

Abstract

This writing will address the need for change in the physical working environment of the Teachers' Room at the British Council Colombo. It will specifically look at windows, lighting, crowding and noise within this space. It hopes to test the evidence against the lay person perspective of what is a good physical environment. In other words, it hopes to go beyond what is 'patently obvious' and give support to the intention for change.

Background

I am an EFL (English as a Foreign Language) teacher working for the British Council in Colombo Sri Lanka. This is my second posting here. I was here previously between 2000 and 2002. When I was first here we had a teaching staff of around 25 teachers using the Teachers' Room, and now that number is around 70. Changes have been made incrementally to utilize space (there was no floor plan of this part of the building as there had been no overall design), but the area remains the same. There are intentions to change its location, but funding must be sought and justified from London Headquarters. I approached the Teaching Centre Manager (TCM) to suggest the usefulness of the assignment I was working on. His response was both intriguing and frustrating. He said that it was 'patently obvious what was wrong with the room', but that he would be interested to read my assignment. I got the feeling that the second part was only to save my feelings. This lay perspective carries weight in other areas of stress research and assessment, so why not environmental psychology.

When I, and around twelve other teachers, arrived in Colombo I was put in a very down market hotel. The first room they gave me had no window. I 'requested' another room, which now had a window, but which faced a brick wall. My third room had a window with a view on to a busy main road. I would have preferred a view of wildebeest roaming across the savanna, but to paraphrase Basil Fawlty, what did I expect a view of from a Colombo hotel window. Most teachers stayed in their windowless rooms and in a subsequent meeting complained of being depressed by the rooms and feeling undervalued by the organization. The fact that the lack of resources, money, put into this choice of hotel would cause such feelings did not need a program of research; it was common sense. Therefore, I could appreciate where the TCM was coming from.

It struck me that the real test of any evidence connecting the physical environment with well-being and health would be with the lay person, rather than preaching to the converted. This writing aims to provide evidence supporting a total revision of the space and resources provided, rather than another incremental change.

Windows

There are eight windows in the teachers' room. They are not entirely uniform in dimensions given the age of the building. They are double hinged and with wood frames, twelve glass frames in each window installation. They are roughly 123 cms in width, 99 cms in height, 77 cms from the floor and 34 cms from the ceiling. The height from floor to ceiling is 214 cms in this mezzanine floor.



The importance of windows, and views, would seem self-evident, see my previous example. The preference we have for windows has been explained as a product of evolution that favored humans who looked to nature for food and safety, a stress related process (Ulrich et al., 1991). Others have conceptualized our preference to look outside in terms of restoring depleted attention processes, a restorative experience (Kaplan & Kaplan, 1989). The difference between these theories is one of cognition. Ulrich et al (Ulrich et al., 1991) appear to avoid allowing recognition to play a role in the stress process as compared to Kaplan & Kaplan (Kaplan & Kaplan, 1989) who argue information processing can occur rapidly and without consciousness. The theory behind our preference is not complete; indeed Kaplan has attempted to bridge the gap by arguing that the integration of attention restoration and stress-related models was possible by focusing on directed attention as a major resource for coping with challenges (S. Kaplan, 1995). However, this theory of integration has proved difficult to incorporate into further research (Farley & Veitch, 2001).

The preference for windows is often related to the function of the space and even the task of the individual occupant. The case for windows, particularly with natural views, in hospitals is strong. Wilson found that more than twice as many patients in windowless intensive care unit developed post-operative delirium compared to a similar group of patients in a unit with windows. There was also a greater incidence of post-surgical depression among those patients in the windowless unit who did not develop post-operative delirium (Wilson, 1972). Ulrich (R.S. Ulrich, 1984) found that access to a view through a window influenced the recovery of surgical patients. Single windows in each room of the same wing were identical in size and looked out on either a small stand of deciduous trees or a brown brick wall. Patients with window views of trees spent less time in the hospital than those with views of the brick wall. Those with the view of trees took less analgesic intake than those with the view of brick walls. Verderber, in a comparative study of patients and staff in a hospital, concluded that occupants with different perceptual and physical abilities differ in terms of the importance they place on the informational needs satisfied by windows and views. (Farley & Veitch, 2001) Spaces with other functions indicate differing preferences. Butler and Biner (Butler & Biner, 1989) found that occupants would cover up existing windows in computer rooms, and Collins (Collins, 1975) found that spaces without windows such as department stores and theatres yielded no dissatisfaction from their users.

