Lean, green or chosen? An experimental examination of the impact of office space management strategies on organizational identification, well-being and productivity

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Running Head: Office space management

Abstract

Principles of lean management encourage managers to exert tight control over office space and the people within it. Alternatively, design-led approaches argue for the value of offices that are enriched, particularly by plants and art. On the basis of social identity perspective, this paper argues that both these approaches may compromise organizational identification and hence productivity and well-being by failing to give workers input into the design of office space. This hypothesis is tested in two experiments (*N*s = 112, 47) that examine the impact of different space management strategies on organizational identification, well-being and productivity. In both experiments, superior outcomes are observed when offices are decorated rather than lean. However, further improvements in well-being and productivity are apparent when workers are have input into office decoration. These effects are attenuated when those choices are overridden. Implications for theory and practice are discussed.

(144 words)

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Studies of psychological well-being at work were initiated at the turn of the last century (e.g., Mayo, 1933; Mead, 1913; Myers, 1925; Viteles, 1925; Wells, 1912) and continue to this day (e.g., Hansson, Vingard, Arnetz & Anderzen, 2008; Messer & White, 2006; Mills, Tomkins & Schlangen, 2007). However, the management of modern office space is typically influenced far less by psychologists than by architects, interior designers, facility managers, corporate real estate agents and popular management theorists (Cohen, 2007; Stegmeier, 2008). Here the emphasis is generally upon corporate return rather than psychological welfare (Bain & Taylor, 2000; Handy, 1990). Indeed it has been observed that when it comes to office management more generally, psychological factors tend to be considered only as an adjunct to business interests rather than exerting any influence over them (Furnham, 1990; Peters & Waterman, 2004; Statt, 2004).

This paper reports research that explores some of the key concepts at the heart of workspace management. In this, it draws on insights from the social identity approach to organizational life, as previously applied to the study of office space (e.g., Ashforth & Mael, 1989; Baldry, Bain & Taylor, 1998; Haslam, 2004; Knight & Haslam, 2008; Millward, Haslam & Postmes, 2007; Postmes, Tanis & de Wit, 2001). The key issues that are investigated here concern whether empowerment within office space impacts upon (a) well-being (in particular, feelings of psychological comfort, organizational identification, physical comfort and job satisfaction) and (b) productivity?

The lean approach: The case for managerial control of office space

Key recommendations of the Taylorist approach to office space management include (a) the removal from the workspace of everything except the materials required to

do the job at hand, (b) tight managerial control of the workspace and (c) standardization of managerial practice and workspace design (Boyer, 2003; Duffy, 1997; Harris & Harris, 2006). These ideas have been particularly influential in work that has promoted the *lean office* as the key to efficiency and productivity (Hirano, 1996; Hobson, 2006; Louis, 2007; Tapping & Shuker, 2002; Zalesny & Farace, 1987). This approach is exemplified by Bibby (1996) in his comparison of two adjacent offices in a modern bank:

> The contrast between the old and new in office life is currently well reflected here. Part of one floor is temporarily being occupied by staff from the [old] operation: here there is the usual clutter of office paperwork to be seen, the pinned-up postcards and personal photographs beside the desks. By contrast, the desks for [new] staff only a few feet away are spick-and-span, bare of all paper and, in line with company policy, free of any personal belongings. (para. 10).

The Taylorist literature sees lean, open space as efficient for a number of reasons. In the first instance, large, uncluttered space can accommodate more people and so lends itself to economies of scale (Durmusoglu & Kulak, 2008; Kelliher & Anderson, 2008). Desks (undecorated or personalized) can also easily be reconfigured for use by other workers (Hobson, 2006; Thompson, 2000). As a result, space occupancy can be centrally managed with minimal 'disruptive' interference from workers (Keyte & Locher, 2002; Titman, 1991). Indeed, many businesses now adopt a clean or lean office policy because they have more employees than they have spaces at which they can work. These lean desks are either taken on a first-come-first-served basis (hot-desking) or can be booked in advance (hotelling; Stegmeier, 2008; Millward et al., 2007). In the lean office, employee involvement in the running of the working space is purposefully de-emphasized (Wood & Wall, 2007; Zeisel, 2006). Low-status workers follow the system planned for them by management (George, Maxey, Rowlands & Upton, 2004; Skinner, 2005), performing

deskilled, repetitive tasks (Becker & O'Hair, 2007), reflecting Taylor's injunction that "all possible brainwork should be removed from the shop and centred in the planning or laying out department" (Braverman 1974, p.447).

This methodology has proved attractive to businesses since Taylor and his contemporaries began their work in the 1880s (Becker & Steele, 1995; Kanigel, 1999-). Yet despite the enormous body of literature it has spawned (e.g., Bibby, 1996; Brill, Margulis, Konar & BOSTI, 1984; George et al, 2004; Hobson, 2006; Hirano, 1996; Hyer & Wemmerlov, 2002; Louis, 2007; Pruijt, 2003) there is a surprising lack of empirical evidence to support its claims for greater efficiency. There would appear to be two main reasons for this oversight. First, the assumption that Taylorist methodology "just works" (Pyzdek, 2003, p.664) and, second, the heavy reliance (particularly in fields of design, architecture and space management) on evidence gleaned from case studies (e.g., Louis, 2007; Taylor, 1911; Tapping & Shuker, 2002).

The green approach: The case for design-led office space

Space planning and design is frequently seen as an expression of managerial intent (Marmot & Ely, 2000), where a building's aesthetics are seen as an opportunity to reflect and project a particular corporate ethos and image (Myerson & Ross, 2003; see also Cornelissen, Haslam & Balmer, 2007). We have seen how this space is often deliberately stark (or lean; Harris & Harris, 2006; Hobson, 2006), but some organizations choose to avoid Taylorist prescriptions for a lean office and instead *enrich* the workspace by investing in "environmental comfort" (Vischer, 2005, p. 102). This strategy is typically informed by a belief that such enrichment may promote health. In particular, aesthetically uplifting art — particularly images from nature — is believed to reduce stress and anger in a working environment (Kweon, Ulrich, Walker & Tassinary, 2008). The presence of living plants in a workspace is also thought to have the additional benefit of cleaning, or

'conditioning' the air, thereby helping workers feel happier and healthier (Bringslimark, Hartil & Patil, 2007; Dravigne, Waliczek, Lineberger & Zajicek, 2005).

