

The Effects of the Environmental Design on Job Satisfaction and Work Stress among the Personnel in Hospitals

Soodeh Tavakkoli, MA*
Department of Psychology
PNU University

Kowsar Simiarian, MA
Young Researchers and Elite Club,
Central Tehran Branch, Islamic Azad
University, Tehran, Iran

Marzieh Hajiaghababaei, M.Sc
Brain and Spinal Injury Research
Center, Neuroscience Institute,
Tehran University of Medical
Sciences, Tehran, Iran

Majid Saffarinia, PhD
Department of Psychology
PNU University

Environmental psychology is effective in reformation of occupational environments. Applying a kind of scenery and environmental design based on principles of the environmental psychology can influence various indicators of human psychology. The aim of this study is to study the influence of environmental design on job satisfaction. The research design was quasi experimental. A sample of 186 participants were selected through convenient sampling from three different parts of Khatam Al Anbia hospital, then Smith and Kendal job satisfaction scale (1996) and Mc Vicar work stress questionnaire (2003) were applied to them. Data were analyzed using the MANOVA method, followed by Tukey post-hoc test. The survey results demonstrated that those who work in an environment designed with natural elements (group1) compared to the rest of the staff in the hospital showed greater job satisfaction and less work stress ($P < .05$). Even without changes in the interior architecture and ergonomics, the use of perspectives and beautiful scenery image (goup2) had an influence on the lessening of the work stress and increasing the job satisfaction among the relevant group of staff ($P < .05$).

Keywords: environmental psychology, designed environment, natural elements, job Satisfaction, work stress.

Recently, industrial and social developments have created some problems for human beings concerning environmental adaptation and as

the result of interaction between man and the environment. Hence, environmental psychology is trying to make changes in behavior and readjustment in an interdisciplinary area to influence the systemic relation between person and environment (Giuliani & Scopelliti, 2009; Gifford, 2007). According to systemic thought, human being is an important part of the social, biological, physical, and technological systems; any flaw in their components may disturb the whole system. If social and behavioral systems are appropriately designed, the whole function of organization will improve (Williams, 2004; Moos & Insel, 2006).

According to WHO (2004, cited by Park, 2006), the effect of environment on mental health is undeniable. To make a healthy environment, environmental psychology as a science has many benefits to improve man-environment ruptures and it demonstrates how environmental features influence the behavior. It also contributes to change behavior and adaptability to environment (Berlet, 2005; Gifford, 2007). The effect of environment on human body and wellbeing is understood by the knowledge of environment which is the main topic of environmental psychology (Bryson, 2005; Mobley, Vagias & Deward, 2010), so the physical place design (e.g., color, light, design components etc.) could have an important influence on attitudes, mental and behavioral states of human beings (Scopelliti & Tiberio, 2010; Giuliani & Scopelliti, 2009).

A lot of research on occupational and professional circumstances has indicated that nature, quality, condition, and design quality of the jobs are considered as important work stress resources (Dadsetan, 2007; Walsh & Knott, 2010).

Job satisfaction is described as liking the conditions and facilities of a job. This meaning is a complex and multidimensional concept related to mental, physical, social, and environmental factors (Valentini, 2005). Working environments include integrated observations of events inside and outside the individual that influence pleasant feelings about the job (Williams, 2004); certainly if people are able to internalize, these normal

roles, the job satisfaction will be increased (Scopelliti & Tiberio, 2010). Job satisfaction is a contextual attitude to generate tendency, interest and aptitude which leads to desirable response to individual and organizational work environment (Bradley, Petrescu, & Simmons, 2007). It includes features and requirements of a job, external environment, and interpersonal relations with work position (Herzberg, 1959; cited by Walsh & Knott, 2010).

