

Office Relocation: Changes in Privacy Fit, Satisfaction, and Fatigue

ABSTRACT

Introduction

Privacy fit is a frequently reported issue in open office environments, yet its context, predictors and consequences remain understudied.

Theory

This study builds on Altman's (1975) privacy regulation model and the cognitive appraisal theory as a transactional model of stress to examine the effect of an office move (and associated changes in settings, protocols and autonomy) on changes in privacy fit, privacy-related coping appraisal, as well as changes in satisfaction and fatigue.

Methods

Data was collected over two points of measurement from 61 office workers who moved from a standard open-plan office to an office that is activity based. The first questionnaire was distributed six weeks prior to the office move and the follow-up questionnaire approximately eight months after. With its longitudinal design, this study extends past research by demonstrating the changing nature of privacy fit and revealing predictors of change in privacy fit and coping appraisal.

Results

Cross-lagged autoregression analysis of change confirmed suggested predictors such as increase in variety of settings and in adherence of others to protocols that positively influenced post-move privacy fit. Further, change in coping appraisal post move was predicted by an increase in perceived environmental and behavioural flexibility. Changes in privacy fit and appraisal were associated with increases in job and workplace satisfaction and decreases in emotional and mental work fatigue post move.

Originality/Value

Results could inform physical workplace design as well as cultural interventions in organisations. To our knowledge, this is the first study investigating the psychological process of privacy experience by using a transactional model of stress.

Keywords

ABW, cognitive appraisal, office design, privacy, work fatigue, work satisfaction

**An earlier version of this paper was presented at the TWR conference 2020 Future Workspaces in September 2020. Further, an extended version of this study is presented in the monography [reference will be added after review].*

1 INTRODUCTION

Despite the interest in work privacy in open-plan offices, which dates back several decades, research on the stress-related consequences of poor work privacy has been limited. Even though theoretical assumptions exist (e.g. Flynn, 2014; Oseland, 2009), there is little empirical evidence of how environmental and social context factors in new work environments, such as activity-based working (ABW), influence privacy regulation and whether these context factors could prevent the stress-related consequences of poor work privacy [reference to be added after review]. In an attempt to fill these gaps in the literature, this study investigates the impact of an office move from standard open-plan office (OPO) to an ABW configuration on workers' privacy experience and related consequences by taking a psychological stress perspective.

WORK PRIVACY FIT AND EXPECTED CONSEQUENCES

Work Privacy Fit

The present study employs a multidimensional conceptualisation and operationalisation of work privacy, which builds on Altman's privacy regulation framework (1975) that is related to person–environment (P–E) fit theory (cf. Edwards et al., 1998). As such, work privacy is regarded as a control process of input and output of information and social stimuli in the work environment. Four distinct dimensions of work privacy are considered: distractions (regulation of indirect social stimuli/input), interruptions (regulation of direct social stimuli/input), task privacy (regulation of visual output) and conversation privacy (regulation of acoustical output). For further detail on the conceptual underpinning of work privacy, please refer to [reference to be added after review].

Expected Consequences

Overall, there is limited evidence of the stress-related consequences of poor work privacy. There is ample empirical evidence associating privacy with job as well as workplace satisfaction, which is consistent across studies using different and often reductionist operationalisations of privacy (e.g. Brunia et al., 2016; Hoendervanger et al., 2019; Kim and de Dear, 2013; Leder et al., 2016; Oldham, 1988; Sundstrom, 1986), as well as multidimensional operationalisations ([reference to be added after review]). P–E fit theory lends itself to explaining this relationship. P–E fit theory suggests that a poor fit between environmental characteristics and workers' needs or requirements results in dissatisfaction (cf. Furnham and Schaeffer, 1984:). A poor fit between workers' privacy needs and the extent to which the physical environment supports those needs should therefore also result in reduced satisfaction.

There is some prior evidence of the relationship between poor privacy fit and emotional fatigue or exhaustion (depleted emotional capacities; Laurence et al., 2013; [reference to be added]). Moreover, there is sufficient empirical support for poor P–E fit being associated with emotional fatigue (e.g. Edwards and van Harrison, 1993; Jamal and Baba, 2000; Vandenberg et al., 2002). Further, a link between poor privacy fit and mental fatigue has been suggested by several researchers (e.g. Cohen, 1978; Geen and Gange, 1977; Laurence et al., 2013; Sundstrom and Sundstrom, 1986). The theoretical assumption has been made that conversation and/or task privacy but also uncontrollable distractions (cf. Cohen, 1978; cf. Sundstrom and Sundstrom, 1986) could create additional attentional demands for workers, resulting in reduced cognitive capacity and fatigue over time. However, empirical evidence is scarce, either providing isolated evidence of the relationship between general distractions and exhaustion (e.g. Appel-Meulenbroek et al., 2020), or focusing on the regulation of acoustical distractions (e.g. Cohen

and Spacapan, 1978). There is some evidence (with reductionist privacy operationalisations) of the negative impact of poor privacy fit on mental fatigue-related concepts, such as self-rated performance reduction (e.g. Banbury and Berry, 1997, 1998; Brill et al., 1984; Kupritz, 1998), attention reduction and increased task errors (e.g. Cohen and Spacapan, 1978; Goodrich, 1986; Hoendervanger et al., 2019; Kupritz, 1998), or concentration difficulties (e.g. Haynes, 2007; Hedge, 1982; Veitch et al., 2002). It is evident that poor privacy fit is likely to have a significant impact on both emotional and mental work fatigue, two key components of burnout (Frone and Tidwell, 2015), and therefore deserves further investigation.

The present study aims to validate findings on satisfaction using a multidimensional operationalisation of work privacy. Further, it aims to extend the current evidence base by assessing whether poor privacy fit has an impact on both emotional and mental fatigue. Moreover, as job demand is an established contributor to satisfaction and fatigue at work (cf. Frone and Tidwell, 2015), this study will control for its effect.

