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The Physical Environment in Organizations

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Abstract

We review empirical research on the physical environment in professional, organizational work settings (i.e., offices, meeting rooms, and design work spaces) from the past several decades. This research reveals no common elements of the physical environment (e.g., enclosures and barriers in work spaces, adjustable work arrangements, personalized work spaces, and ambient surroundings) that are consistently and exclusively associated with desired outcomes in these work settings. Instead, these elements are routinely associated with both desired and undesired outcomes. Based on these findings, we suggest that understanding the role of physical environments in organizations requires an understanding of common trade-offs in organizational life. Further, we suggest that the prevalence of such trade-offs is grounded in tensions that are inherent to the functions that physical environments serve (i.e., aesthetic, instrumental, and symbolic functions). We provide an outline of these tensions and trade-offs in relation to common elements of the physical environment, and suggest that researchers consider these tensions and trade-offs in their future research.

Introduction

Physical environments in organizations include all of the material objects and stimuli (e.g., buildings, furnishings, equipment, and ambient conditions

such as lighting and air quality) as well as the arrangements of those objects and stimuli (e.g., open-space office plans and flexible team work spaces) that people encounter and interact with in organizational life (Carnevale, 1992; Davis, 1984; Hedge, 1982; Sundstrom, Bell, Busby, & Asmus, 1996). These material objects, stimuli, and arrangements distinguish the physical environment from other types of organizational environments such as the social environment (i.e., the surrounding human social structures and norms) and the purely natural environment (i.e., surroundings that are completely constructed by nature).

Physical environments play a major role in facilitating and constraining organizational action. Everything from the efficient manufacture of computer chips to the research and development of new flavors of potato chips is affected by the design and arrangement of machinery, work spaces, environmental controls, and equipment. Further, because physical environments tend to involve large objects, relatively fixed and long-lasting arrangements, and expensive installations, design decisions need to be made carefully and require a clear understanding of the effects of physical environments on organizations and their members.

In this chapter, we review research, published over the last thirty years, examining the effects of physical environments in professional work settings such as offices, meeting rooms, and design areas—the most commonly studied work settings in organizational literature. Our review includes research from both general organizational journals (i.e., *Academy of Management Journal, Administrative Science Quarterly, Journal of Organizational Behavior,* and *Organization Science)* and specialty journals that focus on the managerial implications of physical environments in organizations (i.e., *Environment and Behavior* and *Journal of Environmental Psychology).*

In general, our review suggests that choosing objects and their arrangements in professional, organizational work settings is one of the most difficult tasks a manager faces. It is not difficult because there are few choices and configurations available to managers. In fact, just the opposite is true. There is a dizzying array of choices in the area of office design alone (see Elsbach & Bechky, 2007 for a review). The difficulty arises because these choices always come with both benefits and costs. As a result, managers must balance a large number of complex trade-offs when making decisions about the nature of physical environments in their organizations.

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* We should note that we exclude from our review research on purely physiological effects of physical environments, such as the effects of temperature and lighting on heart rate and cognitive fatigue. We also exclude studies of the physical environment in manufacturing or production settings, such as factory floors, and in purely outdoor settings, such as road construction and farming. These effects and settings are primarily studied by engineering, design, and ergonomic scholars and tend to focus on construction and materials issues, as well as physiological issues.

By focusing on trade-offs, we differ from other reviews that have attempted to organize this rather large body of literature by examining underlying psychological "mechanisms" that may explain how individuals react to the physical environment (e.g., Baron, 1994; Oldham, Cummings, & Zhou, 1995; Sundstrom & Sundstrom, 1986). Our decision to stray from this organizing scheme was based on three rationales. First, because of their large number, a focus on mechanisms may not be parsimonious and may even call for an additional organizing scheme (e.g., a hierarchy of mechanisms). As we argue later, needs for control, the complexity of jobs, and the invocation of stereotypes are just some of the psychological mechanisms that have been linked to individuals' reactions to the physical environment. Second, past attempts to identify overriding mechanisms (e.g., "social interference") have only found mixed support (e.g., Oldham et al., 1995). Third, a mechanism perspective often begins with trying to understand characteristics of people (e.g., our human needs), with the physical environment serving merely as a context for understanding those needs. By contrast, we believe it may be advantageous to reverse this figure-ground relationship and begin with the characteristics of the physical environment itself. Thus, we employ an organizing scheme that was originally designed for explaining elements of the physical environment itself, rather than our reactions to it.

In the following sections, we discuss some of the most commonly studied elements of the physical environment in organizational settings and examine the apparent trade-offs in implementing these elements. We then describe how tensions inherent in these physical elements may explain this prevalence of trade-offs and may provide guidance for how to manage these trade-offs. We close with some guidelines for future research.

Trade-Offs in Managing the Physical Work Environment

In 1965, advice about the design of physical environments in organizations was limited to calls for office tidiness. One handbook admonished

> *Avoid overdecorating your desk area.* When your desk, shelves, and wall space are covered with mementoes, photographs, trophies, humorous mottoes, and other decorative effects, you are probably not beautifying the office; rather you may be giving it a jumbled, untidy look. You may also be violating regulations against using nails in the walls, and so on. The proper atmosphere for a business office is one of neatness and efficiency, not hominess. (Parker Publishing Editorial Staff, 1965, p. 17)

As it turns out, this is not always good advice. On the one hand, an empty and moderately tidy office (characterized by "organized stacks" of paper work) has been shown to have strong positive effects on attributions of the occupant's friendliness, organization, and welcomeness (Morrow & McElroy, 1981). If the

occupant is present, a tidy (vs. messy) office has also been shown to lead to higher ratings of sincerity, intelligence, ambition, and calmness (Sitton, 1984). In addition, a moderately tidy office has been shown to lead to higher ratings of visitor comfort in the office (Morrow & McElroy, 1981). Finally, there is evidence that a neat office is important to prospective employees who are considering joining a corporation, leading to a more positive impression of the organization and a stronger likelihood of accepting a job offer (American Society of Interior Designers, 2000).

On the other hand, research has also shown that an empty and messy (vs. empty and tidy) office leads to more positive attributions of the occupant's activity, kindness, and sociability (Sitton, 1984), as well as busyness (Morrow & McElroy, 1981). Further, if a messy (vs. tidy) office is observed when the occupant is present, observers will make more positive attributions of sociability (Sitton, 1984). Clearly, there are trade-offs to having a messy or neat office.

In a similar manner, most of the research on the elements of physical environments in organizational work settings suggests a complicated picture in which most common objects and arrangements have both positive and negative implications, making it at times necessary for managers to make trade-offs when choosing or designing physical work environments. In the following sections, we review research that illustrates and reveals these trade-offs. We organize this discussion according to the elements of physical environment that, based on our review, appear to be most commonly studied (also see Baron, 1994). These common design elements include the following: (1) enclosures and barriers in work spaces; (2) adjustable work arrangements, equipment, and furnishings; (3) personalization of work spaces, including the display of well-known symbols; and (4) nature-like ambient surroundings, including natural light, presence of plants, wood interiors, views of nature, and natural aromas. These elements and their trade-offs are discussed below and summarized in Table 4.1.

1. Enclosures and Barriers in Work Spaces

No issue in the design of physical environments in professional, organizational work settings has received more attention than the management of enclosures and barriers (i.e., partitions, walls, doors, cubicles, open spaces, and hallways that buffer workers from each other and from ambient disturbances). A number of ongoing debates about the virtues of opposing workplace designs have contributed to this attention (Elsbach, 2003). For instance, the debate between proponents of open-plan office designs (few barriers and enclosures, with work spaces separated by 5-foot high, moveable partitions) versus traditional office designs (more barriers and enclosures, with offices separated by floor-to-ceiling walls and doors) has persisted for over 30 years (Brookes & Kaplan, 1972; Hedge, 1982; Maher & von Hippel, 2005; Oldham & Brass,

Table 4.1 Trade-Offs in the Design of Physical Envi

Dimension of Physical Environment	Generally Desired Effects	Generally Undesired Effects
High Degree of Enclosure and Barriers	Increases satisfaction for managers and professionals (Brennan, Chugh, & Kline, 2002; Carlopio & Gardner, 1992; Hedge, 1982)	Reduces satisfaction for clerical workers (Carlopio & Gardner, 1992; Zalesny & Farace, 1987)
	Increases performance and satisfaction on simple tasks (Oldham et al., 1991)	Reduces performance and satisfaction on complex tasks (Oldham et al., 1991)
	Improves perceived status of managers (Carlopio & Gardner, 1992)	Reduces task identity among clerical, professional, and managerial workers compared to open plan (Zalesny & Farace, 1987)
	Reduces fatigue and psychosomatic complaints if job accompanied by high numbers of interruptions and low screening ability of occupant (Fried, 1990)	Open plan improves speed of mission proposal design among engineers at Jet Propulsion Lab (Mark, 2002)
	Low degree of noise, distraction, and crowding leads to high perceived architectural privacy and sense of control over environment (Becker et al., 1983; Crouch & Nimran, 1989; Oldham, 1988; Oldham & Brass, 1979; Sundstrom et al., 1980; Sundstrom et al., 1994)	Use of desk as barrier between occupant and visitor signals unwelcomeness to visitor (Morrow & McElroy, 1981)
	More enclosed sides and few neighbors improve job performance of administrative and clerical employees (Sundstrom et al., 1980)	If barriers block visual intrusion, but not noise intrusion, they are detrimental to workers with poor stimulus screening abilities (Maher & von Hippel, 2005)
	Employees prefer privacy on complex and routine tasks (Sundstrom et al., 1980)	

Table 4.1 Trade-Offs in the Design of Physical Environments in Organizations (Continued)

