SUPPLEMENTARY MATERIAL

Table S1. List of the SNPs used for genetic profile risk score for BMI

SNP	Chr	Position	Genes	BMI-increasing allele	Other allele	ИьШ и зук 4лп.ь
rs1558902	16	52,361,075	*FTO*	A	T	0.0818
rs6567160	18	55,980,115	*MC4R*	C	T	0.0556
rs13021737	2	622,348	*TMEM18*	G	A	0.0601
rs10938397	4	44,877,284	*GNPDA2*	G	A	0.0402
rs543874	1	176,156,103	*SEC16B*	G	A	0.0482
rs2207139	6	50,953,449	*TFAP2B*	G	A	0.0447
rs11030104	11	27,641,093	*BDNF*	A	G	0.0414
rs3101336	1	72,523,773	*NEGR1*	C	T	0.0334
rs7138803	12	48,533,735	*BCDIN3D*	A	G	0.0315
rs10182181	2	25,003,800	*ADCY3*	G	A	0.0307
rs3888190	16	28,796,987	*ATP2A1*	A	C	0.0309
rs1516725	3	187,306,698	*ETV5*	C	T	0.0451
rs12446632	16	19,842,890	*GPRC5B*	G	A	0.0403
rs2287019	19	50,894,012	*QPCTL*	C	T	0.0360
rs16951275	15	65,864,222	*MAP2K5*	T	C	0.0311
rs3817334	11	47,607,569	*MTCH2*	T	C	0.0262
rs2112347	5	75,050,998	*POC5*	T	G	0.0261
rs12566985	1	74,774,781	*FPGT*	G	A	0.0242
rs3810291	19	52,260,843	*ZC3H4*	A	G	0.0283
rs7141420	14	78,969,207	*NRXN3*	T	C	0.0235
rs13078960	3	85,890,280	*CADM2*	G	T	0.0297
rs10968576	9	28,404,339	*LINGO2*	G	A	0.0249
rs17024393	1	109,956,211	*GNAT2*	C	T	0.0658
rs12429545	13	53,000,207	*OLFM4*	A	G	0.0334
rs13107325	4	103,407,732	*SLC39A8*	T	C	0.0477
rs11165643	1	96,696,685	*PTBP2*	T	C	0.0218
rs17405819	8	76,969,139	*HNF4G*	T	C	0.0224
rs1016287	2	59,159,129	*LINC01122*	T	C	0.0229
rs4256980	11	8,630,515	*TRIM66*	G	C	0.0209
rs12401738	1	78,219,349	*FUBP1*	A	G	0.0211
rs205262	6	34,671,142	*C6orf106*	G	A	0.0221
rs12016871	13	26,915,782	*MTIF3*	T	C	0.0298
rs12940622	17	76,230,166	*RPTOR*	G	A	0.0182
rs11847697	14	29,584,863	*PRKD1*	T	C	0.0492
rs2075650	19	50,087,459	*TOMM40*	A	G	0.0258
rs2121279	2	142,759,755	*LRP1B*	T	C	0.0245
rs29941	19	39,001,372	*KCTD15*	G	A	0.0182
rs6091540	20	50,521,269	*ZFP64*	C	T	0.0188
rs7715256	5	153,518,086	*GALNT10*	G	T	0.0163
rs2176040	2	226,801,046	*LOC646736*	A	G	0.0141
rs657452	1	49,362,434	*AGBL4*	A	G	0.0227
rs12286929	11	114,527,614	*CADM1*	G	A	0.0217
rs7903146	10	114,748,339	*TCF7L2*	C	T	0.0234
rs10132280	14	24,998,019	*STXBP6*	C	A	0.0230
rs17094222	10	102,385,430	*HIF1AN*	C	T	0.0249
rs7599312	2	213,121,476	*ERBB4*	G	A	0.0220
rs2365389	3	61,211,502	*FHIT*	C	T	0.0200

