

Effects of a multicomponent physical activity promoting program on sedentary behavior, physical activity and body measures: a longitudinal study in different office types¹

by Viktoria Wahlström, RPT,² Frida Bergman, PhD, Fredrik Öhberg, PhD, Therese Eskilsson, PhD, Tommy Olsson, MD, PhD, Lisbeth Slunga Järvholm, MD, PhD

1. *Supplementary material*
2. *Correspondence to: Viktoria Wahlström, RPT, Department of Public health and Clinical Medicine, Section of Sustainable Health, Umeå University, 901 87 Umeå, Sweden. [E-mail: viktorias.wahlstrom@umu.se]*

Supplementary information on physical activity promoting program	2
Supplementary information on methods	4
Supplementary figure S1	5
Supplementary figure S2	6
Supplementary Table S1	7
Supplementary Table S2	8
Supplementary Table S3	9
Supplementary Table S4	10
Supplementary Table S5	11
Supplementary Table S6	13
Supplementary Table S7	15
Supplementary Table S8	16
References to supplementary material	17

Supplementary information on physical activity promoting program

Theoretical background and development

“Healthy workplaces model” by WHO (2) is a holistic model for continuous improvements. It highlights leadership commitment and engagement, involvement of workers and their representatives, business ethics and legality, the use of a systematic process for effectiveness and continuous improvements and integration. The model influenced the intervention by the anchoring in leadership and managers. The participatory approach with workplace representatives when developing the communication campaign addressed both the involvement of workers and the adherence to the social and ethical codes in the workplace.

The “Social ecologic model of influences on physical activity” (3) describes the influence of personal, social/organizational- and physical environmental factors as determinants for physical activity in a building. Our intervention is influenced by this model as the two office sites offer different opportunities in the building and by interior design. When developing the communication campaigns there were discussions and considerations about the variation of personal factors, such as health status and attitudes, and social/organizational factors to “tune in the right tone” of the messages.

Banduras “Social cognitive theory” (4) describes knowledge, perceived self-efficacy, outcome expectations, and perceived social as well as structural facilitators and barriers for changes. Our intervention aimed to increase knowledge through the lecture as well as the three communication campaigns. During the lecture and in several of the posters, there were messages aiming to create reflection and goal setting for decreased sedentary behavior and increased physical activity. The anchoring of leadership and managers aimed to facilitate the social acceptance of moving at work.

Lecture:

The lecture was performed by the researchers, and included information about SB, physical activity and health in general, and specific information about SB in office environments. During the lecture, there was a break with reflection and discussions in small groups, about what possibilities there might be to decrease SB and increase physical activity.

Workshop with managers

The workshop with managers was introduced by a 10 minutes lecture, repeating the importance of reducing SB and promote physical activity in the office.

The lecture was followed by group discussions about the current situation in the office regarding sitting and moving, reflections and sharing of best practices for how managers could “walk the talk” and encourage coworkers to sit less and move more.

Communication campaigns:

Three communication campaigns were developed in cooperation with voluntary employees from the organization. In total eight persons were involved, all females. These voluntary employees were recruited from health promoters at the departments. Their role as health promoters, alongside their usual work tasks, promote and inspire colleagues to a healthy and sustainable lifestyle. Before the campaigns were launched, they were anchored in the relocation project group, and the senior management group. Prior to each campaign, the managers got information at manager meetings or via e-mail, and they were expected to discuss the campaigns with their coworkers at workplace meetings.

1. Promoting breaks from prolonged sitting

The first campaign, 10 months after relocation, included a message on the intranet from the municipality manager promoting the upcoming campaigns. There were table signs in lunch- and meeting rooms with the same message and there was also a short movie on the intranet about the importance of breaking up sitting.

Link to the movie: (<https://www.youtube.com/watch?v=jdqZN7bR9OQ>)

Examples of messages on the table-signs:

*“Promote your health – stretch your legs!
What possibilities do you have to increase physical activity and variation?”*

*“Break up your sitting!
We are created for physical activity and variation, and we need both light and more intensive physical activity to promote health. According to recent research, we should also take breaks from prolonged sitting periods.”*

2. Increased physical activity at work and during leisure

The second campaign was performed 13 months after relocation. Prior to the campaign managers got an e-mail with information about the campaign and a request to discuss the topic at an upcoming workplace meeting. Materials to use for the discussions were provided (Questions for discussion and a “variation-schedule” for goalsetting of small changes of increased physical activity in LPA or moderate to vigorous physical activity (MVPA)). There were table signs and posters in lunchrooms. The “variation-schedules” were also available in the lunchrooms.

Example of Poster:

*“Physical activity is good for your brain!
When we are physically active, the bloodstream increases in the body, e.g. in the muscles and to the brain. We know that exercise gives increased ability to concentrate and reduces the risk of getting dementia. Studies also indicate that light intensities of physical activity have positive effects on the brain.”*

Example of messages on the table-signs:

*“A detour can create added value.
Variation and physical activity are positive for humans. Take a small detour to the restroom or printer. The brain gets some rest and the extra steps will make you feel more alert. “*

3. Promoting treadmill workstations and stair walking

The third campaign, 17 months after relocation, differed between the groups, as treadmills only were available in the flex office. Table signs and posters in lunchrooms encouraged the usage of treadmills and stairs. In the flex office, a film about getting started at the treadmill station was posted on the intranet.

