

DOI: 10.7596/taksad.v6i3.923

Citation: Payedar Ardakani, P., Ghanbaran, A., & Sharghi, A. (2017). Environmental Factors' Effect on Stress Reduction of Employees: A Case Study on Farhangian University Staff in Tehran. Journal of History Culture and Art Research, 6(3), 282-296. doi:<http://dx.doi.org/10.7596/taksad.v6i3.923>

Environmental Factors' Effect on Stress Reduction of Employees: A Case Study on Farhangian University Staff in Tehran

**Abdolhamid Ghanbaran¹, Ali Sharghi²,
Pegah Payedar Ardakani³**

Abstract

One of the most important issues the contemporary societies encounter is the job stress. There are various factors affecting it, but not enough researches have been done on the role that environmental factors play. This paper presents an experimental study with 100 participants on the influence of environmental factors on employees' stress level. This method uses information derived from field observations and answers to questionnaires distributed to employees and officials who are in the top management of the central organization of Farhangian University, Tehran branch. The results demonstrate that color, window, lighting and brightness, landscape, communications and interactions, flexibility, thermal convenience, noise convenience, cleanness, physical activity, privacy and accessibility play an important role in the stress of employees, suggesting that the architectures and designers should consider the aforementioned factors so they can create dynamic and pleasant office environments devoid of any stress.

Keywords: Interior Design, Environmental factors, Office, Office design, Stress reduction.

¹ Assistant Professor in Department of Architecture, Shahid Rajaei Teacher Training University, Tehran, Iran.
E-mail: ghanbaran@srutu.edu

² Assistant Professor in Department of Architecture, Shahid Rajaei Teacher Training University, Tehran, Iran.
E-mail: sharghi@srutu.edu

³ Master of Architecture, Department of Architecture, Shahid Rajaei Teacher Training University, Tehran, Iran.,
E-mail: pegah.paydar71@gmail.com

1. Introduction

The role of labor in the production process and providing service is known as the most important phase of workload (Huang et al, 2016: 250). The role of labor has evolved from a simple workforce to human capital during modernization, as the technology advancement lacks any efficiency without labor evolution. Labor constitutes a set of people with numerous needs, willing to leverage their skill and abilities in order to contribute to the organization, provided that their needs get to be fulfilled, hence having enough motivation. Employees not performing at a satisfactory level might cause the company to face staggering problems in achieving its goals and fulfilling tasks. So meeting their spiritual and materialistic needs and also laying out an exciting atmosphere at work are of utmost importance which potentially increases the effectiveness of employees in the organization (Safarzade et al, 2011: 2).

The proper employment of labor – as a manifestation of the most invaluable and biggest asset of any society – is under the radar of governments, in fact, it can be articulated that human is both the development goal and its driving force, and the fulfillment of the development goals significantly hinges on the way this critical asset is managed (Pedram, 2011: 20). The loyal and happy labor, compatible with the goals and values of the organization, willing to contribute to it beyond the specified tasks, can be an essential factor in the efficiency of the organization. (Jahromi, 2009: 9). Such a labor brings an enhancement to the performance, lowers the costs, improves the communications of organizations, reduces the wasted time and is reluctant to leave the work and being absent (Beadles II et al 2005: 39).

Being one of the destructive forces in the working environments, job stress can cause physical, mental and behavioral side-effects, jeopardizing his or her health, threatening the organizational goals and putting a damper on the service quality and the performance of the individual (Miller, 2000: 55). It's been close to 100 years since the inception of investigating the stress concept, but the initial investigations have been done in the medical field (Khanifer, 2009: 18). From medical standpoint, stress is defined as the “amount of physical exhaustion”. From the various types of stress, job stress is one of the most prevalent phenomena in the working environments which have interpersonal relationships (Gueriltault-Chalvin et al., 2000: 150). This kind of mental pressure, is a stress which a specific person experiences in a certain job. Therefore, it can be concluded that investigating job stress is of importance due to two reasons: 1. Neglecting it can have devastating effects on the power of labor in an organization. 2. If the occupations stress gets to have no proper revision, it can affect the performance of employees negatively and make them to be less satisfied (Roelofsen, 2002: 250).

Job stress embodies different dimensions, including: Ergonomic factors, incompetence, role being incompatible, role ambiguity, relations with the supervisor, relations with coworkers, physical factors, chemical factors and biological factors (Khanifer, 2011: 10). Majority of researches suggest that having improved physical environments can result in 5 to 15 percent increase in the efficiency and performance of employees, hence the progress of organization (Clements, 1997: 495 & Lorsch, 1994: 896). In this research, we explore the physical factors affecting the stress reduction of employees in organizations.