COPING APPRAISAL

This research draws on stress theory, specifically cognitive appraisal theory (Folkman and Lazarus, 1985), to shed light on why poor privacy fit might have stress-related consequences. Cognitive appraisal theory suggests that negative emotions at work are fundamentally controlled by appraisal processes; the appraisal process is crucial in determining whether environments or relationships at work are experienced as stressful (Lucas et al., 2012). Hence, the study examines whether an individual's assessment of being able to cope with poor privacy fit (coping appraisal) is related to their levels of satisfaction and fatigue. Further, the study examines the relationship between social and environmental context factors and coping appraisals ([reference to be added]).

ABW CONTEXT FACTORS

There is limited evidence of the relationship between environmental and social context factors and work privacy in ABW environments (cf. Engelen et al., 2019). Most privacy research has been conducted on old versions of open-plan offices that have now fallen out of fashion. However, it has been postulated that ABW or ABW-related characteristics are helpful in regulating interpersonal contact in open-plan spaces (e.g. Flynn, 2014; Keeling et al., 2015; Oseland, 2009), and this therefore requires further research. The following ABW-related context factors have been suggested as critical to privacy regulation:

(1) Setting variety, which refers to a multitude of work settings that differ in their designs to support various work tasks (e.g. Becker, 1999; Gibson, 2003). It has been postulated that these are helpful in regulating interpersonal contact in open-plan offices (Oseland, 2009). However, empirical support for this hypothesis is largely limited to non-peer-reviewed industry research (e.g. Flynn, 2014).

(2) Protocols (also known as house rules, behavioural rules, codes of conduct, or instructions, cf. Babapour Chafi and Rolfö, 2019) refers to office etiquette on how to use different types of work settings (e.g. Oseland, 2009); different types of protocols have been identified and studied in previous works (e.g. speech policies or desk-sharing policies; Babapour Chafi and Rolfö, 2019). There is some evidence of the importance of unspoken rules that cue acceptable behaviour related to privacy (e.g. Justa and Golan, 1977; Steele, 1986) and on the usefulness of protocols in decreasing disturbances by colleagues, such as distractions, interruptions, or avoiding conversations (e.g. Babapour Chafi and Rolfö, 2019; Bellinger et al., 2006; Brennan et al., 2002; Hedge, 1982; Kupritz and Haworth, 2005).

(3) Location autonomy, which refers to employees' ability to choose their preferred work

location inside and outside the office. Conceptually, location autonomy is related to job autonomy (Medik and Stettina, 2014; Szilagy and Holland, 1980), which provides the freedom to decide how one's job is structured and conducted (e.g. Leach et al., 2003). Although proposed as useful in regulating interpersonal access (Flynn, 2014; Wohlers and Hertel, 2017), the evidence base for this idea is scarce (e.g. Robertson et al., 2008; cf. Engelen et al., 2019).

The current study addresses the gap in empirical evidence and aims to explore privacy fit, privacy-related coping appraisal and work satisfaction and fatigue among a sample of workers who move from a traditional office environment to an ABW office environment.

HYPOTHESES

This study examines whether a move from a traditional office environment to an ABW office environment affects perceived setting variety, protocol adherence and location autonomy and how this affects privacy fit, privacy-related coping appraisals, satisfaction and fatigue. The following hypotheses are formulated:

Hypothesis 1a: As the variety of settings, protocol adherence and location autonomy increases, privacy fit increases.

Hypothesis 1b: As the variety of settings, protocol adherence and location autonomy increases, privacy-related coping appraisal increases.

Hypothesis 2a: As privacy fit increases, workplace and job satisfaction increase, and emotional and mental fatigue decrease.

Hypothesis 2b: As privacy-related coping appraisal increases, workplace and job satisfaction increase, and emotional and mental fatigue decrease.

See Figure 1 for the hypothesised relationships.

PLACE FIGURE 1 HERE

2 METHODS

THE FIELD SITUATION

This study was conducted in the context of an office relocation in a global architecture and engineering company in the UK, involving approximately 1,000 staff members. The original office had a standard European open-plan configuration with basic ancillary spaces and shared and assigned desks dispersed across two floors. The new office was configured to support ABW with a wide variety of ancillary spaces, workspaces and shared desks arranged by teams across five floors. Change management activities at biweekly to monthly intervals up to 12 months post move addressed protocols on setting use and on the freedom to choose work location.

PROCEDURE AND STUDY DESIGN

Managers of teams with more than five members were asked to participate; 11 managers agreed for their teams to be involved, which resulted in a target population of $n = 479$ (just under 50% of the total number of employees). The first questionnaire was distributed six weeks before the move and the second approximately eight months after the move. Managers followed up with three reminders over a four-week period. For both data collections, team leaders distributed

the link to the online questionnaire via email to their departments. Participants were asked on each occasion to create a respondent ID to match responses to both questionnaires for later analysis. An incentive of six lottery prizes was given by the company at the time of each survey. In order to take part in the lottery, participants had to indicate their email address in a separate survey, to help ensure anonymity of the survey responses. The email addresses were at no point linked with the questionnaire responses.

SAMPLE DESIGN CONSIDERATIONS

For the intended panel analysis of causal directions across time, recent literature stresses that prior rules of thumb on sample sizes with a minimum of 200 cases to be overly-conservative (Iacobucci, 2010) and suggests that samples with 140 cases would yield reasonable model testing (assuming a well-developed model, high degrees of freedom, and a liberal desired power estimate; Kim, 2005). Nonetheless, due to the high attrition rate in this study, the resulting small sample size falls below this adjusted threshold. Hence, causal directions across time were analysed with individual autoregression models.

PARTICIPANTS

A total of 479 employees were invited to participate in the study; 238 eligible questionnaire responses were collected at Time 1 and 135 at Time 2. In total 85 respondents completed both questionnaires, but 24 of these had to be discounted due to excessive missing data. This meant that 61 longitudinal responses were retained. The respondents were aged between 20 and 65 years ($M = 34.50$, $SD = 10.0$). Twenty-four of the participants were female, and 35 were male (2 missing). In terms of representativeness, the sample was considered adequate regarding gender ratio (organisation: 65% male, 36% female), job role (five categories ranging from ‘junior or graduate position’ to ‘associate, director, or partner’; all roles were represented between 5% and 25%), and response rate of the participating departments¹ relative to size (11 departments ranging from ‘architecture’ to ‘building engineering’ were represented between 10% and 67%).