Link to the movie: <https://youtu.be/6L71pOYZa3I>

In the cell office, a film about health effects of taking the stairs was posted on the intranet. There were table signs and posters in lunchrooms and stairwells encouraging the usage of stairs. Reminders of taking the stairs were posted by the elevators.

Supplementary information on methods

Data collection of sedentary behavior and physical activity

Participants received verbal and written instructions on how to wear the devices. Both devices were removed when taking a shower or bath and sauna. If participants had incomplete data during the measurement period (less than 3 workdays and one non-work-day), additional measurement were, if possible, performed adjacent to the planned period. ActivPAL was attached on the right thigh with a non-waterproof hypoallergic patch, Mepore surgical dressing, and worn for 24 hours per day. If non-wear-time for more than three hours was detected during the visual inspection of the data, and not recorded in the logbook, the participant was contacted for clarification. If no clarification was possible, data were processed according to the diary. Data were discarded if reported as non-wear-time in the logbook. Lunchtime was included in the measurements of work time. At each measurement period, the participants had the possibility to leave a comment in an open question. The researcher met the participants face-to-face for the body measurements at six- and 18-months follow-up, when adverse events also could be reported.

Data processing of ActivPAL

Workdays reported as working from home were excluded as well as work time reported during weekends. When participants reported going to bed after midnight, data was processed until 23.59 for practical reasons. If there was missing data in the logbook for time getting up and going to bed, time was set by manual inspection of first vs. last activity in the data. If data regarding the time-point for starting or ending work was missing, the time from the previous work day in the logbook was used. Wear time was manually entered in the custom-made excel macro (HSC PAL analysis software v2.19s), for total time and work time. A person not further involved in the project performed a quality check of 5% of all collected ActivPAL-files. The inspection showed a discrepancy for one row of data, corresponding to 0,7% of the inspected data.

Data processing of ActiGraph

When participants had worn ActiGraph at night (13 files), awake time was manually entered in the Actilife software, according to the logbook and not according to the algorithm. This was necessary to be able to calculate leisure time outcomes for these days. The cut-point between sedentary behavior (SB) and light physical activity (LPA) was set in a small “pilot study” described elsewhere (1).

