Do Changes in the Work Environment Predict Changes in Privacy Appraisal and Associated Outcomes? – A Longitudinal Study

Clara Weber
Dept. of Life Sciences and Facility Management, Zurich University of Applied Sciences, Switzerland
Visiting Academic at Dept. of Environmental Psychology, School of Psychology, University of Surrey, Guildford, UK
Clara.Weber@zhaw.ch

Birgitta Gatersleben
Dept. of Environmental Psychology, School of Psychology, University of Surrey, Guildford, UK
B.Gatersleben@surrey.ac.uk

ABSTRACT

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

Theory: To investigate these points, this study builds on Altman's (1975) privacy regulation model and the cognitive appraisal theory (Folkman & Lazarus, 1985) as a transactional model of stress. It focuses on the fit between workers' desired and achieved levels of privacy and on the appraisal of privacy fit and its stressful nature.

Methods: This research was designed to examine context predictors of change in privacy fit and coping appraisal, as well as changes in the consequences of privacy fit during an office move. 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

Privacy, cognitive appraisal, office design, work fatigue, work satisfaction

1 INTRODUCTION

Despite the interest in work privacy in open-plan offices, which dates back several decades, evidence of 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. In an attempt to fill these gaps in the literature, this study investigates the impact of an office move from standard open-plan to an ABW configuration on workers' privacy experience and related consequences by taking a stress perspective.

1.1 Work privacy fit and expected outcomes

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).

Expected Outcomes

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., Kim & de Dear, 2013; Oldham, 1988; Sundstrom, 1986). There is some prior evidence of the relationship between poor privacy fit and emotional fatigue (e.g., Laurence et al., 2013), whereas P–E fit research gives sufficient empirical support for poor P–E fit being associated with emotional fatigue (e.g., Edwards & Harrison, 1993; Jamal & Baba, 2000; Vandenberg et al., 2002). Further, a link between mental fatigue and poor privacy fit (e.g., Cohen, 1978; Laurence et al., 2013; Sundstrom & Sundstrom, 1986) has been suggested, whereas only scarce evidence exists to support this relationship; evidence primarily focuses on the regulation of acoustical social stimuli (e.g., Cohen & Spacapan, 1978).

The present study aims to validate findings on satisfaction using a multidimensional operationalisation of work privacy, given that previous studies used a reductionist approach. Further, the present study aims to extend the current evidence base by assessing whether poor privacy fit is associated with emotional and mental fatigue. Furthermore, as job demand is an established contributor to satisfaction and fatigue at work (cf. Frone & Tidwell, 2015), the assessment controls for its effect.

1.2 Coping appraisal

This research draws on stress theory, specifically cognitive appraisal theory (Folkman & 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 one's individual assessment of being able to cope with poor privacy fit (coping appraisal) is related to the levels of satisfaction and fatigue that one experiences.

1.3 Context factors

Overall, there is limited evidence of the relationship between environmental and social context factors and work privacy in ABW environments (cf. Engelen et al., 2018); most privacy research has been conducted on old versions of open-plan offices that have fallen out of fashion. Nonetheless, it has been postulated that ABW or ABW-related characteristics are helpful in regulating interpersonal contact in open-plan spaces (e.g., Flynn, 2014; Oseland, 2009). 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. It has been postulated that these are helpful in regulating interpersonal contact in open-plan offices (Oseland, 2009), although existing evidence is primarily reduced to non-peer-reviewed industry research (e.g., Flynn, 2014).

(2) Protocols, which refers to office etiquette on how to use different types of work setting correctly to prevent misunderstandings (Oseland, 2009). There is some evidence of the importance of unspoken rules that cue acceptable behaviour at work related to privacy (e.g., Justa & Golan, 1977; Steele, 1986) and on the usefulness of protocols in decreasing disturbances by colleagues (e.g., Bellingar et al., 2006; Brennan et al., 2002; Hedge, 1982; Kupritz & Haworth, 2005).

(3) Location autonomy, which refers to employees' ability to choose their preferred work location in and outside the office. Conceptually, location autonomy is related to job autonomy (Medik & Stettina, 2014; Szilagyi & 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 & Hertel, 2017), the evidence base is scarce (e.g., Robertson et al., 2008).

This study addresses the limited available evidence and aims to explore preventative measures that impact on poor privacy fit, privacy-related coping appraisal, and their undue consequences. Therefore, the relationships between ABW-related context factors, privacy fit, and coping appraisal are examined respectively.

