

Lighting Influence on Stress Level of Iranian Staffs (Case study: Central Organization of Farhangian University in Tehran, Iran)

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Abstract

A person's work environment is very important. We spend nearly as much time at work as we do at home and even for some office workers, they spend more at their office than home. Improper office environments can cause major stress for workers. This paper presents an experimental study with 100 participants on the influence of lighting on staffs' 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. Collected information was analyzed by using SPSS-22.

Data analysis shows that degree of stress is an effect of lighting level of workplace and can be changed with making improvement in interior design. Also this study does not claim a correlation between gender and stress but shows that the educational level of an employee influences the degree of stress.

Keywords: Lighting, offices, staffs, stress level.

Introduction

Studies show that stress may have negative effects on physiological, psychological, cognitive, behavioral, psychosocial, and social outcomes (Kiecolt-Glaser ET. Al, 1995). One of the most important negative outcomes of stress is excessive exhaustion, disability in relaxation, insomnia, absence from work, hypertension, hypercholesterolemia, and heart diseases (Cummings et. Al, 1980, 418), horror and lack of social interaction abilities, drop of mental health level (Kilfedder et Al., 2001, 390), diminution of work quality and quantity (Farahmand, 2003, 543).

Studies of the effects of light on stress report that office worker stress can decrease with the quality of light (Edwards & Torcellini, 2002, 9). Occupants in daylight and full-spectrum office buildings reported an increase in general wellbeing. Specific benefits in these types of office environments include increased productivity, reduced stress and Absenteeism, better health, financial savings, and preference of workers. Benefits to the office worker are so great that many countries in Europe require that workers be within 27 feet of a window (Franta & Anstead, 1994).

As International Labour Organization (2014) presents, from the workers perspective, poor lighting at work can lead to stress, eye-strain, fatigue, headaches and accidents. Too much light can also cause safety and health problems such as stress and glare. Both can lead to mistakes at work, poor quality and low productivity. According to the Asian Productivity Organization (APO), productivity of Asian countries including India, China, South Korea, Japan, and Bangladesh is respectively 42%, 47%, 43%, 53%, and 46%, while in Iran it does not exceed 10%. (Nasrollah nia, 2013, 109). In addition, as Kalantari, head of the Association of Productivity, explained, Iran loses more than 33 billion dollars per a year, due to lack of appropriate productivity (Kalantari, 2015).

The aim of this study is to investigate the influence of lightening on the stress of staffs offices that its reduction, enhances organizational productivity and contributing to the development and improvement of economic conditions in the country.

Literature review

Stress

Stress is a reaction of organism to external environment. It is a sensory reaction that allows adaptation based on individual differences and psychological processes. It is the consequence of external (environmental) stimuli, events and incidents that cause so many physical and mental demands in an individual (Ivancevich, John M., & Micheal T. Matteson, 1990).

Stress includes pressure and erosion of body while encountering environment is always changing. Such changes impose physical and emotional effects on humans and could create positive or negative feelings within the person. If positive, the effects of stress make the person act inevitably and bring fresh awareness and new exciting outlook for the person. Stress is a state within body and soul caused by incurring physical and psychological pressures, in a sense, stress resulted from stress pressures and it is appeared against external incompatible stimuli. In other definitions, stress is the person's reactions against threatening situations in the environment. Stress is not an external agent; in fact, it is a negative reaction in which one shows against other persons, events and things (Alvani, 1998, 297).

Light and stress

Studies have revealed that in addition to the potential factors exist outside an organization, the main factors generating stress in an organization are: 1- policies, 2- structures, 3- stages and processes, 4- tangible conditions, 5- congestion, 6- lack of privacy at work, 7- heat & cold, 8-loud noises, 9- improper arrangement of furniture or improper decoration, 10- lack of congruence in space and dimensions, 11-insufficient light (Marens, 1976).

Since a large body of environmental research literature directly or indirectly supports the fact that environmental design can affect individual or work needs, we limit this research to the effects of lightning only. Studies of lighting in the workplace have consistently shown that sunlight has positive effects on workers' subjective well-being; and that employees prefer to work near windows or in workplaces with natural lighting (Leather, Pyrgas, Beale & Lawrence, 1998, 760; Oldham & Fried, 1987, 80).

Ruslan et al. (2014, 87) reported Lighting at work is very important to the health and safety of everyone using the workplace. Poor lighting can not only affect the health of people at work, causing symptoms like eyestrain, migraine and headaches but is also linked to sick building syndrome. Their study did not claim a correlation between lighting, gender and age.

