Author(s): Salin, Kasper; Hirvensalo, Mirja; Kankaanpää, Anna; Magnussen, Costan G.; Yang, Xiaolin; Hutri-Kähönen, Nina; Viikari, Jorma; Raitakari, Olli T.; Telama, Risto; Tammelin, Tuija H.

Title: Associations of partnering transition and socioeconomic status with a four-year change in daily steps among Finnish adults

Year: 2019

Version: Accepted version (Final draft)

Please cite the original version:

Salin, K., Hirvensalo, M., Kankaanpää, A., Magnussen, C. G., Yang, X., Hutri-Kähönen, N., Viikari, J., Raitakari, O. T., Telama, R., & Tammelin, T. H. (2019). Associations of partnering transition and socioeconomic status with a four-year change in daily steps among Finnish adults. Scandinavian Journal of Public Health, 47(7), 722-729. https://doi.org/10.1177/1403494818807558

This is the accepted manuscript of the article, which has been published in *Scandinavian Journal of Public Health*. First Published October 17, 2018. https://doi.org/10.1177/1403494818807558

Associations of partnering transition and socioeconomic status with a four-year change in daily steps among Finnish adults

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Original article

Word count: 3318

Submitted:12.6.2018

Abstract

Aim/Purpose: The aim of this prospective four-year follow-up study was to examine how socioeconomic status (SES) and change in marital status are associated with the change in pedometer-measured physical activity (PA) in adulthood among participants in Cardiovascular Risk in Young Finns Study.

Methods: Questionnaires were completed and pedometers worn at baseline in 2007 and again at follow-up in 2011 by 1,051 Finnish adults (62.3% female, aged 30–45 years in 2007). A latent change score model was used to examine mean change in daily total steps, aerobic steps, and non-aerobic steps during weekdays and weekend days between 2007 and 2011.

Results: In women re-coupling or founding a new partner was associated with decrease in total steps (p=0.010), and being single was associated with increase in non-aerobic steps (p=0.047) during weekdays from 2007 to 2011 compared to women who were married.

In men, divorcing was associated with decrease in non-aerobic steps (p=0.049).

Conclusions: In order to promote PA in the general population of adults, it is recommended to pay attention to people with lower SES and those who have had changes in their marital status. These factors could be taken into account when developing strategies to promote PA among adult population.

Keywords

Pedometer, physical activity, marital status, socioeconomic status, follow-up, adults

Introduction

Regular physical activity (PA) has been shown to have multiple health benefits, such as a reduced risk for diabetes, heart disease, hypertension, stroke, premature death, depression, breast cancer, and colon cancer [1,2]. Conversely, insufficient PA is independently and jointly associated with obesity [3] and substantial economic burden [4]. Since insufficient PA is a growing problem, actions are needed to monitor PA and to promote it among populations across the globe [5]. Although leisure-time PA has increased in recent years, total PA has decreased, partly because of a reduction in occupational PA worldwide [6].

In order to encourage people to be more active, a better understanding is needed about the changes of PA in different sociodemographic groups during the life-course. Earlier studies have found that changes in PA levels over time are dependent on gender and age [7]. Socioeconomic factors, including employment status, are related to leisure-time PA, while sedentary time among men and women [8], marital status [9], and socioeconomic background [10] have also been related to PA level. In a national survey in Finland covering a 22-year period, the strongest predictor of being physically active at the follow-up was occupational status [11]. Allender at al. concluded [12] that changes in marriage reduced PA among females. Likewise, after divorce PA decreased among men [12]. However, there are no objectively measured study results on PA changes over several years in Finland and only a few studies in other countries address the issue [7,13]. Measuring PA objectively is important for determining the health benefits of different amount and intensity of PA [14]. In recent years, the accuracy of measuring PA has improved due to devices capable of measuring PA objectively [15].

