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Employee reactions to office redesign: A naturally occurring quasi-field experiment in a multi-generational setting

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Abstract
Outcomes associated with an office redesign aimed at decreasing workspace while enhancing perceptions of organizational culture and work-related attitudes are examined within a financial services organization. Findings show that employees assigned to the redesigned office environment report less workspace and more distractions than those who remained in a cubicle environment, but that this finding was moderated by age generation. Employees moved to the newly redesigned space reported more favorable perceptions of culture and work-related attitudes, with no age moderating effects. Taken together, results provide support for the theory that office redesign is an effective strategy for implementing organizational change.

Keywords
aesthetics, change, generational cohorts, job/employee attitudes, office design, organizational culture, work environment

How work environments affect employee behavior has long fascinated managers and researchers, beginning with the first array of investigations known as the Hawthorne studies that examined the relationship between light intensity and employee productivity (Roethlisberger and Dickson, 1939). Since then a variety of literatures, ranging from

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architecture and environmental psychology to management, have provided empirical documentation that physical settings affect human perception, attitudes, and behaviors (Brennan et al., 2002; Cohen, 2007; Danielson and Bodin, 2008; Kornberger and Clegg, 2004; Zalesny and Farace, 1987). Within this broad paradigm, research has been undertaken to address particular physical settings among specific groups of people. The impact of office settings on employee attitudes and behaviors, especially the effects of open-plan designs (i.e. offices that minimize physical barriers between employees), has generated a fair amount of attention. The effects of such designs have yielded mixed findings. Open-plan proponents assert that these designs increase employee communication and satisfaction with working conditions (e.g. Boyce, 1974; Canty, 1977; Ives and Ferdinands, 1974; Riland and Falk, 1972; Sundstrom et al., 1980) while decreasing operating costs (Hedge, 1982; Maher and von Hippel, 2005) and allowing for flexible use of space. Other studies report that open plan arrangements result in fewer opportunities to forge workplace friendships and less supervisor feedback (Oldham and Brass, 1979), decreased team member relations (Brennan et al., 2002), less satisfaction with the physical environment (Marans and Yan, 1989; Zalesny and Farace, 1987), and lower perceptions of unit efficiency (Brookes and Kaplan, 1972). In addition, some studies have even reported open plan offices lead to decreased communication compared with private offices (Hatch, 1990) and decreased work performance and motivation (Becker et al., 1983; Brennan et al., 2002; Marans and Spreckelmeyer, 1982; Oldham and Brass, 1979). Nevertheless, open plan offices are normative in most large American and European organizations (Vischer, 1996), which suggests that the perceived benefits outweigh costs, at least in the minds of organizational decision-makers.

The office setting has long been recognized as a physical representation of an organization's culture (Becker, 1981; Davis, 1984). However, only recently have office design and its accompanying physical symbols been identified as factors impeding or facilitating organizational change (Lawler and Worley, 2006; O'Reilly and Pfeffer, 2000; Turner and Myerson, 1998). Turner and Myerson (1998: 35) lamented this very fact in arguing that 'office environments have struggled to keep pace with what has been happening to organizations in terms of technology, business processes, customers and markets'. They suggest that companies seeking to make their cultures less bureaucratic or hierarchical make changes in the physical environment in an effort to use objects to communicate desired changes in organizational identity.

Using the physical environment, such as the design of offices, to communicate meaning has been subsumed under a number of labels, including object language (Lewis, 1987), atmospherics (Kotler, 1973), servicescape (Bitner, 1992), and more generally as organizational artifacts (Rafaeli and Pratt, 2006). The physical structure of organizations provides messages about a firm's capabilities and qualities to outsiders and employees alike (Bitner, 1992) and has been found to affect employee attitudes as well (Parish et al., 2008). Consequently, firms may alter their physical dimensions through office redesign in order to affect organizational culture (i.e. affect 'the way things are done') and reinforce desired changes in culture and strategy (Higgins and McAllaster, 2004; Higgins et al., 2006).

While office design has been viewed as representative symbols and artifacts of an organization's culture (Hatch, 1990), very little research on the efficacy of office design to effect organizational culture change has been conducted. Davis (1984) asserted that

there have been few attempts to organize elements that might be used to classify the physical environment within organizations and subsequent years have not yielded any frameworks with widespread support. In addition, many redesign efforts have offsetting elements in terms of affecting employee reactions (e.g. decreased individual workspace may elicit negative reactions while increased co-worker communication may elicit favorable reactions), making employee reactions to work redesign difficult to untangle (Fayard and Weeks, 2007). Elsbach and Pratt (2007) contend that the absence of a consistent pattern of desired outcomes in the physical environment of work settings (e.g. open plan offices) is reflective of the multiple functions (i.e. aesthetic, instrumental, symbolic) that physical environments are asked to serve.

Explicating how office design may affect employees is challenging for other reasons as well. First, the office landscape has changed considerably since the 1970s and 1980s when many prior studies were conducted, reducing confidence in extrapolating from prior work. Moreover, contemporary office redesign efforts are different from those earlier efforts. Office redesign in the 1970s and 1980s typically involved movement away from single private offices in favor of cubicles. Today, redesign efforts involve different practices (Ellington, 2007; Scott, 2005) such as lowering cubicle walls, creating more alternative workspaces (e.g. creativity rooms, gathering spaces, privacy rooms, etc.), and a greater concern for aesthetics and the environment (e.g. utilizing more natural lighting). In addition, technological advancements preclude direct comparisons; for example, with more information being transmitted electronically, there is less of a need for physical file storage space.

Another issue complicating research on office design is that the age composition of people in today's offices is on average younger and more diverse, raising the question of the extent to which prior findings are applicable to younger and more varied generations of employees. Work experience expectations of younger employees (e.g. so-called 'Gen Xers' and 'Millennials') may be distinct from their older counterparts (e.g. 'Baby Boomers'), who spent most of their work careers in the private, single office environment.

This article reports the results of a naturally occurring quasi-field experiment on office redesign in which some employees were moved from a 1970s-style cubicle office environment to a modern open-plan office configuration. The company engaging in this project had several motivations for doing so. Economically, the company was convinced that it could save money by incorporating an office design that could accommodate more people into much less space by reducing cubicle size by an average of 20 square feet. In addition, the company sought to update its image as a modern, desirable workplace as it competes with others in attracting a new generation of workers. To accomplish this, the new offices received all new furniture, updated décor, and lowered partition height, by up to 9 inches, to allow for more natural light. Finally, the company was looking to change its culture from one that is hierarchically driven to one that is more collaborative in nature, by adding collaborative meeting spaces. They were hoping that a more modern, open office environment would help accomplish this. What they did not know was whether employees would view these changes favorably and whether all types of employees (e.g. age, gender groupings) would feel the same way. Thus the purpose of this study was to examine the human reactions to this company's office redesign effort. In doing so, we address four issues.