MEASURES

Descriptive and reliability statistics for, and correlations among, the variables are provided in Table 1.

Work Privacy Fit

Privacy fit was measured by the Privacy at Work Inventory ([reference will be added after review]), a self-reported inventory of 12 items that assesses *first* the frequency of privacy desires and *subsequently* the frequency of privacy fit during the previous four weeks on two 7-point Likert scales ranging from (1) *Never* to (7) *All the time*. Consequently, each of the 12 items were rated twice, first by their frequency of desire and subsequently by their frequency of fit. Four distinct dimensions of work privacy desires and fit were assessed: 1) acoustical and visual distractions (four items, example item “*work with no acoustical distractions around me*”); 2) interruptions (three items, example item “*be less accessible to my co-workers than I usually am*”); 3) task privacy (three items, example item “*work where I can keep what I am working on confidential*”); 4) conversation privacy (two items, example item “*have confidential conversations or phone calls with my co-workers without others listening in*”).

¹ Preliminary analyses indicated that there was no difference in privacy fit distribution by gender, job role, or department. Hence, gender, job role, and department were not included as controls for further analyses.

Both scales had excellent internal consistency reliability scores: $\alpha_{T1} = .88$, $\alpha_{T2} = .87$ (privacy desires) and $\alpha_{T1} = .93$, $\alpha_{T2} = .92$ (privacy fit). A new variable was created by recoding and weighting privacy-fit scores by privacy-desire scores in accordance with Kahana's (1982) P-E fit assessment procedure (cf. [reference will be added])². This procedure generates a weighted privacy-fit score that incorporates the subjective priority of the privacy fit. As a final step, mean composite scores for weighted privacy fit (hereon referred to as 'privacy fit') were built (range: -21–21; $M_1 = -1.34$, $SD_1 = 4.50$; $M_2 = -0.66$, $SD_2 = 5.10$)³. Negative scores reflect a frequently low privacy fit, scores close to 0 suggest a neutral fit, whereas positive scores suggest a frequently high privacy fit. Table 1 shows that on average perceived privacy fit was negative, representing a low fit.

Coping Appraisal

Privacy-related coping appraisal was assessed using four items from Dewe's (1991) six-item coping appraisal scale and a 5-point Likert scale ranging from (1) *Strongly disagree* to (5) *Strongly agree*. Two items from the original scale (*the organisational bureaucracy made it difficult to deal with; needed to know more before could act*) were excluded as they were not considered relevant. As the majority of the four items reflected 'uncontrollable situations' (Peacock and Wong, 1990, p. 232) and only one item reflected 'controllability by oneself' (p. 232), an item was added (*could think of lots of ways to do so*) reflecting the latter theme, which is important to the coping appraisal construct. The wording was amended to suit the study by adding a reference frame, "*In the last 4 weeks*". An example item is "*In the last 4 weeks, when I was in situations in which I wanted less contact with my co-workers in the base office building, I had to accept that I couldn't achieve it and get used to the situation*".

Internal consistency reliability was excellent: $\alpha_{T1} = .87$; $\alpha_{T2} = .87$. A new variable was created by building mean composite scores (range: 1–5; $M_1 = 3.04$, $SD_1 = 0.98$; $M_2 = 3.25$, $SD_2 = 0.97$). A high score reflects high coping appraisal and the perception of being able to do something about the situation.

Outcome Variables 1—Workplace and Job Satisfaction

Workplace satisfaction was assessed using a three-item measure by Oldham (1988), with two affect-related items and one cognition-related item and a 7-point Likert scale ranging from (1) *Strongly disagree* to (7) *Strongly agree*. As before, a reference frame was added: "*In the last 4 weeks*". An example item is "*In the last 4 weeks, the workplace environment in my base office building supported me well in the daily tasks I had to perform*".

Job satisfaction was assessed using a three-item scale by Lee and Brand (2005) with two affect-related items and one cognition-related item and a 5-point Likert scale ranging from (1) *Strongly disagree* to (5) *Strongly agree*. The same reference frame was added as above. An example item is "*In the last 4 weeks, I have been satisfied with my job*".

Both scales had adequate internal consistency reliability scores: $\alpha_{T1} = .93$; $\alpha_{T2} = .93$ (workplace satisfaction) and $\alpha_{T1} = .64$; $\alpha_{T2} = .75$ (job satisfaction). Two new variables were created by building mean composite scores for workplace satisfaction (range: 1–7; $M_1 = 4.28$,

² Recode the privacy-fit ratings by shifting the scale's midpoint from 4 to 0 (old range 1–7, new range -3–3). Multiply the recoded privacy-fit and privacy-need ratings for each item of the four dimensions [(item 1-fit recoded * item 1-need), (item 2-fit recoded * item 2-need) and so forth].

³ For a total privacy-fit score, sum the 12 products of the multiplied recoded privacy-fit and privacy-need ratings across all dimensions and divide by the total number of products (in this case 12) [(item 1-fit recoded * item 1-need) + (item 2-fit recoded * item 2-need) and so forth/number of products].

$SD_1 = 1.54$; $M_2 = 5.16$, $SD_2 = 1.52$) and job satisfaction (range: 1–5; $M_1 = 3.51$, $SD_1 = 0.74$; $M_2 = 3.64$, $SD_2 = 0.73$). High scores reflect high levels of workplace and job satisfaction.