The aim of the current study was to determine the mean changes in daily steps over a four-year period and to examine if socioeconomic status (SES) at baseline and changes in marital status during the follow-up were associated with change in step counts. Based on previous literature, it is possible to hypothesize that there are certain life changes that may influence on daily PA and there may be some differences between men and women.

Methods

Study design and participants

The study data were obtained from the 2007 and 2011 follow-ups of the Cardiovascular Risk Young Finns Study (YFS). The YFS began in 1980 when a random sample of 3,596 boys and girls aged 3, 6, 9, 12, 15, and 18 years from five university cities with medical schools (Helsinki, Turku, Tampere, Oulu, and Kuopio) attended data collection clinics. The examinations included questionnaires, physical measurements, and blood tests. Since baseline, the YFS sample has been followed up on seven separate occasions (1983, 1986, 1989, 1992, 2001, 2007, and 2011). Pedometer measurement of PA was performed in the two latest follow-ups (2007 and 2011). Pedometer data were collected on 1,520 participants (613 men and 907 women) in 2007 and 1,525 (633 men and 892 women) in 2011. Of these, 1,051 participants had valid pedometer data both in 2007 and 2011. In 2007, the participants were aged 30, 33, 36, 39, 42, and 45 years. In 2007, 67.8% of the participants wore pedometers during the fall (October or November) and 32.8% during the winter (December, January or February). In 2011, 23.4% of participants participated in the measurements during the fall (September, October or November), 30.7% during the winter (December, January or February), 33.2% during the spring (March, April or May), and 12.7% during the summer

(June or August).

Demographic variables. The distribution into different occupational socioeconomic status (SES) groups (1) manual, (2) non-manual low, (3) non-manual high—was made using the classification of occupations by the Central Statistical Office of Finland in 2007 and 2011. Education years were self-reported as number of school years in 2007. Marital status of the study participant was asked for in the questionnaire as follows: (1) unmarried, (2) married, (3) cohabiting without marriage, (4) divorced or separated, (5) widowed and (6) civil partnership. Married, cohabiting without marriage and civil partnership were merged into married group and divorced or separated and widowed were merged into an unmarried group. Body height and weight were measured in clinical examination and body mass index (BMI) was computed as weight (kg)/height (m)^2.

Pedometer measured physical activity. Pedometer measurement protocol has been described in detailed earlier [16]. Participants were instructed to attach an Omron Walking Style One (HJ-152R-E) pedometer during waking hours to their waistband or belt in the same position for seven consecutive days and to maintain a pedometer log. Pedometer logs were used to record the time of pedometer removal and at the end of the day to record the steps taken on the display. Participants were asked to continue with their typical activities and to remove the pedometer only while bathing or swimming. Participants could report comments and problems about their pedometer use in the pedometer log and contact the study personnel. On the eighth day, participants were instructed to send their pedometer log and the pedometer to the study centers using a padded mailbag in a stamped, self-addressed envelope that was provided to all participants. The pedometer also collected aerobic steps. Aerobic steps were those taken during activities that lasted for at least ten minutes without interruption at a pace of 60 or more steps per minute. Non-aerobic steps were determined as total steps minus aerobic steps. Previously, we compared Omron Walking Style One pedometers used in this study with the steps measured by ActiGraph accelerometers (GT1M) in a subsample of 45 participants for six or seven successive days (304 days total). The Spearman's rank correlation coefficient was 0.966 ($p < 0.001$) [17].

Pedometer data treatment. All of those who had at least four recorded days with at least eight hours and at least 500 steps were included in all analyses. Sickness or injury status, exceptional step counts reported as an untypical day, or problems with pedometer use were considered and compensated for by the mean of other days. A daily wearing time was imputed if the participant had at least two days of wearing for eight hours. Participants reported several reasons for daily nonparticipation or interruption of wearing the pedometer. The main reasons in 2007 were lost ($n = 52$) or broken pedometer ($n = 23$), illness ($n = 30$), or other reasons such as an untypical day ($n = 22$). The remainder of the participants ($n = 203$) chose not to participate in the pedometer study or did not send pedometer information back to the research center. In 2011 the main reasons for daily nonparticipation or interruption of wearing the pedometer were lost pedometer ($n = 1$), illness ($n = 105$), and other reasons, such as an untypical day ($n = 31$).

