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# The hybrid workspace: testing an activity-based model of hybrid workspace design

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**ABSTRACT**

Using the lens of activity-based workspace design, we develop a model of the hybrid workspace (i.e. the organizational and home settings in which hybrid work occurs) which proposes that each setting has three core activity-supportive characteristics: interaction-supportive, concentration-supportive and recovery-supportive. Drawing on a two-wave data set collected from office-based employees in an engineering organization, we test and find support for our hypotheses that activity-supportive workspace characteristics (in oth organizational/office and home settings) foster employee outcomes, i.e. task performance, engagement and workspace satisfaction. Specifically, we find that office recovery-supportive characteristics increased task performance, office interaction-supportive characteristics increased satisfaction with the office workspace, and that home concentration-supportive workspace characteristics increased employee engagement. Conclusions are drawn for our understanding of workspace design and hybrid working.

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Activity-based perspectives on workspace design have been highly influential in the practice of office design over the last 60 years (Duffy & Powell, 1997) with many offices designed according to its principles (Gatt & Jiang, 2021). Activity-based perspectives characterize workspaces (i.e., the design and arrangement of furniture, technology and space) according to the types of work activity that they support, and typically distinguish between interaction-supportive workspace characteristics (e.g., meeting rooms and pods, group desks) that facilitate work tasks requiring discussion and communication, and concentration-supportive workspace characteristics (e.g., quiet zones, private rooms) that facilitate work tasks requiring concentration and sustained attention (Davis et al., 2011; Engelen et al., 2019). These *activity-supportive* workspace characteristics are thought to benefit employee outcomes such as well-being and task performance by, for example, aiding task processes, meeting employee needs, and reducing demands that hinder work, such as noise or unwanted interruptions (Wohlers & Hertel, 2017). A growing body of research evidence supports these claims (Engelen et al., 2019).

We use activity-based perspectives on workspace design as a lens to theorize and study the effects of hybrid workspaces, which we define as the multiple settings across which hybrid work is performed, typically an organizational setting and a home setting (Halford, 2005; Handke et al., 2025). The activity-based model of hybrid workspaces that we develop and test extends knowledge of workspace design in two important ways. First, we propose that activity-supportive workspace characteristics are key features of both organizational and home workspaces. Current activity-based models of workspace design are restricted to organizational settings, meaning that scholars have yet to theorize or empirically explore the effects of hybrid workspaces on employees, especially the simultaneous effects of organizational and home workspaces on employee outcomes, such as performance and well-being (c.f. Allen et al., 2015; Appel-Meulenbroek et al., 2022; Halford, 2005). Second, we propose that "*recovery-supportive*" workspaces are a key characteristic of the hybrid workspace in addition to interaction-supportive and concentration-supportive workspace characteristics (Cropley et al., 2023; Kaplan, 1995). We define recovery-supportive workspace characteristics as those features of the work setting that facilitate employee recovery activities, such as physical exercise, socializing (e.g., meeting friends), or low-effort activities (e.g., reading, attending to nature) that benefit well-being and subsequent task effort (Sonnentag et al., 2017). Recovery-supportive workspace characteristics are thought to be particularly

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salient in hybrid workspaces because studies show home and organizational settings to be key sites in which employees choose to engage in recovery activities (Smolders et al., 2012; Steed et al., 2021). However, researchers have yet to theorize or empirically examine the effects of recovery-supportive characteristics in the office, home or hybrid workspace, nor examine their effects relative to interaction-supportive and concentration-supportive characteristics.

Hybrid work enables employees to align different activities to the type of workspace best suited to support them (Wu et al., 2024). For example, while both home and office may offer concentration-supportive features, the specific tasks that they most closely support may differ. Offices may be better suited for concentration-intensive tasks that benefit from short, repeated bursts of focused effort combined with immediate feedback (e.g., coding, design), or from reliable high-speed networks, or specialist software and hardware. In contrast, home spaces may be better suited to concentration-intensive tasks requiring long uninterrupted workflows, such as focused writing or reviewing complex materials. Similarly, the types of activity best supported by interaction-supportive characteristics might vary between settings. Offices typically provide greater support for team problem solving meetings, collaborative workshops and in-the-moment conversation, whereas home settings may be more fitted to supporting one-to-one virtual meetings or online presentations. Likewise, with regard to recovery-supportive activities, offices are more likely to provide spaces for social breaks with colleagues, while home settings may be better at providing spaces to relax with music or walking in nature. Together, these distinctions between activities emphasize the potential benefits of hybrid work as it enables employees to select the workspace best matched to the needs of their specific task or recovery activities, aiding task-environment fit (Bäcklander & Richter, 2022).

In sum, using the lens of activity-based workspace design, we develop and test a model that conceptualizes each component of the hybrid workspace (i.e., organizational and home workspaces) as having three core activity-supportive characteristics: interaction-supportive, concentration-supportive and recovery-supportive (see Figure 1). We propose that these activity-supportive characteristics are physical job resources (Demerouti et al., 2001; Hobfoll, 2002) and that each characteristic fosters employee outcomes (i.e., task performance, engagement and workspace satisfaction) by facilitating goal attainment, reducing demands, and enabling access to, or recovery of, personal resources (Van der Voordt, 2004).

We test our model using data drawn from a two-wave study of office-based employees in an engineering organization, answering calls to improve the methodological rigour of research on workspace design (Engelen et al., 2019). Our research contributes to knowledge on hybrid workspace design and its effects on employee

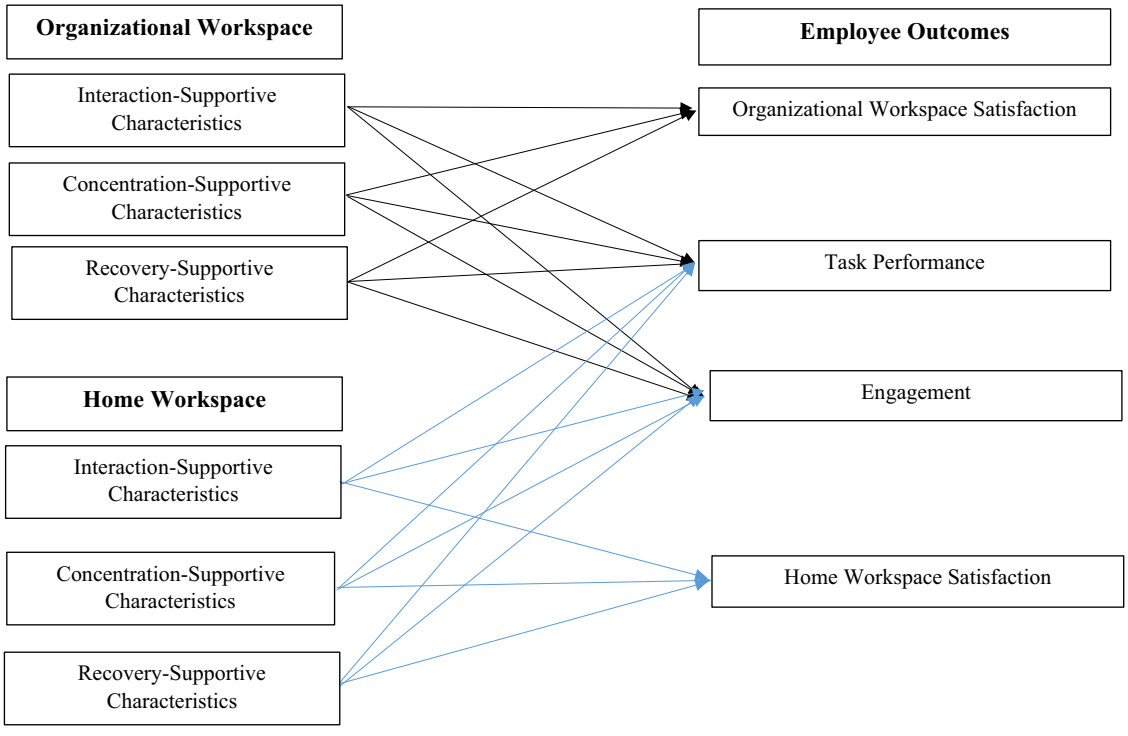


**Figure 1.** Activity-based model of hybrid workspace.

outcomes. We develop a model of workspace design that enables a broader and more integrated understanding of workspaces in hybrid work by theorizing the effects of workspaces in the organization and the home. Our research also advances understanding of the nature of workspaces by introducing the concept of recovery-supportive workspace characteristics and answers basic questions concerned with their effects on employee outcomes. Testing our model is important given recent changes to working patterns and office occupancy brought about by global increases in hybrid working (Aksoy et al., 2023) and the considerable amounts organizations invest in workspace design.

## Theoretical background & hypotheses

### *Conceptualizing hybrid workspaces*

A hybrid workspace refers to the multiple settings in which work is performed (Halford, 2005). This differs from concepts such as flexible or flexiplace working arrangements that refer to the formal and informal policies that govern the use of hybrid workspaces, e.g., the extent of employee choice over when and where to work (Shifrin & Michel, 2022).

Activity-based perspectives on workspace design provide a lens for understanding hybrid workspaces and characterize workspaces according to the type of employee activity that they shape[1] (Wohlers et al., 2019). Current models of activity-based workspaces typically distinguish between interaction-supportive characteristics and concentration-supportive characteristics (Appel-Meulenbroek et al., 2011; Engelen et al., 2019). Interaction-supportive characteristics enable work activities requiring discussion, collaboration, coordination, coaching and presentation. They include, for example, meeting rooms, break-out spaces, team working areas, meeting pods and group desks, as well as more informal spaces such as refreshment areas and canteens (Vos & Van der Voordt, 2002). Concentration-supportive characteristics enable work activities requiring sustained concentration and attention, such as report writing, planning, forecasting, and reviewing documents. They include, for example, private rooms, break out spaces, and office "cells" (Davis et al., 2011; Haapakangas et al., 2018; Wohlers & Hertel, 2017).

The focus in current models of activity-based workspace design is on how workspaces shape activities related to the fulfilment of role requirements, i.e., in-role behaviour. Yet, research on employee recovery demonstrates that employees frequently take breaks from role-related activity (e.g., long lunch breaks, short micro-breaks) and use these breaks to engage in recovery activities that regain energy and well-being (Sianoja et al., 2016). Recovery theories and empirical evidence indicate that recovery activities during breaks (especially physical exercise, socializing, and low-effort activities) can induce recovery experiences such as relaxation, psychological detachment, and mastery over challenging tasks (Bosch et al., 2018; Sonnentag et al., 2017). Furthermore, a reasonable assumption, supported by empirical evidence, is that workspaces with facilities such as gyms afford opportunity for physical exercise (Edmunds et al., 2013), that canteens or common rooms afford social activity (Corvo et al., 2020), and those workspaces with rest rooms, games rooms, sleeping pods afford opportunity for low-effort activities (Putrino et al., 2020).

Further theoretical support for the idea that workspace settings foster recovery activities comes from attention restoration theory (ART, Kaplan, 1995). ART asserts that recovery from mental fatigue is enabled by "restorative environments" with characteristics (e.g., rich and stimulating visual content) that occupy the mind, engage attention with minimal effort, and divert attention from daily concerns and hassles. Although natural settings (e.g., parks) are thought to embody these characteristics (Ohly et al., 2016), research suggests that the inclusion of aesthetic content (e.g., artwork; Aeschbach et al., 2022) and natural elements (e.g., office plants) that engage the mind can assist the recovery processes in built settings (Korpela et al., 2015). ART is similar to recovery perspectives, as both assert the importance of low-effort recovery activities and the role of recovery experiences such as psychological detachment. A difference is that ART emphasizes environmental characteristics directly stimulating recovery activities, whereas workplace recovery perspectives emphasize the opportunities afforded by the environment to engage in recovery activities.

Building on these theoretical and empirical insights, we propose that workspaces can include "recovery-supportive" characteristics that a) afford employees the opportunity to engage in recovery activities (e.g., gyms for physical exercise) and b) have informationally, aesthetically and sensoryly rich content (e.g., pictures, murals, natural spaces and views, well designed architectural features and furniture) that occupy thought and engage attention with minimal effort.

So far, we have focused on organizational workspaces rather than home workspaces. However, given empirical evidence that the types of work and recovery activity that employees perform at work are similar to those they perform at home (Davis et al., 2022; Steed et al., 2021), then it is profitable and reasonable to conceptualize *home* settings according to the extent that they have

interaction-supportive, concentration-supportive and recovery-supportive characteristics. For example, an interaction-supportive home workspace might be characterized by fast broadband, communication software (e.g., Zoom), cloud access software (e.g., Dropbox), hardware technology (e.g., headset, laptop, mobile phone), as well as a separate area for holding online conversations and meetings. A concentration-supportive home workspace might have a private area for working (e.g., a home office) with a door, comfortable chair, and desk. In addition, a recovery-supportive home workspace might have a quiet area (e.g., a living room), a garden, entertainment technologies that enable low-effort activities (e.g., listening to music), and exercise equipment. Home workspaces may therefore differ from organizational workspaces in terms of layout but function in an equivalent way to office workspaces with regard to types of activities supported.