The first is to investigate reactions to changes in office space by comparing the perceptions and attitudes of employees who are moved to a new office environment with those who do not experience an office change. Second, we seek to determine whether changes in office design affect employee perceptions of the culture of an organization. Third, we examine whether office redesign affects employee attitudes toward their jobs and their organization. Thus, we go beyond assessments of employee reactions to the physical changes in office design to investigating the spillover effects of changes in the physical dimensions of the work environment on employee perceptions of 'how things are done' (i.e. culture), as well as their work-related attitudes. Such findings should yield insights into whether office redesign is indeed a strategy for effecting organizational change. Finally, we explore whether the effects of office redesign are moderated by employee age group. An examination of cohort effects will tell us whether the reactions to workplace redesign found in the research in the 1970s and 1980s is still relevant to today's younger and more diverse workforce as well as whether office redesign as a potential facilitator of change is equally effective across age groups of employees.

Reactions to office redesign

Davis (1984) suggested that the physical setting within organizations consists of three elements: physical structure, physical stimuli, and symbolic artifacts. Physical structure refers to the design, physical location and physical layout of the workplace. Physical stimuli refer to the things that happen within the workspace; for example, incoming emails, telephone calls, reports to read, and even odors in the workplace. Finally, symbolic artifacts refer to the aesthetics of the office environment: the colors, type of flooring, furniture style, and overall office décor. As indicated, the effects of office redesigns have been mixed, and with most studies conducted 20 to 30 years ago. During this time, the emphasis of these redesign efforts was primarily on the functionality of ergonomic design elements (Luparello, 2005) and the more efficient use of space. As a result, employees were moved from private, enclosed offices to cubicle workspaces. Not surprisingly, employees subject to these redesign efforts reacted negatively to the decrease in privacy and increase in noise levels (Oldham and Brass, 1979; Vischer and Fischer, 2005). This decline in privacy and square footage, which generates both positive (less costly) and negative (less favorable employee reactions) repercussions is emblematic of the tensions and trade-offs Elsbach and Pratt (2007) assert are common in efforts to gauge the effects of the physical environment. Indeed there are a number of notable examples of how changes in workplace design resulted in unanticipated consequences for designers (Fayard and Weeks, 2007; Grajewski, 1993; Horgen et al., 1999).

Office space configurations and designs have continued to evolve since the introduction of cubicles, but research on the effects of these changes has not kept pace. Indeed, in Elsbach and Pratt's (2007) review of the literature on the physical environment in organizations, only a handful of studies in the last decade dealt with reactions to changes in office design. Consequently, relatively little is known about contemporary changes in office environments. Innovations in technology, office furnishings, and the push toward more environmentally friendly offices have modified physical environments in important

ways and typically increased functional workspace while reducing square footage per employee. Examples of such changes include opening up office spaces, lowering cubicle walls, letting in more natural light, and providing alternative workspaces for collaborative efforts as well as private meetings. Given that these changes involve the physical structure, physical stimuli, and symbolic artifacts dimensions of offices, it is not surprising that past research has shown mixed results. Work based on social interference theory (Oldham et al., 1995) and design proxemics (Yanow, 2006) suggests that these modern office redesign efforts will be resisted given the increase in distractions and violations of personal space, respectively, inherent in the physical stimuli changes that accompany such designs. This is consistent with research showing open office designs associated with less satisfaction with the physical environment (Marans and Yan, 1989; Zalesny and Farace, 1987), lower perceptions of unit efficiency (Brookes and Kaplan, 1972), and decreased work performance and motivation (Becker et al., 1983; Brennan et al., 2002; Marans and Spreckelmeyer, 1982; Oldham and Brass, 1979). However, the fact that these changes also affect the physical structure and symbolic artifact dimensions suggests that removing barriers decreases status differences (McCoy, 2002) and meets employee needs for meeting, training, and even socializing space (Luparello, 2005). Moreover, changes in the symbolic artifacts such increased natural lighting and the use of bright colors results in a more pleasant work atmosphere, which elicits positive reactions (Parish et al., 2008). The mixed findings associated with changes to these different dimensions of office design leads us to predict:

P1: Employees assigned to newly designed, modern, open offices will report greater levels of distraction but demonstrate more favorable overall reactions to their workspace than will employees working in traditional office cubicles.

Effects of office redesign on perceptions of culture and employee attitudes

Bitner (1992) argues that physical arrangements within organizations have consequences for organizational members as well as customers. Among these are the amount and type of interaction that takes place among organizational members and their affective reactions to the job, the organization, and those with whom they interact. Not only will office design and layout affect the amount of interaction, for example, closer proximity promotes greater interaction, but it can also be reflective of cooperative or competitive interaction environments (Sommer, 1969). This suggests that office design can serve as a physical representation of an organization's culture.

While few studies have investigated whether office design is an effective strategy for influencing employee perceptions of culture, it would seem to have great potential. According to Schein (1990), an organization's culture manifests itself at three different levels: observable artifacts, values, and underlying assumptions, which determine employee thought processes, feelings, and behaviors. Moreover, observable artifacts, along with other contextual factors like an organization's structure, charter, and folklore, provide an indirect way by which leaders articulate and reinforce their views on how the

organization should function. Reactions to observable artifacts may vary across organizational subgroups and such artifacts may or may not truly be representative of the broader organization's true values and underlying assumptions (Schein, 1990). Even with possible subcultures, Schein's (1990) model outlining levels of culture suggests that office design may serve as both an observable artifact of culture as well as a manifestation of a culture's espoused values, which over time may result in a change in the behavioral assumptions, underlying culture. In other words, changes in office design may signal changes in an organization's culture. Previous research on office design does suggest that it can serve to influence or reinforce an organization's culture. We know, for example, that different seating arrangements can be used to foster cooperative versus competitive interactions (Sommer, 1969) and that going from private to cubicle office arrangements fosters interaction (but also distraction) (Elsbach and Pratt, 2007; Sundstrom et al., 1980). Allen (1977) engaged in a number of investigations demonstrating how communication and innovation in R&D types of organizations could be enhanced by office designs that stimulate informal interaction. Still, there has been limited attention devoted to whether office redesign efforts can affect how things are done in more conventional organizations (e.g. the degree of collaboration, the nature of organizational controls, the degree of innovation and flexibility, etc.). Hatch (1990), for example demonstrated in a cross-firm analysis that occupants in open offices interacted more with others than did occupants of closed offices, but that the relationship is reversed when both private and open offices exist within the same firm. Moreover, case examples of how office design and layout can affect intergroup communication and collaboration are beginning to appear (Elsbach and Bechky, 2007). In addition there is some research to support the use of flexible workspaces to promote group cohesiveness (Lee and Brand, 2005) as well as how physical surroundings can deliberately be used to achieve strategic objectives that entail team cohesiveness and creativity (McCoy, 2005), innovation (Moultrie et al., 2007), and organizational change (Higgins et al., 2006).