Statistical analysis

Descriptive statistics of the study variables were calculated and presented as means and standard deviations (Mean ± Standard deviation) for continuous variables and as proportions (%) for categorical variables. Differences in the background variables between women and men were tested with Student's *t* test or Pearson's chi-squared test. The characteristics of the participants having valid pedometer data from both measurement points were compared to the participants with incomplete (missing values or attrition) data by using Student's *t* test and Pearson's chi-squared test. Changes in total steps, aerobic steps and non-aerobic steps were studied using structural equation modeling. A latent change score model was used to examine the overall mean change in steps between 2007 and 2011 as well as the determinants of change [18].

First, steps in 2007 were adjusted for seasonal variation and number of days of illness in 2007 using Cholesky decomposition of the variables [19]. Seasonal variation was included, since it has been noted that weather may have an influence on PA [20]. The unobserved variable of steps in 2007, representing the variation in steps, from which seasonal variation is excluded, was created and used in further modeling. Second, latent change scores adjusted for seasonal variation and the number of days of illness (Δ) were specified. Steps in 2011 were regressed on latent steps in 2007 and the corresponding regression coefficient was fixed to be one. In addition, steps in 2011 were also regressed on a dummy coded season in 2011. The latent change score was defined as an unobserved variable representing the variation in steps in 2011, which was not identical to steps at previous the measurement point and not explained by seasonal variation and the number of days of illness in 2011.

Overall mean differences in steps between 2007 and 2011 were tested for significance by using adjusted latent change scores. In order to study the determinants of step change, the adjusted latent change score was predicted by SES in 2007 and marital status change from 2007 to 2011. The model was controlled for age and steps in 2007. All the analyses were conducted separately for men and women, and separately for the steps during the entire week, weekdays, and weekend days.

Descriptive statistics were calculated using IBM SPSS Statistics (version 20.0) and structural equation modeling was conducted using Mplus statistical package (version 7.0) [21].

Missing data were assumed to be missing at random (MAR). Under the MAR assumption, missingness may be associated with observed variables but not with unobserved ones. The parameters of the model were estimated using the full information maximum likelihood method (FIML). FIML produces unbiased parameter estimates under MAR. Robust standard errors of parameter estimates were reported.

Results

In the beginning of the data analysis comparisons were made between participants with complete and incomplete data. Comparison differences in certain background variables but not in PA levels. Participants with complete and valid pedometer data were more likely to be women (62.3% vs. 51.9%, $p < 0.001$) and to be older (Mean 38.1 vs. 37.4 years, $p = 0.001$) than participants with incomplete data. Education years (15.5 vs. 15.5 years, $p = 0.739$), BMI (25.59 vs 26.00, $p = 0.060$), SES and marital status in 2007 did not differ between the groups, but the proportion of participants who divorced between 2007 and 2011 was higher among the participants with incomplete data (7.9% vs 4.9% $p = 0.038$). The levels of daily steps (total, aerobic or non-aerobic steps) did not differ between the groups.

The mean age of the respondents in 2007 was 37.8 years (SD 5.0 years) and 57.4% were female. In total, 78.6% were married. Table 1 shows the characteristics of the 1,994 participants included in the final sample, as well as gender differences in the background variables.

Steps in 2007 and 2011 are presented in table 2 as well as the significance in the step change from 2007 to 2011 after adjustment for season. Women had, on average, 7,976 (SD 2892) total steps (the average of steps per day) in 2007 and 8,323 (SD 3014) total steps in 2011 (Table 2). Men had, on average, 7,295 (SD 2820) total steps in 2007 and 7,600 (SD 3069) total steps in 2011.