In summary, we propose that hybrid workspaces located across organizational and home settings will have three key activity-supportive characteristics, specifically, interaction-supportive, concentration-supportive and recovery-supportive (see Figure 1). In the next section, we show how each type of organizational activity-supportive characteristics will separately affect employee outcomes in organizational and home settings.

## *Effects of hybrid workspace on employee outcomes*

To explain how hybrid workspaces affect employee outcomes, we use integrated perspectives on work design theory[2] (Morgeson & Humphrey, 2006; Parker, 2014; Parker & Ohly, 2008; Parker & Wall, 1998) that draw together insights from core work design theories, such as job demands-resources theory (Demerouti et al., 2001), job demands-control theory (Karasek & Theorell, 1990), conservation of resources theory (Halbesleben et al., 2014), action regulation theory (Zacher & Frese, 2018) and the job characteristics model (Hackman & Oldham, 1976). An advantage of using an integrated perspective is that it provides a multi-faceted account of job characteristics and the mechanisms through which they affect an array of employee outcomes, particularly employee performance, well-being and job attitudes.

Using an integrated perspective on work design, job characteristics can be broadly classified as job demands and job resources (Demerouti et al., 2001, Morgeson & Humphrey, 2008; Parker, 2014). Job demands are the social, task-related and physical aspects of the job that require physical and/or psychological effort. Job demands include workload, social demands (e.g., interacting with others, conflict), cognitive demands (e.g., problem-solving) and physical demands (e.g., lifting, walking, repetitive movements, noise, heat). Job resources are the task-related, social and physical characteristics of work that facilitate the attainment of work goals (De Jonge & Dormann, 2003; Demerouti et al., 2001; Halbesleben et al., 2014; Nielsen et al., 2017). Task resources include job discretion and task variety, social resources include social support, and physical resources include workplace layouts and design, as well as ergonomic and technical support (e.g., for lifting, for interaction) (De Jonge & Dormann, 2003; Demerouti et al., 2001; Morrison & Macky, 2017). Based on these insights from work design theory, we conceptualize activity-supportive workspaces as physical job resources because they are aspects of the physical working environment that (as illustrated in the previous section) can facilitate goal-related work activity (Roskams & Haynes, 2021).

Integrated perspectives on work design suggest that job resources may affect job-related performance, well-being, and attitudes (Parker et al., 2017) and there is strong meta-analytic and empirical evidence in support of such effects (Crawford et al., 2010; Humphrey et al., 2007; Miao et al., 2017). In particular, job resources are proposed to directly affect a key aspect of job performance, namely, task performance (i.e., the extent to which the employee meets job requirements, Bakker & Demerouti, 2017; Koopmans et al., 2014) and a key aspect of well-being, namely, job engagement (i.e., a positive, affective-motivational state characterized by vigour, dedication, and absorption, Schaufeli et al., 2019). Within the broader domain of job-related well-being, which includes physical and psychological elements (Danna & Griffin, 1999), job engagement can be positioned as a positively valenced and strongly motivated state of affective psychological well-being (Schaufeli, 2013; Warr, 1990). In addition, job resources are proposed to shape positive job-related attitudes, including job satisfaction (a positive cognitive appraisal that expresses contentment with and positive feelings about one's job as a whole) and facet-level satisfaction with specific job resources such as workspace satisfaction or co-worker satisfaction (Judge & Kammeyer-Mueller, 2012). Focusing on facet-level satisfaction (such as workspace satisfaction) rather than general job satisfaction can provide a more nuanced and accurate understanding on how employees appraise specific job resources (Spector, 1997; Warr et al., 1979). We therefore focus on task performance and engagement, as well as organizational workspace satisfaction and home workspace satisfaction.

An integrated reading of work design theories suggests that job resources can affect employee outcomes through five mechanisms (Parker, 2014; Parker & Ohly, 2008). First, job resources enable task-relevant behaviours (Demerouti et al., 2001; Hobfoll, 2002; Parker & Wall, 1998). For example, a resource such as task discretion enables the selection of appropriate task behaviours thereby facilitating task performance. Second, job resources can reduce demands and constraints (Demerouti et al., 2001; Karasek & Theorell, 1990). Job discretion, for example, enables the individual to deploy appropriate coping strategies that directly reduce task constraints (Wall et al., 1992) and thereby help to sustain task performance and engagement. Third, job resources enable learning of new skills and knowledge (Demerouti et al., 2001; Karasek & Theorell, 1990; Parker et al., 2017). For example, job resources such as task feedback and social support can provide employees with task knowledge that enhances task performance, and knowledge of new coping strategies that the employee can use to help sustain engagement. Fourth, job resources can fulfil psychological needs (e.g., for autonomy, relationships and competence, Van den Broeck et al., 2008) (Hackman & Oldham, 1976; Parker & Ohly, 2008; Wohlers et al., 2019). For example, receiving constructive feedback can fulfil a need for positive social relationships, as well as a need for competence, and thereby motivate task performance and evoke positive affective responses that enhance well-being and engagement (Tafvelin & Stenling, 2018; Van den Broeck et al., 2016). Fifth, job resources are likely to be appraised positively because they facilitate task-related behaviours, learning and need-fulfilment, such that they are likely to foster positive job attitudes such as job satisfaction (Hackman & Oldham, 1976; Judge & Kammeyer-Mueller, 2012).

Thus, based on integrated perspectives of work design theory, we conceptualize activity-supportive workspace characteristics as "physical" job resources of the work environment that will associate positively with task performance, job engagement, and workspace satisfaction. In the following section, we draw on the proposed mechanisms to theorize how activity-supportive workspace characteristics affect these three outcomes.

*Effects on task performance:* Based on the mechanisms outlined in integrated work design perspectives, activity-supportive characteristics of organizational and home workspaces may aid task performance by directly facilitating task-relevant behaviours (Demerouti et al., 2001; Hobfoll, 2002; Parker & Wall, 1998). In particular, interaction-supportive characteristics that provide areas where employees can easily meet and converse are likely to facilitate interpersonal behaviours that are essential for the performance of a wide range of job tasks (e.g., meetings, coaching, problem-solving), and concentration supportive workspace characteristics are likely to facilitate the sustained attention required for effective performance on many job tasks. In addition, recovery-supportive characteristics may facilitate activities (e.g., rest, relaxation) that help to conserve the energy required for the sustained effective performance of task behaviours (Jahncke et al., 2011; Steed et al., 2021).

A further way in which activity-supportive workspaces can aid task performance is by reducing demands and task constraints. Interaction-supportive characteristics that facilitate social interaction may help employees to deal more rapidly with hinderances and constraints that are impeding task performance, while concentration-supportive characteristics are likely to reduce noise and unwanted interruptions that may interfere with task efficiency (Burmeister et al., 2018; Demerouti et al., 2007). Recovery-supportive characteristics may help employees sustain and recover key resources, such as energy and attention, that are needed for effective performance, a proposition that is in keeping with attention restoration theory (Kaplan & Berman, 2010).

Activity-supportive workspace characteristics may also aid task performance by facilitating the development of task-relevant knowledge and skills (Demerouti et al., 2007). For example, interaction-supportive characteristics should enable employees to acquire knowledge and skills from others through discussion and task feedback (Demerouti et al., 2007; Kim et al., 2016), while concentration-supportive characteristics may help employees to develop task relevant knowledge and skills by facilitating complex problem-solving and deeper engagement with new material (Burmeister et al., 2018). Recovery-supportive characteristics may also support knowledge development by allowing employees time to detach from work and engage in mind wandering processes that foster creative ideas and insights (Fox & Christoff, 2018). Activity-supportive workspaces may therefore help to improve task performance in the short-term by aiding access to knowledge that can be quickly applied to current problems and over the long-term by promoting skill development.

Another way by which activity-supportive workspaces may affect task performance is through the motivation arising from need fulfilment. Self-determination theory, for example, asserts that employees have three core needs – for autonomy, relatedness, and competence (Ryan & Deci, 2000). By fostering knowledge and skill development (as previously described), activity-supportive characteristics may fulfil the need to feel competent (i.e., have a sense of mastery over the environment), while

interaction-supportive characteristics may help to fulfil the need for relatedness (i.e., to feel connected with others and cared for) by fostering social interaction. In addition, other more specific needs may be fulfiled by activity-supportive characteristics, such as the need for privacy (Bhave et al., 2020). For example, both concentration and recovery-supportive characteristics may fulfil the need for privacy by providing environments in which a person can physically and psychologically distance themselves from others (Hann et al., 2007; Oldham, 1988).

*Effects on engagement:* Based on integrative perspectives of work design, activity-supportive workspaces may foster employee engagement through multiple mechanisms. Specifically, activity-supportive characteristics may enable task-relevant behaviours, thereby facilitating the flow of work tasks and leading to greater task absorption, a core component of engagement (Bakker & Van Woerkom, 2017). For example, interaction-supportive characteristics should aid absorption in tasks requiring debate and discussion, whereas concentration-supportive characteristics are likely to aid absorption in tasks requiring attention. Another way that activity-supportive workspaces can foster engagement is by reducing demands and task constraints (Demerouti et al., 2007). For example, concentration-supportive characteristics are likely to directly reduce demands arising from unwanted noise and interruption, while recovery-supportive will provide opportunities to limit job demands characteristics (e.g., a quiet zone in the office or living room at home, Morrison & Macky, 2017; Sianoja et al., 2016). By reducing demands and constraints, activity-supportive characteristics help the employee to maintain high levels of vitality, another core component of engagement.

Activity-supportive characteristics may also foster engagement by promoting learning (Parker et al., 2021). Interaction-supportive characteristics may help employees obtain new insights on task management from others, while concentration-supportive and recovery-supportive characteristics may provide quiet spaces that aid knowledge acquisition activities, such as reading, problem-solving or mind wandering (Williams et al., 2018). The knowledge acquired may facilitate more effective coping strategies, which in turn help employees to sustain core components of engagement, such as absorption and vitality (Holman & Wall, 2002). In addition, as activity-supportive characteristics promote learning and closer social relationships, as well as providing opportunities for greater privacy, they are likely to fulfil fundamental needs for competence, relatedness and privacy that, in turn foster positive active states of wellbeing such as engagement (Wohlers & Hertel, 2017).

*Effects on workspace satisfaction:* Activity-supportive characteristics of a workspace are likely to be appraised and evaluated as positive features of the work environment – and hence result in workspace satisfaction – when they aid the accomplishment of work goals, reduce job demands, promote learning and fulfil needs (Humphrey et al., 2007; Maier & Brunstein, 2001). For example, concentration-supportive characteristics are likely to reduce the number of interruptions and distractions, the most common predictor of workspace (dis) satisfaction (Davis et al., 2011), while interaction-supportive characteristics can be expected to aid information and feedback seeking, supporting satisfaction with the workspace (Gerdenitsch et al., 2018). Recovery-supportive characteristics facilitate behavioural strategies (e.g., reading, exercising, listening to music) that reduce demands, promote learning and contribute to evaluations of the workspace as satisfying basic needs (Morrison & Macky, 2017; Smolders et al., 2012). Furthermore, appraisals of the organizational workspace are likely to be relatively independent from appraisals of the home workspace (Edwards et al., 2008; Smith et al., 1969) such that activity-supportive characteristics in the organization should be associated with organizational workplace satisfaction, whereas activity-supportive characteristics in the home should be associated with home workplace satisfaction.

In summary, our theoretical arguments propose that interaction-supportive, concentration-supportive and recovery-supportive characteristics will be positively associated with task performance, engagement and workspace satisfaction. Furthermore, as employees are able to discern and appraise different features of their working environment (Edwards et al., 2008; Humphrey, 2007) both at home and in the office, each activity-supportive characteristic is likely to have an independent effect on each relevant outcome.