Not surprisingly, there is a great preference for windows with office workers. Collins, in a study of 139 office workers in the United States, reported that 90% of respondents in windowless spaces expressed dissatisfaction with the lack of windows; almost 50% of these workers thought that the lack of windows affected them or their work adversely (Collins, 1975). What one can see from the window is also important. Markus assessed the view preferences of 400 office workers in a building with varying views and found respondents reported a preference for views of a landscape (88%) over nearby buildings (8%) and a view of the sky (4%) (Markus, 1967) (Farley & Veitch, 2001). Butler and Biner reported five major reasons window preference in office workers: view of outside for temporal information, task performance, mood, sunlight and view of outside to others. They concluded that researchers and practitioners should exercise caution in generalizing the results from window preference research in a particular setting to other settings (Butler & Biner, 1989). It is also important who you ask. Purcell (Purcell, Lamb, Mainardi Peron, & Falchero, 1994) found that Australian and Italian university students judged transition from city to country scenes differently. Italian participants consistently rated scenes as natural that Australian participants tended to rate as built.

So we can establish that having a window is important, both in terms of preference and in terms of influences by the parasympathetic nervous system. Also what one can see from the window is of importance as is who you ask. In addition, size does matter. Two studies indicate that the size, and in particular the width, of a window was rated higher by study participants. Ne'eman and Hopkinson (Ne'eman & Hopkinson, 1970) and the work of Keighley (Keighley, 1973) demonstrated that windows must occupy at least 20% of a wall space to be deemed satisfactory. This ties in with the later and more comprehensive study by Leather (Leather, Pygras, Beale, & Lawrence, 1998) that showed that the area of sunlight penetration was directly and positively related to job satisfaction and general well-being and negatively related to intention to quit, and that having access to a view of nature at work also seems to act as a buffer to stress. (Farley & Veitch, 2001)

Relating these studies to the windows at my place of work it is difficult to come to any conclusions other than the patently obvious. We can determine that the windows are too small, below the 20% of wall space, and due to their construction do not allow sufficient sunlight penetration. Views are obstructed by shelves and computers. The degree to which they view nature is minimal, but will also depend on who you ask, this being a multi-culturally staffed place of work. A study of the tasks taking place is needed, as teachers fulfill many types of task, in order to best assess the effects on well-being, as well as satisfaction, task performance and productivity. A common element throughout all aspects of the workplace environment is that occupants with some control over their workspace lighting (and other building systems) report fewer building-related illnesses (Sterling, 1986). Although it is possible to open the windows at work, they are rarely opened. This is because of the heat and humidity, but also due to the prevalence of mosquito borne diseases such as malaria, dengue fever and chicken guniya. There are no mosquito prophylactics in use in the building and therefore there is a reliance on air conditioned air with its subsequent health risks (Brasche, Bullinger, Morfield, Gebhardt, & Bischof, 2001).

Returning to Leather's work, the findings suggested that that it is not the general level of illumination for which windows are important, but rather the size of sunlight areas to which they give rise and the proportion of natural elements in the available view (Leather et al., 1998) (Farley & Veitch, 2001). Ne'emen and Longmore (E. Ne'eman & Longmore, 1973) found preferences for sunlight varied with the type of environment, and others have supported the case for access to natural light being highly desirable to office workers (Wineman, 1982). (Leather et al., 1998) (Tonello, 2004) Collins (Collins, 1975) opined that the desire for sunlight might be confounded by latitude, citing studies from South Africa and Israel. The writer could not find any studies on sunlight as illumination, or otherwise, for countries near the Equator, in fact many studies have seasonal variations as a basis of their research and its effect of mood, i.e. Seasonal Affective Disorder (SAD) (R. Kuller, Ballal, Laike, Mikellides, & Tonello, 2001). (Tonello, 2004) Sri Lanka has a fairly constant 6 a.m. to 6 p.m. period of sunlight throughout the year, and a fairly constant temperature of 30 degrees Celsius. This makes assumptions from 'euro-centred' research difficult to equate with this latitude.