After adjusting for seasonal variation and the number of days of illness, the increase in total steps among women was significant during the weekend days ($p = 0.033$) as well as in non-aerobic steps during the weekdays ($p = 0.031$; see Table 2). After adjusting for seasonal variation no significant changes were observed in men in the overall level of steps. In addition, there was significant individual variability in each latent change score (all $p < 0.001$).

The socioeconomic and marital status (marital status continuity and change) on the latent change score of steps among women ($n = 1,144$) are presented in Table 3. In women SES was associated with the change of steps only on the weekend days. Women with high SES showed a steeper increase of total steps and aerobic steps during weekend days during four years follow-up than did women with low SES ($b = 636$, $p = 0.033$ and $b = 633$, $p = 0.015$, respectively). In addition, non-aerobic steps seemed to increase more among women with middle SES compared to women with low SES ($b = 586$, $p = 0.040$).

Among women, change in marital status was associated with the latent change of steps during the whole week, including both weekdays and weekend days. Women who had recoupled or found a new partner between 2007 and 2011 decreased their total steps compared to women who were married in both time points (during the whole week: $b = -846$, $p = 0.009$; weekdays: $b = -908$, $p = 0.010$ and weekend days: $b = -1117$, $p = 0.014$, respectively). In addition, women's aerobic steps during weekend days and non-aerobic steps during weekdays seemed to decline compared to married or cohabiting women (b = -1045, p = 0.002; b = -642, p = 0.039, respectively). Non-aerobic steps during weekdays seemed to increase more among single women compared to married or cohabiting women (b = 422, p = 0.047).

The regression coefficients of SES and marital status change on the latent change score of steps among men (n = 850) are presented in Table 4. Aerobic steps during weekdays seemed to increase among men with high SES than among men with low SES (b = 311, p = 0.042). Non-aerobic steps tended to decline more among men with high SES compared to men with low SES during the whole week and weekdays (b = -591, p = 0.004, b = -664, p = 0.004, respectively) and increase less during the weekend days (b = -581, p = 0.029). Non-aerobic steps during the whole week tended to decline more among divorced men compared **to** continuously married men (b = -839, p = 0.049).

Discussion

The purpose of this study was to examine how socioeconomic status (SES) and change in marital status are associated with the change in pedometer measured PA in adulthood. In this study it was found that daily steps increased statistically significantly among women but not among men between the follow-up points. Even though there was no increase in steps among men, an increasing trend can at least be seen as a positive. The increase in steps among women was observed only in three of twelve step variables after adjustments for the season. This increase may reflect that women in Finland are becoming more aware of the importance of regular PA because of strong promotion of physically active lifestyle during two decades.

In another study [7], it was found that daily steps among men decreased during a six-year follow-up period. Similar decreasing results for both genders have also been found in Denmark by Matthiessen et al. [21].

Changes in marital status were associated with changes in pedometer measured PA. In women re-coupling or founding a new partner was associated with decrease in steps, and being single was associated with increase in non-aerobic steps during weekdays from 2007 to 2011 compared to women who were married at both time points. Other studies have found that remaining single keeps PA at the same level, but getting married [22], remarriage [23] or changing from single to cohabiting [24] decreases PA. In this study, divorce was associated with decreased levels of PA only among men. Regarding women and divorce, other studies have indicated an increase in physical fitness [25] or conflicting results [26]. It was a bit surprising that changes in marital status was associated with steps only during weekdays but not during weekend days. Changes in steps during the follow-up happened mostly during the weekdays or the change was observed from the whole week data. It could be assumed that after changes in marital status, during weekend individuals could have more or less time for PA than during the weekdays. As a conclusion, unchanged status (being constantly married or single) was associated with stable PA habits but changes in marital status may influence PA level, depending on gender. It is good to consider the economic effects of divorce on men and women. Among women recoupling decreases steps. Is this associated with car access and less usage of public transport? Are men using primarily car after the divorce, since their non-aerobic steps decreased?

