

A Comparative Study of the Effects of Light on the Sense of Place in Traditional and Contemporary Houses*

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ABSTRACT

A sense of place is a mixture of conscious and unconscious emotions and refers to how people receive, experience, and express a place. It makes a place meaningful. House, as a platform for human life, is related and interacts with other aspects of his life. Light is a symbol of life and also seems to be a medium for seeing, understanding, and knowing. In this regard, the following question arises: What is the relationship between the characteristics of daylight and the sense of place in the house according to the comparison between traditional and contemporary houses? The present study aims to investigate daylight and its effect on the house environment with an emphasis on its effect on the sense of place in houses. This study is descriptive research carried out using a qualitative-quantitative approach and a causal-comparative method through correlation tests. Data are collected using library study and field study. Moreover, the data collection tools include indexing, observation, interview, and questionnaire that are used in different parts of the research. The final output of the research is a model for comparing traditional and contemporary houses in terms of the characteristics of daylight and the sense of place. The results show that there is a significant relationship between daylight and the sense of place in traditional houses, which is greatly faded in contemporary houses.

Keywords: Sense of Place, Traditional House, Contemporary House, Daylight.

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1. INTRODUCTION

In various dictionaries, light means brightness, illumination, luminosity and sunlight, its antonym is darkness and it can be a countable or uncountable noun, so its plural form can be light or lights. In most cultures, light is a symbol of excellence, culmination, perfection, growth, self-confidence, and many other excellent qualities. Light is a phenomenon that its nature has not yet been recognized by human beings despite the progress of sciences and technologies (Nayebi, Kateb, Mazaheri, & Birashk, 2007).

A sense of place is a dynamic linkage an individual develops as a result of attachment to place, belonging to a place, awareness of place, satisfaction with a place, and commitment to place. A sense of place is an abstract distance between self and place that makes a place perceivable (Kashi & Bonyadi, 2013, p. 45).

The house is the most complex building in the area of design, the design of this use is beyond the response to the program because it must display public figures in the private lives of its residents. With the development of human societies and the change in the lifestyle and settlement of people, architects, designers, and planners have paid more attention to the quality of built spaces and environments. Due to the increasing demand for housing in Iran, many efforts have been made to provide housing but the qualitative aspects

of the building have been ignored as the number of buildings has increased (Asefi & Imani, 2014, p. 64).

In this regard, the following question arises: What is the relationship between the characteristics of daylight and the sense of place in the house according to the comparison between traditional and contemporary houses? It seems that the sense of place in traditional and contemporary houses varies under the influence of light. The present study aims to investigate daylight and its effect on the house environment with an emphasis on its effect on the sense of place in the house. Recognizing the characteristics of natural light and paying attention to the sense of place created by it, especially in the house, is a new and worthy subject. Therefore, it seems necessary to reduce the adverse effects of the inappropriate presence of light in the human environment as much as possible and instead, use "light" to create peace in life and strengthen emotions and the presence of meaning in space.

2. THEORETICAL BACKGROUND

In recent years, due to the progress of scientific knowledge in Iran and the interest of some students to conduct research projects, many studies have been carried out on natural light and its effects on humans, and many articles and books have also been written, as briefly described in Table 1.

Table 1. Theoretical Background

Author	Year	Title	Results
Mohamed Boubekri	2008	Daylighting, Architecture and Health. Building Design Strategies	<ul style="list-style-type: none"> - The presence or absence of daylight affects residents' mental and physiological health. - In addition to their traditional role as shelters, buildings should also act as a healing place. - It is necessary to use daylight as a solution for lighting buildings. - Daylight is one of the most effective, available antidepressants.
Poormohamad et al.	2014	Natural light, Architectural Space, Sensory Perception and Residential Space (Case study of Asian House)	<ul style="list-style-type: none"> - Light, as the most non-material, tangible natural element, is always present in Iranian architecture. - In traditional architecture, light and color refraction caused by it caused made outstanding spaces, gave special meanings to them and make them efficient. - Light, with its different qualities, influences the psychological and social atmosphere an individual lives in. - Conscious use of natural elements, especially light and color in architecture, enhances the quality of living spaces and the presence of meaning in space.
Zargardaghigh	2015	The Quality of Natural Light on the Sensory Perception of the Interior Spaces of the Residential Environment.	<ul style="list-style-type: none"> - Light is the clearest, softest, easiest and cheapest structural materials available for the production of qualities and objects required by the human environment. - Light makes it possible to characterize and vitalize daily activities and represent life in variable imaginations and mental states. - Light plays a key role in valuing architectural elements. - Light is one of the important determinants of space.