According to environmental psychologists, design and ergonomics can influence mental and physical stresses and work stress (Moos & Insel, 2006). Carlopio and Gardner (1992) suggested that job satisfaction of the bank employees is directly related to ergonomics, design requirements and other environmental factors including: 1) the organizational factor including the needs of job design, 2) the physical factor including light, sound, atmosphere and architecture conditions 3) the mechanical factor including job mastery and work load, 4) the motor-perception factor including visual and auditory triggers and also the ways that individual is able to control the environment, and 5) the motivational job features such as autonomy which are important in integrating environment. Swings of each mentioned factors within professional environment result in work stress and is regarded as the greatest cause of job dissatisfaction (Cooper, 1986; Matson, 1980; quoted in Saane, Van, Sluiter, Verbeek & Frings-Dresen., 2003).

Environmental psychologists suppose that health care systems, such as clinics and hospitals, are rigid and stressful environments for the employees who work there (Kingsbury, 2005). They have demonstrated that work stress and job dissatisfaction are serious and prevalent problems among those who work in service systems particularly in medical centers. Factors such as work stress, job nature, personality, life style and coping strategies with stress have important roles on job satisfaction and well-being of the workers (Chaudhury, Mahmood & Valente, 2011). Over the years, a lot of studies showed that attitude and job satisfaction are associated with the low price of production, high productivity, reduction of

work absence, increasing efficiency and decreasing mistakes related to work (Danielsson & Bodin, 2008).

Decreasing work stress and fatigue allow employees to exit from stereotypical contexts and experience more job satisfaction (Stephan Roderick & Janet, 2002; quoted in Walsh & Knott, 2010). Environmental psychologists today believe that using nature and therapeutic landscapes is effective in increasing environmental health. Therapeutic landscapes include places, scenes, views and environments in which two concepts of mental and body health are connected to each other and create cure and treatment in a new form. The holistic treatment in the field of health psychology provides environment-biosocial patterns outside of the traditional area of positivity (Han, 2009; Stigsdotter, Ekolm, Schippergen, Toftager, Camper & Randrup, 2010).

Environmental psychologists using Fromm theory (1996, quoted in Regan & Horn, 2005), (escape from the urban areas and back to the nature) holds that we are able to reduce work stress through using natural elements in rigid and stressful environments. Work absence, anxiety and aggression decreases when the principles of health psychology are used in the work atmosphere (Han, 2009; Walsh, Knott, 2010). Moreover, it leads to higher positive emotions, arousal and environment satisfaction (Moos & Insel, 2006). Environment psychologists believe that using accessible natural elements such as lakes, parks, gardens, home yards and zoos are also effective in environment design (Park, 2006). Studies indicated that the environments designed by natural elements have a positive effect on job satisfaction and will decrease work stress (Van Nieuw- Amerongen, Kremers, Vries & Kok, 2011). Presence of the natural or designed environments could lead to the treatment of stress in the short-term, lower preoccupation, lower absence and more efficiency (Han, 2009, English, 2006). Danielson and Bodin (2008) suggested that different architectures have different effects on the health states and job satisfaction, for example, employees tend to have lower health in the cell offices and more job satisfaction in offices with environmental designs.

In addition, designed environments not only increase medical efficacy but also decrease nursing oversights (Chaudhury, Mahmood & Valente, 2011). It has been shown that designing a separate garden for staff rest (without clients direct access) would result in decreasing 80% of work stress, leave hours, abdication as well as higher work efficiency and improving interpersonal relationships between employees and clients (Sherman Varni, Ulrich & Malcarne, 2005).

Using vase plants in ICU and surgery would diminish work stress and will improve psychological well-being in the long term (Park, 2006). One study has shown that designed environment results in lower stress in the work, higher job satisfaction and productivity, and organizational accomplishment (Phillips, Chung, Yeh-Anthony & Oi-Ling, 2010). Furthermore, designed environment in health care centers results in lower work anxiety, increased health and well-being as well as higher attention, work quality, economic utilization and lower movement of employees (Williams, 2004). Research indicated that designed environments of therapeutic landscapes induce the quality of "being far" in which preoccupation and work stress would be decreased and psychological well-being between employees and clients would be established (Phillips, Cheng, Yeh, Anthony, Oi-Ling, 2010).