In line with these ideas, the psychological literature suggests that relative to lean offices, enriched offices are psychologically advantageous (Greenwood, 2008; Elsbach, 2003; Handy, 1990; Haslam & Knight, 2006; Myerson, 2007; Thompson, 2000; Vischer, 2005; Zelinsky, 2006). More specifically, it leads to the hypothesis that enriching office space with pictures and plants is likely to increase workers' (a) sense of psychological comfort, (b) organizational identification, (c) job satisfaction, (d) physical comfort and (e) productivity (H1).

The social identity approach to space use

Yet despite being more sensitive to employees' needs than lean approaches, it remains true that even the most benign, design-focused space management strategies still tend to assume that it is management's prerogative to retain control of the workspace (Laing, Duffy, Jaunzens & Willis, 1998; Peters & Waterman, 2004). This assumption is one that is increasingly being called into question – not least by designers themselves (CABE, 2004; Froggett, 2001; Zeisel, 2006). In particular, some psychologists have argued that employees should be encouraged to decorate their immediate space with meaningful artefacts in order to project their identity onto their own environment and to give some sense of permanency, control and privacy (Baldry, 1997; Hall, 1968; Vischer, 2005). At a group level it is also argued that collectively, teams should be free to express their own identity within their workspace, differentiating themselves from other groups without necessarily compromising identification with the organization as a whole (Abrams, Ando & Hinkle, 1998; Peters & Waterman, 2004).

In particular, this recommendation is informed by a social identity approach to organizational life (after Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher &

Wetherell, 1987; Turner, Oakes, Haslam & McGarty, 1994), which suggests that employee recognition and involvement has the capacity to increase motivation, engagement and organizational identity (Ashforth & Mael, 1989; Haslam, Postmes & Ellemers 2003; Tyler & Blader, 2000). High levels of organizational identification are associated with a higher sense of job satisfaction (Kreiner & Ashforth, 2004; van Dick, 2004) and also with enhanced group performance (Worchel, Rothgerber, Day, Hart & Butemeyer, 1998). Along these lines, a social identity approach to space management suggests that managers who involve employees in decision-making are also likely to build a sense of shared organizational identity that enhances the motivation and commitment of junior colleagues (Ashforth & Mael, 1989; Cornelissen et al., 2007; Ellemers, De Gilder & Haslam, 2004).

Where decision-making is not shared, management is likely to foster less intrinsic motivation and compliance may be contingent upon higher levels of control and surveillance (Ellemers, van Rijswijk, Bruins & de Gilder, 1998; McCabe & Black, 1997; Turner, 1991). This in turn may lead to lower morale (Ellemers, et al., 2004; Oldham, Hackman & Pearce, 1976), less co-operative behaviour (Baldry et al, 1998; Organ, 1988; Paille, 2008; Tyler & Blader, 2000) and to lower levels of productivity (Vischer, 2005); in a way that compromises a company's bottom line (Ellemers et al, 2004; Hackman & Oldham, 1980; Lawler, 1986). On the basis of this approach, we therefore hypothesize that empowering workers to manage and have input into the design of their own workspace - thereby projecting their own identity onto it - will enhance feelings of (a) psychological comfort, (b) organizational identification, (c) job satisfaction and (d) physical comfort and also (e) enhance productivity relative to both lean and enriched conditions (H2).

Re-establishing managerial control

Historically, management has not empowered low-status workers (Hobsbawm, 1969; McCabe & Black, 1997). Indeed, the management literature generally counsels that

managers should assert (or reassert) control of the workspace (Prujit, 2003; Taylor, 1911). Giving autonomy to workers, only to remove it because management prefers its own options to those chosen by workers is seen by some literature as a legitimate option (Pruijt, 2003; Tapping & Shuker, 2006). However, the social identity approach outlined above would suggest that re-introducing managerial control into areas where workers are used to more autonomous conditions is likely to compromise organizational identification and thereby undermine productivity and well-being (Peters, 1989; Peters & Waterman, 2004). Along these lines, disempowerment within the workspace (Frederickson, 1989; George et al, 2004; Titman, 1991) has been found to engender a sense of alienation and discomfort (Baldry et al, 1998; Handy, 1990) and to reduce job satisfaction (Ashforth & Mael 1989; Cohen, 2007). Meanwhile, research in both environmental design and psychology points to a link between a reduction in workplace autonomy and greater levels of stress-related complaint (Bringslimark, Hartig & Patil, 2007; Danielsson & Bodin, in press; Scheepers & Ellemers 2005). Similarly, a meta analysis by Humphrey, Nahrgang and Morgeson (2007), suggests that an integrated approach which accounts for social needs at work increases motivation and satisfaction. On the basis of these arguments (Keyte & Locher, 2004; Louis, 2007; Pruijt, 2003; Wood & Wall, 2007), we therefore predict that disempowering workers by overriding their input into workspace design will reduce their feelings of (a) psychological comfort, (b) organizational identification, (c) job satisfaction and (d) physical comfort. Again too, we predict (e) that this will impact upon (i.e. reduce) productivity relative to an enriched or an empowered office environment (H3).

The present research

To test the above hypotheses we conducted two experiments in which space management was manipulated across four independent conditions. In these, the *lean* condition is informed by a neo-Taylorist perspective, in which minimalist office space is

intended to focus employees' attention solely on the work at hand (in particular through the imposition of a clean desk policy; Bibby, 1996; Fredrickson, 1989; George at al, 2004). The second, *enriched* condition, instantiates ideas from the design literature in which workers fulfil their job function in an office that incorporates art and plants, but where they have no input into their deployment (e.g., Duffy, 1997; Greenhalgh, 2002; Myserson, 2007). A third *empowered* condition is informed by social identity principles and allows participants to design their own office environment using a selection of the same art and plants as in the enriched condition but thereby allowing them to realize something of their own identity within their working space (De Croon, Sluiter, Kuijer & Frings-Dresen, 2005; Elsbach, 2003; Elsbach & Bechky, 2007). Finally, in a *disempowered* space, participants' workspace design is overridden by the experimenter, so that an initial sense of autonomy within the workspace is taken away (Becker & Huselid, 1998; Wood & Wall, 2007). Our goal in both studies was to assess the impact of these manipulations on participants' feelings of (a) psychological comfort, (b) organizational identification, (c) job satisfaction, (d) physical comfort and (e) productivity.