In this study women took more steps than men. This is in line with studies from Sweden, but in the USA [8] and Czech [13] men have been found to be more active than women.

However, there may be natural explanation in the longer steps (10%) of men. In previous study the difference has disappeared when gender was adjusted for height [16]. This study found that women had more aerobic steps than men, while among men the daily step count resulted more from non-aerobic steps. Previous studies have shown opposite results, with men tending to spend more time in recreation activity of higher intensity higher [8]. The higher amount of non-aerobic steps among men may be related to occupation. While only 27.5% of women were in manual work, among men this percentage was 42.6. According to Proper et al. [27], the amount of total PA accumulates more during the workday among those with lower SES. In another study [28], a lower amount of work-related PA but a higher amount of recreational PA was observed among men with high SES when they were compared to men with lower SES. However, among women no difference was observed in work-related PA, but in recreational PA women with high SES had a higher amount of PA when compared to women with low SES [28].

The reasons for the steadier increase of steps among men may be multiple, but one reason may lie in parenting practices. Because men have a short paternity leave, their everyday routines do not change dramatically. Instead, women's life transitions, multiple roles and even gender-role expectations may influence their PA behaviour more [29]. However, more research is needed to determine the association of life transitions and changes in daily PA.

Strengths and limitations

The long follow-up period, objectively measured PA and the large population of Finnish adults are the strengths of this study. To date, most of the objectively measured PA studies have relied on cross-sectional data or the follow-up period has been short. In this study, changes in PA, especially the increase of PA, is more reliable than in studies that have followed people after an intervention. Interventions may increase people's PA for a short time, but longitudinal changes are not guaranteed nor are they, in particular, followed. This study provides valuable information about changes in PA and highlights specific groups that should be targeted with more effective programs to increase PA. The data were objectively measured by pedometers, an approach which has been shown to be more valid and unbiased than self-reported questionnaires. They are also unobtrusive and can store information for a week without any inconvenience to the participants [30].

However, there are certain limitations when using pedometer measured data. For example, cycling may be underestimated and PA during water-based activities is not monitored when using pedometers. Even though pedometer measured PA gives more accurate results than self-reported questionnaires, it is important to keep in mind that there are challenges when these results are compared with other results. For example, PA data collected from different locations (e.g., hip or wrist) or data of different types (raw data, implemented) may influence the results [31]. It is also good keep in mind that behavioral changes may not be long-lasting and results may have been influenced by short-term behavioral changes that may have occurred. In addition, some unmeasured changes such as losing one's job and mobility, may be reason for lost-to-follow-up and therefore may violate MAR assumption.

Conclusions

PA typically decreases as age increases, but not in this study. Increase in steps was observed in women three of twelve step variables after adjustment for the season. Future research for this cohort would be valuable and could show whether steps are increasing, remaining stable or decreasing. SES seems to be associated with lower levels of daily PA. Likewise, changes in marital status seem to have a certain influence on daily steps, but the influence appeared to be opposite on women and men. In order to promote PA in the general population of adults, it is recommended to pay attention to people with lower SES and those who have had changes in their marital status.

Acknowledgements

Funding

This work was supported by Finnish Cultural Foundation (personal grant KS), the Ministry of Education and Culture (Major, grant number: 83/626/2014). We wish to thank Harto Hakonen from the LIKES Research Center for Physical Activity and Health for statistical help with the step data.

Conflict of interest

None declared.

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Table 1. Characteristics of the study participants.

