

Impact of activity-based workplaces on burnout and engagement dimensions

Burnout and
engagement
dimensions

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Abstract

Purpose – This paper aims to explore, which characteristics of activity-based offices are related to the position of workers on the burnout – engagement continuum.

Design/methodology/approach – Literature review and an online survey amongst knowledge workers in the Netherlands, which provided data of 184 respondents from 14 organisations. The data has been analysed by descriptive statistics, bivariate analyses, factor analyses and path analysis, to test the conceptual model.

Findings – Five physical work environment constructs were identified of which three showed to have significant relations with employees' position on one of the three dimensions of the burnout – engagement continuum. Distraction has a direct and indirect (through overload) negative relation with the individual strain (meaning increased exhaustion). Office comfort has indirect positive relations (through recognition and appreciation) with the interpersonal strain (meaning increased involvement). The possibility for teleworking has an indirect positive relation (through control) on the self-evaluation strain (meaning increased efficacy).

Practical implications – The findings show that in the design and management of a healthy physical work environment, corporate real estate managers and human resource managers should particularly pay



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attention to lowering distraction, providing comfortable workplaces and considering the option of teleworking to some extent.

Originality/value – This paper provides new insights into the impact of distinct activity-based workplace characteristics on workers' position on the burnout – engagement continuum.

Keywords Burnout, Engagement, Health, Distraction, Comfort, Activity-based workplaces

Paper type Research paper

Introduction

According to [Maslach and Leiter \(1997\)](#), people's psychological relationship to their job can be positioned on a continuum between the negative experience of burnout and the positive experience of engagement. Burnout can be defined as a state of mental and physical exhaustion caused by one's professional life ([Freudenberger, 1974](#)). It is associated with psychological and physical health problems ([Schaufeli and Enzmann, 1998](#); [Shirom *et al.*, 2005](#)), job dissatisfaction, low levels of commitment and destabilisation of one's work-life balance ([Grawitch *et al.*, 2006](#)), increased sickness absence ([Schaufeli *et al.*, 2009](#)) and reduced productivity and job performance ([Maslach and Leiter, 2008](#)). The opposite on the continuum, work engagement, is defined as a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption ([Schaufeli *et al.*, 2002](#)). The engagement has been associated with high levels of energy, pleasure, activation and commitment ([Parker and Griffin, 2011](#)). Engaged workers appear to be more open to new experiences, explore their work environments and, in doing so, become more creative ([Fredrickson, 2001](#)).

In a present-day competitive society with its war on talent, employees are recognised as the most valuable assets of the organisation. Regarding corporate real estate (CRE) management, it is, thus, important to better understand the role of the physical environment in reducing the risk of burnout and instead of stimulating engagement. In line with the person-environment fit theory, a suboptimal fit between the work environment and employees' needs and abilities would otherwise result in stress ([Edwards *et al.*, 1998](#)). This could mean that a poor office workplace might push people towards the negative side of the burnout-engagement continuum (BEC). So far, studies on healthy workplaces have focussed mostly on isolated design aspects such as plants, indoor climate and sick building syndrome ([Arif *et al.*, 2016](#)). Knowledge about the impact of activity-based workplaces (ABW) on health is very limited ([Engelen *et al.*, 2019](#)). We only found one study that included the BEC ([Van Steenbergen *et al.*, 2018](#)). This before-after study (amongst 126 employees of a large Dutch provider of financial services) showed new ways of working to be beneficial in reducing mental demands and workload. It did not harm relationships with supervisors and co-workers, but autonomy and possibilities for professional development decreased. Burnout and work engagement remained stable over time. The current paper further explores, which characteristics of ABW influence employees' position on the BEC. A literature-based conceptual model is tested through path analysis for relations and effect sizes. The model incorporates physical work environment characteristics as independent variables, job-related situational characteristics as mediators and individual characteristics as control variables.

Burnout and engagement: dimensions and influencing factors

Maslach and Leiter (1997) distinguished three sub-dimensions in their BEC theory as follows: individual strain (exhaustion – energy), interpersonal strain (depersonalisation – involvement) and self-evaluation strain (inefficacy – efficacy). Exhaustion refers to feelings

of being overextended and depleted of one’s emotional and physical resources. It is related to work fatigue, i.e. extreme physical, mental and/or emotional tiredness and reduced functional capacity (Frone and Tidwell, 2015). It is the most widely reported and most thoroughly analysed dimension (Maslach *et al.*, 2001; Maslach and Leiter, 2008), with energy as the engagement opposite. Depersonalisation refers to a negative or excessively detached response to various aspects of the job (Maslach *et al.*, 2001). To make this depersonalisation dimension applicable in multiple industries, Schaufeli *et al.* (1996) replaced depersonalisation by the term cynicism, reflecting a distant attitude towards work, with involvement as the engagement opposite. Inefficacy refers to feelings of incompetence and declined personal achievements at work (Maslach *et al.*, 2001; Maslach and Leiter, 2008), with efficacy as the engagement opposite. The three dimensions are included as dependent variables in our conceptual model, see Figure 1.