Empirical evidence from numerous sources supports arguments for the positive effects of activity-supportive workspace characteristics on employee outcomes. Research studies show activity-supportive workspace characteristics to have positive associations with task performance, well-being (including engagement) and job satisfaction (including workspace satisfaction). Specifically, interaction-supportive work characteristics have been found to be positively associated with task performance (Kim et al., 2016; Meijer et al., 2009; Wadu & Chiang, 2019), engagement or other forms of well-being (Kim et al., 2016; Wohlers et al., 2019) and job or workspace satisfaction (Kim et al., 2016; Marzban et al., 2023; Wohlers et al., 2019). Similarly, concentration-supportive work characteristics have been found to be positively associated with task performance (Zamani & Gum, 2019),

engagement or other forms of well-being (Bergefurt et al., 2022; Wohlers et al., 2019) and job or workspace satisfaction (Colenberg et al., 2021; Marzban et al., 2023; Sundstrom et al., 1980; Wohlers et al., 2019; Zamani & Gum, 2019). For instance, a study of office workers across multiple organizations found that employees with interaction-supportive and concentration-supportive characteristics reported more positive work attitudes (i.e., satisfaction and commitment) and higher levels of vitality (Wohlers et al., 2019). In addition, recovery-supportive characteristics have been shown to have positive associations with performance (Dul et al., 2011; Kim et al., 2016), engagement or other forms of well-being (Colenberg et al., 2021; Gulwadi, 2006; Krajewski et al., 2010) and job satisfaction (Bandara et al., 2022; Bhati & Ashokkumar, 2013). Kim and Jang (2022), for example, found that well-designed break rooms were positively associated with engagement and posited that this occurred because well-designed break rooms helped employees to rest and detach from work (Nejati et al., 2016), while Dul et al. (2011) reported a positive relationship between work environments with restorative characteristics (e.g., view of nature, calming colours, indoor plants) and creative performance.

Although there is substantial evidence to support the proposed relationships between activity-supportive characteristics and employee outcomes, we recognize that some studies show null or negative relationships (Engelen et al., 2019) and that the effects of activity-supportive characteristics may depend on discretion over where to work (Engelen et al., 2019) or job complexity (Carlopio & Gardner, 1992). Despite this, we believe that the combination of theoretical argument and empirical evidence is sufficient to warrant setting the following hypotheses:

**Hypothesis 1a:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in office workspaces will each be positively associated with employee performance.

**Hypothesis 1b:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in home workspaces will each be positively associated with employee performance.

**Hypothesis 2a:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in office workspaces will each be positively associated with employee engagement.

**Hypothesis 2b:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in home workspaces will each be positively associated with employee engagement.

**Hypothesis 3a:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in office workspaces will each be positively associated with, respectively, office workspace satisfaction and home workspace satisfaction.

**Hypothesis 3b:** Interaction-supportive, concentration-supportive and recovery-supportive characteristics in home workspaces will each be positively associated with, respectively, office workspace satisfaction and home workspace satisfaction.

## Methods and materials

### *Participants*

Participants were office-based employees from a large U.K. engineering organization. The survey was completed by 1214 employees at Time 1 and 890 employees at Time 2 six months later. The final sample consisted of 253 matched responses. Of these 253 employees, 8% were senior managers, 50% were managers, 37% were office-based technical staff and 5% were administrative staff. They reported working across the following departments: project delivery (27%), finance and business support (13%), site management (11%), enterprise (9%), chief operating office (8%), operations (7%), strategy (5%), HR (2%), and environmental safety (2%). Sixteen per cent did not report their directorate. The modal age group was between 46 and 55 (34%), followed by those between 36 and 45 (23%). Of those reporting gender, 45% were female and 51% were male.

Participants worked in nine buildings across three sites that were part way through a programme of refurbishment (see Table A1 in the Appendices). In one building, the offices had been fully refurbished according to activity-based principles such that workspaces included group desks (with non-reservable seating), quiet work areas, meeting pods and collaborative work areas, informal seating areas, and refreshment spaces. In three buildings, office workspaces were unrefurbished and characterized by traditional open plan style desks with non-reservable individual workstations, a limited number of breakout areas, and formal meeting spaces. In another building, office workspaces had been fully refurbished but kept a traditional open plan layout with a small number of collaborative workspaces. Four buildings were partly refurbished, which

meant that some employees could, in principle, choose to work in either a refurbished or unrefurbished workspace. For three of the partly refurbished buildings, some floors were redesigned according to activity-based principles, and the remaining unrefurbished floors had a traditional layout. The fourth partly refurbished building contained a refurbished floor that kept a traditional open plan layout, and a floor in which one half had been refurbished according to activity-based principles and another half with an unrefurbished traditional layout. Overall, given the differences in building size, about half of all workspaces were designed according to activity-based principles (i.e., workspaces included group desks, quiet work areas, meeting pods etc.), while the other half of workspaces had more a traditional open plan style with large numbers of non-reservable individual workstations, a limited number of break out areas and formal meeting spaces.

## Procedure

An email with information and a link to the survey was distributed by the organization using an internal listserv across nine different office locations. To track responses across time, the survey asked each respondent to construct a unique anonymous ID (Yurek et al., 2008). The first survey was administered in May 2022 and the second in October 2022.

## Instruments

### Activity-based workspace characteristics

We assessed interaction-supportive, concentration-supportive and recovery-supportive workspace characteristics in the office and at home using six separate measures. The same questions were asked for office and home workspaces but with a different contextual framing (i.e., "Thinking about your OFFICE workspace, to what extent does it" and "Thinking about your HOME workspace, to what extent does it". The full set of items is in Appendix Table A2.

Interaction-supportive characteristics in the office and home are both five-item scales based on Wohlers et al. (2019). An example item is "[To what extent does it] allow you to have intensive discussions with colleagues". The reliabilities for the office and home measures are α = .91 and .89 at Time 1 α = .88 and .88 at Time 2.

Concentration-supportive characteristics in the office and home are both three-item scales based on Wohlers et al. (2019). An example item is "[To what extent does it] allow you to concentrate on work tasks without interruption". Reliabilities for the office and home measures are α = .96 and .94 and α = .96 and .94 at Time 2.

Recovery-supportive characteristics in the office and home are both four-item scales that we developed using recovery theories to assess the extent to which the workspace allows the person to take a break, recover, relax and detach from work (Kaplan, 1995; Sonnentag & Fritz, 2007; Sonnentag et al., 2017). We focused on workspaces that facilitate these types of recovery activity as Sonnentag et al. (2017) suggests that the evidence for their effectiveness is more consistent than for other strategies (e.g., mastery). Example items are "[To what extent does it] allow you to have some downtime in the working day" and "[To what extent does it] allow you to detach yourself from work for a while". Reliabilities for the office and home measures are α = .95 and .92 at Time 1 and α = .93 and .92 at Time 2.

### Employee outcomes

To measure job performance, we used the five items on individual in-role performance by Williams and Anderson (1991). An example item is "I have met the formal performance requirements of the job". (1–5, Strongly Disagree-Strongly Agree). Reliabilities were $\alpha$ = .83 at Time 1 and $\alpha$ = .90 at Time 2. Due to the organization's strict confidentiality concerns, we were unable to collect multi-source performance data that we could link to employee responses. Engagement was assessed using the 3-item Utrecht Work Engagement Scale (Schaufeli et al., 2019) that has one item per key dimension of engagement (vigour, dedication, and absorption) (1–7, Never-Always). Reliabilities were α = .84 at Time 1 and α = .85 at Time 2. The UWES is a highly utilized and validated work engagement measure (Mazzetti et al., 2023) which has been demonstrated to be relevant indicator of a range of related well-being correlates (e.g., life satisfaction and psychological distress) (Mazzetti et al., 2023). Satisfaction with office workspace and home workspace was assessed using two single-items (Nagy, 2010; Wanous et al., 1997) (1–7, Highly Dissatisfied to Highly Satisfied).

### Control variables

As experiences of hybrid working may differ according to the amount of time working at home and in the office, we asked employees to estimate the percentage of time worked at either location. Previous research also indicates that employees with complex jobs may be better placed to take advantage of activity-supportive workspaces (Davis et al., 2011; Wohlers & Hertel, 2017). For example, Block and Stokes (1989) reported that individuals performed better on a complex task in a room on their own, while a simple repetitive task was performed better in the presence of others. We therefore included a six-item index of job complexity that assesses the

degree to which employees have various job characteristics based on the job characteristics model (e.g., discretion, task variety, task significance, task interdependence, Hackman & Oldham, 1974).

### *Analysis strategy*

We first performed confirmatory factor analyses to test the factor structure and factor invariance across the two waves (lavaan version 0.6.15, R Core Team, 2021; Rosseel, 2012) using MLR, which is superior to WLSMV when the sample size is small (Li, 2016). To test the factor structure of the activity-supportive characteristic measure, we compared (using model fit and a log likelihood ratio test) the proposed six-factor model (i.e., separate activity-supportive characteristics) with a one factor model (all items loading on one factor), and a model with second-order latent factors for office activity-supportive characteristics and home activity-supportive characteristics. We then tested a measurement model that included activity-supportive characteristics, task performance and engagement outcomes. To test measurement invariance, we began with a longitudinal baseline model that considers the relationship of homologous items across time (Little, 2013). We then used this model to assess the fit of subsequent configural, weak and strong invariance models, with $\Delta CFI < .01$ indicating a non-significant change in fit (Little, 2013).

We then tested our hypotheses using a series of cross-lagged models of increasing complexity. The simplest models (M1.1-M1.9) included a single pair of workspace characteristics as independent variables (e.g., office and home concentration-supportive characteristics), a single dependent variable (e.g., task performance) and relevant controls (i.e., time in office, job complexity). Next, we developed models (M2.1-M2.3) that incorporated all six activity-supportive workspace characteristics as independent variables, one dependent variable, and controls. Models 1 and 2 included all autoregressive and cross-lagged paths. Finally, we built a third model (M3) that included all dependent variables at T2 (i.e., task performance, engagement, workspace satisfaction). Here, we included all independent variables (as in Models M2.1-M2.3), all autoregressive paths, and all cross-lagged paths except for those of the dependent variables at T1 to the other dependent variables at T2.

Initially, we planned to analyse the above models using SEM with MLR, but they did not converge properly. The smallest eigenvalue was very small (5.68e-16), suggesting that the convergence issue was due to the large number of free parameters compared to the sample size rather than model misspecification. Thus, we estimated the same model using a Bayesian approach with the blavaan package (version 0.4.7) for R (Merkle & Rosseel, 2015) as it is less affected by non-convergence due to sample size. It is important to consider that Bayesian inference differs from frequentist approaches in that results need to be understood as the estimate being the most likely value for a given parameter, as a function of a prior distribution (Zyphur & Oswald, 2015). To assess model fit we followed the recommendations of Garnier-Villarreal and Jorgensen (2020) and used Bayesian RMSEA and Gamma-Hat. The BRMSEA is interpreted in a similar way as the RMSEA when estimating SEM models using ML, namely, BRMSEA lower than .05 is indicative of excellent fit, and values lower than .08 are indicative of acceptable fit. In turn, the Gamma-Hat index is sensitive to model misspecification, which is what is required of a fit index. Here, values closer to 1 are indicative of excellent fit and values above .90 indicate good fit.

For our analysis, we used non-informative priors ($\mu = 0$, $\sigma^2 = 10$), which means that we are assuming that any value for a given parameter is equally likely. We decided on non-informative priors for two reasons. First, we are developing a new model for understanding the influence of workspace design on different outcome variables and hence did not want to assume either the magnitude or sign of a parameter. Second, using non-informative priors mimics frequentist estimation as they do not influence the estimation process (Zyphur & Oswald, 2015). The Bayesian approach yielded similar results to the analysis using MLR with convergence issues. Thus, we report the Bayesian results because they are more robust in this case but also include the MLR results in the Appendix (Table A4). We also report the results for Model 3 without controls in the Appendix (Table A5). The results for the model without controls are substantively the same as those with controls.

## Results

### *Measurement quality, correlations and descriptive information*

The results for the six-factor model (six separate office and home activity-supportive characteristics) indicate good model fit ($\chi^2 = 1549.08$, df = 1035, $p < .01$, SRMR = .05, RMSEA = .04 [.04, .05], CFI = .95, TLI = .95, AIC = 23510, BIC = 24177). Furthermore, model fit was significantly better ($\Delta\chi^2$ ($\Delta$df) = 1526.31 (18) $p < .01$) than a one factor model ($\chi^2 = 8964.64$, df = 1105, $p < .01$, SRMR = .21, RMSEA = .17 [.16, .17], CFI = .30, TLI = .25, AIC = 30785, BIC = 31206) and significantly better ($\Delta\chi^2$ ($\Delta$df) = 231.58 (52) $p < .01$) than a second-order factor model ($\chi^2 = 1775.03$, df = 1087, $p < .01$, SRMR = .09,

RMSEA = .05 [.05, .05], CFI = .94, TLI = .93, AIC = 23632, BIC = 24116). The measurement model including activity-supportive characteristics, task performance and engagement showed excellent model fit ($\chi^2$ = 2476.08, df = 1727, $p < .01$, SRMR = .05, RMSEA = .039 [.035, .043], CFI = .95, TLI = 95).

With regard to the analysis of measurement invariance (for full results see Table A3 in Appendix), fit indices and changes in CFI suggest that the measurement model for each construct fits well and is invariant over time in all but one case (i.e., office interaction-supportive measure) where strong invariance is not achieved, ΔCFI > .01). The level of non-invariance is thus trivial (Newsom, 2015) and we freed this constraint when estimating structural models.