2. Literature Review

Randall Ross and Altmaier, categorize the various factors causing occupation stress in 6 groups: The role features, occupation characteristics, the organizational structure and atmosphere, organizational management methods, technology and physical factors. In their book, in addition to describing each one of the mentioned groups and the ways to prevent them, they define the physical factors of the working environment stress as “the physical conditions the individual has involved in” and go further to say “regarding the physical variables, stress occurs when the bare minimum of physical safety and living conditions have not maintained”. They define these physical factors as light, noise, temperature, physical activity, polluted air and ergonomic factors, and regarding light factors, they mention the insufficient light or the intensity of that as examples. Yamini & Hasanzade, in addition to the said elements, have taken the decoration and spacing into account, making a meaningful connection between them and stress (2015: 1).

Monazzam et al (2011: 42) concluded that thermal stress lowers the efficiency of the individual and increases the work errors, decreasing the quality and efficiency of system. O’Neil et al (1993: 890), suggested that controlling the environment can affect the satisfaction and productivity directly and can affect the distraction, privacy, stress, interactions and communications indirectly. Huang et al (2004: 617), have also suggested that increasing the control of employees on their working environment can make them to change based on their needs and desires, hence they can be more comfortable and less stressful.

Majority of the office researches indicate that window and lighting affect the productivity, satisfaction and happiness of the people and lower their stress level stemming from work load (Flynn, 1977: 6). Aries et al (2010: 533), demonstrate that the view of windows can increase stress and dizziness, hence lowering the efficiency and productivity, and being close to a window or absorbing light beyond the standard amount can also have a negative impact. Increase in efficiency, decrease in unfortunate events, high level of mental sharpness, and

increased level of satisfaction are of the consequences of having adequate light in working environments that Luo (1998: 4) mentions in his research. Of course, researches indicate the preference to using natural light, as Markus reports (1967: 60) that approximately 96 percent of the respondents prefer to be exposed to natural light rather than having artificial ones in their working environments.

Researches indicate that there's a relation between the human health and the surrounding environment, so using the natural environment can increase the well-being of people and decrease the stress level and contribute to the reconstruction. (Graham, 2010: 270). There are different opinions and approaches to this. For instance, one can mention the Ulrich Stress Improvement theory, which suggests landscape lowers the stress, while city environments negatively impact the stress improvement (Velarde, et al., 2007: 200).

Gorji and Ahangar (2012: 61) investigated the color effect on hospital environments and concluded that employing proper coloring in different medical centers is an essential factor in the improvement process of patients. This can also positively impact the personnel of the hospital and people accompanying the patients. Emami and Hamidian reached to the conclusion that occupation stress of employees has a lot to do with the physical working environment, mental stress stemming from noise pollution, headache due to the air and noise pollution, air pollution in the working space and their residency area (2012: 147).

Kuma et al (Fani et al, 2012: 25), in order to increase positive emotions, did a research and concluded that interacting with friends and creating a friendly passionate atmosphere, successful experiences and appropriate working environment can be important in growing emotions and creating happiness in the working environment. Generally, majority of researches show that cheering up employees would go a long way in lowering the stress of them. O'Neil et al, in 1993, explored the relation between private territory and the satisfaction and stress level of employees. The results show that the privacy and the feeling of being watched has a meaningful connection with the stress level of employees.

Steptoe & Boiton (1988: 100) believe that sports decrease the exhaustion, stress, anxiety and depression, and increase the energy. According to Biddle & Mutire (1991), sports can also improve self-esteem and finally, will result in more happiness. Jegen & Chevret (2016) use a questionnaire called *GABO* in order to investigate the factors affecting the convenience of employees, which in addition to the aforementioned variables, comprises of cleanness.

