Changes in non-occupational sedentary behaviors across the retirement transition: the Finnish Retirement and Aging Study (FIREA)

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ABSTRACT

Background Retirement is a major life transition and it may influence health behaviors and time use as people no longer go to work. Very little is known how sedentary behavior changes as a result of increased time availability after the retirement transition. The aim of this study was to examine changes in non-occupational sedentary behaviors across the retirement transition. In addition, we examined which pre-retirement characteristics were associated with these changes.

Methods The study population consisted of 2,011 participants from the Finnish Retirement and Aging Study (FIREA). Repeated postal survey including questions on sedentary behavior domains (television viewing, computer use at home, sitting in a vehicle and other sitting) were conducted once a year across the retirement transition, covering on average 3.4 study waves. Linear regression analyses with generalized estimating equations (GEE) were used for the analyses.

Results Total sedentary time increased by 73 (95% CI 66-80) minutes/day to 5.9 hours/day during the retirement transition. Of the domain-specific sedentary behaviors, television viewing time increased by 28 (95% CI 25-32) minutes/day, computer use at home by 19 (95% CI 17-22) minutes/day, and other sitting time by 37 (95% CI 33-41) minutes/day, while time sitting in a vehicle decreased by 6 (95% CI 4-9) minutes/day during the retirement transition. Women and persons who had high occupational sitting time, low physical activity level, sleep difficulties, mental disorders, or poor health before retirement increased mostly time spent on sedentary behaviors during the retirement transition (all P-values for interaction <0.03).

Conclusion Total and domain-specific sedentary times, except sitting in a vehicle, increased during the retirement transition.

Key words: sedentary behavior, sitting, retirement, cohort, aging, television viewing

What is already known on this subject?

Retirement is associated with increased time spend sedentary.

There are no longitudinal studies with repeated measures of sedentary behavior domains across the retirement transition.

What this study adds?

Total and domain-specific sedentary behaviors, except sitting in a vehicle, increase during the retirement transition.

Total non-occupational sedentary time continued to increase during the post-retirement period.

Women, and those who had high occupational sedentary time, low physical activity level, sleep difficulties, mental disorders, or poor health before retirement were most likely to report an increase in total non-occupational sedentary time during the retirement transition.

BACKGROUND

Sedentary behavior, defined as any waking behavior characterized by an energy expenditure ≤1.5 metabolic equivalents (METs) whilst in a sitting or reclining posture [1], is highly prevalent among adult population [2]. Older adults are the most sedentary age group spending 65% to 80% of their wake time on sedentary behaviors [3]. This is a major public health concern as sedentary behavior is associated with poor health [4,5] and mortality [6,7].

Retirement is one of the major life transitions which can modify lifestyle after middle life [8]. Retirement is associated with positive lifestyle changes, such as increased leisure physical activity [9] and sleep duration [10] most likely due to increased time availability, restructure of leisure activities and awareness of one's own health and well-being [11,12]. However, retirement has also been listed as a strong determinant for engaging sedentary behavior [13]. To date, only a small number of studies have examined how sedentary behavior changes during the retirement transition [14].

Prior longitudinal studies have shown that retirement is associated with increased time spend on television viewing and computer use, and with decreased passive transportation time [8,14–17]. However, previous studies have not been able to repeatedly follow people across the retirement transition nor to illustrate the short and long-term changes in both total and domain-specific sedentary behaviors [8,15–17]. Furthermore, previous studies have examined changes in sedentary behavior only by education or work-related factors [14]. However, multiple other factors, such as lifestyle and health factors, are shown to be associated with sedentary behavior [18] and it is of interest to examine how these factors moderate the changes in sedentary behavior during retirement transition.

To address the limitations of the previous studies, this longitudinal study examined how non-occupational sedentary behavior, namely television viewing, computer use at home, sitting in

a vehicle and other sitting, changed across the retirement transition using repeated annual measurements. We also investigated which pre-retirement characteristics were associated with changes in total and domain-specific sedentary times during the retirement transition.

METHODS

Study population

Finnish Retirement and Aging Study (FIREA) is an ongoing longitudinal cohort study of older adults in Finland established in 2013. The aim of the FIREA study is to follow aging workers from work to full-time retirement and to determine how health behaviors and clinical risk factors change during transition to statutory retirement. The eligible population for the FIREA study cohort included all public sector employees whose individual retirement date was between 2014 and 2019 and who were working in year 2012 in one of the 27 municipalities in Southwest Finland or in the 9 selected cities or 5 hospital districts around Finland. Information on the estimated individual retirement date was obtained from the pension insurance institute for the municipal sector in Finland (Keva). Participants were first contacted 18 months prior to their estimated retirement date by sending a questionnaire, which was thereafter sent annually, four times in total. The actual retirement date was self-reported by the participants. Due to the eligibility criteria, large majority of the FIREA participants retired based on their age, and not due to diseases. The FIREA study was conducted in line with the Declaration of Helsinki, and was approved by the Ethics Committee of Hospital District of Southwest Finland.