Experiment 1

In our first experiment, participants were drawn from a wide cross-section of society and were recruited to take part in a study that was conducted in a university psychology department. Here participants were randomly assigned to one of the four experimental conditions described above in order to gauge the impact of various space management strategies on well-being and productivity with reference to our three main hypotheses.

Method

Participants and design

One hundred and twelve people (40 male, 72 female) ranging in age from 18 to 78 (M = 37.55, SD = 15.05) took part in the study. 31% of the sample described themselves as students, 61% as being in paid employment and 8% as retired. Potential participants were recruited from a range of sources, but most were drawn from a panel of members of the general community who had indicated a willingness to participate in psychological research. Participation was voluntary and unpaid, although where appropriate, travelling expenses were reimbursed.

Individual participants were randomly assigned to one of four conditions (*lean*, *enriched*, *empowered*, or *disempowered*). The main dependent variables were psychological comfort, organizational identification, job satisfaction, physical comfort and productivity.

Materials and procedure

The laboratory 'office' was a small, interior room in a University department, without windows or natural light. Participants arrived individually and it was explained to them that they would take part in an experiment examining performance on analytical, processing and intellectual tasks. Participants gave their informed consent and confidentiality and anonymity were assured.

At every trial, the experimenter (the first author) explained that he needed to confirm a room booking with a secretary, thus leaving the participant alone in the office space for five minutes to take in the ambient environment. The office contained a rectangular desk (1600mm x 800 mm) and a comfortable office chair on castors. The room was lit by diffused, overhead fluorescent tubes, the floor was carpeted and an air conditioning system kept the room at a constant temperature of 21°C.

In the lean condition, no further additions to the room were made. In the enriched condition, participants were shown into a space where six potted plants (each approximately 350mm high) had already been placed around the edges of the desk and six pictures (800mm X 800mm) hung around the walls. The pictures were all photographs of plants enlarged onto canvas.

In the empowered condition, participants entered an office where the pictures and plants were placed randomly around the room. They were told that they could decorate the space to their taste using as many, or as few, of the plants and pictures provided as they wished. The disempowered condition involved the same initial procedure as the empowered condition. However, when the experimenter re-entered the office, he looked at the chosen decorations, briefly thanked the participant and then completely rearranged the pictures and plants — thereby overriding the participant's choices. If challenged, participants were told that their designs were not in line with those required by the experiment. No further information was given until the final debrief.

Measures

Card-sorting task. Once the experimenter returned to the office (or as soon as he had rearranged the pictures and plants in the disempowered condition), he asked the participant to perform a card-sorting task. Three packs of playing cards had been shuffled together and the participant was required to sort them back into the three constituent packs and to sort each pack into its four suits (hearts, clubs, diamonds and spades). These suits then had to be ordered from ace to king and placed in discreet piles, leaving twelve piles altogether. Key performance measures were the time taken to complete this task and the number of errors made.

Vigilance task. After this, participants performed an vigilance task. For this purpose they were given an A4 photocopy of the same magazine article and asked to cross

out and count all the lower case letters 'b' that were on the page. The time taken to complete the task was measured as well as the number of errors (missed 'b's).

In both cases the participants were told that they needed to perform the tasks as quickly and as accurately as possible.

Questionnaire. After they had finished both tasks, participants completed a 74-item questionnaire, in which items measuring different constructs were presented on five different pages. Most of these required a response on a seven-point scale (1='*completely disagree'*, 7='*completely agree'*). The penultimate page obtained participants' demographic information. The first items constituted manipulation checks in which participants were asked to consider the *managerial control of space.* This was measured by means of three, three-item scales that examined (a) *involvement* (α = .87; e.g., "I felt engaged in what I was doing in the office"; after Lodahl & Kejner, 1965); (b) *autonomy* (α = .82; e.g., "During this experiment I had control over my environment"; after Breaugh, 1989) and (c) *the quality of the workspace* (α = .87; e.g., "This was a pleasant room in which to work"; after Ferguson & Weisman, 1986).

The scales that followed were all based on previous studies of space management and organizational identification at work (Knight & Haslam, 2008). *Psychological comfort* was measured using a five-item scale (α = .87; e.g., "I felt at ease during the experiment"; after Vischer, 2005). *Organizational identification* was measured by three items that assessed participants' identification with the university in which the study was conducted (α = .70; e.g., "I identify with the university"; after Doosje, Ellemers & Spears, 1995). Employees' *positive experience of work* was assessed using two scales (a) *job satisfaction* (5 items; α = .68; e.g., "I enjoyed the 'finding the letters' task"; after Haslam, O'Brien, Jetten, Vormedal & Penna., 2005) and (b) *physical comfort* (5 items; α = .75; e.g., "I felt

too hot in the room"; after Spector et al., 2005). After completing the questionnaire, participants were debriefed and thanked for their participation.

Results

Analytic Strategy

None of the key demographic variables (sex, occupational status, age) correlated with any of our core analytic constructs and so these were not included in further analysis. In order to test our hypotheses, we first checked the robustness of the scales we had constructed. Questionnaire and performance data were then analysed by means of analysis of variance (ANOVA) with office condition (lean, enriched, empowered, disempowered) as a between-participants factor. Means are presented in Tables 1 and 2.

Manipulation checks

Analysis of variance revealed effects for involvement, autonomy and quality of workspace, Fs(3,108) = 44.92, 38.21, 20.23 respectively, all $ps < .001$. Orthogonal planned contrasts showed that (a) participants in the lean condition felt less involved, less autonomous and thought they were in a poorer quality space than participants in other conditions, Fs(3,108) = 36.97, 47.61, 50.41, respectively, all ps < .001; (b) that participants in the enriched office felt less involved and less autonomous than participants in the empowered condition, Fs(3,108) = 72.25, 54.32 respectively, all ps < .001; and that (c) participants in the disempowered condition felt less involved, less autonomous and thought they were in a poorer quality space than participants in the enriched and empowered conditions, Fs(3,108) = 25.40, 12.60, 10.11, respectively, all ps < .01.