1.4 Hypotheses

Hypothesis 1a: Changes in privacy fit over time are accounted for by changes in context factors (setting variety, protocol adherence, and location autonomy).

Hypothesis 1b: Changes in privacy-related coping appraisal over time are accounted for by changes in context factors (setting variety, protocol adherence, and location autonomy).

Hypothesis 2a: Changes in satisfaction and fatigue over time are accounted for by changes in privacy fit when controlled for job demand.

Hypothesis 2b: Changes in satisfaction and fatigue over time are accounted for by changes in privacy-related coping appraisal when controlled for job demand.

2 METHODS

2.1 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 and 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 autonomous working with regard to location choice.

2.2 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 sample population of n = 479. 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. An incentive of six lottery prizes was given by the company at the time of each survey; participants were asked on each occasion to create a respondent ID to match responses to both questionnaires for later analysis.

2.3 Participants

A total of 479 employees were invited to participate in the study. A total of 238 eligible questionnaire responses were collected at Time 1, and 135 at Time 2. A total of 85 respondents participated in both questionnaires, of which 24 were discounted because of excessive missing data. Sixty-one longitudinal responses were retained. The respondents of those 61 retained questionnaires were aged between 20 and 65 years (M = 34.50, SD = 10.0). Twenty-four of the participants were female, 35 male (2 missing). In terms of representativeness, the sample was considered adequate regarding gender ratio (organisation: 65% male, 36% female)[1], 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 departments relative to size (11 departments ranging from 'architecture' to 'building engineering' were represented between 10% and 67%)[2].

2.4 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 (PAW) V.1, a self-reported inventory of 12 x 12 items assessing first, the frequency of privacy needs 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*. Privacy fit scores were weighted with privacy need scores in accordance with Kahana's (1982) P–E fit assessment procedure.

Coping Appraisal

Privacy-related coping appraisal was assessed using four items from Dewe's (1991) six- item

[1] Preliminary analyses indicated that there was no difference in privacy fit distribution by gender. Hence, gender was not included for further analyses.

[2] Five departments were represented with < 10%, three were represented with 11–20 %, two were represented with 31–40 %, and one was represented with 67%.

coping appraisal scale and adapted for this study; two items from the original scale were excluded as they were not considered relevant or unspecific (cf. Weber, 2019). As the majority of the four items reflected 'uncontrollable situations' (Peacock & Wong, 1990, p. 232) and only one item reflected 'controllability by oneself' (p. 232), another item was added reflecting the latter theme, which is important to the coping appraisal construct. In line with the original measurement, a 5-point Likert scale ranging from *(1) Strongly disagree* to *(5) Strongly agree* was used. Low scores reflect high coping appraisal and the perception of being able to do something about the situation.

Outcome Variables

Workplace satisfaction was assessed using a three-item measure by Oldham (1988) with a 7-point Likert scale ranging from *(1) Strongly disagree* to *(7) Strongly agree*. Job satisfaction was assessed using a three-item scale by Lee and Brand (2005) with a 5-point Likert scale ranging from *(1) Strongly disagree* to *(5) Strongly agree*. 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*. Overall, high scores reflect high levels of satisfaction and fatigue.

Independent Variables

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. Adherence to protocols was assessed by a one-item measure developed for this study based on a definition by Oseland (2009). Location autonomy was assessed with three items developed for this study. 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.* Overall, low scores reflect little variety of settings, little adherence of others to protocols, and low levels of location autonomy.

Control Variable

Job demand was assessed using a four-item measure by Elovainio et al. (2015). Two items (intensive work and conflicting demands) 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*. High scores reflect high levels of job demand.

Table 1

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

	Variable	*M*	SD	*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	.88	-																			
2.	Privacy fit T2	-0.66	5.10	.87	.48**	-																		
3.	C. appraisal	3.04	0.98	.87	.48**	.57**	-																	
4.	C. appraisal	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. satisfaction	4.28	1.54	.93	.17	.14	.50**	.15	-.48**	-.36**	-.27*	-.19	-											
10.	W. satisfaction	5.16	1.51	.93	.44**	.70**	.45**	.61**	-.28*	-.33**	-.05	-.32*	.21	-										
11.	J. satisfaction	3.51	0.74	.64	.21	.33**	.43**	.36**	-.48**	-.33**	-.20	-.23	.55**	.36**	-									
12.	J. satisfaction	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).

3 ANALYSIS

3.1 Causal directions across time

Autoregressive cross-lagged analysis, as opposed to panel analysis, was conducted to assess causal directions across time (Bollen & Curran, 2006), due to the study's high attrition rate. 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). Tests were carried out to ascertain whether changes in context variables account for changes in privacy fit and coping appraisal (H1), and whether changes in privacy fit and coping appraisal account for changes in outcome variables (H2). Overall, 10 hierarchical regression models were tested.