Author	Year	Title	Results
Abotaleb et al.	2015	The place of light in the design of Iranian traditional and contemporary houses in Iran	<ul style="list-style-type: none"> - Whether functionally, physically or spiritually, light has been consciously used in traditional Iranian architecture. - In contemporary Iranian architecture, the appearance of traditional architecture is blindly imitated mostly based on the architect's personal taste.
Asefi & Imani	2014	Redefining Design Patterns of Islamic Desirable Contemporary Housing through Qualitative Evaluation of Traditional Homes	<ul style="list-style-type: none"> - Improving the qualitative properties of housing is the same as improving the spirit in its body. - Contemporary house should be able to provide real peace for contemporary man. - The simultaneous alignment between the indicators (physical-spatial, structural, functional, and environmental) and human needs is proportional to the time and their vertical interrelationship in a way that guarantees unity. - The house architecture should approach nature and meet the needs of human beings, as God's representative and expression.

3. METHODS

This study is descriptive research in which the relationships between various independent and dependent indicators, in two homogeneous groups, were investigated using a qualitative-quantitative approach and a causal-comparative method. Since the manipulation of the conditions is out of the author's control and the research aims to find out the properties of the independent variable considering the variations of the dependent variable (sense of place), it was decided to apply a causal-comparative method to explain the relationships between dependent and independent variables through correlation tests and compare contemporary and traditional houses in terms of them. It should be noted that these two groups were studied in terms of general conditions and characteristics such as dimensions, socio-cultural conditions of residents, etc. and were almost homogeneous. Data were collected using library study and field study. Moreover, the data collection tools included indexing, observation, interview, and questionnaire. A total of 10 traditional houses and 10 contemporary houses were studied and the questionnaires were distributed among all the residents (total N=80, nearly 40 persons in each house type, i.e. traditional and contemporary) of the houses. In this study, 40 (50%) of residents were male and 40 (50%) were female. The data obtained from the questionnaires were statistically analyzed. The

Cronbach alpha was applied to verify the reliability of this number of samples. The data obtained from the questionnaires were collected, encoded, and entered into a computer and then, analyzed using SPSS software and Smartpls. The field samples were selected using a purposive sampling method. In order to select the samples, the houses constructed in the period from the Qajar era to the present, for which there were study documents and the possibility of field studies, were examined. Finally, the Shirzadiha House (constructed in the Qajar period), the Ashouri House (constructed in the Pahlavi period), and the Bahrami House (constructed in the present era) were selected.

4. FACTORS RELATED TO THE SENSE OF PLACE

A sense of place is a mixture of conscious and unconscious emotions and perceptions. It is a rich concept referring to refers to how people receive, experience, and express a place and gives meaning to a place. A person's sense of place influences his attitudes towards that place and his behavior in it (Kashi & Bonyadi, 2013, p. 45). According to the concept of sense of place in different perspectives and different levels of sense of place, the factors affecting the sense of place can be categorized in two groups of cognitive and physical factors, as listed in Table 2 (Falahat, 2006, p. 62).