Table 1 shows correlations, descriptive information, and Cronbach alphas. Correlations between T1 and T2 variables are moderate to high ($r$ = .37-.63), indicating a medium to high degree of stability. The low to medium correlations between the home and office workspace variables suggest that they are independent. Cronbach alphas are at appropriate levels. All scales therefore have sufficient measurement quality.

### Hypothesis testing

We hypothesized that each office and home workspace characteristic (i.e., concentration, interaction, and recovery-supportive) would be related to changes in performance (Hypotheses 1a & 1b), engagement (Hypotheses 2a- & 2b) and workspace satisfaction (Hypotheses 3a & 3b). The structural model M3 on which we based our hypothesis testing showed good to excellent fit (BRMSEA = .04, Gamma-hat = .91) and the parameter estimates from this model (see Table 2) provide partial support for our hypotheses. Specifically, office recovery-supportive characteristics at Time 1 was positively associated with task performance at Time 2 (b = .14 [.02, 25]), in partial support of Hypothesis 1a. Home concentration-supportive characteristics at Time 1 was positively associated with engagement at Time 2 (b = .26 [.04, .48]), partially supporting Hypothesis 2b. In addition, office interaction-supportive characteristics at Time 1 was positively associated with office space satisfaction at Time 2 (b = .39 [.14, .65]), partially supporting Hypothesis 3a.

We also found some unanticipated cross-lagged effects (see Table 3). Performance at Time 1 was

**Table 1.** Descriptive information and zero-order correlations.

| | Mean (SD) | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Performance 1 | 4.50 (.59) | **.83** | | | | | | | | | |
| 2. Performance 2 | 4.45 (.63) | .49** | **.90** | | | | | | | | |
| 3. Engagement 1 | 5.14 (1.06) | .25** | .25** | **.84** | | | | | | | |
| 4. Engagement 2 | 5.18 (1.02) | .29** | .29** | .57** | **.85** | | | | | | |
| 5. Office Satisfaction 1 | 4.33 (1.55) | −.08 | −.01 | .20** | .13* | – | | | | | |
| 6. Office Satisfaction 2 | 4.00 (1.55) | −.14* | −.07 | .13* | .30** | .37** | – | | | | |
| 7. Home Satisfaction 1 | 5.71 (1.41) | .28** | .13* | .20** | .24** | .04 | .02 | – | | | |
| 8. Home Satisfaction 2 | 5.96 (1.2) | .29** | .32** | .11 | .23** | −.01 | .05 | .63** | – | | |
| 9. Office Concentration 1 | 2.52 (.97) | −.08 | −.04 | .06 | .05 | .41** | .14* | −.23** | −.19** | **.96** | |
| 10. Office Concentration 2 | 2.44 (.87) | −.20** | −.20** | .00 | .02 | .32** | .41** | −.21** | −.25** | .46** | **.96** |
| 11. Home Concentration 1 | 4.43 (.74) | .34** | .25** | .30** | .31** | −.10 | −.05 | .50** | .37** | −.18** | −.17** |
| 12. Home Concentration 2 | 4.57 (.67) | .36** | .41** | .25** | .33** | −.03 | −.05 | .34** | .50** | −.21** | −.30** |
| 13. Office Interaction 1 | 3.66 (.89) | −.11 | .06 | .08 | .08 | .38** | .29** | −.09 | −.13* | .30** | .23** |
| 14. Office Interaction 2 | 3.37 (.84) | −.06 | −.04 | .05 | .04 | .31** | .40** | −.19** | −.29** | .30** | .39** |
| 15. Home Interaction 1 | 3.46 (.87) | .31** | .26** | .21** | .20** | −.18** | −.09 | .33** | .29** | −.19** | −.31** |
| 16. Home Interaction 2 | 3.53 (.79) | .22** | .28** | .10 | .09 | −.16* | −.16* | .33** | .42** | −.20** | −.35** |
| 17. Office Recovery 1 | 2.26 (1.04) | −.03 | .09 | .10 | .02 | .34** | .11 | −.18** | −.16* | .52** | .19** |
| 18. Office Recovery 2 | 2.18 (.85) | −.07 | −.03 | .09 | .03 | .21** | .25** | −.01 | −.12 | .21** | .30** |
| 19. Home Recovery 1 | 4.01 (1.01) | .22** | .15* | .07 | .01 | −.02 | −.07 | .28** | .23** | −.09 | −.17** |
| 20. Home Recovery 2 | 4.02 (.94) | .05 | .21** | −.05 | −.09 | −.02 | −.06 | .22** | .27** | −.15* | −.17** |
| 21. Job complexity 1 | 3.78 (.59) | .17** | .16* | .31** | .37** | −.04 | .04 | .12 | .11 | −.06 | −.09 |
| 22. %Work from Office 2 | 9.79 (19.93) | −.06 | −.05 | .13* | .04 | .23** | .13* | −.21** | −.21** | .16* | .23** |

| | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11. Home Concentration 1 | **.94** | | | | | | | | | | |
| 12. Home Concentration 2 | .42** | **.95** | | | | | | | | | |
| 13. Office Interaction 1 | −.11 | −.05 | **.91** | | | | | | | | |
| 14. Office Interaction 2 | −.16** | −.13* | .49** | **.88** | | | | | | | |
| 15. Home Interaction 1 | .41** | .25** | −.10 | −.16** | **.89** | | | | | | |
| 16. Home Interaction 2 | .30** | .28** | −.06 | −.17** | .62** | **.89** | | | | | |
| 17. Office Recovery 1 | −.24** | −.11 | .34** | .26** | .02 | .00 | **.95** | | | | |
| 18. Office Recovery 2 | −.03 | −.13* | .21** | .27** | −.01 | −.07 | .37** | **.93** | | | |
| 19. Home Recovery 1 | .37** | .17** | .02 | −.02 | .24** | .25** | .04 | .03 | **.92** | | |
| 20. Home Recovery 2 | .19** | .24** | .01 | .01 | .14* | .18** | −.06 | .01 | .46** | **.92** | |
| 21. Job complexity 1 | .13* | .18** | .02 | .00 | .21** | .18** | .06 | .11 | .09 | .02 | – |
| 22. %Work from Office 2 | .07 | −.07 | .06 | .11 | −.10 | −.15* | .16* | .13* | −.01 | −.02 | .00 |

Notes. **$p < .01$, *$p < .05$.

**Table 2.** Bayesian estimates for model M3.

| | Performance T2 Estimate [$CI_L$; $CI_U$] | Engagement T2 Estimate [$CI_L$; $CI_U$] | Office Satisfaction T2 Estimate [$CI_L$; $CI_U$] | Home Satisfaction T2 Estimate [$CI_L$; $CI_U$] |
|---|---|---|---|---|
| Performance T1 | .46* [.31; .61] | | | |
| Engagement T1 | | .50* [.37; .63] | | |
| Office Satisfaction T1 | | | .27* [.14; .40] | |
| Home Satisfaction T1 | | | | .44* [.35; .54] |
| Office Concentration T1 | −.09 [−.20; .02] | .07 [−.08; .21] | −.05 [−.32; .22] | .01 [−.16; .17] |
| Home Concentration T1 | .12 [−.04; .28] | .26* [.04; .48] | .03 [−.30; .37] | .12 [−.12; .37] |
| Office Interaction T1 | .07 [−.03; .17] | .06 [−.08; .2] | .39* [.14; .65] | −.07 [−.22; .09] |
| Home Interaction T1 | .06 [−.05; .19] | .09 [−.08; .25] | .00 [−.27; .28] | .12 [−.06; .30] |
| Office Recovery T1 | .14* [.02; .25] | −.03 [−.18; .12] | −.07 [−.33; .2] | −.03 [−.20; .15] |
| Home Recovery T1 | −.03 [−.14; .08] | −.14 [−.28; .01] | −.16 [−.41; .08] | .07 [−.10; .22] |
| Job complexity T1 | −.01 [−.04; .02] | .02 [−.01; .06] | −.06 [−.37; .22] | −.06 [−.26; .14] |
| %Work fr. Off. T2 | .00 [−.01; .00] | .00 [−.01; .00] | .01 [−.01; .01] | −.01 [−.01; .00] |

**Table 3.** Bayesian estimates for model M3.

| | Office Concentration T2 Estimate [$CI_L$; $CI_U$] | Home Concentration T2 Estimate [$CI_L$; $CI_U$] | Office Interaction T2 Estimate [$CI_L$; $CI_U$] | Home Interaction T2 Estimate [$CI_L$; $CI_U$] | Office Recovery T2 Estimate [$CI_L$; $CI_U$] | Home Recovery T2 Estimate [$CI_L$; $CI_U$] |
|---|---|---|---|---|---|---|
| Performance T1 | .00 [−.17; .17] | .19* [.06; .33] | .21* [.04; .39] | −.06 [−.20; .09] | −.07 [−.26; .11] | −.07 [−.25; .10] |
| Engagement T1 | −.03 [−.13; .08] | .06 [−.02; .14] | −.04 [−.14; .07] | −.02 [−.11; .06] | .04 [−.07; .14] | −.07 [−.18; .02] |
| Office Satisfaction T1 | .05 [−.02; .12] | .01 [−.05; .06] | .06 [−.01; .14] | −.03 [−.09; .04] | .00 [−.07; .08] | .00 [−.07; .06] |
| Home Satisfaction T1 | −.03 [−.10; .04] | .04 [−.02; .09] | −.09* [−.17; −.01] | .04 [−.02; .11] | −.02 [−.09; .06] | .06 [−.01; .13] |
| Office Concentration T1 | .34* [.21; .47] | −.12* [−.22; −.01] | .07 [−.07; .21] | −.07 [−.19; .04] | .00 [−.14; .13] | −.08 [−.21; .05] |
| Home Concentration T1 | .06 [−.13; .25] | .26* [.11; .41] | −.02 [−.21; .19] | .02 [−.14; .19] | .11 [−.08; .31] | .00 [−.18; .20] |
| Office Interaction T1 | .09 [−.03; .22] | .02 [−.07; .12] | .43* [.30; .56] | .04 [−.07; .15] | .07 [−.05; .20] | .06 [−.06; .18] |
| Home Interaction T1 | −.18* [−.33; −.03] | .01 [−.10; .13] | −.10 [−.25; .04] | .56* [.43; .70] | −.02 [−.17; .13] | .04 [−.11; .19] |
| Office Recovery T1 | −.06 [−.19; .07] | .04 [−.06; .15] | −.01 [−.14; .13] | .04 [−.08; .15] | .31* [.17; .45] | .00 [−.12; .14] |
| Home Recovery T1 | −.09 [−.21; .04] | −.04 [−.14; .06] | −.01 [−.14; .13] | .05 [−.05; .16] | .00 [−.13; .14] | .38* [.25; .50] |
| Job complexity T1 | −.04 [−.14; .06] | −.02 [−.09; .07] | .01 [−.16; .18] | −.01 [−.10; .08] | .00 [−.11; .11] | −.09 [−.19; .01] |
| %Work fr. Off. T2 | .01 [.00; .01] | .00 [−.01; .00] | .00 [.00; .01] | .00 [−.01; .00] | .00 [.00; .01] | .00 [.00; .01] |

positively related to office concentration-supportive and interaction-supportive characteristics at Time 2 (.19 [.06, .33] and .21 [.03, .39]). Home workspace satisfaction at Time 1 was negatively related with office interaction-supportive characteristics at Time 2 (−.09 [−.17, −.01]). Furthermore, the home interaction-supportive characteristics at Time 1 were negatively related with office concentration-supportive characteristics at Time 2 (−.18 [−.33, −.03]).

