

ARTICLE

THE SURVEY OF THE COLOR AND LIGHT PSYCHOLOGICAL EFFECTS IN IRANIAN TRADITIONAL ARCHITECTURE (CASE STUDY: TABATABA'EES HOUSE)

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ABSTRACT

In the past, the subject of the relationship between the human beings and the environment and the way it was rendered into the architecture and environment designing language have been greatly focused on by the researchers of this field of study. In line with this, realizing the human characteristics and the environmental features and attributes in the periphery and the quality of establishing relationship between these two factors are of a great importance. Proper lighting in the human beings' living spaces including work environment, homes, etc. besides influencing the human efficiency and productivity results in the emergence of some adverse effects such as of anxiety, diminishing health and comfort and pertinent behavioral disorders. The windows with colorful glasses let in the light with various and diverse colors and in the meantime they can prevent a considerable percent of the hot and scorching radiations from entering the interiors and they play a role as light controllers as well. The current study is an analytical review on the color and light psychological effects regarding the environmental psychology in the Iranian traditional architecture, the interrelationships between the mankind and the environment and also the effect that the built environment quality has on the human beings' behaviors and psyche. In the current study it has been demonstrated that the interdisciplinary knowledge of "environmental psychology" has evolved out of the interactions between the two areas of behavioral sciences and the architecture and the designing theories have been drawn upon the human needs and perceptions of the life environment, thus the environmental psychology can be envisaged as being pertained to the common overlapping area between architecture and behavioral sciences. By dealing with such knowledge, the architectures attempt to analyze the relationship between the human beings and the environment and that how can it be taken advantage of in architectural designing procedures. The results obtained from the current study are connected to the survey of such effects and influences rates in Tabataba'ees' House sash window style which was selected for the present study as a case study and also the spectra of the glass colors applied therein were also evaluated and then there was made investigations regarding the effects such colors have on the human behavior. Finally, the appropriate lights that can be used in the buildings and are found to impose the smallest range of behavioral disorders on the humans were also identified. The current research is based on the qualitative studies and it has been conducted based on descriptive-analytical methods and the data collection tool has been library, articles and credible journal essays and documents and evidences and the written references study and investigation.

INTRODUCTION

KEY WORDS

color, light, environmental psychology, sash window, behavioral sciences, architecture

Windows are one of the elements in architecture which are to known to perpetually play an effective role in establishing order and coordination in the buildings or quite adversely cause perturbation. The new era evolutions and the boundless freedom in the formation of the buildings' elements have resulted in some sort of confusion and sometimes a monotonous form which is perceived as being irrelevant to the culture in the windows which, all in all, have led to windows role fading out in human beings' lives. Before the new era's effects and influences the windows used to play a considerable part regarding the human mental aspects (1).

Whatever building has been made in Kashan and its vicinity is made of mud and its derivatives. It is clear that the architects were not thinking of anything other than mud and they have not taken advantage of any other material and masonry since he would know that no other material can be replaced by mud even if there were to be found stones or wood in the proximity. In this region the life has been interdependently intertwined with soil and mud (2).

In constructing the traditional buildings and houses in the city of Kashan, paying attention to the environmental and climatic conditions for controlling and making use of the environmental capabilities has been greatly valued. In Kashan's traditional architecture, the entire elements and the components of the buildings are generated according to the environmental conditions and each of them plays a considerable role in providing for the creation of the optimum conditions. According to the effect that the sun movement causes on the various dimensions and aspects of the houses, the builders have considered special applicability for each of the house frontiers according to certain seasons and hours. According to this idea, the frontier facing the sun has to be used for winter life and the frontier in the opposite and away from the sun has to be used for spending the summers. Also, there are made

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entrances to the basements for spending the hot summer days. In Kashan, a great section of the house has been made in the form of a small garden hole in order for a cold environment to be created through planting trees and creating a green area besides providing for having access to the water from the aqueducts and wells (3). In the table below, some of the features regarding the home designing systems are presented as showcasing the Tabataba'ees' home in Kashan (table 1).