The antecedents of burnout and engagement are often classified into individual factors and situational factors (Maslach *et al.*, 2001; Bakker and Demerouti, 2008). In this paper, the individual variables are incorporated as control variables, whereas the situational characteristics are treated as mediators between the BEC dimensions and the characteristics of the physical work environment (the independent variables). Besides being antecedents of the BEC, these situational factors are likely to be influenced by the ABW as well. See Figure 1 for the full model that is tested in this study. The next literature review will explain the four main hypotheses and the variables chosen for each box to test these hypotheses.

Activity-based workplaces

In the past decades, various new office concepts have been developed to support optimal use of the available space and to empower knowledge workers to work more efficiently and effectively. ABW is characterised by the shared use of different types of workplaces that are supposed to optimally fit with different office tasks, mainly in open and semi-open settings. The additional support by modern information and communication technology (ICT) provides workers more autonomy and freedom to work how, when and where they find this most appropriate (Van der Voordt, 2004; Haapakangas *et al.*, 2019). Such new ways of (flexible) working may provide better opportunities for communication, collaboration and interaction (Engelen *et al.*, 2019), but are also associated with less social cohesion amongst co-workers, referring to a lower sense of community. Complaints include lack of privacy and concentration, loss of storage space and loss of personal and group identity by not being

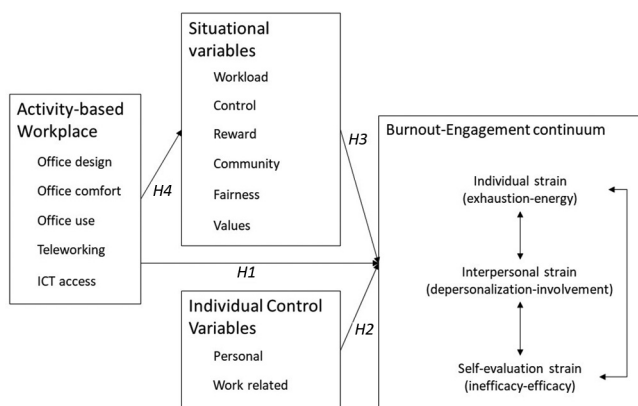


Figure 1. Conceptual model

able to personalise the workspace (Gorgievski *et al.*, 2010). In particular distraction by conversations of colleagues and phone calls and lack of visual and auditory privacy cause dissatisfaction amongst employees (Brunia *et al.*, 2016). So far, it remains unclear whether ABWs would have a positive or negative influence on workers' position on the BEC and how their characteristics relate to the three distinct dimensions.

Vos *et al.* (1999) and De Croon *et al.* (2005) argue that offices can be described according to three constructs, being office location (place of work: at the office versus teleworking at home/third places), office layout (space design i.e. open plan, cellular offices, team offices or combi-offices) and office use (personal desks versus non-assigned desks). Haynes (2007a) developed a model with two constructs as follows: the physical environment and the behavioural environment, each with two subcomponents, respectively, office layout and office comfort and interaction and distraction. These authors did not specifically study ABWs, which is, perhaps, why ICT support was not part of their frameworks. However, it is an essential element of ABWs. Building on these references, the ABW component of the conceptual model is split into five main constructs as follows (Figure 1): office layout, office comfort, office use, teleworking and ICT access.

Office layouts that do not fit with user needs and behaviour may result in feelings of lack of control and community, and thus higher levels of workplace stress (Vischer, 2007). Based on a review of 24 studies, De Croon *et al.* (2005) conclude that there is much evidence that working in open workplaces reduces the office worker's psychological privacy and some evidence that working in open workplaces and close distances between workstations intensify cognitive workload and/or worsen interpersonal relations. They also found the relationship between these two design aspects and performance to be inconsistent. So potentially, office layout relates to all three dimensions of the BEC. In ABWs the variety of workplaces may increase feelings of autonomy, which has a positive relationship with work engagement (Maslach and Leiter, 2008). Haynes *et al.* (2017) even showed that the availability of a variety of spaces had the greatest impact on productivity (the self-evaluation strain).

Office comfort is usually related to ambient factors (Seppänen and Fisk, 2006) and ergonomics (Kroemer and Kroemer, 2016). Indoor climate and lighting are often ranked highest in the office's impact on perceived health and performance (Bae *et al.*, 2017). Kroemer and Kroemer (2016) point out that office ergonomics can lower stress, increase personal engagement and raise performance as well. Besides comfort, the ability to adjust these factors to individual preferences may contribute to feelings of control and fairness (e.g. equal treatment regardless of job rank) (Clements-Croome and Li, 1997) and as such may be related to dimensions of the BEC as well, following Maslach and Leiter (2008).

Office use regards both interaction and distraction and desk-sharing. Interaction and distraction are highly interrelated. One person's interaction is another person's distraction (Haynes and Price, 2004) and can decrease feelings of privacy. Both social and work interactions may be linked to feelings of community, while distraction by interruptions, feelings of crowding and noise and feelings of lack of control and privacy may be related to all three dimensions of the BEC (Bakker *et al.*, 2014; Haynes, 2007b). The ABW environment adds additional relevant use-aspects, as workers have to share workspaces and are expected to switch between different workspaces. The evidence of whether desk-sharing increases overload is still inconsistent but provided by some studies according to De Croon *et al.* (2005). Only 4% of workers switch workstations during the day (Hoendervanger *et al.*, 2016). Apparently, this ABW-rule is not perceived as a positive demand and might cause stress. Additionally, it determines who sits by whom and could, thus, relate to the interpersonal dimension.