Lighting

Much of the research on lighting looks at the relationship between luminance and visual performance: how well we understand the relationship of light levels and visibility (McCoy, 2002). Veitch and Newsham (Veitch & Newsham, 1998) categorize the behavioral outcomes associated with lighting as: task performance, communication and social interaction, mood, health and safety, and aesthetic judgments. Much of the research on these associations is disappointing and relies heavily on self report (Tonello, 2004) and/or is difficult to generalize to the real world because of its artificial laboratory base (Oyama, 2004). It is also difficult to disassociate the effects of daylight from artificial light in offices with windows. There is also contradictory research on levels of light. BOSTI (the Buffalo Organization for Social and Technological Innovation) (Brill, Margulis, & Konar, 1984) reported that nearly half of the employees who have difficulty with light indicated that they have too much (McCoy, 2002). While Begemann et al (Begemann, van den Beld, & Tenner, 1997) argue that present indoor lighting levels are too low for biological stimulation, actually coining the term 'ill-lighting syndrome'. Increased light levels may expand arousal level, which suggests greater alertness for shift workers (Campbell & Dawson, 1990), but we must question whether it is healthy for office workers to have such an increase in arousal which may lead to adaptive costs of coping with suboptimal environmental conditions, such as cumulative fatigue, learned helplessness, physiological mobilization, and overgeneralization (Evans & Cohen, 2004).

There are twelve ceiling light installations in the room, each with two florescent tubes with a mirrored frame. As discussed, window size in this location is inadequate for optimal illumination during the day, which is evident as the artificial lighting remains on throughout the day. This may have some benefit, Begemann et al state that people prefer to follow a daylight cycle instead of a constant level (Begemann et al., 1997). Darkness falls very quickly in this part of the world and specific research in this latitude would be more convincing. Boyce (Boyce, 1996) has it that the eye is very adaptable, making a broad range of light levels acceptable and providing adequate quantity of illumination to see,

but given the increasing amount of work teachers do on computers, we must question how great a preference is to a very essential need. Teachers have an increasingly workload around systems such as SAP, and current methods of planning and preparing are much more centered on the computer. Two studies (Bernecker et al., 1994) (Sanders & Bernecker, 1990) make this a worrying aspect of our work given the traditional lighting aspects of our workplace, arranged for a horizontal plain and tasks such as reading from paper. The fluorescent lamps used have also been shown to have effects on neural activity, visual performance, saccadic eye movements, reading and headaches (R. Kuller & Laike, 1998) (J. Veitch & McColl, 1995) (Veitch & Newsham, 1998) . Control, once again, suggests an influence on well-being as people wish to control the ambient properties of the environment to suit their own requirements (Gerlach, 1974). Conversely, inability to control the ambient properties of the workplace to satisfy those requirements is likely to result in some increased level of individual stress (Cohen, Evans, Stokols, & Krantz, 1991). (McCoy, 2002)

Crowding



This is an L shaped room and the only mezzanine floor in the building, which means the ceiling is only 216 cms high. The entrance part of the room is 628 x 995 cms, the latter part is 393 x 1170 cms. At this shortest width there is only 152 cms between the back of a chair positioned at a computer terminal and the facing cupboards, much of this space is taken up by a table and chairs (see floor plan and photographs).

Crowding is the most critical environmental stressor in terms of the space under discussion, and this is the first section of the assignment that the author feels may add something to the lay perspective of environmental psychology above and beyond the patently obvious.