We conducted further supplementary analyses to gain additional insight into the employee experiences of hybrid workspaces. First, we compared (using t-tests) whether there were significant differences in employee perceptions of activity-supportive characteristics between home and office workspaces. The results shown in Table 4 reveal that employees tended to rate home workspaces more favourably than office workspaces, particularly with regard to the provision of concentration-supportive and recovery-supportive characteristics. For example, at Time 1, the mean level of concentration-supportive characteristics at home was significantly higher than in office workspaces ($M_{home}$ = 4.43 vs. $M_{office}$ = 2.52; $t$ = 22.91, $p$ = .01) and the mean level of recovery-supportive characteristics at home workspaces was significantly higher than in office workspaces ($M_{home}$ = 4.01 vs. $M_{office}$ = 2.26; $t$ = 19.61, $p$ = .01). The direction and scale of these differences were similar at Time 2. However, differences with regard to

**Table 4.** Mean differences between office and home characteristics.

| Home | Mean | Office | Mean | t (df) | Mean Difference |
|---|---|---|---|---|---|
| Home Concentration T1 | 4.43 | Office Concentration T1 | 2.52 | 22.91 (252)** | 1.91 |
| Home Concentration T2 | 4.57 | Office Concentration T2 | 2.44 | 27.19 (252)** | 2.13 |
| Home Interaction T1 | 3.46 | Office Interaction T1 | 3.66 | −2.50 (252)* | −.21 |
| Home Interaction T2 | 3.53 | Office Interaction T2 | 3.37 | 2.09 (252)* | .16 |
| Home Recovery T1 | 4.01 | Office Recovery T1 | 2.26 | 19.61 (252)** | 1.75 |
| Home Recovery T2 | 4.02 | Office Recovery T2 | 2.18 | 23.18 (252)** | 1.84 |

interaction-supportive characteristics were not as large and were less consistent over time. At Time 1, employees reported that they experienced home workspaces as having significantly lower interaction-supportive characteristics than office workspaces (M*home* = 3.46 vs. M*office* = 3.66; $t = -2.50$, $p = .05$) but, at Time 2, the same employees reported that they experienced home workspaces as having significantly higher interaction-supportive characteristics than office workspaces (M*home* = 3.53 vs. M*office* = 3.37; $t = 2.09$, $p = .05$).

We then examined whether there were any interaction effects between office and home workspace characteristics with regard to performance and engagement.[3] Results show no interaction effects between any of the office and home workspace characteristics, with full results reported in the appendix in Tables A6-A8. We also examined whether time spent in the office moderates the effects of office and home workspace characteristics, as effect size might vary according to time spent in each location. Of the 24 interactions tested (see Appendix Tables A9-A14), three were significant. Specifically, the results suggest that time spent working at the office moderates the relationship between home concentration-supportive characteristics and home workspace satisfaction (−.01*), and office interaction-supportive characteristics and task performance (−.003*) and home workspace satisfaction (−.01*). Inspection of the interaction plots (see Figure A1-3 in Appendix) indicates that the effects of these activity-supportive characteristics were stronger when less time was spent working in the office. For example, the effect of home concentration-supportive characteristics and home workspace satisfaction is positive when time is spent working at the office is low but neutral when time is spent at the office is high (Figure A1).

Lastly, we constructed a second-order model to examine the effects of home activity-supportive characteristics and office activity supportive characteristics as a whole on employee outcomes. The fit for this structural model was slightly below accepted standards ($\chi^2$ (df) = 3297.78 (2162); CFI = .92; TLI = .92; RMSEA [$CI_L$; $CI_U$] = .05 [.04, .05]; SRMR = .08) and the results (see Table 5) indicate that office activity-supportive characteristics at Time 1 are associated with task performance at Time 2 (.25*), and that home activity-supportive characteristics at Time 1 are associated with engagement at Time 2 (.72**).

## Discussion

The findings from our two-wave field survey show that office and home activity-supportive workspace characteristics shape employee outcomes in hybrid work. Specifically, we found that office recovery-supportive characteristics were positively related to task performance, office interaction-supportive characteristics were positively related to office workspace satisfaction, and home concentration-supportive workspace characteristics were positively associated with employee engagement. Further supplementary analysis suggested that combined measures of office activity-supportive characteristics were positively related to task performance and that combined measures of home activity-supportive characteristics were positively associated with engagement. We also showed that employees perceived that home workspaces had better concentration- and recovery-supportive characteristics than office workspaces, and that office and home workspaces were more similar with regard to interaction-supportive characteristics. These findings provide implications for research on workspace design and hybrid working.

*Theoretical and Empirical Contributions:* Our study introduces a conceptual model of the hybrid workspace which proposes that office and home workspaces can be understood as having activity-supportive characteristics that shape employee outcomes. Previous models of workspace design have been restricted to organizational settings (Bäcklander & Richter, 2022; Gerdenitsch et al., 2018; Wohlers et al., 2019) and while the issue of workspace in hybrid and homeworking is not new (Allen et al., 2021), theory has failed to keep pace with the

**Table 5.** Second-order workspace factors and employee outcomes.

| | Performance 2 Estimate (SE) | Engagement 2 Estimate (SE) | Office Satisfaction 2 Estimate (SE) | Home Satisfaction 2 Estimate (SE) | Office Workspace 2 Estimate (SE) | Home Workspace 2 Estimate (SE) |
|---|---|---|---|---|---|---|
| Performance 1 | .42 (.09)** | | | | .04 (.06) | −.05 (.05) |
| Engagement 1 | | .45 (.08)** | | | −.01 (.04) | −.05 (.03) |
| Office Satisfaction 1 | | | .25 (.09)** | | −.03 (.04) | .03 (.03) |
| Home Satisfaction 1 | | | | .44 (.10)** | .01 (.04) | .00 (.03) |
| Office Workspace 1 | .25 (.13)* | .24 (.18) | .34 (.48) | −.01 (.19) | .76 (.20)** | −.03 (.09) |
| Home Workspace 1 | .44 (.23) | .72 (.33)* | −.09 (.40) | .61 (.50) | −.12 (.23) | .89 (.18)** |
| Job complexity 1 | .01 (.02) | .02 (.03) | .12 (.16) | −.08 (.15) | −.06 (.04) | .00 (.03) |
| %Work fr. Off. 2 | .00 (.00) | .00 (.00) | .01 (.00)* | −.01 (.00) | .01 (.00)** | .00 (.00) |

Notes. **$p < .01$, *$p < .05$. Home and Office Supply represent higher order constructs containing all office and home supply respectively. The fit of the model is below acceptable standards: $\chi^2$ (df) = 3297.78 (2162)**; CFI = .92; TLI = .92; RMSEA [$CI_L$; $CI_U$] = .05 [.04, .05]; SRMR = .08.

multi-locational workspaces that hybrid workers occupy. Consequently, our understanding of how office and home workspaces jointly shape employee outcomes has been limited. Our model extends theoretical understanding of workspace design using activity-based perspectives to office *and* home settings and, by illuminating the activity-supportive characteristics that they share, provides a means of comparing the effects of office and home workspaces despite wide ranging superficial differences in furniture, space and architecture. The ability to conceptualize and examine the simultaneous effects of office and home workspace settings is significant given the rise of hybrid working since the pandemic and the need for employees and managers to better understand how to organize and manage hybrid working in an effective manner.

The results of our study support the general thrust of our theorized model by showing that specific office workspace characteristics (i.e., interaction-supportive, recovery-supportive) and home workspace characteristics (i.e., interaction-supportive) affect employee outcomes. These findings are consistent with evidence from previous studies reporting general measures of workspace resource to be positively associated with task performance (Van de Ven et al., 2014), well-being (Humphrey et al., 2007; Van de Ven & Vlerick, 2013, 2014) and job satisfaction (Ji et al., 2022) and studies using more specific measures of activity-supportive workspace characteristics, such as those by Kim et al. (2016) and Wohlers et al. (2019) which report office interaction-supportive characteristics to be positively associated with job satisfaction.

Our theoretical model also introduces the concept of recovery-supportive workspace characteristics. Previous research and practice on workspace design have stressed the importance of places to recover from work but lacked extensive theorization (Duffy & Powell, 1997; Sonnentag & Fritz, 2007). Building on these insights, our model suggests that workspaces will support recovery when they have characteristics that offer the opportunity to engage in recovery activities and have informationally, aesthetically and sensoryly rich content that engages attention with minimal effort. In doing so, our research extends understanding of workspace characteristics, particularly for workspace design practices that aim to facilitate employee recovery (Duffy & Powell, 1997), and addresses calls in the literature to better understand how workplace context shapes recovery (Sonnentag & Fritz, 2007).

A notable discovery is that office recovery-supportive characteristics have a positive relationship with employee performance. Based on our theoretical arguments, such relationships may occur because the offices we studied provided spaces that afforded the opportunity to socialize and engage in low-effort activities such as reading and relaxation during breaks (Nejati et al., 2016; Steed et al., 2021). Our results are in keeping with the limited number of studies on recovery spaces, such as the study by Dul et al. (2011) showing a positive relationship between work environments with restorative characteristics and creative performance. We therefore supply much needed empirical evidence for the importance of supplying recovery areas in organizational settings. We did not, however, find a concomitant effect on performance with regard to recovery-supportive workspace characteristics in the home. One possible reason is that, while some employees may use recovery spaces sparingly, for others, they might prove too much of a distraction from task-related activity.

Our analyses also uncovered unexpected relationships between outcome variables and activity-supportive workspaces. Specifically, performance was associated with a change in concentration-supportive and interaction-supportive workspace characteristics in the office. One possible explanation for these relationships is that high performers are more proactive in trying to craft their workspace to better suit their needs (Tims et al., 2016) or that over time they are better able to adapt their working patterns to existing resources such that they perceive the environment more positively. These findings highlight how employees' proactive behaviours interact with workspace features, generating added value from the same environment. From the perspective of action regulation theory (Zacher & Frese, 2018), our study suggests that activity-supportive spaces not only function as static resources but also promote adaptive regulation, fostering proactive work behaviour.

The results from our analyses using second-order latent factors relating to the combined effects of office and home activity-supportive characteristics also support the general thrust of our hypotheses, as they showed office activity-supportive characteristics to be positively related with task performance and home activity-supportive characteristics to be positively associated with engagement. One reading of these findings, which are in keeping with previous findings for combined measures of activity-supportive characteristics (Humphrey et al., 2007; Van de Ven et al., 2014), is that the effects of activity-supportive characteristics may be more evident when they co-occur with other types of activity-supportive characteristics in home or office workspaces. Although these results need to be treated with caution (as the fit of the model on which they are based was slightly lower than accepted standards), they do suggest that future studies would profit from not

only examining the effects of specific activity-supportive characteristics but also from profiles of various activity-supportive characteristics (Mäkikangas, 2018).

In addition to extending our theoretical understanding of activity-based workspace design, our findings further refine established perspectives in work design theory. By advancing the understanding of job resources within integrative perspectives of work design (Morgeson & Humphrey, 2006; Parker, 2014), we demonstrate a distinct role of physical and environmental resources, particularly with recovery-supportive features across both the office and home environment. Although such resources are conceptually included in these perspectives, most empirical work has examined psychosocial resources (e.g., autonomy, social support, feedback) and not distinguished the extent to which these are present across different work locations. Consistent with recent research on the physical environment for work (Roskams & Haynes, 2021), our results corroborate the importance of fully integrating specific environmental characteristics into work design theory. Furthermore, our results may also imply that the value of particular physical job resources depends on context. For example, while recovery-supportive spaces in the office are linked to performance, similar features at home are not. This nuance challenges assumptions of context-free resources across different workspaces. Relatedly, our findings also have implications for needs-based motivation frameworks, such as self-determination theory (Ryan & Deci, 2000) by illustrating how physical workspaces compatible with different activities may fulfil basic psychological needs for autonomy (via control over space), relatedness (via social hubs), and competence (via concentration spaces).

Our findings also contribute to the emerging literature on the nature, implementation and effects of hybrid work arrangements. Increasing empirical evidence supports hybrid work as a beneficial work arrangement for individuals and organizations (e.g., Bloom et al., 2024; Srivastava et al., 2024) and new theorization is beginning to explain differential outcomes, e.g., the dual pathway model of autonomy and isolation in relation to remote work intensity (Gajendran et al., 2024). Such explanations are often limited in their conceptualization of the physical work environment, with the context often reduced to binary home/remote or office, or as an influence on the work-life boundary (e.g., Hill et al., 2024). Our findings demonstrate that specific features of both home and office environments can independently influence individual outcomes, suggesting a potential moderating role of individual activity-supportive workspace characteristics within theories such as the dual pathway model, e.g., perceived isolation may be moderated by the interaction-supportive characteristics of both the home and office. Integrating this perspective may provide a more nuanced interpretation of hybrid work by broadening the measurement of boundary conditions (Kossek et al., 2023) beyond established concepts such as the intensity of remote work or location autonomy.

*Limitations and Future Research:* Despite the study's strengths (e.g., two-wave design, multiple locations), it has a number of limitations. Some of these limitations may help to explain why the study did not find support for 15 of the 18 hypothesized relationships. First, we did not assess how employees were using different workspaces, particularly whether employees sought to match activity to workspace characteristics, e.g., did employees conduct tasks requiring concentration in a concentration-supportive workspace. Although matching activity to workspace has been shown to be associated with higher levels of employee engagement and satisfaction (Hoendervanger et al., 2022; Wohlers et al., 2019), studies have shown that employees do not necessarily switch workspaces to suit an activity (Hoendervanger et al., 2019). This may have occurred in the setting we studied, such that the benefits of workspaces on offer were not realized. Future studies of hybrid workspaces would therefore benefit from assessing the types of activity engaged in work and home settings, and examining the extent to which employees match activity with workspace. Second, job characteristics might have constrained the ability of employees to use different spaces. For example, employees lacking task variety may not have been able to take advantage of the different spaces on offer. Third, unmeasured workspace characteristics could have attenuated the effects of workspace resources. For example, the presence of workspace demands such as workspace noise or technological and ergonomic constraints may have negated the positive effects of workspace resources. Future research could therefore examine the joint effects of workspace resources and demands (Bakker et al., 2010). Thus, a more general point is that the effects of specific workspace characteristics may depend on other work-related factors. Indeed, this was hinted at by the findings relating to the moderating effects of time spent in the office and home locations, which suggested that the effects of some activity-supportive characteristics were stronger when less time was spent working in the office.