Table 1: designing features in Tabataba'ees' house, source: Gorji Mahlbani,

Design characteristics	Effects
Four-porch style	For the purpose of making an appropriate use of every space according to a certain season
Winter-stay section with fireplace	For heating the area
Winter-stay section facing the sun	Taking advantage of the sun's natural energy
One-side open winter-stay section	For better and easier temperature control and easier traffic
Summer-stay section and alcove with higher decorations and in an upper level	For better air ventilation during hot seasons of the year
The garden hole section (the alley level is about five meter higher and the stable is also in an upper level	The reason for making use of the garden hole has been making use of the water for the aqueducts and reusing the soil extracted from digging the garden hole
The cellar was used from the noon till the afternoon during the summers	The temperature differences between the cellar and the outside which was usually 15° C cooler
So, the cellar could have been used for storing the food	The coldness of this section of the house prevents from the food stuff decaying
The steep sloping of the cellar steps	1-the entrance mouth was small,2-short length for the cellar for better controlling of the required temperature
The use of the colorful glass	1-aesthetic aspects,2-providing a coverage and reflection,3-repelling the insects through the use of multiple colors
The existence of patio	Supplying the inside with light, air ventilation and air chilling effect through constructing a pond underneath
The existence of dome-like roofs	Parts of the roof was shaded

Sash windows, the original wooden handmade artefacts, are a memorial of the old times and they are inspired by the original Islamic designs which are now outdated and they can only be found in the then houses, but they are still present in the entire Iranian territory in the old cities and villages. It can be said that sash window is a type of wooden sliding grid which is opened and closed via moving it up and down. It is usually of the height from the floor to the roof. Such a window is sometimes opened to the yard and sometimes to the porch and sometimes it is placed between two halls to be opened as required to provide for a larger hall. The sash window in Iranian architecture is applied as a fundamental opener has a very old background. Beautiful specimens of such windows can be seen all around Iran. By building the sash window in a grid network the architects intended to use it as a wooden window or orifice (figures 1 and 2).

Figure (1): Tabataba'ees House, source: the author/ **Figure (2):** sash window in Tabataba'ees House, source: Isfahan Cultural Heritage office



Study background:

Haghshenas and Fiabekloo in an article entitled “the survey of the colorful glass effect on the light intensity and the passing energy in visible spectral region” dealt with the study of a number of traditional sash windows and obtained the transferred visible region spectra for four different color glasses used in the sash windows by making use of a spectrophotometer and then discussed the relevant climatic and radiation issues. Purdeyhimi and Haji Seyyed Javadi also in another study entitled “the effect of the day light on the human beings” dealt with the study of the day light therapeutical effects, biological-therapy processes and its perceptual psychology. Nayebi and Kateb in their study entitled “the effect of the interior spaces light on the quality of life and the human beings’ ethical behaviors in respect to the importance of the light in Iranian architecture and taking advantage of the natural light in designing and creating optimum spaces and the relationship between the environment with the body and soul health” did some researches.

Study methodology:

The study methodology in writing the current study has been a qualitative method and it has been conducted based on descriptive-analytical methodologies and the information required for the current study was acquired through library researches. The study has been generally organized as follows: firstly, a definition and identification of Tabataba’ees’ House is presented and then the color and light psychological effects is introduced for the sash windows in Tabatabaees’ house. After that, Tabatabaees’ house which is a traditional and old house in the city of Kashan was selected for the study project since had been found to be of particular characteristics and then the sash windows in the house were analyzed in terms of color and light psychology and finally we deal with the investigation of such effects in the above cited house in the city of Kashan and the role of the sash window was consequently evaluated therein.

Study questions:

1. Do natural colorful lights have any positive effect on the improvement or prevention from psychological diseases?
2. Is there a way to contribute to the individuals’ stress reduction through taking advantage of such methodologies?

Study hypothesis:

It seems that the use of the colorful glass can positively influence the human beings psychological and physical health.

It seems that applying the colorful glass in such a modern world as this one in the people’s residential places can cause a reduction in the stresses and the anxieties resulting from the exterior environment.

The necessity to do research:

The objective of the current study is to find the best natural light colors spectra in the life environment including the work place, leisure time environment, education location, recreation resorts and so forth which can besides increasing the individuals’ efficiency and productivity pave the way for the reduction in anxiety, improvement of the behavior and also the preservation and augmentation of the health status and their comfort and welfare level elevation.

Statement of the problem:

The sun light is an eternal source, clean, free of charge and in accord with the entire human beings’ bioenvironmental and psychological aspects which can be benefited from perpetually and the increasingly wider use of such energy in the buildings during the recent decades is confirmatory of the aforementioned idea. The studies indicate that the light intensity, type of the light source and the way it is distributed in the various environments where the human beings perform their activities may influence their behaviors, temperaments, productivity and efficiency to a great extent. A window with colorful glass transfers the light with various and diverse colors. And it can prevent a considerable percentage of the hot and scorching rays from entering the interior spaces in a building and it can also

play a part as a light controller. Also, the colors emitted out of such windows can positively influence the individuals with psychological diseases. We deal with the prevalence of the psychological diseases and the lack of making use of the colorful glass in the buildings.