Therefore, considering the track record of well-known studies and researches, the environmental factors affecting the stress and their variables can be categorized in the following table (Table 1):

Table 1. The list of variables and factors

Factors	Variables	Factors	Variables
Thermal convenience	-Cooling -Heating -Moisture -Ventilation	Lighting and brightness	-Natural light -Artificial light
		Landscape	-Surroundings Plants
Accessibility	-Accessibility in buildings -Accessibility in city	Color	-Color
		Noise convenience	-Noise and crowd
Flexibility	-Arrangement -Decoration -Furniture -The level of control of people on the environment	Privacy	-The level of privacy -The level of crowd
Window	-The view -Natural light -Natural ventilation	Physical activity	-Physical activity
		cleanness	-cleanness

3. Inquiries and Hypothesis

The current study's question is that "which one of the environmental factors is effective on lowering the stress level of employees?" and "how the environmental factors can be used in order to lower the stress level of employees?" Also, "Is the level of job stress differ in men and women?" and "Is the education level can have an impact on the job stress?"

4. Method and Procedure

4.1. Sample

This research uses the analytic-descriptive method. This method uses information derived from field observations and answers to questionnaires distributed to employees and officials who are in the top management of the central organization of Farhangian University, Tehran branch (Fig. 1).

This study is done as the employer decided to understand how can increase organization's productivity and efficiency by improving physical and environmental conditions and how environmental factors can influence on employees' stress level.

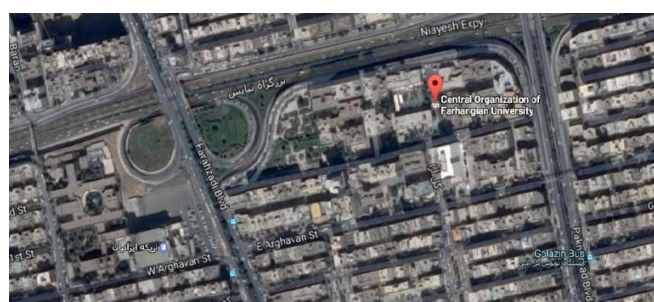


Fig. 1. The location of selected company on map

270 employees work in this organizations in which 120 of them were selected randomly. Figure 2 shows some of the employees' offices and their conditions.

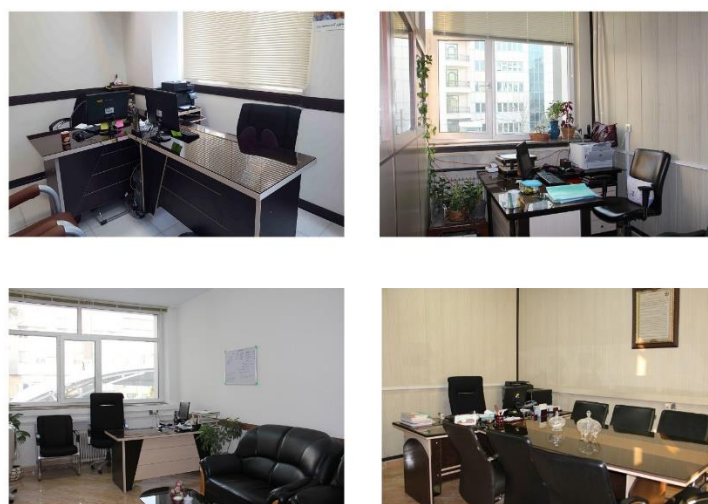


Fig. 2. Some of the employees' offices [Authors]

4.2. Methodology

At first, studies have been extracted regarding the literature, factors and variables. As observed, these factors involve the following: thermal convenience, color, window, lighting and brightness, landscape, communications and interactions, flexibility, noise convenience, cleanness, training and body movement, privacy and accessibility. Actually, these factors and associated variables form the foundation of the employed inquiry.

The questionnaire employed consists of four parts: the first part involves questions like gender, education, age and track record. The second part is made by researcher comprising of 46 questions, third part is the standard questionnaire of job stress of Health and Safety Executive (HSE) and the final part has two questions regarding how to arrange the office by considering the number of employees and their gender.

The Cronbach Alpha of the first questionnaire is 0.756, which as it's higher than 0.7, it has a good stability. The 35-question of HSE questionnaire was built in the late 1990s by HSE in order to measure the job stress of British workers and employees, which has a good Cronbach Alpha factor if 0.78. Also, covering the various aspects is another advantage of this questionnaire in comparison to others which are designed to measure or evaluate the job stress level (Azadmarzabady and Gholami, 2011: 292). Both of these questionnaires are designed based on Likert rating from too much to too low in a 5-rating fashion, and for quantifying the response, 5 to 1 was used. After the questionnaire provided by the professors of architecture and urbanization department of Shahid Rajaei University verified, 120 questionnaires were distributed among 260 employee of the Central Organization of Farhangian University of Tehran, which 105 of them collected. Sampling was done in a random fashion. After that, the gathered data were transferred to computer and 5 questionnaires were discarded due to not readable data. The SPSS-22 analyzed the data. The tables extracted from it and finally, by the aid of T test, correlation factor and regression tests the relations between different factors were investigated.

