Figure S1. Flow chart for the study population.

AGES II-Reykjavik Study Participants From 2007-2011  
(n = 3411)

Sub-study Measuring Free-living Physical Activity and Sleep – April 2009 to June 2010  
(n = 1194)

Did Not Complete Physical Activity Monitoring (n = 545)  
Refused (84)  
Excluded (150)  
- Cognitively Impaired (55)  
- Physical Obstruction (95)  
Schedule Conflicts (294)  
Device Failures (12)  
Lost Monitors (5)

Completed Physical Activity Monitoring  
(n = 649)

Insufficient Wear time (59)

≥ 4 Valid Days of Physical Activity Data  
(n = 590)  
Used For Cross-sectional Analyses

Invited to participate in Summer-Winter Repeat sub-study: First Measurement from May 15, 2009 to Sept 30, 2009  
(n=219)

Refused Participation (n=59)

Accepted Participation: Repeated Measurement From November 18, 2009 to March 19, 2010  
(n=160)

<4 Valid Days of Physical Activity Data During Repeat Visit (n = 22)

≥ 4 Valid Days of Physical Activity Data During Repeat Visit  
(n = 138)  
Used For Repeated Analyses
Table S1. Results of backward-elimination, linear regression of cross-sectional PA and SB parameters for the AGESII cohort. Covariates included age, sex, BMI, self-reported health status, day length, and temperature. Data are presented as standardized Beta. A negative standardized Beta ($\beta$) value indicates an inverse relationship.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Temperature/Day length</th>
<th>Age</th>
<th>Female</th>
<th>BMI</th>
<th>Health status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>95%CI</td>
<td>$\beta$</td>
<td>95%CI</td>
<td>$\beta$</td>
</tr>
<tr>
<td>WT-SB$^a$</td>
<td>Temperature</td>
<td>-0.10</td>
<td>-0.17; -0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Day length</td>
<td>0.31</td>
<td>0.23; 0.38</td>
<td>-0.15</td>
<td>-0.23; -0.08</td>
</tr>
<tr>
<td>TPA$^a$</td>
<td>Temperature</td>
<td>0.10</td>
<td>0.03; 0.17</td>
<td>-0.37</td>
<td>-0.45; -0.30</td>
</tr>
<tr>
<td></td>
<td>Day length</td>
<td>-0.14</td>
<td>-0.22; -0.11</td>
<td>-0.18; -0.03</td>
<td></td>
</tr>
<tr>
<td>LIPA$^a$</td>
<td>Temperature</td>
<td>0.06</td>
<td>-0.02; 0.13</td>
<td>-0.29</td>
<td>-0.36; -0.21</td>
</tr>
<tr>
<td></td>
<td>Day length</td>
<td>0.11</td>
<td>0.038; 0.19</td>
<td>-0.36</td>
<td>-0.43; -0.28</td>
</tr>
<tr>
<td>LSPA$^a$</td>
<td>Temperature</td>
<td>0.05</td>
<td>-0.02; 0.13</td>
<td>-0.29</td>
<td>-0.37; -0.21</td>
</tr>
<tr>
<td></td>
<td>Day length</td>
<td>0.11</td>
<td>0.038; 0.19</td>
<td>-0.03</td>
<td>-0.12</td>
</tr>
</tbody>
</table>

WT= Wear time; SD= standard deviation, day to day variation in each PA/SB variable; PA= Physical activity; SB= Sedentary behavior; TPA= Total PA; LIPA= Low-intensity PA (100-759 counts × min$^{-1}$); LSPA= Lifestyle PA (≥760 counts × min$^{-1}$); MVPA= Moderate-to-vigorous PA (≥2020 counts × min$^{-1}$); $a$= adjusted for wear time; $b$= square root transformed.