Sash window:

Sash window is a sliding-up window or door which moves vertically up or down and it is mostly opened to the yard (platform). The body of the sash window is made up of wood which is usually carved and lattice-like (Girih tiles) and it is usually built with variegated geometries mostly with plant-like shapes. Then colorful glasses are nested into these wooden reticular frameworks (4).

The specimen used in the current study is the sash window belonging to Tabataba'ees' House in which there has been exerted the least amount of interference in the structure and the composition of the glass colors and the color combinations and geometry of the wooden art works have been minimally changed in the repairing and restoring works and it has been tried to keep them unchanged to the maximum extent possible. In the studies performed on the existing sash windows it became evident that four main colors of red, yellow, blue and green are most predominantly applied (figure 3).

Figure (3): Tabataba'ees' House, source: the author



Sharden, the French voyager, travelled to Iran in Safavid era and meanwhile writing expositions about the houses and their decorations states that “the windows for the ordinary people’s homes are made of sycamore tree wood but the windows for the aristocrats and the noblemen’s homes is made of lattice-like wooden frames in each of the lattices there is installed and inserted a colorful small glass and these as a whole give birth to a beautiful figure... their window frames is either installed with glass or transparent plasters which also have beautiful shapes and figures carved on them and at the same time they let a lot of light to be passing through (5).

Madam Carla Serena has a section in her travel diaries in which she has written “Darvazeh Dowlat opens to a street... at the end of the street there is the King’s palace... the palace’s entrance gate façade has been decorated with colorful glasses and it is exactly across from Darvazeh Dowlat” (6).

Color psychology:

The colors exert a great influence on the life so intangibly that we are rarely mindful of such effects. The scientists believe that the colors are absolutely influential on the human beings behaviors and characteristics. And this is in a manner that each organ of the body has been discovered to be in possession of its own specific energy and the colors are in connection to this energy in the human body. The colors effects on the human body, spirits and the human thinking style have been studied for years by the researchers. They say that the human tendency and attraction to a color is stemming from the feeling created in the person by a certain color. Colors are energies which are transferred through waves and the receptors in the human eye retina (cone cells) transform such energies to the perceptions of the colors in the human brain. The colors energies stimulate the pituitary and pineal (pea-like conical mass) glands in the brain. Through this stimulation, the above-mentioned glands secrete hormones which are effective on the human body physiology. And this can act as a factor relating the colors to the human physical and psychological moods. Chromo-therapy has been focused on by the researchers as a type of natural thrapeutical method. In 1942, the Russian scientists found out that red stimulates the sympathetic nerves and the colors white and blue cause an instigation of the parasympathetic nerves. The other studies have indicated that some colors stimulate hormone secretion and some others control or prevent the hormone secretion. In the following sections of the current study it was determined that the colors are effective on the treatment and/or exacerbation of the diseases (figures 4 and 5).

Figure (4): colors, source: Doroodi, 2012/ **Figure (5):** colors, source: (7)



Nowadays, the scientists believe that the mind responds differently to the various colors emitted by the light and we can treat sleeping disorders and the temperament and behavioral variations through taking advantage of such a finding. For instance, the waves of the colors such as dark white or purple can induce the human minds with hypnotic mood (sort of the brain tranquility) and they can also reduce stress and the chronic ailments. The studies have indicated that a color or a combination of the colors can be directly or indirectly effective on the treatment of the diseases (table 2).

Table 2: the effect of the colors on curing the diseases, source: Dorrodi with the author's emphasis

Color	Disease treatment
Red	Red is effective on the treatment of anemia, bronchial asthma, cold, constipation, bronchitis, tuberculosis and depression and it is not recommended when the individual is angry, has fever, hypertension and inflammation. For example the measles symptoms were found to be decreased when the individual was exposed to a window with red glass. Also, the patients with melancholia (type of depression) were found to be experiencing a better situation when hospitalized in rooms with windows nested with red glass.
Orange	Orange has been shown to be regulating the thyroid gland function, stimulates breathing and extends the lungs, and causes happiness and joy in the human beings. Orange is said to have anti-spasm (muscular contraction) effects and helps the food intake. Also, it has been found to be useful in treating the spleen, pancreas, stomach, intestine, kidney, lung, rheumatism, gout and depression.
Yellow	Yellow strengthens the mental power and intelligence. Yellow activates the nerve cells, augments the muscles strength and causes an increase in learning. It can be used in curing diabetes, constipation, eczema, digestive tract disorders, inflation, maldigestion, exhaustion, organs' numbness and depression.
Green	Green is the color of the nature. This color is growth balancer and tranquilizer, sedative and it is found to have calming effects on the human body and soul. It reduces hypertension and it has been found to be effective on the sleeping disorders, exhaustion and irritability. Through regulating the metabolism, yellow also spreads its effectiveness to weight control and it is considered as an important factor in treating the heart problems, headaches and ulcers. The color green possesses characteristics such as inducing the individual with decisiveness in performing and fulfilling tasks, perseverance, and endurance and it causes regeneration and youth and vitality and growth and it has an affective content which is accompanied with pride. The color green is the symbol of flexibility and determination and these are adjusted beside and in line with one another.
Blue	Blue is effective on the increase in hypertension and the throat problems. Blue has been discovered to be very efficient in curing the children's diseases and it combats the malignant effects of the diseases such as cataracts, chickenpox, cholera, insomnia, hysteresis, itchiness, and goiter and tonsil inflammations. When the person feels cold it is better not to make use of blue.