Table 2. Factors Affecting the Sense of Place

Cognitive-Perceptual Factors				
The sense of place is a cognitive system and structure with which an individual feels a sense of belonging to the subjects, persons, objects and concepts of a place.				
Physical Factors				
Human scale	Proportion	Opposition	Degree of enclosure	Place size
Voice	Odor	Color	Texture	Distance
Pleasure	Secret and mystery	Fantasy	Historical identity	Visual Variety
Livability	Memory	Vitality	Security	Surprise

5. HOUSE

The word "house", that is idiomatic today, has referred to "room" in the past. The private room was called Vostakh or Gostakh or Vosagh. The word "sara" (in Persian) has been used instead of the word "house" with its today's meaning (Pimia, 2007, p. 153). The house must be such that the world accommodates man. The house, as the most important living space, must be such that a person can see his own domain and territory, independence, and ownership in it. Therefore, the house, like a man, must have a gradational state and respond to the delicacies of its owner. (Ramyar, 2011, p. 34). There are several definitions of a healthy house. The WHO defines a healthy house as follows: "To live in an adequate shelter means more than a roof over one's head: It means to have a home, a place which protects privacy, contributes to physical and psychological well-being, and supports the development and social integration of its inhabitants—a central place for human life." (WHO, 1998).

6. LIGHT

Light is the first prerequisite for any visual perception.

In absolute darkness, we can see neither space nor form nor color. However, light is not just a physical necessity and its psychological value is one of the most important factors in all aspects of human life. In addition to practical use, light has always had a symbolic value. Light symbolizes life and in many cultures, light, or the sun as a source of light, has been considered a divine element and valued (Zargardagh, 2015). Daylight refers to the light emitted from the sun and reaching the earth, whether directly or indirectly, as well as light reflected from other surfaces (Ziaeaoun, 2012).

6.1. Daylight in Traditional Iranian Architecture

In traditional Iranian architecture, light (especially daylight) has been used as an applied element in all periods. In general, light-related elements in traditional Iranian architecture are categorized into two groups: 1. Light controllers; and 2. Light-catching elements. These elements regulate the amount of light entering the building. In fact, these elements help buildings to always receive modified light (Asadpourtabrizinezhad, 2014).

Table 3. Light Controllers

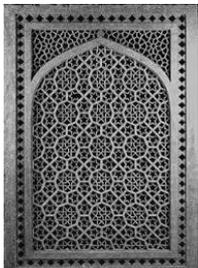
Lighting Controller		
Awning	Tabeshband (Sunbreaker)	Portico
		
