

**Supplementary Table 1: Means and variances of daily physical activity traits and sedentary behavior in monozygotic and dizygotic twins**

Trait	Mean $\pm$ SD		test of difference			
	MZ-twins	DZ-twins	unadjusted		adjusted	
			$P_{\text{mean}}$	$P_{\text{variance}}$	$P_{\text{mean}}$	$P_{\text{variance}}$
PAEE (kJ/day) <sup>1</sup>	2592 $\pm$ 968.1	2484 $\pm$ 950.1	1.3x10 <sup>-2</sup>	0.79	4.1x10 <sup>-2</sup>	0.58
Acceleration (m/s <sup>2</sup> )	0.113 $\pm$ 0.050	0.105 $\pm$ 0.044	2.8x10 <sup>-4</sup>	1.6x10 <sup>-4</sup>	1.1x10 <sup>-2</sup>	7.9x10 <sup>-6</sup>
MVPA (min/d) <sup>1</sup>	44 $\pm$ 35	39 $\pm$ 33	2.6x10 <sup>-3</sup>	0.76	0.06	0.50
Sedentary (min/d)	1039 $\pm$ 126.6	1055 $\pm$ 128.8	8.1x10 <sup>-3</sup>	0.65	0.14	0.98

PAEE, physical activity energy expenditure; Acceleration, average longitudinal acceleration of the trunk; MVPA and Sedentary, time spent in moderate-to-vigorous intensity physical activity (>3 METs) and sedentary behavior ( $\leq$ 1.5 METs).

Results are based on data from 899 monozygotic (MZ) and 755 dizygotic (DZ) twins; <sup>1</sup> Traits were analyzed after inverse-normal transformation. Differences were calculated using Student's t-tests, either directly (unadjusted) or on residuals after adjusting for sex, age, BMI, ethnicity and seasonality (adjusted).

**Supplementary Table 2: Actiheart wear time in monozygotic and dizygotic twin pairs**

n days data	Absolute sample size (n)				Relative frequency (%)
	MZ	DZ	Combined	Cumulative	Cumulative inverse
≥ 7 days	486	415	901	901	54.5
6 days	291	249	540	1,441	87.1
5 days	54	31	85	1,526	92.3
4 days	26	29	55	1,581	95.6
3 days	20	11	31	1,612	97.5
2 days	11	10	21	1,633	98.7
1 day	11	10	21	1,654	100.0

Numbers were rounded down to the nearest integer for monozygotic (MZ) and dizygotic (DZ) twins.

**Supplementary Table 3: The influence of adjusting for body mass index on variance component estimates**

Trait	Variance components						Model fit			
	A	95% CI A	C	95% CI C	E	95% CI E	$\Delta h^2$	-2IL	df	AIC
<b>Adjusted for sex, age, age<sup>2</sup> and BMI</b>										
PAEE <sup>1</sup>	0.465	0.234, 0.534	0.015	0.000, 0.211	0.521	0.459, 0.595	-	4,265.6	1650	965.6
Acceleration	0.352	0.000, 0.442	0.016	0.000, 0.320	0.632	0.554, 0.716	-	-5,675.9	1650	-8,975.9
MVPA <sup>1</sup>	0.474	0.289, 0.538	0.000	0.000, 0.166	0.526	0.460, 0.603	-	4,280.3	1648	984.3
Sedentary	0.310	0.094, 0.505	0.145	0.000, 0.321	0.545	0.478, 0.618	-	20,389.2	1648	17,093.2
<b>Adjusted for sex, age and age<sup>2</sup></b>										
PAEE <sup>1</sup>	0.504	0.292, 0.558	0.000	0.000, 0.183	0.496	0.439, 0.565	0.039	4,343.3	1,650	1,043.3
Acceleration	0.328	0.000, 0.461	0.056	0.000, 0.339	0.616	0.533, 0.701	-0.024	-5,602.4	1,650	-8,902.4
MVPA <sup>1</sup>	0.491	0.287, 0.556	0.000	0.000, 0.176	0.509	0.441, 0.589	0.017	4,352.5	1,648	1,056.5
Sedentary	0.301	0.085, 0.503	0.151	0.000, 0.329	0.548	0.478, 0.624	-0.009	20,438.0	1,648	17,142.0