Teleworking may result in more autonomy where to work, and thus in less interaction between staff members, which may reduce the possibility to obtain social support and feedback. It also may indicate that work is never completed (Demerouti *et al.*, 2014; Peters and Van der Lippe, 2007). Teleworking is shown to create loneliness, irritability, worry and guilt and stress (Mann and Holdsworth, 2003). Besides these potential links to the individual and the interpersonal dimensions of the BEC, research has shown that telework intensity has consequences for the efficacy dimension (Hoorneweg *et al.*, 2016).

Last, inappropriate ICT facilities, information overload, the pressure to respond quickly to e-mails and social media and insufficient skills to cope with these issues may result in perceived work overload (Rennecker and Derks, 2012; Demerouti *et al.*, 2014). As a consequence, a relationship with at least the individual dimension of the BEC can be expected. ICT access has also been shown to relate to the productivity of workers (Nurmilaakso, 2009). Intuitively, technology such as intranet and cloud computing could relate to the interpersonal dimension as well, as people can exchange information this way.

Therefore, we pose:

H1. ABW characteristics have a direct effect on an employee's position on the BEC.

Individual control variables

Not all individuals are equally likely to get a burnout. Therefore, various individual characteristics are included in the model as control variables. Maslach *et al.* (2001) pointed out that the level of burnout amongst younger employees is higher than amongst those over 30 or 40 years old. This suggests that workers are more at risk to burn out earlier in their careers. Men score a little higher on the cynicism dimension of burnout, whereas women score higher on the exhaustion dimension of burnout (Maslach *et al.*, 2001), so gender matters as well. Also, employees with higher levels of education and singles are more likely to experience burnout (Maslach *et al.*, 2001). With regard to personality, Schaufeli and Enzmann (1998) refer to numerous studies that included one or more of the Big five personality characteristics. For example, people who score high on neuroticism are more sensitive to stress (Albrecht, 2010) while extraversion and conscientiousness are directly associated with a higher level of well-being (Parent-Lamarche and Marchand, 2019).

Besides personal characteristics, individual job-related aspects could be relevant as well. Knowledge workers have to be productive in three different main activities, namely concentrated work, formal interactions and informal interactions (De Been *et al.*, 2016). It might differ between workers how important each activity is, which could be relevant to the interpersonal strain (interactions) and, perhaps, also to the other BEC dimensions. Also, Maslach *et al.* (2001) mention that burnout is higher amongst people in lower job ranks, who have little participation in decision making. Also, work experience acquired through on-the-job-training has been shown to lead to greater productivity (Quiñones *et al.*, 1995), and thus may affect the self-evaluation strain.

Therefore, we pose:

H2. Individual control variables affect an employee's position on the BEC.

Situational variables

Bakker *et al.* (2014) found that stressful aspects of the work situation are even more important predictors of burnout than personal control variables. Maslach and Leiter (1997) identified six domains of situational work environment factors as follows: stress, control,

reward, community, fairness and values. TNO (2015) showed that job stress is mainly caused by insufficient autonomy (44%) and excessive workload (38%). High job demands and lack of control may result in job stress, which has been recognised as an early predictor of burnout and as an impairment of physical health, psychological well-being and work performance (Kahn and Byosiere, 1992). Reward refers to the power of reinforcements to shape behaviour and stress (Leiter and Maslach, 2005). A high level of a perceived community may reduce stress (Schaufeli and Bakker, 2004), e.g. by social support from co-workers and supervisors. Fairness emerged from the literature on equity and social justice. Unfairness occurs when there is the inequity of workload or reward, when there is cheating or when evaluations and promotions are handled inappropriately (Maslach *et al.*, 2001). The sixth domain – Values – picks up the cognitive-emotional power of job goals and expectations (Leiter and Maslach, 2005). When a conflict of values occurs at the job, workers will find themselves making a trade-off between the work they want to do and the work they have to do (Maslach *et al.*, 2001; Maslach and Leiter, 2008):

H3. Situational variables affect an employee's position on the BEC.

Besides a direct relation between situational variables and the BEC, the office environment is likely to relate to these situational variables as well, so they are included as mediators in the conceptual model. For example, Van der Voordt (2004) warns for additional workload due to desk sharing and switching, as workers lose time by finding available workspaces and adjusting their settings to their own preferences. Then, teleworking could reduce social support (community) and increase workload (Demerouti *et al.*, 2014; Peters and Van der Lippe, 2007). Oseland (2009) states that office design should provide workers with a feeling of control through both the personal space and the way they are allowed to use the office. Access to ICT and teleworking might also increase feelings of control. Reward not only relates to financial payment but also to a feeling of being appreciated. Supportive office design and comfort might add to this feeling (Rothe *et al.*, 2011). On the other hand, an office design that does not fit with user needs and behaviour may result in a lack of feelings of a community (Vischer, 2007). Studies on activity-based offices also refer to fairness and values, for example, by mentioning that ABW is not considered as fair if not all levels in the organisation give up their dedicated desks (Appel-Meulenbroek *et al.*, 2015).