Outcome Variables 2—Emotional and Mental Work Fatigue

Emotional and mental work fatigue were assessed using a 2 x six-item measure by Frone and Tidwell (2015) on a 5-point Likert scale ranging from (1) *Never* to (5) *Every day*. Frone and Tidwell's (2015) Three-Dimensional Work Fatigue Inventory is a multidimensional inventory, originally taking into account three different resource-specific types of fatigue at work (emotional, mental and physical). The dimensions/subscales assessing emotional and mental fatigue were used for this study. The wording was amended to suit the study by using a reference frame of the last 4 weeks as opposed to the original reference frame of 12 months. An example item for the mental fatigue subscale is “*During the past 4 weeks, how often did you feel mentally exhausted at the end of the workday?*” An example item for the emotional fatigue subscale is “*During the past 4 weeks, how often did you feel emotionally exhausted at the end of the workday?*”

Both subscales had excellent internal consistency reliability scores: $\alpha = .97$ (emotional work fatigue) and $\alpha = .96$ (mental work fatigue). Two new variables were created by building mean composite scores for emotional work fatigue (range: 1–5; $M_1 = 2.70$, $SD_1 = 1.16$; $M_2 = 2.60$, $SD_2 = 1.18$) and mental work fatigue (range: 1–5; $M_1 = 3.61$, $SD_1 = 0.98$; $M_2 = 3.37$, $SD_2 = 0.97$). High scores reflect high levels of emotional and mental fatigue.

Independent Variables—Variety of Settings, Protocols and Location Autonomy

Perceived variety of settings was assessed with a one-item measure taken from the ‘Leesman survey’, which is an industry service survey for assessing office adequacy (Leesman, 2017). Participants rated whether the design of their office encouraged them to use different settings that best supported their work tasks. Participants rated their agreement with this statement on a 7-point scale from (1) *Strongly disagree* to (7) *Strongly agree*. Low scores reflected little perceived variety (range: 1–7; $M_1 = 3.46$, $SD_1 = 1.44$; $M_2 = 4.80$, $SD_2 = 1.57$).

Adherence to protocols was assessed by a one-item measure developed for this study, as no measurement of the concept was found. Following a definition by Oseland (2009), participants rated their agreement on whether people in the office adhered to the protocols about the use of space on a 7-point scale from (1) *Strongly disagree* to (7) *Strongly agree*. As before, a reference frame was added: “*In the last 4 weeks*”. Low scores reflected little adherence of others to the protocols (range: 1–7; $M_1 = 4.25$, $SD_1 = 1.56$; $M_2 = 4.18$, $SD_2 = 1.74$).

Location autonomy was assessed with three items developed for this study; no sufficient measurement of the concept was found. An example item is “*In the last 4 weeks, even if I could have worked somewhere else, I felt I should work at my desk.*” All items were assessed on a 7-point Likert scale from (1) *Strongly disagree* to (7) *Strongly agree*. Informed by internal consistency reliability analysis, one item was excluded. The final Cronbach's alpha of the two-item scale was $\alpha = .70$, and therefore it reached the minimum desired reliability (Nunnally and Bernstein, 1994). A new variable was created by building mean composite scores for location autonomy (range: 1–7; $M_1 = 4.25$, $SD_1 = 1.57$; $M_2 = 4.09$, $SD_2 = 1.63$). High scores reflect high levels of location autonomy.

Control Variable—Job Demand

Job demand was assessed using a four-item measure by Elovainio et al. (2015). This four-item scale was used due to its similarity to the job demand dimension of Karasek et al.'s Job

Contents Questionnaire (1998). Initially, the aim was to employ the original Karasek measure, but project funds were not available to afford its purchase. For closer representation of Karasek's measure, two items (intensive work and conflicting demands), derived from the UK Health and Safety Executive's Management Standards (Edwards et al., 2008), were added. Items were assessed on a 7-point Likert scale ranging from (1) *Strongly disagree* to (7) *Strongly agree*. The wording was amended to suit the study by adding a reference frame: "In the last 4 weeks". An example item is "In the last 4 weeks, I had to work very fast."

The internal consistency reliability score of the six-item scale was excellent ($\alpha = .90$). A new variable was created by building mean composite scores for job demand (range: 1–7; $M_1 = 3.61$, $SD_1 = 0.78$; $M_2 = 3.65$, $SD_2 = 0.76$). High scores reflect high levels of job demand.

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3 ANALYSIS

PRELIMINARY ANALYSIS TO ASSESS DATA VALIDITY

Missing Records

Initial analyses were conducted to examine the validity and reliability of the data. A large number of surveys were not fully completed, which can affect the reliability of the data if the missing data is not completely random. To test this individual and aggregated Little's tests were performed on the relevant demographic, independent and dependent variables. The results suggest that there is no relationship between missing and observed records and that records are missing completely at random rather than missing systematically, $\chi^2(452, n = 85) = 425.00, p = .62$. Because of the number of incomplete questionnaires, it was decided to replace missing records using mean imputation in accordance with established guidelines and best-practice recommendations (e.g. Graham, 2009; Madley-Dowd et al., 2019).

Panel Attrition

In order to test whether the final sample consisting of all participants who completed the Time 1–Time 2 questionnaire differed from those who completed only the first questionnaire, a multivariate analysis of variance (MANOVA) was conducted. Participants who completed only the first questionnaire ($n = 121$) were compared to those who completed both questionnaires ($n = 85$) on relevant Time 1 variables (e.g. job demand, workplace and job satisfaction, emotional and mental fatigue). The MANOVA revealed no significant difference at the multivariate level at Time 1, Wilks' Lambda = .95, $F(6, 199) = 1.86, p = .10$.

CAUSAL DIRECTIONS ACROSS TIME

Autoregressive cross-lagged analysis was conducted to assess causal directions across time (Bollen and Curran, 2006). Panel analyses were originally planned but deemed not feasible due to the sample size. Cross-lagged models are in line with principles of causal inference (measuring putative causes prior to the effects and thereby supporting temporal precedence of the cause) (cf. Kearney, 2017). In practice, autoregressive cross-lagged analyses were performed by entering Time 1 scores of the dependent variable in the first block, the control variable (job demand) in the second block (for analyses of satisfaction, stress and fatigue), Time 1 scores of the independent variables in the third block, and Time 2 scores of the independent variables in the fourth block.

Overall, 10 hierarchical regression models were tested. Specifically, two regression models tested whether changes in context variables (variety of settings, protocol adherence

and location autonomy) account for changes in privacy fit (model 1 testing H1a) and coping appraisal (model 2 testing H1b). Further, four regression models tested whether changes in privacy fit account for changes in the four outcome variables; workplace satisfaction, job satisfaction, emotional fatigue, and mental fatigue (models 3–6 testing H2a). The final set of regression models tested whether changes in coping appraisal account for changes in the four outcome variables; workplace satisfaction, job satisfaction, emotional fatigue, and mental fatigue (models 7–10 testing H2b).