Dimension of Physical Environment	Generally Desired Effects	Generally Undesired Effects
High Degree of Enclosure and Barriers (continued)	More privacy does not reduce social interaction compared to open plan (Sundstrom et al., 1980) Increases task feedback and trust in management (Zalesny & Farace, 1987)	Adjustable workstation lighting led to worse performance on creative task than no control over lighting (Veitch & Gifford, 1996)
Adjustable Work Arrangements	Control over work station settings and design of work arrangements more important to job satisfaction than adequacy of physical features, actual arrangement of features, or symbolic effects of features (Carnevale & Rios, 1995) Ability to adjust and arrange work space associated with greater job satisfaction and performance (Lee & Brand, 2005) Adjustability of work space furniture, storage, and materials associated with greater environmental satisfaction and self-reported performance. Adjustable partitions associated with greater perceived privacy and better communication (O'Neill, 1994)	Control over temperature led to lower job satisfaction (Paciuk, 1990) Customizable furniture and barriers are rarely adjusted by work space occupants (Hedge, 1982)
Ability to Personalize Work Space	Personalization increases ability to affirm distinctive identities and personalities (Donald, 1994; Elsbach, 2003; Wells, 2000).	Personalization of office with hobby mementoes and conversation pieces can lead to negative attributions of occupant (e.g., low status, unprofessional) (Elsbach, 2004)

Companies that allow for greater personalization have more positive social climates and moral and lower turnover (Wells, 2000)

Capacity for work space personalization and ability to control access to work space associated with high status (Veitch & Gifford, 1996)

Status markers improve job satisfaction and work space satisfaction for supervisors more than for nonsupervisors (Konar et al., 1982)

Personalization is a means to mark and defend territories (Brown, 1987)

Personalization helps to improve employee well-being (i.e., general happiness, stress and anxiety levels, and physical health) by improving job satisfaction and work environment satisfaction (Wells, 2000)

Personalization increases attachment and commitment to a place or organization (Vinsel, 1980)

Personalization increases pleasantness of surroundings for workers (Wells, 2000)

Messy offices signal busyness (Morrow & McElroy, 1981)

Messy offices signal less welcomeness, organization, and friendliness. Moderately tidy offices (organized stacks) led to most positive attributions (Morrow & McElroy, 1981)

Presence of identity-affirming artifacts may affect role perceptions and lead to behavior consistent with those roles—even if inappropriate (Rafaeli & Pratt, 1993; Weick, 1996)

Authority symbols lead to stereotyped perceptions of organization, including low degree of autonomy for workers (Ornstein, 1986; 1992)

Newer courthouse façade that looked like schema of "prison" perceived as more intimidating and more likely to lead to a conviction than courthouse façade that did not match this schema (Maas et al., 2000)

Personalization of offices accurately signals traits of openness (through high level of decoration, quantity of magazines, quantity and variety of books and CDs), conscientiousness (through cleanliness, organization, and uncluttered space), and extroversion (through highly decorated, cheerful, colorful, cluttered, and unconventional decor; Gosling et al., 2002).

Table 4.1 Trade-Offs in the Design of Physical Environments in Organizations (Continued)

Dimension of Physical Environment	Generally Desired Effects	Generally Undesired Effects
Ability to Personalize Work Space (continued)	Large, salient artifacts such as desks and high barriers are most likely to lead to status categorizations of office occupant (Elsbach, 2004)	
	Presence of status symbols (credentials and diplomas) lead to attributions of achievement orientation (Morrow & McElroy, 1981)	
	Authority symbols (U.S. flag, restrictive sign) led to low ratings of autonomy in organization in both bank and movie industry reception area (Ornstein, 1986; 1992)	
	Empathic symbols (plants, artwork) led to higher ratings of consideration in both bank and movie industry reception area (Ornstein, 1986; 1992)	
	Reward symbols (certificates, diplomas) led to higher ratings of rewards in the organization in both bank and movie industry reception area (Ornstein, 1986; 1992)	
	Dress signals professional identities and status in organizations (Rafaeli & Pratt, 1993; Rafaeli et al., 1997)	
	Project prototypes or artifacts may be displayed and serve as boundary objects, that allow workers to communicate across functional boundaries, while affirming distinctive functional identities and legitimacy (Bechky, 2003a; Carlile, 2002)	

Personalization of offices does not accurately signal traits of agreeableness and emotional stability (Gosling et al., 2002).

Nature-Like Surroundings		
	Working on clerical tasks or negotiations in room with natural (vs. neutral) aroma led to higher perceptions of self-efficacy (Baron, 1991)	Work areas with large numbers of plants led to low productivity on a low complexity, repetitive task, while areas with no plants led to high productivity in same task (Larsen et al., 1998)
	Working on clerical task or negotiation in room with natural aroma (vs. neutral aroma) led to higher output goals, more efficient work strategy, and preference for less confrontational modes of conflict resolution, and more concessions in negotiations (Barron, 1990).	Posters of nature scenes in work area increased perceived task demand, hostility, and depression for workers working on a high-task demand task (Stone & English, 1998)
	Working in room with natural lighting and plants leads to high ratings of environmental pleasantness and satisfaction (Stone & English, 1998) and higher test scores in classroom (Wollin & Montagne,1981)	Use of natural green color on public transit buses was seen by some observers as symbolizing identification with terrorist group, military; and garbage trucks; also made the buses hard to see at night and hot during the day (Rafaeli & Vilnai-Yavetz, 2004b)
	Views of nature through windows improves satisfaction and reduces stress (Finnegan & Solomon)	
	Views of nature through windows reduce need to compensate by displaying visual items with nature-like images in one's office (Heerwagen & Orian, 1986)	

Table 4.1 Trade-Offs in the Design of Physical Environments in Organizations (Continued)

Dimension of Physical Environment	Generally Desired Effects	Generally Undesired Effects
Nature-Like Surroundings (continued)	Office decorated with natural wood flooring and furnishings leads to more positive overall impressions of occupant (Ridoutt et al., 2002), and more natural building exterior leads to evaluative responses of "calmness" by observers (Nasar, 1994)	
	Use of natural materials and view of the natural environment (vs. use of more manufactured, composite materials) leads to greater creative performance in an interior work space (Mitchell-McCoy & Evans, 2002)	
	Natural green color of bus seen by some observers as pleasant and calming (Rafaeli & Vilnai-Yavetz, 2004b)	

1979). This debate was recently highlighted in an article about the simultaneous hatred for and persistence of the office cubicle:

Reviled by workers, demonized by designers, disowned by its very creator, [the cubicle] still claims the largest share of office furniture sales—$3 billion or so a year—and has outlived every 'office of the future' meant to replace it. It is the Fidel Castro of office furniture. (Schlosser, 2006, p. 21)

One reason that barriers and enclosures appear to be such a hot topic is their visual salience and easy comparison among workers (e.g., workers may easily identify inequities in the degree of privacy they are afforded in comparison to their coworkers). Such salience makes barriers and enclosures a common signal of status and rank. Further, barriers and enclosures may demand attention because their inadequacy in buffering employees from noise and distractions has been shown to be a strong inhibitor (vs. facilitator) of work performance (Crouch & Nimran, 1989). Such negative effects tend to garner more attention than do positive effects (Fiske & Taylor, 1991). It is perhaps not surprising then, that issues related to enclosures and barriers were the top environmental concern of office workers, designers, and top executives in a large-scale survey of Canadian employees (Kelly, 1992).

In the following sections, we discuss research indicating both the generally desired and generally undesired effects of using more (vs. less) barriers and enclosures in professional work settings.

Generally desired effects of barriers and enclosures. One of the primary arguments in favor of more barriers and enclosures is that barriers and enclosures reduce unwanted intrusions and overstimulation from the environment, allowing workers to concentrate on their jobs and reducing their feelings of dissatisfaction with the work environment (Cohen, 1980; Oldham, 1988). According to proponents of this "overstimulation" theory, in work spaces that lack adequate barriers and enclosures

the combination of excessive social interaction and small amounts of personal space . . . exposes employees to overstimulation (Desor, 1972; Paulus, 1980) . . . [and] generally evokes a negative response from individuals, both behaviorally and attitudinally, and in the workplace this likely results in employee dissatisfaction and withdrawal (Oldham, 1988; Paulus, 1980). (Maher & von Hippel, 2005, p. 220)

By contrast, adequate barriers and enclosures can be used to stop both unwanted background stimuli (e.g., noise and light), as well as interruptions from others. Further, these salutary effects of adequate barriers and enclosures on job satisfaction may be more useful to managers and professional workers than to clerical workers (Carlopio & Gardner, 1992; Hedge, 1982;

Maher & von Hippel, 2005). For managers, having control (we discuss control as an important element of the physical environment in and of itself later) over one's barriers (e.g., being able to close one's door) allows them the opportunity to "shut out" both background stimuli and noises that interfere with "heads down" or "thinking" work that they are commonly called upon to complete (O'Neill, 1994). In addition, for managers, a closed door on a private office is an effective means of discouraging others from interrupting its occupant because it signals that "thinking" work is being done. Yet, for secretarial or clerical workers, a private office may not strongly dissuade other workers from interrupting or disturbing the office occupant because these other workers assume that the clerical worker is not doing important "thinking" work and does not need privacy. In support of this argument, researchers have found that clerical workers perceive an enclosed office as less private than do managerial workers because such an office does not, in practice, afford great privacy to these clerical workers (Sundstrom, Town, Brown, Forman, & McGee, 1982).

A second benefit of barriers and enclosures is that they may help signal appropriate status levels, especially in organizations that desire such stratification of the workforce. In turn, they may improve satisfaction among high - ranking managers who value status as a component of their workplace identity (Elsbach, 2003; Sundstrom, Burt, & Kamp, 1980). In support of this reasoning, researchers have found that occupying a private, enclosed office with floor-to-ceiling walls and a door is one of the most widely recognized physical markers of status within modern corporations (Campbell, Dunnette, Lawler, & Weick, 1970). Further, researchers have found that removing barriers, through the use of an open-plan office design that provides approximately equal amounts of privacy to all levels of workers, reduces satisfaction with the work space among higher status workers (e.g., managers) while it increases satisfaction among lower status workers (e.g., clerical workers; Carlopio & Gardner, 1992; Zalesny & Farace, 1987).