So last, we pose:

H4. ABW characteristics have an indirect effect on employee's position on the BEC, via the situational variables.

Research methods

Sampling and measuring

To test the conceptual model and hypotheses, quantitative data has been collected by means of an online questionnaire. CRE managers, facility-managers and human resource managers of 14 organisations with an ABW concept were asked to distribute the questionnaire to knowledge workers within their organisation, between 10 July and 4 September 2018. In total, 184 employees completed the full questionnaire with 85 questions and statements.

Regarding the ABW environment, respondents were asked to respond to a number of statements, using a five-point scale. The office layout is operationalised by workplace variety, workplace availability, openness, the distance between workplaces and facilities. The responses to eight statements (e.g. "The variety of workspaces allows me to choose the workspace that best fits the activity" and "In my opinion, the spatial design of the office

environment is optimal”) range from (strongly) disagree till (strongly) agree. Office comfort has been measured by 10 statements on ambient factors (e.g. air quality, ventilation, personal control), ergonomic furniture (desks and chairs) and overall comfort, with responses ranging from (very) uncomfortable till (very) comfortable. Office use has been operationalised by the frequency of choosing a workplace that fits best with the activity, leaving behind a clean desk, claiming a workplace by personalisation, interaction, distraction, the experience of excessive noise and opportunities to isolate themselves from colleagues, using 10 items (e.g. “during work, I interact with colleagues on a social level” and “during work, I am easily distracted by colleagues”). For teleworking two items were used (“I can work at home” and “I can work between home and the office” at any given time) and for ICT three items (e.g. “I can use cloud computing to store my data”), both with answers ranging from never till always.

The individual control variables age, gender, level of education and household composition were measured by closed questions. Personality has been measured by the Big Five Inventory (BFI-10) questionnaire (Rammstedt and John, 2007), job rank by marking one out of six choices (e.g. trainee, board member, other) and work experience by indicating years of deployment at the current employer. Activities, in particular communication and concentration, were measured by their importance on a five-point scale. The six situational variables have been measured by 11 statements from the areas of work-life scale measure (AWS) (Leiter and Maslach, 2003), e.g. “I have too much work to do” and “I perceive my social rewards (e.g. appreciation, respect) as being sufficient for the work I do”.

For the employees’ position on the BEC, 15 statements (seven-point scale) were adopted from the Utrecht Burnout Scale (UBOS, Brenninkmeijer and Van Yperen, 2003). The UBOS-GS is very similar to the widely used MBI-GS that assesses the three BEC dimensions (Maslach and Leiter, 2008). See Aussems (2019) for the full survey set-up.

Data analysis

Checks were conducted on sufficient sample size, multicollinearity and singularity, outliers, normal distribution, linearity and homoscedasticity, to define, which statistical analyses would be most appropriate and what kind of data reduction could be applied before the main analysis. Scale constructs were checked on internal consistency by Cronbach’s alpha, which showed to be sufficiently high (>0.70) for most variables. Distraction conditions in the office (close proximity) lowered Cronbach’s alpha of the office layout construct from 0.81 to 0.71. Because of its expected impact based on the many office noise studies, it was kept as a separate “proximity” variable. The office use items ($\alpha = 0.34$) were entered into a factor analysis (Principal Axis Factoring and Direct Oblimin with Kaiser normalisation) to reduce the set of variables while assuming a latent construct of office use. This provided four factors, labelled interaction, distraction, desk-switching and claiming, explaining 62.8% of the total variance. The six situational variables were reduced by factor analysis as well due to low Cronbach’s alpha values ($\alpha = 0.634$ (control), 0.540 (rewards) and 0.306 (community) with single items for the other three variables). The factor analyses reduced the set of variables to four factors, explaining 62.5% of the total variance. Recognition includes financial and social rewards and fairness. Overload and values group together. The control contains all original control items, while appreciation combines the social support items (from co-workers and from supervisors) with intrinsic rewards (pride). Table 1 shows the final variables that were used for further analyses. A path analysis was used as an extension of multiple regression analysis to simultaneously analyse the direct and indirect effects of ABWs on all three strains of the BEC and the relationships between the strains while controlling for individual variables and placing the situational variables as mediators. A