A, C and E, the variance explained by additive genetic, shared/common environmental and unique environmental factors with their 95% confidence intervals as acquired by structural equation modeling. PAEE, physical activity energy expenditure (kJ/d); Acceleration, average acceleration of the trunk along the vertical axis of the body ( $m/s^2$ ); MVPA and Sedentary, time spent in moderate-to-vigorous intensity physical activity ( $>3$  METs) and sedentary behavior ( $\leq 1.5$  METs) (min/day);  $\Delta h^2$ , heritability estimate (A) compared with the model that adjusts for body size; -2IL, -2 log-likelihood; df, degrees of freedom; AIC, Akaike's information criterion. <sup>1</sup> Traits were analyzed after inverse-normal transformation.

**Supplementary Table 4: The influence of including pairs with sub-optimal data quality or of male sex on variance component estimates**

Trait	Variance components						$\Delta h^2$	-2IL	Model fit df	AIC
	A	95% CI A	C	95% CI C	E	95% CI E				
<b>No exclusions</b>										
PAEE <sup>1</sup>	0.465	0.234, 0.534	0.015	0.000, 0.211	0.521	0.459, 0.595	-	4,265.6	1,650	965.6
Acceleration	0.352	0.000, 0.442	0.016	0.000, 0.320	0.632	0.554, 0.716	-	-5,675.9	1,650	-8,975.9
MVPA <sup>1</sup>	0.474	0.289, 0.538	0.000	0.000, 0.166	0.526	0.460, 0.603	-	4,280.3	1,648	984.3
Sedentary	0.310	0.094, 0.505	0.145	0.000, 0.321	0.545	0.478, 0.618	-	20,389.2	1,648	17,093.2
<b>73 twins with less than four days of data excluded; data from 1,581 twins of 714 complete twin pairs analyzed</b>										
PAEE <sup>1</sup>	0.487	0.252, 0.544	0.000	0.000, 0.200	0.512	0.450, 0.591	0.022	4,074.2	1,577	920.2
Acceleration	0.292	0.000, 0.451	0.081	0.000, 0.363	0.626	0.536, 0.710	-0.060	-5,417.2	1,577	-8,571.2
MVPA <sup>1</sup>	0.463	0.225, 0.528	0.000	0.000, 0.204	0.537	0.467, 0.621	-0.011	4,080.8	1,575	930.8
Sedentary	0.339	0.121, 0.515	0.126	0.000, 0.308	0.535	0.467, 0.611	0.029	19,476.8	1,575	16,326.8
<b>174 twin pairs in whom PA assessment did not start on the same day in both co-twins excluded; data from 1,306 twins of 598 complete pairs analyzed</b>										
PAEE <sup>1</sup>	0.462	0.196, 0.545	0.021	0.000, 0.250	0.517	0.447, 0.602	-0.003	3,360.6	1,302	756.6
Acceleration	0.290	0.000, 0.469	0.084	0.000, 0.374	0.626	0.522, 0.725	-0.062	-4,499.8	1,302	-7,103.8
MVPA <sup>1</sup>	0.402	0.107, 0.536	0.077	0.000, 0.344	0.521	0.448, 0.607	-0.072	2,274.5	1,301	772.5
Sedentary	0.307	0.057, 0.515	0.148	0.000, 0.351	0.545	0.466, 0.630	-0.003	16,098.1	1,301	13,496.1
<b>125 twin pairs in whom PA assessment did not start within 7 days in both co-twins excluded; data from 1,404 twins of 647 complete pairs analyzed</b>										
PAEE <sup>1</sup>	0.439	0.189, 0.539	0.043	0.000, 0.255	0.518	0.451, 0.600	-0.026	3,609.2	1,400	809.2