The writer was first posted to Sri Lanka seven years ago. At that time, teachers all had their own desks, but we were a workforce of around twenty teachers. As the centre expanded there was need of more utilization of this finite space. Management initiated a consultation process on the idea of 'hot desking'. Teachers unanimously rejected the idea, but it was done anyway. Adrian Furnham puts it like this: '... a move to open-planned is good for the bottom-line: it means more people in a smaller more adaptable space. The workplace of the new millennium is becoming as unnatural and unpleasant as those typing-pool rooms of 100 years ago.' (Furnham, 2004) The fact that the users of the room had no control over the changes has a profound effect on their satisfaction, as the literature shows, 'workers' satisfaction *is* related to participation in designing the renovations.' (Spreckelmeyer, 1993) The number of teachers has increased to 70 since five years ago and the space has been diminished further by the installation of wall cupboards that take up 48 cms of floor space across the width of the floor.

This lack of control is important. We can see from previous examples that a 'perception' of control over aspects of the work environment has an effect on behavioral outcomes. Learned helplessness provides a cogent theoretical framework for understanding environmental stressors and motivation, with Evans and Stecker's work being the most rewarding (G.W. Evans & Stecker, 2004). It has the potential, although not proven, to illustrate a pathway linking chronic environmental stressor exposure to helplessness, and then, in turn, to mental health. Their work cites the research of Baum and colleagues into crowding in college dormitories (A. Baum, Aiello, & Calesnick, 1978). (A. Baum, Calesnick, Davis, & Gatchell, 1982) (A. Baum, Gatchell, Aiello, & Thompson, 1981) (A. Baum & Valins, 1977). Students randomly assigned to more crowded dormitories when participating in small group interaction games were more likely to engage in passive, withdrawal strategies; whereas their relatively uncrowded counterparts were more apt to behave either cooperatively or competitively (A. Baum & Valins, 1977). In a longitudinal study, the changes in game playing strategies of the crowded dorm closely paralleled shifts over the same period in residents' perceptions of their abilities to regulate social interventions in the dormitory (A. Baum et al., 1981). (G.W. Evans & Stecker, 2004) The behaviors and feelings of helplessness developed in reaction to chronic residential crowding had generalized widely both to social interactions with other people and to settings that were not crowded.

There have been found to be individual differences to crowding, also mirrored in noise arousal (J.A. Veitch, 1990). (Sundstrom, Bell, Busby, & Asmus, 1996) and lighting (Tonello, 2004). Mehrabian suggests that some people are able to screen stimuli, by attending to information on a priority basis, and others who are not able to screen and become over-stimulated. Screeners seem to reduce the stress of numerous stimuli whereas non-screeners tend to become over aroused by the same stimuli and as a result report more negative attitudinal responses toward the environment (Mehrabian, 1977) (Oldham & Kulik, 1991) (Maher & von Hippel, 2005) This is supported by Baum and colleagues work on crowded dormitories, with a link shown between tolerance to crowding, and stimulation, being less susceptible to learned helplessness (A. Baum et al., 1982). (G.W. Evans & Stecker, 2004)

These findings have profound effects on organizational performance and show the pitfalls of design to utilize space over design for users and tasks. Duffy has defined four categories of office types, each with unique patterns of work and spatial requirements; these are the 'Hive', the 'Cell', the 'Den' and the 'Club' (Duffy, 1997). He concludes that the most innovative groups were found in Clubs, which he defined thus:

High level work carried out by talented independent individuals who need to work both collaboratively and individually. Work processes may be constantly evolving and require a diverse, complex, manipulability range of settings to accommodate a wide variety of tasks. High interaction, high autonomy is required. (Duffy, 1997) (McCoy, 2002)