By the end of 2017, 6,673 (63% of the eligible sample, n=10,629) of the FIREA cohort members had responded to at least one questionnaire and of them 4,311 had so far responded at least twice to questionnaires, 2,082 both prior and after the actual retirement date reported

by the responders. There were two possible study waves before retirement (wave -2, wave -1) and three possible waves after retirement (wave +1, wave +2, wave +3). Each successive wave was one year apart from each other. To be included in this study, the participants had to have information on total sedentary time immediately before and after transition to statutory retirement (i.e. at wave -1 and at wave +1) (n=2,058). Then we excluded those with missing information on socio-economic status (n=24) and those who were not working full-time or part-time at wave -1 (n=23) resulting in an analytic sample of 2,011 persons. Thus, depending on the retirement date, participants' observations came from one of the following alternative set of waves: 1) wave -2, wave -1, wave +1, wave +2, or, 2) wave -1, wave +1, wave +2, and wave +3. Study waves around retirement are demonstrated in Table 1. On average, these participants provided information on total sedentary time at 3.4 (range 2-4) of the possible four study waves. The analytical sample did not differ from the eligible sample (83 vs. 80% of women, 33 vs. 29% of upper grade non manual, 37 vs. 42% of manual workers, respectively).

Assessment of sedentary behavior

Sedentary behavior was inquired at each study wave with a question: "On average, how many hours on a non-weekend days you spend on sitting: 1) at the office, 2) watching television or videos at home, 3) using computer at home, 4) in a vehicle (car, train, airplane), and 5) other sitting?" Response alternatives for each domain were: 0 (sitting less than an hour or not at all), 1, 2, …, 9, ≥10 hours per day, coded as 0 to 10 hours, respectively. We calculated a total non-occupational sedentary time by summing up sitting times for television viewing, computer use, vehicle and other.

Assessment of covariates

Sex, date of birth, and occupational status were obtained from the pension insurance institute for the municipal sector in Finland (Keva). Occupational status was categorized into three groups according to the occupational titles by the last known occupation preceding retirement: upper-grade non-manual workers (e.g. teachers, physicians), lower-grade non-manual workers (e.g. registered nurses, technicians) and manual workers (e.g. cleaners, maintenance workers). All other covariates were based on the responses in the last questionnaire prior to retirement (wave -1). These covariates were selected because they have been shown to be associated with sedentary behavior [18] and might influence the decision to retire [19]. Work status was divided into full-time or part-time workers and marital status into married/cohabiting or not married/other. Heavy physical work (no vs. yes) was assessed by using validated gender-specific job exposure matrix (JEM) for physical exposures [20,21]. Occupational sedentary time before the retirement transition was categorized into four groups: <4 hours, 4 to <6 hours, 6 to <8 hours and ≥8 hours daily.

Physical activity was assessed with a question on average weekly duration and intensity of leisure and commuting physical activity during the past year. Weekly physical activity was expressed as metabolic equivalent (MET) hours and categorized as: low (<14 MET hours/week), moderate (14 to <30 MET hours/week), and high (≥30 MET hours/week) activity levels [22]. Body mass index (BMI) was calculated from self-reported weight and height and categorized into: underweight (<18.5 kg/m^2), normal weight (18.5 to <25.0 kg/m^2), overweight (25 to <30 kg/m^2) and obese (≥30 kg/m^2) [23]. The participants reported their habitual frequency and amount of beer, wine, and spirits consumption, in weekly units of alcohol. Heavy alcohol use (no vs. yes) was defined as >16 drinks/week for women and >24 drinks/week for men, as these limits correspond with the lower limit for heavy use of alcohol set by the Finnish Ministry of Health and Social Affairs [24]. Smoking status was categorized into non-smokers (never and former) and current smokers. Sleep difficulties were measured

151 with the Jenkins Sleep Problem Scale [25] and categorized as no sleep difficulties (sleep
152 difficulties ≤ 1 night/week), moderate sleep difficulties (2-4 nights/week), or severe sleep
153 difficulties (5-7 nights/week) [26].