Also, from psychologists point of view, the different colors used in making such glasses and the creation of the same color lights passed through them variously influences the human beings and each color juxtaposed by the other one neutralizes the effect intensity and consequently an appropriate amount of each color is regulated and adjusted. Most of the colors used in the glasses installed in the sash windows are azure blue, red, green and yellow and each of them has been found to exert a unique psychological effect. Azure blue (dark blue) is considered as a biological need for the human beings, it psychologically signifies comfort and tranquility and physiologically it conveys satisfaction, to wit being satisfied with the situation and the comfort along with enjoying such a comfort and welfare. It creates a sense of sacrosanctity and pureness and produces a feeling of stability, integrity and safety. It is expressive of the truth, trust, love and devotion and sacrifice and it is a symbol of eternity, endlessness and it is a sign of sustainable values thus it is taken to be tending to eternalize the past. Red is expressive of the vital strength of the nervous system and glands activity therefore it is intended to mean wishes and the entire forms of willingness and desires. Red means acquiring the interested results and achieving accomplishment. Red is a symbol of wishfulness for the entire things encompassing the life intensity and the maximum extent of experience. Red is a motivation for

intensifying activity, sports, struggling, competing. Red bears the meaning of being willed and having volition whereas yellow brings happiness and light. Yellow has characteristics including light, reflection, shining quality and transient happiness. Yellow is indicative of wishing to develop invincibly, easy-goingness or the tranquility within. Yellow is in the opposite end to green. It means stressing accumulation of the green can even lead to pressure and convulsion, while yellow is assertive of the calmness and exhilaration. On the other hand, yellow green has a lower concentration and it is lighter than the red, thus instead of being stimulating and acting as an incentive it is more of a blending and pooling effect.

One of the important theoreticians in the field of colors effects is Johann Wolfgang Goethe. He believes that “the colors are the mysterious mirrors of the entire human beings processes and each color has a special sensory-psychological on the human beings.

Machi Lucher, the famous psychologist, has indicated that through surveying the interests everyone has to special colors we can determine their psychological disorders quality and then they can be manipulated in terms of their attitudes and cognitions.

In the modern psychology, the colors are enumerated as one of the personality assessment scales; because each color has been found to be connected to certain effect on the individual’s soul and body and it is said to be expressive of the individual’s psychological and physical status. From long ago, the human beings have been subject to the influence of the colors in their periphery and during the recent one hundred and several years, during which the paint manufacturing industry has reached to its peak evolution, the colors effects have doubled and the colors have penetrated into every aspect of the human life. Such an increasingly higher and more accentuated use of the colors has brought about the grounding for the color psychology. The colors are replete with highly extraordinary forces, forces that influence their onlookers like energetic and pyrogenic nucleus. And disregarding the negative or positive effects they have on the human subconscious ego, the creative artist should not only attempt to take a journey to the indefinitely extremeness of the color world and to pile up whatever scientific experience s/he he can, but it is also necessary for the color concepts to be identified and recognized in every respect. But the most important of such aspects upon which the colors aesthetic concepts credibility is laid is the recognition of the colors as one of the most prominent configuration factors and then the power of the color in establishing a relationship which should be known to the artists and everyone.

Ergonomics application of the colors:

Colors are an integral part of the life. The effect of the color on the human life transcends beyond the hedges of the human mind and only a trivial amount of the colors effects can be observed in the human spirit, work, tiredness, incidents, art and perceptions. According to the great many of the effects color have on various systems and their role in designing and developing the human systems, ergonomics and the study of the colors features, its effects on the human beings and his psychology and the colors perceptions and the related analysis seem to be required for the industrial engineers and the industry-service system designers. The research conducted by the scientists indicates that the way the colors influence the human body and soul they are also effective on the human physique. Some of the researchers believe that the color which is selected by an individual and is his or her favorite can be expressive of the person’s psychological and moral characteristics.