However, we do not have this option at this time. Perhaps it would be best to follow through on this theory of learned helplessness, and look at ways we can enable users to more positively cope with this environmental stressor. Langer and Saegert (Langer & Saegert, 1977) found that by providing subjects with increased cognitive control of the situation by giving them information about the effects of crowding, the aversive effects of the high-density situation would be ameliorated. Positive psychology goes further in the work of Fredrickson and her 'Broaden and Build Theory of Positive Emotions'. "This posits that experiences of positive emotions broaden people's momentary thought-action repertoires, which in turn serves to build their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources" (Fredrickson, 2001). This work was later developed to show that these positive emotions led to trait development (Psychological resilience and positive emotional granularity) (Tugade, Fredrickson, & Barrett, 2004). Taylor's work on self-enhancement (self-efficacy) shows the positive results of feeling good about oneself. His results indicated that self-enhancement is positively associated with multiple indicators of mental health and with a more favorable impact on others (Taylor, Lerner, Sherman, Sage, & McDowell, 2003). Briner puts it concisely: "... traditional views of work stress and coping fail to acknowledge people's pro-activity and agency in crafting the characteristics of their jobs" (Briner, Harris, & Daniels, 2004), whereas a positive psychology approach emphasizes a perception of self-efficacy that has been shown to lead to an upward spiral of personal and organizational resources (Salanova, Bakker, & Llorens,

2006). This is perhaps more useful than a simple: A or B, introvert or extrovert type that characterizes individual differences in much of the environmental psychology research thus far.

Noise

Noise is the unwanted sound; desirable, beautiful sound is euphony (Gifford, 1997). Once again, whether it is perceived as euphony or noise is dependent on the person, the setting and the task. An office setting may not parallel the noise within industrial settings that may lead to physical damage; however they can influence work performance and satisfaction. As uncontrolled or uncontrollable sound becomes more relevant to an employee, it is likely to be branded distracting noise and considered a stressor detrimental to work performance (M. Brill, Weidemann, Alard, Olsen, & Keable, 2001) (Cohen et al., 1991) (McCoy, 2002). Personality type and ability to screen once again play a part in determining if this environmental feature is a stressor (McCoy, 2002). Veitch reported better reading comprehension in noisy conditions by individuals with internal locus of control, and better reading comprehension in quiet conditions by individuals with external locus of control (J.A. Veitch, 1990) (Sundstrom et al., 1996). There are consistent trends in the learned helplessness literature showing that control beliefs moderate vulnerability to helplessness induction (Hiroto, 1974) (Krantz, Glass, & Snyder, 1974) (Peterson, Maier, & Seligman, 1993) (G.W. Evans & Stecker, 2004). A lot more research needs to be carried out on individual differences in noise sensitivity, but Leather et al has shown that lower levels of ambient noise buffer the negative impact of psychosocial stress upon Job satisfaction, well-being and organizational commitment (P. Leather, Beale, & Sullivan, 2003).

Research on noise and learned helplessness is exemplified by the work of Glass and Singer (Glass & Singer, 1972), and the results of this research have been supported by a good deal of later work (G.W. Evans & Stecker, 2004). There are two main findings to their work. First, unpredictable or unsignalled noise causes greater deficits in task persistence than either predictable or signalled noise. Second, the adverse effects of noise on motivation can be significantly curtailed by instilling in participants a sense of perceived control over the noise source. They do not need to use this control only to perceive it for it to have a positive effect (G.W. Evans & Stecker, 2004). Sherrod et al (Sherrod, Hage, Halpern, & Moore, 1977) found that the more control participants had over noxious noise, the stronger the benefit of control (G.W. Evans & Stecker, 2004).

Rotton and colleagues (Rotton, Olszewski, Charleton, & Soler, 1978) found when a noise stimulus was speech rather than conglomerate noise, the adverse motivational consequences were greater. McCoy (J. McCoy, 2000) (McCoy, 2002) argues that individuals in offices in which spatial organization inhibits informal encounters between teammates may be less likely to develop open systems of communication and collaboration. I doubt whether she had such a crowded and confined space as the Teachers' Room in mind, but it is true that on a day to day basis workers can benefit from the proximity of colleagues. However, the writer's experience is that this space is neither as friendly nor as creative as it was when we each had a desk of our own. Teachers still make claim to desks, but it is more as a passenger on a train would stake a claim by leaving a newspaper on the empty chair. It would seem clear that in order to give this control to teachers in Colombo requires more space and a variety of settings. However, this is not going to happen in the short term, and I return to my earlier point of the merits of Positive Psychology.

