United States	5940 (2.3)	95959 (37.3)	83818 (32.5)	41669 (16.2)	17410 (6.8)	12129 (4.7)	130604 (33.7)	71208 (27.7)
United Kingdom	1133 (3.1)	16093 (44.4)	11696 (32.3)	4643 (12.8)	1514 (4.2)	920 (2.5)	18857 (34.2)	7077 (19.5)
Canada	533 (3.0)	7599 (42.1)	5808 (32.2)	2486 (13.8)	926 (5.1)	618 (3.4)	8847 (32.9)	4030 (22.3)
Australia	588 (3.2)	7756 (42.0)	6091 (33.0)	2487 (13.5)	912 (4.9)	563 (3.0)	8172 (30.7)	3962 (21.4)
Japan	795 (5.5)	9739 (67.2)	3151 (21.7)	632 (4.4)	118 (0.8)	42 (0.3)	5889 (28.9)	792 (5.5)
China	1040 (8.4)	8377 (67.8)	2439 (19.8)	375 (3.0)	64 (0.5)	20 (0.2)	5080 (29.2)	459 (3.7)
Germany	243 (2.7)	4399 (49.0)	3043 (33.9)	971 (10.8)	200 (2.2)	112 (1.2)	3253 (26.6)	1283 (14.3)
India	188 (2.5)	3017 (39.6)	3131 (41.1)	968 (12.7)	196 (2.6)	78 (1.0)	3528 (31.6)	1242 (16.3)
France	302 (5.2)	3384 (58.2)	1596 (27.5)	370 (6.4)	111 (1.9)	36 (0.6)	2375 (29.0)	517 (8.9)
Russia	386 (6.8)	3152 (55.2)	1545 (27.1)	480 (8.4)	100 (1.8)	33 (0.6)	2204 (27.9)	613 (10.7)
Spain	131 (2.6)	2611 (51.0)	1743 (34.0)	473 (9.2)	124 (2.4)	31 (0.6)	1600 (23.8)	628 (12.3)
Netherlands	125 (2.6)	2552 (53.6)	1572 (33.0)	363 (7.6)	94 (2.0)	37 (0.8)	1481 (23.7)	494 (10.4)
Mexico	85 (2.3)	1605 (42.8)	1363 (36.4)	501 (13.4)	132 (3.5)	46 (1.2)	1949 (34.2)	679 (18.1)
Italy	157 (3.8)	2366 (57.3)	1224 (29.6)	281 (6.8)	63 (1.5)	26 (0.6)	1437 (25.8)	370 (9.0)
Singapore	217 (5.8)	2099 (56.0)	1071 (28.6)	271 (7.2)	50 (1.3)	26 (0.7)	1666 (30.8)	347 (9.3)
Sweden	103 (3.0)	1842 (53.1)	1080 (31.1)	317 (9.1)	88 (2.5)	31 (0.9)	1705 (32.9)	436 (12.6)
South Korea	177 (4.8)	2272 (61.4)	1032 (27.9)	184 (5.0)	26 (0.7)	7 (0.2)	1320 (26.3)	217 (5.9)
Taiwan	196 (5.3)	2289 (61.7)	973 (26.2)	208 (5.6)	31 (0.8)	6 (0.2)	1114 (23.1)	245 (6.6)
Hong Kong SAR China	268 (7.7)	2235 (64.6)	744 (21.5)	148 (4.3)	25 (0.7)	21 (0.6)	1292 (27.2)	194 (5.6)
Turkey	130 (4.1)	1556 (48.6)	1071 (33.5)	333 (10.4)	78 (2.4)	22 (0.7)	1511 (32.1)	433 (13.5)
Thailand	243 (7.2)	2014 (59.5)	809 (23.9)	236 (7.0)	49 (1.4)	24 (0.7)	1228 (26.6)	309 (9.1)
Norway	113 (3.7)	1562 (51.3)	961 (31.6)	303 (10.0)	75 (2.5)	23 (0.8)	1211 (28.5)	401 (13.2)
United Arab Emirates	66 (2.3)	1043 (37.0)	1100 (39.0)	435 (15.4)	109 (3.9)	52 (1.8)	1319 (31.9)	596 (21.1)
Brazil	52 (1.9)	1175 (41.8)	1061 (37.8)	383 (13.6)	98 (3.5)	33 (1.2)	1189 (29.7)	514 (18.3)
Denmark	102 (3.7)	1459 (53.3)	813 (29.7)	246 (9.0)	78 (2.8)	26 (0.9)	1186 (30.2)	350 (12.8)
Saudi Arabia	91 (3.8)	819 (33.8)	861 (35.5)	400 (16.5)	133 (5.5)	100 (4.1)	1414 (36.9)	633 (26.1)
Malaysia	152 (5.6)	1315 (48.1)	843 (30.8)	287 (10.5)	94 (3.4)	36 (1.3)	1051 (27.8)	417 (15.2)
Belgium	93 (4.1)	1287 (57.2)	656 (29.1)	163 (7.2)	39 (1.7)	9 (0.4)	800 (26.2)	211 (9.4)
New Zealand	67 (3.3)	861 (42.9)	668 (33.3)	281 (14.0)	82 (4.1)	43 (2.1)	932 (31.7)	406 (20.2)
Philippines	77 (4.0)	980 (50.9)	590 (30.6)	191 (9.9)	44 (2.3)	28 (1.5)	967 (33.4)	263 (13.7)
Ireland	40 (2.2)	851 (47.5)	584 (32.6)	203 (11.3)	65 (3.6)	32 (1.8)	966 (35.0)	300 (16.7)
South Africa	42 (2.3)	653 (36.5)	632 (35.3)	325 (18.1)	88 (4.9)	46 (2.6)	927 (34.1)	459 (25.6)
Ukraine	150 (8.6)	999 (57.1)	444 (25.4)	122 (7.0)	21 (1.2)	8 (0.5)	671 (27.7)	151 (8.6)
Indonesia	107 (6.5)	815 (49.4)	532 (32.2)	147 (8.9)	28 (1.7)	10 (0.6)	675 (29.0)	185 (11.2)
Switzerland	58 (3.4)	964 (57.0)	513 (30.3)	122 (7.2)	25 (1.5)	7 (0.4)	559 (24.8)	154 (9.1)
Czech Republic	71 (4.3)	823 (50.0)	534 (32.4)	156 (9.5)	51 (3.1)	9 (0.5)	485 (22.7)	216 (13.1)
Poland	73 (4.6)	843 (52.6)	508 (31.7)	133 (8.3)	29 (1.8)	11 (0.7)	526 (24.7)	173 (10.8)
Israel	41 (3.9)	506 (48.6)	337 (32.4)	110 (10.6)	32 (3.1)	9 (0.9)	448 (30.1)	151 (14.5)
Finland	38 (3.6)	587 (55.0)	308 (28.9)	85 (8.0)	30 (2.8)	16 (1.5)	421 (28.3)	131 (12.3)
Romania	79 (7.6)	523 (50.6)	300 (29.0)	90 (8.7)	28 (2.7)	9 (0.9)	389 (27.4)	127 (12.3)
Portugal	43 (4.0)	595 (55.8)	318 (29.8)	94 (8.8)	10 (0.9)	4 (0.4)	351 (24.8)	108 (10.1)
Egypt	18 (2.2)	312 (38.7)	283 (35.1)	126 (15.6)	42 (5.2)	20 (2.5)	406 (33.5)	188 (23.3)
Greece	17 (1.9)	378 (42.7)	332 (37.5)	119 (13.4)	26 (2.9)	11 (1.2)	274 (23.6)	156 (17.6)
Hungary	43 (4.9)	483 (54.9)	243 (27.6)	89 (10.1)	16 (1.8)	6 (0.7)	271 (23.5)	111 (12.6)
Chile	12 (1.6)	347 (47.5)	267 (36.6)	82 (11.2)	18 (2.5)	1 (0.1)	330 (31.1)	101 (13.8)
Qatar	23 (3.3)	216 (31.3)	272 (39.4)	130 (18.8)	33 (4.8)	9 (1.3)	358 (34.1)	172 (24.9)