Well-being

Analysis revealed effects for psychological comfort, organizational identification, job satisfaction and physical comfort, Fs(3,108) = 21.15, 2.87, 5.55, 10.03 respectively, ps = .001, .04, .001, .001, respectively. Consistent with H1, orthogonal contrasts showed that

participants in the lean condition felt less psychologically comfortable (H1a), reported less job satisfaction (H1c) and expressed lower feelings of physical comfort (H1d) than participants in other conditions, *F*s(3,108) = 21.53, 11.49, 10.18 respectively, all *p*s < .01.

Consistent with H2, orthogonal contrasts showed that participants in the empowered condition felt more psychologically comfortable (H2a) and reported greater job satisfaction (H2c) than participants in the enriched condition, *F*s(3,108) = 17.81, 4.33 respectively, *p*s < .001, .039, respectively.

Consistent with H3, orthogonal contrasts showed that participants in the disempowered condition, felt less psychologically comfortable (H3a), displayed less organizational identification (H3b) and reported lower feelings of physical comfort than participants in either the enriched or the empowered conditions (H3d), *F*s(3,108) = 17.56, 4.80, 19.10 respectively, *p*s = .001, .031, .004, respectively.

Productivity

Analysis revealed effects for time taken to complete the card-sorting and the vigilance tasks, *F*s(3,108) = 10.07, 4.44, respectively, both *p*s < .01. However, there were no effects for the number of errors made on either task, *F*s(3,108) = 1.67, 0.91 respectively, *p*s = .18, .44, respectively.

Consistent with H1, orthogonal contrasts showed that participants in the lean condition took longer to complete both timed tasks than participants in other conditions, *F*s(3,108) = 22.47, 2.76 respectively, both *p*s < .01. Consistent with H2, orthogonal contrasts showed that participants in the empowered condition took less time to complete the card-sorting task than participants in the enriched condition, $F(3,108) = 6.30$, $p = .01$. Consistent with H3, orthogonal contrasts showed that participants in the disempowered condition took more time to complete the vigilance task than those in either the enriched or the empowered conditions, $F(3,108) = 9.12$, $p = .003$.

Discussion

This experiment provided support for our three core hypotheses. Consistent with H1, relative to the lean condition, participants in enriched office space reported enhanced feelings of psychological comfort, job satisfaction and an improved sense of physical comfort, in line with previous claims made in the design literature (Elsbach & Beckhy, 2007, Zelinsky, 2006). It also led to the tasks being performed quicker, with no decrement in accuracy.

When participants were empowered to decorate their own working space, this led to further improvements in participants' perceptions of their working conditions. Consistent with H2, empowerment within the office space improved feelings of psychological comfort and job satisfaction (Faller, 2002; Haslam, Eggins & Reynolds, 2003; Postmes et al., 2001). Tasks were completed more quickly but, importantly, without any accompanying rise in errors. However, once this feeling of empowerment was overridden by the experimenters (i.e., in the disempowered condition), as predicted by H3, feelings of psychological comfort, organizational identification and physical comfort fell relative to those of participants in both the enriched and the empowered conditions. Disempowerment also led participants to take longer to complete the two tasks (Peters, 1989).

Yet despite the support that it provides for our hypotheses, this first study also has some significant limitations. First, our sample represented a fairly wide cross-section of the population who had not necessarily experienced office work themselves. Second, the experiment took place in a university setting, whereas (for obvious reasons) the majority of previous design studies have been based in the workspace (e.g., Brill et al, 1984; Dravigne, Waliczek, Lineberger & Zajicek, 2008; Gensler, 2005; Gorjup Valverde & Ryan, 2008; Louis, 2007).

Our measure of organizational identity was also problematic. Here we asked participants to express their levels of identification with the university, but this was irrelevant both to their everyday lives and to this study as many participants were recruited from outside the university. More relevant, then, was their identification with those who conducted the study itself (Tajfel & Turner, 1979). However, this was something we failed to assess. Another concern was that the card-sorting task could be seen to have limited ecological validity as a means of assessing office-based performance (Anastasi, 1988). Finally, this study did not include specific measures of organizational citizenship behaviour (OCB; Organ, 1988) that might have allowed us to examine issues of workspace motivation and consideration. Along these lines, OCB is seen as a key indicator of relevant outcomes at the organizational level because it measures "behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate promotes the efficient and effective functioning of the organization" and so would seem to be particularly important to address in this context (Organ, 1988, p.4; see also Baker, Hunt & Andrews, 2006; Messer & White, 2006; Tyler & Blader, 2000).

Experiment 2

Experiment 1 provided evidence that participants performed and felt better having been involved in decisions that affected their workspace. As hypothesized, non-empowered and disempowered participants (after Baldry et al, 1998; Laing et al, 1998; Sewell, 1998; van Dick, Christ & Stellmacher, 2004) were less satisfied and less productive than participants who were empowered. Nevertheless, the study had significant limitations, as outlined above. To address these issues, Experiment 2 used a sample drawn exclusively from a population of office workers. The experiment itself took place in a working office and contained more realistic, office-based tasks. The study also included a more relevant measure of organizational identification and an explicit measure of organizational

citizenship behaviour (Organ, 1988). These tasks were designed to replicate the straightforward tasks (information procesing and management) and repetitive activities (vigilance) found in many low-skilled office jobs (Harris & Harris, 2006).

While recongizing that self-reported OCB is of only limited validity (Baker, Hunt & Andrews, 2006); it was felt that developing a quantifiable measure of citizenship behaviour would usefully augment the results of the study. On the basis of social identity theorizing, we anticipated that OCB would increase to the extent that workers identify with each other and with their employer (Haslam, 2001; Postmes, Tanis & de Wit, 2001). Thus, while the hypotheses for Experiment 2 were the same as those in Experiment 1, we also predicted that OCB would be more apparent in an enriched office rather than a lean space (H1f), that it would increase further in an empowered space (H2f), but that it would fall away if empowered workers were subsequently disempowered (H3f).