Variables	Individual strain	Interpersonal strain	Self-evaluation strain
<i>Workplace characteristics</i>			
Office layout	0.100	0.036	0.060
Proximity	-0.077	-0.030	-0.176*
Office comfort	0.023	0.135	0.144*
Office use			
- Interaction	0.078	0.085	0.168*
- Distraction	-0.282**	-0.176*	-0.110
- Desk-switching	0.008	0.074	0.210**
- Claiming	-0.086	-0.103	-0.037
Possibility to telework	-0.015	0.020	-0.006
ICT access	0.091	0.076	0.155*
<i>Individual control variables</i>			
Demographics			
- Age	0.106	0.109	0.277**
- Gender	Z = -0.354**	Z = -0.131	Z = -0.767
- Education level	0.046	-0.066	-0.064
- Household composition	0.050	-0.024	0.061
Personality			
- Extraversion	0.121	0.221**	0.263**
- Agreeableness	0.087	0.212**	0.198**
- Conscientiousness	0.061	0.188*	0.225**
- Neuroticism	-0.202**	-0.150*	-0.314**
- Openness	0.015	0.231**	0.158*
Work-related variables			
- Job Rank	Z = -0.218	Z = -0.036	Z = -0.133
- Work experience	0.038	0.052	0.339**
- Activities_concentration	-0.039	0.112	0.083
- Activities_informal interaction	0.097	0.191**	0.080
- Activities_formal interaction	0.028	0.307**	0.010
<i>Situational variables</i>			
Recognition	0.228**	0.297**	0.146*
Overload	0.365**	0.106	-0.037
Control	0.130	0.196**	0.370**
Appreciation	0.054	0.367**	0.290**

Table 1.
Bivariate correlations
of workplace
characteristics and
individual and
situational variables
with BEC dimensions

Notes: ** = significant at 0.01 level; * = significant at 0.05 level. A test on interrelationships between the three BEC dimensions showed two correlations to be significant: between the individual and interpersonal strain (0.419**) and between the self-evaluation and interpersonal strain (0.289**). The correlation between individual strain and self-evaluation strain was not significant. As Maslach and Leiter (1997) did assume relations between all three strains, we stick to including all three relations in the path model, with arrows in both directions

major advantage is that this method can estimate direct and indirect effects simultaneously and allows them to include several dependent variables. To select, which variables and relations to include in the path analysis, first bivariate correlation analyses were performed for all possible relations in the model, to check whether the theoretical assumptions are replicated in this sample. A minimum sample size for regression type analyses is $N = 50 + 8k$, in which k is the number of predictors or independent variables (Tabachnick and Fidell, 2007). The variable with the highest amount of (15) predictors in the path model is the self-evaluation strain and $50 + 8 * 15 = 170$ still falls within the sample size of 184 respondents.

Results

Sample characteristics

The sample contains a larger share of women (56.0%) compared to the whole Dutch work population (46%). The respondents are between 20 and 66 years of age ($M = 43.7$; $SD = 11.8$), whereas the overall average age of Dutch workers is 42.1 years; the difference is not significant. The majority of respondents (77.7%) is highly educated, 20% is single, 76.6% is living together/married without children (32.1%) or with children (44.6%) and 3.3% marked "other". The majority of respondents perceive themselves as outgoing and sociable (72.8%), indicating extravert personalities. For agreeableness, most respondents see themselves as generally having trust (91.8%). The majority of respondents identify themselves as doing a thorough job (91.8%) and, thus being conscientious. For neuroticism, the majority of respondents identify themselves as being relaxed and handling stressful situations well (66.3%), rather than being nervous easily (6.5%). With respect to openness, the majority of respondents identify themselves positively too. Work experience averages 13.1 years ($SD = 11.4$). Most respondents are regular employees (71.2%), with 20.7% being a manager/supervisor. The importance of the three activities (concentration, formal and informal communication) is very similar for all respondents as follows: the average is a little above 4 (= important) with standard deviations of approximately 0.7.

In general, the mean scores on the BEC traits were on the positive side of the seven-point scale, so pointing towards an engaged sample with relatively low burnout symptoms. The individual dimension scored a 6.13 average ($SD = 0.74$), the interpersonal dimension 6.36 ($SD = 0.82$) and the self-evaluation dimension 5.70 ($SD = 0.713$).

Bivariate correlation analyses

The findings of the bivariate analyses (Table 1) indicate significant relationships between most ABW constructs and all situational variables with at least one of the BEC dimensions. Only office layout, desk claiming and teleworking did not show any significant direct correlations. However, office layout and teleworking do show potential for an indirect relation mediated by situational variables, as they correlated, respectively, with recognition and with control and appreciation (Table 2). Again, desk claiming did not, and therefore is left out of the path analysis, as there is also no existing proof in previous studies relating this specific aspect of office use to any of the situational variables or the BEC.

The individual control variables age, gender and personality also showed to be significantly correlated with at least one of the BEC dimensions, whereas education level

Workplace characteristics	Recognition	Overload	Control	Appreciation
Office layout	0.149*	0.071	0.103	0.037
Proximity	0.027	-0.007	-0.097	-0.078
Office comfort	0.255**	-0.090	0.127	0.233**
Office use				
- Interaction	0.093	0.060	0.044	0.112
- Distraction	-0.069	-0.153*	-0.100	-0.038
- Desk-switching	0.107	-0.056	0.143	0.060
- Claiming	-0.089	0.030	-0.091	-0.116
Possibility to telework	0.114	-0.122	0.205**	0.170*
ICT access	0.117	-0.091	0.128	0.118

Notes: ** = significant at 0.01 level; * = significant at 0.05 level

Table 2.
Correlations between
workplace
characteristics and
situational variables

and household composition did not. Regarding the five work-related variables, work experience and formal and informal interaction showed to be significantly correlated, with, respectively, the self-evaluation strain and the interpersonal strain.