Supplementary figure S1

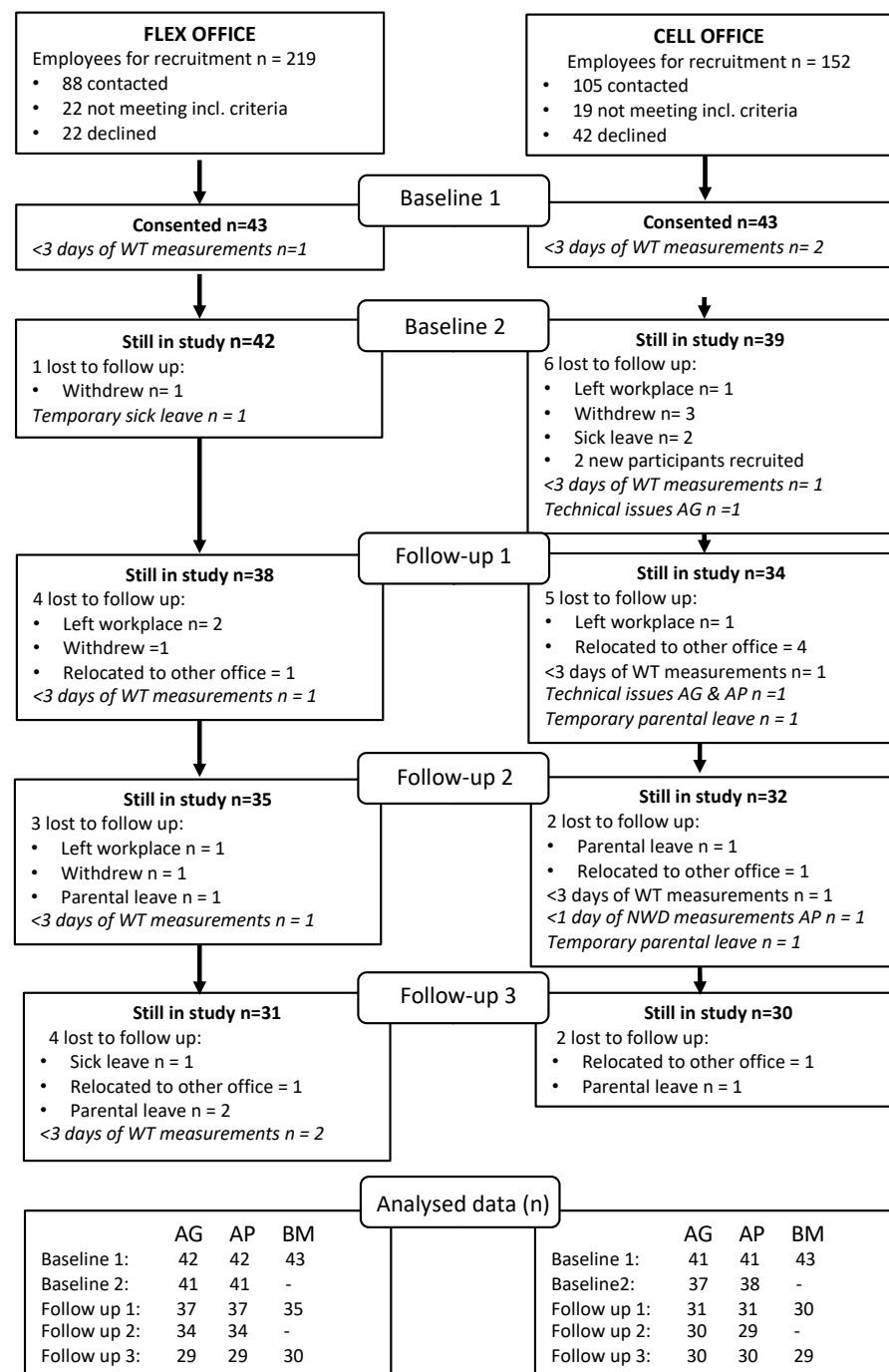


Figure S1. Flow chart for recruitment, drop-outs and data collection.
WT = Work time, NWD = non-work day, AG = ActiGraph, AP = ActivPAL, BM = body measures
Reasons to drop-out are presented at the bullet points and the cursive text describes missing data at each timepoint.

Supplementary figure S2

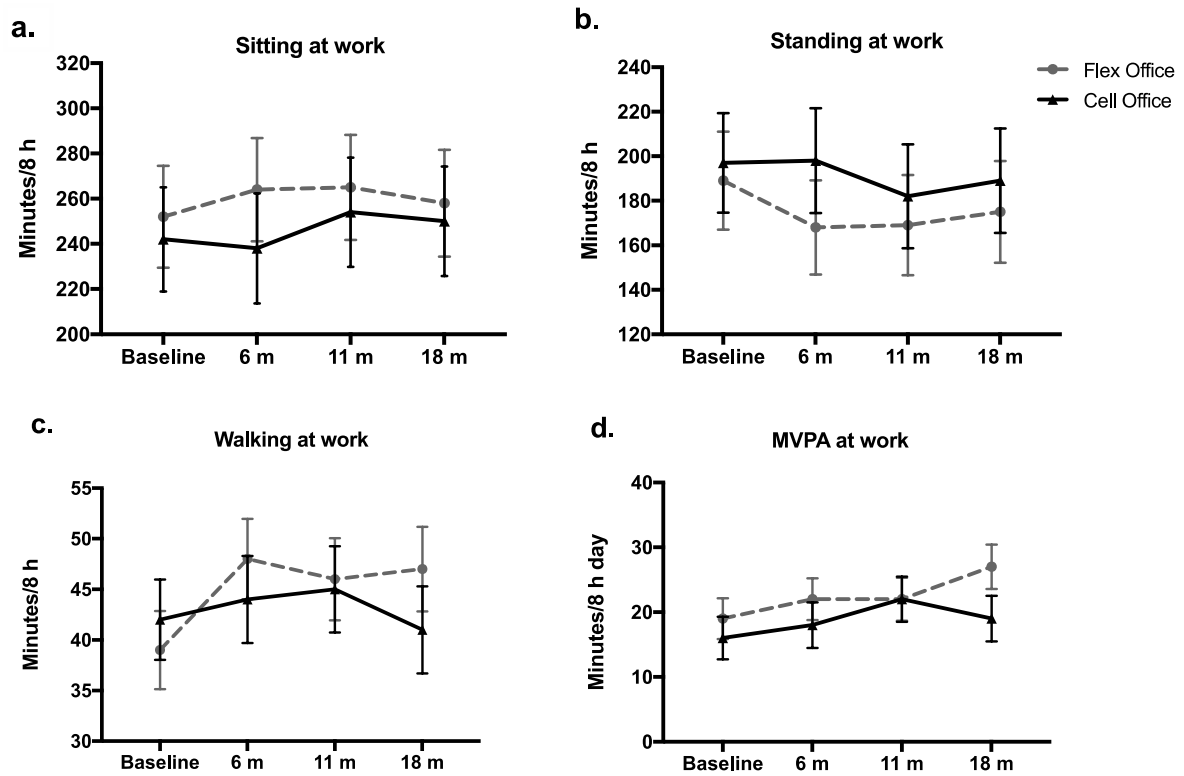


Figure S2. Results with estimated means and confidence intervals of sitting, standing, walking and MVPA at work. Significant group effects were found for walking ($p=0.001$) and MVPA ($p<0.001$).

Supplementary Table S1. Organisational and architectural features of the office designs at follow-up 3. [Clean desk policy = when leaving the workstation all personal belongings must be removed; Personal work station = a workstation assigned for an individual employee; Policies for zones = Application of rules for different sound levels and behavior in different areas of the office; ICT-solutions = Information and Communication Technology; Total area (m²) = measured from printed drawings of the office area included in this study using gross external area (GEA), according to British governmental standards (5); Area per person (m²) = Calculated as the ratio from total area and actual number of employees at follow-up 3.]