Curtain	Saabat	Saradagh
		

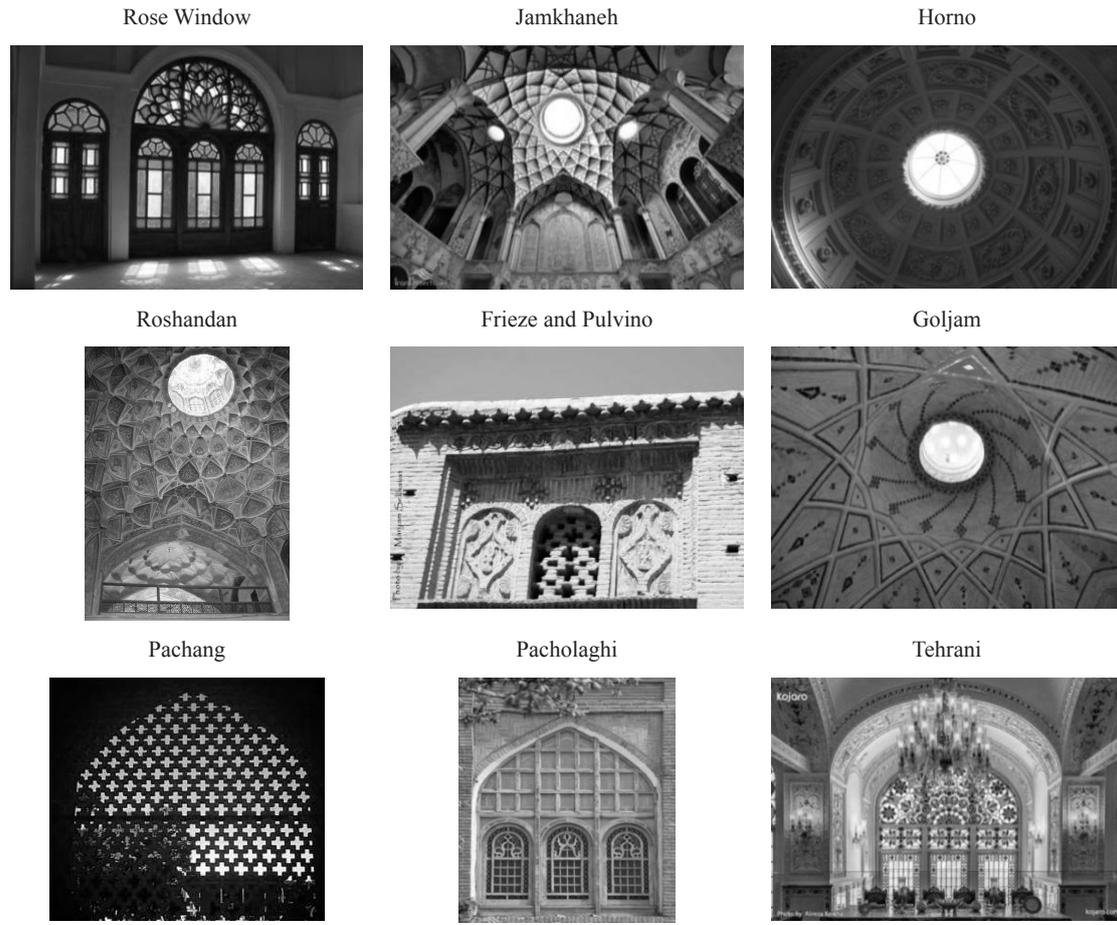
(Poormohamad, Dolah, & Farbod, 2014)

The most important and main function of skylights is to direct natural light into the building. In general, the climatic conditions of the place where the building

is and the building use play an important role in the design of the components of light-catching elements and light controllers (Asadpourtabrizinezhad, 2014).

Table 4. Light-Catching Elements

Light-Catching Elements		
Grille	Lattice Doors and Windows	Roazan
		



(Poormohamad, Dolah, & Farbod, 2014)

6.2. Daylight in Contemporary Architecture

Nowadays, technical and technological advances have made architectural lighting easy and without any difficulty and, of course, empty of any feeling. In addition, using artificial lighting takes man away from nature and he loses his connection with it. That is why it is necessary to pay very deep attention to the role of natural light. By directing natural light to the interior, very beautiful and attractive spaces can be created. In addition to light, there must be darkness because, with the presence of it, light can show its existence. Darkness, which increases the brilliance of light and reveals the power of light, is inherently part of the light. In contemporary Iranian architecture, the greatness and depth of darkness are ignored while it has been used as meaningful darkness in traditional architecture and has played a role alongside light (Banihashem & Latifi, 2015).

6.3. Daylight, Architecture, and Health

Various studies have shown the strong effects of daylight on the human body. It influences the performance of people and their visual function. Daylight affects individuals' performance and activity by influencing their emotions, motivation, and experiences as well as the internal body system. However, the visual function of individuals is affected by eye strain, how

visual messages are received, and cognitive functions and activities (Boyce, Hunter, & Howlett, 2003). One of the attributes of natural light is its sequence and transformation during the day, which plays a role in creating vitality through movement and change in mode during the day and at different hours of the day. This sequence leads to the secretion of the melatonin in the brain, which is one of the most important hormones in the body. Sunlight is an important source of vitamin D, as one of the essential vitamins required by the body (Huang, Hocheng, Chou, & Yang, 2013).

7. THEORETICAL FRAMEWORK

Based on the above, studying the issue of health in the living space, as the source and destination of everyday life, is so necessary because inadequate environmental health in housing causes many physical and mental problems and diseases. Among the various housing features that can be promoted and revised, daylight, as the most main component related to public and social health, can play a key role in enhancing public health and reducing depression through optimal and favorable design. In biology studies of daylight, daylight has been recognized as one of the most important elements of the environment affecting the human body. Table 5 shows the strong relationship between daylight and human physiology.