4 RESULTS

HYPOTHESIS 1—IMPACT OF CONTEXT FACTORS ON PRIVACY (H1a) AND COPING (H1b)

Hypothesis 1a was partially supported as changes in the variety of settings ($\beta = .29, p < .01$) and protocol adherence ($\beta = .30, p < .01$), but not in location autonomy ($\beta = .17, p > .05$), predicted changes in privacy fit post move. Together, both variables explained 25% (semi-partial correlations = .24; .26) of variance in the final model, $F(7, 53) = 8.44, p < .001$. Additional findings include a lagged effect of Time 1 privacy fit on Time 2 privacy fit ($\beta = .33, p < .001$), which explained 9% (semi-partial correlations = .30) of the variance in the model. The lagged effect stayed significant in the final modelling stage. The total model explained 47% of adjusted variance.

Hypothesis 1b was partially supported as changes in perceived variety of settings ($\beta = .31, p < .01$) and location autonomy ($\beta = .25, p = .03$), but not in protocol adherence ($\beta = .11, p > .05$), predicted changes in coping appraisal. Together, both variables explained 19% (semi-partial correlations = .26; .17) of variance in the final model, $F(7, 53) = 10.16, p < .001$. The total model explained 52% of adjusted variance.

HYPOTHESIS 2—IMPACT OF PRIVACY AND COPING ON SATISFACTION AND FATIGUE

Hypothesis 2a was supported as changes in privacy fit predicted changes in emotional fatigue ($\beta_{ef} = -.24, p = .04$) and mental fatigue ($\beta_{mf} = -.36, p < .001$) post move after controlling for job demand. Time 2 privacy fit explained 4% (semi-partial correlation = -.20) and 10% (semi-partial correlation = -.31) of variance in the final models testing emotional fatigue, $F(5, 55) = 8.44, p < .001$, and mental fatigue, $F(5, 55) = 14.42, p < .001$. Additional findings include a lagged effect of Time 1 emotional fatigue on Time 2 emotional fatigue ($\beta = .61, p < .001$), which explained 24% of the variance (semi-partial correlation = .49) in the final model. Similarly, a lagged effect of Time 1 mental fatigue was found on Time 2 mental fatigue ($\beta = .56, p < .001$), which explained 25% of the variance (semi-partial correlation = .50) in the final model. The lagged effects stayed significant in both final modelling stages. The total models including change in job demand as control explained 47% of adjusted variance for the emotional fatigue model and 53% of adjusted variance for the mental fatigue model. Further, changes in privacy fit predicted changes in job satisfaction ($\beta_{js} = .32, p < .01$) and workplace satisfaction ($\beta_{ws} = .62, p < .001$) post move after controlling for job demand. Privacy fit explained 7% (semi-partial correlation = .27) and 29% (semi-partial correlation = .54) of variance in the final models testing job satisfaction, $F(5, 55) = 7.18, p < .001$, and workplace satisfaction, $F(5, 55) = 12.46, p < .001$. Additionally, findings include a lagged effect of Time 1 job satisfaction was found on Time 2 job satisfaction ($\beta = .44, p < .001$), which explained 16% of the variance (semi-partial correlation = .40) in the final model. The lagged effect stayed significant in the final modelling

stage. The total models including change in job demand as control explained 34% of adjusted variance for the job satisfaction model and 49% of adjusted variance for the workplace satisfaction model.

Hypothesis 2b was supported as changes in coping appraisal predicted changes in emotional fatigue ($\beta_{ef} = -.22, p = .05$) and mental fatigue ($\beta_{mf} = -.30, p < .01$) post move after controlling for job demand. Time 2 coping appraisal explained 4% (semi-partial correlation = $-.19$) and 7% (semi-partial correlation = $-.26$) of variance in the final models testing emotional fatigue, $F(5, 55) = 11.26, p < .001$, and mental fatigue, $F(5, 55) = 12.57, p < .001$. As above, additionally, a lagged effect of Time 1 emotional fatigue was found on Time 2 emotional fatigue ($\beta = .71, p < .001$), which explained 33% of the variance (semi-partial correlation = $.57$) in the final model. Similarly, a lagged effect of Time 1 mental fatigue was found on Time 2 mental fatigue ($\beta = .62, p < .001$), which explained 32% of the variance (semi-partial correlation = $.56$) in the final model. The lagged effects stayed significant in both final modelling stages. The total models including change in job demand as control explained 46% of adjusted variance for the emotional fatigue model and 49% of adjusted variance for the mental fatigue model. Further, changes in coping appraisal predicted changes in job satisfaction ($\beta_{js} = .50, p < .001$) and workplace satisfaction ($\beta_{ws} = .53, p < .001$) post move after controlling for job demand. Time 2 coping appraisal explained 18% (semi-partial correlation = $.42$) and 21% (semi-partial correlation = $.46$) of variance in the final models testing job satisfaction, $F(5, 55) = 10.17, p < .001$, and workplace satisfaction, $F(5, 55) = 8.631, p < .001$. As above, additionally, a lagged effect of Time 1 job satisfaction was found on Time 2 job satisfaction ($\beta = .42, p < .001$), which explained 12% of the variance (semi-partial correlation = $.35$) in the final model. The lagged effect stayed significant in the final modelling stage. The total models including change in job demand as control explained 43% of adjusted variance for the job satisfaction model and 39% of adjusted variance for the workplace satisfaction model.

Additional material, such as regression tables, can be made available upon request. See Figure 2 for the supported hypothesised relationships.

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5 DISCUSSION

The present study was designed to assess the directional relationship between privacy fit and privacy-related coping appraisal and associated stress-related consequences at work due to changes in context factors as a result of a move to an ABW office. Therewith, the study extends prior cross-sectional correlational evidence on some of these relationships (e.g. Appel-Meulenbroek et al., 2020; Laurence et al., 2013; Sundstrom, 1986). An autoregression approach was used to estimate the directional influence that variables have on each other over time and to draw conclusions about causal influences between variables (Kearney, 2017).