Variable	Flex Office	Cell Office
Number of employees		
Number of employees scheduled to work in the office	270	195
Actual number of employees at follow-up 3	315	199
Organisational conditions		
Clean desk policy	Applied	Partly applied
Shared workstations	Yes	No
Personal workstations, %	2%	100%
Policies for zones	No application of zones	No application of zones
ICT solutions	Wireless network in the whole office Lap tops and USB docking stations Skype for Business Air media (blue tooth) Mobile phones VPN tunnel (CISCO)	Wireless network, mostly in meeting rooms Stationary computers Skype for business, small extent. Air media in meeting rooms Stationary telephones
Architectural features		
Total area (m ²)	4805	6091
Area per person (m ²)	15	31
Number of workstations (all sit-stand)		
Open plan offices, n	116	21
Quiet rooms/cell offices (1-2 persons), n	44	153
Quiet rooms/cell offices (3-5 persons), n	-	28
Touch Downs		
Sitting height Touch Down tables, n	5	-
Standing height Touch Down tables, n	7	-
Touch down seats, n	46	-
Group tables in open plan offices		
Sitting height tables, n	1	-
Sit-stand tables, n	4	-
Number of seats	30	-
Small meeting rooms (2-6 p)		
Number of rooms, sitting height tables, n	9	14
Number of rooms, sit-stand tables, n	2	-
Number of seats	52	60
Large meeting rooms (7-25 p)		
Number of rooms	5	7
Number of seats	56	72
Conference facilities		
Number of seats	90	200
Lounges and break spaces		
Sofas and lounge chairs, number of seats	160	47
Break spaces, number of seats	193	86
Number of standing height tables	17	3
Total number of seats in the office (Conference seats excluded)	697	467
Workstations		
Total number of workstations (Desk, chair, computer, screen)	160	202
% of IT workstations with two screens or one big screen.	Approx. 90%	Approx. 70 %

Supplementary Table S2. Baseline characteristics to illustrate representativeness of the recruited samples. The recruited sample is included in the total office population in the Active Office Design project.

	Flex office				Cell Office			
	Total office population N=219		Recruited sample N=43		Total office population N=152		Recruited sample N=43 ^a	
	N	%	N	%	N	%	N	%
Agegroup								
18-39	58	27	12	28	53	35	10	23
40-49	55	25	11	25	38	25	12	28
> 50	106	48	20	47	61	40	21	49
Sex, women	149	68	32	74	143	93	42	98
Managers	59	27	10	23	10	7	3	7
Computer work per workday								
0-2 hours	5	2	0	0	2	1	0	0
2-4 hours	47	22	3	7	24	16	5	12
4-6 hours	78	36	16	37	62	41	22	51
6-8 hours	89	40	24	56	64	42	15	35
Self-rated general health								
Very good or excellent	134	61	30	70	74	49	19	45
Good or fair	83	38	13	30	77	50	23	55
Bad	2	1	0	0	1	1	0	0
Physical exercise								
No exercise	26	7	1	2	15	10	7	16
Occasionally – not regular	92	25	7	16	48	32	10	23
1 time per week	64	17	7	16	30	20	10	23
2-3 times per week	122	33	18	42	38	25	11	26
>3 times per week	66	18	10	23	21	14	4	9

^a Partially missing data from one participant.

Supplementary Table S3. Estimated means for sedentary behavior and physical activity at baseline 1 and 2. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes]

Outcome	Flex Office				Cell Office			
	Baseline 1		Baseline 2		Baseline 1		Baseline 2	
	EM	95% CI	EM	95% CI	EM	95% CI	EM	95% CI
Worktime								
Sitting, min/ 8 h	258	235-281	246	223-269	243	220-267	240	216-264
Standing, min/ 8 h	183	160-205	196	173-218	195	173-218	199	176-222
Walking, min/ 8 h	39	36-43	38	34-42	42	38-46	42	37-46
Number of steps, n/8 h	3629	3253-4005	3575	3192-3957	3813	3428-4198	3697	3253-4005
Time in prolonged sitting, min/8h	118	102-136	100	82-117	96	78-113	100	81-119
Mean sitting duration, min	10.0	5.0-14.9	6.1	1.0-11.3	11.1	5.9-16.3	9.7	4.2-15.1
Number of breaks/sitting hour	6.7	5.6-7.7	6.8	5.7-7.9	8.4	7.3-9.4	7.4	6.3-8.5
Time in LPA, min/8 h	146	135-157	150	139-160	161	150-172	152	141-163
Time in MVPA, min/8 h	19	16-22	18	15-21	17	14-21	14	11-18
Time in MVPA-bouts, min/8 h	5.6	3.1-8.2	5.2	2.6-7.8	4.4	1.7-7.0	3.5	0.7-6.2
Leisure time on workdays								
Sitting, min/ 8 h	280	266-294	284	270-298	268	254-283	264	249-279
Standing, min/ 8 h	140	128-151	135	124-147	144	133-156	149	137-161
Walking, min/ 8 h	61	55-67	60	54-66	67	60-73	68	62-75
Number of steps, n/8 h	5292	4682-5902	5214	4593-5835	5656	5031-6280	5841	4836-6126
Time in LPA, min/8 h	188	177-199	190	179-201	204	192-215	203	192-215
Time in MVPA, min/8 h	35	29-40	33	27-39	35	29-45	30	24-36
Time in MVPA-bouts, min/8 h	7.9	4.3-11.5	6.6	2.9-10.3	5.4	1.6-9.2	4.2	0.4-8.2
Non-work days								
Sitting, min/ 16 h	546	513-579	553	520-587	508	474-542	509	474-544
Standing, min/ 16 h	292	265-320	282	255-310	323	295-351	324	295-353
Walking, min/ 16 h	122	109-135	124	111-137	129	115-142	130	116-144
Number of steps, n/16 h	9835	8676-10994	9891	8709-11073	10050	8860-11239	9958	8713-11202
Time in LPA, min/16 h	406	382-431	399	374-424	434	407-460	432	406-459
Time in MVPA, min/16 h	63	51-76	61	49-74	65	51-78	50	36-63
Time in MVPA-bouts, min/16 h	33	23-43	32	22-42	35	24-45	27	16-38