Today's office redesign efforts are more purposeful with changes in physical structures and symbolic artifacts intended to affect perceptions of culture. For example, today's office redesign efforts focus not only on creating effective workspace for employees carrying out a specific job, but also on creating spaces for meeting other employees and achieving other organizational purposes such as private work areas and even 'mentor pods', an open workspace where experienced employees go to work in order to signal they are available for consultation (Steelcase, Inc., 2006). These redesign efforts use the language of objects (e.g. team spaces, creativity rooms) to communicate a desire to have things done differently. The question is whether these more open office designs signal to employees a shift to what Galbraith (1973) refers to as increased lateral relations to coordinate and solve problems as opposed to a culture of hierarchical referral. Based on object language and the notion that the physical properties of the design of organizations affect the network of social relations that develop within organizations, we predict:

P2: Employees assigned to newly designed, modern, open offices will perceive the organization's culture as less bureaucratic and more collaborative, across a number of dimensions, than will employees working in traditional office cubicles.

In their more recent work, the Buffalo Organization for Social and Technological Innovation (BOSTI) consortium reports that job satisfaction and job performance are affected by design elements such as physical enclosure and furniture (Brill et al., 2001). However, McCoy (2002) points out that the work of the BOSTI group has not been described in sufficient detail as to eliminate potential Hawthorne effects in their findings. Thus whether office design changes result in more or less favorable reactions is really unknown, with some changes likely to stimulate positive reactions while others may advance negative reactions. Research in which employees moved from private, closed offices to open (cubicle) offices tends to be associated with declining attitudes (Brennan et al., 2002; Oldham and Brass, 1979; Zalesny and Farace, 1987), but there is an absence of research updating this phenomenon within the more modern office environment. The work of Parish et al. (2008) suggests that physical environments that are perceived as convenient, safe, and pleasant (colorful, ample natural light) can positively affect employee job satisfaction and organizational commitment among service workers. We adopt the perspective, drawn from the social exchange literature (e.g. Cropanzano and Mitchell, 2005), that employees who move to new redesigned office space will generally regard the move as an indicator of corporate willingness to invest in employee work environments and thus will reciprocate by reacting favorably. Moreover, Bitner's (1992) notion that physical layout affects the social relational network and that increased interaction leads to more positive affective reactions toward those with whom one interacts, suggests that open offices may affect satisfaction with co-workers as well.

P3: Employees assigned to newly designed, modern, open offices will demonstrate more favorable attitudes toward their jobs, the organization, and their co-workers than will employees working in traditional office cubicles.

Generational differences in reactions to office design

Although the phrase 'generation of employees' is commonly used, only recently have scientific studies examined how birth cohorts may differ in the workplace (e.g. Davis et al., 2006; Dencker et al., 2008; Lippmann, 2008). Such studies are typically based on the assertion that common historical experiences of similarly aged people give rise to similar values and attitudes, and that different generations might thus hold different expectations and outlooks. In the employment context, some have suggested that younger (i.e. more recent birth cohort) employees are materially different from older employees (Glass, 2007; Smola and Sutton, 2002; Yu and Miller, 2005), although other studies have not found many generational differences (Jurkiewicz, 2000; Yang and Guy, 2006).

Examinations of employee generations have typically been defined by demographic age groupings based on year of birth. While cut points have differed slightly among researchers, multiple groups are typically recognized. The Society for Human Resource Management (SHRM, 2004) uses Veterans (born between 1925 and 1940), Baby Boomers (born between 1941 and 1960), Generation X (born between 1961 and 1976) and Millennials (Gen Y, nexters, echo boomers; born between 1977 and 1992). Another established source on cohort data in the US is provided by Mitchell (2003). She describes

age cohorts beginning with Baby Boomers (born before 1965), Gen Xers (born between 1965 and 1977), and Millennials (born after 1977). This latter classification will be used, as it best represents the age cohorts in contemporary workplaces.

Glass (2007) summarized major differences among these three groups. Baby Boomer life experiences included rock and roll, the space race, and women's liberation, making them idealistic, diligent, and for them, work and personal sacrifice are the keys to financial success. They are also the most likely cohort to have spent part of their working career in the private office setting. In contrast, the Gen X group's defining events included higher divorce rates among their parents, corporate downsizings, and fears about the ability of Social Security to support their retirement. These events resulted in less trust in employers and greater concern for work–life balance. Some are resentful of technological advances such as PDAs and wireless technologies because they have fueled the expectation that they should always be working and/or accessible. Finally, hallmarks of the Millennials' experience include major technological advances (e.g. computers, the internet, cell phones) and school systems that emphasized self-esteem and teamwork. As a result, Millennials are self-confident, open to change and new technologies, and comfortable working electronically or in groups.

Davis et al. (2006) summarize literature on differences between Baby Boomers and Gen-Xers and report that Gen-Xers place less value on the work itself, are less willing to sacrifice their personal lives for work, and change jobs more frequently than Baby Boomers. Yu and Miller (2005) concurred in their assessment of the values and attitudes of Baby Boomers and Gen-Xers but also characterized Baby Boomers as 'technically challenged', having a preference for 'formality', and a 'sense of entitlement' whereas Gen-Xers were labeled 'technically savvy', with a preference for 'informality', and more 'entrepreneurial'. While research on Millennials remains limited given they are just now beginning to enter the labor force in large numbers, their exposure to even more modern technologies (e.g. email, instant messaging, TiVo) is virtually certain to affect communication styles and preferences in the workplace. Tyler (2007) suggests, for example, that because Millennials are so used to being connected to friends and parents they prefer working in team environments and group decision-making. She also notes that with the prevalence of cell phones, iPods, and similar devices, Millennials are excellent multi-taskers and not easily distracted by external stimuli.

Because of these generational differences, we expect that the effects of new office redesign efforts will be moderated by generational age cohorts. Younger employees, whose office expectations, work habits, and coping strategies are less well entrenched (Brisson et al., 1999), should react most favorably, while older employees are more likely to resist change because their 'impressionable years' have passed (Forteza and Prieto, 1994). Moreover, older employees, having perhaps already given up their access to the private single office environment may react more negatively because they view their re-assignment as a breach in their psychological contract with the employer (Bal et al., 2008). Support for this line of thinking is indirectly provided by May et al. (2004) who found younger workers' perceptions of their workstations were influenced more positively by ergonomic improvements than older workers' perceptions.

P4: Employee reactions of workplace office design will be moderated by generational age cohort such that younger employees will react more positively to more modern, open office arrangements than will older employees.

Methods

Sample and data collection

An online survey was administered to 350 employees within a large Midwestern financial services organization. Of these, 165 had participated in an office redesign and relocation project while 185 employees had not. Since these employees were not randomly assigned to be moved or not, an attempt was made to generate a sample of nonmovers that matched the characteristics of those who did participate in the office redesign project. Participation in the study was limited to those employees who had been in their current office location for at least six months. Of the 350 employees invited to participate, 127 of the employees who moved and 144 of those who did not move responded to the survey. Thus the sample consisted of 271 employees for a response rate of 77.4 percent. The sample of respondents was 35.4 percent male and 64.6 percent female, with an average age of 34.6 years and an average tenure with the organization of 7.7 years. The sample was well educated with 72 percent having a college education or more. Chi-square and *t*-tests confirmed that there were no differences between the sample of employees who moved into the redesigned office space and those who did not in terms of their gender, age, organization tenure, level of education, or their rank in the organization.