Method

Participants and design

The design of Experiment 2 was the same as Experiment 1 but with the addition of a quantifiable measure of OCB. Forty-seven office workers (28 male, 19 female) ranging in age from 22 to 61 (M = 36.23, SD = 9.57) took part in the study. 35% of the sample described themselves as non-management staff, 30% as lower management, 26% as middle management and 9% as senior management. Potential participants, all from commercial businesses, were contacted by mail, email and telephone. Participation was on a voluntary basis and was unpaid.

Materials and procedures

The study took place in an air-conditioned office approximately 4.5 x 6 metres in size. The space housed an executive desk (approximate dimensions 2200 x 800mm) with two, 90° returns of approximately 2000 x 600mm, so that the effective desktop area took up

three sides of a hollow square with the participant at its centre. There was also a large matching credenza with eye-level storage in the room (approximately 1800 high x 2200 wide x 800 deep). Participants sat in a high backed, comfortable leather chair as they worked. The room had a raised Tec-Crete floor, with a large sea-grass rug beneath the desk covering the immediate working area. The door and most of the walls were glass. In order to minimize distraction, participants sat with their backs to the outside world and temporary, opaque transfers obscured the windows below eye-line height. The study followed the same procedure as Experiment 1, allowing the participants five minutes alone in their workspace in which to absorb the ambient environment before the experiment began.

Measures

Although the instructions and timing procedures were the same as in Experiment 1, the measures in Experiment 2 varied slightly in order to improve the ecological validity of the tasks that participants performed (Anastasi, 1988). An additional OCB element was also added.

Information management and processing task. Participants were asked to work with a shuffled pile of corporate memoranda based on a fictitious company. They had to imagine that they were employees of this company and (a) sort the memoranda into chronological order (an information management task) and then (b) answer fifteen, multiple-choice questions based on the information contained in these memos (an information processing task).

Vigilance task. The experiment's second element, was exactly the same as in Experiment 1 and once more participants were told that they needed to perform the tasks as quickly and accurately as possible.

Organizational citizenship behaviour task. This new measure took the form of a quantifiable, OCB task (after Organ 1988; Williams Pitre & Zainuba, 2000). This built on the participants' fictitious employment with the company described in the information management task. Participants were asked to imagine that in addition to a normal workload, they were responsible for ten additional tasks. Five of these were undesirable (e.g., "Draw up proposals about how the company should reduce its headcount") and five were desirable (e.g., "Represent the company at the annual Awards Dinner"; after Paille, 2008). Participants were told that any number of these tasks could be off-loaded onto a colleague and that this would have no additional implications for them as the company's management would make sure that the participants' peers did not find out the source of any increase in workload.

Questionnaire. The same questionnaire was used as in Experiment 1, but with two modifications. The three-item, *organizational identification* scale now reflected participants' identification with the organization managing (rather than the organization hosting) the experiment ($\alpha = .90$; typical item: "I identify with the organization that is running this experiment"; after Doosje et al., 1995), whilst the *job satisfaction* scale incorporated a measure of OCB (8 items; $\alpha = .90$; e.g., "If these were my normal working conditions I would stay behind to do extra work if necessary, even if I was not paid overtime"; after Haslam et al., 2005)

Results

Analytic strategy

None of the key demographic variables (sex, occupational status, age) correlated with any of our core analytic constructs and so these were not included in further analysis. In order to test our hypotheses, we first checked the robustness of the scales we had constructed. Questionnaire and performance data were then analysed by means of analysis of variance (ANOVA) with office condition (lean, enriched, empowered, disempowered) as a between-participants factor. Means are presented in Tables 3 and 4.

Manipulation checks

Analysis of variance revealed effects for involvement, autonomy and quality of workspace, Fs(3,43) = 18.42, 29.96, 11.51 respectively, all ps < .001. Orthogonal planned contrasts indicated (a) that participants in the lean condition felt less involved, less autonomous and thought they were in a poorer quality space than participants in other conditions, Fs(3,43) = 24.30, 26.42, 16.65, respectively, all ps < .001; (b) that participants in the enriched office felt less involved and less autonomous than participants in the empowered condition, Fs(3,43) = 3.28, 14.06, respectively, ps =.078, < .001, respectively and (c) that participants in the disempowered condition felt less involved, less autonomous and thought they were in a poorer quality space than participants in the enriched and empowered conditions, Fs(3,43) = 26.42, 47.89, 16.97, respectively, all ps < .001.

Well-being. Analysis revealed effects for psychological comfort, organizational identification, job satisfaction and physical comfort, Fs(3,43) = 20.50, 4.29, 7.00, 6.65 respectively, all ps < .01. Consistent with H1, orthogonal planned contrasts indicated that participants in the lean condition felt less psychologically comfortable (H1a), reported less job satisfaction (H1c) and felt less physically comfortable (H1d) than participants in other conditions, Fs(3,43) = 29.70, 12.18, 4.45 respectively, ps < .001, .001, .041 respectively.

Consistent with H2, orthogonal contrasts showed that participants in the empowered condition felt more psychologically comfortable (H2a) than participants in the enriched condition, $F(3,43) = 3.80$, $p = .058$.

Consistent with H3, orthogonal contrasts indicated that participants in the disempowered condition felt less psychologically comfortable (H3a), reported less organizational identification (H3b), reported lower levels of job satisfaction (H3c) and reported feeling less physically comfortable (H3d) than participants in either the enriched or the empowered conditions, Fs(3,43 = 44.36, 11.76, 8.24, 14.52 respectively, all ps < .01.

Productivity

Analysis revealed effects for time taken to complete both the information management and the vigilance tasks, Fs(3,43) = 3.73, 5.75 respectively, ps = .018, .002 respectively. It also revealed effects for the total number of tasks retained on the OCB task, $F(3,43) = 4.77$, $p = .006$; and for the number of errors made on the information management task $F(3,43) = 4.17$, $p = .011$. At the same time there were no effects for the number of errors made on the vigilance task, $F(3,43) = 1.23$, $p = .311$.