Table 5. Physiological Consequences of Light

Physiological Consequences of Light	
Presence of adequate daylight	Lack of adequate daylight
Physiological regulation	disruption of the circadian rhythm
Regulation of the sleep/wake cycle	disruption of the sleep/wake cycle
Hormone regulation and production of vitamin D	Disruption of hormone secretion (melatonin and serotonin)
Maintenance and increase of health and comfort	Depression and seasonal affective disorder
Increase of efficiency	Reduction of efficiency
Reduction of anxiety	Increase of anxiety
Vitality	Reduced energy and fatigue
Positive effect on the human psyche	Negative effect on the human psyche

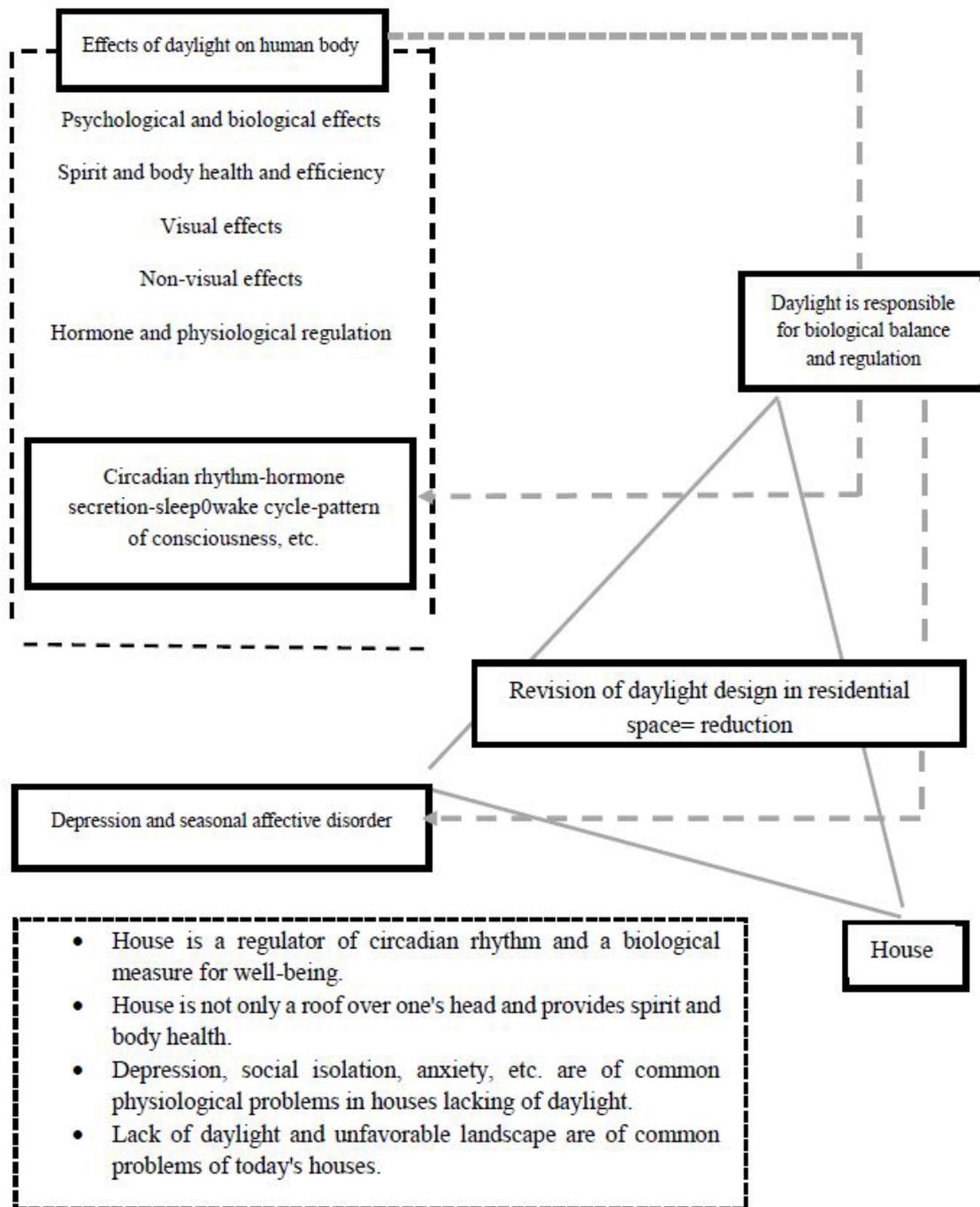


Fig. 1. Theoretical Framework

8. INVESTIGATION OF CASE STUDIES

This section aims to discover and understand the message of the architect, to decode the meanings latent in the buildings constructed in different periods, and to know how lighting of them is. Therefore, according to the principles of using daylight in Iranian architecture, the selected buildings were investigated to know how light was used in different spaces using a casual-comparative method. The field samples were selected using a purposive sampling method. In order to select the samples, the houses constructed in the period from the Qajar era to the present, for which there were study documents and the possibility of field studies, were examined. They were located in Malayer City.