5. Data Analysis

In the present research, in order to analyze the gathered data, descriptive statistics and perceptual statistics have been used. As the Table 2 shows, from the delivered questionnaires, 47 percent of the studied population are men and 53 percent women. Variance analyses is also shown in the Table 3, there is no discernable difference between the two genders and the sig value equals to 0.084.

Table 2. Data Frequency to Gender Variables

Gender	Frequency	Variables Percentages
Male	47	47%
Female	53	53%

Table 3. Correlation Analysis between Gender Variable and Stress Level

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	0.642	1	0.642	3.048	0.084
Within groups	20.628	98	0.210		
Total	21.270	99			

Table 4 shows the number of respondents in terms of educational level. Unlike the previous case, in statistical analysis, a meaningful difference between job stress and the level of education was observed and the null assumption rejected, in fact, the higher the education, the less satisfaction of the working environment and higher level of stress is there (Table 5).

Table 4. Data Frequency to Educational Level

		Frequency	Percentages	Valid Percent	Cumulative Percent
Valid	Associate	3	3.0	3.0	3.0
	Bachelor	27	27.0	27.0	30.0
	Master	53	53.0	53.0	83.0
	PhD.	17	17.0	17.0	100.0
	Total	100	100.0	100.0	

Table 5. Correlation Analysis between Educational Level Variable and Stress Level

	Sum of Squares	Df	Mean Square	F	Sig.
Between groups	4.043	3	1.348	7.511	.000
Within groups	17.226	96	0.179		
Total	21.270	99			

After the descriptive analysis, for analyzing the affectability of the variables from parametric tests, we consider H_0 as the normal data assumption and H_1 as the non-normal data assumption. When investigating the normal assumption, we test the null assumption at 5% error level. Therefore, if we get a higher result, there will be no reason to reject the assumption. Now, by using the Kolmogorov-Smirnov test we have (Table 6):

Table 6. Kolmogorov-Smirnov test results

		Total variables
N		100
Normal Parameters	Mean	3.042
	SD	0.79
Test statistics		0.096
Sig.		0.169

The results of the test demonstrate that the distribution of research variables is normal (H_0 is verified and H_1 is rejected) and parametric tests can be used in analyzing the research assumptions.

The Table 7 shows a meaningful relation between the research variables and the total factors resulted from the HSE questionnaire, which is acquired by the Anova test. In this table values lower than 0.05 show a positive impact on the stress level of employees. As all the variables

show a meaningful relation, it can be perceived that environmental factors are effective in lowering the stress level of employees.

Table 7. Anova Test results

	Variable		Sum of Squares	df	mean square d	F	Sig.		Variable		Sum of Squares	df	mean squared	F	Sig.
1	Thermal comfort	B G	76.54 6	3 2	2.392	1.69 3	0.0 30	7	Color	B G	23.37 7	3 2	0.731	2	0.0 0
		W G	122.9 80	6 7	1.836					W G	43.31 1	6 7	0.632		
		T	199.5 26	9 9						T	65.68 8	9 9			
2	Accessibilit y	B G	24.84 4	3 2	0.776	1.62 4	0.0 48	8	Noise convenie nce	B G	51.13 6	3 2	1.598	1.9 91	0.0 1
		W G	32.03 8	6 7	0.478					W G	53.77 4	6 7	0.803		
		T	56.88 2	9 9						T	104.9 0	9 9			
3	Flexibility	B G	88.68 7	3 2	2.771	1.63 3	0.0 30	9	interactio ns	B G	60.72 4	3 2	1.889	1.8 92	0.0 08
		W G	137.2 62	6 7	2.080					W G	102.7 42	6 7	2.270		
		T	225.9 49	9 9						T	163.4 66	9 9			
4	window	B	54.10	3	1.691	1.99	0.0	1	Privacy	B	38.13	3	1.192	1.7	0.0