154 Data on chronic diseases was based on question "Have your doctor ever told that you have or
155 have had …." and following diseases were taken into account: angina pectoris, myocardial
156 infarction, stroke, claudication, osteoarthritis, osteoporosis, sciatica, fibromyalgia, rheumatoid
157 arthritis, migraine, and malign cancer. For the analyses, participants were categorized into
158 having no chronic disease, having one chronic disease or having more than one chronic
159 diseases. Mental disorders included depression and/or other mental diseases (no vs. yes). Self-
160 rated health was assessed with a 5-point scale (1=good, …, 5=poor), and was then categorized
161 as good (1-2), average (3), and poor (4-5) health. Psychological distress was measured with the
162 12-item version of General Health Questionnaire (GHQ-12), which gives a total score ranging
163 from 0 to 12. A cut-off point of three or more symptoms was used to indicate psychological
164 distress (no vs. yes) [27].

165

166 **Statistical analysis**

167 Characteristics of the study population before retirement (at wave -1) are presented as numbers
168 and percentages for categorical variables and as means and standard deviations (SDs) for
169 continuous variables. We first calculated mean estimates and their 95% confidence intervals
170 (CI) for the total and domain-specific sedentary times in each study wave to illustrate the levels
171 of these behaviors across the retirement transition (from wave -2 to wave +3). We used linear
172 regression analyses with generalized estimating equations (GEE). The GEE models control for
173 the intra-individual correlation between repeated measurements using an exchangeable
174 correlation structure and is not sensitive to measurements missing completely at random

175 [28,29]. The difference in the mean change in total and domain-specific sedentary times
176 between two specific time periods: the retirement transition period (from wave -1 to wave +1)
177 and the post-retirement period (from wave +2 to wave +3) were tested using a period*time
178 interaction term.

179 We also examined whether sociodemographic and work-related factors (sex, occupational
180 status, work status, marital status, heavy physical work and occupational sedentary time),
181 lifestyle factors (physical activity, BMI, heavy alcohol use, current smoking status, sleep
182 difficulties), and health factors (number of chronic diseases, mental disorders, self-reported
183 health, and psychological distress) before retirement were associated with the magnitude of
184 changes in total and domain-specific sedentary times during the retirement transition (from
185 wave -1 to wave +1). For these analyses, the interaction term pre-retirement factor*time was
186 added to the GEE models. All models were adjusted for age, sex, and occupational status. The
187 SAS 9.4 Statistical Package was used for all of the analyses (SAS Institute Inc., Cary, NC).
188

189 **RESULTS**

190 Characteristics of the study population are shown in Table 2. Of the participants, 83% were
191 women, 33% had upper grade non-manual work, and 37% had manual work. Before the
192 retirement transition (at wave -1), the mean age of the study population was 63.2 (SD 1.3)
193 years, 39% had low physical activity level, 38% had normal BMI, and 28% were free of chronic
194 diseases. The mean time spent being sedentary at leisure was 4.7 (95% CI 4.5-4.8) hours/day.
195 The total sedentary time before retirement differed by sex, work and marital status, physical
196 strenuousness of the work, physical activity level, BMI category, alcohol use, severity of sleep
197 difficulties, self-reported health, and psychological distress ($p<0.05$ for all).

Figure 1 illustrates the changes in total and domain-specific non-occupational sedentary times across the retirement transition. The total sedentary time, including sitting time for television viewing, computer use, vehicle and other, increased by 73 minutes/day to 5.9 hours/day during the retirement transition and continued to increase by 18 minutes/day to 6.2 hours/day during the post-retirement period. Thus the change in total sedentary time during the retirement transition was four times that of change during the post-retirement period (period*time interaction p<.0001). Of the domain-specific sedentary behaviors, television viewing time increased by 28 minutes/day to 2.7 hours/day, computer use at home by 19 minutes/day to 1.1 hours/day, and time spent on other sitting activities by 37 minutes/day to 1.6 hours/day during the retirement transition. Time sitting in a vehicle decreased by 6 minutes/day during retirement transition. Computer use and other sitting times continued to increase during the post-retirement period (by 5 and 8 minutes/day, respectively).

Table 2 presents mean estimates for the change in total non-occupational sedentary time during the retirement transition by the pre-retirement characteristics. Supplemental Tables 1-3 present results for domain-specific sedentary times. Women increased their total sedentary time more than men during the retirement transition (77 vs. 56 minutes/day, sex*time interaction p=0.01). Changes in total sedentary time by men and women are shown in Supplement Figure 1.

