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Supplemental data

Table S1. Summary information of data extraction of reviewed papers.

Lead author, year	Study Design*	Country≠	Setting of study population	Number of [illegible]	N	Exposure measures	Outcome(s)	Measurement tools	Statist. Test+	Relevant findings	Study population demographics described?	Sample size and participation rate acknowledged

Appel-Meulenbroek (2011)	POS	NL	Municipality (x2), Energy and petrochemical multinational, and Housing Association	4	128		Use of office space and furniture; End-user perspectives about ABW features of work space	Survey and Observation	N	In ABW: - Suitable workspaces for different activities (60%) - individual vs team workspace balance not right (48%) - Few (12%) use more than 3 types of workstations each week - 68% never switch workstations in an average day, - Privacy: comfortable to have confidential conversation (63%), 59% would want option to shield their screen when needed - Distractions: 55% distracted by conversations - Social: 50% come to office to keep in touch with colleagues; 59% lunch together - 62% said on busy days more productive to work at home	no	Low numbers acknowledged but not specified
Blok (2009)	PP	NL	ICT	1	684	Relocating from traditional office to ABW	Communication, collaboration, efficiency of workspace use	RFID and survey	N	In ABW: - More likely to use shared workstations and meeting rooms - Higher number of workstation switches in one department, but not in the other. - Increased Time walking or standing without a workstation - "travel time", although not significantly. - Less workspaces, but more satisfaction with the number of workspaces available and of privacy. - Increased self-rated productivity, concentration, cooperation and communication with colleagues and visitors.	81% male, average age 37 y, interns, consultants and admin staff	1125 invited to complete questionnaire, 684 completed pre, and 315 completed both.

Brunia (2016)	POS	NL	Diverse	21	7140	Relocating from cell office to flex office	Satisfaction with workspace, environment, organisation, content of work, architecture and layout of the building, privacy, concentration, communication, indoor climate, facilities and remote working	WODI[a] questionnaire and focus group	A	- High satisfaction: When work spaces provide enough opportunities to collaborate or for concentration, natural light. - Dissatisfaction: Dark office, long distances between office spaces, perceived lack of privacy, insufficient workspaces, poor temperature control, lack of employee engagement in change process	No	Response rate not specified
Candido (2016)	POS	AU	Private	30	5171		Spatial comfort and space, Indoor air quality, thermal comfort, noise distraction, privacy, visual comfort, personal control, building image, overall satisfaction, perceived productivity, health		B	In ABW: - Higher scores on space for breaks, interactions with colleagues, space to collaborate, air quality, building aesthetics, work area comfort, building satisfaction, productivity and health. - Lower scores on visual and sound privacy	no	Sample size, yes, response rate no
Danielsson (2008)	POS	SWE	Diverse	26	469	7 office definitions	Sick leave, general health, physical and psychological health, emotional health, job satisfaction	Survey	A	Cell office and flex office both scored high with respect to good health and job satisfaction, whereas open plan office types generally scored low. However, after adjusting for confounders such as gender, age and job rank there was little difference.	Age, gender, job rank, line of business	Sample size was 491 with a 72.5% response rate

De Been (2014)	POS	NL	Public, University, Private, semi-private	87	11799	Individual office shared room office, combi office and flex office	Satisfaction with productivity, privacy, concentration, communication, architecture, layout, indoor climate.	WODI light questionnaire	A	In ABW (flex office): - More satisfied with architecture and layout compared with individual and shared room offices. - Less satisfied with productivity support, privacy and concentration compared with individual and shared room offices. - Less satisfied with communication than in combi office - Less satisfied with indoor climate than in individual and shared room offices	Gender, age, education, white collar workers	24 733 users of 87 different work environments were invited to participate. 11 799 employees responded
De Been (2015)	POS	NL	Semi-public	20	2377	ABW	Satisfaction work environment, layout, storage, workspaces, openness, IT, functionality, interior design, privacy, concentration, communication, facility mgmt, indoor climate, remote working	WODI quick scan, group interviews	N	In ABW: - High ratings for architecture, interior design, communication, and IT facilities - Low satisfaction ratings for concentration and privacy. - Interviews indicated negative comments about communication- could not have private conversations, social bond seems to suffer and the popular workspaces are not available to everyone as the same people claim it regularly.	No	5128 invited to participate via email, 2377 respondents (46% response rate)