		G	6	2		8	02	0		G	4	2		26	4
		W	74.94	6	1.119					W	65.11	6	0.972		
		G	8	7						G	5	7			
		T	129.0	9						T	103.2	9			
			54	9							49	9			
5	Lighting and brightness	B	47.67	3	1.490	1.98	0.0	1	Physical	B	26.97	3	0.843	1.7	0.0
		G	7	2		0	03	1	activity	G	1	2		10	38
		W	55.60	6	0.830					W	44.12	6	0.659		
		G	5	7						G	3	7			
		T	103.2	9						T	71.09	9			
			82	9							4	9			
6	Landscape	B	28.54	3	0.892	1.99	0.0	1	cleanness	B	17.90	3	0.560	1.6	0.0
		G	6	2		1	05	2		G	8	2		80	38
		W	42.96	6	0.641					W	42.62	6	0.636		
		G	9	7						G	0	7			
		T	75.51	9						T	50.52	9			
			5	9							8	9			

BG= Between Groups

WG= Within Groups

T= Total

Also, the determined variables can be prioritized by the aid of average and standard deviation tables, which is shown in the Table 8.

Table 8. The mean and standard deviation of variables

	frequency	Mean	SD
thermal comfort	100	3.542	0.78485
Accessibility	100	2.9825	0.75800
flexibility	100	3.3369	1.51842
window	100	4.0620	0.99359
Lighting and brightness	100	4.0483	0.7788
Landscape	100	4.0200	0.84993
color	100	4.3250	0.81456
Noise convenience	100	3.4233	0.78689
interactions	100	3.8950	4.95551
Privacy	100	3.0867	1.02123
Physical activity	100	3.1467	0.84742
cleanness	100	3.2150	0.78191
valid frequency	100		

Therefore, given the statistical analyses, the reported priority by the employees is, respectively: color, window, light and brightness, landscape, interactions and communications, thermal convenience, noise convenience, flexibility, cleanness, training and body movement, privacy and accessibility.

6. Discussion and Conclusion

Today, the mental pressures imposed on human in the “anxiety and mental stress” age, makes the need to finding solutions for preventing the factors which cause stress and anxiety such a crucial one. This research aims to investigate and analyze the role of environmental factors on lowering the stress level of employees in working environments. To this end, first, studies have been done on the various theories regarding stress – as one of the destructive stimuli - and its effects on the different aspects of people’s life and also, the role of environmental factors on stress reduction, and the domestic and foreign researches regarding this issue were explored. These studies show that experts put an emphasis on the role of environmental and physical factors on the stress of people and speak of elements specific to this issue.

Then, a questionnaire was prepared and distributed among the employees of the central organization of Farhangian University of Tehran. The results show that, based on the chosen statistical society, there is no discernable relationship between stress and the gender and the situation is the same for both. But, between the education and the level of stress a meaningful relationship was found, meaning that the higher the education, the less satisfaction of the working environment and higher level of stress is there.

According to the findings, there is a meaningful relationship between all the color, window, light and brightness, landscape, interactions and communications, thermal convenience, noise convenience, flexibility, cleanness, training and body movement, privacy and accessibility factors and stress, meaning that if these factors are not designed properly, people will have stress and this in turn will cause lower efficiency and productivity and so many other devastating effects. These results demonstrate that designers and architectures should care about the effect of the aforementioned factors when designing the work environments and should look for ways to improve them even further.