Supplementary table S4. Adjusted results for sedentary behavior and physical activity at work in the two office groups presented as estimated means (EM) with confidence intervals (CI). Pairwise comparisons within groups compared to baseline and model effects for group by time interactions are presented. Estimated means are calculated with group and time interaction in the linear mixed model, adjusted for age, BMI, self-reported physical exercise and self-reported health at baseline. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes] **Bold indicates statistically significant.**

Outcome	Flex Office		Cell Office		P-value for group*time effect
	EM	95% CI	EM	95% CI	
Work time					
Sitting, min/8 h					
Baseline	250	228-273	246	221-270	0.282
Follow-up 1	262	239-286	240	214-265	
Follow-up 2	263	240-287	254	229-280	
Follow-up 3	257	233-281	253	227-278	
Standing, min/ 8 h					
Baseline	191	169-213	193	169-216	0.101
Follow-up 1	170^b	147-192	195	171-220	
Follow-up 2	171^a	148-194	180	155-205	
Follow-up 3	177^a	154-200	186	161-211	
Walking, min/ 8 h					
Baseline	39	35-43	42	38-46	0.029
Follow-up 1	48^c	44-52	45^a	40-50	
Follow-up 2	46^c	41-50	46^b	41-50	
Follow-up 3	46^c	42-51	42	37-46	
Number of steps, n/8 h					
Baseline	3586	3190-3981	3786	3364-4209	0.018
Follow-up 1	4565^c	4158-4972	4250^b	3796-4704	
Follow-up 2	4320^c	3906-4375	3933^c	3915-4814	
Follow-up 3	4332^c	3905-4758	3786	3480-4386	
Time in prolonged sitting, min/8 h					
Baseline	108	92-124	101	84-116	0.339
Follow-up 1	109	92-126	94	75-113	
Follow-up 2	114	97-131	100	81-119	
Follow-up 3	106	88-124	109	90-128	
Mean sitting duration, min					
Baseline	8.7	3.8-13.5	9.1	3.9-14.4	0.350
Follow-up 1	10.9	5.8-16.0	12.3	6.2-18.4	
Follow-up 2	9.8	4.4-15.2	13.3	7.4-19.2	
Follow-up 3	10.5	4.8-16.3	20.4^a	14.4-25.4	
Number of breaks/sitting hour					
Baseline	6.7	5.7-7.7	8.1	7.1-9.2	0.001
Follow-up 1	6.7	5.7-7.8	7.5	6.4-8.6	
Follow-up 2	6.4	5.4-7.5	6.6^c	5.5-7.8	
Follow-up 3	7.2	6.2-8.3	6.6^c	5.5-7.7	
Time in LPA, min/8 h					
Baseline	148	137-158	158	146-169	0.001
Follow-up 1	136^c	125-147	147^b	135-159	
Follow-up 2	128^c	117-140	155	143-167	
Follow-up 3	139^a	127-150	152	140-164	
Time in MVPA, min/8 h					
Baseline	18	15-21	17	13-20	<0.001
Follow-up 1	21^a	18-25	19	15-22	
Follow-up 2	21^a	18-25	23^c	20-27	
Follow-up 3	26^c	23-30	19	15-23	
Time in MVPA-bouts, min/8 h					
Baseline	5.2	2.4-7.8	4.6	1.8-7.5	0.054
Follow-up 1	6.4	3.6-9.1	6.0	3.0-9.1	
Follow-up 2	6.1	3.3-8.9	8.6^c	5.5-11.6	
Follow-up 3	8.6^a	5.6-11.5	6.1	3.1-9.1	

^a P-value <0.05.

^b P-value <0.01.

^c P-value <0.001.