Foley (2016)	PP	AU	Commercial Office	1	88	Relocating from traditional office (BL) to ABW (F1) and then returning back to traditional office (F2)	Objectively measured Sedentary time, sedentary breaks, step counts, light and moderate to vigorous physical activity Self-reported sitting, standing, walking time at work, musculoskeletal (MSK) discomfort, work ability.	Accelerometer and survey	A	- The effect on objectively measured sedentary behaviour was not significant. - Decline in light physical activity from BL (9.1%) to F1 (7.7%) and F2 (7.6%) - Moderate to vigorous physical activity (MVPA) did not change. - Step counts and the number of sedentary breaks per hour increased, although not significantly, during the intervention and returned to near baseline levels at F2 - Participants reported a 13.8% unit reduction in sitting and a 10.7% unit increase in standing time when in the ABW compared with BL. - Participants were twice as likely to report low back pain at BL compared with when in ABW. - Work ability at baseline was reported as good (8.4) and did not significantly change in ABW; however, at F2, work ability had significantly decreased to 7.8.	Average age 38.1 y, BMI 25.7, average 43.7 working h/week	100 staff members contacted to participate out of 500 in pilot. 64 participants with self-report data at all three time points, 54 with valid objective data
Gorgievski (2010)	POS	NL	University	1	266	Relocating from traditional cellular office to ABW	Workspace satisfaction, privacy, security, fit for purpose, privacy, security, control, storage, work location, social interaction.	Survey. Quantitative diary describing activities completed at work.	B	In ABW: - Less satisfied with flexible office plan, spaces for confidential phone calls, visual and auditory privacy, control of office environment, security, storage. - More satisfied with enough space, allowed for more collaboration and functional workspaces, increase of social interaction.	54% male, mean age 42.2 y, 17.4 y employent, 30.8 h /week work	226 employees participated in the survey with a response rate of 26.4%. 83 employees (8.2%) filled out the diary.

Keeling (2015)	POS	UK	University, Design, Charity	7	179	Three typologies: open plan, agile, or cellular	Privacy, information control, interactions, crowding, distractions	Survey	B	In Agile: - Similar to cellular offices for having confidential conversations, distractions and working with confidential documents, working without visual and acoustic distractions - Better than cellular offices for interactions - Less private than cellular offices - Better than open plan offices for control of information.	Gender	Broken down response rate for each building- average response rate was 20%
Kim (2016)	POS	AU	DiversePrivate	20	3974	Flexi desk compared to fixed desk	Spatial comfort, air quality and thermal comfort, noise distraction, visual comfort, productivity, health	BOSSA survey, evaluated floor plans for 11 out of 20 buildings	B	Flexi desk: - More satisfied on 16 of the 18 items, especially space for break and space to collaborate. - More space for break out areas and meeting areas - Less satisfied with personal storage space provided. - No effect on self-reported productivity and health - Qualitative responses around flexi desking were around non-available desk upon arrival at workplace, difficulties in locating team members, waste of time setting up work station, lack of personalisation.	Age range 31-50 y, professional or administrative roles, mainly full-time work	3974 individuals with a response rate of 45.2%

Medik (2014)	POC	NL	Public, University, Private, semi-private	7	12		1) interpretation of NWW concept; 2) concrete NWW implementation steps; 3) concrete practices in ICT, facilities management and HR domains; 4) perceived implications of NWW		N	1) reasons for adopting NWW: cost savings in office space, higher job motivation and job autonomy, greater individual efficiency 2) Respondents associated NWW with greater job autonomy, flexibility in working time and location, smarter use of organisational capacity, more efficient use of space and knowledge sharing 3) All organisations implemented flexibility in work location, flexibility in work time, and result-oriented management practices 4) implications: more frequent work from home, mixing of work and private spheres, different activities in different work locations, no tracking of hours worked, noise in open plan, challenges in maintaining work-life balance, lack of privacy	no	no
Nijp (2016)	PP	NL	Finance	1	2912	Relocating from traditional office to ABW Comparison group working traditional office	Work time and location control, job autonomy, job demands, social contact cooperation, connectedness, work-nonwork balance, health/well-being, fatigue, stress, performance, and job satisfaction	Survey	A	In ABW: - Increased work location control access, use and satisfaction, work hours, evening hours, home hours and home days/week. - Decreased commute hours and office hours. - Increased fatigue, job demands, organisational commitment, and in-role performance - Decreased health scores and extra-job performance - no change in stress and other aspects of work performance, work/non-work balance and support	Mean age 42 y. 64% male, 10.5% in leadership position.	1443 total participants at BL. Response rates varied from 37 to 52% per measure. Total sample with all three times points 361 in intervention group, 80 in comparison group