Conclusion

The Teachers' Room in the British Council Colombo is patently unfit for its purpose. Making a case for a lay person, beyond what is patently obvious, based on research in environmental psychology is hindered by the wholesale use of caveats (e.g. 'it depends'; 'only in some circumstances'), some acknowledgement of the limitations of existing approaches (e.g. 'future research needs to deploy better methodologies and designs') and frank admissions of only very partial knowledge ('more research is needed'; 'research is in its infancy') even though the field is some 40 years old (Briner et al., 2004). There is also a sense of academics researching what would seem common sense, as Cialdini put it, "An academic is someone who is not satisfied by something working well in practice until he's tried it out in theory." (Cialdini, 2000) The writer believes that the research cited has implications for future planning of the Teachers' Room. I believe that the research under learned helplessness is the most promising for making a convincing argument for urgent change. It has the potential for a link to mental health, but more importantly for management, it illustrates how adverse environmental conditions can affect job satisfaction, creativity and team collaboration and individual cooperation.

Words: 4119

References

- Baum, A., Aiello, J.R., & Calesnick, L. (1978). Crowding and personal control: Social density and development of learned helplessness. *Journal of Personality and Social Psychology, 36*, 1000-1011.
- Baum, A., Calesnick, L., Davis, G., & Gatchell, R.J. (1982). Individual differences in coping with crowding: Stimulus screening and social overload. *Journal of Personality and Social Psychology, 43*, 821-830.
- Baum, A., Gatchell, R., Aiello, J.R., & Thompson, D. (1981). Cognitive mediation of environmental stress. In J. Harvey (Ed.), *Cognition, social behavior, and the environment* (pp. 513-533). Hillsdale, NJ.: Erlbaum.
- Baum, A., & Valins, S. (1977). *Architecture and social behavior: Psychological studies of social density*. Hillsdale, NJ.: Erlbaum.
- Begemann, S.H.A., van den Beld, G.J., & Tenner, A.D. (1997). Daylight, artificial light and people in an office environment, overview of visual and biological responses. *International Journal of Industrial Ergonomics, 20*, 231-239.
- Bernecker, C., Brainard, G., Fernsler, F., Rollag, M., Long, R., Tierney, S., et al. (1994). Biological effects of architectural lighting and their associated energy utilization. *Journal of the Illuminating Engineering Society, 23*(2), 31-39.
- Boyce, P. (1996). Illumination selection based on visual performance - and other fairy stories. *Journal of the Illuminating Engineering Society, 25*(2), 41-49.
- Brasche, S., Bullinger, M., Morfield, M., Gebhardt, H.J., & Bischof, W. (2001). Why do women suffer from sick building syndrome more often than men? - Subjective Higher Sensitivity versus objective cause. *Indoor Air, 11*, 217-222.

- Brill, M., Margulis, S., & Konar, E. (1984). *Using office design to increase productivity* (Vols. 1-2). Buffalo, NY.: Workplace Design and Productivity.
- Brill, M., Weidemann, S., Alard, L., Olsen, J., & Keable, E. (2001). *Disproving widespread myths about workplace design*. Jasper, IN.: Kimball International.
- Briner, R.B., Harris, C., & Daniels, K. (May 2004). How do work stress and coping work? Toward a fundamental theoretical reappraisal. *British Journal of Guidance and Counselling*, 32(2), 223-234.
- Butler, D.L., & Biner, P.M. (1989). Effects of setting on window preferences and factors associated with those preferences. *Environment and Behavior*, 21, 17-31.
- Campbell, S., & Dawson, D. (1990). Enhancement of night-time alertness and performance with bright ambient light. *Physiology and Behavior*, 48, 317-320.
- Cialdini, R. *Executive Summary*. Audible.com.
- Cohen, S., Evans, G., Stokols, D., & Krantz, D. (1991). *Behavior, health and environmental stress*. New York: Plenum Press.
- Collins, B.L. (1975). *Windows and people: A literature survey. Psychological reaction to environments with or without windows*. Washington, DC: National Bureau of Standards.
- Duffy, F. (1997). *The new office*. London: Conran Octopus.
- Evans, G.W., & Cohen, S. (2004). Environmental Stress. In C.D. Spielberger (Ed.), *Encyclopedia of Applied Psychology* (I, pp. 815-824). USA: Elsevier Inc.
- Evans, G.W., & Stecker, R. (2004). Motivational consequences of environmental stress. *Journal of Environmental Psychology*, 24, 143-165.
- Farley, K.M.J., & Veitch, J.A. (August 2001). *A Room with a View: A Review of the Effects of Windows on Work and Well-Being*. Retrieved from Website of the Institute for