IMPACT OF CONTEXT FACTORS ON PRIVACY AND COPING: FROM OPO TO ABW

Results suggest that post-move privacy fit was influenced by changes in the physical environment (perceived variety of settings) and the social environment (protocol adherence). It can be inferred that the perceived increase in the variety of work settings, alongside others' adherence to protocols, helped participants to achieve a better privacy fit in the new ABW environment than in the old OPO. Presumably, the new ABW environment enabled workers to choose a distinct setting for a certain task in a context where there is a mutual understanding of acceptable interaction levels between colleagues. This suggests that the new office set-up

helped workers to meet their diverse needs for privacy better than the old office did. These findings validate previous suggestions (Flynn, 2014; Keeling et al., 2015; Oseland, 2009) and reviewed findings (e.g. Babapour Chafi and Rolfö, 2019; Bellingar et al., 2006; Brennan et al., 2002; Hedge, 1982; Justa and Golan, 1977; Kupritz and Haworth, 2005; Steele, 1986) on the usefulness of setting variety and protocols in regulating interpersonal contact at work in ABW environments.

Further, results suggest that post-move privacy-related coping appraisal was influenced by changes in the physical environment (variety of settings) and the social environment (location autonomy). It can be inferred that the perceived increase in the variety of work settings and in location autonomy helped participants to cope better with poor privacy fit. More specifically, these findings suggest that the more varied participants perceived their work settings to be, and the more they felt a sense of autonomy in choosing their work locations in their new office, the more positively they appraised their capacity to cope with poor privacy fit. The relationship between appraisal and autonomy is in line with related appraisal research findings on job autonomy and job stress (e.g. Prem et al., 2016). This supports previous suggestions (Flynn, 2014; Wohlers and Hertel, 2017) and findings (Robertson et al., 2008; cf. Engelen et al., 2019), that location autonomy is an important context variable for managing privacy-related demands at work. These findings highlight that context factors can shape one's individual assessment of being able to cope with poor privacy fit. Therewith, the findings offer practical solutions not only to achieve better privacy fit but also to mitigate stress-related consequences in cases of poor fit.

IMPACT OF PRIVACY AND COPING ON SATISFACTION AND FATIGUE

Results suggest that changes in privacy fit and coping appraisal were related to changes in job and workplace satisfaction as well as to changes in emotional and mental fatigue post move. It can be inferred that after the move, respondents felt more satisfied with their workplace and job and less emotionally and mentally fatigued by experiencing a better privacy fit. Further, it can be inferred that respondents appraised their privacy-related coping appraisal better after the move, which was related to feeling more satisfied with their workplace and job and less emotionally and mentally fatigued. The results verify previous evidence (which used limited operationalisations of privacy) and suggestions concerning the detrimental impact of poor privacy fit and poor privacy-related coping appraisal. Further, the study verified theoretical suggestions and previous findings that workers who experience poor privacy fit in the office are less satisfied with the office environment or the job (e.g. Brunia et al., 2016; Hoendervanger et al., 2019; Kim and de Dear, 2013; Oldham, 1988; Sundstrom, 1986), are more generally fatigued (Appel-Meulenbroek et al., 2020), emotionally fatigued (Laurence et al., 2013) and mentally fatigued (cf. Cohen, 1978; Laurence et al., 2013; Sundstrom and Sundstrom, 1986). Furthermore, by taking a stress appraisal approach, the results suggest that one's individual assessment of being able to cope with poor privacy fit is related to the levels of dissatisfaction and fatigue one experiences. Taking into consideration prior cross-sectional evidence on these relationships ([reference will be added]), the explanatory value of studying individual coping experiences when examining stress-related consequences of privacy becomes evident.

IMPLICATIONS FOR PRACTICE

The results have practical implications. Firstly, it became evident that a poor privacy fit can jeopardise *psychological well-being* by contributing to emotional and mental fatigue, which can be regarded as components of burnout (Frone and Tidwell, 2015). This has financial implications.

In 2009, burnout-related costs for UK employers were estimated at £28 billion (NICE, 2009). Independently of extreme cases such as burnout, the economic impact of reduced work performance due to poor psychological well-being is well established (e.g. Harter et al., 2002). Until now, evidence of a connection between privacy fit and psychological well-being has been limited and its wider economic impact seldom discussed.

The present study not only highlights the risks of a poor privacy fit, it also attempts to offer solutions. Based on the results, it is postulated that flexible forms of office designs, such as ABW environments, that are designed to provide *work settings for occupants' varying privacy needs* (task and conversation privacy, limited interruptions and limited distractions), are occupied by more satisfied and less exhausted workers. Workers should have the opportunity to retreat and reduce social interaction by providing various types of spaces that enable withdrawal (e.g. cell-offices, quiet rooms/zones, sheltered spaces and anonymous spaces) (Flynn, 2014; Hoendervange et al., 2019).

Further, this study suggests that *protocols*, which are a typical ABW component that define desired and non-desired behaviour in different office settings, make privacy regulation more successful. Considering evidence of other in-depth studies on the usefulness of and adherence to protocols in ABW environments (Babapour Chafi and Rolfö, 2019), it can be assumed that protocols can prevent misunderstandings and conflict (cf. Oseland, 2009), regulate respectful use of open spaces and foster shared social norms and values that are privacy conducive. As previous research has shown, protocol acceptance and adherence can be increased, for example, by user participation during the planning process and by explicit and clear communication (cf. Babapour Chafi and Rolfö, 2019).

Furthermore, it is assumed that achieving optimal privacy fit consistently throughout a working day is not always possible—at least not for the entire office population. This study and prior mediation results ([reference will be added]) suggest that this might not necessarily result in a detrimental impact on workers' psychological health: the impact of poor privacy fit can possibly be mitigated by providing workers with coping options. In this study, it became evident that *location autonomy*, another ABW characteristic, and *office design with varying work settings*, increase workers' perception of being able to cope with privacy issues; giving workers full autonomy over where they work and making them aware that there are plenty of spaces they can choose from, could lend itself as a mitigation strategy.