The colors effects on our perceptions:

As we know, the colors influence the human beings’ temperaments and feeling, and it is this effect that has been taken advantage of for the purpose of increasing the workers’ productivity in the industries. There are numerous efforts spent in line with this idea in order to make use of the attractive colors, proportionate to the extant environments, environment lighting systems and the type of the job.

The following table explains the quality of the colors’ effects on our perceptions of the environment (table3).

Table 3: the effect of the colors on our perceptions, source: (8)

The color effect on the objects’ size	The green and blue objects look bigger than the yellow and red ones
The color effect in the objects distances	Green and blue surfaces look farther, yellow and red surfaces look closer
The color effect on the objects flexibility	The colors with short wavelength (purple, blue, green) give us an even image of the objects. The colors with long wavelength (yellow, red) cause feelings of softness and flexibility
The color effect on the objects temperature	Red and yellow are among the warm colors, green and blue are among the cold colors
The color effect on the objects hardness	Red, white are among the hard colors, blue, green and black are among the soft colors
The color effect on the objects’ weights	The objects with light colors look lighter

The effect of colors in the human beings:

The color is a strong factor which can be stimulating or tranquilizing, cause a feeling of coldness or warmness and make a person irritated or joyful. The colors favored by the individuals can reveal numerous secrets about them. Experiencing the color energies emitted by different colors can explicitly exert a visual-sensational effect on us. Colors can revolutionarily change our periphery and they can increase our creativities, By the help of the colors, an individual can bring about the conditions for elevating his or her self-awareness and be changed to a lively and active human being (figure 6).

Figure (6): the color effect on the human environments, source: (7)



The physical impact of the colorful glass on the space:

The colorful glasses used in the sash windows cause the officious insects to be repelled and stay away from the interiors of the house through generating colorful lights and this can be considered as one of the most important characteristics defined for such sash windows (9).

Also, the colorful glass per se can act as decorative and ornamental curtains for the interior spaces with the difference that it is not perceived as being added and appended (figure 7).

Figure 7: sash window, source: Isfahan cultural heritage



The effect of the colors used in Tabataba'ees' House sash window on the individuals has been illustrated in table 4.

Table 4: the effect of the colors in Tabataba'ees' House Sash window, source: Surtiji, with the author's emphasis

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The spiritual effects of the colorful glasses in the space:

In our traditional art and architecture, the principle of spatial unity (the principle of deducing unity out of plurality) is the most fundamental principle considered by many of the researchers. The principle is reminding of metaphysical and philosophical aspects of architecture which is manifested within the space (11).

When the sun light is radiated to the sash window it is transformed into various colors and it renders the space colorful this is while the light is transmitted only from one source but it is manifested with various forms and colors and the principle of the unity within plurality and the plurality while being uniform is

flowing in such an idea. This very issue causes the human being to be granted with safety and imagination and then he can be overflowing with the philosophical and theosophical thoughts. The carvings on the sash windows were completely explained at this point, but there are also a myriad of such traits seem to be left untold that is because such an element and its components are so much interlaced that in combination with the general and detailed spatial characteristics of the house they can serve plenty of roles. In fact, sash window is a miraculous festival of the nature, technology, math, art and theosophy; on the one hand, the wood and glass and paper and gypsum and the colorful chromes and also the techniques such as Girih tiles and arabesque traceries and wooden artworks and matrices, lattice works and carpentry and, on the other hand, theosophical and philosophical thoughts have been working together to be presenting such a beautiful festival to the human beings and that be the human being who is floating in his peak of the presence in the society and daily life to find himself a solitude lifer who hunts the musk deer from the Khotan deserts.

Supplying light:

Supplying the light is one of the most important functions of the windows since no lightless space for the human living can be deemed as appropriate and endurable. The amount of the light required for every space depends on various factors such as function, situation, depth and elevation of the space. In the past the windows' light absorbing surface sizes used to be selected based on the aforementioned factors and they were chosen in a way that sufficient light could be provided to be passed through to the maximum extent possible (12) (figure 8).

Light is the source of the entire universe livelihood. When it hits the surfaces of the objects it gives them form and shape and with accumulating shade behind the objects it gives them depth. The beauty that pats the eyes should be thankful to the light and luminosity, otherwise, in the darkness beauty has no meaning.

Figure (8): Tabataba'ees' House sash window, source: Isfahan cultural heritage office



Light is an active factor in introducing the space. Also the light is capable of giving the space a visual expansion. It is the primary condition for visual perceptions. In the absolute darkness we cannot see the space nor the forms or the shapes. But, the light is not the only physical necessity; rather it is more of a psychological value which makes it one of the most important factors of life in every respect. The way the objects are manifested in contrast with the light makes them more highlighted or less highlighted.