Harting (1995) showed that slight eye contacts with actual, natural or simulated environments can evoke psychological and physical energy between 3 to 5 minutes or even at the rate of 20 seconds. This energy manifests itself as decreased negative emotions, increased certain positive emotions and change in psychological indicators and also creates lower irritability (Harting et al., 1995; quoted in Herzog & Strevey, 2008).

Caplan (1995, quoted in Herzog & Strevey, 2008) has shown that activity in an environment with windows facing the natural views lead to energizing experiences, positive emotions, improved life quality and positive interactions. This study has demonstrated that the kind of view (natural vs. simulated) has no effect on efficacy quality.

Overall, environmental psychology, application of architectural techniques and creating environments, especially professional environments, play an important role in enhancing job satisfaction and suppressing work stress, resulting in relaxation and efficiency. The main aim of the present study is to examine the effect of designed work environment through natural elements on indicators of job satisfaction as well as low work stress on employees. It is assumed that there is a significant difference among the laboratory employees working in an environment with designed pseudo-garden and interior architecture with short walls, staff who work in radiology and renal stone-breaking parts who watch the environment only through a window from a distance and those employees who work in the basement of hospitals (an undersigned environment without any attention to the environmental-psychological factors) on job satisfaction and work stress).

Method

The present study employed a quasi-experimental design. A sample of 186 males and females was selected by the convenient method from the employees of Khatam Al Anbia hospital in Tehran. The range of subjects' age was 25-57 (with the mean age of 39.1 and the variance of 7.03). The participants were divided into 3 groups:

The first group included 61 subjects who worked at the part of laboratory designed with a pseudo-garden based on environment psychology principles, the second group included 63 people who worked at the part of radiology and renal stone-breaking and watched the environment only through a window from a distance, and the third group consisted of 62 participants working in the basement of the same hospital who experienced a stiff and ordinary environment without any environmental-psychological factors.

Khatam Al Anbia hospital was repaired, so that the interior walls were pulled down to 1 meter of height and glazed to the ceiling facing the

pseudo-garden with tall windows entirely facing the outside and made all laboratory systems to a height of 1 meter.

The construction of the designed pseudo-garden is based on the principle of environmental psychology and natural elements in which there is an environment covered with green plants and reed with a cascade having a sweet sound with soft and gentle song of the birds and decorated with comfortable chairs made of bamboo wood for the staff relaxation under the arbor. The designed pseudo-garden could be seen from inside the environment of laboratory and the cascade sound and the song of the birds could be heard while they were working. The employees can use pseudo-garden environment to rest during leisure hours. On this floor of hospital, at the end of the opposite saloon to the laboratory door, there is an environment at the part of radiology and renal stone-breaking in which employees are able to see designed pseudo-garden just from a distance without access to the garden itself, on the bottom floor of this hospital which there is not even one window opening to the outside with no consideration of environmental-psychological factors. In other words, a rigid environment in which the minimum light is provided by the electric power.

The instruments used in this study were the job satisfaction and work stress questionnaires. The job satisfaction questionnaire was provided by Smith and Kendal (1996; quoted in Saane, *et al*, 2003) is a paper-and-pencil scale with 20-items which were responded in a 5-point Likert scale. The providers of this questionnaire believed that this scale had high validity and reliability. They reported the reliability coefficients of the subtests as 0.59-0.92 in the first study and 0.62-0.93 in the second study in Iran (Khorasani, 2008). In this study, the scale reliability was 0.83 as indicated by Cronbach's *alpha* and the item reliability was verified by the lecturers. The scale of work stress was provided by Mc Vicar (2003; quoted in Khorasani, 2008), consisted of a 34-item questionnaire with a 3-point Likert scale. Its item validity was put at 0.87, whereby the impact of stressing and upsetting factors on the staff was measured. The reliability of

its two halves was reported by the lecturers to be 0.78. In this study, the reliability of the scale was estimated 0.78 as revealed by the Cronbach's alpha and the item reliability was confirmed by the three lecturers.