A third argument in favor of barriers and enclosures is that they allow for more confidentiality in work, including the ability to have confidential conversations with other employees (Carlopio & Gardner, 1992). Thus, several studies of managerial workers have shown that a primary dissatisfaction with open office plans is the inability to hold confidential conversations, such as performance evaluations, without being overheard (Oldham & Brass, 1979; Sundstrom, Herbert, & Brown, 1982). Further, in a university setting, researchers found that students actually noticed a reduction in useful and honest feedback when speaking with faculty who occupied nonprivate versus private offices (Becker, Gield, Gaylin, & Sayer, 1983). In related research, researchers found that open-plan offices that used 5-foot partitions to separate work spaces were effective at reducing visual distractions and interruptions, but not noise distractions and interruptions (Kupritz, 1998). The fact that one can easily hear conversations through moveable partitions supports

the notion that such partitions are not effective barriers for preventing others from overhearing confidential conversations.

A final benefit of barriers in the work space is that they may motivate workers to have more frequent and satisfying conversations and interactions (especially informal and unscheduled interactions) because these workers perceive that their discussions will not disturb coworkers. In this manner, Hatch (1987) found that technical workers actually increased their level of informal interaction and communication in a high-tech firm when they worked in areas that had higher (vs. lower) partitions between work spaces. Hatch proposed that this effect may have been due to the privacy that barriers allowed. Similarly, in their study of university students, Becker et al. (1983) found that students felt more comfortable dropping in, unexpectedly, on faculty members who occupied private (vs. open) offices. The researchers suggested that this effect may have been due to students' reduced worries about disrupting nearby faculty during nonscheduled meeting hours. Together, these findings support the paradoxical notion that barriers actually increase informal interaction. As Becker et al. (1983) put it, "[Informal] interaction is facilitated not by unlimited opportunities for interpersonal contact, but by the opportunity for privacy. The ability to control interaction appears to be the critical variable mediating the negative effects of reduced privacy and crowding" (p. 723).

Generally undesired effects of barriers and enclosures. Despite the above findings, opponents of barriers and enclosures in the work environment argue that these elements prevent some specific forms of informal communication, specifically the communication of visual information (Boje, 1971; Pile, 1978). For example, researchers have found that many clerical staff dislike enclosures and barriers because they prevent visual scanning of the work environment that allows them to know who is available to answer questions or provide information (Carlopio & Gardner, 1992; Zalesny & Farace, 1987). Similarly, researchers have shown that barriers may inhibit visual information about the source of intrusive noise (Maher & von Hipple, 2005) . Further, these researchers suggest that if workers can anticipate noise, see where it is coming from, or anticipate when it will end, then the disruption is less bothersome than if they can hear the noise but cannot see its source (Maher & von Hippel, 2005, p. 226).

A second downside of barriers and enclosures is that they may inhibit collaboration in environments that require fast-paced problem solving and decision making. For instance, Mark (2002) discussed how engineers in a mission proposal design team (referred to as "Team X") were able to move their work fluidly around a "war room" at the Jet Propulsion Laboratory. This ability to fluidly change the work arrangement enabled them to follow problems in real time and simultaneously work on several issues, focusing attention on a given issue as it became most relevant. In this manner, Mark described how

the barrierless war room lent itself to a constantly changing arrangement of workers:

> As soon as expertise is needed to solve a problem, team members seek out the source of the problem, possibly approaching colleagues already working on its solution, a customer with a question, or even a public display indicating an error. Others may join in the solution effort or stay at their desks calling out quick answers. Team X members routinely move between individual subsystem work, group work, and the orchestrated combined work of the entire team. . . . Activity among team members is always related to physical location, *and each one's activity is visible to everyone else in the room* [italics added]. Thus, the physical arrangement of the entire group provides indication to everyone else as to the state of the human network, which in turn conveys information about a particular mission proposal's overall design status. (pp. 91–92)

Other researchers have suggested that barriers may reduce performance on simple tasks that benefit from social facilitation effects (i.e., increased stimulation from ambient intrusions; Geen & Gagne, 1977). Evidence from more recent research on barriers and job performance suggests,however, that such facilitation may also occur on complex tasks and that ambient intrusions may actually hamper some simple tasks. Thus, researchers have found that workers in more complex jobs actually show improved performance when barriers are reduced, while those in simple jobs show decreased performance in more open work environments (Oldham, Kulik, & Stepina, 1991). It may be that the particular job processes are more important than the task type in determining the benefits versus costs of barriers in the work environment. This argument fits with research that suggests that the degree to which interruptions and distractions negatively affect job performance (regardless of task type) predicts the degree to which workers prefer private work spaces (Becker et al., 1983; Crouch & Nimran, 1989; Fried, 1990; Lee & Brand, 2005; Sundstrom, Town, Rice, Osborn, & Brill, 1994). Thus, if the job process involves a lot of focused, "heads down" thinking, whether it is a simple task (e.g., simple copy editing) or a complex task (e.g., complex research coding), a more enclosed and private work space may be beneficial. By contrast, jobs requiring less cognitive focus but more stimulation -- such as a simple sorting tasks or a complex brainstorming sessions -- may benefit from less privacy and enclosure.

A fourth downside to barriers and enclosures in the corporate work environment is that they may reduce workers' perceptions of task significance and task identity, which have been shown to be important predictors of job satisfaction (Oldham & Rotchford, 1983; Zalesny & Farace, 1987). For instance, in a study of task significance among female, clerical workers, Oldham and Rotchford (1983) found that a more open work environment produced greater perceptions of task significance (i.e., perceptions that jobs were meaningful

and important to the organization). The researchers suggest that the more open environment allowed the clerical workers to compare their roles with others in the organization and helped them to become aware of their importance in the organization (which was greater than they would have thought if they had not been able to compare to others in the organization). By contrast, in a similar study of clerical workers, Oldham and Brass (1979) found that workers perceived a reduction in task significance in an open office plan. They suggest that, in this case, greater exposure to other workers allowed the clerical workers to see how their jobs were *less* important than they would have thought if they had not been able to compare to others. Thus, barriers and enclosures may inhibit a positive sense of task significance in those cases in which this significance is not readily apparent to workers.

In terms of task identity, it appears that the same mechanisms may be at work. Zalesny and Farace (1987) found, for example, that perceptions of task identity for clerical, professional, and managerial workers all increased after a move from a traditional to an open-plan office. In the open-plan office, it appears that all of these workers were able to see how they were doing a complete job versus only part of a job. Again, this may have been the case because, in the open-plan office, workers were able to compare what they did to others and could see how their jobs and outputs constituted complete tasks within the organization.

A final downside to barriers is that they may signal and reinforce undesired status and power differences between workers, especially in organizations that wish to improve collaboration and feedback across job levels and ranks. Thus, as noted earlier, the strong symbolic effects of barriers and private offices (i.e., more privacy and barriers around a person's work space are perceived to indicate that the person has higher status and more power in the organization) may be undesirable in an organization that is seeking to reduce status barriers to collaboration (Vilnai-Yavetz, Rafaeli, & Yaacov, 2005). Researchers have found that these symbolic effects are very potent, especially when they are confirmed by an office occupant's high organizational rank (Sundstrom, Town, et al., 1982).

2. Adjustable Work Arrangements, Equipment, and Furnishings

As organizations have moved toward nontraditional work arrangements that call for employees to work in many different locations or require them to reserve work spaces one day at a time (e.g., nonterritiorial or hoteling arrangements), the adjustability or customizability of one's work environment has become an essential component of work space design (Zelinsky, 2002). Much of the research on adjustable work arrangements focuses on the benefits and costs of perceiving control over one's work environment, regardless of the type of adjustments that are available (Huang, Robertson, & Chang, 2004;

Karasek, 1979, Karasek & & Theorell, 1990). We discuss these effects in the following sections.

Generally desired effects of adjustable work arrangements. Research from environmental psychology suggests that giving employees the opportunity to control task-relevant dimensions of their work environment—including control of ambient conditions (i.e., lighting, temperature, noise, air quality) as well as the ability to adjust equipment, tools, and furnishings to meet individual needs (e.g., adjustable-height chairs, adjustable tools, and customizable office arrangements)—is associated with improved job satisfaction and job performance (Carnevale & Rios, 1995; Lee & Brand, 2005). Researchers suggest several reasons for these benefits.

First, researchers have shown that the ability to adjust or adapt work space arrangements and storage areas improves job satisfaction and performance because it allows workers to adjust privacy, comfort, and ease of access to work materials in ways that fit their *specific work needs* (Lee & Brand, 2005; O'Neill, 1994). Further, training that enhances workers' ability to effectively make these adjustments (e.g., training that helps them to adjust their work station equipment and furniture) has been shown to be critical to achieving greater work satisfaction in customizable work settings (Huang et al., 2004).

Second, the positive effects of adjustability and adaptability of work arrangements may result from an innate *need for control* that all humans possess (Baumeister, 1998). By providing employees with the opportunity and ability to adjust and control their physical work environment, organizations may be helping workers to satisfy this need. As Baumeister (1998) noted,

> Broadly speaking, control and esteem are probably the two most important motivations of the self. People almost universally react badly to any major loss of either esteem or control, and they generally seem to desire and enjoy opportunities to gain either esteem or control. Both are strongly linked to happiness (Campbell, 1981; Campbell, Converse, & Rogers, 1976), and people will often augment their substantive esteem and control with inflated, exaggerated self-perceptions. (p. 713)

This argument also suggests that the perception of control (or what is often called the "illusion of control" [Langer, 1975]) may be just as important as actual control in improving employees' job and environmental satisfaction. Although not studied in relation to adjustable work arrangements, the notion that perceived control increases satisfaction has been supported by numerous studies in other contexts, including decision making (Brown, 1995), risk taking and gambling (Horswill & McKenna, 1999), and coping with threat (Taylor, 1983).