Supplementary Table 2: United States Cities sorted by their walk scores (only showing cities with at least 20,000 weekdays of data; Methods). We use the top 10 and bottom 10 cities for our analysis (Fig. 3bc).

	City	Walkability Score		City	Walkability Score
1	New York, NY	87.6	29	Madison, WI	47.4
2	Jersey City, NJ	84.4	30	Tampa, FL	46.3
3	San Francisco, CA	83.9	31	Atlanta, GA	45.9
4	Boston, MA	79.5	32	Houston, TX	44.2
5	Philadelphia, PA	76.5	33	Irvine, CA	43.9
6	Miami, FL	75.6	34	Dallas, TX	43.6
7	Chicago, IL	74.8	35	Sacramento, CA	43.4
8	Washington, DC	74.1	36	Omaha, NE	41.1
9	Seattle, WA	70.8	37	Columbus, OH	40.0
10	Oakland, CA	68.5	38	Albuquerque, NM	39.6
11	Arlington, VA	67.1	39	Orlando, FL	39.3
12	Baltimore, MD	66.2	40	Tucson, AZ	38.9
13	Long Beach, CA	65.8	41	El Paso, TX	38.7
14	Minneapolis, MN	65.4	42	Las Vegas, NV	38.6
15	Los Angeles, CA	63.9	43	Phoenix, AZ	38.3
16	Portland, OR	62.8	44	Austin, TX	35.4
17	Honolulu, HI	62.6	45	San Antonio, TX	33.7
18	Saint Louis, MO	59.8	46	Colorado Springs, CO	33.0
19	Pittsburgh, PA	59.8	47	Kansas City, MO	32.1
20	Milwaukee, WI	59.4	48	Fort Worth, TX	31.6
21	Cleveland, OH	56.8	49	Oklahoma City, OK	31.6
22	New Orleans, LA	56.3	50	Louisville, KY	31.2
23	Saint Paul, MN	56.0	51	Raleigh, NC	28.8
24	Denver, CO	55.7	52	Indianapolis, IN	28.7
25	Cincinnati, OH	50.1	53	Nashville, TN	26.5
26	Richmond, VA	49.2	54	Jacksonville, FL	25.5
27	San Diego, CA	48.5	55	Charlotte, NC	24.4
28	San Jose, CA	48.1			