Oldham and Fried (1987, 78) reported that when offices were darker, employees were more likely to leave offices when they had a choice, at lunchtime, breaks, and so forth. The luminous flicker of fluorescent lamps, which can be reduced or eliminated by replacing magnetic ballasts with digital ballasts, has shown to have affected visual performance; caused visual discomfort and general stress (Wilkins et al., 1989, 16). In addition, Rashid and Boulevard (2008, 165) named their Major findings on the effects of lighting in office, as follow:

- There are many direct physiological and psychological benefits of daylight in workplaces.
- Lighting may impact worker performance and stress directly because of its effects on vision and indirectly because of its effects on attention and arousal.
- The level of luminance impacts the activities of older people more.

- Some lighting systems support self-reported productivity and cognitive task performance better than the others.

- Lighting has shown to have some effects on social relations.

Environmental and Occupational Health Centre of Iran explained: “according to the statistics announced in 2006 by this center, about 11% of workspaces didn’t have an appropriate lighting, as well as 11% of staffs worked in poor lighting. The statistics also showed that in 2007, nearly 17% of workspaces didn’t have an appropriate condition and 12% of workers worked in inappropriate lighting (Aghili & Egtesadi, 2008, 4).

This emphasizes a need to understand how the use lighting impacts directly or indirectly on worker stress, well-being and performance.

Inquiries and Hypothesis

How far would workroom brightness and light bring about occupational stress and anxiety? Does occupational stress affect men and women differently, and to what extent? How far may educational attainment affect occupational stress?

Hypothesis

Light and brightness decrease stress in the workplace.

Men and women experience different levels of occupational stress.

The educational level of an employee influences the degree of occupational stress the employee experiences.

Methodology

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. Later, the effect of light and brightness on the level of office space workers’ stress and anxiety was determined by studying the collected information and analyzing data, using SPSS-22.

The required questionnaires consist of two sections; the first part, which is researcher-designed, consists of 12 questions. Eight of these 12 questions are designed to get responses from people in regard to their satisfaction with the natural and artificial light of their rooms. Professors have approved the four initial questions. These four ask for personal information including gender, education, age, and occupational experiences of related organization. The Cronbach’s alpha equals 0.75. Proper durability is expected when the score exceeds 0.7. Five architect professors, approved the validity of the questionnaires. All of these professors have more than ten years of experience.

In the second part, the standard questionnaire of occupational stress has been taken from Health and Safety Executive Institute, HSE, in England. The 37-question inquiry was designed to estimate English employees’ and workers’ occupational stress, in late 1990s. Its validity is highly adequate given its 0.78 Cronbach’s alpha coefficients.

Furthermore, besides the high validity, considering various issues and providing a small number of questions is one of the privileges of this inquiry (Azadmarz Abadi, 2010, 292). Both parts are designed based on a Likert rating in five-grading system from too much to too low.

Of the 120 employees (at Farhangian University, Tehran branch), who participated in the survey, 105 participants handed in their responses to the inquiries. In the end, after removing 5 more samples due to incomplete and deficient information, 100 answer sheets were analyzed by SPSS 22. This research methodology and investigation of the research hypothesis are T-test, the correlation coefficient, and Regression test, which are discussed below.

Data Analysis

Table 1 shows that 47% of contributors are males while 53% are females. Also, The Variance analysis demonstrates no meaningful distinction between the level of occupational stress between men and women. The sig equals 0.087. (Table 2)

Table 1. Data Frequency to Gender Variables

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

Table 2. 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			

As Table 3 suggests, this cohort contains employees who have earned Associate's degrees (3%), Bachelor's degrees (27%), and Master's degrees (53%) and PhD (17%).

Table 3. Data Frequency to Educational Level

Level of Education	Frequency	Percentages
Associate	3	3%
Bachelor	27	27%
Master	53	53%
PhD.	17	17%

Table 4. 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			

In statistical analysis, however, a meaningful distinction was observed between employees' feeling occupational stress and their educational level. The null hypothesis was rejected. In other words, the study shows that the higher the level of educational success of an employee, the more dissatisfaction the employee feels, in regard to work environment and so occupational stress is higher for employees who are more educated than others (Table 4).

The correlation coefficient between research variable, which are light and brightness, are related to a total of two factors, derived from the standard HSE occupational stress questionnaires that is 0.000 and the null hypothesis was rejected. Therefore, the data is meaningful (Table 5).

Table 5. Correlation Analysis between Lightning and Stress Level

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.398	20	.470	3.127	.000
Within Groups	11.871	79	.150		
Total	21.270	99			

Conclusions

The principal conclusions were:

- Appropriate light and brightness can decrease stress level in the workplace.
- There is no different levels of occupational stress in men and women experiences.
- The educational level of an employee influences the degree of occupational stress.

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