Generally undesired effects of adjustable work arrangements. While the positive effects of adjustable work arrangements appear to be commonly found, there is growing evidence that control over the work environment may have downsides. The first downside is that, while the *perception* that one has control over one's environment may be beneficial in many cases, the actual *exercise* of control can be detrimental, at least in specific instances.

For example, researchers have found that while having the opportunity to control ambient conditions (e.g., temperature, lighting) is associated with higher job satisfaction for workers, actually altering ambient conditions can be associated with poorer job satisfaction and job performance in particular cases (Paciuk, 1990; Veitch & Gifford, 1996). In one case, Veitch and Gifford (1996) found that in an experimental study of lighting and performance on creative tasks, subjects who were given choice over their lighting conditions perceived that they had more control over their environment than subjects who were not given choice over lighting conditions, but performed more poorly and more slowly on a creativity task than "no-choice" subjects. Veitch and Gifford suggested that the subjects in the "choice" condition may have felt additional pressure to perform because they were given choice over their ambient conditions. In turn, the authors suggest that this added pressure may have led to poorer performance on the creativity task.

In another case, Paciuk (1990) found that while perceptions of control over thermal dimensions of the work environment increased job satisfaction, the actual use of these thermal controls reduced satisfaction. Paciuk suggested that this effect may have resulted from poor use of temperature controls (e.g., adjusting the temperature so that it is too high or too low for comfort and effective work) and that it highlights the need for training that actually allows employees to exercise control over their work environments in an effective manner. This finding underscores our general lack of understanding about when and where to give employees control over their physical work environments. As Veitch and Gifford (1996) put it, "We do not know which features of the physical environment are the ones for which control is desired, nor can we reliably predict which experiences of the physical environment will lead to the development of such control" (p. 274).

A second downside of providing adjustable work arrangements, equipment, and furnishings to workers is that these adjustable features are often not used, and equipment and furnishings are left in their original configurations. Thus, in his study of 649 employees of an office building that had recently been converted from a traditional plan to a more open office plan, Hedge (1982) found that while furnishings and arrangements in the open plan could have been adjusted to meet specific user needs, this just was not done. As he reported,

Although the open-plan office provides extremely flexible accommodations, this study found little evidence that it was being used in this way

at either the personal or the organizational level. Rather, once layout plans had been prepared, the office remained relatively static for several years. (p. 539)

The problem with this scenario is that the original configuration of the office may not have been well suited for the worker or task to which it was assigned. Yet, the presumption that the work space occupant would adjust it prevented management from checking to see if work space arrangements and equipment configurations were well suited for that occupant. Thus, a nonadjustable work arrangement may have led to a better fit for occupants of the open plan because, at least, these arrangements could have been set up correctly from the beginning.

3. Personalization of Work Areas and Display of Well-known Symbols

Personalization of work areas includes the display and arrangement of artifacts and objects according to personal choices and desires. It is important to note that when we use the term *personalization* we are not so much referring to the ability to personalize (i.e., whether or not one's corporate policies allow personalization at all) as we are to the quantity and quality of personalization (i.e., how much one chooses to display, what types of things are displayed, and how they are arranged).

As was indicated earlier in our discussion of messy desks, the notion of personalization of work areas is an issue that has been long discussed in management literature. Perhaps this is because personalization is so common among workers. In fact, research suggests that over 70% of employees personalize their work spaces (Brill, Marguilis, & Konar, 1984). We discuss the benefits and costs of such displays in the following section.

Generally desired effects of personalization and symbol display. A commonly found benefit of personalization of work environments is that such displays help employees to affirm their workplace and professional identities (Elsbach, 2003, 2004; Gosling, Ko, Mannarelli, & Morris, 2002). In fact, some researchers have defined personalization as "the deliberate decoration or modification of an environment by its occupants to reflect their *identities* [italics added] (Sommer, 1974; Sundstrom 1986)," (Wells & Thelen, 2002, p. 302). Further, expression of identity has been found to be the top-cited reason for personalization in studies of office workers (Wells, 2000). As Dittmar (1992) put it,

[Material] possessions can symbolize an individual's unique personal qualities, values, and attributes, and they can be a symbolic record of personal history and relationships (self-expressive symbols). But material possessions also locate people in social-material terms: They signify the social groups we belong to, social position, and relative wealth and

status (categorical symbols). Personal attributes and social locations are integral aspects of identity, as seen by both self and others. Thus, material possessions are important means of constructing, maintaining, and expressing both personal and social identity. (p. 380)

Such personalization and the display of symbols and artifacts reinforce identity by either affirming *status* (e.g., relative rank, such as "top-management") or affirming *distinctiveness* (e.g., relative uniqueness, such as "engineer"; Brewer, 1991; Dittmar, 1992; Frank, 1985; Pratt & Rafaeli, 2001).

First, just as barriers and enclosures can be important indicators of employee status, so too can office personalization indicate and affirm the status of its displayer. Common personal artifacts that are used to indicate status include awards and diplomas, high-quality furnishings, business cards denoting rank and prestige, and expensive-looking artwork (Elsbach, 2004; Pratt & Rafaeli, 2001).

The critical link between personalization and status is especially salient when employees cannot personalize their workplace. In these conditions, individuals may engage in behaviors (sometimes illegitimate) designed to compensate for these lost status markers (Elsbach, 2003; Steele, 1973). For example, when organizations attempt to remove status markers (e.g., by assigning everyone the same type of work space, regardless of rank), employees have been shown to improvise means of determining status vis-à-vis physical markers (e.g., by supporting unspoken rules about the number of personal artifacts allowed to different levels of management; see Zenardelli, 1967). These effects have been shown to be especially strong for managers, who typically have been found to personalize with art, furniture, and photos that enhance their status rather than with artifacts that merely display personal interests (Goodrich, 1986; Konar, Sundstrom, Brady, Mandel, & Rice, 1982).

In a similar manner, personalization can help employees to affirm distinctiveness (i.e., show that they belong to a distinct social group or possess distinctive interests, knowledge, or abilities; Belk, 1988). Humans have been shown to possess a strong *need for uniqueness* (Snyder & Fromkin, 1980) or *need for differentiation* (Brewer, Manzi, & Shaw, 1993) that motivates them to affirm their distinctiveness in social situations. As a result, it is not surprising that individuals would want to affirm distinctive identities and traits at work. At least in some cases, such affirmations have been shown to be effectively cued through personalization of offices. For instance, Gosling et al. (2002) showed that office workers could effectively and accurately signal the traits of conscientiousness (through a clean, organized, and uncluttered office), openness (through an office with lots of decoration, books, and magazines), and extroversion (through an office with lots of clutter, color, and unconventional decor).

In turn, losing the ability to personalize one's work surroundings may be highly threatening to individuals. For example, Goffman (1961) described

how institutions that confiscate personal possessions upon arrival (e.g., hospitals, military training camps, prisons, boarding schools, and monasteries) systematically limit the personal distinctiveness of individuals and may cause a traumatic dampening of a distinctive sense of self.

These needs for distinctiveness may sometimes be powerful enough to overshadow needs for status, especially in highly depersonalized settings. For example, in a study of high-tech workers, Elsbach (2003) found that employees who moved to a nonterritorial work arrangement—in which employees did not "own" permanent work areas, but instead reserved a different work area on a day to day basis—perceived more threat to their distinctiveness than to their status. As Elsbach noted, in the non-territorial environment,

> participants routinely reported that they were not able to display permanent physical identity markers that indicated the valued and distinctive attributes, skills, and roles they possessed and that they felt a loss of identity as a result. The most common instances of personal distinctiveness threats resulted from the absence of personal artifacts (e.g., photos, mementoes, equipment) that participants used to signal distinctiveness categorizations central to their workplace identities (e.g., parent, artist, athlete). Although these distinctiveness categorizations were relevant to participants' workplace identities, they typically involved nonjob roles, such as being a parent, that were not easily affirmed through other work-related markers like behavior or titles. As a result, personal distinctiveness categorizations were likely to be affirmed exclusively through the display of personal physical artifacts. (p. 635)

In addition to its effects on identity, personalization has also been shown to improve mood and reduce stress (Scheiberg, 1990; Wells, 2000). In one study, the most commonly reported reason for personalizing work space was the positive emotional response that workers experienced from working in a personalized environment (Scheiberg, 1990). Many others reported that their personalized surroundings helped them to relax and cope with stress. In turn, companies that allow great freedom in the personalization of individual work spaces have reported lower turnover and higher morale than companies that highly restrict such personalization (Wells, 2000). By contrast, in companies that limit or discourage personalization of work space, employees have called the work environment "sterile, impersonal, and cold" (Goodrich, 1986, p. 130).

Symbol display, more generally, can also affect cross-functional coordination via the use of *boundary objects* (Bechky, 2003a; Carlile, 2002). Star (1988) defined boundary objects as objects that, figuratively and sometimes literally, "sit in the middle" (p.47) of two or more functional areas and help to establish a shared context for workers in those functional areas. For example, Bechky (2003a) described how engineers and assemblers in a semiconductor equipment manufacturing organization used design drawings (of machines) and machine

prototypes as boundary objects for problem solving during the development and testing phases of a new product launch. Bechky found that the machines were more effective than the drawings as boundary objects because they were concrete and allowed engineers to "see" the problems that assemblers were having with machine prototypes, even though they did not understand the assemblers' descriptions of these problems. By contrast, Bechky found that design drawings were too abstract and unfamiliar to assemblers to serve as a useful boundary object for problem solving.