Context and measures

The company undertook office renovations with explicit goals in mind. Senior management sought to reduce costs by housing more employees in less space, promote a more collaborative culture among employees, increase favorable work related attitudes, and manage more effectively the diverse age generations of employees.

The traditional, cubicle office arrangement used within this company consisted of 50, 100, and 125 sq. ft cubicles for non-titled, titled employees, and officers, respectively, with 65″ partitions separating workspaces. The redesigned space consisted of 48 sq. ft cubicles for all employees, with the exception of vice presidents. The redesigned office environment increased the workspace density by 14 percent, going from an average of 168 sq. ft to 148 sq. ft per employee and the number of workstations in each redesigned workspace increased from 177 to 204. All new furniture was purchased, the décor was updated, brighter colors were selected, and partition height was decreased from 65″ to 54″ or 60″ in order to allow for increased natural light within the office floor. In addition, common meeting/gathering areas were incorporated into the floor layout along with four- to five-person conference rooms (also available for personal calls and/or private conversations), and existing white noise was modified in order to decrease audible distractions. Thus all three of Davis's (1984) physical setting variables, physical structure, physical stimuli, and symbolic artifacts, were involved in this office redesign effort. The

result was a brighter, more modern looking, more open, office arrangement with better lines of vision throughout the floor and more natural lighting.

An online survey was used to capture 14 variables covering respondent reactions to the design of their office and workspace. These reactions were grouped into three general categories: perceptions of their workspace, perceptions of the organization's culture, and attitudes about their work and the organization. Unless otherwise indicated, respondents were asked to indicate their level of agreement with each item using a seven-point response format (1 = strongly disagree to 7 = strongly agree), with responses averaged to create a single score for each variable (see Table 1). The end of the survey included open-ended questions asking what the best/worst features of their office environment were and what they liked most/least about their personal workspace. These comments were limited in number but do shed light on the quantitative results.

Perceptions of workspace

The office redesign involved workspace alterations that affected both an individual employee's workstation space and the work environment surrounding that workspace. To investigate how employees felt about the new workplace redesign and how this compared with the former, traditional cubicle office design used in the organization, four scales were used to measure a variety of workspace perceptions.

Office space adequacy Employee perceptions of the extent to which their office space is large enough to meet their needs was captured using five items developed by Brennan et al. (2002) to capture perceptions related to office space. Three items were: 'I have enough work surface area at my workspace', 'It is easy to have a one-on-one conversation at my workspace', and 'I can easily accommodate a drop-in visitor at my workspace'. One of Brennan et al.'s original items ('I have enough storage space at my workspace') was divided into two separate items: 'I have enough storage space for work materials at my workspace', and 'I have enough storage space for personal items in my workspace'. All five items were factor analyzed and yielded a single factor, with a Cronbach alpha of .87. A high score on this scale indicates that respondents perceive they have enough room within their workspace. With the reduction in cubicle square footage (i.e. increased spatial density), movers were expected to report less favorable perceptions of their workspace than non-movers (May et al., 2005).

Distraction Lee and Brand's (2005) five-item distraction scale was used to assess the extent to which employees feel distracted while working. Using a seven-point response framework (1 = yes, all the time, 7 = no, never), respondents were asked whether they find it difficult to concentrate at work (reverse coded), whether they experience auditory distractions while at their workstations (reverse coded), whether they have adequate privacy, whether they experience visual distractions (reverse coded), and whether their individual workspace is too noisy (reverse coded). The way this scale was coded, a high score indicates a work environment perceived to contain a lot of distractions. Coefficient alpha for the scale was .87.

Department layout Six items were used to evaluate employees' perceptions of their overall department's layout: 'The general office workplace layout facilitates teamwork', and 'There is enough natural light at our workplace', both from Brennan et al. (2002), 'My work area is located close to people I need to talk to with my job' from Zalesny and Farace (1987), and three items specifically written for this study, 'My department's physical layout supports collaborative work', 'I like the way my department's offices are configured', and 'The physical layout of my department helps make this a nice place to come to work'. A high score on this scale is indicative of employee satisfaction with how their departmental office space is configured. Coefficient alpha for this scale was .86.

Meeting space Three items were specifically written to gather information on the degree to which employees perceive that they have adequate meeting spaces at work: 'Meeting space in my department is conveniently located', 'There are adequate meeting spaces for collaborative work with others', and 'There are places for me to go if I need privacy'. A high score on this scale indicates perceptions of adequate meeting space. Coefficient alpha for this scale was .73.

Perceptions of the organization's culture

There is an infinite number of ways to describe corporate culture. Schein's (1990) definition includes the three levels of observable artifacts, espoused values, and underlying assumptions. Given his inclusion of observable artifacts as one integral aspect of culture, we sought to understand how the artifacts of office design (e.g. layout of offices, quality of furnishings) influence perceptions of organizational culture. For example, organizations may choose to convey status differences among employees by assigning higher ranked individuals more or better space than others (e.g. the 'corner office'). While survey research alone is an inadequate methodology for tapping the underlying assumption dimension of culture, it does allow us to capture commonly recognized dimensions of an organization's culture (Schein, 1990). Consequently, six indicators of culture were included in this survey in order to ascertain whether the office redesign project affected employees' perception of the culture of this organization.

Formalization Five items from Patterson et al.'s (2005) formalization scale, with 1–7 response option anchors, were used to measure the degree to which an organization is perceived to be driven by rules, regulations, and procedures. Respondents were asked to indicate their level of agreement with the following statements: 'It is considered extremely important here to follow the rules', 'People can ignore formal procedures if it helps get the job done' (reverse coded), 'Everything has to be done by the book', 'It is not necessary to follow procedures to the letter around here' (reverse coded), and 'Nobody gets too upset if people break the rules around here' (reverse coded). A high score indicates that employees perceive the culture of this organization to be very formal. Coefficient alpha was .77.

Professional control Professional control is the perception that employees are capable of monitoring and controlling their own behaviors. Professional control contrasts with

organizations that prefer bureaucratic control where work is constantly reviewed and then approved or rejected by others higher up in the organization. This concept was assessed using the following five questions used by Ramaswami (1996): 'Management encourages cooperation among employees', 'Employees in my work unit are familiar with each others' work', 'Management fosters an environment where employees respect each others' work', 'Management encourages job-related discussions among employees', and 'Most employees in my work unit are able to provide accurate appraisals of each others' work'. A high score indicates high perceptions among employees of a professional control culture. Coefficient alpha was .86.