Robertson (2008)	PP	US	Management Consulting	2	642	Relocation to ABW compared to standard office. Groups: ABW; ABW +ergonomic training; Comparison group.	Musculoskeletal discomfort, job control, environmental satisfaction, sense of community, ergonomic climate, communication, collaboration, business process efficiency.	Workplace survey, ergonomic knowledge tests and Business Process Analysis (BPA)	B/N	In ABW: - Positive, significant effects on work-related musculoskeletal discomfort, job control, environmental satisfaction, sense of community, ergonomic climate, communication and collaboration, and business process efficiency (time and costs)	No	1250 invited, 642 responded (51% response rate for time 1) Time 2, 512 participated (response rate of 79.8%) Time 3, 375 participated (response rate 73.2% from time 2)
Seddigh (2014)	POS	SWE	IT, Construction, Public	5	1445	Cell-office; shared-room; small open-plan; medium open-plan; large open-plan; flex office	Concentration, distraction, cognitive stress, burnout, general health	Surveys, Ergonomic knowledge	A	- Distraction in flex office similar to shared office - Cognitive stress lowest in cell and shared offices and was highest in medium and large open-plan offices. This effect was stronger for employees who rate their job as requiring high need for concentration. - No significant results for emotional exhaustion, depersonalisation, personal efficiency or self-reported general health	yes. Age, gender, public/private sector, educational level	2078 invited, 1445 (69.5%) completed the survey. Analyses based on N=1241
Ten Brummelhuis (2012)	POS	NL	Telecom	1	110		Work engagement; daily exhaustion; connectivity; effective and efficient communication; interruptions, ABW work environment use	Business Process Analysis (BPA).	A	In NWW: - Positively related to effective, efficient communication and connectivity, work engagement - Negatively related to interruptions. - Relationship work engagement and NWW was mediated fully by communication and connectivity. - No direct effect of NWW on exhaustion, however communication had a good effect on exhaustion; while connectivity, NWW, and interruptions all were related to increase ratings of exhaustion.	Age, gender, work hours, education, partner, children	yes 110 out of 400 contacted (response rate 27.5%)

van der Voordt 2004	PP	NL	Government and Finance	3	152	Relocating from traditional office to ABW	Perceived productivity and employee satisfaction	Survey	N	In ABW: - Perceived productivity reduced at public organisation: (7.5, 6.5 and 6.9 at BL, F1 and F2) - Perceived productivity increased at financial org: 14% to 51% positive judgements and negative judgements dropped from 27% to 8%. - Mixed Employee satisfaction: desire to return to original setup ranged 17%-78%, while no wish to return ranged 22%-83% - Critical factors related to satisfaction included: enthusiastic initator; top-down & bottom-up approach; evident objectives; transparent project organisation; follow-up care; sufficient time change process; realistic timeframes and expectations; balance between no. employees and no. and types of workspaces; consideration for personal preferences and privacy in open environment.	no	partial

Notes:

*PP- Pre-post study, POS – Post-occupancy Survey, POC- Post-occupancy Case study

≠ NL- Netherlands, AU-Australia, US- United States, SWE - Sweden, UK- United Kingdom

+ N – no statistics reported, B – Basic statistics reported, A – Appropriate statistics performed and reported

a. Maarleveld, M., Volker, L. & Van der Voordt, T.J.M. (2009) Measuring employee satisfaction in new offices – the WODI toolkit, Journal of Facilities Management Vol. 7 nr. 3, 181-197.