rs2820292	1	200,050,910	*NAV1*	C	A	0.0195
rs12885454	14	28,806,589	*PRKD1*	C	A	0.0207
rs16851483	3	142,758,126	*RASA2*	T	G	0.0483
rs1167827	7	75,001,105	*HIP1*	G	A	0.0202
rs758747	16	3,567,359	*NLRC3*	T	C	0.0225
rs1928295	9	119,418,304	*TLR4*	T	C	0.0188
rs9925964[1]	16	31,037,396	*KAT8*	A	G	0.0192
rs11126666	2	26,782,315	*KCNK3*	A	G	0.0207
rs2650492	16	28,240,912	*SBK1*	A	G	0.0207
rs6804842	3	25,081,441	*RARB*	G	A	0.0185
rs4740619	9	15,624,326	*C9orf93*	T	C	0.0179
rs13191362	6	162,953,340	*PARK2*	A	G	0.0277
rs3736485	15	49,535,902	*DMXL2*	A	G	0.0176
rs17001654[2]	4	77,348,592	*SCARB2*	G	C	0.0306
rs11191560	10	104,859,028	*NT5C2*	C	T	0.0308
rs1528435	2	181,259,207	*UBE2E3*	T	C	0.0178
rs1000940	17	5,223,976	*RABEP1*	G	A	0.0192
rs2033529[1]	6	40,456,631	*TDRG1*	G	A	0.0190
rs11583200	1	50,332,407	*ELAVL4*	C	T	0.0177
rs9400239	6	109,084,356	*FOXO3*	C	T	0.0188
rs10733682	9	128,500,735	*LMX1B*	A	G	0.0174
rs11688816	2	62,906,552	*EHBP1*	G	A	0.0172
rs11057405	12	121,347,850	*CLIP1*	G	A	0.0307
rs11727676	4	145,878,514	*HHIP*	T	C	0.0358
rs3849570	3	81,874,802	*GBE1*	A	C	0.0188
rs6477694	9	110,972,163	*EPB41L4B*	C	T	0.0174
rs7899106	10	87,400,884	*GRID1*	G	A	0.0395
rs2176598	11	43,820,854	*HSD17B12*	T	C	0.0198
rs2245368	7	76,446,079	*DTX2P1*	C	T	0.0317
rs17724992	19	18,315,825	*PGPEP1*	A	G	0.0194
rs7243357	18	55,034,299	*GRP*	T	G	0.0217
rs1808579	18	19,358,886	*C18orf8*	C	T	0.0167
rs2033732	8	85,242,264	*RALYL*	C	T	0.0192
rs1441264	13	78,478,920	*MIR548A2*	A	G	0.0175
rs2080454	16	47,620,091	*CBLN1*	C	A	0.0168
rs7164727	15	70,881,044	*LOC100287559*	T	C	0.0180
rs17203016	2	207,963,763	*CREB1*	G	A	0.0210
rs977747	1	47,457,264	*TAL1*	T	G	0.0167
rs9914578	17	1,951,886	*SMG6*	G	C	0.0201
rs9374842	6	120,227,364	*LOC285762*	T	C	0.0187
rs16907751	8	81,538,012	*ZBTB10*	C	T	0.0350
rs9540493	13	65,103,705	*MIR548X2*	A	G	0.0172
rs7239883	18	38,401,669	*LOC284260*	G	A	0.0164
rs13201877	6	137,717,234	*IFNGR1*	G	A	0.0233
rs2836754	21	39,213,610	*ETS2*	C	T	0.0164
rs492400	2	219,057,996	*USP37*	C	T	0.0158
rs9641123	7	93,035,668	*CALCR*	C	G	0.0191
rs1460676	2	164,275,935	*FIGN*	C	T	0.0197
rs4787491	16	29,922,838	*INO80E*	G	A	0.0159
rs6465468	7	95,007,450	*ASB4*	T	G	0.0166

[1] Not genotyped in UK Biobank cohort and therefore not analysed in the current report.

[2] Excluded from the SNP set for GPRS calculation on the basis of Hardy-Weinberg equilibrium $p < 10^{-6}$.

Table S2. Cohort characteristic by genetic risk score quartiles by combined categories of total self-reported PA and total sedentary behaviour