Innovation Three items from Patterson et al. (2005) were used to measure the degree to which employees agreed that this organization's culture fosters innovation. This scale used a four-item response framework (1 = definitely false to 4 = definitely true). The items used were: 'New ideas are readily accepted here', 'Assistance in developing new ideas is readily available', and 'Employees are always searching for new ways of looking at problems'. The higher the score, the more innovative the culture is perceived to be. Coefficient alpha was .78.

Flexibility of management Three items from Patterson et al. (2005) measured the degree to which management is perceived to foster a culture of adaptability and flexibility. Using the same four-point scale that was used to measure innovation, respondents were asked how true the following statements were: 'Management is quick to respond when changes need to be made', 'Management is quick to spot the need to do things differently', and 'Management is very flexible, it can quickly change procedures to meet new conditions and solve problems as they arise'. A high score corresponds to perceptions that the organization's culture is highly flexible. Coefficient alpha was .91.

Altruism Some organizations foster a culture in which people go the extra mile for others and the organization out of a sense of goodness or altruism. Five items developed by Podsakoff et al. (1990) were included to capture this form of organizational citizenship behavior (Organ, 1990): 'I am willing to help others who have heavy workloads', 'I am always willing to lend a helping hand to those around me', 'I am willing to help others who have been absent', 'I am willing to help others who have work-related problems', and 'I am willing to help orient new people even though it is not required'. A high score indicated a high degree of employee willingness to help others at work. Coefficient alpha for this scale was .93.

Collaboration A second form of organizational citizenship behavior centers around collaboration. Employees are often not required to keep others up-to-date on work activities or seek input when problems arise, but such behavior can lead to more effective work performance. Five items specifically developed for use in this study were used to capture employee perceptions of the degree to which their organization has a collaborative culture: 'I confer with my co-workers to discuss work-related issues', 'Collaborating with co-workers is a common occurrence here at (the organization)', 'Co-workers in my office location seldom visit with one another about work-related issues' (reverse coded),

'Employees in my office location keep to themselves and have little interaction with others on work-related issues' (reverse coded), and 'Co-workers often get together to brainstorm work-related issues'. A high score equates to employees' perceptions that collaboration is a common occurrence. Coefficient alpha was .85.

Attitudes about work and the organization

Four scales were included in the survey in order to measure the extent to which the redesign of offices has spill-over effects on employee attitudes and perceptions about their work and their organization.

Overall job satisfaction Three questions from the Michigan Organizational Assessment Questionnaire (Seashore, 1964) used by Zalesny and Farace (1987) were used to ascertain employee overall job satisfaction levels: 'I am satisfied with my job', 'I really don't like my job' (reverse coded), and 'I like working here'. A high score is indicative of a high level of job satisfaction. Coefficient alpha for this scale was .88.

Co-worker satisfaction Spector's (1997) four-item scale was used to measure employee satisfaction with their co-workers: 'I like the people I work with', 'I find I have to work harder at my job than I should because of the incompetence of people I work with' (reverse coded), 'I enjoy my co-workers', and 'There is too much bickering and fighting at work' (reverse coded). A high score on this scale is indicative of a high level of satisfaction with co-workers. Coefficient alpha was .73.

Affective organizational commitment Affective organizational commitment is one's feeling of commitment to (loyalty or identification with) an organization because of a belief in that organization's goals and values. In other words, one is committed to an organization because he/she *wants* to be. The six-item short form of Meyer and Allen's (1997) affective commitment scale was used: 'I would be happy to spend the rest of my working life with (this organization)', 'I feel that (this organization's) problems are my own', 'I feel like ''part of the family'' at (this organization)', 'I feel ''emotionally attached'' to (this organization)', 'Working for (this organization) has a great deal of personal meaning for me', and 'I feel a strong sense of belonging to (this organization)'. A high score is indicative of a strong sense of affective commitment. Coefficient alpha was .87.

Perceived organizational support Perceived organizational support is a measure of employees' beliefs that the organization cares about them and supports them. The short form of Eisenberger et al.'s (1986) Perceived Organizational Support measure was used. Respondents were asked to indicate their level of agreement with the following: 'The (organization) values my contribution to its well-being', '(The organization) cares about my general satisfaction at work', '(The organization) is willing to help me when I need a special favor', '(The organization) cares about my opinions', '(The organization) really cares about my well-being', '(The organization) strongly considers my goals and values', and '(The organization) shows very little concern for me' (reverse coded). A high score indicates high levels of perceived organizational support. Coefficient alpha for this scale was .92.

Generational age cohort and other demographics

The online survey was linked to employee records in order to collect data on employee demographic characteristics of gender, education (1 = high school, 2 = some college, 3 = bachelors degree, 4 = graduate degree), organizational tenure, and age group. Following the Mitchell (2003) recommendations for establishing generational cut points, Millennials were defined as those born after 1976 (30 years of age or younger in this sample; $N = 111$, 41.0%), Gen Xers were those born between 1965 and 1976 (31 to 42 years of age in this sample; $N = 108$, 39.9%), and Baby Boomers were those born prior to 1965 (over age 42 in this sample; $N = 52$, 19.2%).

Results

Table 1 shows the variables measured, means and standard deviations, and the correlation matrix. With the exception of the Altruism measure (with its high mean of 6.24, suggesting it was affected by social desirability), none of the variables was unduly characterized with excessive restriction in range. Many of the variables are significantly correlated with one another (> +/-.12), given the large sample size. Some correlations are sufficiently large to merit comment.

The correlations among the perceptions of workspace measures indicate some interesting patterns. Perceptions of the layout of their department is positively associated with perceptions of the adequacy of meeting space ($r = .60$), indicating that meeting space (and not just individual workspace) plays a role in assessments of how a department is configured. Conversely, there is a negative relationship between perceptions of the amount of room they have ($r = -.64$) and the amount of perceived distraction in the workplace. These correlations suggest that smaller workspaces and distraction are inextricably bound together.

Turning to the culture measures, perceptions of collaboration are related to perceptions that people in the organization are trusted to control their own efforts. This is reflected in the high positive correlation ($r = .54$) between collaboration and professional control. In addition, perceptions of management's flexibility is associated with perceptions that the company has an innovative culture ($r = .66$).

Table 1 also shows moderately strong associations among the attitudes about work and organization measures, with correlations ranging from .35 to .67. Affective organizational commitment appeared particularly salient, demonstrating high correlations with both job satisfaction and perceived organizational support ($r = .67$).