Consistent with H1, orthogonal planned contrasts showed that participants in the lean condition took longer to complete the information management task (H3e) and retained fewer OCB tasks than participants in other conditions (H3f), Fs(3,43) = 7.56, 12.66 respectively, both ps<.01. There were no significant differences in the number of errors made on the information management task, $F(3,43) = 0.01$, $p = .922$.

Consistent with H2, orthogonal contrasts showed that participants in the empowered condition took less time to complete the vigilance task than participants in the enriched condition (H3e), $F(3,43) = 5.02$, $p = .030$. There were no significant differences in terms of the number of errors made on the information management task, Fs(3,108) = 0.19, $p = .659$.

Consistent with H3, orthogonal contrasts showed that participants in the disempowered condition took longer to complete the vigilance task than participants in either the enriched or the empowered conditions (H3e), $F(3,43) = 11.70$, $p = .001$. Participants in the disempowered condition also made significantly more errors on the information management task than those in the enriched or empowered conditions, $F(3,43) = 12.39$, $p = .001$.

Discussion

The findings from this experiment are consistent with those from Experiment 1 and provide further support for our experimental hypotheses. Consistent with H1, relative to the lean condition, enriched office space led to improved feelings of psychological comfort, job satisfaction and physical comfort. It also led to tasks being performed more quickly and to an increase in organizational citizenship behaviour.

Consistent with H2, when participants were empowered to decorate their own working space, this led to a further improvement in feelings of psychological comfort and to an increase in their levels of productivity relative to participants in the enriched condition. As had been found in Experiment 1, and consistent with Hypothesis 3, amongst disempowered participants, feelings of psychological comfort, organizational identification and physical comfort all fell relative to participants in both the enriched and empowered conditions. Disempowerment also caused participants to take more time to complete the two tasks.

As well as replicating effects observed in Experiment 1, this study extended its findings within a more realistic organizational setting and with a representative organizational sample. In particular, it did this by examining the impact of space management on organizational citizenship behaviour, which was lower in the lean office than in any other condition. This accords with observations in the social psychological

literature, which suggest that when managers extend visible signs of care and empowerment to employees, this can enhance organizational identification and thereby increase the likelihood of workers engaging in more supra-contractual activity that benefits both their colleagues and their employer (Baker Hunt & Andrews, 2006; Williams & Anderson, 1991).

General Discussion

The two experiments reported above provide consistent support for our hypotheses and for the central claim of this paper, namely that design and empowerment both have an important role to play in determining people's responses to their work environment. In both experiments, well-being and productivity were enhanced by enriching a space (H1) and then by empowering participants (H2) within the same working environment. Disempowering participants (H3) had the effect of significantly compromising both well-being and productivity. Experiment 2 also suggested that enrichment and empowerment lead to increased organizational citizenship behaviour (Organ, 1988).

The evidence presented here accords with the view that lean conditions may indeed be psychologically impoverished (Munsterberg, 1913; Zelinksy, 2006) and that insufficient peripheral stimulation may be a factor in lower performance (Bringslimark et al., 2007; Peters & Waterman, 2004; Zeisel, 2006). Certainly, enriching the environment – in line with most animal studies (e.g., Larsson, Winblad & Mohammed, 2002) – made a quantitative and qualitative difference to participants' perceptions and performances. As one of our participants remarked, "it's so nice to come into an office with plants and pictures, it makes a place feel more homely, even a glass box [of an office] like this." In line with claims in the organizational literature (Becker & Huselid, 1998; Lawler, 1986) and as suggested by research in the social identity tradition (Ellemers, de Gilder & Haslam, 2004) having input into the design of their work space increased participants' feelings of

autonomy and decisional involvement and this led to increases in comfort, job satisfaction and productivity. However, as a corollary, these effects were attenuated when participants were disempowered (Cohen, 2007; Peters, 1989).

From one perspective, these results may not seem at all surprising. Workers' perception of procedural fairness via participative decision making has already been equated with higher levels of organizational identification and greater job satisfaction (Ellermers et al., 2004; Haslam, 2004; Tyler & Blader, 2000). Nevertheless, these data sit uncomfortably with a large body of neo-Taylorist literature which promotes lean space, clean-desk policies and standardized managerial control of working environments as keys to productivity (e.g., Fredrickson, 1989; Hyer & Wemmerlov, 2002; Marmot & Ely, 2000; Mills et al, 2007; Sewell & Wilkinson, 1992; Titman, 1991; Wilmott, 1993). Illustratively, Hobson (2006) argues that to maximize efficiency, the office must be standardized to a pattern determined by management and clearly communicated to staff (p.33). Such an approach highlights a gulf between managers empowered to think and workers expected to respond to their injunctions (see Baldry et al, 1998). Hobson explains that "Having a defined, current best way of doing something is of course completely useless unless people use it. We (i.e., management) must communicate the new way of working to the people who will use it" (p.38). This philosophy of standardization and control lie at the core of the lean office (see Keyte & Locher, 2004; Louis, 2007) where the practice of 'sorting' (Hirano, 1995; George et al, 2004; Peterka, 2006), encourages managers to remove all items not directly related to the business process in order to promote 'work focus' and to minimize distraction (Thompson, 2000).

Contrary to these ideas, the data from the present research indicate that a lean space over which employees have no control is the *least* productive use of the working environment. Instead, the present research suggests that welfare and productivity are most

likely to be optimized by practices that empower the workforce (after Reicher & Haslam, 2006). Indeed, in the experiments here, empowerment was the key differentiating factor in increasing productivity by up to 32%.