Apart from the role the light plays in illuminating the buildings' interior sections it is also important regarding the architectural decorations and ornamentations and due to the fact that the ornamentation and decoration have been, and are, a manifestation of the luminosity and happiness in the entire eras of the Iranian architecture, the Iranian artist makes use of elements in his ornamentation and decoration which can practically best implement his thoughts of lighting and illumination; among such ornamentations is the use of ornamented vaulting which is applied to absorb and disperse the light in precise and narrow degrees and quality in controlling the light. The use of colors in the building is particularly effective on the building illumination and it is through the balance and the coordination of the colors that we can figure out the role and the standpoint of the colors in the illumination and the glassiness. Also, the use of the windows with colorful glass will be of a great help to the actualization of such an objective by the architect (13).

Color psychology:

The quality of dealing with the lighting system implementation in the interior building spaces exerts a considerable psychological effect on the individuals' eyesight and looks within a built environment. It is clearly obvious that the sufficient and appropriate light has no other effect than strengthening one's

spirit and the otherwise can also be held true. Maybe you have had experiences of how the insufficient lighting has adversely and unpleasantly influenced your feelings when making use of a space. For instance, the rooms facing the sun tend to take in greater light and provide the residents with pleasant, warm and happy spaces which cause them to feel agreeable. This is while the rooms which are exposed to direct sun light tend to have tiring, dull and cold spaces and cause the residents to feel depression and nostalgia. On sunny days during which the sunlight creates black and white visual effects the individuals turn out to be more active and energetic. Conversely, on misty and cloudy days when there is no black and white effect present the space looks stagnant, dull and boring. The differences between the two days can be found out in the quality of light (14) (figure 9).

Figure (9): Sash window, source: Isfahan cultural heritage office



Sash window as the skylight:

Such windows cause the sunlight to be passed through in sufficient amount into the room space, not so much intensified and not so much less intensified. As we know, all of us are born of light. The sunlight gives life to our planet and the vigor of the light beauty is so important in our lives that we metaphorically make use of expressions related to the light in our daily life without thinking about them. Light conceptually conveys the meaning of happiness or easy-goingness, agility or lightness and it has never meant to be semantically taken as darkness, depression, unpleasantness and sedentariness and it can be said to be inhibiting all such negative characteristics. The light is the difference between the life and death. The light changes our world and it has exposed our lives to revolution and change. Light has changed greatly our universal perspective, our good and bad beliefs and also our religions and finally it can be said that light is the basis and foundation of our perspectives spirits and it is the missing part of our everyday life. The shining sunlight is the source of our lives and it causes the human beings to stay healthy. The lack of the sun light exposure (deficiency in vitamin D) causes softness of the bones (Osteomalacia) in children. Also, it is noteworthy that according to the medical experiences the light can bring about the grounding for the treatment of depression (light therapy) in some patients. The presence of the light and the lack of it influences every minute of our lives. The way we grow and mature, our health, sleeping, eating, our relations and even our habits and propensities and finally our life length are subject to the amount of the light we receive. Of course, it has to be mentioned that the excessive light also can be a cause of disadvantages such as skin cancer and the shortage in our bodies' water reservoir and so forth; in the Iranian traditional architecture all these advantages and disadvantages have been taken into consideration and we can control the amount of the light entering an interior section of the building through building and taking advantage of such windows. The sunlight is comprised of a rainbow of colors and also the sash windows transform the single-color sunlight to various colors inside the interior parts of the rooms through the use of colorful glasses more like an earthly rainbow and they generate a beautiful and enchanting vista (figure 10).

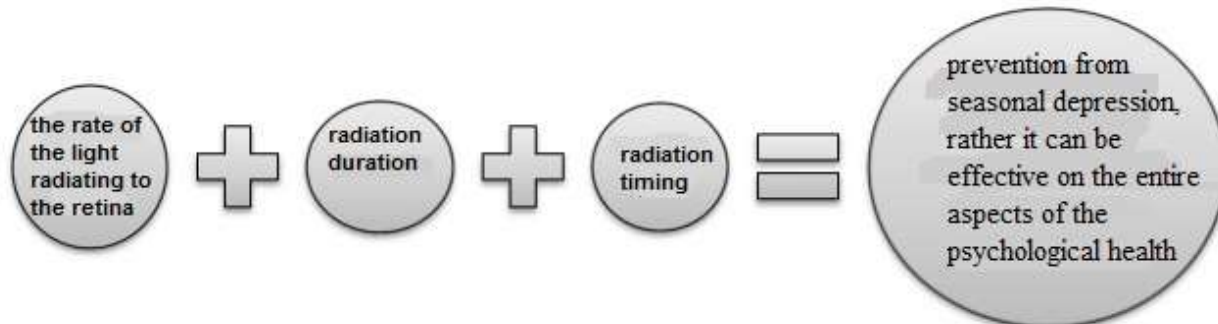
Figure (10): Sash window, source: the author