Movers versus non-movers

Does a more modern, open office arrangement have a psychological effect on employees who are exposed to it? Does age of the employee matter? To answer these questions we first conducted a multiple analysis of variance (MANOVA) test to determine whether move status, and age cohort have effects across all the outcome (dependent) variables. Results consistently indicated, using Pillai's Trace (.984, $F(4, 225) = 3884.83$, $p < .001$) and other analog statistics, that move status, age cohort, and their interaction had

Table 1 Descriptive statistics and correlations (N = 266–271)

Variables	Scale	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Office space adequacy	1–7	4.43	1.56	0.87															
2 Distraction	1–7	4.13	1.40	–0.64	0.87														
3 Department layout	1–7	5.15	1.18	0.28	–0.25	0.86													
4 Meeting space	1–7	4.70	1.38	0.35	–0.32	0.60	0.73												
5 Formalization	1–7	4.75	0.94	0.17	–0.22	0.08	0.15	0.77											
6 Professional control	1–7	5.44	0.93	0.09	0.09	–0.08	0.33	0.32	0.86										
7 Innovation	1–4	2.95	0.53	0.07	–0.05	0.16	0.15	0.10	0.46	0.78									
8 Management flexibility	1–4	2.73	0.69	0.21	–0.20	0.32	0.27	0.13	0.49	0.66	0.91								
9 Altruism	1–7	6.24	0.62	0.00	0.04	0.22	0.23	0.12	0.26	0.16	0.14	0.93							
10 Collaboration	1–7	5.83	0.81	–0.00	0.08	0.30	0.16	–0.05	0.54	0.32	0.29	0.34	0.85						
11 Job satisfaction	1–7	5.68	1.06	0.05	–0.11	0.22	0.27	0.12	0.47	0.31	0.37	0.21	0.26	0.88					
12 Co-worker satisfaction	1–7	5.68	0.97	–0.01	–0.01	0.18	0.21	0.03	0.56	0.35	0.24	0.27	0.45	0.47	0.73				
13 Affective commitment	1–7	4.85	1.00	0.09	–0.12	0.26	0.26	0.15	0.46	0.35	0.34	0.22	0.28	0.67	0.35	0.87			
14 Perceived org. support	1–7	5.13	0.96	0.19	–0.16	0.27	0.29	0.16	0.53	0.49	0.46	0.19	0.33	0.55	0.45	0.67	0.92		
15 Age group[a]	1–3	1.78	0.75	0.02	–0.14	–0.02	0.02	–0.05	–0.04	–0.12	–0.09	–0.01	0.04	0.06	0.05	0.06	–0.07	—	
16 Move status[b]	1–2	1.47	0.50	–0.53	0.47	0.17	0.06	–0.24	0.15	0.13	–0.01	0.05	0.16	0.12	0.18	0.15	0.08	–0.10	—

Notes: Numbers on the diagonal are estimates of the reliability of each scale. All reliability estimates exceed conventional standards. Correlations greater than +/– .12 were statistically significant at the $p < .05$ level.

[a] 1 = 30 years of age or younger, 2 = 31 to 42 years of age, 3 = over 42 years of age.

[b] 1 = Not moved, 2 = moved.

statistically significant effects on the dependent variables. We then compared the average responses on the variables captured in the survey between those employees who have moved into the redesigned office space with those who remain in the traditional office space. The results of this analysis are shown in Table 2.

Perceptions of workspace Employees who have moved into the new workspace perceive that they have significantly less overall room ($M_{movers} = 3.57$ vs $M_{non\text{-}movers} = 5.21$) than do respondents housed in traditional cubicle spaces in the company. Moreover, they report significantly greater distractions in the new office design environment than do those working in traditional office spaces ($M_{movers} = 4.83$ vs $M_{non\text{-}movers} = 3.51$). Since the office redesign entailed a decrease in personal workspace square footage, these reactions were expected. On the other hand, they report more positive perceptions about the manner in which their department is laid out than do respondents in traditional workspaces ($M_{movers} = 5.37$ vs $M_{non\text{-}moyers} = 4.96$). There are no significant differences between movers and non-movers relative to the amount of meeting space available to employees. Thus Proposition 1 received partial support. It would seem that the improvements associated with the redesigned office space (e.g. more modern furnishings, increase in natural light, improvements to white noise) are not so large as to mask the decrease in personal square footage and increased spatial density, as evidenced by movers' less favorable perceptions about overall space availability and distractions. However, the move did elicit favorable reactions to departmental spatial configuration. These quantitative results were reinforced by the written comments received. For example, the most often cited favorable comments made by movers entailed design, décor, and furniture while their most often negative comments focused on distractions and lack of privacy. Non-movers, on the other hand, favorably commented on desk space and higher partitions, but also voiced concern over lack of privacy.

Perceptions of the organization culture Table 2 shows that respondents moved to the new office design environment perceive the organization culture to be significantly less formal ($M_{movers} = 4.52$ vs $M = 4.96_{non\text{-}movers}$), based more on professional control ($M_{movers} = 5.59$ vs $M = 5.32_{non\text{-}moyers}$), and more innovative ($M_{movers} = 3.02$ vs $M = 2.88_{non\text{-}movers}$) than do those working in traditional work environments. In addition, employees moved to the newly designed office environment report greater levels of collaboration in their workplace than do those working in traditional cubicle work environments ($M_{movers} = 5.96$ vs $M_{non\text{-}movers} = 5.71$). Increased collaboration was also frequently mentioned in the written comments as a positive aspect of the office environment change. Only perceptions of management flexibility and employee altruism (which was marked by restriction in range) were unaffected by move status. Consequently, Proposition 2 received substantial support.

Attitudes about work and the organization There were significant differences between movers and non-movers relative to two of the four measured attitudes about work and the employing organization. Employees moved to the newly designed office environment report being more satisfied with their co-workers ($M_{movers} = 5.87$ vs $M_{non\text{-}movers} = 5.52$) and having higher levels of affective organizational commitment ($M_{movers} = 5.01$ vs

Table 2 A comparison of movers and non–movers

Variable	Average response for		*t*–statistic
	Movers (*N* = 127)	Non–movers (*N* = 144)	
Perceptions of workspace			
Office space adequacy	3.57	5.21	9.98***
Amount of distraction	4.83	3.51	–8.80***
Perceptions of dept layout	5.37	4.96	–2.86**
Amount of meeting space	4.78	4.62	–.98
Perceptions of the culture			
Formalization	4.52	4.96	3.93***
Professional control	5.59	5.32	–2.41*
Innovation	3.02	2.88	–2.20*
Management flexibility	2.73	2.74	.10
Altruism	6.27	6.21	–.85
Collaboration	5.96	5.71	–2.63**
Attitudes about work and the organization			
Job satisfaction	5.81	5.57	–1.91
Co–worker satisfaction	5.87	5.52	–2.92**
Affective org commitment	5.01	4.71	–2.55**
Perceived org support	5.21	5.06	–1.25

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

$M_{non\text{-}movers} = 4.71$) than do respondents in traditional cubicle office environments. Job satisfaction nearly demonstrated the hypothesized difference in means ($M_{movers} = 5.81$ vs $M_{non\text{-}movers} = 5.57$; $p = .10$), while perceived organizational support was unaffected by the office redesign effort. Proposition 3 then also received considerable but not complete support.