	Active / Low sedentary behaviour	Active / High sedentary behaviour	Inactive / Low sedentary behaviour	Inactive / High sedentary behaviour
Socio-demographics				
Total n	111,565	72,403	83,714	70,354
Women, n (%)	58,138 (52.1)	37,029 (51.1)	47,678 (57.0)	38,809 (55.0)
Age (years)	56.9 (8.3)	56.6 (7.9)	57.1 (7.9)	56.8 (7.6)
Deprivation index tertile				
Lower	41,445 (37.2)	26,711 (36.9)	29,661 (35.5)	23,686 (33.6)
Middle	38,707 (34.7)	25,243 (34.9)	28,094 (33.6)	23,922 (34.0)
Higher	31,293 (28.1)	20,361 (28.2)	25,867 (30.9)	22,819 (32.4)
Smoking status, n (%)				
Never	63,893 (57.4)	37,303 (51,7)	47,932 (57.6)	35,182 (50.1)
Previous	38,171 (34.3)	27,618 (38.2)	27,026 (32.4)	25,991 (37.0)
Current	9,214 (8.3)	7,284 (10.1)	8,316 (10.0)	9,097 (12.9)
Obesity-related markers				
BMI $kg.m^{-2}$	26.3 (4.1)	27.8 (4.5)	27.2 (4.8)	29.0 (5.4)
BMI Categories, n (%)				
Underweight (<18.5)	671 (0.6)	224 (0.3)	532 (0.6)	273 (0.4)
Normal weight (18.5-24.9)	45,924 (41.2)	20,332 (28.1)	28,584 (34.1)	15,860 (22.5)
Overweight (25.0 to 29.9)	47,294 (42.4)	32,972 (45.5)	35,106 (42.0)	29,039 (41.2)
Obese (≥30.0)	17,676 (15.8)	18,875 (26.1)	19,492 (23.3)	25,362 (35.9)
Body fat (%)	29.3 (8.3)	31.5 (8.2)	31.8 (8.5)	33.9 (8.4)
Waist Circumference (cm)	87.4 (12.3)	91.1 (13.2)	90.1 (13.4)	94.4 (14.4)
Central Obesity, n(%)	26,150 (23.4)	24,941 (34.4)	28,667 (34.2)	33,205 (47.1)
Physical activity				
Total PA ($METs\text{-}hr.week^{-1}$), mean (SD)	72.3 (73.6)	69.6 (72.0)	13.6 (18.8)	12.0 (17.3)
Objective total PA ($milli\text{-}gravity.day^{-1}$), mean (SD)	30.1 (8.8)	27.9 (8.2)	27.1 (7.4)	24.9 (7.0)
TV viewing ($h.day^{-1}$)	2.0 (1.1)	3.7 (1.5)	2.1 (1.1)	4.0 (1.7)
Total Sedentary Behaviour ($h.day^{-1}$)	3.6 (1.1)	6.9 (1.8)	3.6 (1.1)	7.1 (2.0)
Dietary intake				
Total energy intake ($Kcal.day^{-1}$)	2,212 (656)	2,180 (668)	2,149 (620)	2,131 (647)
Protein intake (% of TE)	15.4 (3.4)	15.6 (3.6)	15.4 (3.4)	15.6 (3.7)
Carbohydrates intake (% of TE)	47.5 (7.9)	47.0 (8.0)	47.1 (7.9)	46.6 (8.1)
Total Fat intake (% of TE)	31.7 (6.6)	32.0 (6.7)	32.3 (6.5)	32.6 (6.8)
Saturated intake (% of TE)	12.1 (3.3)	12.3 (3.3)	12.4 (3.3)	12.6 (3.4)
Polyunsaturated fat intake (% of TE)	14.5 (7.2)	14.5 (7.4)	14.2 (7.1)	14.4 (7.4)
Processed meat intake, n(%)				
Never	11,338 (10.2)	5,377 (7.4)	6,795 (8.1)	4,241 (6.0)
<1 a week	34,799 (31.2)	20,981 (29.0)	25,394 (30.4)	20,034 (28.5)
2-4 a week	61,623 (55.3)	43,015 (59.4)	48,067 (57.6)	42,864 (60.9)
>5 times a week	3,724 (3.3)	3,000 (4.2)	3,226 (3.9)	3,258 (4.6)
Sugar intake (% of TE)	22.9 (6.8)	22.6 (6.9)	22.2 (6.7)	21.9 (7.0)
Starch intake ($g.day^{-1}$)	124.5 (46.0)	122.0 (47.2)	122.6 (44.5)	121.2 (46.6)
Alcohol intake (% of TE)	5.4 (6.4)	5.4 (6.6)	5.2 (6.6)	5.2 (6.8)
Health status, n (%)				
Diabetes history	3,547 (3.2)	3,534 (4.9)	3,878 (4.6)	5,185 (7.4)
Cancer history	8,285 (7.4)	5,569 (7.7)	6,642 (8.0)	5,971 (8.5)
CVDs	28,754 (25.8)	21,830 (30.2)	25,441 (30.4)	24,854 (35.2)
Hypertension	22,580 (20.2)	16,752 (23.1)	19,540 (23.3)	18,687 (26.5)

Data presented as mean and SD for continuous variables and as n and % for categorical variables.
TE: % of total energy intake; CVD: cardiovascular diseases, MET: metabolic-equivalent task; BMI: body mass index.

Table S3. Cohort characteristic by genetic risk score quartiles by combined categories of total objective PA and total sedentary behaviour