The therapeutical effects of the daylight:

The studies indicate that the daylight radiations can have positive therapeutical effects on the patients who are recognized to be suffering from the seasonal affective disorder. Such patients feel depressed during winter, find themselves diminished of their energy and physical potential (15). From another perspective, whenever making use of the light is performed according to the considerations regarding the diagram (1), then

Diagram (1): daylight considerations, source: LRC, 1996



In the studies performed regarding the light biology, the daylight luminosity is one of the most important environmental elements on the human body and the human being today through taking advantage of the results obtained in the plethora of the studies carried out in this regard can take into consideration the light-therapy as the best option in curing many of the psychological disorders (Poordeihimi) (figure 11).

Figure (11): Tabataba'ees' House, source: the author



Light and depression treatment:

The clinical research indicates the similar effect of the light and the antidepressant drugs on the treatment of the depression special seasonal affective disorder. Therefore, the patients choose light therapy as the first choice of interest in treating depression (16). Nowadays, the positive effect of the appropriate light on the human psychology, behavior and propensities, invigorating and generating positive energy cannot be denied, since it has been found that the light directly influences the intra-brain sections and the desire and interest in the luminosity and fear of the dark are not baseless psychological or social invalid presumptions. Rather, the optimized light effectiveness on the human psychological health and the effect it has on the change in the human temperament and behavior and finally the human beings' qualitative behavioral enhancement have all been approved in various research projects (17).

Guiding appropriate light to the interiors and reducing the sun radiant energy flux intensity:

In hot and dry climates, the sun radiation angle is too much and the number of the sunny days is too many, to prevent from the too much sun to enter and cause too much heat the opening sections aspects should be made as small as possible and the elevations from the ground level should be heightened. But such a solution does not seem to provide sufficient light for carrying out the routine activities. The Iranian architect transfers a sufficient amount of light to the interior of the building through the use of sash window and by taking advantage of beautiful Girih tiles and by making use of the sun light fractionation and also by taking advantage of the wood which possesses a low heat transfer coefficient the amount and the intensity of the heat transfer is reduced (18) (figure 12).

Figure (12): sash window, source: the author



Spatial diversification (from psychological aspects):

There are commonly used four colorful glasses in the frameworks of the sash windows. Such colorful glasses influence the human beings differently and it is in a manner that each color in juxtaposition with another color neutralizes the intensity of the other colors and therefore an appropriate amount of each color is regulated and adjusted (9). These four colors are yellow, blue, green and red. Azure blue induces the person with tranquility, safety and satisfaction of the current situation. In the contrary, the red corroborates the senses of volition, victory, intensive activity, desire for progress and excitement. Green

induces the individual with feelings of endurance, growth and pride and finally yellow has been found to be connected to such feelings as tranquility and easy-goingness. During various hours of a day, with the change in the color spectra various psychological spaces are created which exert considerable effects on the individuals (figure 13).

Figure (13): Tabataba'ees' House sash window, source: the author



This multifunctional window serves as a light reflector which radiates the colors on various surfaces and also causes the users' spirit to enhance under various circumstances besides softening of the colors and getting them entered to the interior spaces of the building. The sash windows surface was used to be ornamented and decorated with the use of different and variegated carvings of Girih tiles and with colorful and simply plain glasses and by doing so innovative combinations are resulted and this way the disharmony between the geometrical lattice-like structures and the colorful lights generate a sort of agreeable beauty. Proportionate workings between the sash window (light geometrical order) and the color, as proposed by Ibn Heytham, are the two of the three superior elements which seem to be possessing the greatest capability in creating visual aesthetic effects and they are intensively dependent on the third element which is the light and the light is the ultimate source of the visual beauty which is the prerequisite for the individual to be able to see and also it has been expressed by him that the color per se can add another beauty to the light beauty and prettiness.

Because the radiating colors are pleasant and pat the spectators' eyes, when the colorful designs and the colorful glasses are organized proportionately and symmetrically their value of beauty increases considerably. That is because when the shining and lean designs and colors enjoy a normative and even order are perceived better rather than being disordered and such a beauty and order ripens with the very geometrical Girih tiles.