It is acknowledged that privacy needs vary, amongst other things (cf. reference will be added), according to personal preference and capabilities (e.g. Maher and von Hippel, 2005; Oldham, 1988; Oldham et al., 1991), as well as job tasks/complexity, job type and industry sector (e.g. Kupritz, 2011; Hoendervanger et al., 2018; Hoendervange et al., 2019; Sundstrom et al., 1982). Nonetheless, prior studies have indicated that ABW environments can be suitable for various knowledge worker sectors “as long as the three key pillars of ABW are fully implemented, including design, behavior and technology” (cf. Candido et al., 2021, p. 122) and “when a perceived need-supply fit [person-environment fit] is created” (Gerdenitsch et al., 2018, p. 293). Hence, it is argued that ABW design features *and* ABW cultural/behavioural features *together* provide a flexible working environment that can answer to various forms and degrees of privacy needs. However, in order to create a privacy-conducive work environment, design and culture must go hand in hand [cf. reference will be added].

5 LIMITATIONS

First, the use of a single sample of workers may limit the generalisability of findings to other OPO workers within and outside the UK. Second, the sample size is small due to

substantial attrition (43%), which limited the choice of the advanced statistical testing and reduced the statistical power of the regression analysis. Third, this study cannot account for any spurious effects of organisational changes outside the scope of this study. Fourth, the study cannot account for any retest effects and inclusion of construct-irrelevant variance. Fifth, the study cannot determine causal relations between variables to the same extent that an experiment with random assignment (where groups are randomly assigned to an experimental stimulus group and a non-experimental stimulus group/control group) and independent manipulation of putative causes can (Selig and Little, 2012). Further, it was not possible to model the unique effect of several causes simultaneously. Furthermore, the study did not test the effects of change management interventions at any stage; however, the study results suggest causal explanations of one variable over another.

6 CONCLUSION

Overall, the results of the present research add to a growing body of literature investigating privacy at work and stress-related consequences. From a theoretical perspective, the usefulness of studying the dynamic nature of privacy fit and individual coping experiences when examining stress-related consequences of privacy became evident. From an empirical perspective, the study supports assumptions and single evidence on the undue consequences of poor privacy fit (satisfaction and fatigue). In addition, the study highlights that individual differences in coping appraisal shape one's privacy-related stress experience at work, and it points to context factors that are positively associated with privacy-related coping appraisal. Further, the results add to the limited evidence concerning the relationship between privacy and context factors in ABW environments. Both social and environmental context factors seem to be important resources when managing privacy demands. The study indicates the merit of ABW context factors (variety of settings, protocol adherence and location autonomy) in providing privacy fit in comparison to standard OPO context factors (little variety of settings, no/little protocol adherence and no/little location autonomy).

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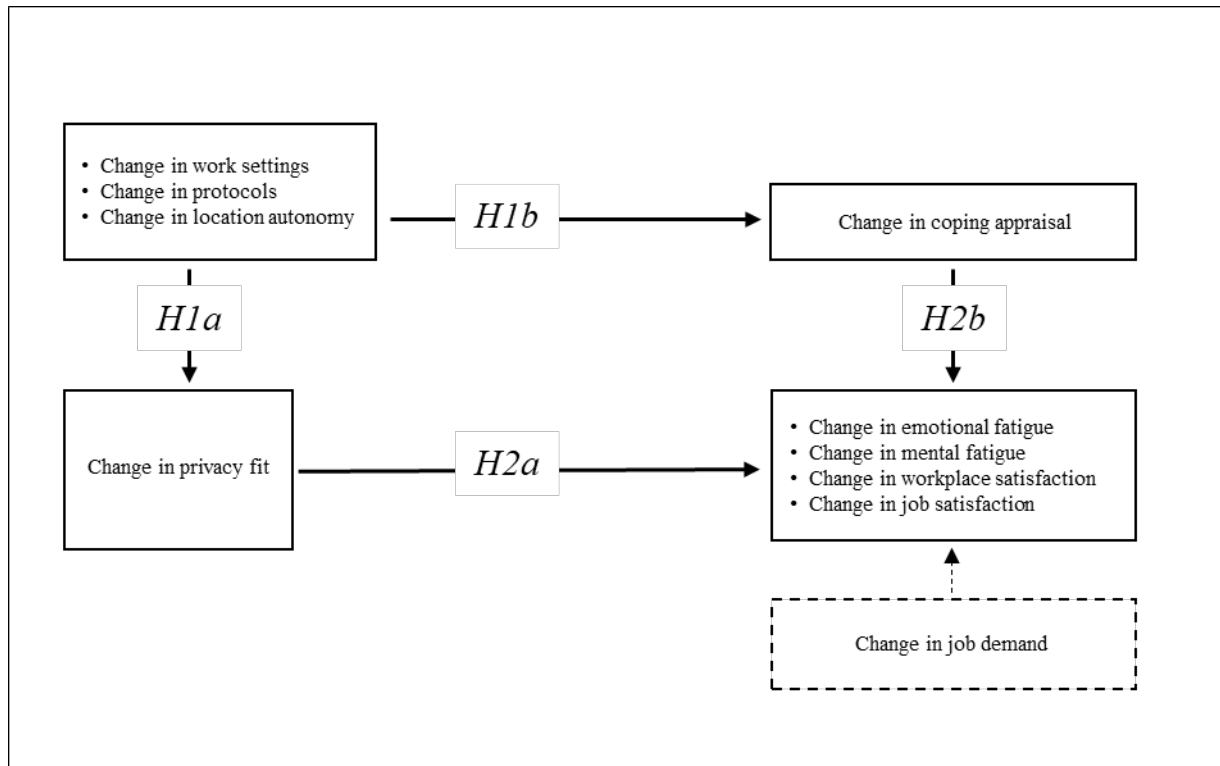


Figure 1. Hypothesised relationships.