	Active / Low sedentary behaviour	Active / High sedentary behaviour	Inactive / Low sedentary behaviour	Inactive / High sedentary behaviour
Socio-demographics				
Total n	22,045	11,737	18,265	15,991
Women, n (%)	12,758 (57.9)	6,964 (59.3)	9,515 (52.1)	8,427 (52.7)
Age (years)	54.8 (7.8)	54.5 (7.4)	58.3 (7.5)	58.0 (7.2)
Deprivation index tertile				
Lower	8,856 (40.2)	4,567 (39.0)	7,182 (39.4)	6,099 (38.2)
Middle	7,604 (34.5)	4,203 (35.8)	6,300 (34.6)	5,687 (35.6)
Higher	5,568 (25.3)	2,955 (25.2)	4,755 (26.0)	4,187 (26.2)
Smoking status, n (%)				
Never	13,519 (61.5)	6,506 (55.5)	10,722 (58.8)	8,232 (51.6)
Previous	7,316 (33.3)	4,425 (37.8)	6,338 (34.8)	6,330 (39.7)
Current	1,161 (5.2)	785 (6.7)	1,160 (6.4)	1,396 (8.7)
Obesity-related markers				
BMI $kg.m^{-2}$	25.2 (3.7)	26.6 (4.2)	26.9 (4.4)	28.6 (5.1)
BMI Categories, n (%)				
Underweight (<18.5)	186 (0.8)	60 (0.5)	89 (0.5)	36 (0.2)
Normal weight (18.5-24.9)	11,483 (52.1)	4,520 (38.5)	6,569 (36.0)	3,884 (24.3)
Overweight (25.0 to 29.9)	8,238 (37.4)	5,069 (43.2)	7,952 (43.5)	6,872 (43.0)
Obese (≥30.0)	2,138 (9.7)	2,088 (17.8)	3,655 (20.0)	5,199 (32.5)
Body fat (%)	28.3 (8.0)	30.7 (8.0)	30.9 (8.4)	33.2 (8.4)
Waist Circumference (cm)	84.2 (11.5)	87.2 (12.4)	89.8 (12.7)	93.6 (13.8)
Central Obesity, n (%)	3,563 (16.2)	3,023 (25.8)	5,593 (30.6)	6,921 (43.3)
Physical activity				
Total PA ($METs\text{-}hr.week^{-1}$), mean (SD)	50.0 (58.0)	48.4 (59.8)	37.2 (48.4)	33.4 (46.2)
Objective total PA ($milli\text{-}gravity.day^{-1}$), mean (SD)	34.5 (7.0)	33.6 (6.1)	22.2 (3.5)	21.4 (3.9)
Physical active individuals, n (%)	14,596 (66.2)	7,315 (62.3)	9,651 (52.8)	7,510 (47.0)
TV viewing ($h.day^{-1}$)	1.7 (1.0)	3.3 (1.4)	1.9 (1.0)	3.7 (1.5)
Total Sedentary Behaviour ($h.day^{-1}$)	3.5 (1.0)	6.7 (1.8)	3.7 (1.0)	7.0 (1.9)
Dietary intake				
Total energy intake ($Kcal.day^{-1}$)	2,247 (628)	2,215 (636)	2,140 (582)	2,136 (597)
Protein intake (% of TE)	15.1 (3.0)	15.4 (3.3)	15.5 (3.2)	15.6 (3.4)
Carbohydrates intake (% of TE)	47.5 (7.4)	47.0 (7.7)	47.0 (7.6)	46.6 (7.6)
Total Fat intake (% of TE)	32.2 (6.1)	32.3 (6.3)	32.2 (6.3)	32.4 (6.3)
Saturated intake (% of TE)	12.3 (3.1)	12.4 (3.1)	12.4 (3.2)	12.6 (3.2)
Polyunsaturated fat intake (% of TE)	14.9 (6.8)	14.9 (7.0)	14.1 (6.5)	14.2 (6.7)
Processed meat intake, n(%)				
Never	2,640 (12.0)	1,079 (9.2)	1,635 (8.9)	1,074 (6.7)
<1 a week	7,206 (32.7)	3,686 (31.4)	5,916 (32.4)	4,927 (30.8)
2-4 a week	11,506 (52.2)	6,556 (55.9)	9,997 (54.8)	9,297 (58.2)
>5 times a week	680 (3.1)	410 (3.5)	707 (3.9)	685 (4.3)
Sugar intake (% of TE)	22.8 (6.3)	22.6 (6.5)	22.3 (6.4)	22.0 (6.6)
Starch intake ($g.day^{-1}$)	127.1 (43.9)	124.2 (44.6)	120.9 (41.2)	120.3 (42.7)
Alcohol intake (% of TE)	5.2 (5.8)	5.2 (6.1)	5.3 (6.2)	5.3 (6.4)
Health status, n (%)				
Diabetes history	293 (1.3)	283 (2.4)	683 (3.7)	1,009 (6.3)
Cancer history	1,358 (6.2)	774 (6.6)	1,528 (8.4)	1,365 (8.6)
CVDs	3,861 (17.5)	2,395 (20.4)	5,430 (29.7)	5,507 (34.4)
Hypertension	3,180 (14.4)	1,946 (16.6)	4,332 (23.7)	4,328 (27.1)

Data presented as mean and SD for continuous variables and as n and % for categorical variables.

TE: % of total energy intake; CVD: cardiovascular diseases, MET: metabolic-equivalent task; BMI: body mass index.