Fourth, the study did not address how individual differences, such as individual needs or Big five personality traits, may affect employee responses to activity-supportive workspaces. Regarding individual needs, research on activity-supportive workspaces has drawn on person–environment fit theories to suggest that the benefits of workspace resources may be most beneficial

when they directly match the three basic needs (for autonomy, relatedness and competence) as identified by self-determination theory (Ryan & Deci, 2000), as well as other relevant needs, such as a need for privacy (i.e., a preference to be isolated from other people and stimuli) and a need for structure (i.e., a preference for structured and predictable situations) (Hoendervanger et al., 2018). For example, employees with a high need for relatedness may be more motivated and satisfied in interaction-supportive workspaces but less motivated and satisfied in concentration-supportive workspaces. Combining these insights with research on matching workspaces to task activity suggests that the positive effects of activity supportive workspaces may only become apparent when employees are able to match activity-supportive workspace to task activity *and* individual needs. Similar person–environment fit rationales can be used to frame the potential effects of Big five personality traits. For example, individuals with high agreeableness may prefer to work in interaction-supportive workspaces, although there is also some evidence that they may also find them more distracting (Seddigh et al., 2016). In addition, employees with neurodivergent conditions, such as ADHD, dyslexia, and autism, may have different workspace needs (Krzeminska et al., 2019). In the same concentration-supportive workspace, neurodivergent employees may receive more benefits than neurotypical ones because it is functional in avoiding sensory disturbances. Furthermore, due to the extra burden of virtual communications experienced among neurodivergent employees (Szulc et al., 2021), the effects of an interaction-supportive workspace are likely to differ between home and office settings. Future research in this direction offers a more fine-tuned approach to the hybrid activity-based workspace design, making it a purposeful tool for increasing competitive advantages (Austin & Pisano, 2017).

A further limitation of our study was that we collected data at two time-points 6 months apart. Collecting data at more than two time-points may have allowed us to better capture growth patterns in employee outcomes. In addition, as task activities may vary on a daily and weekly basis (Handke et al., 2025), as well as the extent to which a person works in the office and at home, the effects of an employee's workspace may also be subject to much variation. Such variation may be best captured in future studies using diary methods (Hoendervanger et al., 2022) that also assess shorter time frames to capture the possibility that workspaces have more immediate (i.e., daily, weekly) effects on employee outcome: and this may have been one of the key reasons why we failed to find support for our hypothesized relationships. Our data was also self-report, which may have inflated relationships due to common method bias (Podsakoff et al., 2012), and self-report bias, particularly with regard to the measurement of task performance. However, the presence of differential relationships between activity-supportive workspace design variables and task performance variables suggests that these biases, if present, may not have unduly affected the results. Future studies would therefore benefit from the inclusion of multi-source measures.

*Practical Implications:* For managers and office designers, our findings emphasize the importance of designing home and office workspaces that support task and recovery activities throughout the working day (Appel-Meulenbroek et al., 2011; Gerdenitsch et al., 2018). In particular, although recovery spaces are sometimes incorporated into activity-based flexible offices (Wohlers & Hertel, 2017), they are not an explicit consideration in many office designs, and their presence may even be declining (Corvo et al., 2020). Our study therefore suggests that organizations would benefit from intentionally providing spaces in the office that support recovery activities, such as quiet areas for relaxing and disconnecting from work, (e.g., soundproof relaxation pods, access to greenery and natural light, outdoor garden space or wellbeing rooms) and social hubs for informal interaction (e.g., lounges, play areas, café spaces or kitchen areas, Kaplan & Kaplan, 1989; Knight & Haslam, 2010). This reflects a trend towards "hotelification" in offices, i.e., for more lounge-style spaces, softer accent lights, natural and tactile furnishing that promote relaxation and informality. For task-focused activities, features such as noise-controlled workspace, acoustic dampening panels, focused task lighting and ergonomic furniture can directly enhance concentration, supporting higher task performance. While employers have less control over home workspaces, they can still indirectly support employees' recovery and concentration. For example, organizations may offer allowance for ergonomic equipment at home or provide practical tips for workspace setup (e.g., visual cues separating work and non-work areas). Furthermore, as the successful use of hybrid workspaces may require employees to adopt new habits and behaviours (e.g., strategies for managing working time, interruptions, distractions, overwork, boundary management), it is important that leaders help their teams with such strategies as well as the establishment of shared norms around recovery and online availability (Kossek et al., 2012). Indeed, by signalling their endorsement of hybrid workspaces, leaders can give employees greater confidence that their efforts to utilize and craft hybrid workspaces are supported and worthwhile in the long term (Jaß et al., 2024).

Thus, HR policies and training to support the effective use of hybrid workspaces could target both leaders and employees.

A key implication for organizations is the need to critically evaluate the purpose and balance of activity-supportive workspaces within their offices – particularly in the context of hybrid working. Our results reveal that interaction-supportive spaces aid workspace satisfaction, suggesting that they could be a powerful tool to encourage employees to return to the office and foster a more positive workplace experience. Conversely, recovery supportive spaces were found to support productivity. Organizations must therefore take care to balance the spaces that they provide. Our framework could be used as a diagnostic tool to understand the current availability of activity-supportive workspaces. This would enable organizations to make targeted investments in redesigning or repurposing space, and to do so in a way that addresses disparities in the availability of activity-supportive home workspace, promoting greater equity across the workforce. Furthermore, given the dynamic nature of hybrid work, where employee needs may vary from day-to-day organizations should also consider the design of multipurpose spaces. These could include adaptable environments – for example, soundproof pods – that support both concretive work and relaxation. For instance, a pod might serve as a quiet retreat for reading a report or as a space for brief mental recovery, depending on the employee's needs.

Our findings also have practical implications for the design and implementation of hybrid working systems, i.e., the hybridization of work. In particular, our findings suggest that the design of hybrid working systems in organizations needs to attend to the design and evaluation of activity-based workspaces. This is echoed by Vartiainen and Vanharanta (2024), who, in their review of hybrid work research argued that consideration of physical workplace characteristics was one of the basic elements to be considered in the design of hybrid work, and the findings from this study help to flesh-out which workplace characteristics that are important to consider in this design process (i.e., concentration, interaction- and recovery- supportive characteristics). Vartiainen and Vanharanta's (2024) review also highlights other basic elements to be considered in hybrid working (e.g., time arrangements, social structure and relations, and available digital tools and platforms) as well as other secondary and tertiary elements, such as HR policies, leader practices, and evaluation systems for continuous improvement. Indeed, this broader perspective suggests that the design and implementation of hybrid working spaces may be approached best as part of a wider hybridization work strategy that involves multiple stakeholders within the organization (e.g., senior leadership, HR managers, employees, and employee representatives) (Jaß et al., 2024).

## Conclusion

Our research has advanced our understanding of workspace design and hybrid working. We provide a model of activity-based hybrid workspace design that provides a broader and more integrated understanding of workspaces in hybrid work, shows how the workspace is integral to understanding the workspace environments experienced by hybrid workers, and advances understanding of the nature of workspaces by introducing the concept of recovery-supportive workspace characteristics. The two-wave study design has provided much needed empirical evidence for the directional effects of activity-based workspaces.

## Notes

1. This contrasts with ergonomic perspectives that focus on specific attributes (e.g., chair height, screen height) or configurations (e.g., degree of openness) of objects in the workspace (Davis et al., 2011; Janneck et al., 2018). This approach provides important insights but can overlook the way that employees use workspaces to achieve different activities.
2. Work design refers to the composition, content, structure, and environment within which jobs are enacted (Morgeson & Humphrey, 2008).
3. We did not test interactions with regard to home and office workspace satisfaction, as these logically only apply to one type of workspace).

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Data availability statement

The data is not available due to national security restrictions.

## Ethics

The study received ethical approval from the University of Manchester Ethics Committee. Ref 11889.

## References

Aeschbach, V. M., Schipperges, H., Braun, M. A., Ehret, S., Ruess, M., Sahintuerk, Z., & Thomaschke, R. (2022). Less is more: The effect of visiting duration on the perceived restorativeness of museums. *Psychology of Aesthetics,*

*Creativity, and the Arts*, *18*, 940–947. https://doi.org/10.1037/aca0000475

Aksoy, C., Barrero, J., Bloom, N., Davis, S., Dolls, M., & Zarate, P. (2023). *Working from home around the world (Centre for Economic Performance* Discussion Paper No. 1920). London School of Economics.

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest*, *16*(2), 40–68. https://doi.org/10.1177/1529100615593273

Allen, T. D., Merlo, K., Lawrence, R. C., Slutsky, J., & Gray, C. E. (2021). Boundary management and work-nonwork balance while working from home. *Applied Psychology*, *70*(1), 60–84. https://doi.org/10.1111/apps.12300

Appel-Meulenbroek, R., Groenen, P., & Janssen, I. (2011). An end-user's perspective on activity-based office concepts. *Journal of Corporate Real Estate*, *13*(2), 122–135. https://doi.org/10.1108/14630011111136830

Appel-Meulenbroek, R., Kemperman, A., van de Water, A., Weijs-Perrée, M., & Verhaegh, J. (2022). How to attract employees back to the office? A stated choice study on hybrid working preferences. *Journal of Environmental Psychology*, *81*, 101784. https://doi.org/10.1016/j.jenvp.2022.101784

Austin, R. D., & Pisano, G. P. (2017). Neurodiversity as a competitive advantage. *Harvard Business Review*, *95*, 96–103.

Bäcklander, G., & Richter, A. (2022). Relationships of task-environment fit with office workers' concentration and team functioning in activity-based working environments. *Environment & Behavior*, *54*(6), 971–1004. https://doi.org/10.1177/00139165221115181

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*(3), 273–285. https://doi.org/10.1037/ocp0000056

Bakker, A. B., Van Veldhoven, M. J. P. M., & Xanthopoulou, D. (2010). Beyond the demand-control model: Thriving on high job demands and resources. *Journal of Personnel Psychology*, *9*(1), 3–16. https://doi.org/10.1027/1866-5888/a000006

Bakker, A. B., & Van Woerkom, M. (2017). Flow at work: A self-determination perspective. *Occupational Health Science*, *1* (1–2), 47–65. https://doi.org/10.1007/s41542-017-0003-3

Bandara, S., Abdeen, F., Disaratna, V., & Perera, B. (2022). Employee welfare and job satisfaction in the Sri Lankan hotel industry. *International Journal of Construction Management*, *22*(15), 3045–3054. https://doi.org/10.1080/15623599.2020.1839705

Bergefurt, L., Weijs-Perrée, M., Appel-Meulenbroek, R., Arentze, T., & de Kort, Y. (2022). Satisfaction with activity-support and physical home-workspace characteristics in relation to mental health during the COVID-19 pandemic. *Journal of Environmental Psychology*, *81*, 101826. https://doi.org/10.1016/j.jenvp.2022.101826

Bhati, P. P., & Ashokkumar, M. (2013). Provision of welfare under factories act & its impact on employee satisfaction. *Journal of Business Management & Social Science Research*, *2*, 57–69.