The effect of the light on the Islamic architecture is undeniable and it is of a considerable importance and expanded semantics. The role of the light in the Islamic architecture puts a very high stress on the manifestation principle. The role of the light is to clarify the matter and it has also been considered as reducing the buildings' coldness and harshness. The light is diffused into the interior spaces of a mosque as a manifestation of existence to be considered as one of the constituent elements of the perceived space. In fact, the light grants the Islamic decorations with agility and vitality and it guides the human beings to an imaginative world instead of distracting the mind to wander around in search of it. If we believe that Iranian architecture is a truth-seeking architecture, so the truth that should be sought for by the architecture is in perfection and the perfection should only be looked for before the one God almighty and the more it is present in such an architecture the more it is perceived as a part integrated to it and it is, as well, moving in the direction to search for and reach such a perfection. Light is a sign of movement towards the truth and it is devoid of any physical or material state and such a fact is discussed along with the other factors including climate and the building's placement locality and the way the light is applied. In the architecture of the contemporary buildings the light is entered directly to the buildings' interior spaces; this is in conflict with the spiritual purity. With such an attitude and mindset, the light is directly present in the architecture, this is while in the Iranian architecture the light has always been adjusted and this is insured through the architectural constituent elements such as orifices, skylights, Goljams and the colorful glasses and sash windows. The natural light has always been an orientation determination factor in the traditional architecture and it has been allowed to enter the buildings from certain given directions, whereas with the tangible changes that have occurred in the human attitude their look at the skies as a supernatural space has been transformed to a physical and material principle and the light has been taken advantage of as a practically applied element. Therefore, the use of the light in the modern space has become devoid of its secretive semantics. In other words,

“the light brings about convergence in the traditional architecture and it causes divergence in the modern architecture.”

Conclusion:

The knowledge of the environmental psychology is the common area of interest between the behavioral sciences and the architecture which has emerged through the coalition of the two above fields of study subsequent to the world war and after dissatisfactions aroused in the people of the modern architecture spaces in which the human beings immaterial motivations and the needs were disrespected and the main objective pursued by such a field of study was the in situ study of the human beings.

In the present era, the color has been studied in various sciences and from different perspectives. Aspects such as light and color physics, colors chemical structures, color sociology, color study of symbols, color in visual arts, the semiotics concepts and approaches, mythology and the colors spirituality, treatment and curing of the patients by means of the colors or natural resources, chromatology and finally the psychological and personality aspects on the human beings. In modern psychology, the color and colors are one of the scales of the personality assessment, because each color exerts certain effect in the human beings both physically and psychologically and the colors are suggestive of a psychological and physical state. This knowledge has been justified according to the progresses made in both of the physiology and psychology fields.

In different architectural eras with their own unique architectural styles, the light was utilized aiming at a specific and defined objective. The trend which is currently pursued by the contemporary architecture is gradually moving towards a direction in which the light loses its spiritual and sensational stance. This is the architect's duty to make use of the light and shade, illumination and darkness, the orifices in the buildings' walls and so many other elements in such a manner that they are not hindering the daily activities. Furthermore, they should be providing the users of the buildings with a pleasant feeling. The light is the most transparent, softest, the easiest and the cheapest extant structural material in producing the qualities and the objects required by the human being and it is a thing that provides the grounding for the personality development and vitalizing the daily activities and representing the life in the various imaginations and moods. The light not only plays a significant role in valuation of the architectural elements it is also one of the important factors determining and delineating the space. The light has many effects on variegating the spatial and textural nature of the things.

What is indicated by the historical studies is that the human beings have always been subject to the color effects during their lives and these effects have been intensified with the progresses made possible in the color industry during the recent century. According to the characteristics and attributes mentioned regarding the colors one can get to know the effects of the colors on the individuals' behavior and also spirits. The reason behind taking advantage of the colorful glasses in the past has been for the sole reason of the effects the colors have on the human beings psychologically and the old architecture had been well aware of the idea. They used yellow, blue, red and green in the sash windows. Because yellow is a happy color which enhances the feeling of healthiness and increases the human efficiency, blue is a tranquilizing color which has pacifying effects and it can induce sleep. Red is a stimulating and dynamic color and wherever it is used it corroborates the activity vigor, green is a harmonic color and it reminds us of the nature and all in all it is a warm and delighting color. According to such studies, the use of the colorful lights and/or colorful glasses which enter the colorful lights into the buildings has numerous positive effects on the human personality and behavior and spirits. By taking advantage of the appropriate colors we can handle the treatment of the diseases including stress and anxiety resulting from the modern life, treating the seasonal affective disorder and psychological diseases.

CONFLICT OF INTEREST

There is no conflict of interest

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FINANCIAL DISCLOSURE

None

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