Supplementary table S5. Results for sedentary behavior and physical activity at leisure time on work days and on non-work days in the two office groups presented as estimated means (EM) with confidence intervals (CI). Pairwise comparisons within groups compared to baseline and model effects for group by time interactions are presented. Estimated means are calculated with group and time interaction in the linear mixed model. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes]
Bold indicates statistically significant.

Outcome	Flex Office		Cell Office		P-value for group*time effect
	EM	95% CI	EM	95% CI	
Leisure time on work days					
Sitting, min/8 h					
Baseline	282	269-296	266	252-280	
Follow-up 1	284	270-297	279^a	264-294	0.042
Follow-up 2	274	260-288	250^b	235-265	
Follow-up 3	283	268-297	279^a	264-294	
Standing, min/ 8 h					
Baseline	137	126-148	147	135-158	
Follow-up 1	135	124-146	135^b	123-148	0.033
Follow-up 2	140	129-151	152	141-165	
Follow-up 3	141	129-153	137^a	125-149	
Walking, min/ 8 h					
Baseline	60	55-66	67	61-73	
Follow-up 1	61	55-67	64	57-70	0.034
Follow-up 2	66^a	60-72	78^c	71-84	
Follow-up 3	57	51-63	68	61-74	
Number of steps, n/8 h					
Baseline	5248	4653-5842	5561	4950-6171	
Follow-up 1	5289	4678-5895	5418	4754-6082	0.079
Follow-up 2	5770^a	5147-6393	6454^c	5798-7110	
Follow-up 3	4770	4128-5412	5802	5141-6464	
Time in LPA, min/8 h					
Baseline	189	183-195	203	197-210	
Follow-up 1	185	179-192	197	190-205	0.938
Follow-up 2	195^a	188-202	211^a	204-218	
Follow-up 3	180	172-187	196 ^a	188-203	
Time in MVPA, min/8 h					
Baseline	34	31-38	32	29-36	
Follow-up 1	30	27-34	28	24-32	0.011
Follow-up 2	34	30-37	42^c	38-46	
Follow-up 3	33	29-37	35	31-39	
Time in MVPA-bouts min/8 h					
Baseline	7.3	4.9-9.8	4.6	2.0-7.2	
Follow-up 1	8.8	6.2-11.3	8.1^a	5.1-11.1	0.028
Follow-up 2	6.4	3.7-9.1	8.5^a	5.6-11.4	
Follow-up 3	13.4^b	10.4-16.3	6.8	3.9-9.8	
Leisure time on non-work days					
Sitting, min/16 h					
Baseline	549	518-580	508	476-540	
Follow-up 1	495^c	462-527	532	497-567	0.001
Follow-up 2	507^b	474-540	475^a	439-511	
Follow-up 3	515^a	481-549	517	481-553	
Standing, min/16 h					
Baseline	288	262-314	323	297-350	
Follow-up 1	318^b	292-345	296^a	267-325	<0.001
Follow-up 2	302	275-329	349	319-378	
Follow-up 3	301	272-329	306	277-336	
Walking, min/16 h					
Baseline	123	110-136	129	116-142	
Follow-up 1	147^c	134-160	131	117-145	0.048
Follow-up 2	149^c	136-162	136	122-150	
Follow-up 3	143^b	130-157	136	121-150	
Number of steps, n/16 h					
Baseline	9875	8743-11008	10 017	8851-11182	
Follow-up 1	11 797^b	10628-12968	10 418	9139-11696	0.133
Follow-up 2	12 131^c	10931-13332	10 473	9160-11786	
Follow-up 3	11 589^b	10335-12843	10 819	9510-12128	

Time in LPA, min/16 h					
Baseline	403	380-426	432	408-457	0.759
Follow-up 1	416	392-440	435	409-461	
Follow-up 2	426^a	401-450	461^a	434-488	
Follow-up 3	416	390-442	436	410-464	
Time in MVPA, min/16 h					
Baseline	63	51-75	57	45-70	0.111
Follow-up 1	75^a	62-87	53	40-66	
Follow-up 2	67	54-79	63	49-77	
Follow-up 3	78^a	65-92	61	47-75	
Time in MVPA-bouts, min/16 h					
Baseline	33	23-42	31	21-41	0.805
Follow-up 1	39	29-49	32	21-43	
Follow-up 2	31	21-41	30	18-41	
Follow-up 3	40	29-51	32	21-44	

^aP-value <0.05.

^bP-value <0.01.

^cP-value <0.001.