Research in Construction, National research Council Canada: <http://irc.nrc-cnrc.gc.ca/pubs/fulltext/rr/rr136/rr136.pdf>

Fredrickson, B.L. (March 2001). The Role of Positive Emotions in Positive Psychology The Broaden-and-Build Theory of Positive Emotions. *American Psychologist*, 56(3), 218-226.

Furnham, A. (2004). *Management and Myths Challenging business fads, fallacies and fashions*. UK: Palgrave MacMillan.

Gerlach, K. (1974). Environmental Design to counter occupational boredom. *Journal of Architectural Research*, 3(3), 15-19.

Gifford, R. (1997). *Environmental Psychology: Principles and practice*. Boston: Allyn & Bacon.

Glass, D.C., & Singer, J.E. (1972). *Urban Stress*. New York: Academic.

Hiroto, D. (1974). Locus of control and learned helplessness. *Journal of Experimental Psychology*, 102, 187-193.

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(169-182).

Keighley, E.C. (1973). Visual requirements and reduced fenestration in offices. *Building Science*, 8, 321-331.

Krantz, D.S., Glass, D.C., & Snyder, M. (1974). Helplessness, stress level, and coronary prone behavior pattern. *Journal of experimental Social Psychology*, 10, 284-300.

Kuller, R., Ballal, S.G., Laike, T., Mikellides, B., & Tonello, G. (2001). *The prevalence of seasonal affective disorder symptoms in working populations in Argentina, England,*

- Saudi-Arabia and Sweden*. Doctoral Thesis, Paper III, Lund Institute of Technology, Lund, Sweden.
- Kuller, R., & Laike, T. (1998). The impact of flicker from fluorescent lighting on well-being, performance and physiological arousal. *Ergonomics*, *41*, 433-447.
- Langer, E.J., & Saegert, S. (1977). Crowding and Cognitive Control. *Journal of Personality and Social Psychology*, *35*(3), 175-182.
- Leather, P., Beale, D., & Sullivan, L. (2003). Noise, psychosocial stress and their interaction in the workplace. *Journal of Environmental Psychology*, *23*, 213-222.
- Leather, P., Pygras, M., Beale, D., & Lawrence, C. (1998). Windows in the workplace: Sunlight, view and occupational stress. *Environment and Behavior*, *30*(6), 739-762.
- Maher, A., & von Hippel, C. (2005). Individual differences in employee reactions to open-plan offices. *Journal of Environmental Psychology*, *25*, 219-229.
- Markus, T.A. (1967). The function of windows: A reappraisal. *Building Science*, *2*, 97-121.
- McCoy, J. (2000). *The creative work environment: The relationship of the physical environment and creative teamwork at a state agency - A case study*. Unpublished manuscript, University of Wisconsin - Milwaukee.
- McCoy, J.M. (2002). Work Environments. In R.B. Bechtel & A. Churchman (Eds.), *Handbook of Environmental Psychology*. New York: John Wiley & Sons.
- Mehrabian, A. (1977). A questionnaire measure of individual difference in stimulus screening and associated differences in arousability. *Environmental Psychology and Nonverbal Behavior*, *1*, 89-103.
- Ne'eman, E., & Hopkinson, R.G. (1970). Critical minimum acceptable window size: A study of window design and provision of a view. *Lighting Research and Technology*, *7*, 17-27.