Path analysis

The model to be tested, based on theory and bivariate analyses, is presented in [Figure 2](#).

[Figure 3](#) shows the relations that remained significant in the path analysis, with the standardised coefficient for each link. The R^2 is 0.20 for the individual strain, 0.25 for the interpersonal strain and 0.31 for the self-evaluation strain. So, a maximum of almost a third of the variation in the BEC dimension is explained by the independent variables. The ABW constructs explain only a few per cent of the variation in the situational variables (recognition $R^2 = 0.07$; overload $R^2 = 0.02$; control $R^2 = 0.04$; appreciation $R^2 = 0.07$). Three ABW constructs showed significant relations with a BEC dimension, namely distraction (office use), Office comfort and teleworking. The interpersonal strain has (bidirectional) links both with the individual ($\beta = 0.31$) and the self-evaluation strain ($\beta = 0.12$), but again the relationship between the individual and the self-evaluation strain was not significant.

Distraction has a direct negative relationship with the individual strain ($\beta = -0.21$) indicating that when distraction increases, exhaustion increases. More peculiar is the indirect relationship through overload, where distraction decreases overload ($\beta = -0.15$) and increases energy ($\beta = 0.22$). Also, women score higher on individual strain (more energy) than men ($\beta = -0.18$).

Office comfort only has indirect relations, both through increasing feelings of recognition ($\beta = 0.23$) and appreciation ($\beta = 0.20$), with increased involvement (the interpersonal strain, $\beta = 0.18$ and 0.17). Workers for who formal meetings are more important ($\beta = 0.23$) or who have more open personalities ($\beta = 0.15$) also score higher on the interpersonal strain.

The possibility for teleworking relates to increased feelings of control ($\beta = 0.21$), which relates to efficacy (the self-evaluation strain, $\beta = 0.20$), so again only an indirect relation.

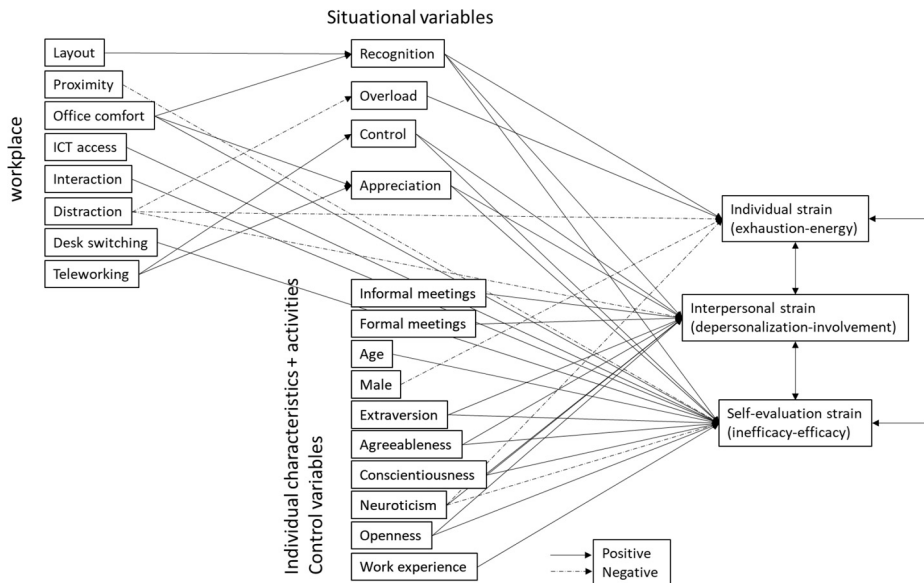


Figure 2.
Model used for path analysis

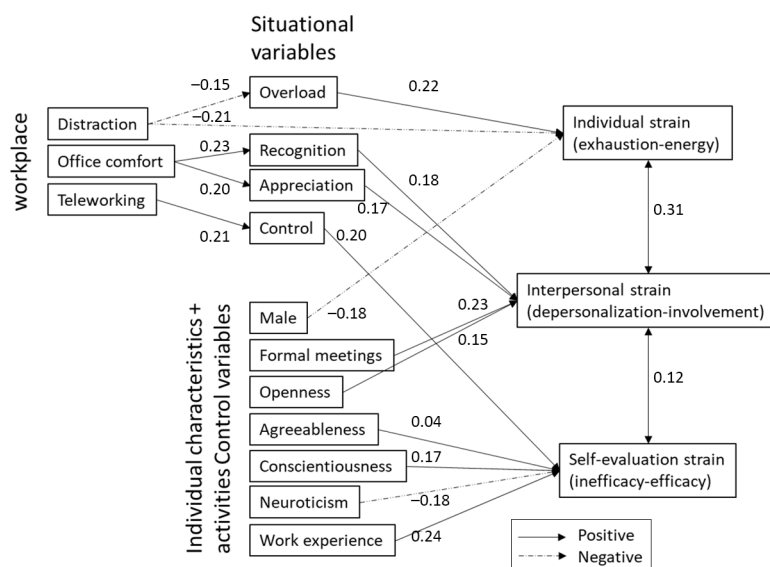


Figure 3.
Final model after path analysis

More conscientious ($\beta = 0.17$) and more agreeable ($\beta = 0.04$) personalities and workers with more work experience (in years at this employer; $\beta = 0.24$) also score higher on efficacy, while more neurotic persons score lower ($\beta = -0.18$).