This study was conducted in 2 to 3 months after the design of the laboratory space during which lab staff used this pseudo-garden and the members of staff at radiology and kidney stone breakup wards saw this pseudo-garden from far away, and the basement staffs were provided with no psychological factors. In this piece of research, job satisfaction and work stress indices for members of staff at radiology and kidney stone breakup wards were compared with those of the basement personnel given the sameness of all working conditions and only on the base of difference in workplace indices. Data were analyzed using the MANOVA method, followed by the Tukey post-hoc test.

Results

The findings relating to the comparison of job satisfaction and workplace stress indices of the first group in the laboratory with architecture and space design using environmental elements and the second group in radiology and kidney stone breakup wards with no special architectural design using the environmental elements with the third group of staff who were indeed working in the basement and provided with no psychological index are displayed in the following Tables. In order to investigate and compare the differences in the means of the three groups in job satisfaction and workplace stress, MANOVA and then Tukey post-hoc test were adopted.

Table 1 shows the means and standard deviations of job satisfaction and workplace stress of the 3 groups.

Table 1
Descriptive Characteristics of Job Satisfaction and Work stress of the Three Groups

Variables	1 st Group		2 nd Group		3 rd Group	
	M	SD	M	SD	M	SD
Job satisfaction	36.40	1.91	27.13	1.71	20.56	1.10
Workplace stress	19.90	4.34	30.26	4.06	37.90	5.08

As displayed in Table 2, there is a significant correlation between variables ($p < .01$), i.e., the two variables of workplace stress and job satisfaction are correlated.

Table 2
Pearson Correlation Coefficient between the Variables of Job Satisfaction and Work stress

Variable	M	SD	1	2
Job Satisfaction	36.40	1.91	1	**-.828
Work stress	19.90	4.34		1

** $p < .01$

Table 3 exhibits the results of the MANOVA analysis. The obtained Pillai's Trace suggests that at least the means of two out of the three groups is significantly different either on job satisfaction or on workplace stress.

Table 3
Results of the MANOVA Analysis to Test the Differences among the Three Groups on Job Satisfaction and Work Stress

Source	Work	Value	F	df1	df2	p	η^2
Group	Pillai	.913	980.055	2	346	.0001	.113
	Wilkes Lambda	.087	980.055	2	346	.0001	.113
	Hotelling	254.127	980.055	2	346	.0001	.113
	Ray max. root	254.127	980.055	2	346	.0001	.113

Given the results of Tukey post-hoc test, it can be said that the work stress of the first group (engaged in an environment with architecture) is significantly less than the work stress of radiology-renal stone-breaking personnel (engaged in an un designed environment but can watch the designed pseudo-garden from a distance) and also the work stress and job satisfaction of the first group is significantly $P < .05$ less than work stress and job satisfaction of the second group and also the third group in the basement.

Table 4
The Results of the ANOVA and Tukey's Follow-up Test on Work Stress for the Personnel of Different Parts of the Hospital

	Total Squares	Df	M	F	Sig.	Difference in Mean Groups (Tukey Posttest)	SD of Error	Sig.
Between Group	681.54	2	354.231	2.901	.01	3.51(2) & (1)	1.022	.021
Within Group	2591.76	83	16.91			2.01(3) & (1)	1.025	.023
Total	3315.60	85				1.98 (3) & (2)	2.013	.01

Given the results of ANOVA and Tukey's follow-up tests, it can be said that the work stress of the first group (engaged in an environment with architecture) is significantly $P < .05$ less than the work stress of the second group (engaged in an undersigned environment but can watch the designed pseudo-garden from a distance) and also the third group in the basement.

Given the results of ANOVA and Tukey's follow-up tests, it can be said that the job satisfaction of the first group (engaged in an environment with architecture) is significantly $P < .05$ more than the job satisfaction of the second group (engaged in an undersigned environment but can watch the designed pseudo-garden from a distance) and also more than the third group in the basement.