Finally, researchers have found that personalization and symbol display may increase employees' organizational attachment and commitment (Goodrich, 1986; Hess, 1993). In a study of personalization among college dorm residents, Vinsel, Brown, Altman, and Foss (1980) found that college students who stayed in school beyond their freshman year displayed more items reflecting their commitment to their present university environment, while students who dropped out of college after their freshman year displayed more items reflecting their commitment to their previous home environment. In a similar way, employees who personalize their work environment in ways that reflect affiliation with that organization (i.e., display of mementoes with company logos, company newsletters, and project-related artifacts from work in the company) may also be likely to report higher commitment to the organization than employees who do not engage in such personalization (Pratt & Rafaeli, 2001). In these cases, the visible display of company artifacts may cause employees to feel psychological pressure to behave consistently (e.g., express organizational attachment) with their public commitments of company affiliation (Cialdini, 1993; Rafaeli & Pratt, 1993).

Generally undesired effects of personalization and symbol display. Despite the numerous benefits of workplace personalization and symbol display described, there is evidence that such displays may also have downsides. In particular, there is evidence that workplace personalization and symbol display may lead to inaccurate (Gosling et. al., 2002) and, sometimes, negative perceptions of displayers (Elsbach, 2004). Psychological and organizational research on *impression management* (Schlenker, 1980) and *first impressions* (King & Pate, 2002) has examined the role of physical markers such as décor and material wealth on initial and lasting impressions of individuals who display such markers. This research suggests that first impressions of individuals are strongly influenced by easily observable attributes that are seen early on in an encounter (Christopher & Schlenker, 2000; Greenberg, 1988; Laumann & House, 1969; Rafaeli & Pratt, 1993).

At the same time, psychological research on cognitive biases has shown that observers are prone to a number of inaccuracies in their attributions of workers who display personal artifacts. In particular, research on the actor/observer effect (Jones & Nisbett, 1972), stereotyping based on physical

markers (Waibel & Wicklund, 1994), and categorizations based on "dominant representations" (Dittmar, 1992) suggest that observers may primarily attend to large and visual salient physical artifacts (e.g., prominently displayed photos, large and imposing furniture) and view those artifacts in stereotypical ways (e.g., personal artifacts are displayed as symbols of status vs. symbols of distinctive interests) and as intentional signals of a displayer's symbolic identity (vs. merely artifacts that happen to be in one's office for instrumental purposes, such as relevance to a current work project).

Because of these biases, observers may stereotype displayers of work space personalization based on a quick glimpse or brief encounter with their work setting, and in ways not intended by the displayer. For example, in a study of office workers, Elsbach (2005) found that observers were more likely than displayers to focus their attention on artifacts that were salient due to large size, novelty, or contrast (e.g., hobby artifacts, fun artifacts, awards, and provocative artifacts). Further, observers were more likely than displayers to interpret physical markers as indicators of identity in general, and of status (vs. distinctiveness) in specific.

There is also the potential for symbol display to lead to stereotyping at the organizational level. Research on the interpretation of common symbolic displays in reception areas of corporations has shown that observers interpret some types of symbols in very predictable (and often, stereotypical) ways. For instance, Ornstein (1986, 1992) found that observers interpreted authority symbols that were displayed in reception areas (e.g., U.S. flags, pictures of organizational leaders, displays of organizational logos, formally dressed receptionists, and restrictive signs) as signals that the organization provided low autonomy to workers and was characterized by a high degree of structure. By contrast, Ornstein found that observers interpreted empathic symbols in reception areas (e.g., plants, artwork, magazines, family photos, and informally dressed receptionists) as signals that the organization allowed employees greater autonomy and had a climate of higher consideration. Interestingly, these effects occurred both in a reception area of a bank and a reception area of a movie industry corporation, suggesting that these symbols were so strongly aligned with specific attributions that context did not make a difference in their interpretation.

In a similar study, Maas et al. (2000) found that while observers of photos of two courthouse facades found both to be equally pleasing aesthetically, these observers found the courthouse with a more modern and industrial look (vs. an older, more European look) to be more intimidating and to elicit greater predictions that a given suspect would receive a conviction. Observers' comments revealed that, although the modern courthouse was aesthetically pleasing, it also more closely fit observers' schemas or stereotypes of what a prison looks like. As a result, this symbolic exterior led to perceptions of the modern courthouse that were more negative.

4. Nature-Like Ambient Surroundings

Ambient work surroundings include the temperature, lighting, air quality, aroma, textures, visual stimuli, and sounds workers experience merely by their presence in the work area. Our review of research on ambient dimensions of the work setting suggests that surroundings that mimic nature—that is, what we call "nature-like" ambient surroundings (e.g., natural sunlight, natural materials such as wood in décor, the presence of plants in the work area, nature-like colors, and art depicting scenes of nature)—generally result in positive emotional and cognitive responses from those experiencing them. This finding echoes research showing that among "favorite" places identified by residents of several different countries, natural environments (e.g., woods, beaches, mountains, lakes) are mentioned by the majority (Newell, 1997). Both natural settings and nature-like built environments may be preferred by workers because they are cognitively and emotionally restorative and "freeing" (Newell, 1997). Thus, numerous studies have found that people report restorative effects of natural environments compared to unnatural built environments (Hartig, Mang, & Evans, 1991).

Yet, because of the wide variation in individual preferences and sensitivities, surroundings that are experienced as pleasant to some workers are likely to be experienced as unpleasant to others. Further, even those surroundings that are experienced as pleasant to most workers may have unintended and negative side effects because they also effect the ability of people to perform their work (Wollin & Montagne, 1981). We discuss these trade-offs of nature-like ambient surroundings in the following section.

Generally desired effects of nature-like ambient surroundings.   A growing amount of research suggests that nature-like ambient stimuli are associated with job satisfaction and, in turn, improved job performance (Spreckelmeyer, 1993). For example, research on aroma in work surroundings has shown that a natural scent (e.g., a mild aroma of cotton flower) improves self-efficacy perceptions, goal setting, use of efficient work strategies, and less confrontational negotiation styles. Researchers have also shown that in classroom situations, more natural lighting and plants led to higher test scores, higher teacher ratings, and more positive ratings of the classroom than a more traditional, sterile classroom (Campbell, 1979; Wollin & Montagne, 1981). Further, several studies have shown that windows that allow views of natural settings (e.g., trees, water, lawns) are highly desired by office workers. In turn, office workers who do not have such views are less satisfied and more stressed than other workers (Finnegan & Solomon, 1981) and are likely to hang more visual materials that are nature-oriented on their walls to compensate for the lack of natural views (Heerwagen & Orians, 1986). Finally, researchers have recently found that the use of natural materials in interior design (vs. use of manufactured composite materials) led to higher ratings of creative potential for a work space and

higher actual creative performance in that work space (Mitchell-McCoy & Evans, 2002).

Researchers suggest that these positive effects may be due to the effects of nature-like work surroundings on positive sensory experiences of workers, which, in turn, lead to positive mood states and arousal levels (Baron, 1994). That is, nature-like ambient surroundings lead to more positive moods (Hartig, Böök, Garvill, Olsson, & Gärling, 1996) and to higher levels of cognitive arousal (Hartig et al., 1991), both of which may improve job performance (especially on creative tasks) and job satisfaction.

Another positive effect of nature-like ambient surroundings is the positive impression that these surroundings give to observers. For example, in a study of interpersonal perception of office occupants, Ridoutt, Ball, and Killerby (2002) found that the presence of wood furniture and flooring in an office led to a more positive overall impression of the office occupant (on the dimensions of professionalism, success, honesty, caring, and creativity) compared to an occupant of an office decorated with nonnatural materials. Similarly, other studies have found that the presence of plants and wood finishes in offices are associated with perceived status of the office occupant (see Sundstrom & Sundstrom, 1986 for a review). While these effects are partly attributed to the association between quality of furnishings and status (i.e., because wood is considered a high quality, expensive furnishing, it is associated with high status), these effects may also be due to the aesthetic responses associated with natural decor. In particular, researchers have shown that built environments that are high in order and naturalness lead observers to experience a sense of "calmness" (Nasar, 1994). Such a response may indicate to observers that they are in the presence of a positive and successful other.

Generally undesired effects of nature-like surroundings. Yet, nature-like ambient surroundings may not be desirable in all settings and with all users. For instance, a naturally lit office that leads to relaxation for some workers may impose stress for others (Boubekri, Hull, & Boyer, 1991). Similarly, a rustic decor that suggests nature and openness to some may suggest an imposing masculinity to others. A vivid example of this type of effect comes from Rafaeli and Vilnai-Yavetz's (2004b) study of Israel's public transportation buses and the decision to paint them a dark green color in 1999. While some observers found the green color aesthetically pleasing and associated it with positive emotions (e.g., "I like this green color. It creates calmness. It is pleasant" [p. 680]), others found it to be just the opposite (e.g., "This color is repulsive, disgusting" and "[The color] creates fear and anxiety").

While these differences could have reflected purely personal preferences, it is likely that the symbolic meaning of the color had something to do with observers' reactions. On one hand, the green color was widely associated with nature and the natural environment. On the other hand, the green color of the bus was

also commonly associated with a terrorist organization that had a long history of attacks in Israel and was also similar to the color of military fatigues and local garbage trucks. Because of these symbolic connotations, many observers' emotional reactions to the buses were fueled both by their perception of the color itself and by symbolic meaning of the color in the context of their daily lives.

A second downside of nature-like physical environments is that they may have negative effects on performance. Again, in the case of the green bus, Rafaeli and Vilnai-Yavetz (2004b) found that some drivers disliked the color because it was too dark and because it too easily blended into its surroundings, making it easier for traffic and pedestrian accidents to occur, especially at night. In addition, other drivers and riders reported that the dark green color made the bus very hot inside due to the increase in heat absorption.