Table S4. Cohort characteristic by genetic risk score quartiles by combined categories of total self-reported PA and total TV-viewing

	Active / Low sedentary behaviour	Active / High sedentary behaviour	Inactive / Low sedentary behaviour	Inactive / High sedentary behaviour
Socio-demographics				
Total n	112,938	58,611	98,930	65,771
Women, n (%)	61,133 (54.1)	30,605 (52.28)	52,536 (53.1)	35,936 (54.6)
Age (years)	56.9 (7.9)	56.6 (8.4)	57.0 (7.7)	56.8 (8.2)
Deprivation index tertile				
Lower	42,742 (37.9)	19,236 (32.8)	38,298 (38.8)	20,731 (31.5)
Middle	39,537 (35.0)	20,005 (34.2)	34,295 (34.7)	21,583 (32.9)
Higher	30,525 (27.1)	19,308 (33.0)	26,212 (26.5)	23,371 (35.6)
Smoking status, n (%)				
Never	64,033 (56.8)	29,980 (51.3)	56,686 (57.5)	32,586 (49.8)
Previous	39,620 (35.2)	21,457 (36.7)	33,503 (34.0)	23,623 (36.1)
Current	9,003 (8.0)	7,009 (12.0)	8,397 (8.5)	9,244 (14.1)
Obesity-related markers				
BMI $kg.m^{-2}$	26.3 (4.1)	27.8 (4.6)	27.3 (4.7)	29.0 (5.4)
BMI Categories, n (%)				
Underweight (<18.5)	684 (0.6)	199 (0.3)	522 (0.5)	280 (0.4)
Normal weight (18.5-24.9)	46,194 (40.9)	16,121 (27.5)	33,215 (33.6)	14,613 (22.2)
Overweight (25.0 to 29.9)	47,487 (42.1)	26,687 (45.6)	42,299 (42.8)	27,156 (41.3)
Obese (≥30.0)	18,573 (16.4)	15,604 (26.6)	22,894 (23.1)	23,722 (36.1)
Body fat (%)	29.6 (8.2)	31.8 (8.4)	31.3 (8.4)	33.9 (8.6)
Waist Circumference (cm)	87.3 (12.5)	91.2 (13.1)	90.5 (13.3)	94.4 (14.3)
Central Obesity, n(%)	27,233 (24.1)	20,793 (35.5)	33,173 (33.5)	30,884 (47.0)
Physical activity				
Total PA ($METs\text{-}hr.week^{-1}$), mean (SD)	76.6 (70.7)	80.9 (77.1)	10.7 (7.6)	9.3 (7.7)
Objective total PA ($milli\text{-}gravity.day^{-1}$), mean (SD)	30.1 (8.7)	28.0 (8.3)	26.7 (7.3)	25.0 (7.3)
Physical active individuals, n (%)	101,032 (89.5)	51,089 (87.2)	20,497 (20.7)	10,952 (16.6)
TV viewing ($h.day^{-1}$)	1.8 (0.9)	4.3 (1.1)	1.9 (0.9)	4.5 (1.4)
Total Sedentary Behaviour ($h.day^{-1}$)	4.1 (1.8)	6.4 (1.9)	4.3 (1.9)	6.7 (2.2)
Dietary intake				
Total energy intake ($Kcal.day^{-1}$)	2,196 (654)	2,197 (695)	2,158 (614)	2,136 (656)
Protein intake (% of TE)	15.4 (3.4)	15.6 (3.8)	15.4 (3.4)	15.7 (3.8)
Carbohydrates intake (% of TE)	47.4 (7.9)	47.1 (8.1)	46.9 (7.9)	46.6 (8.1)
Total Fat intake (% of TE)	31.7 (6.6)	32.0 (6.7)	32.2 (6.5)	32.7 (6.8)
Saturated intake (% of TE)	12.2 (3.3)	12.4 (3.3)	12.4 (3.3)	12.7 (3.4)
Polyunsaturated fat intake (% of TE)	14.4 (7.1)	14.8 (7.7)	14.2 (7.0)	14.6 (7.6)
Processed meat intake, n(%)				
Never	12,108 (10.7)	3,907 (6.6)	7,915 (8.0)	3,662 (5.6)
<1 a week	36,394 (32.2)	16,133 (27.6)	30,513 (30.9)	17,580 (26.8)
2-4 a week	60,707 (53.9)	35,887 (61.3)	56,706 (57.4)	41,210 (62.8)
>5 times a week	3,670 (3.2)	2,642 (4.5)	3,679 (3.7)	3,151 (4.8)
Sugar intake (% of TE)	23.0 (6.8)	22.4 (7.1)	22.2 (6.6)	21.8 (7.1)
Starch intake ($g.day^{-1}$)	122.6 (45.7)	124.6 (48.9)	122.6 (44.5)	122.5 (47.3)
Alcohol intake (% of TE)	5.4 (6.3)	5.3 (6.8)	5.4 (6.5)	5.0 (6.8)
Health status, n (%)				
Diabetes history	3,600 (3.2)	2,986 (5.1)	4,349 (4.4)	5,064 (7.7)
Cancer history	8,442 (7.5)	4,535 (7.8)	7,727 (7.8)	5,567 (8.5)
CVDs	28,579 (25.3)	18,405 (31.4)	28,690 (29.0)	24,407 (37.1)
Hypertension	22,621 (20.3)	13,966 (23.8)	22,575 (22.8)	17,874 (27.2)

Data presented as mean and SD for continuous variables and as n and % for categorical variables.