Discussion, implications and limitations

Impact of activity-based workplaces on employees' position on the burnout-engagement continuum

Hypothesis *H1* (ABW characteristics have a direct effect on an employee's position on the BEC) can only be partially accepted for office use. Only one significant, negative direct relation came forward, between distraction and the individual strain (exhaustion-energy) of the BEC. A lot of distractions can be frustrating, which costs energy on its own and people have to work longer to get their work done by making up for a lost time. There is not much research yet on how to deal with distractions. Most studies on acoustics and noise focus on sound levels (Keränen and Hongisto, 2013) or noise effects on satisfaction (Kim and De Dear, 2013) but not on (mental) health of employees. With the trend towards increased open offices, this deserves further research into the effects of technologies such as sound masking (Jahncke et al., 2016) and optimising coping behaviour. Contrary to previous studies on productivity (Haynes, 2007b), distraction did not relate to the self-evaluation strain. As there was no link between the individual and self-evaluation strain, there is also no indirect effect of distraction on efficacy, which is unexpected. As many respondents in this sample rated their efficacy very high, there might be a restriction of range in the dependent variable. All the other ABW characteristics did not relate to the self-evaluation strain in the path model either, where previous studies suggested a relationship with comfort (Bae et al., 2017) and ICT access (Nurmilaakso, 2009).

That desk-switching supports people's efficacy is one of the basic assumptions of ABW, but it has not been proven in studies and again is not confirmed here. Previous work suggests that task-switching triggers overload (Demerouti et al., 2014), but for desk-switching

(which is supposed to be based on switching tasks) this is not confirmed by our findings. Perhaps, for desk switching this is only the case when there are “negative” reasons (e.g. distraction) causing the switch (Hoendervanger *et al.*, 2016). Claiming the same desk by personalising does not seem to support the efficacy or provide less exhaustion either. Perhaps, those who claim desks, do this for different reasons than stress, for example, to express status or to be able to use a preferred workplace every day.

Also, surprising is the lack of a relation between interaction and interpersonal strain (involvement). Where the importance of formal meeting activities for one’s work was related to increased involvement in the model, actually having more social or work-related interactions was not. As involvement definitions are generally based on communication processes (Lopes *et al.*, 2017), this seems counterintuitive. On the other hand, the actual interactions might not have provided a positive experience to the employees. Clearly, further research on office use is needed to fully understand ABW environments. It would also be interesting to replicate this research amongst people with more extensive burnout symptoms.

Hypothesis *H4* (ABW characteristics have an indirect effect on employee’s position on the BEC via the situational variables) can be accepted more strongly. First, where distraction already had a direct effect, there is additionally a mediated effect through a negative effect on overload. Remarkably, the data do not only suggest that an increase in overload (“I have too much work to do”) increases feelings of energy but also that distraction decreases perceived overload. A lack of (auditory) privacy is generally associated with greater feelings of exhaustion (Bakker *et al.*, 2014), but maybe there are also welcome forms of distraction, which make people relax for a moment. A large part of the sample scored high on the individual strain (more energy), so, perhaps, they get energy from having a lot of work to do. However, the continuation of this situation might lead to burnout in the long run. Clearly, distraction in the office deserves further research.

Second, perceived office comfort relates significantly to both feelings of recognition and appreciation. Like in earlier research (Maslach and Leiter, 2008), such feelings increase the involvement of workers (interpersonal strain). One of the major dilemmas in designing office comfort remains that what is optimal for one person or group may not be optimal for other people (Bitner, 1992). There exist significant individual differences in preferences (Wang *et al.*, 2018) and Budie *et al.* (2019) showed that those using the open spaces in ABWs a lot find comfort even more important.

Third, teleworking improved efficacy via increased control. While teleworking provides some autonomy, and thus control, Hoornweg *et al.* (2016) showed that there might be a limit to this effect, as the effect on productivity changed from positive to negative with a higher telework intensity. Also, telecommuters experience more time pressure in the long run, while making longer work hours (Peters and Van der Lippe, 2007), although in this sample this did not lead to more exhaustion. The increased perceived efficacy could also be caused by the fact that the respondents found a distraction-free environment at home or a better work-life balance.

The expected indirect relations between office layout and all BEC dimensions through recognition were not confirmed in the path analysis. So, relations of office layout design with the workload and interpersonal relations (De Croon *et al.*, 2005) and control (Vischer, 2007) could not be confirmed. In general, all layout items scored a mean between 3 and 4 on a five-point scale indicating that workers in the sample perceive a good fit between their needs and abilities and the layout of their ABW. Perhaps, there was too little variation in layout quality to identify an effect. Another explanation might be that the high demands of an open ABW environment (noise-causing exhaustion and less efficacy) are compensated by appropriate

resources (variety in spaces, facilities), as put forward in the Job-demands-resources model by Bakker and Demerouti (2007). Further research should shed more light on whether and how the ABW layout design affects burnout and engagement.