Nature-like work environments may also negatively affect performance by providing a salient contrast to unpleasant task characteristics. For example, in a laboratory study involving a computer task in a small office, Stone and English (1998) found that the display of posters depicting a nature scene led to improvements in perceptions of the workplace pleasantness, but increased perceived task demand on a high-demand task and increased hostility and depression levels among participants. Stone and English argue that the nature scene made workers more acutely aware of how stressful their task was in comparison to their feelings when in nature.

A final downside of nature-like ambient surroundings is that they may induce positive moods that, in addition to creating more job satisfaction, also lead employees to have more overconfidence in their gut instincts and greater motivation to maintain their good mood by not engaging in unpleasant aspects of work (Bless et al., 1990; Isen, 1993). As a result, researchers have found that in repetitive or uninteresting tasks that require employees to follow a strict protocol (e.g., equipment testing, copy editing, some routine maintenance tasks), moderately negative (vs. positive) moods actually improve performance because they motivate employees to do a good job as a means of alleviating their negative moods, and they do not cause employees to have overconfidence in their own abilities or gut instincts (Elsbach & Barr, 1999). In support of this notion, in a laboratory clerical task, Larsen, Adams, Deal, Kweon, and Tyler (1998) found that while the laboratory "office" was rated as most attractive when it contained a large number of potted plants, participants' productivity scores on a letter identification or sorting task were lowest in this office.

Tensions Inherent in the Physical Work Environment

The mixed findings reported in the preceding sections become more understandable—and we argue, even expected—when we examine the complex nature of the objects and arrangements that comprise the physical environment in organizational settings. Specifically, we suggest that the very nature of this physical environment is fraught with different, and sometimes opposing,

qualities. When these qualities come into opposition—a condition we refer to as *tensions*— they can force those attempting to alter or manage the physical environment to make difficult choices.

As we will argue, some of these tensions can be ameliorated, at least in part, through deliberate efforts to cope with various differences (e.g., functional differences) inherent in the physical environment. Building on research that concerns the management of tensions (Maybury-Lewis, 1989; Poole & Van de Ven, 1989; Pratt & Foreman, 2000), we argue that tensions in the physical environment can be handled in one of three basic ways: (1) *deletion* or *sacrifice* where one tension is satisfied but the other is not—as in the case of a classic trade-off; (2) *integration* where both tensions are addressed simultaneously (i.e., via alignment of tensions); and (3) *compartmentalization* or *segregation* where the tensions are managed by treating them separately. Segregation can take at least two forms: *spatial* (i.e., allowing different parts of the organization to focus on ameliorating different tensions) and *temporal* (i.e., meeting opposing needs at different points in time).

All of the tensions we describe are based on opposing effects between or within the *functions* that physical environments serve in organizational life. Using the framework of Rafaeli and Vilnai-Yavetz (2004a,b)[*], we define these tensions as occurring between or within the instrumental (i.e., performance relevant), symbolic (i.e., meaning relevant), and aesthetic (i.e., sensory relevant) functions of physical objects and arrangements. Overall, it is our assertion that these inherent tensions in the environment can explain why researchers find so few consistently positive effects of workplace designs. We illustrate these various tensions in Figure 4.1 and discuss them below. As noted in Figure 4.1, these distinctions are important for determining whether the tensions can be successfully managed—that is, whether both "sides" of the tensions can be satisfied (i.e., through integration or segregation) or whether tensions must involve "true" trade-offs where hard choices must be made about what must go unsatisfied (i.e., sacrifices).

Interfunctional Tensions

One major set of tensions inherent in the physical environment occurs *between* the functions (i.e., instrumental, symbolic, and aesthetic) of the objects or

[*] We should point out two differences between our discussion of these elements and how they were originally used by Rafaeli and Vilnai-Yavetz (2004a,b). First, Rafaeli and Vilnai-Yavetz's focus was solely on physical artifacts. We widen this focus to include other aspects of the physical environment, such as the arrangement of those artifacts. Second, they refer to these various aspects of physical artifacts as "dimensions." However, our inclusion of arrangements of artifacts adds an intentional element to our discussion; thus, we prefer to call these aspects "functions" as they reflect various purposes or meanings of the physical environment -that is, to make production easier (instrumentality), to evoke sensory and aesthetic experiences (aesthetics), and to represent other concepts or images (symbolism).
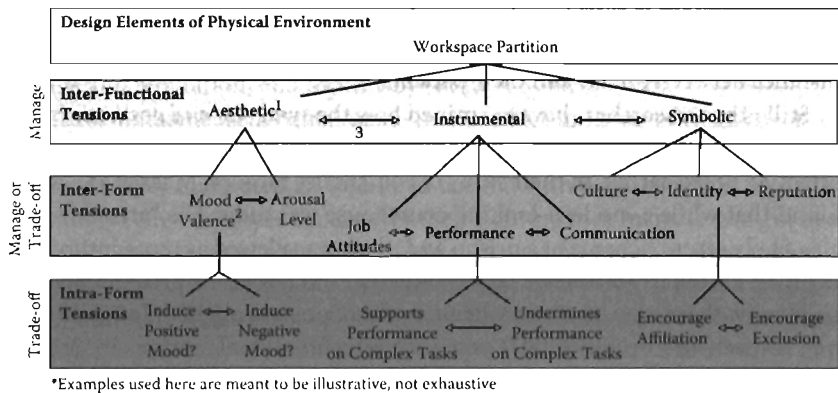
Figure 4.1   Basic Functions[1], Forms of Functions[2] and Tensions[3] Embedded in Physical Environment— Examples Used Here Are Meant to Be Illustrative, Not Exhaustive.

artifacts in that environment. For example, the symbolic and instrumental functions of an office partition may be at odds if the partition denotes desired symbolic status to a manager, but prevents the instrumental function of private conversations required by a manager. Since any given artifact, stimulus, or arrangement in the physical environment can simultaneously serve each of these functions, it is perhaps not surprising that these functions can potentially be at odds with each other in organizations. Thus, one of the lessons of the "green bus" case previously described (Rafaeli & Vilnai-Yavetz, 2004a) is that the instrumental function of "visibility" (e.g., the ability of the buses to be seen), the aesthetic function of "color" (e.g., whether it was perceived as ugly or not), and the symbolic function of "identity" (e.g., the association of the color with specific groups or causes) of an object can undermine each other.

Increasingly, researchers are simultaneously examining the multiple functions that elements of the physical environments play. For example, Cappetta and Gioia (2006) noted the tension between *aesthetics and instrumentality* in the fashion industry (e.g., a beautiful store can be horrible to work in just as a beautiful shoe can be painful to walk in). Others have noted that the aesthetic benefits of some elements of the physical environment—such as the improved mood and job satisfaction resulting from nature-like artwork or plants in the office—may be offset by negative instrumental effects due to the contrasts workers perceive between pleasant surroundings and a menial and tedious task (see Larsen et al., 1998; Stone & English, 1998).

In other research, Pratt and Rafaeli (1997) show how the *symbolic and instrumental* aspects of professional dress (a less-studied dimension of physical environment in organizations) may also be at odds. In their study, the use of scrubs (i.e., the standard-issue garb of health professionals) by rehabilitation

nurses produced positive instrumental effects by allowing nurses to more effectively deal with bodily fluids but at the symbolic cost of increasing the distance between nurses and their patients.

Still other researchers have examined how the *symbolic and aesthetic* functions of a single dimension of physical work environment may oppose each other. As noted earlier, in their study of courthouse facades, Maas et al. (2000) found that while a modern-looking courthouse was judged as "attractive," it also fit observers' schema of a prison and, thus, was viewed as more intimidating than a similarly attractive courthouse that did not fit the prison schema.

Finally, there may be times when two functions are aligned, but a third is not. Elsbach and Bechky (2007) note such interfunctional tensions in Oticon, a Danish hearing aid manufacturer. Oticon used potted and portable birch trees as a means of creating flexible boundaries in an open office design. While *symbolically and aesthetically* effective (i.e., they effectively created boundaries and created a pleasant environment), the trees failed in terms of *instrumentality* as they were unable to effectively block noise in the office.

As noted in Figure 4.1, we believe that these types of interfunctional tensions are manageable. That is, it is *possible* to align or simultaneously satisfy (i.e., integrate) the instrumental, aesthetic, and symbolic functions of objects, stimuli, and arrangements in the physical environment. For example, Elsbach and Bechky (2007) illustrated how the Lincoln and Mercury brand's flexible "team room" at the Ford Motor Company was able to align each of these functions. In this case, the adjustable design of the room facilitated collaboration (instrumental), could be used to demarcate boundaries for different groups (symbolic), and allowed team members to adjust conditions to create a positive and pleasant sensory experience (aesthetic).

Yet, there may be some factors that make the resolution of interfunctional tensions difficult. For example, organizations may lack the resources (monetary or creative) to align these functions. Lacking these resources, organizations may end up managing interfunctional tensions by segregation. For example, different functions may become fulfilled differently in different parts of the organization (i.e., spatial segregation). Thus, one's entrance lobby may largely be used to facilitate aesthetic functions, while one's work space may tend more toward the instrumental (Elsbach & Bechky, 2007). When resource constraints are extreme, however, these tensions may have to be managed via sacrifice—deleting the expression of one function for another.

Interform Tensions

Within each of the major functions, there are a variety of forms that the physical environment can take. For example, aesthetic functions may include a variety of sensory experiences such as general mood and arousal, as well as auditory, olfactory, tactile, and visual stimulation. Instrumental functions include effects on productivity, communication patterns, and job attitudes such as

job satisfaction. Finally, there are also several functional divisions within the symbolic realm including the expression of culture, identity, authority, brand image and reputation, and legitimacy (Pratt & Rafaeli, 2006).