TE: % of total energy intake; CVD: cardiovascular diseases, MET: metabolic-equivalent task; BMI: body mass index.

Table S5. Cohort characteristic by genetic risk score quartiles by combined categories of total objective PA and total TV-viewing

	Active / Low sedentary behaviour	Active / High sedentary behaviour	Inactive / Low sedentary behaviour	Inactive / High sedentary behaviour
Socio-demographics				
Total n	25,343	8,393	22,602	11,575
Women, n (%)	14,905 (58.8)	4,778 (56.9)	11,729 (51.9)	6,146 (53.1)
Age (years)	55.0 (7.6)	53.8 (7.8)	58.4 (7.2)	57.6 (7.8)
Deprivation index tertile				
Lower	10,284 (40.6)	3,114 (37.1)	8,936 (39.6)	4,318 (37.4)
Middle	8,801 (34.8)	2,999 (35.8)	7,965 (35.3)	3,998 (34.5)
Higher	6,235 (24.6)	2,274 (27.1)	5,670 (25.1)	3,244 (28.1)
Smoking status, n (%)				
Never	15,300 (60.5)	4,696 (56.1)	12,933 (57.3)	5,970 (51.7)
Previous	8,698 (34.4)	3,029 (36.2)	8,154 (36.2)	4,491 (38.9)
Current	1,294 (5.1)	650 (7.7)	1,466 (6.5)	1,089 (9.4)
Obesity-related markers				
BMI $kg.m^{-2}$	25.3 (3.7)	26.7 (4.2)	27.2 (4.6)	28.7 (5.1)
BMI Categories, n (%)				
Underweight (<18.5)	205 (0.8)	41 (0.4)	97 (0.4)	28 (0.2)
Normal weight (18.5-24.9)	12,928 (51.1)	3,060 (36.5)	7,702 (34.1)	2,727 (23.6)
Overweight (25.0 to 29.9)	9,542 (37.6)	3,741 (44.6)	9,828 (43.5)	4,970 (42.9)
Obese (≥30.0)	2,668 (10.5)	1,551 (18.5)	4,975 (22.0)	3,850 (33.3)
Body fat (%)	28.6 (8.0)	30.6 (8.1)	31.2 (8.4)	33.5 (8.5)
Waist Circumference (cm)	84.4 (11.6)	87.7 (12.4)	90.5 (13.0)	93.7 (13.8)
Central Obesity, n(%)	4,364 (17.2)	2,206 (26.3)	7,409 (32.8)	5,067 (43.8)
Physical activity				
Total PA ($METs\text{-}hr.week^{-1}$), mean (SD)	49.4 (57.4)	49.6 (62.2)	36.0 (47.6)	34.4 (47.1)
Objective total PA ($milli\text{-}gravity.day^{-1}$), mean (SD)	34.4 (6.8)	33.7 (6.3)	22.0 (3.6)	21.3 (3.9)
Physical active individuals, n (%)	16,761 (66.1)	5,134 (61.2)	11,700 (51.2)	5,437 (47.0)
TV viewing ($h.day^{-1}$)	1.6 (0.9)	4.0 (1.0)	1.9 (0.9)	4.4 (1.2)
Total Sedentary Behaviour ($h.day^{-1}$)	4.0 (1.7)	6.4 (1.9)	4.5 (1.8)	6.9 (2.0)
Dietary intake				
Total energy intake ($Kcal.day^{-1}$)	2,237 (624)	2,232 (654)	2,136 (585)	2,142 (600)
Protein intake (% of TE)	15.2 (3.1)	15.4 (3.4)	15.5 (3.2)	15.7 (3.5)
Carbohydrates intake (% of TE)	47.5 (7.4)	47.0 (7.6)	46.8 (7.6)	46.7 (7.6)
Total Fat intake (% of TE)	32.1 (6.2)	32.5 (6.3)	32.2 (6.3)	32.5 (6.4)
Saturated intake (% of TE)	12.3 (3.1)	12.5 (3.1)	12.4 (3.2)	12.6 (3.2)
Polyunsaturated fat intake (% of TE)	14.8 (6.8)	15.2 (7.2)	14.1 (6.5)	14.4 (6.8)
Processed meat intake, n(%)				
Never	3,031 (12.0)	687 (8.2)	1,993 (8.8)	712 (6.2)
<1 a week	8,376 (33.1)	2,496 (29.8)	7,437 (32.9)	3,385 (29.3)
2-4 a week	13,145 (51.9)	4,899 (58.4)	12,317 (54.5)	6,932 (59.9)
>5 times a week	783 (3.0)	303 (3.6)	848 (3.8)	537 (4.6)
Sugar intake (% of TE)	22.8 (6.3)	22.2 (6.6)	22.3 (6.4)	21.9 (6.6)
Starch intake ($g.day^{-1}$)	126.1 (43.9)	126.2 (45.1)	120.1 (41.1)	121.8 (43.4)
Alcohol intake (% of TE)	5.2 (5.8)	5.2 (6.2)	5.4 (6.2)	5.1 (6.6)
Health status, n (%)				
Diabetes history	373 (1.5)	201 (2.4)	924 (4.1)	765 (6.6)
Cancer history	1,616 (6.4)	514 (6.1)	1,896 (8.4)	986 (8.5)
CVDs	4,497 (17.7)	1,749 (20.8)	6,785 (30.0)	4,112 (35.5)
Hypertension	3,687 (14.6)	1,430 (17.0)	5,434 (24.0)	3,195 (27.6)