Supplementary table S6. Adjusted results for sedentary behavior and physical activity for leisure time on work days and time on non-work days in the two office groups presented as estimated means (EM) with confidence intervals (CI). Pairwise comparisons within groups compared to baseline and model effects for group by time interactions are presented. Estimated means are calculated with group and time interaction in the linear mixed model, adjusted for age, BMI, self-reported physical exercise and self-reported health at baseline. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes] **Bold indicates statistically significant.**

Outcome	Flex Office		Cell Office		P-value for group*time effect
	EM	95% CI	EM	95% CI	
Leisure time on work days					
Sitting, min/8 h					
Baseline	280	266-294	271	256-286	
Follow-up 1	280	266-295	282	266-298	0.047
Follow-up 2	271	257-286	255 ^b	239-271	
Follow-up 3	280	265-294	284 ^a	268-300	
Standing, min/ 8 h					
Baseline	140	128-151	143	131-154	
Follow-up 1	138	127-150	132 ^a	120-145	0.038
Follow-up 2	143	131-154	148	135-160	
Follow-up 3	144	132-156	133 ^a	120-145	
Walking, min/ 8 h					
Baseline	60	54-66	67	61-74	
Follow-up 1	61	55-67	64	57-71	0.043
Follow-up 2	66 ^a	59-72	78 ^c	71-85	
Follow-up 3	57	50-63	68	61-75	
Number of steps, n/8 h					
Baseline	5212	4601-5823	5601	4949-6253	
Follow-up 1	5273	4644-5902	5511	4809-6214	0.088
Follow-up 2	5749 ^a	5107-6390	6546 ^c	5851-7241	
Follow-up 3	4753	4093-5414	5870	5169-6571	
Time in LPA, min/8 h					
Baseline	188	182-194	201	194-208	
Follow-up 1	187	180-193	194	187-202	0.721
Follow-up 2	195 ^a	189-202	211 ^b	204-218	
Follow-up 3	181	174-189	193 ^a	186-200	
Time in MVPA, min/8 h					
Baseline	34	31-37	32	28-36	
Follow-up 1	31	27-34	28	24-32	0.009
Follow-up 2	34	30-38	43 ^c	39-47	
Follow-up 3	33	29-37	34	30-38	
Time in MVPA-bouts min/8 h					
Baseline	7.0	4.5-9.5	5.4	2.7-8.1	
Follow-up 1	8.4	5.8-11.0	8.6 ^a	5.5-11.7	0.024
Follow-up 2	6.3	3.6-9.1	9.6 ^b	6.5-12.6	
Follow-up 3	12.6 ^b	9.7-15.6	6.9	3.9-9.9	
Non-work days					
Sitting, min/16 h					
Baseline	547	514-579	512	477-547	
Follow-up 1	487 ^c	453-521	537	500-575	<0.001
Follow-up 2	502 ^b	468-537	480 ^a	442-518	
Follow-up 3	510 ^a	474-546	518	480-557	
Standing, min/16 h					
Baseline	290	263-317	321	292-350	
Follow-up 1	324 ^b	295-351	292 ^a	261-323	<0.001
Follow-up 2	305	277-334	345	314-377	
Follow-up 3	304	275-334	306	274-337	
Walking, min/16 h					
Baseline	123	110-136	128	114-142	
Follow-up 1	149 ^c	134-163	130	115-145	0.037
Follow-up 2	150 ^c	137-164	135	120-150	
Follow-up 3	145 ^b	131-159	135	120-150	
Number of steps, n/16 h					
Baseline	9885	8720-11050	9896	8641-11149	
Follow-up 1	12 009 ^c	10794-13225	10 369	9013-11726	0.112
Follow-up 2	12 244 ^c	11006-13481	10 388	8995-11780	
Follow-up 3	11 714 ^b	10422-13006	10 799	9407-12191	

Time in LPA, min/16 h					
Baseline	401	379-423	429	405-453	0.618
Follow-up 1	419	396-442	431	406-457	
Follow-up 2	426^a	402-449	458^a	431-485	
Follow-up 3	417	392-442	433	406-459	
Time in MVPA, min/16 h					
Baseline	61	49-73	57	44-70	0.101
Follow-up 1	75^a	62-87	53	40-67	
Follow-up 2	66	53-79	63	50-77	
Follow-up 3	78^a	64-91	61	46-75	
Time in MVPA-bouts, min/16 h					
Baseline	31	22-41	31	21-42	0.745
Follow-up 1	39	29-50	33	22-44	
Follow-up 2	31	21-41	29	17-41	
Follow-up 3	40	29-51	32	20-44	

^aP-value <0.05.

^bP-value <0.01.

^cP-value <0.001.

Supplementary table S7. Results for sedentary behavior and physical activity for total week time (both work days and non-work days) in the two office groups presented as estimated means (EM) with confidence intervals (CI). Pairwise comparisons within groups compared to baseline and model effects for group by time interactions are presented. Estimated means are calculated with group and time interaction in the linear mixed model. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes]
Bold indicates statistically significant.