3.2 Sample design considerations

A priori power calculations were conducted with G*Power (Faul et al., 2007) considering multiple regression analyses. An *a priori* power calculation with power (1-β) of .95, and α = .05 indicated that a sample of $n = 70$ would be required to detect large effects ($f2 = 0.35$) in regression models with seven predictors (to test H1). An *a priori* power calculation indicated that a sample of $n = 63$ would be sufficient in detected large effects in regression models with five predictors (to test H2). These results suggest that large effects could be found with the acquired sample size.

4 RESULTS

4.1 Hypothesis 1 – Impact of context factors on privacy and coping

Hypothesis 1a was partially supported as changes in variety of settings ($\beta = .29$, $p < .01$) and protocol adherence ($\beta = .30$, $p < .01$) predicted changes in privacy fit post-move, but not in location autonomy ($\beta = .17$, $p > .05$). Together, both variables explained 22% of variance in the final model, $F(7, 53) = 8.44$, $p < .001$.

Hypothesis 1b was partially supported as changes in variety of settings ($\beta = .31$, $p < .01$) and location autonomy ($\beta = .25$, $p = .03$) predicted changes in coping appraisal but not in protocol adherence ($\beta = .11$, $p > .05$). Together, both variables explained 16% of variance in the final model, $F(7, 53) = 10.16$, $p < .001$.

4.2 Hypothesis 2 – Impact of privacy and coping on satisfaction and fatigue

Hypothesis 2a was partially 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% and 10% of variance in the final models testing emotional fatigue, $F(5, 55) = 8.44$, $p < .001$, and mental fatigue, $F(5, 55) = 14.42$, $p < .001$. 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% and 29% of variance in the final models testing job satisfaction, $F(5, 55) = 7.18$, $p < .001$, and workplace satisfaction, $F(5, 55) = 12.46$, $p < .001$.

Hypothesis 2b was partially supported as changes in coping appraisal predicted changes in emotional fatigue ($\beta_{ef} = -.22$, $p = .05$) and mental fatigue ($\beta_{mf} = -.30$, $p < .001$) post-move after controlling for job demand. Time 2 coping appraisal explained 4% and 7% of variance in the final models testing emotional fatigue, $F(5, 55) = 11.26$, $p < .001$, and mental fatigue, $F(5, 55) = 12.57$,

$p < .001$. 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% and 21% of variance in the final models testing job satisfaction, $F(5, 55) = 10.17$, $p < .001$, and workplace satisfaction, $F(5, 55) = 8.631$, $p <.00$

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 these relationships (e.g., 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).

5.1 Impact of context factors on privacy and coping

Results suggest that post-move privacy fit was influenced by changes in the physical environment (variety of settings) and the social environment (protocol adherence). Presumably, the new office 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. These findings validate previous suggestions (Flynn, 2014; Keeling et al., 2016; Oseland, 2009) and reviewed findings (Brennan et al., 2002; Hedge, 1982) on the usefulness of setting variety and protocols in regulating interpersonal contact at work.

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). This suggests 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 & Hertel, 2017) and findings (Robertson et al., 2008), that location autonomy is an important context variable for privacy regulation at work.

5.2 Impact of privacy and coping on satisfaction and fatigue

Results showed that privacy fit and coping appraisal changes related to changes in job and workplace satisfaction and emotional and mental fatigue post-move. By taking a privacy fit perspective (Altman, 1975), the results verified previous evidence (which used limited approaches to privacy) and suggestions on detrimental impact of poor privacy fit (e.g., Laurence et al., 2013; Sundstrom & Sundstrom, 1986) and poor coping appraisal.

6 LIMITATIONS

First, the use of a single sample of workers may limit the generalisability of findings to other open-plan office workers within and outside the UK. Second, the sample size is small due to substantial attrition (43%), which limited the choice in advanced statistical testing and reduced the statistical power in 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 re-test effects and inclusion of construct-irrelevant variance. Fifth, the study cannot determine causal relations between variables to the same extent as can an experiment with random assignment and independent manipulation of putative causes (Selig & Little, 2012).

Further, it was not possible to model the unique effect of several causes simultaneously (Selig & Little, 2012). 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.

7 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). Further, it highlights how individual differences in coping appraisal shape one's privacy-related stress experience at work. Furthermore, the results add to limited evidence of 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.

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