When management follows the recommendations to limit or eliminate entirely the decisional involvement of low-status workers in environmental decision-making (e.g., Brill et al., 1984; Duffy, 1997; Durmusoglu & Kulak, 2008; Faller, 2002; Gartenberg, 2006; George et al, 2004; Hirano, 1996; Titman, 1991), the result, as Vischer (2005) points out, is that apparently rational space alteration, such as the removal of a door or partition, made by managers and planners in the interests of efficiency, can mean a "loss of privacy, a loss of control, a loss of identity" for the powerless person who works in that space (p.45). Such managerial intrusion into 'established' workspace (Sewell, 1998) links to the fourth condition in the present studies, in which disempowerment of participants was found to be at least as disadvantageous as imposing a lean environment. Our results thus suggest that workspace management techniques such as 'setting in order' (George et al, 2004; Hobson, 2006) which is prescriptive at the micro level — so that, for example, "a draftsman should locate all his stationery within reachable distance but not put (out) more pencils than required on an average day" (Peterka, 2006, para.4) — are likely to compromise comfort, organizational identification and ultimately organizational effectiveness.

These findings represent an advance on previous studies in providing a direct, quantitative assessment of the relative benefits of approaches to space management informed by Taylorist, design and social identity approaches. Although the patterns observed here accord with findings that have previously been observed in qualitative, case-studies (e.g., Elsbach, 2003; Keyte & Locher, 2002; Laing et al., 1998; Peters & Waterman, 2004), the particular advantage of the present research is that it uses an experimental approach to manipulate relevant variables thereby increasing control over these variables

and increasing confidence in the causal status of our independent variables. These data thus provide strong support for previous suggestions that there may be value in organizations taking steps to empower *all* employees in the development and management of their work space. This conclusion is very much at odds with Taylorist principles and the managerial approach they have inspired, but it also points to some of the limitations of an approach to space management which is solely design-led (Baldry et al., 1998; Furnham, 1990; Haberkorn, 2005; Hobsbawm, 1969; Louis, 2007; Masaaki, 1986; McGregor, 1960; Taylor, 1911; Zalesny & Farace, 1987).

Limitations and further research

Not withstanding the support it lends our hypotheses, this research also has a number of limitations. The first of these is the nature of the work space, which, even in Experiment 2, was somewhat artificial. Participants were introduced to a strange space and asked to perform unfamiliar tasks — a situation clearly unlike most working offices in which workers are familiar with both their working environment and the often repetitious nature of their jobs (Baldry et al., 1998; Laing et al, 1998). In Experiment 2 it could be argued that rather than moving to a 'real world' setting, we had instead simply created a laboratory in an office. This though, was very much the point, and by allowing us to exclude the role of elements that were extraneous to our purpose, the two studies allowed for a more forensic examination of different theoretical positions than has previously been possible (Mook, 1983; Turner, 1981). Indeed, in this respect, our manipulations may have exposed less striking effects than we might otherwise have achieved (e.g., had we disempowered participants in their own established office rather than one in which they were unfamiliar; see Peters & Waterman, 2004; Wegge, van Dick, Fischer, Wecking & Moltzen, 2006; Zelinsky, 2006)

Second, our studies examined individuals in cellular space, whereas most low-status office workers work (a) in multi-person, open-plan offices and (b) in teams (see Baldry et al, 1998; Barker, 1993; Fredrickson, 1989; Laing et al., 1998; Millward et al, 2007). Accordingly, there is clearly a need for future studies to extend the reasoning of the present studies to investigate the behaviour of groups of participants working in designated space. Our general expectation would be that the hypotheses explored here would also hold true in these contexts, although we might expect the effects to be moderated by social identity dynamics that would exacerbate both productivity and resistance (e.g., see Haslam, 2004).

Third, additional data need to be drawn from longitudinal work. These studies do not show, for example, whether workers in the lean office perform better as time progresses. Interestingly, the lean literature suggests they do not. Indeed, sustaining improvements associated with the introduction of lean practices is frequently cited as hard for managers to achieve (George et al, 2004; Hobson, 2006; Peterka, 2006). Conversely it is important to establish whether improvements brought about by empowering employees will be maintained in the way that the literature suggests they are (Cohen, 2007; Duffy, 1997; Vischer, 2006). At the moment, there is a lack of quantitative data to support either observation.

Finally, our research to date has concentrated on the world of work. However, it may be beneficial to examine the effects of empowerment in, for example, hospital or residential care environments. Literature tells us of the importance of high-quality emotional contact with family and friends in such settings (Deci, La Guardia, Moller, Scheiner & Ryan, 2006) and of the importance of group identity within familial and social boundaries (Twigger-Ross, Bonaiuto & Breakwell, 2003). But would introducing elements of group choice into care situations increase or compromise physical well-being and feelings of satisfaction?

As part of the present programme, we have begun to conduct such studies (Knight, Haslam & Haslam, 2008). Preliminary findings provide strong support for the present analysis. Nevertheless, it needs to be emphasized that this research too, has important limitations (e.g., it involves small, non-representative populations). However these developments, we believe, provide important vindication of organizations who seek to empower not only managers but all their employees.

Concluding comment

The novel contribution of the present research lies in identifying theoretical and empirical connections between different strategies of office space management and workers' well-being and productivity. In this, it also breaks new ground by demonstrating how strategies of empowerment that enhance organizational identification can contribute not only to organizational productivity but also to employee welfare.

At the same time it suggests that popular approaches to office space management which overlook the psychological needs of employees may be misguided. For these approaches miss out on the benefits that accrue when employees are included in decisions about space management and hence come to identify both with that space and with the organization itself. In this respect, it may be better for an office to be 'green' rather than 'lean', but it would also appear advantageous for employees to have input into office design rather than simply having it thrust upon them.

Acknowledgement

This research was supported by a CASE award from the Economic and Social Research Council (PTA—33-2005-00021). This award was co-sponsored by Ambius (a division of Rentokil Initial) and Haworth UK (a division of Haworth Inc.).