	Women (n=1,144)	Men (n=850)	p
Age (years), M (SD) in 2007	37.8 (±5.0)	37.7 (±5.1)	0.772
Education years in 2007	n=1,056	n = 772	
M (SD)	15.9 (±3.3)	15.0 (±3.5)	<0.001
BMI (kg/m^2) in 2007	n=1,032	n=766	
M (SD)	25.2 (±4.9)	26.5 (±4.0)	
Marital status in 2007	n=1,055	n=771	
Married %	77.6	78.2	
Unmarried %	22.4	21.8	0.217
Marital status in 2011	n=981	n=722	
Married %	80.0	80.3	
Unmarried %	20.0	19.7	0.282
Change in marital status from 2007 to 2011	n=896	n=647	
Continuously married or cohabiting %	72.5	75.4	
Continuously single %	15.5	13.3	
Divorced %	5.9	5.9	
New partner %	6.0	5.4	0.584
SES 2007	n=936	n=735	
Manual %	27.5	42.6	
Non-manual low %	23.0	14.7	
Non-manual high %	49.6	42.7	<0.001

NOTE. M, Mean; SD, standard deviation; BMI, body mass index; SES, socioeconomic status.

Table 2. Total steps **(average per day)**, aerobic steps and non-exercise steps in 2007 and 2011 and latent change scores between the years.

	2007	2011	Latent change score Δ [a]					
	Mean (SD)	Mean (SD)	Mean	SE	p	Variance	SE	p
Week+weekend								
Women (n=1,144)								
Total steps	7976 (2892)	8323 (3014)	366	189	0.053	7972188	498093	<0.001
Exercise steps	2386 (2113)	2258 (2166)	25	143	0.862	5380858	390345	<0.001
Non-exercise steps	5598 (1931)	6062 (2126)	329	131	0.012	3609047	249564	<0.001
Men (n=850)								
Total steps	7295 (2820)	7600 (3069)	205	193	0.288	6847823	572685	<0.001
Exercise steps	1500 (1784)	1480 (1937)	157	152	0.303	3017014	318647	<0.001
Non-exercise steps	5796 (2253)	6117 (2392)	55	145	0.705	4293068	381319	<0.001
Week								
Women (*n*=1,144)								
Total steps	8135 (3125)	8470 (3230)	245	203	0.226	9909364	652800	<0.001
Exercise steps	2231 (2213)	2128 (2201)	-69	146	0.640	6087661	433723	<0.001
Non-exercise steps	5910 (2185)	6339 (2318)	310	143	0.031	4556982	328775	<0.001
Men (*n*=850)								
Total steps	7531 (2997)	7741 (3289)	143	217	0.511	7821158	617365	<0.001
Exercise steps	1368 (1779)	1344 (1921)	163	155	0.294	3298257	346458	<0.001
Non-exercise steps	6165 (2558)	6394 (2674)	-22	165	0.892	5118555	484066	<0.001
Weekend								
Women (*n*=1,144)								
Total steps	7569 (3448)	7935 (3614)	560	262	0.033	15121340	844556	<0.001
Exercise steps	2748 (2854)	2608 (3010)	245	222	0.270	11659530	811323	<0.001
Non-exercise steps	4831 (2111)	5327 (2423)	317	177	0.073	7210086	495609	<0.001
Men (*n*=850)								
Total steps	6598 (3534)	7251 (3799)	460	292	0.115	15901600	1413673	<0.001
Exercise steps	1851 (2604)	1842 (2762)	162	236	0.492	9097856	982437	<0.001
Non-exercise steps	4748 (2508)	5395 (2779)	305	213	0.152	9450728	861097	<0.001

Note. [a] Latent change score was adjusted for seasonal variation and number of days of illness in 2007 and 2011

Table 3. Associations of socioeconomic status (SES) and marital status on the latent change scores of total steps, aerobic steps and non-aerobic steps **(average per day)** among women. Unstandardized regression coefficients are presented.