Table 5

The Results of the ANOVA and Tukey's Follow-up tests of Job Satisfaction for the Personnel of Different Parts of the Hospital

	Total Squares	Df	M	F	Sig.	Difference in Mean of Groups Tukey Posttest)	SD of Error	Sig.
Between Group	650.113	2	325.071	3.051	.01	4.01 (2)&(1)	1.52	.01
Within Group	2304.908	183	17.01			1.31(3) & (1)	1.65	.017
Total	3014.50	185				.925(3) & (2)	2.03	.05

Discussion and Conclusion

The environment is a tool to achieve the goals and the relationship between person-community is a dynamic one. Fromm (1996; quoted in Regan, Horn, 2005) believed that the people feel loneliness after being free from restrictions in the natural environments. In order to be free from loneliness and gain affection and productive task, it is better to pay attention to the person-environment fit and that cannot be accomplished unless through returning to the nature. Work environments especially stressful environments such as clinics and hospitals are perilous for the employees (Stigdauter et al., 2010).

The present study indicated that laboratory personnel who engaged in a designed environment with natural elements and based on environmental psychology principles are more likely to experience lower work stress than those who work in an undesigned environment in radiology-renal stone-breaking and in the basement. If ergonomics could be designed based on the environmental psychology so that the individuals feel the least work stress, decreasing stress can be expected to influence the social-

psychological- physiological indicators, such as anxiety, relaxation, job satisfaction, well-being, and mental health.

In addition, this study showed that radiology-renal stone-breaking personnel experience lower work stress compared to those who work in the basement. This result demonstrates that work stress could be reduced just by looking at green plants and designed pseudo-gardens from a distance without making a change in the ergonomics (e. g., change in decorate and interior architecture). These findings are consistent with the findings of Caplan (1995); quoted in Fillips *et al.*, (2010); Harting *et al.*, (1995); quoted in Herzog & Strevey (2008); Sherman *et al.*, (2005); English (2006); Park (2006); Stigdauter *et al.*, (2010); Chaudhury *et al.*, (2010) & Van Nieuw-Amerongen *et al.*, (2011).

Furthermore, our findings show that there is a significant difference among laboratory personnel, radiology-renal stone-breaking personnel, and those who work in the basement in job satisfaction and work stress, that is, the laboratory personnel who have access to the designed pseudo-gardens indicated a higher job satisfaction than the second group (radiology-renal stone-breaking personnel who engaged in the undesigned environment but was able to see the designed pseudo-garden from a distance in the laboratory) and then the third group (those who work in a common environment in the basement). These findings are consistent with the findings of Tyson *et al.*, (2002); Curtis (2002); quoted in Herzog & Strevey (2008); Moos & Insel, (2006); Park (2006); Danielson & Bodin (2008); Fillips *et al.*, (2010); Walsh & Knott (2010) & Van Nieuw-Amerongen *et al.*, (2011).

A study conducted on nurses and personnel of an elderly hospital by Marjorie (1997, quoted in Park, 2006) showed that those employees who use therapeutic gardens during leisure hours exhibit more efficiency, positive emotion, and adaptation than those who did not use environment in any form. Several studies have shown application of environmental psychology principles in workplace not only reducing work absence, anxiety and aggression but also increasing positive emotions, arousal and

environment satisfaction. The findings of the present study are consistent with the findings of Sherman et al, (2005) which showed that therapeutic landscapes lead to lower work stress in the staff as well as more efficiency and better treatment for clients.

According to the mentioned findings, it can be assumed that even a little changes in work environment could influence the work stress, job dissatisfaction, fatigue, and gradually affect the other psychological variables such as well-being and mental health which themselves play a key role in efficiency and productivity. So it could be considered that applying natural elements based on environmental psychology can decrease work stress and stress as well as increase job satisfaction, efficiency and improve performance and in the long-term it may lead to more well-being and economic benefits in offices and hospitals.

There are a few studies that have been conducted on the subject of the environmental design and it is proposed that further studies focus on the effect of the environmental design on the variable of work fatigue, especially in the stiff environments related to the treatment. The main limitation of this study was unavailability of participants because of the lack of an appropriate place to design a healing environment in Tehran. Limitations related to appropriate place may be because of the fact that hospitals want to maximize their working space to be more economical and efficient.

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Received: 13 / 12/ 2011

Revised : 1/ 11/ 2013

Accepted: 21 / 11/ 2013