Supplementary Table 3: Three United States cities in close geographic proximity. Increased walkability is associated with decreased activity inequality in this set of otherwise similar cities. For example, San Jose and Fremont are similar to San Francisco in terms of age, race distribution, and median household income. However, San Francisco has a higher walkability rating, lower activity inequality, and lower obesity levels. Therefore, we find that the discovered relationship between walkability and activity inequality holds even for cities that are geographically and socioeconomically similar. Walkability scores are from WalkScore.com², activity inequality and obesity are estimated from our dataset (marked *), and all other variables are taken from United States Census 2010 and the American Community Survey 2006-2010².

City	Walkability Score	Activity Inequality* (Percentile)	%Obese*	%White	%Asian	%Hispanic/Latino	%Black/African American	Median Age	Median Household Income (\$)
San Francisco, CA	83.9	0.227 (0.07)	13.4	48.5	33.3	15.1	6.1	38.5	71,304
San Jose, CA	48.1	0.264 (0.33)	18.7	42.8	32.0	33.2	3.2	35.2	79,405
Fremont, CA	44.5	0.268 (0.48)	18.2	32.8	50.6	14.8	3.3	36.8	96,287

Supplementary Table 4: Number of subjects for each city and group used in the walkability analysis (Fig. 3d). We use the 24 United States cities with at least 25 subjects across all groups (N=13,498 total; Methods).

City	female							male						
	Age 0-29	Age 30-49	Age 50+	normal BMI	over-weight	obese	all	Age 0-29	Age 30-49	Age 50+	normal BMI	over-weight	obese	all
Atlanta, GA	114	109	51	147	56	55	288	83	171	67	120	106	78	330
Austin, TX	106	109	48	138	71	46	283	83	142	72	109	99	74	309
Charlotte, NC	58	60	27	77	38	27	147	49	95	34	49	75	41	190
Chicago, IL	228	236	77	268	126	126	572	182	314	102	237	229	111	624
Cleveland, OH	51	53	36	53	35	43	145	29	48	35	27	52	28	119
Dallas, TX	95	80	50	93	61	62	235	69	129	67	96	104	62	279
Houston, TX	160	197	97	170	141	120	477	145	255	131	149	212	147	556
Indianapolis, IN	57	51	33	57	37	39	146	50	56	48	35	65	47	156
Jacksonville, FL	43	60	28	48	31	43	139	26	66	51	39	44	53	148
Las Vegas, NV	62	79	51	80	62	40	203	71	158	68	76	125	82	305
Los Angeles, CA	138	139	46	173	86	54	340	108	188	55	127	131	70	365
Miami, FL	84	87	56	103	60	42	233	70	144	83	68	130	73	305
New York, NY	240	222	92	322	131	62	583	168	288	100	230	200	91	573
Orlando, FL	67	64	46	81	44	39	188	58	116	48	64	73	74	231
Philadelphia, PA	132	119	42	126	68	89	311	95	100	36	67	91	59	238
Phoenix, AZ	59	65	37	71	44	33	171	43	105	48	55	75	52	203
Pittsburgh, PA	72	44	27	70	36	31	146	41	59	36	46	53	29	141
Portland, OR	70	117	37	103	66	47	234	43	114	57	74	75	57	224
Raleigh, NC	59	50	30	61	33	38	145	28	69	32	36	53	36	133
San Antonio, TX	90	116	38	84	70	85	259	77	147	64	65	99	113	299
San Diego, CA	115	129	52	140	80	57	308	86	191	77	113	148	80	372
San Francisco, CA	98	133	35	183	47	26	283	100	220	87	194	141	54	423
San Jose, CA	80	86	51	106	61	37	226	68	195	86	131	137	70	366
Seattle, WA	92	115	35	133	60	39	253	60	173	49	106	111	53	294
Total	2370	2520	1122	2887	1544	1280	6315	1832	3543	1533	2313	2628	1634	7183