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Table 1. *Experiment 1: Descriptive statistics and bivariate correlations*

	M (SD)	1	2	3	4	5	6	7
1. Involvement	3.68 (1.53)	-	.16	.65**	.46**	.08	.41**	.44**
2. Autonomy	4.14 (1.19)		-	.01	.02	.12	.06	.07
3. Quality of workspace	4.69 (1.23			-	.75**	.04	.39**	.57**
4. Psychological comfort					-	.14	.40**	.70**
5. Organizational identification						-	.30**	.15
6. Job satisfaction							-	.35**
7. Physical comfort								-

Note: $^{**}p < .01$

Table 2. *Experiment 1: Scale properties, means and effects for measures of participants' subjective experience*

	Scale		Condition (n = 112)				Effects		Contrasts (t-values)		
	N	α	**L**ean	**E**nriched	**Em**powered	**D**isempowered	*F* (3,108)	effect size (η^2)	LvE,Em,D	DvE,Em	EvEm
Involvement	3	.87	2.56	3.21	5.77	3.18	44.92**	.56	6.08**	5.04**	8.50**
Autonomy	3	.82	2.90	3.77	5.93	3.95	38.21**	.51	6.90**	3.55**	7.37**
Quality of workspace	3	.87	3.32	5.39	5.49	4.57	20.23**	.36	7.10**	3.18**	.32
Psychological comfort	5	.78	4.01	4.74	5.72	4.24	21.15**	.37	4.64**	4.19**	4.22**
Organizational identification	3	.70	4.60	5.25	4.64	4.33	2.87*	.07	.56	2.17*	1.88
Job satisfaction	5	.68	4.82	5.26	5.71	5.31	5.55**	.13	3.39**	.91	2.08*
Physical comfort	5	.75	4.56	5.49	5.74	4.59	10.03**	.22	3.19**	4.37**	.92

Note $^{\#}p < .10$, $^{*}p < .05$, $^{\dagger}p < .01$

Table 3. *Experiment1: Means and effects for performance measures*

	Condition (n = 47)				Effects		Contrasts (t-values)		
	Lean	**E**nriched	**Em**powered	**D**isempowered	$F(3,43)$	effect size (η^2)	LvE,Em,D	DvE,Em	EvEm
Card sorting task (time in minutes)	15.24	12.91	10.94	12.76	10.07**	.22	4.74**	1.23	2.51*
Card sorting task (Errors)	1.04	1.29	0.36	0.82	1.67	.04	.61	.00	2.15*
Vigilance task (time in minutes)	7.51	6.69	6.08	7.70	4.44**	.11	1.66#	3.02**	1.21
Vigilance task (Errors)	19.54	17.64	18.21	19.82	.91	.02	.77	1.41	.37
Total time (minutes)	22.75 (100%)	19.60 (86.2%)	16.74 (73.6%)	20.47 (90.0%)	13.11**	.27	4.81**	2.73**	2.95**
Total errors	20.57 (100%)	18.86 (91.2%)	18.36 (89.3%)	20.64 (100.3%)	.96	.03	.93	1.39	.30

Note # p <.10, * p <.05, ** p < .01

Table 4. *Experiment 2: Descriptive statistics and bivariate correlations*

	M (SD)	1	2	3	4	5	6	7
1. Involvement	3.68 (1.58)	-	.01	.89**	.72	.68	.55	.60
2. Autonomy	3.80 (1.32)		-	.04	.12	.07	.05	.02
3. Quality of workspace	4.26 (1.51)			-	.79**	.62**	.55**	.62**
4. Psychological comfort	4.22 (1.48)				-	.64**	.60**	.61**
5. Organizational identification	4.35 (1.66)					-	.72**	.67**
6. Job satisfaction	4.46 (1.02)						-	.60**
7. Physical comfort	5.59 (1.15)							-

Note: $^{**}p < .01$

Table 5. *Experiment 2: Scale properties, means and effects for measures of participants' subjective experience*

	Scale		Condition				Effects		Contrasts (*t*-values)		
	N	α	**L**ean	**E**nriched	**Em**powered	**D**isempowered	*F*(3,43)	effect size (η^2)	LvE,Em,D	DvE,Em	EvEm
Involvement	3	.87	2.25	4.82	5.83	2.79	18.42**	.57	4.93**	5.14**	1.81#
Autonomy	3	.82	2.44	4.33	5.94	2.48	29.96**	.68	5.14**	6.92**	3.75**
Quality of workspace	3	.87	3.39	5.47	5.69	3.82	11.51**	.45	4.08**	4.12**	.46
Psychological comfort	5	.87	3.02	4.98	5.68	3.20	20.50**	.65	5.45**	6.66**	1.95#
Organizational identification	3	.90	4.00	5.19	5.00	3.21	4.29**	.23	.93	3.43**	.32
Job satisfaction	8	.90	3.51	5.06	5.25	4.02	7.00**	.33	3.49**	2.87**	.43
Physical comfort	5	.84	5.02	6.08	6.45	4.79	6.65**	.32	2.11*	3.81**	.84

Note #$p < .10$, *$p < .05$, **$p < .01$

Table 6. *Experiment 2: Means and effects for performance measures*

	Condition				Effects		Contrasts (*t*-values)		
	Lean	**E**nriched	**Em**powered	**D**isempowered	*F*(3,43)	effect size (η^2)	LvE,Em,D	DvE,Em	EvEm
Information management/handling task (time in minutes)	32.04	25.49	21.29	27.27	3.73*	.21	2.75†	1.33	1.29
Information management (errors)	1.42	1.00	.75	2.64	4.17*	.23	.10	3.52**	.44
Vigilance task (time in minutes)	8.42	8.03	6.13	9.67	5.75**	.29	.68	3.42**	2.24*
Vigilance (errors)	22.92	20.00	16.33	21.64	1.23	.08	1.21	1.07	1.01
Total time (minutes)	40.45 (100%)	33.53 (82.9%)	27.41 (67.8%)	36.94 (91.3%)	4.58**	.24	2.61*	1.98#	1.67
Total errors	24.33 (100%)	20.42 (83.9%)	17.08 (70.2%)	24.09 (99.0%)	1.88	.12	1.32	1.70#	.95
Negative OCB tasks retained	2.00	3.42	3.92	2.82	4.20*	.23	2.97**	1.67	.88
Positive OCB tasks retained	2.50	3.25	2.75	3.09	1.25	.08	1.53	.24	1.18
Total OCB tasks retained	4.50 (100%)	6.42 (142.7%)	6.67 (148.2%)	5.91 (131.3%)	4.77**	.25	3.56**	1.13	.40

Note: # $p < .10$, * $p < .05$, ** $p < .01$