Those who retired from full-time jobs increased total sedentary time more than those who retired from part-time jobs (78 vs. 62 minutes/day, pre-retirement job status*time interaction p=0.02). This was also seen for change in television viewing time (Supplemental Table 1). Those who had high pre-retirement occupational sedentary time reported higher increase in total sedentary time during the retirement transition than those who had low occupational sedentary time (98 vs. 65 minutes/day, pre-retirement occupational sedentary time*time interaction p<0.0001). This association was also seen for change in computer use (Supplemental Table 2) and change in other sitting time (Supplemental Table 3). In addition,

those who had low pre-retirement physical activity level reported higher increase in total sedentary time during the retirement transition than those who had high pre-retirement physical activity level (79 vs. 62 minutes/day, pre-retirement activity level*time interaction p=0.02). The pre-retirement physical activity level associated also with changes in television viewing time (Supplement Table 1).

Among those with severe sleep difficulties before retirement, the increase in total sedentary time during the retirement transition was reported to be higher than among those who had no pre-retirement sleep difficulties (89 vs. 64 minutes/day, pre-retirement sleep difficulties*time interaction p=0.002). Sleep difficulties were also associated with changes in sitting time for computer use (Supplemental Table 2). Those who had chronic diseases reported higher increase in total sedentary time during the retirement transition than those who had no chronic diseases before retirement (79 vs. 61 minutes/day, pre-retirement disease status*time p=0.03). Furthermore those who had mental disorders before retirement increased their total sedentary time more than those who had no pre-retirement mental disorders (94 vs. 71 minutes/day, pre-retirement mental health*time interaction p=0.009). Also self-reported health before retirement associated with changes in total sedentary time so that those reporting poor health increased their total sedentary time more than those reporting good health (96 vs. 68 minutes/day, pre-retirement health*time interaction p=0.03). Self-reported health showed strongest association with increased television viewing time (Supplemental Table 1). In addition, psychological distress before retirement associated with the changes in television viewing time (Supplemental Table 1) and computer use (Supplemental Table 2) during the retirement transition.

DISCUSSION

This is the first longitudinal study examining changes in non-occupational sedentary behavior across the retirement transition. Total sedentary time as well as television viewing time, computer use at home, and other sitting time increased during the retirement transition. Total sedentary time, and especially computer use and other sitting domain, continued to increase during the years following retirement. Women, and those who had high occupational sedentary time, low level of physical activity, sleep difficulties, mental disorders, or poor health before retirement were most likely to report an increase in total sedentary time during the retirement transition. An advantage of the present comprehensive investigation over previous studies is that we examined annual changes in sedentary behavior by using repeated measures of domain-specific sedentary behaviors (television viewing time, computer use at home, sitting in a vehicle and other sitting) across the retirement transition. In addition, we have studied the associations between pre-retirement characteristics and the changes in total and domain-specific sedentary times during the retirement transition.

Our finding that total sedentary time, television viewing, computer use, and other sitting time increase during the retirement transition corresponds to previous longitudinal findings showing higher increase in total leisure sedentary time [16], television viewing time [8,15,16], and computer time [16] among retiring adults than among those who remained employed. As sedentary behavior in general [2,4] and television viewing specifically [30–32] are related to adverse health outcomes among older adults, our findings, among others, suggest that more attention should be paid to reducing overall sedentary behavior and especially television viewing time after transitioning to retirement. We also observed that total, computer use at home, and other sitting time continued to increase in the years following retirement. However, computer use and other sitting time increased to lower absolute level of sedentary behavior per day than television viewing. It is worth of noting that computer use is mentally activating compared to passive television viewing[33], and may not be as harmful for health among older

271 adults [34]. Despite the overall increase in sedentary behavior during retirement, we also
272 observed that sitting in a vehicle decreased during the retirement transition. Similarly to our
273 finding, a previous study has shown that passive transportation decreases more among retiring
274 than among already retired adults [17]. This decrease is probably mostly due to absence of
275 commuting-related passive transportation after retirement.

276 A unique feature in our study compared to previous ones is that we also examined wide range
277 of pre-retirement characteristics that could affect the magnitude of change in total and domain-
278 specific sedentary times during the retirement transition. We found that women increased their
279 total and other sitting time more than men, although men were more sedentary before
280 retirement. Also high occupational sedentary time before the retirement transition was
281 associated with greater increases in total, computer use and other sitting times during the
282 retirement transition. Similar relationship was also seen in previous study where higher work-
283 related sitting associated with greater increase in screen time after retirement [35] and in
284 another study in which less physically demanding job associated with increased time spent
285 watching television after retirement [15]. Although less educated adults [17] and those retiring
286 from manual social class [16] have previously been shown to be more susceptible to increase
287 television viewing time after retirement, we did not observe association between occupational
288 status or heavy physical work and total or domain-specific sedentary times.