Bhave, D. P., Teo, L. H., & Dalal, R. S. (2020). Privacy at work: A review and a research agenda for a contested terrain. *Journal of Management*, *46*(1), 127–164. https://doi.org/10.1177/0149206319878254

Block, L. K., & Stokes, G. S. (1989). Performance and satisfaction in private versus nonprivate work settings. *Environment & Behavior*, *21*(3), 277–292. https://doi.org/10.1177/0013916589213003

Bloom, N., Han, R., & Liang, J. (2024). Hybrid working from home improves retention without damaging performance. *Nature*, *630*(8018), 920–925. https://doi.org/10.1038/s41586-024-07500-2

Bosch, C., Sonnentag, S., & Pinck, A. S. (2018). What makes for a good break? A diary study on recovery experiences during lunch break. *Journal of Occupational & Organizational Psychology*, *91*(1), 134–157. https://doi.org/10.1111/joop.12195

Burmeister, C. P., Moskaliuk, J., & Cress, U. (2018). Office versus leisure environments: Effects of surroundings on concentration. *Journal of Environmental Psychology*, *58*, 42–51. https://doi.org/10.1016/j.jenvp.2018.07.011

Carlopio, J. R., & Gardner, D. (1992). Direct and interactive effects of the physical work environment on attitudes. *Environment & Behavior*, *24*(5), 579–601. https://doi.org/10.1177/0013916592245001

Colenberg, S., Jylhä, T., & Arkesteijn, M. (2021). The relationship between interior office space and employee health and well-being-a literature review. *Building Research & Information*, *49*(3), 352–366. https://doi.org/10.1080/09613218.2019.1710098

Corvo, P., Fontefrancesco, M. F., & Matacena, R. (2020). Eating at work: The role of the lunch-break and canteens for well-being at work in Europe. *Social Indicators Research*, *150*(3), 1043–1076. https://doi.org/10.1007/s11205-020-02353-4

Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology*, *95*(5), 834–848. https://doi.org/10.1037/a0019364

Cropley, M., Weidenstedt, L., Leick, B., & Sütterlin, S. (2023). Working from home during lockdown: The association between rest breaks and well-being. *Ergonomics*, *66*(4), 443–453. https://doi.org/10.1080/00140139.2022.2095038

Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management*, *25*(3), 357–384. https://doi.org/10.1177/014920639902500305

Davis, M. C., Collis, H., Hughes, H. P. N., Wu, C., Gritt, E., Fang, L., Rees, S. J., & Iqbal, A. (2022). *Where is your office today? Part two: New insights on employee behaviour and social networks*. University of Leeds. https://doi.org/10.48785/100/125

Davis, M. C., Leach, D. J., & Clegg, C. W. (2011). The physical environment of the office: Contemporary and emerging issues. *International Review of Industrial and Organizational Psychology*, *26*, 193–237. https://doi.org/10.1002/9781119992592.ch6

De Jonge, J., & Dormann, C. (2003). The disc model: Demand-induced strain compensation mechanisms in job stress. In M. F. Dollard, A. H. Winefield, & H. R. Winefield (Eds.), *Occupational stress in the service professions* (pp. 43–74). Taylor & Francis.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Demerouti, E., Taris, T. W., & Bakker, A. B. (2007). Need for recovery, home-work interference and performance: Is lack

of concentration the link? *Journal of Vocational Behavior*, *71* (2), 204–220. https://doi.org/10.1016/j.jvb.2007.06.002

Duffy, F., & Powell, K. (1997). *The new office*. Conran Octopus.

Dul, J., Ceylan, C., & Jaspers, F. (2011). Knowledge workers' creativity and the role of the physical work environment. *Human Resource Management*, *50*(6), 715–734. https://doi.org/10.1002/hrm.20454

Edmunds, S., Hurst, L., & Harvey, K. (2013). Physical activity barriers in the workplace. *International Journal of Workplace Health Management*, *6*(3), 227–240. https://doi.org/10.1108/IJWHM-11-2010-0040

Edwards, B. D., Bell, S. T., Arthur, W., Jr., & Decuir, A. D. (2008). Relationships between facets of job satisfaction and task and contextual performance. *Applied Psychology*, *57*(3), 441–465. https://doi.org/10.1111/j.1464-0597.2008.00328.x

Engelen, L., Chau, J., Young, S., Mackey, M., Jeyapalan, D., & Bauman, A. (2019). Is activity-based working impacting health, work performance and perceptions? A systematic review. *Building Research & Information*, *47*(4), 468–479. https://doi.org/10.1080/09613218.2018.1440958

Fox, K. C., & Christoff, K. (2018). *The Oxford handbook of spontaneous thought: Mind-wandering, creativity, and dreaming*. Oxford University Press.

Gajendran, R. S., Ponnapalli, A. R., Wang, C., & Javalagi, A. A. (2024). A dual pathway model of remote work intensity: A meta-analysis of its simultaneous positive and negative effects. *Personnel Psychology*, *77*(4), 1351–1386. https://doi.org/10.1111/peps.12641

Garnier-Villarreal, M., & Jorgensen, T. D. (2020). Adapting fit indices for Bayesian structural equation modeling: Comparison to maximum likelihood. *Psychological Methods*, *25*(1), 46–70. https://doi.org/10.1037/met0000224

Gatt, G., & Jiang, L. (2021). Can different types of non-territorial working satisfy employees' needs for autonomy and belongingness? Insights from self-determination theory. *Environment & Behavior*, *53*(9), 953–986. https://doi.org/10.1177/0013916520942603

Gerdenitsch, C., Korunka, C., & Hertel, G. (2018). Need-supply fit in an activity-based flexible office: A longitudinal study during relocation. *Environment & Behavior*, *50*(3), 273–297. https://doi.org/10.1177/0013916517697766

Gulwadi, G. B. (2006). Seeking restorative experiences: Elementary school teachers' choices for places that enable coping with stress. *Environment & Behavior*, *38*(4), 503–520. https://doi.org/10.1177/0013916505283420

Haapakangas, A., Hongisto, V., Varjo, J., & Lahtinen, M. (2018). Benefits of quiet workspaces in open-plan offices-evidence from two office relocations. *Journal of Environmental Psychology*, *56*, 63–75. https://doi.org/10.1016/j.jenvp.2018.03.003

Hackman, J. R., & Oldham, G. R. (1974). *The job diagnostic survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects*. Yale University.

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior & Human Performance*, *16*(2), 250–279. https://doi.org/10.1016/0030-5073(76)90016-7

Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR" understanding the role of resources in conservation of resources theory. *Journal of Management*, *40*(5), 1334–1364. https://doi.org/10.1177/0149206314527130

Halford, S. (2005). Hybrid workspace: Re-spatialisations of work, organisation and management. *New Technology, Work and Employment*, *20*(1), 19–33. https://doi.org/10.1111/j.1468-005X.2005.00141.x

Handke, L., O'Neill, T. A., McLarnon, M. J. W., & Kauffeld, S. (2025). What goes around comes around - work characteristics as both antecedents and outcomes of hybrid work adoption. *European Journal of Work & Organizational Psychology*, *34*(1), 12–23. https://doi.org/10.1080/1359432X.2024.2441884

Hann, I. H., Hui, K. L., Lee, S. Y. T., & Png, I. P. (2007). Overcoming online information privacy concerns: An information-processing theory approach. *Journal of Management Information Systems*, *24*(2), 13–42. https://doi.org/10.2753/MIS0742-1222240202

Hill, N. S., Axtell, C., Raghuram, S., & Nurmi, N. (2024). Unpacking virtual work's dual effects on employee well-being: An integrative review and future research agenda. *Journal of Management*, *50*(2), 752–792. https://doi.org/10.1177/01492063221131535

Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, *6*(4), 307–324. https://doi.org/10.1037/1089-2680.6.4.307

Hoendervanger, J. G., Ernst, A. F., Albers, C. J., Mobach, M. P., & Van Yperen, N. W. (2018). Individual differences in satisfaction with activity-based work environments. *PLOS ONE*, *13*(3), e0193878. https://doi.org/10.1371/journal.pone.0193878

Hoendervanger, J. G., Van Yperen, N., Mobach, M., & Alberts, C. (2019). Perceived fit in activity-based work environments and its impact on satisfaction and performance. *Journal of Environmental Psychology*, *65*, 1–10. https://doi.org/10.1016/j.jenvp.2019.101339

Hoendervanger, J. G., Van Yperen, N. W., Mobach, M. P., & Albers, C. J. (2022). Perceived fit and user behavior in activity-based work environments. *Environment & Behavior*, *54*(1), 143–169. https://doi.org/10.1177/0013916521995480

Holman, D. J., & Wall, T. D. (2002). Work characteristics, learning-related outcomes, and strain: A test of competing direct effects, mediated, and moderated models. *Journal of Occupational Health Psychology*, *7*(4), 283–301. https://doi.org/10.1037/1076-8998.7.4.283

Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology*, *92*(5), 1332–1356. https://doi.org/10.1037/0021-9010.92.5.1332

Jahncke, H., Hygge, S., Halin, N., Green, A. M., & Dimberg, K. (2011). Open-plan office noise: Cognitive performance and restoration. *Journal of Environmental Psychology*, *31*(4), 373–382. https://doi.org/10.1016/j.jenvp.2011.07.002

Janneck, M., Jent, S., Weber, P., & Nissen, H. (2018). Ergonomics to go: Designing the mobile workspace. *International Journal of Human-Computer Interaction*, *34*(11), 1052–1062. https://doi.org/10.1080/10447318.2017.1413057

Jaß, L., Klußmann, A., Harth, V., & Mache, S. (2024). Job demands and resources perceived by hybrid working employees in German public administration: A qualitative study. *Journal of Occupational Medicine and Toxicology*, *19* (1), 28. https://doi.org/10.1186/s12995-024-00426-5

Ji, T., de Jonge, J., Taris, T. W., Kawakami, N., & Peeters, M. C. (2022). Walking the tightrope between work and home: The

role of job/home resources in the relation between job/home demands and employee health and well-being. *Industrial Health*, *61*(1), 24–39. https://doi.org/10.2486/indhealth.2021-0276

Judge, T. A., & Kammeyer-Mueller, J. D. (2012). Job attitudes. *Annual Review of Psychology*, *63*(1), 341–367. https://doi.org/10.1146/annurev-psych-120710-100511

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, *15*(3), 169–182. https://doi.org/10.1016/0272-4944(95)90001-2

Kaplan, S., & Berman, M. G. (2010). Directed attention as a common resource for executive functioning and self-regulation. *Perspectives on Psychological Science*, *5*(1), 43–57. https://doi.org/10.1177/1745691609356784

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. Basic.

Kim, J., Candido, C., Thomas, L., & de Dear, R. (2016). Desk ownership in the workplace: The effect of non-territorial working on employee workplace satisfaction, perceived productivity and health. *Building & Environment*, *103*, 203–214. https://doi.org/10.1016/j.buildenv.2016.04.015

Kim, M., & Jang, J. (2022). The effect of physical environment of the employee break room on psychological well-being through work engagement in the hospitality industry. *Journal of Human Resources in Hospitality and Tourism*, *21*(2), 175–196. https://doi.org/10.1080/15332845.2022.2031606

Knight, C., & Haslam, S. A. (2010). The relative merits of lean, enriched, and empowered offices: An experimental examination of the impact of workspace management strategies on well-being and productivity. *The Journal of Experimental Psychology: Applied*, *16*(2), 158–172. https://doi.org/10.1037/a0019292

Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., De Vet, H. C., & Van Der Beek, A. J. (2014). Construct validity of the individual work performance questionnaire. *Journal of Occupational and Environmental Medicine*, *56*(3), 331–337. https://doi.org/10.1097/JOM.0000000000000113

Korpela, K., De Bloom, J., & Kinnunen, U. (2015). From restorative environments to restoration in work. *Intelligent Buildings International*, *7*(4), 215–223. https://doi.org/10.1080/17508975.2014.959461

Kossek, E. E., Perrigino, M. B., & Lautsch, B. A. (2023). Work-life flexibility policies from a boundary control and implementation perspective: A review and research framework. *Journal of Management*, *49*(6), 2062–2108. https://doi.org/10.1177/01492063221140354

Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work-nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior*, *81*(1), 112–128. https://doi.org/10.1016/j.jvb.2012.04.003

Krajewski, J., Wieland, R., & Sauerland, M. (2010). Regulating strain states by using the recovery potential of lunch breaks. *Journal of Occupational Health Psychology*, *15*(2), 131–139. https://doi.org/10.1037/a0018830

Krzeminska, A., Austin, R. D., Bruyere, S. M., & Hedley, D. (2019). The advantages and challenges of neurodiversity employment in organizations. *Journal of Management and Organization*, *25*(4), 453–363. https://doi.org/10.1017/jmo.2019.58

Li, C.-H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, *48*(3), 936–949. https://doi.org/10.3758/s13428-015-0619-7

Little, T. D. (2013). *Longitudinal structural equation modeling*. The Guilford Press.