	Δ Total steps [a]			Δ Aerobic steps [a]			Δ Non-aerobic steps [a]		
	b	SE	*p*	b	SE	*p*	b	SE	*p*
Weekdays and weekend days									
SES in 2007 (ref. class: low)									
Middle	-209	283	0.460	-134	199	0.499	-68	207	0.741
High	105	239	0.661	313	174	0.072	-186	170	0.275
Marital status in 2007-2011 (ref. class: continuously married or cohabiting)									
Single	-27	273	0.923	-250	198	0.208	343	189	0.070
Divorced	344	395	0.384	153	305	0.617	202	292	0.488
Re-coupled / new partner	**-846**	**323**	**0.009**	-404	238	0.090	-390	301	0.195
Weekdays only									
SES in 2007 (ref. class: low)									
Middle	-439	305	0.151	-29	209	0.891	-418	223	0.061
High	-114	263	0.665	259	179	0.148	-345	191	0.071
Marital status in 2007-2011 (ref. class: continuously married or cohabiting)									
Single	115	305	0.706	-200	212	0.345	**422**	**213**	**0.047**
Divorced	531	452	0.241	298	344	0.386	205	312	0.511
Re-coupled /new partner	**-908**	**352**	**0.010**	-187	275	0.496	**-642**	**311**	**0.039**
Weekend days only									
SES in 2007 (ref. class: low)									
Middle	76	371	0.837	-531	285	0.062	**586**	**285**	**0.040**
High	**636**	**298**	**0.033**	**633**	**261**	**0.015**	-41	202	0.838
Marital status in 2007-2011 (ref. class: continuously married)									
Single	-213	330	0.518	-215	281	0.445	47	223	0.834
Divorced	127	631	0.840	-165	485	0.733	337	481	0.483
Re-coupled /new partner	**-1117**	**453**	**0.014**	**-1045**	**332**	**0.002**	-108	371	0.772

NOTE: Δ, latent change score adjusted for seasonal variation and number of days of illness in 2007 and 2011; *b*, unstandardized regression coefficient; SE, standard error; SES, socioeconomic status.

[a] The regression model was controlled for steps and age in 2007.

Table 4. Associations of socioeconomic and marital status on latent change scores of total steps, aerobic steps and non-aerobic steps **(average per day)** among men. Unstandardized regression coefficients are presented.

	Δ Total steps [a]			Δ Aerobic steps [a]			Δ Non-aerobic steps [a]		
	b	SE	*p*	*b*	SE	*p*	*b*	SE	*p*
Total steps during the week									
SES in 2007 (ref. class: low)									
Middle	-80	346	0.817	206	226	0.361	-256	272	0.347
High	-260	258	0.314	282	152	0.064	**-591**	**203**	**0.004**
Marital status in 2007-2011 (ref. class: continuously married or cohabiting)									
Single	196	389	0.614	380	201	0.059	-210	304	0.491
Divorced	-555	557	0.319	350	357	0.327	**-839**	**426**	**0.049**
Re-coupled /new partner	181	544	0.740	346	382	0.365	-208	348	0.550
Weekdays									
SES in 2007 (ref. class: low)									
Middle	140	373	0.707	382	239	0.110	-232	296	0.432
High	-312	289	0.281	**311**	**153**	**0.042**	**-664**	**232**	**0.004**
Marital status in 2007-2011 (continuously married or cohabiting)									
Single	9	409	0.983	393	221	0.074	-391	334	0.242
Divorced	-156	603	0.796	318	367	0.385	-410	471	0.385
Re-coupled /new partner	284	699	0.685	622	438	0.156	-364	482	0.450
Weekends									
SES in 2007 (ref. class: low)									
Middle	76	462	0.870	43	336	0.899	118	378	0.756
High	-169	372	0.649	426	258	0.098	**-581**	**266**	**0.029**
Marital status in 2007-2011 (continuously married or cohabiting)									
Single	357	560	0.524	268	313	0.392	26	446	0.954
Divorced	279	741	0.707	1046	633	0.099	-776	470	0.099
Re-coupled /new partner	-277	495	0.575	-265	388	0.495	-74	335	0.825

NOTE: Δ, latent change score adjusted for seasonal variation and number of days of illness in 2007 and 2011; *b*, unstandardized regression coefficient; SE, standard error; SES, socioeconomic status.

[a] The regression model was controlled for steps and age in 2007.