289 According to our findings, high level of physical activity before retirement was associated with
290 less increase in total and television viewing times during the retirement transition. Another
291 novel finding is that those who had sleep difficulties, mental disorders or poor health before
292 retirement were most likely to report an increase in total sedentary time during the retirement
293 transition. Sleep difficulties were associated with increased sitting time for computer use
294 whereas poor self-reported health associated with increased television viewing time. Also pre-
295 retirement psychological distress was associated with increased television viewing and

296 computer use after retirement. These findings adds to previous studies which have found that
297 sedentary behavior associate with poor sleep quality [36], poor mental health [37,38] and with
298 increased risk of depression [39,40].

299 The main limitation of this longitudinal study is the reliance on self-reported data in relation to
300 the behavioral changes, which is commonly used in large data collection but can lead to bias
301 and underreporting of sedentary time [3]. To our knowledge the questionnaire used in this study
302 is not validated against objective measurements of sedentary behavior. However, the
303 assessment of sedentary behavior as self-reported hours/day is frequently used in observational
304 studies [7]. In addition, since we calculated the total non-occupational sedentary time based on
305 the time used in different domains, we were not able to control the simultaneity of domain-
306 specific sedentary behaviors. This may have lead slight overestimation of the total sedentary
307 time. Future studies with objective monitoring of sedentary time are therefore needed to fully
308 understand the changes in sedentary behavior during the retirement transition. There are also
309 some other methodological issues that deserve discussion. We only assessed sedentary time on
310 non-weekend days. This can be a limitation, because sedentary time may be different in
311 weekend vs. non-weekend days among older adults [41]. On the other hand, by focusing on
312 week-days only we were able to better capture changes in sedentary behavior when week-day
313 routines change after moving into retirement. In addition, we did not include occupational
314 sedentary time in the calculation of total sedentary time because occupational sitting disappears
315 after retiring from work [16] and this would have masked the increase in non-occupational
316 sedentary behavior [14]. Instead we examined changes in sedentary behavior during the
317 retirement transition based on the levels of pre-retirement occupational sedentary time. Finally,
318 the study population is representative of the Finnish public sector employees, however, the
319 results may not necessarily be generalizable to other sectors.

320

Conclusions

Total non-occupational sedentary time in general and television viewing, computer use and other sitting time increased during the retirement transition. Total sedentary time continued to increase during the post-retirement period. Women and adults who had high occupational sedentary time, low physical activity level, sleep difficulties, mental disorders, or poor health before retirement were most likely to report an increase in time spend sedentary after the retirement transition. However, objective measurements of sedentary behavior are needed to fully understand the changes in sedentary behavior across the retirement transition.

Contributionship SS and JV designed this study and the data collection. TL analyzed the data and drafted the manuscript. All authors contributed to data interpretation, revised article critically, and approved the final version of manuscript.

Competing interest: None declared.

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Data sharing The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethical approval The FIREA study is conducted in line with the Declaration of Helsinki, and was approved by the Ethics Committee of Hospital District of Southwest Finland.

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474 **Figure Labels**

475 **Figure 1. Total and domain-specific sedentary times across the retirement transition.**
476 **Adjusted for age, sex and occupational status.**

477

478 **Tables**

479 **Table 1. Study design. Annual study waves around retirement and the construction of the**

480 **pre-retirement, retirement transition and post-retirement periods.**

Pre-retirement period	**Retirement transition**			**Post-retirement period**	
n=955	*n*=2,011	RETIREMENT	*n*=2,011	*n*=1,211	*n*=547
	wave -1		wave +1	wave +2	wave +3
wave -2	wave -1		wave +1	wave +2	

481

482 **Table 2. Total non-occupational sedentary time before retirement (wave -1) and mean changes in total sedentary time during the**
483 **retirement transition period (from wave -1 to wave +1) by pre-retirement characteristics of the population. All models adjusted for age,**
484 **sex and occupational status.**