Data presented as mean and SD for continuous variables and as n and % for categorical variables.

TE: % of total energy intake; CVD: cardiovascular diseases, MET: metabolic-equivalent task; BMI: body mass index.

Table S6. Correlation matrix between physical activity, sedentary-related behaviours and genetic profile risk score for BMI.

Exposures	Self-reported PA	Objective PA	Sedentary behaviours	TV-viewing
Self-reported PA				
Objective PA	0.180*			
Sedentary behaviours	-0.044	-0.183*		
TV-viewing	-0.036	-0.198*	0.644**	
GPRS-BMI	0.002	-0.009	0.017	0.016

Pearson correlation coefficient. P-values at *<0.01, **<0.0001

Table S7. Association of genetic profile risk score with body mass index, overweight and obesity.

		BMI ($kg.m^{-2}$**)***		**BMI ≥25‡**		**BMI ≥30‡**	
Models	N	**Beta (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**
Model 1	338,216	0.54 (0.53; 0.56)	$2.1x10^{-241}$	1.18 (1.16; 1.19)	$1.9x10^{-281}$	1.30 (1.28; 1.31)	$1.7x10^{-253}$
Model 2	229,871	0.51 (0.49; 0.53)	$4.3x10^{-207}$	1.17 (1.16; 1.18)	$2.0x10^{-193}$	1.29 (1.28; 1.31)	$1.5x10^{-191}$

Data presented as beta coefficients (*) or odds ratio (OR) (‡) and the corresponding 95%CI. *The beta coefficient indicates the change in BMI per SD increase in GPRS. ‡ The OR indicates the odds ratio for extra risk of being overweight (BMI ≥25.0) or obese (BMI ≥30.0) per SD increase in GPRS.
Analyses for model 1 were adjusted for age, sex, deprivation, education qualifications, recruitment center, month of recruitment, the first 10 principal components of ancestry and genotyping batch, smoking status, dietary intake (alcohol, fruit & vegetable, red meat, processed meat, cereals, bread and cheese) and comorbidities (diabetes, hypertension, cardiovascular diseases and cancer). Analyses performed for objectively measured PA were additionally adjusted for season and wearing time. Analyses for model 2 was adjusted for model 1 but participants with CVD, cancer, diabetes hypertension and major illness were excluded from the analyses.

Table S8. Association between genetic profile risk score and BMI levels of physical activity and sedentary behaviour

	n	Low levels		High levels		
		Beta (95% CI)	p-value	Beta (95% CI)	p-value	$P_{(interaction}$
Self-reported total PA	338,216	0.63 (0.61 to 0.66)	1.6×10^{-7}	0.46 (0.44 to 0.48)	8.0×10^{-10}	3.8×10^{-29}
Objective Total PA*	62,881	0.55 (0.50 to 0.60)	6.5×10^{-14}	0.40 (0.36 to 0.45)	1.1×10^{-83}	3.5×10^{-6}
Total discretionary sedentary time	338,216	0.49 (0.47 to 0.51)	3.8×10^{-13}	0.62 (0.60 to 0.65)	4.0×10^{-5}	2.9×10^{-17}
TV-viewing	338,216	0.50 (0.48 to 0.52)	6.3×10^{-10}	0.63 (0.60 to 0.66)	2.1×10^{-7}	1.2×10^{-13}

Data presented as beta coefficients (95%CI). The beta coefficient indicates the change in BMI per SD increase in the genetic profile risk score by high or low levels of physical activity (self-reported or objectively-measured PA) and high and low levels of discretionary sedentary behaviors (overall discretionary sedentary time and TV-viewing).
The p-value for the interaction between GPRS and the exposure of interest (PA self-reported, PA accelerometer, sedentary behaviors and TV-viewing) is presented as P-interaction. Analyses were adjusted for age, sex, deprivation, education qualifications, recruitment center, month of recruitment, the first 10 principal components of ancestry and genotyping batch, smoking status, dietary intake (alcohol, fruit & vegetable, red meat, processed meat, cereals, bread and cheese) and comorbidities (diabetes, hypertension, cardiovascular diseases and cancer). Analyses performed for objectively measured PA were additionally adjusted for season and wearing time and sedentary behavior whereas analyses for sedentary behavior and TV-viewing were additionally adjusted for self-reported total PA.
*Objectively measured physical activity; PA: physical activity; BMI: body mass index.