- Ne'eman, E., & Longmore, J. (1973). Physical aspects of windows: Integration of daylight with artificial light. *Windows and their function in architectural design*. Symposium conducted at the meeting of CIE, Istanbul.
- Oldham, G.R., & Kulik, C.T. (1991). Physical environments and employee reactions: Effects of stimulus-screening skills and job complexity. *Academy of Management Journal*, *34*, 929-938.
- Oyama, Y. (2004). Psychological Effect of Daylighting on Behavior. *Journal of Light and Visual Environment*, *28*(1), 70-71.
- Peterson, C., Maier, S., & Seligman, M.E.P. (1993). *Learned helplessness*. New York: Oxford University Press.
- Purcell, A.T., Lamb, R.J., Mainardi Peron, E., & Falchero, S. (1994). Preference or preferences for landscapes. *Journal of Environmental Psychology*, *14*, 195-209.
- Rotton, J., Olszewski, D., Charleton, M., & Soler, E. (1978). Loud speech, conglomerate noise, and behavioral aftereffects. *Journal of Applied Psychology*, *63*, 360-365.
- Salanova, M., Bakker, A., & Llorens, S. (2006). Flow At Work: Evidence for an Upward Spiral of Personal and Organizational Resources. *Journal of Happiness Studies*, *7*, 1-22.
- Sanders, P., & Bernecker, C. (1990). Uniform veiling luminance and display polarity effect VDU user performance. *Journal of the Illuminating Engineering Society*, *19*(2), 113-123.
- Sherrod, D., Hage, J., Halpern, P., & Moore, B. (1977). Effects of personal causation and perceived control on responses to an aversive environment. *Journal of experimental Social Psychology*, *13*, 14-27.
- Spreckelmeyer, K.F. (1993). Office relocation and environmental change: A case study. *Environment and Behavior*, *25*, 181-204.

- Sterling, E. (1986). Indoor air quality - Total environment performance: Comfort and productivity issues in modern office buildings. *The Canadian Journal of Real Estate, 18*, 21-25.
- Sundstrom, E., Bell, P.A., Busby, P.L., & Asmus, C. (1996). ENVIRONMENTAL PSYCHOLOGY 1989-1994. *Annual Review of Psychology, 47*, 485-512.
- Taylor, S.E., Lerner, J.S., Sherman, D.K., Sage, R.M., & McDowell, N.K. (2003). Portrait of the Self-Enhancer: Well Adjusted and Well Liked or Maladjusted and Friendless? *Journal of Personality and Social Psychology, 84*(1), 165-176.
- Tonello, G. (2004). How is Workers' Mood Affected by Workplace Lighting. *Journal of Light and Visual Environment, 28*(3), 139-147.
- Tugade, M.M., Fredrickson, B.L., & Barrett, L.F. (December 2004). Psychological Resilience and Positive Emotional Granularity: Examining the Benefits of Positive Emotions on Coping and Health. *Journal of Personality, 72*(6), 1161-1190.
- Ulrich, R.S. (1984). View from a window may influence recovery from surgery. *Science, 224*, 420-421.
- Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology, 11*, 201-230.
- Veitch, J., & McColl, S. (1995). On the modulation of fluorescent light: Flicker rate and spectral distribution effects on visual performance and visual comfort. *Lighting Research and Technology, 27*, 243-256.
- Veitch, J., & Newsham, G. (1998). Determinants of light quality I: State of the Science. *Journal of the Illuminating Engineering Society, 27*(1), 92-106.
- Veitch, J.A. (1990). Office noise and illumination effects on reading comprehension. *Journal of Environmental Psychology, 10*, 209-17.

Wilson, D.P. (1972). Intensive care delirium: The effect of outside deprivation in a windowless unit. *Archives of Internal Medicine*, 130, 225-226.

Wineman, J. (1982). The office environment as a source of stress. In G.W. Evans (Ed.), *Environmental Stress*. New York: Cambridge University Press.

Appendix