Moderating effects of age cohorts

In order to ascertain whether the findings above hold across age cohorts of employees, ANOVA was used to determine the moderating effects of age on the effects of the change in office design.[1] The only employee reactions affected by age were employee reactions to the changes in their actual workspace. Age did not moderate the effects of the office design change on either employee perceptions of culture or their attitudes about work or the organization. Thus Proposition 4 was only partially supported. The findings for perceptions of workspace are reported in Table 3 and depicted in Figure 1. All four perceptions of workspace were affected by generational cohort, with incremental amounts of explained variation ranging from 2 to 4 percent.

As shown in the figure, people in the different age categories had different reactions to the move with respect to perceptions of how much room they have, the degree of distraction, the layout of the department, and meeting space. By and large, Generation Xers and Baby Boomers reacted similarly. It is the Millennials, those aged 30 years or younger,

Table 3 Perceptions of workspace and age cohort ANOVA results

Variables	Office space adequacy			Distraction			Department layout			Meeting space		
	Mean square	*F*	eta^2	Mean square	*F*	eta^2	Mean square	*F*	eta^2	Mean square	*F*	eta^2
Move status	154.66	88.40***	.25	103.53	69.57***	.21	7.24	5.36*	.02	4.03	2.17	.01
Age group	.44	.25	.00	2.12	1.42	.01	.02	.01	.00	.65	.35	.00
Move x age group	5.88	3.36*	.03	5.70	3.83*	.03	4.36	3.23*	.02	9.73	5.24**	.04
Error	1.75			1.49			1.35			1.86		

[a]Cell sizes ranged from 19 to 57.
*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

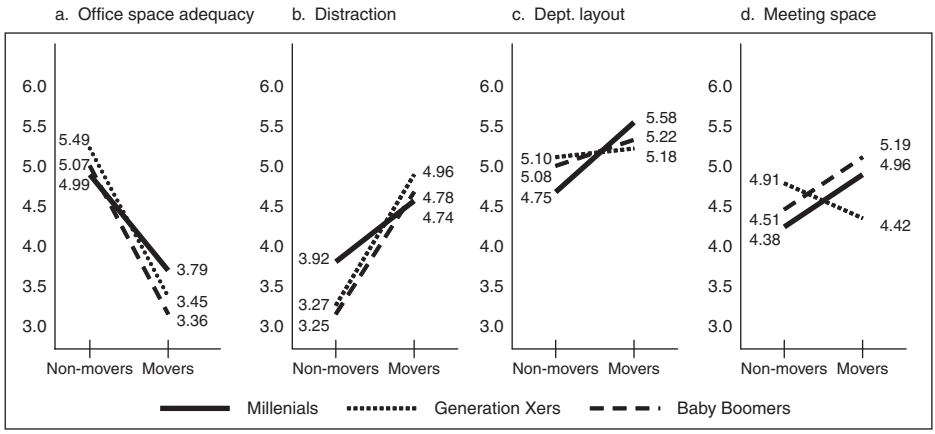

Figure 1 Reactions to changes in workspace by age categories

who exhibited a different pattern of perceptions of their workspace in the newly designed office environment compared with Millennials in the traditional cubicle office design. While Gen Xers and Baby Boomers reported having less room and more distractions in the newly designed office environment as compared with those in traditional cubicle arrangements, this differential was felt to a much lower degree among Millennials (i.e. Gen Xers and Boomers were more adversely affected than Millennials). Moreover, Millennials reported much more favorable opinions of the departmental layout and meeting space associated with the renovated offices as compared with the traditional cubicle office arrangements. Finally, with respect to distraction, Millennials who moved reported only slight increases in distraction compared with the Millennials who did not move. Gen Xers and Baby Boomers who moved, on the other hand, did report higher levels of distraction than did those Gen Xers and Baby Boomers who did not move.

Discussion

The results of this survey suggest that employees continue to react to physical changes in their workspace following an office design initiative. Specifically, while employees reacted favorably to some elements in this redesign, they also recognized that their office space had shrunk and that the increased openness in design created a greater level of distraction. These findings provide empirical support for Elsbach and Pratt's (2007) contention that physical environment interventions yield offsetting results. More importantly, these results highlight how reactions are moderated by generational effects. Millennials are less affected by such changes than are Gen Xers or Baby Boomers. This could be due to their lack of experience with other office configurations; consistent with the impressionable years model of attitude development (Tyler and Schuller, 1991), or it could be due to different values (i.e. younger employees may be more egalitarian and less status conscious). It could also be a result of Millennials being a multitasking generation of workers who are able to tune out distractions. In any case, the finding that

Millennials are less adversely affected by more open office redesigns suggests that the adverse impact of such open office design efforts may be short lived as Baby Boomers and Gen Xers move through their work careers.

The results also provide, perhaps for the first time, a documented association between office redesign and organizational change. Specifically, the findings show that despite some adverse reactions to workspace, today's open office redesign efforts can have the desired effects of influencing perceptions of a company's culture and employee attitudes. Employees exposed to the new, modern, more open office arrangement view the organization's culture as less formal, more innovative, believe they can monitor and solve their own problems, and collaborate more than do those respondents working in traditionally designed workspaces. They also like their co-workers more and have higher levels of organization commitment. Moreover, while age differentially affects mover versus nonmover perceptions about their actual workspace, these impressions do not spill over and affect their perceptions of the culture of the company or their attitudes about their coworkers and the organization as a place of employment.

These findings speak to the importance of assessing the effects of office redesign holistically, as opposed to considering only available workspace. Specific changes such as an increase in spatial density can be expected to generate less favorable reactions when considered in isolation. Managers would do well to anticipate this reaction and other inherent tensions that may emerge with changes to the physical office environment (Elsbach and Pratt, 2007). But it is the overall effects of the changes, including layout and arrangement of offices, décor, and ambience, that are more critical in terms of understanding the longer-term consequences of office redesign (i.e. effects on culture and work-related attitudes). Moreover, the influx of Millennials and departure of the Baby Boomers from the workforce suggest that initial adverse reactions to office redesign will diminish with the passage of time while the improvements in culture and work attitudes should extend to all generational groups.

Limitations

The office redesign project in this organization provided a naturally occurring quasi-field experiment enabling us to directly test the effects of office redesign on employees' reactions. Comparing reactions of an experimental group (those who moved) with a control group (those who did not move to the new space), allows for an analysis of differences between these two groups of employees. However, several limitations exist which must be kept in mind when viewing the results of this study.

First, subjects in this field experiment were not randomly assigned to the two experimental conditions. While the control and experimental groups were similar with respect to a host of demographics (e.g. gender, age, organization tenure, education, and rank), they are by no means perfectly comparable. In other words, there is no way to be sure that some other difference between these two groups of employees, other than their work environment, did not cause the differences in their reactions to their workspace, attitudes, etc. A true longitudinal research study, where the same employees are surveyed prior to and after the move, compared with a control group, would eliminate this alternative

explanation and potential limitation of this study. Such a study would also minimize the problem of same source at a single point in time bias inherent in our data.