These different forms often come into conflict in terms of their effects on organizations and their members. For example, as noted earlier, Veitch and Gifford (1996) illustrated an interform tension within the function of instrumentality: Giving people choice over their lighting may increase control over the work environment (one form of instrumental function) at the expense of productivity on creative tasks (another form of instrumental function). Similarly, our early illustration of the "messy desk" reveals an interform tension within the function of symbolism. Having a tidy desk may allow one to look more intelligent, but at the cost of appearing unsociable (Sitton, 1984). Finally, in their laboratory study of clerical work, Stone and English (1998) suggested an interform tension within the function of aestheticism. Specifically, they found that adding posters to the work environment created pleasant work surroundings but led to increased hostility and depression when workers were asked to do a high-demand task in those surroundings (because the contrasts between work and surroundings become more salient).

Like interfunctional tensions, some of these interform tensions may be successfully managed via integration, especially when contextual factors are considered in the design of physical environments (Ahrentzen, 1990; Carnevale & Rios, 1995; Lee & Brand, 2005). Thus, Mark's (2002) depiction of the flexible arrangement of a team space revealed that it contributed to both successful communication and job performance in the context of high-paced problem solving. Similarly, research on boundary objects shows how the tension between the symbolic forms of identity and legitimacy may be managed. For example, Bechky (2003a) showed how machine prototypes used by assemblers and engineers in a semiconductor manufacturing equipment company allowed these two groups to both affirm distinct group identities (i.e., the engineers designed the machines but did not understand their functioning in practice, while the assemblers understood their functioning but did not understand their design) and provided legitimacy to each group when they were required to interact (working on the machine showcased why it was important to have both groups working on the same project).

By contrast, other interform conflicts may be less manageable. A good example is our discussion of messy versus tidy offices earlier. As noted, researchers have found that both messy and tidy offices lead to positive attributions of inhabitants (Sitton, 1984). On the one hand, if the occupant is present, a tidy office leads to higher ratings of sincerity, intelligence, ambition, warmth, and calmness. On the other hand, if the occupant is not present, a messy office leads to more positive attributions of the occupant's activity, kindness, warmth, and sociability. Clearly, one cannot be both present in and absent from one's office. Therefore, office occupants must decide whether they want to receive

attributions of activity, kindness, and sociability (in which case they should leave their offices messy and hope observers see them empty) or if they want to receive attributions of sincerity, intelligence, and ambition (in which case they should keep their offices tidy and hope observers see them occupied).

Fortunately, even some of these apparent trade-offs may be manageable to a degree. For example, apparent trade-offs in the use of one artifact (e.g., one's desk) may be offset by looking across patterns of artifacts (e.g., group pictures on a neat desk), rather than just one (Pratt & Rafaeli, 2001). Similarly, instrumental interform tensions, such as between control and productivity, may be ameliorated somewhat with additional training (e.g., training on how to adjust lighting for different tasks). More generally, we believe that these more difficult interform tensions can often be managed via temporal or spatial segregation. For example, returning to the messy desk example, a person might intentionally vary the tidiness of his or her office depending on who is likely to see it. Thus, when prospective job candidates are visiting, you might keep your desk clean; however, you may leave it messier when meeting with a protégé and trying to establish a friendly connection. As with interfunctional tensions, resource constraints may push the resolution of these tensions toward making sacrifices. As noted in Figure 4.1, however, as we move toward intraform tensions, it becomes increasingly difficult to skirt the trade-offs imposed by the physical environment.

Intraform Tensions

A final set of tensions in the physical environment occurs within a specific form itself. Here a form of a function may have two or more different manifestations that may conflict with each other. As illustrated in Table 4.1, our review found that intraform tensions were most likely to manifest within the symbolic function.* For example, physical markers can be used to denote "territories" of organizational groups (see Brown, Lawrence, & Robinson, 2005 for review) that hold various social identities (Pratt & Rafaeli, 1997, 2001). These social identities (which are forms of the "symbolic" function of physical environments), however, may manifest in both the encouragement of *affiliation* with in-group members and *exclusion* from out-group members. To illustrate, organizational groups may differentiate from one another by designing

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* In some instances, attempts to manipulate the aesthetic environment may lead to an intraform tension. For example, assuming different preferences among employees, any given piece of artwork will likely induce *both* positive and negative moods as some will like it and some will dislike it. Similarly, specifically tailoring a work setting to encourage performance for one functional group may also simultaneously be dysfunctional and discourage performance for another group. Unlike social identity, however, that both affiliates and excludes in *all conditions*, our review suggests that the intraform tensions in instrumentality and aesthetics were more situation dependent. Because they may not be "pure" examples of intraform tensions, we have added question marks after these examples in Figure 4.1.

physical work areas that symbolize each group's identity (e.g., work areas filled with supplies and equipment that are useful primarily to that group). These social identity markers attempt to establish—even if temporarily—who is "in" the group and, in turn, encourage affiliation among those in-group members (Bechky, 2003a; Brown et al., 2005; Carlile, 2002; Fleischmann, 2006). Yet, at the same time, these markers may also signal who is "out" of the group and, thus, they may also encourage exclusion of these out-group members. This exclusion can become a problem when members who may be assigned to work in a functional group do not identify with the physical markers used to symbolize that group's territory (e.g., if a work area has only drawing supplies and an engineer assigned to that group works in sculpting or modeling, she may feel excluded from the group). Further, such exclusion may discourage cross-functional collaboration because out-group members may feel alienated and unwelcome in the in-group's space.

Unlike the other tensions previously noted, the only way to deal with intra-form tensions is to make trade-offs and sacrifices. Thus, in the case described in the preceding section, workers may be forced to choose whether they value in-group affiliation most (in which case they should display social identity markers for their group and risk alienating out-group members) or if they prefer a more inclusive organizational culture and cross-group identification within a work space (in which case they should limit social identity markers for their group to encourage interaction with out-group members).

Taking Stock and Moving Forward

Our review suggests that the objects, stimuli, and arrangements that comprise the physical environment in corporate work environments have both powerful and complex effects in organizations. Their power is reflected in their ability to strongly shape individual behavior and interpersonal and group interactions in instrumental, aesthetic, and symbolic ways. Their complexity is evident in the myriad of trade-offs, tensions, and challenges inherent in their design and management.

By looking backward on what has been done over the past 30 or so years, we can see a few primary trends. First, the bulk of the research summarized in Table 4.1 has been more focused on the instrumental and symbolic functions of physical environments than on aesthetic functions. This is perhaps not surprising given our field's emphasis on productivity and on the "cultural turn" that has pervaded recent research in management. Second, we have only just begun to examine interactions between the physical environment and other types of environments (e.g., the social environment and natural environment). Finally, we find relatively few clear messages or guidelines about how people in organizations can successfully and proactively manage their physical environment. These historical trends offer three suggestions about where research on the physical environment should go.

1. Putting the "Physical" into the Physical Environment

Perhaps ironically, we believe that attention is needed in that area where individuals most directly (i.e., via the senses and our aesthetic sensibilities) interact with the physical environment. The incorporation of the physiological sensory experience, in general, is lacking in the organizational management field (see Heaphy, 2006, and Heaphy & Dutton, 2007, for a critique and reconceptualization). We feel that this connection between physiology and the physical environment, however, may play a critical role in organizational studies.

As noted in our introduction, the influence of environmental conditions (e.g., light and temperature) on physiological reactions (e.g., heart rate) has largely been outside the scope of organizational researchers' areas of interest. Two possible exceptions may be research on the physical environment and *stress* (e.g., Scheiberg, 1990; Wells, 2000)—although even here the emphasis tends to be on psychological stress rather than its sensory implications and manifestations (e.g., Huang, Robertson, & Chang, 2004)—and on *relaxation* (Boubekri et al., 1991; Oldham, et al., 1995; Scheiberg, 1990). But are these the only ways that physical environments effect our physiologies?

While we do not suggest that organizational researchers become physiologists, per se, we do believe that we need to look more closely at the often underexamined direct and indirect effects of the physical environment on our physiological well-being. We might, for example, take a new look at the direct effects. How might other physiological reactions—beyond various states of activation (stress vs. relaxation)—relate to how we think, feel, and act at work? We know that noxious stimuli can affect health and mood. By contrast, we know that certain aspects of the physical environment (e.g., natural light) can induce positive mood. Can we use this information to design "happier" organizations? And are there other beneficial physiological effects? Moreover, we know that our genetic "wiring" can lead to variations in our responses to ambient stimuli, but can a specific work environment "rewire" us to psychologically and physiologically respond to a given environment in either healthy (e.g., with a positive attitude and low blood pressure) or nonhealthy (e.g., with a negative attitude and high heart rate) ways?

We also expect that there are some critical indirect effects as well. For example, research suggests that social relationships have a strong influence on our physiologies, such as the functioning of our cardiovascular and immune systems as well as our neuroendocrine responses (Heaphy & Dutton, 2007). Given that the physical environment influences social relationships, we should—at minimum—expect an indirect effect of the physical environment on physiological well-being. Can we design organizations to promote healthiness? The rising cost of employee health insurance makes this a nontrivial issue.

2. Looking at Interactions Between Physical, Social, and Natural Environments

More generally, our review suggests that researchers begin to look more closely at how the physical environment interacts with other environments such as the social environment or the natural environment.* For example, in looking at the intersection of the physical and natural environment, researchers might examine how various aspects of building design (e.g., number and placements of windows and skylights, quality of artificial heating and cooling) interact with natural climate conditions (e.g. local cloudiness temperatures) to produce desired effects on job performance.