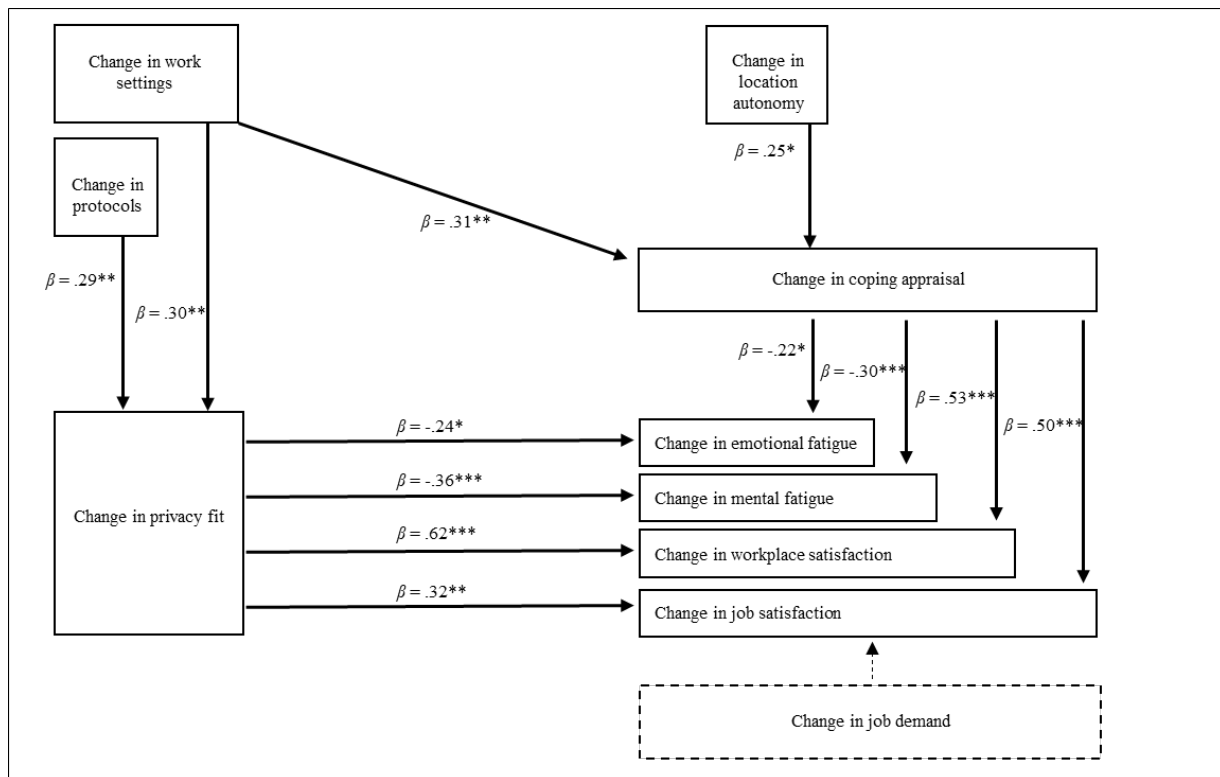


Figure 2. Supported hypothesised relationships. Note: $*p < .05$; $**p < .01$; $***p < .001$; $n = 61$.

Table 1

Means, standard deviations, Cronbach alpha, and zero-order correlations between study variables.

Variable	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Privacy fit T1	-1.34	4.50	.93	-																			
2. Privacy fit T2	-0.66	5.10	.92	.48**	-																		
3. C. appraisal T1	3.04	0.98	.87	.48**	.57**	-																	
4. C. appraisal T2	3.25	0.97	.87	.40**	.61**	.50**	-																
5. E. fatigue T1	2.70	1.16	.97	-.20	-.32**	-.37**	-.07	-															
6. E. fatigue T2	2.60	1.18	.98	-.13	-.38**	-.25	-.21	.69**	-														
7. M. fatigue T1	3.61	0.98	.95	.02	-.05	-.09	.13	.66**	.47**	-													
8. M. fatigue T2	3.37	0.97	.95	-.12	-.37**	-.17	-.20	.56**	.65**	.33*	-												
9. W. sat. T1	4.28	1.54	.93	.17	.14	.50**	.15	-.48**	-.36**	-.27*	-.19	-											
10. W. sat. T2	5.16	1.51	.93	.44**	.70**	.45**	.61**	-.28*	-.33**	-.05	-.32*	.21	-										
11. J. sat. T1	3.51	0.74	.64	.21	.33**	.43**	.36**	-.48**	-.33**	-.20	-.23	.55**	.36**	-									
12. J. sat. T2	3.64	0.73	.75	.27*	.48**	.29*	.59**	-.18	-.30*	.07	-.18	.29*	.58**	.53**	-								
13. Protocols T1	4.25	1.56	-	.13	.14	.25*	.22	-.16	-.11	.08	.16	.21	.17	-.01	.11	-							
14. Protocols T2	4.18	1.74	-	.12	.47**	.34**	.43**	-.24	-.30*	-.15	-.29	.28*	.44**	.39**	.39**	.21	-						
15. Autonomy T1	4.25	1.57	.81	.21	.26*	.32*	.53**	-.12	-.07	-.01	-.13	.38**	.29*	.41**	.34**	.03	.31*	-					
16. Autonomy T2	4.09	1.63	.73	.16	.43**	.35**	.57**	-.08	-.15	-.04	-.26*	.21	.40**	.36**	.21	.03	.37**	.63**	-				
17. Settings T1	3.46	1.44	-	.35**	.21	.40**	.25*	-.26*	-.21	-.09	-.10	.60**	.19	.39**	.21	.11	.15	.32*	.18	-			
18. Settings T2	4.80	1.57	-	.35**	.54**	.38**	.56**	-.18	-.14	-.05	.04	.30*	.62**	.25	.36**	.33**	.44**	.30*	.32*	.30*	-		
19. J. demand T1	3.61	0.78	.81	-.11	-.03	-.17	.01	.49**	.33**	.42**	.39**	-.13	.13	-.27*	-.03	-.15	-.27*	.05	0.11	-.17	0.17	-	
20. J. demand T2	3.65	0.76	.89	.05	-.04	.01	.03	.36**	.27*	.27*	.36**	.00	.00	-.26*	-.10	-.03	-.36**	.10	0.01	-.03	0.03	.56**	-

Note. $n = 61$, * $p < .05$, ** $p < .01$ (2-tailed).