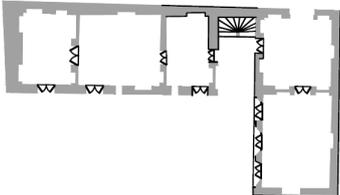
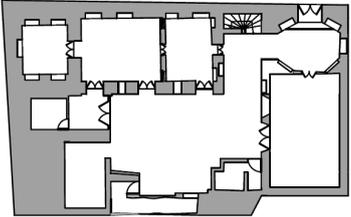
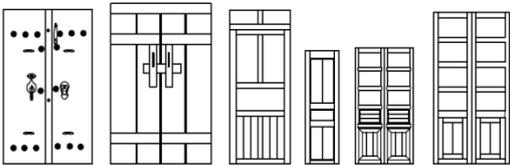
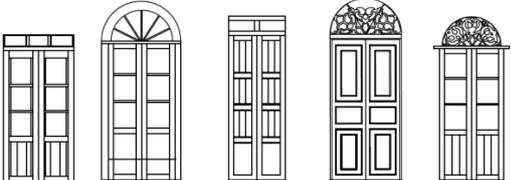
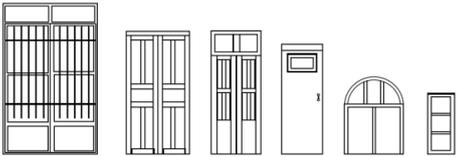
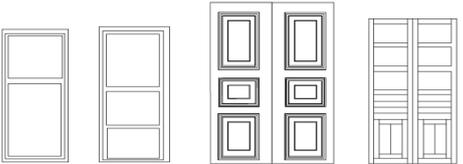
The Shirzadiha House was built in 1813 by Hassan Khan Shamloo and is now owned by Mr. Shirzadi. The current building includes the interior and exterior, which is now separated. The main entrance is in the north. In Shirzadiha House, the rooms have double doors with carved geometric motifs. Decorations used in rooms are colored glaze, sash, and beautiful gerehchini composed of crescents in which seven-color glazes (in rainbow colors) are used. In the rooms, there is a beautiful manifestation of colored lights, which leads to movement and change in mode at different

hours.

Ashouri House was built in 1944 by Mirza Hassan Ashouri and is now owned by Mohammad Ashouri. The building is a one-storey house with two entrances: its main entrance is in the east, and the other entrance is in the south. In Ashouri house, the rooms have double doors and the windows have large dimensions, from the ceiling to the floor. These large windows are divided into three or four parts with different frames. In each part, using small glasses, beautiful exterior, and interior are provided for the room. The casements rotate around the hinge shaft. These windows, first, provide light for the interior, and then, the people within the room can see the outside.