Acceleration	0.362	0.000, 0.450	0.003	0.000, 0.330	0.635	0.545, 0.730	0.010	-4,812.2	1,400	-7,612.2
MVPA <sup>1</sup>	0.472	0.186, 0.544	0.011	0.000, 0.267	0.516	0.447, 0.599	-0.002	3,625.7	1,399	827.7
Sedentary	0.270	0.039, 0.493	0.180	0.000, 0.371	0.550	0.477, 0.629	-0.040	17,308.7	1,399	14,510.69
<b>435 twins with self-reported zygosity excluded; data from 1,219 twins of 571 complete pairs analyzed</b>										
PAEE <sup>1</sup>	0.500	0.281, 0.570	0.000	0.000, 0.179	0.500	0.426, 0.590	0.035	3,143.0	1,215	713.0
Acceleration	0.296	0.000, 0.442	0.045	0.000, 0.326	0.659	0.554, 0.763	-0.056	-4,163.7	1,215	-6,593.7
MVPA <sup>1</sup>	0.437	0.253, 0.516	0.000	0.000, 0.153	0.563	0.480, 0.664	-0.037	3,146.8	1,213	720.8
Sedentary	0.404	0.160, 0.560	0.091	0.000, 0.279	0.505	0.424, 0.597	0.094	15,016.5	1,213	12,590.5
<b>79 twins with self-reported disability excluded; data from 1,575 twins of 704 complete pairs analyzed</b>										
PAEE <sup>1</sup>	0.470	0.224, 0.535	0.007	0.000, 0.215	0.523	0.458, 0.601	0.005	4,035.0	1,571	893.0
Acceleration	0.375	0.008, 0.456	0.000	0.000, 0.315	0.625	0.541, 0.713	0.023	-5,398.3	1,571	-8,540.3
MVPA <sup>1</sup>	0.468	0.265, 0.537	0.000	0.000, 0.176	0.532	0.460, 0.612	-0.006	4,075.9	1,570	935.9
Sedentary	0.317	0.083, 0.505	0.129	0.000, 0.322	0.554	0.483, 0.632	0.007	19,416.9	1,570	16,276.9
<b>35 male twins excluded; data from 1,619 twins of 757 complete pairs analyzed</b>										
PAEE <sup>1</sup>	0.485	0.248, 0.540	0.000	0.000, 0.200	0.515	0.454, 0.592	0.020	4,159.6	1,615	929.6
Acceleration	0.350	0.000, 0.439	0.012	0.000, 0.312	0.638	0.558, 0.726	-0.002	-5,566.4	1,615	-8,796.4
MVPA <sup>1</sup>	0.476	0.304, 0.543	0.000	0.000, 0.151	0.524	0.455, 0.600	0.002	4,175.4	1,613	949.4
Sedentary	0.307	0.093, 0.505	0.146	0.000, 0.322	0.547	0.479, 0.620	-0.003	19,958.2	1,613	16,732.2

A, C and E, the variance explained by additive genetic, shared/common environmental and unique environmental factors with their 95% confidence intervals as acquired by structural equation modeling. All models are adjusted for sex, age, age<sup>2</sup>, BMI and sex (except for analyses in women only); PAEE, physical activity energy expenditure (kJ/d); Acceleration, average acceleration of the trunk along the vertical axis of the body (m/s<sup>2</sup>); MVPA and Sedentary, time spent in moderate-to-vigorous intensity physical activity (>3 METs) and sedentary behavior (≤1.5 METs) (min/day);  $\Delta h^2$ , heritability estimate (A) when compared with the model with no exclusions; -2IL, -2 log-likelihood; df, degrees of freedom; AIC, Akaike's information criterion. <sup>1</sup> Traits were analyzed after inverse-normal transformation.