Table S9. Association between genetic profile risk score and BMI by the combined categories of physical activity and sedentary behaviour

	n	Physically active & Low sedentary behaviour		Physically active & High sedentary behaviour		Physically inactive & Low sedentary behaviour		Physically inactive & High sedentary behaviour		$P_{(interaction)}$
		Beta (95% CI)	p-value	Beta (95% CI)	p-value	Beta (95% CI)	p-value	Beta (95% CI)	p-value	
Self-reported Total PA	338,216	0.43 (0.40 to 0.46)	1.7×10^{-279}	0.51 (0.48 to 0.55)	8.4×10^{-207}	0.55 (0.51 to 0.59)	3.7×10^{-250}	0.73 (0.69 to 0.78)	1.3×10^{-281}	2.3×10^{-34}
Objective Total PA*	62,881	0.37 (0.32 to 0.42)	2.3×10^{-51}	0.47 (0.39 to 0.54)	5.6×10^{-34}	0.52 (0.45 to 0.58)	1.2×10^{-54}	0.60 (0.52 to 0.68)	8.9×10^{-50}	3.5×10^{-6}

Data presented as beta coefficients (95%CI). The beta coefficient indicates the change in BMI per SD increase in the genetic profile risk score by combined categories of high and low physical activity (self-reported or objectively-measured PA) and overall discretionary sedentary behaviors. A multiplicative interaction term between GPRS-BMI and combined categories of PA/Sedentary behaviors were fitted into the model to investigate a potential interaction effect. The p-value for the interaction between GPRS and the exposure of interest (PA self-reported, PA accelerometer, sedentary behaviors and TV-viewing) is presented as P-interaction.
Analyses were adjusted for age, sex, deprivation, education qualifications, recruitment center, month of recruitment, the first 10 principal components of ancestry and genotyping batch, smoking status, dietary intake (alcohol, fruit & vegetable, red meat, processed meat, cereals, bread and cheese) and comorbidities (diabetes, hypertension, cardiovascular diseases and cancer). Analyses performed for objectively measured PA were additionally adjusted for season and wearing time.
*objectively measured physical activity; PA: physical activity; BMI: body mass index.

Table S10. Association between genetic profile risk score and BMI by the combined categories of physical activity and TV-viewing

	n	Physically active & Low TV-viewing		Physically active & High TV-viewing		Physically inactive & Low TV-viewing		Physically inactive & High TV-viewing		$P_{(interaction)}$
		Beta (95% CI)	p-value	Beta (95% CI)	p-value	Beta (95% CI)	p-value	Beta (95% CI)	p-value	
Self-reported Total PA	338,216	0.43 (0.40 to 0.46)	$2.0x10^{-276}$	0.52 (0.48 to 0.56)	$5.6x10^{-163}$	0.58 (0.55 to 0.61)	$2.8x10^{-301}$	0.72 (0.68 to 0.76)	$4.2x10^{-251}$	$4.4x10^{-30}$
Objective Total PA*	62,774	0.40 (0.35 to 0.45)	$5.1x10^{-64}$	0.44 (0.36 to 0.54)	$2.3x10^{-22}$	0.53 (0.47 to 0.59)	$2.6x10^{-68}$	0.60 (0.51 to 0.70)	$1.7x10^{-35}$	$2.9x10^{-6}$

Data presented as beta coefficients (95%CI). The beta coefficient indicates the change in BMI per SD increase in the genetic profile risk score by combined categories of high and low physical activity (self-reported or objectively-measured PA) and overall discretionary sedentary behaviors. A multiplicative interaction term between GPRS-BMI and combined categories of PA/Sedentary behaviors were fitted into the model to investigate a potential interaction effect. The p-value for the interaction between GPRS and the exposure of interest (PA self-reported, PA accelerometer, sedentary behaviors and TV-viewing) is presented as P-interaction.

Analyses were adjusted for age, sex, deprivation, education qualifications, recruitment center, month of recruitment, the first 10 principal components of ancestry and genotyping batch, smoking status, dietary intake (alcohol, fruit & vegetable, red meat, processed meat, cereals, bread and cheese) and comorbidities (diabetes, hypertension, cardiovascular diseases and cancer). Analyses performed for objectively measured PA were additionally adjusted for season and wearing time.

*objectively measured physical activity; PA: physical activity; BMI: body mass index.