References

- Aries, Myriam; Veitch, Jennifer & Newsham, Guy, R. (2010). Windows, View, and Office Characteristics Predict Physical and Psychological Discomfort. *Journal of Environmental Psychology*, No. 30.
- Azadmarzabady, Esfandiyar & Gholami, Mohammad (2011). Reliability and Validity Assessment for the HSE Job Stress Questionnaire. *Journal of Behavioral Sciences*, Vol. 4, No. 4. (In Persian).
- Beadles II., Nicholas Aston et. al. (2005). The Impact of Human Resource Information Systems: An Exploratory Study in the Public Sector. *Communications of the IIMA*. Volume 5 Issue 4.
- Biddle, S. & Mutrie N. (1991). *Psychology of Physical Activity and Exercise*. London: Springer.
- Clements-Croome, D. & Baizhan Li (1997). Assessment of the Influence of Indoor Environment on the Job Stress and Productivity of Occupants in Offices, *Healthy Buildings*, No. 97.
- Emami, Amin & Hamidiyan, AmirHossein (2012). Occupational stress caused by environmental pollution in Tehran high schools' staffs. *Journal of Natural Environment*. No. 2. (In Persian).
- Fani, AliAsghar et. al. (2012). Identify the components of individual and organizational vitality and the assessment of the components. *Organizational Culture Management*, Vol. 11, No. 1. (In Persian).
- Flynn, J. E. (1977). A Study of Subjective Responses to Low Energy and Non-uniform Lighting System. *Lighting design and application*, no. 2.
- Grahan P, Stigsdotter U. K. (2010). The Relation between Perceived Sensory Dimensions of Urban Greenspace and Stress Restoration. *Landscape and Urban Planning*, No. 94.
- Gorji, Yoosef & Saleh Ahangar, Mojgan (2012). The impact of color in the design of the inpatient hospitals. *The Scientific Society of Architecture & Urbanism*, No. 6. (In Persian).
- Gueriltault-Chalvin, V.; Kalichman, S. C.; Demi, A. & Peterson, J. L. (2000). Work- Related Stress and Occupational Burnout in AIDs Caregivers: Test of a Coping Model with Nurses Providing AIDs Care. *AIDs Care*, No. 12 (2).
- Huang, Yueng-Hsiang; Robertson, Michelle & Chang, Kuo-I (2004). The Role of Environmental Control on Environmental Satisfaction, Communication, and Psychological Stress: Effects of Office Ergonomics Training. *Environment and Behavior*, No. 36.
- Huang, Yueng-Hsiang et. al. (2016). Beyond safety outcomes: An investigation of the impact of safety climate on job satisfaction, employee engagement and turnover using social exchange theory as the theoretical framework. *Applied Ergonomics*, Volume 55.
- Jahromi, Amin et. al. (2009). Relationship between organizational justice and job satisfaction among teachers of special schools in the city of Bandar Abbas. *Education Journal*, No. 5. (In Persian).
- Khanifer, Hossein (2009). Job Stress from Myth to Reality. *Rahbord Journal*, No. 1. (In Persian).
- Khanifer, Hossein et. al. (2010). The Relationship between the Trustment and Commitment (in Agriculture and Education Organization of Qom). *The journal of Public Administration*. No. 2. (In Persian).
- Lorsch, H. G. & Ossama, A. A. (1994). The Impact of the Building Indoor Environment on Occupant Productivity-part 1: recent studies, measures, and costs. *ASHRAE Trans*, 100 (2).

Luo, C. (1998). *To Capture the Sun and Sky; Lighting Futures*. New York: Rensselaer Polytechnic Institute Lighting Research Center.

Markus, T. A. (1967). *The Significance of Sunshine and View for Office Workers*. Proceedings of the CIE Conference on Sunlight in Buildings. Rotterdam: Bouwcentrum International.

Miller, Lynnete (2000). *Managing stress*. Select Editions Pub.

Monazzam, MohammadReza et. al. (2011). Evaluation of the risk of heat stress in a steel factory. *Iran Occupational Health Journal*, No. 4. (In Persian).

N. Perrin Jegen & P. Chevret (2016). Effect of Noise on Comfort in Open-Plan Offices. Application of an Assessment Questionnaire, *Ergonomics*. National Institute for Occupational Safety and Health Stress at Work. Centers for Disease Control and Prevention, U S Department of Health and Human Services. Publication No. 99-101.

O'Neil, Michael J.; Miller, Herman & Carayon, Pascale (1993). The Relationship between Privacy, Control and Stress Responses in Office Workers. *Proceeding of the human Factors and Ergonomics Society*. 37th Annual Meeting, P. 443.

Pedram, Mohsen (2011). Improving the efficiency of human resources [Part 1]. *Iranian Melli Bank's article collections*, No. 180. (In Persian).

Randall, R. Ross & Altmaier Elizabeth, M. (1994). *Intervention in Occupational Stress*. SAGE Publications.

Roelofsen, Paul (2002). The impact of office environments on employee performance: The design of the workplace as a strategy for productivity enhancement. *Journal of Facilities Management*, Vol. 1 Issue 3.

Safarzade, Hossein & Moradi, Kobra (2011). Branding and Improving the Performance of Companies. *Business Management Journal*, No. 10. (In Persian).

Steptoe, A. & Boiton, J. (1988). A short term influence of high and low intensity physical exercise on mood. *Health and Psychology*, No. 2.

Velarde, M. D.; Fry G. & Tveit, M. (2007). Health Effects of Viewing Landscapes: Landscape Types in Environmental Psychology. *Urban Forestry and Urban Greening*; 6.

Yamini, Sarah & Hassanzadeh, Hamid (2015). A Survey on the Relation between Variables Influential on Interior Design of Workplace and Personal's Degree of Stress. *International Journal of Management and Applied Science*, Volume 1, Issue-4.