Similarly, there remains considerable room for additional research at the intersection of the physical and social environment. For example, most of the research we have reviewed has been on the social implications of physical environments from a western perspective. But how and to what degree do these insights generalize across cultures? Do different cultures relate to the physical environment in fundamentally different ways? How might ideas of *feng shui*, the Chinese art of placing objects, relate to Western notions of office design (e.g., Goodall, 2001)?

Another highly promising area concerns how the physical environment influences nonconscious cognition. Dual process theories, for example, posit that two distinct information-processing systems exist in the human body: one slower—primarily cognitive, analytical, and tied to conscious rational thought; and the other faster—strongly emotional, associative, and tied to more nonconscious intuitive process (e.g., Epstein, 2002; Dane & Pratt, 2007; Gollwitzer & Bayer, 1999). Kahneman's (2003) work in this area suggested that some properties of objects, such as their size and loudness, are automatically and unconsciously processed via a "natural assessment" (p. 701). Other aspects of physical objects, by contrast, often require the use of language and, thus, more effortful and conscious processing. By implication, dual processing theory suggests that the sensory aspects of objects in the physical environment may be processed through one type of information-processing system, while

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* Of course, this begs the question of whether it is meaningful to see these environments as independent. For example, we cannot have the "physical" environment with its artificial barriers and symbols without having a "natural" environment that supplies the raw materials. It may even be that we cannot have a "social" environment without a physical one. As Carlile (2006) noted, "The material world, in one shape or form, always mediates human activity. People never act in a vacuum or some sort of hypothetical universe of doing but always with respect to arrangements, tools, and material objects" (p. 101). Thus, the physical environment is inexorably entwined with the other environments. Therefore, we might consider what is gained and lost by dividing the environment into these component types.

some social elements that require language to process may require another.* This leads us to wonder what impact each of these information-processing systems has on our perceptions and what might happen if the conclusions drawn from each differ.

Research at the intersection of the physical and social environments may also continue to look at the reasons *why* the physical environment influences how we think and feel. In this way, managers can come up with potential means of better managing the physical environment. For example, one of the key benefits of enclosures is that they allow for more personal and frequent communication—especially confidential communication. This effect, however, is explained by a mediator: privacy. If privacy is central—rather than high barriers and enclosures—might there be other ways of achieving it?

There may be. Researchers have found that being positioned away from major traffic areas and noise intrusions, which provides a space barrier rather than an actual partition barrier, has a stronger affect on perceived privacy than having barriers that may not completely buffer workers from noise intrusions (Kupritz, 1998). Continuing to explore the various physiological (e.g., arousal), cognitive (e.g., information overload), and emotional (e.g., disgust) mediators between our physical world and our social reactions to it will help us be more effective in finding additional avenues for attaining similar outcomes (e.g., job satisfaction, performance).

An alternative approach to examining the intersection of the physical environment with the social and natural environments would be to try to move farther away from this intersection. For example, is it possible to look more purely at the physical environment apart from the people in it or the natural environment surrounding it? Pratt and Rafaeli (2006) suggested a more archeological approach to studying the physical environment that may involve examining empty or abandoned physical environments for clues to how people work. This research could, in turn, complement existing work that examines "actor-observer" effects—that is, the difference between what is intended by the placer or objects and what is interpreted by those who interact with them in an organization (Cappetta & Gioia, 2006; Elsbach, 2005). An archeological perspective takes a further step back, adding a third-party observer perspective to the perspective of what the physical environment was intended to do (e.g., Bell, Fisher, Baum & Greene, 1990) and how employees react to it (May, Reed, Schwoerer, & Potter, 2004; Morrow & McElroy, 1981; Oldham & Brass, 1979; Sutton & Rafaeli, 1987).

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* Kahneman (2003) does suggest that repeated exposure to more abstract features of objects or other stimuli can, over time, lead to its more automatic processing. This opens up the possibility for the influence of nonconscious thought and the physical environment even more.

3. Understanding and Managing Trade-Offs and Tensions

A third opportunity for exploration in the area of the physical environments in corporate work settings is to disentangle the reasons for the highly inconsistent effects found for various physical environment interventions, such as the use of enclosures and barriers in work spaces, adjustable work arrangements, the personalization of work, and the creation of nature-like workplace surroundings. We have attempted to disentangle these effects, at a very basic level, by identifying various tensions inherent in the physical environment. We believe, however, that additional work is needed in this area.

To begin, it would be interesting to examine whether and how different types of tensions influence the magnitude and scope of outcomes in organizational settings. For example, we would imagine that tensions involving instrumentality may be the most disruptive for an organization, and likely for the individual employee, too (depending on one's job and degree of job security). It is unclear, however, if tensions involving instrumentality and some other function have greater effects than those involving just instrumentality. Given the nested nature of the tensions, we also wonder if intraform tensions are more pernicious than interform and interfunctional tensions. Finally, it is unclear if tensions are additive or multiplicative in their effects.

In addition, we believe that researchers should look for other conditions that may exacerbate or attenuate these tensions. For example, we know that actors and observers view physical objects differently (Devine, 1989; Fiske & Neuberg, 1990; Gilbert, 1989). Because objects and arrangements in the physical environment are not only relatively permanent and visibly salient, but also have an existence that is independent of the person who designed or placed these objects in the environment (Elsbach, 2004, 2005), actor-observer dynamics in the physical environment may be even more pronounced. These dynamics, in turn, may serve to heighten inherent tensions in the physical environment. For example, if customers view a high-ranking manager's office as reflecting low status, this may worsen interfunctional tensions between the symbolic (e.g., status) and instrumental (e.g., performance) aspects of the officer's job.

Alternatively, human resource management practices may provide a means for attenuating tensions. For example, training employees about how an office design reflects not only task demands but also symbolic and aesthetic concerns may help ameliorate interfunctional tensions. Similarly, assessing aesthetic tastes may enhance the relationship between music or architecture and performance by aligning these functions. Of course, these recommendations presume that (a) there are some connections between the various functions of workplace stimuli, objects, and arrangements; and (b) that a given manager can recognize and articulate these connections.

From a more practitioner-oriented perspective, we believe that a better understanding of the inherent tensions and their degree of "manageability" can significantly enhance a manager's ability to navigate the complexity inherent in the physical environment. In particular, our review points to a general "decision tree" for those who want to better manage the stimuli, objects, and arrangements in their workplace.

To start, managers should endeavor to understand which types of tensions they are facing. Are they between or within functions (instrumental, aesthetic, or symbolic)? If they are within functions, are they between forms (e.g., job attitudes and job performance) or within forms (e.g., affiliating and excluding through the creation of territories)? To make such an analysis, however, involves the recognition that the physical environment *can* be viewed along various functions and forms. Moreover, to fully appreciate these various functions may involve bringing in very different areas of expertise to assess the situation. For example, while Rafaeli and Vilnai-Yavetz (2004a) noted that "instrumental experts" such as those who work in the physical environment (e.g., engineers, mechanics, drivers), "aesthetics experts" (e.g., product designers), and "symbolism experts" (e.g., public relations consultants) each could raise issues involving all three functional areas surrounding a particular artifact (a green bus), other types of expertise may need to be leveraged when assessing the physical environment.

If the tension is deemed "manageable," then organizations need to commit sufficient resources to resolving the issue. As Elsbach and Bechky (2007) noted, such management takes more than money. It also involves committing sufficient cognitive (e.g., creative) resources to "work smart" and understanding how you can achieve multiple functions with the same objects and arrangements. They recommend explicitly mapping out how a specific set of design features facilitates the various instrumental, symbolic, and aesthetic functions within an organization. In their example of a law firm, they map the firm's "production areas," comprised of distinct functional areas (e.g., document preparation, case mapping, mock trials, etc.), and how these physical features facilitate decision making (instrumental), affirm the status of different groups (symbolic), and allow for individuals and groups to tailor their aesthetic experiences to meet their needs (aesthetic).

If a tension cannot be resolved, either because a firm lacks resources or faces an intraform tension, then the manager's task is prioritization. Such prioritization may involve emphasizing some functions over another. For example, as we noted earlier, Elsbach and Bechky (2007) noted that certain functions may need to dominate in different parts of the organization (e.g., aesthetics in the entrance lobby). In other instances, prioritization simply involves very difficult choices and, possibly, sacrifices. For example, should temporary workers be given similar offices to full-time staff, thus symbolically communicating that they are part of the same group? Should management be cloistered on the

top floor of an office building or located more centrally? To answer these types of issues, it is best that organizational leaders have a good sense of what they value, and use their physical environment as a means to enact these values.

In Closing: A Call to Action

In 1981, Franklin Becker, author of the seminal book *Workspace: Creating Environments in Organizations,* noted, "The way the physical setting is created in organizations has barely been tapped as a tangible organizational resource" (p. 130). Over 25 years later, almost the same statement could be made. In fact, during the years 1975–2005, the more mainstream organizational journals, *Academy of Management Journal, Administrative Science Quarterly, Journal of Organizational Behavior,* and *Organization Science,* published only 15 empirical papers that explicitly focused on the role of physical environments in organizations[*]. As organizations continue extend the boundaries of physical environments (e.g., "virtual" organizations, hoteling, and teleworking), the importance of understanding the role that the physical environment—and its interaction with other aspects of both organizational and nonorganizational environments—plays on how we think, feel, and work is only becoming more critical.

Acknowledgments

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[*] These 15 papers include Bechky (2003b); Carlile (2002); Elsbach (2004); Elsbach (2003); Fried (1990); Hatch (1987); Oldham & Brass (1979); Oldham, Kulik, & Stepina (1991); Oldham & Rotchford (1983); Pratt & Rafaeli (1997); Rafaeli, Dutton, Harquail, & Mackie-Lewis (1997); Rafaeli & Vilnai-Yavetz (2004b); Sundstrom, Burt, & Kamp (1980); Sutton & Rafaeli (1987); and Zalesny & Farace (1987).

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