Burnout-engagement continuum and personal control variables

It was not completely unexpected that no relationships between the individual and self-evaluation strain were found in the path analyses. Others (Lee and Ashforth, 1996) found relatively low correlations of professional efficacy with both other dimensions as well. The relationship between the individual and interpersonal strain was confirmed, which is in line with the idea that these form the core of burnout (Green *et al.*, 1991).

Hypothesis *H2* (Individual control variables affect an employee's position on the BEC) and *H3* (Situational variables affect an employee's position on the BEC) are confirmed, but less complete than expected. For example, Alarcon *et al.* (2009) found that neurotic workers feel less energetic and experience more exhaustion, while in this study the neuroticism trait only relates negatively to efficacy. Previous research (Langelaan *et al.*, 2006) claims that high neuroticism is the core antecedent of burnout, whereas people who score high on work engagement are characterised by low neuroticism in combination with high extraversion. The positive relation between openness and efficacy is also not confirmed, nor are previous findings of a relation between neuroticism and the interpersonal dimension (Schaufeli and Enzmann, 1998). It is clear that personality plays a role, but further research with larger and more diverse samples is necessary to gain more insight into how personality influences the BEC in an ABW context. Also, the findings regarding the effect on gender oppose that of Maslach *et al.* (2001), as men scored higher on exhaustion than women.

As expected, more experienced workers are more likely to see themselves as efficacious. Maslach *et al.* (2001) argued that age is related to work experience, suggesting that the risk of burnout is higher in an earlier phase of ones' career, but in this study, age was not related to any of the BEC dimensions. Regarding the importance of activities, workers who consider formal meetings more important show higher involvement. This does not apply to informal meetings. Further research should identify why this might be the case.

Limitations of the study

The study of complex phenomena such as burnout and engagement would benefit from longitudinal research. Due to the cross-sectional design of our study, it is impossible to derive causal relationships. Besides being a cross-sectional survey, this study was limited to the *perceived* impact of the physical environment, workers' activities, individual characteristics and work-related situational variables on burnout/engagement. The R^2 values suggest that additional variables exist that explain workers' position on the BEC dimensions.

The sample only included Dutch respondents and was relatively small. Although the current sample showed to be sufficiently large to conduct an appropriate path analysis, the limited size of the sample and a large number of influencing variables allowed to identify only relatively strong relationships. Not identifying relationships does not mean that they do not exist, but probably they are not sufficiently strong to be identified with the present size of the sample. A larger sample might have resulted in the identification of more relationships between the many independent variables and the burnout-engagement dimensions. The sample also includes workers from many different organisations. However, apart from being an official organisation, no further information about these organisations was available. Also, the findings can only be an indication of the Dutch context in which the data were gathered.

While the burnout-engagement dimensions have been measured by validated measures, this does not (yet) apply to some of the independent variables. Additionally, using a more extended questionnaire (e.g. all 29 statements derived from the AWS, rather than the selection of 11 statements in this study) would be worthwhile to conduct more in-depth analyses of the relationships between the physical workplace characteristics, control variables and other potentially relevant variables, if the sample had been bigger.

The current study is partly exploratory (data-driven decisions, which variables to include in the path analysis) and partly theory-driven (testing hypotheses of interrelationships between families of independent, mediating and control variables and the BEC). When a more extended theory is available, follow-up research could focus on more detailed hypotheses regarding single variables.

Besides larger samples, qualitative research using workshops with medical experts, business managers, CRE and facilities managers, human resource managers and well-informed employees and analyses of sick leave data should be used to further validate the scales of the BEC and its relationship with ABW characteristics.

Practical implications

Especially office use requires more attention of workplace managers in practice when implementing the ABW concept. CRE managers aiming at mentally healthy workplaces should focus on offering a low distraction, comfortable environment. Workers should have the opportunity (and the organisational culture, Babapour, 2019) to isolate themselves from distraction when necessary, by providing various types of workplaces that support concentration (e.g. cell-offices, quiet areas, private spaces) and/or clear use-protocols in more open environments. Furthermore, CRE managers are recommended to support teleworking to a certain extent, to keep employees feeling in control but still connected to the organisation and their colleagues. In all cases, individual preferences should be taken into account as well.

Conclusion

Overload showed to be the strongest predictor of the individual (exhaustion-energy) dimension of the BEC, the importance of formal interaction of the interpersonal (cynicism-involvement) dimension and work experience of the self-evaluation (inefficacy-efficacy) dimension. Because CRE is a supportive resource, it makes sense that work and individual characteristics have a larger effect on employees' mental health than the CRE. However, the standardised coefficients of the ABW constructs were of a similar size as those of the individual and situational variables. So, although neglected in previous studies, the physical work environment should clearly be included in future studies on burnout and engagement in ABWs as well. An additional novelty of this paper is that several general assumptions of ABW did not come forward in this analysis and clearly need more research to show whether these expectations are met in practice.

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