			Before retirement			During retirement transition			
	n	%	Total sedentary time (h)	95% CI		Mean change (h)	95% CI		P-value for interaction with time
Total	2011	100	4.65	4.52	4.78	1.23	1.11	1.34	
Sex									0.01
Men	335	17	5.02	4.77	5.26	0.94	0.69	1.19	
Women	1676	83	4.39	4.29	4.49	1.28	1.16	1.41	
Occupational status									0.45
Upper grade, non-manual	665	33	4.55	4.38	4.71	1.24	1.07	1.42	
Lower grade, non-manual	605	30	4.67	4.48	4.86	1.30	1.10	1.50	
Manual	741	37	4.71	4.53	4.89	1.15	0.98	1.32	
Work status									0.02
Full-time	1401	70	4.52	4.38	4.66	1.31	1.18	1.44	
Part-time	610	30	4.94	4.75	5.15	1.04	0.85	1.23	
Marital status									0.43
Married or cohabiting	1436	73	4.57	4.44	4.71	1.21	1.09	1.34	
Not married or other	518	27	4.82	4.59	5.04	1.30	1.10	1.51	

Heavy physical work									0.33
No	1713	85	4.58	4.44	4.72	1.24	1.12	1.36	
Yes	298	15	5.01	4.74	5.29	1.10	0.85	1.36	
Occupational sedentary time									<.0001
0-<4 h	931	50	4.54	4.37	4.71	1.08	0.93	1.23	
4-<6 h	400	22	4.74	4.51	4.97	1.34	1.11	1.56	
6-<8 h	452	24	4.38	4.18	4.57	1.70	1.49	1.91	
≥8h	78	4	4.47	3.99	4.95	1.63	1.10	2.16	
Physical activity									0.02
Low	777	39	4.85	4.67	5.03	1.31	1.14	1.49	
Moderate	589	29	4.50	4.31	4.68	1.32	1.13	1.51	
High	631	32	4.51	4.33	4.68	1.03	0.86	1.20	
Body mass index									0.65
Underweight	7	0.5	4.72	3.36	6.09	NA			
Normal weight	757	38	4.38	4.20	4.55	1.19	1.03	1.35	
Overweight	806	41	4.56	4.41	4.71	1.20	1.03	1.36	
Obese	414	21	5.31	5.06	5.55	1.30	1.06	1.54	
Heavy alcohol use									0.83
No	1837	92	4.60	4.47	4.72	1.23	1.11	1.35	
Yes	164	8	5.19	4.80	5.58	1.20	0.86	1.53	
Current smoking									0.32
No	1802	91	4.62	4.48	4.75	1.21	1.09	1.33	
Yes	172	9	4.90	4.53	5.28	1.39	1.05	1.73	

Sleep difficulties									0.002
No	985	49	4.54	4.38	4.69	1.06	0.91	1.21	
Moderate	460	23	4.78	4.57	4.99	1.22	1.00	1.44	
Severe	565	28	4.77	4.58	4.97	1.48	1.28	1.68	
Number of chronic diseases									0.03
0	540	28	4.60	4.42	4.79	1.02	0.83	1.21	
1	745	38	4.64	4.45	4.82	1.29	1.12	1.47	
≥2	655	34	4.71	4.52	4.89	1.32	1.13	1.50	
Mental disorders									0.01
No	1527	84	4.63	4.49	4.78	1.18	1.05	1.31	
Yes	285	16	4.80	4.53	5.07	1.56	1.29	1.83	
Self-reported health									0.03
Good	1492	74	4.52	4.38	4.65	1.13	1.00	1.26	
Average	438	22	4.92	4.70	5.13	1.40	1.18	1.63	
Poor	78	4	5.70	5.07	6.34	1.60	1.11	2.10	
Psychological distress									0.08
No	1760	88	4.62	4.48	4.75	1.18	1.06	1.30	
Yes	243	12	4.90	4.61	5.18	1.46	1.16	1.77	

485

486

Supplement material

Supplemental Figure 1. Total sedentary time across the retirement transition for men and women.

Supplemental Table 1. Television viewing time before retirement (wave -1) and mean changes in television viewing time during the retirement transition period (from wave -1 to wave +1) by pre-retirement characteristics of the population. All models adjusted for age, sex and occupational status.

Supplemental Table 2. Computer use at home before retirement (wave -1) and mean changes in computer use during the retirement transition period (from wave -1 to wave +1) by pre-retirement characteristics of the population. All models adjusted for age, sex and occupational status.

Supplemental Table 3. Other sitting time before retirement (wave -1) and mean changes in other sitting time during the retirement transition period (from wave -1 to wave +1) by pre-retirement characteristics of the population. All models adjusted for age, sex and occupational status.