Maier, G. W., & Brunstein, J. C. (2001). The role of personal work goals in newcomers' job satisfaction and organizational commitment: A longitudinal analysis. *Journal of Applied Psychology*, *86*(5), 1034–1042. https://doi.org/10.1037/0021-9010.86.5.1034

Mäkikangas, A. (2018). Job crafting profiles and work engagement: A person-centered approach. *Journal of Vocational Behavior*, *106*, 101–111. https://doi.org/10.1016/j.jvb.2018.01.001

Marzban, S., Candido, C., Mackey, M., Engelen, L., Zhang, F., & Tjondronegoro, D. (2023). A review of research in activity-based working over the last ten years: Lessons for the post-COVID workplace. *Journal of Facilities Management*, *21*(3), 313–333. https://doi.org/10.1108/JFM-08-2021-0081

Mazzetti, G., Robledo, E., Vignoli, M., Topa, G., Guglielmi, D., & Schaufeli, W. B. (2023). Work engagement: A meta-analysis using the job demands-resources model. *Psychological Reports*, *126*(3), 1069–1107. https://doi.org/10.1177/00332941211051988

Meijer, E. M., Frings-Dresen, M. H., & Sluiter, J. K. (2009). Effects of office innovation on office workers' health and performance. *Ergonomics*, *52*(9), 1027–1038. https://doi.org/10.1080/00140130902842752

Merkle, E. C., & Rosseel, Y. (2015). Blavaan: Bayesian structural equation models via parameter expansion. *ArXiv*. https://doi.org/10.18637/jss.v085.i04

Miao, C., Humphrey, R. H., & Qian, S. (2017). A meta-analysis of emotional intelligence effects on job satisfaction mediated by job resources, and a test of moderators. *Personality & Individual Differences*, *116*, 281–288. https://doi.org/10.1016/j.paid.2017.04.031

Morgeson, F. P., & Humphrey, S. E. (2006). The work design questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology*, *91*(6), 1321–1329. https://doi.org/10.1037/0021-9010.91.6.1321

Morrison, R. L., & Macky, K. A. (2017). The demands and resources arising from shared office spaces. *Applied Ergonomics*, *60*, 103–115. https://doi.org/10.1016/j.apergo.2016.11.007

Nagy, M. S. (2010). Using a single-item approach to measure facet job satisfaction. *Journal of Occupational & Organizational Psychology*, *75*, 77–86. https://doi.org/10.1348/096317909X478557

Nejati, A., Shepley, M., Rodiek, S., Lee, C., & Varni, J. (2016). Restorative design features for hospital staff break areas: A multi-method study. *HERD: Health Environments Research & Design Journal*, *9*(2), 16–35. https://doi.org/10.1177/1937586715592632

Newsom, J. T. (2015). *Longitudinal structural equation modeling: A comprehensive introduction*. Routledge.

Nielsen, K., Nielsen, M. B., Ogbonnaya, C., Känsälä, M., Saari, E., & Isaksson, K. (2017). Workplace resources to improve both employee well-being and performance: A systematic review

and meta-analysis. *Work & Stress*, *31*(2), 101–120. https://doi.org/10.1080/02678373.2017.1304463

Ohly, H., White, M. P., Wheeler, B. W., Bethel, A., Ukoumunne, O. C., Nikolaou, V., & Garside, R. (2016). Attention restoration theory: A systematic review of the attention restoration potential of exposure to natural environments. *Journal of Toxicology and Environmental Health Part B*, *19*(7), 305–343. https://doi.org/10.1080/10937404.2016.1196155

Oldham, G. R. (1988). Effects of changes in workspace partitions and spatial density on employee reactions: A quasi-experiment. *Journal of Applied Psychology*, *73*(2), 253–258. https://doi.org/10.1037/0021-9010.73.2.253

Parker, S. K. (2014). Beyond motivation: Job and work design for development, health, ambidexterity, and more. *Annual Review of Psychology*, *65*(1), 661–691. https://doi.org/10.1146/annurev-psych-010213-115208

Parker, S. K., & Ohly, S. (2008). Designing motivating jobs: An expanded framework for linking work characteristics and motivation. In R. Kanfer, G. Chen, & RD. Pritchard (Eds.), *Work motivation: Past, present and future* (pp. 233–284). Routledge.

Parker, S. K., Van den Broeck, A., & Holman, D. (2017). Work design influences: A synthesis of multilevel factors that affect the design of jobs. *Academy of Management Annals*, *11*, 267–308.

Parker, S. K., & Wall, T. (1998). *Job and work design*. Sage.

Parker, S. K., Ward, M. K., & Fisher, G. G. (2021). Can high-quality jobs help workers learn new tricks? A multidisciplinary review of work design for cognition. *Academy of Management Annals*, *15*(2), 406–454. https://doi.org/10.5465/annals.2019.0057

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, *63*(1), 539–569. https://doi.org/10.1146/annurev-psych-120710-100452

Putrino, D., Ripp, J., Herrera, J. E., Cortes, M., Kellner, C., Rizk, D., & Dams O'Connor, K. (2020). Multisensory, nature-inspired recharge rooms yield short-term reductions in perceived stress among frontline healthcare workers. *Frontiers in Psychology*, *11*, 560833. https://doi.org/10.3389/fpsyg.2020.560833

R Core Team. (2021). *R: A language and environment for statistical (4.2.2)* [computer software]. R Foundation for Statistical Computing.

Roskams, M., & Haynes, B. (2021). Environmental demands and resources: A framework for understanding the physical environment for work. *Facilities*, *39*(9/10), 652–666. https://doi.org/10.1108/F-07-2020-0090

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*(1), 69–78. https://doi.org/10.1037/0003-066X.55.1.68

Schaufeli, W. B. (2013). What is engagement? In C. Truss, K. Alfes, R. Delbridge, A. Shantz, & E. Soane (Eds.), *Employee engagement in theory and practice* (pp. 15–35). Routledge.

Schaufeli, W. B., Shimazu, A., Hakanen, J., Salanova, M., & De Witte, H. (2019). An ultra-short measure for work engagement. *European Journal of Psychological Assessment*, *35*(4), 577–591. https://doi.org/10.1027/1015-5759/a000430

Seddigh, A., Berntson, E., Platts, L. G., & Westerlund, H. (2016). Does personality have a different impact on self-rated distraction, job satisfaction, and job performance in different office types? *PLOS ONE*, *11*(5), e0155295. https://doi.org/10.1371/journal.pone.0155295

Shifrin, N. V., & Michel, J. S. (2022). Flexible work arrangements and employee health: A meta-analytic review. *Work & Stress*, *36*(1), 60–85. https://doi.org/10.1080/02678373.2021.1936287

Sianoja, M., Kinnunen, U., Bloom, J. D., Korpela, K., & Geurts, S. A. E. (2016). Recovery during lunch breaks: Testing long-term relations with energy levels at work. *Scandinavian Journal of Work and Organizational Psychology*, *1*(1), 1–12. https://doi.org/10.16993/sjwop.13

Smith, P. C., Kendall, L. M., & Hulin, C. L. (1969). *The measurement of satisfaction in work and retirement*. Rand McNally.

Smolders, K. C., de Kort, Y. A., Tenner, A. D., & Kaiser, F. G. (2012). Need for recovery in offices: Behavior-based assessment. *Journal of Environmental Psychology*, *32*(2), 126–134. https://doi.org/10.1016/j.jenvp.2011.12.003

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, *12*(3), 204–221. https://doi.org/10.1037/1076-8998.12.3.204

Sonnentag, S., Venz, L., & Casper, A. (2017). Advances in recovery research: What have we learned? What should be done next? *Journal of Occupational Health Psychology*, *22*(3), 365–380. https://doi.org/10.1037/ocp0000079

Spector, P. E. (1997). *Job satisfaction: Application, assessment, causes, and consequences*. Sage Publications.

Srivastava, C., Murnane, E. L., Billington, S. L., & Samuelson, H. W. (2024). Impact of workplace design on perceived work performance and well-being: Home versus office. *Journal of Environmental Psychology*, *95*, 102274. https://doi.org/10.1016/j.jenvp.2024.102274

Steed, L. B., Swider, B. W., Keem, S., & Liu, J. T. (2021). Leaving work at work: A meta-analysis on employee recovery from work. *Journal of Management*, *47*(4), 867–897. https://doi.org/10.1177/0149206319864153

Sundstrom, E., Burt, R. E., & Kamp, D. (1980). Privacy at work: Architectural correlates of job satisfaction and job performance. *Academy of Management Journal*, *23*(1), 101–117. https://doi.org/10.2307/255498

Szulc, J. M., McGregor, F.-L., & Cakir, E. (2021). Neurodiversity and remote work in times of crisis: Lessons for HR. *Personnel Review*, *52*(6), 1677–1692. https://doi.org/10.1108/PR-06-2021-0469

Tafvelin, S., & Stenling, A. (2018). Development and initial validation of the need satisfaction and need support at work scales: A validity-focused approach. *Scandinavian Journal of Work and Organizational Psychology*, *3*(1), 1–14. https://doi.org/10.16993/sjwop.30

Tims, M., Derks, D., & Bakker, A. B. (2016). Job crafting and its relationships with person-job fit and meaningfulness: A three-wave study. *Journal of Vocational Behavior*, *92*, 44–53. https://doi.org/10.1016/j.jvb.2015.11.007

Van den Broeck, A., Ferris, D. L., Chang, C. H., & Rosen, C. C. (2016). A review of self-determination theory's basic

psychological needs at work. *Journal of Management*, *42*(5), 1195–1229. https://doi.org/10.1177/0149206316632058

Van den Broeck, A., Vansteenkiste, M., De Witte, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work & Stress*, *22*(3), 277–294. https://doi.org/10.1080/02678370802393672

Van der Voordt, T. J. M. (2004). Productivity and employee satisfaction in flexible workplaces. *Journal of Corporate Real Estate*, *6*(2), 133–148. https://doi.org/10.1108/14630010410812306

Van de Ven, B., de Jonge, J., & Vlerick, P. (2014). Testing the triple-match principle in the technology sector: A two-wave longitudinal panel study. *Applied Psychology*, *63*(2), 300–325. https://doi.org/10.1111/j.1464-0597.2012.00523.x

Van de Ven, B., & Vlerick, P. (2013). Testing the triple-match principle among technology employees. *European Journal of Work & Organizational Psychology*, *22*(6), 658–669. https://doi.org/10.1080/1359432X.2012.682359

Vartiainen, M., & Vanharanta, O. (2024). True nature of hybrid work. *Frontiers in Organizational Psychology*, *2*, 1448894. https://doi.org/10.3389/forgp.2024.1448894

Vos, P., & Van der Voordt, T. (2002). Tomorrow's offices through today's eyes: Effects of innovation in the working environment. *Journal of Corporate Real Estate*, *4*(1), 48–65. https://doi.org/10.1108/14630010210811778

Wadu, J., & Chiang, Y. H. (2019). The impact of new working practices on employee productivity. *Journal of Facilities Management*, *17*(2), 122–141. https://doi.org/10.1108/JFM-03-2018-0020

Wall, T. D., Jackson, P. R., & Davids, K. (1992). Operator work design and robotics system performance: A serendipitous field study. *Journal of Applied Psychology*, *77*(3), 353–362. https://doi.org/10.1037/0021-9010.77.3.353

Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology*, *82*(2), 247–252. https://doi.org/10.1037/0021-9010.82.2.247

Warr, P. (1990). The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology*, *63*(3), 193–210. https://doi.org/10.1111/j.2044-8325.1990.tb00521.x

Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology*, *52*(2), 129–148. https://doi.org/10.1111/j.2044-8325.1979.tb00448.x

Williams, K. J., Lee, K. E., Hartig, T., Sargent, L. D., Williams, N. S., & Johnson, K. A. (2018). Conceptualising creativity benefits of nature experience: Attention restoration and mind wandering as complementary processes. *Journal of Environmental Psychology*, *59*, 36–45. https://doi.org/10.1016/j.jenvp.2018.08.005

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, *17*(3), 601–617. https://doi.org/10.1177/014920639101700305

Wohlers, C., Hartner-Tiefenthaler, M., & Hertel, G. (2019). The relation between activity-based work environments and office workers' job attitudes and vitality. *Environment & Behavior*, *51*(2), 167–198. https://doi.org/10.1177/0013916517738078

Wohlers, C., & Hertel, G. (2017). Choosing where to work at work: Towards a theoretical model of benefits and risks of activity-based flexible offices. *Ergonomics*, *60*(4), 467–486. https://doi.org/10.1080/00140139.2016.1188220

Wu, C. H., Davis, M., Collis, H., Hughes, H., & Fang, L. (2024). A diary study on location autonomy and employee mental distress: The mediating role of task-environment fit. *Personnel Review*, *53*(5), 1208–1223. https://doi.org/10.1108/PR-01-2023-0011

Yurek, L. A., Vasey, J., & Sullivan Havens, D. (2008). The use of self-generated identification codes in longitudinal research. *Evaluation Review*, *32*(5), 435–452. https://doi.org/10.1177/0193841X08316676

Zacher, H., & Frese, M. (2018). Action regulation theory: Foundations, current knowledge, and future directions. *Handbook of Industrial, Work and Organizational Psychology*, *2*, 80–102.

Zamani, Z., & Gum, D. (2019). Activity-based flexible office: Exploring the fit between physical environment qualities and user needs impacting satisfaction, communication, collaboration and productivity. *Journal of Corporate Real Estate*, *21*(3), 234–253.

Zyphur, M. J., & Oswald, F. L. (2015). Bayesian estimation and inference: A user's guide. *Journal of Management*, *41*(2), 390–420. https://doi.org/10.1177/0149206313501200