Second, the fact that all employees in the experimental group at one time worked in the traditional cubicle setting in the company could be construed as another potential weakness of the study. The fact that they had a history with the organization makes comparisons with what they left when they moved inevitable. New employees, being placed directly into the newly designed office environment, may not have such a history and consequently may not report levels of dissatisfaction with workspace, distractions, etc., having not had a contrasting, prior office with which to compare. Indeed, the fact that Millennials reported less dissatisfaction with workspace, distractions, etc., than did other age groups suggests that some of the problems reported herein may be alleviated over time as additional Millennials replace longer-term employees. On the other hand, the fact that all employees in the experimental group did have a comparative work environment within the organization supports the idea of using office redesign to effect organizational change.

Third, because these redesign efforts encompassed so many different aspects (changes in physical structure, physical stimuli, and symbolic artifacts), we were not able to isolate the precise office design dimension responsible for these results. It might be that the only significant factor was the change in aesthetics, or the dropping of partition height. While we have no way to determine which factor or factors produced the results we can say that the office redesign, in total, is associated with changes in employee perceptions and attitudes.

Fourth, our study uses a survey methodology in an attempt to capture the association between changes in the physical environment and perceptions of culture. Association and perceptions are key words here. We want to be careful to avoid implying that changes in office design caused changes in culture. Survey research is designed to uncover association not causality. Moreover, it is difficult to offer a deterministic argument for office design causing culture when each is itself a socially constructed concept. Our methodology attempted to capture culture by measuring how employees perceive the attitudes and behavior of others. While this may give us a glimpse of the values held by employees, it does not allow us to delve into the deeper levels of culture; that is, its basic underlying assumptions. Based on the arguments raised by Leonardi (2008) regarding the socially constructed connection of technology and culture, or what Orlikowski and Scott (2008) refer to as sociomateriality, other research methodologies, such as ethnography, may be required to capture the deeper meaning of an organization's culture (Schein, 1990).

Finally, it is possible that some of the study's findings may be related to the nature of the change process employed. Two points are relevant here. First, it may be, as we suggest that those employees who moved saw the move as an indicator of the company's willingness to invest in its employees and thus responded favorably. The opposite is also possible; that those left in the old cubicles saw this office redesign as an unwillingness to invest in them and thus the difference in attitudes between movers and non-movers may be due to a decrease in non-movers' perceptions and attitudes. However, this is unlikely given that there was not a single written comment suggesting that non-movers felt slighted by the office redesign program. Second, the company made a conscious effort to involve employees who were going to be affected by the change in office design. Focus groups and other inclusive means were used to get employee input into color schemes,

chair selection, location of common meeting spaces, etc. Thus it is possible that this involvement may explain some differences in employee attitudes (e.g. affective organization commitment) and perceptions of culture (e.g. innovation) as much or more so than the change in office design per se.

Implications

The implications of this study are two-fold. First, the results indicate that researchers and managers alike ought to take the generational cohort and age composition of their employees into account more frequently and especially in advance of attempting organizational change initiatives. Various age cohorts share experiences and as such may constitute what Schein (1990) refers to as subcultures within an organization. Evidence for the moderating effects of cohort and age are mounting (Kanfer and Ackerman, 2004), Simply put, 'older workers respond differently to organizational treatment than younger colleagues' (Bal et al., 2008: 154) and the results of this study further support this contention. Perhaps even more importantly, recent research is revealing that age and generational cohort can sometimes be untangled, and when they are, differential relationships with such work-related behaviors as duration of unemployment and likelihood of occupational change are observed (Lippmann, 2008). While it is true that theoretical explanations for cohort, age, and even organizational tenure and career stage differences still lag in development, the growth in these findings will hopefully stimulate more work in this area.

Second, office work has changed dramatically over the years from a preponderance of clerical and repetitive activities to the so-called 'knowledge work' common to so many organizations today. This work requires individual and group creativity and collaboration. Moreover, future work will likely continue to be changed by technological innovation. What the results of this study show, if generalizable beyond this one setting, is that the physical environment can be used to support the changes taking place in the nature of work in today's organizations. Non-verbal behavior has a large and significant effect on interpersonal communication, ranging from 55 percent of the meaning of a message when operationalized as facial expression (Mehrabian, 2007) to approximately two-thirds when viewed as 'other than words' (Hickson et al., 2004). This study suggests that this effect carries over to the macro level as well. Object language can be used to communicate to employees, as well as to customers and visitors (e.g. Morrow and McElroy, 1981) about how things are done within an organization. These results also underscore how object language, operationalized as office redesign, can be used as a method for implementing and institutionalizing organization change.

Conclusion

The powerful role of space and architecture in affecting human interaction in organizations has long been recognized but is still not well understood (Kornberger and Clegg, 2004). Office design research has long sought to close this gap but has not yet spawned a fully developed theory of office design. This study accomplishes what Miller (2007) suggests this type of research should do: uncover patterns (in this case the relationship between office design and perceptions of culture) that should be of concern to at least

some organizational stakeholders and discover something original (i.e. the existence of multigenerational differences). These results can be used to initiate a theory of office design, namely, that planned change in office design plays a role in organizational culture. Using Lewin's (1951) model of the change process, changes in the physical environment may be one vehicle for unfreezing cultural patterns or perhaps a necessary means for refreezing new patterns of behavior generated by other change techniques. Going back to Schein's (1990) definition of culture, observable artifacts like office design may be central to cultural change since they are the most visible. The physical environment in general, and office design in particular, may constitute one of a number of organizational elements that need to be aligned, including technology, organizational structure, and business processes, in order to avoid sending mixed messages to organizational participants about what the organization's values and underlying assumptions really are. Logical next steps would be to identify the boundary conditions for such a theory (i.e. what is the role of the physical environment vis-à-vis other structural elements) and to establish nomological nets for key office design concepts. For example, Elsbach and Pratt (2007) suggest that the symbolic function of the physical environment is more closely connected to culture than are the instrumental and aesthetic dimensions. Yet the instrumental function appears to more accurately reflect a deeper manifestation of culture in terms of how things are actually done within an organization. Future work is needed to explicate these relationships as well as to articulate how individual office design elements might exhibit variation with respect to their instrumentality, aesthetics, and symbolism functions (Vilnai-Yavetz and Rafaeli, 2006; Vilnai-Yavetz et al., 2005). At the very least, this study speaks to the need for a renewed interest in research on the role of the physical environment in organizational behavior.

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Note

1 Because of laboratory findings (e.g. Paulus et al., 1976) that men reacted more negatively to crowding than women, we did look at gender as a possible moderator of the effects of the office redesign effort. There was only one finding between those who moved and those who had not that was affected by gender. While respondents in general who had moved into the new office arrangement saw the organization's culture as less formal than did those who remained in the traditional office environment, this trend was greater for males than for females. This is an isolated finding, however, and, with the number of analyses conducted, could have occurred by chance.

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