Outcome	Flex Office		Cell Office		P-value for group*time effect
	EM	95% CI	EM	95% CI	
Total week time					
Sitting, min/16 h					
Baseline	537	511-563	505	478-531	0.119
Follow-up 1	531	505-558	516	488-544	
Follow-up 2	530	503-556	494	466-522	
Follow-up 3	531	504-558	522	494-550	
Standing, min/16 h					
Baseline	319	295-343	342	318-366	0.272
Follow-up 1	309	285-334	327	301-353	
Follow-up 2	307	283-332	340	315-366	
Follow-up 3	313	288-338	323^a	298-349	
Walking, min/16 h					
Baseline	104	96-112	113	105-121	0.018
Follow-up 1	119^c	111-127	115	106-124	
Follow-up 2	122^c	114-131	125^c	117-134	
Follow-up 3	116^b	107-124	115	106-124	
Number of steps, n/16 h					
Baseline	8958	8194-9723	9375	8593-10157	0.213
Follow-up 1	10298^c	9519-11078	9886^a	9054-10719	
Follow-up 2	10662^c	9869-11455	10644^c	9813-11476	
Follow-up 3	9881^c	9070-10692	9874^a	9039-10709	
Time in LPA ^c , min/16 h					
Baseline	352	334-369	379	351-398	0.201
Follow-up 1	347	328-365	370	374-413	
Follow-up 2	352	334-371	394^a	351-390	
Follow-up 3	347	328-366	370	351-390	
Time in MVPA ^d , min/16 h					
Baseline	53	46-60	49	42-57	0.001
Follow-up 1	57	50-64	48	40-56	
Follow-up 2	58	50-65	63^c	55-71	
Follow-up 3	64^c	56-72	54	47-62	
Time in MVPA-bouts ^e , min/16 h					
Baseline	23	17-29	22	16-28	0.269
Follow-up 1	24	18-31	25	19-32	
Follow-up 2	25	19-31	30^b	23-36	
Follow-up 3	27	21-34	26	20-33	

^a P-value <0.05.

^b P-value <0.01.

^c P-value <0.001.

Supplementary table S8. Adjusted results for sedentary behavior and physical activity for total week time (both workdays and non-workdays) in the two office groups presented as estimated means (EM) with confidence intervals (CI). Pairwise comparisons within groups compared to baseline and model effects for group by time interactions are presented. Estimated means are calculated with group and time interaction in the linear mixed model, adjusted for age, BMI, self-reported physical exercise and self-reported health at baseline. [Prolonged sitting = sitting bout > 30 minutes; LPA = light physical activity; MVPA = moderate and vigorous physical activity; MVPA-bout = time spent in MVPA-bout >10 minutes]

Bold indicates statistically significant.

Outcome	Flex Office		Cell Office		P-value for group*time effect
	EM	95% CI	EM	95% CI	
Work time					
Sitting, min/16 h					
Baseline	534	507-561	511	482-540	0.127
Follow-up 1	526	499-554	520	490-550	
Follow-up 2	526	498-554	498	468-528	
Follow-up 3	528	499-555	526	497-557	
Standing, min/16 h					
Baseline	322	297-346	336	310-362	0.269
Follow-up 1	314	289-339	322	295-350	
Follow-up 2	311	286-336	336	308-363	
Follow-up 3	317	291-342	318^a	291-346	
Walking, min/16 h					
Baseline	104	95-112	113	104-122	0.022
Follow-up 1	119^c	111-128	116	106-125	
Follow-up 2	122^c	114-131	126^c	117-135	
Follow-up 3	116^b	107-125	116	106-125	
Number of steps, n/16 h					
Baseline	8913	8125-9701	9434	8592-10275	0.233
Follow-up 1	10322^c	9515-11129	10016^a	9126-10906	
Follow-up 2	10652^c	9835-11469	10759^c	9871-11647	
Follow-up 3	9876^b	9039-10713	10005^a	9112-10897	
Time in LPA ^c , min/16 h					
Baseline	351	334-369	376	358-395	0.161
Follow-up 1	349	331-366	367	347-387	
Follow-up 2	353	335-371	391^a	371-411	
Follow-up 3	348	330-367	368	348-388	
Time in MVPA ^d , min/16 h					
Baseline	52	45-59	50	43-58	0.001
Follow-up 1	56	49-64	49	41-57	
Follow-up 2	57	50-65	64^c	56-72	
Follow-up 3	63^c	56-71	55	47-63	
Time in MVPA-bouts ^e , min/16 h					
Baseline	23	17-28	23	17-29	0.372
Follow-up 1	24	18-30	27	20-33	
Follow-up 2	25	19-31	30^b	24-37	
Follow-up 3	27	21-34	27	20-34	

^a P-value <0.05.

^b P-value <0.01.

^c P-value <0.001.

References for supplementary material:

1. Bergman F, Wahlström V, Stomby A, Otten J, Lanthén E, Renklint R, et al. Treadmill workstations in office workers who are overweight or obese: a randomised controlled trial. *Lancet Public Heal*. 2018;2667(18):1–13.
2. World Health Organisation. Five Keys to Healthy Workplaces: No Business Wealth without Workers' Health (April 2010). Available from: http://www.who.int/occupational_health/5keys_healthy_workplaces.pdf
3. Zimring C, Joseph A, Nicoll GL, Tsepas S. Influences of building design and site design on physical activity: Research and intervention opportunities. *Am J Prev Med*. 2005;28(Suppl. 2):186–93.
4. Bandura A. Health promotion by social cognitive means. *Heal Educ Behav*. 2004;31(2):143–64.
5. GOV.UK. Code of measuring practice: definitions for rating purposes [Internet]. 2012. Available from: <https://www.gov.uk/government/publications/measuring-practice-for-voa-property-valuations/code-of-measuring-practice-definitions-for-rating-purposes>