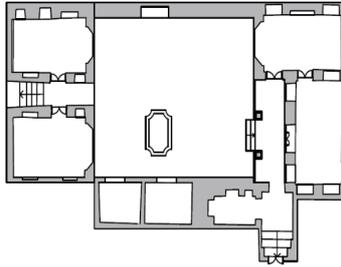
Bahrami House was built in 1996. The building includes exterior and interior space, each of which has its own separate entrance. The entrance is on the west side of the building. Bahrami House benefits from daylight from three directions, making all spaces including the entrance, living room, drawing room, kitchen, bedrooms, and dining room have direct access to sunlight. The rooms have wooden single doors with a simple design. As indicated, the windows have a fixed part and a movable part with plain glass. In Table 6, traditional and contemporary houses are comparatively studied in terms of the effects of light.

Table 6. A Comparative Study of the Effects of Light in Traditional and Contemporary Houses

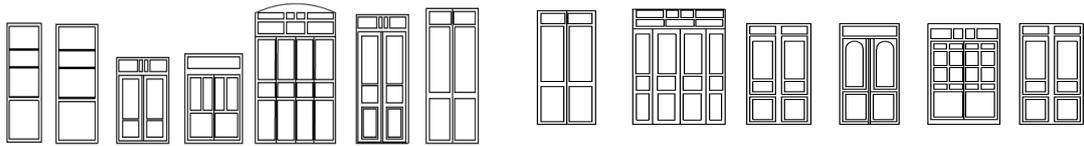
House	Shirzadiha House
Construction Date	1813 (Qajar Period)
Floor Plan	
	
The Details of Doors and Windows	
	
	
Photos	
	

House	Ashouri House
Construction Date	1944 (Pahlavi Period)

Plan



The Details of Doors and Windows

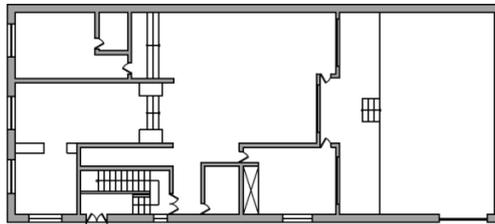


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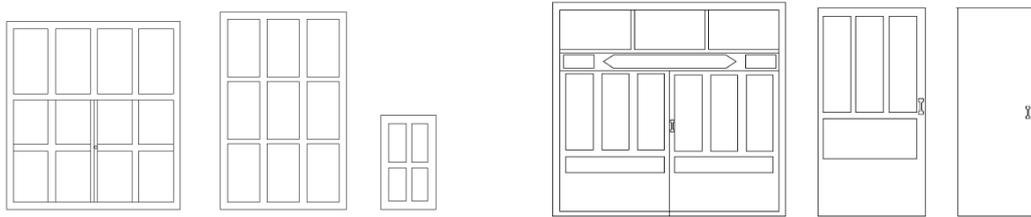


House	Bahrami House
Construction Date	1996 (Contemporary Period)

Plan



The Details of Doors and Windows



Photos



8.1. The Relationship between Light in Different Places of Contemporary and Traditional Houses and the Studied Indicators

After investigating the case studies and distributing the questionnaires, the data obtained from the questionnaires were statistically analyzed. Each

indicator was assessed from the point of view of residents using factor analysis. The residents were surveyed through a questionnaire including questions on six indicators related to the sense of place. In this section, using Pearson's correlation test, the relationships between the studied variables are investigated and the results are listed in Table 7.

Table 7. Pearson Correlation Coefficients Estimated to Investigate the Relationship between Light in Different Places of the House and Indicators

Light in Places	Vitality		Sense of Security and Peace		Efficiency		Anxiety and Confusion		Sense of Satisfaction	
	Contemporary	Traditional	Contemporary	Traditional	Contemporary	Traditional	Contemporary	Traditional	Contemporary	Traditional
Bedroom	0.688*	0.512*	0.502*	0.507*	0.171	0.093*	0.171	0.093*	0.494*	0.363*
Entrance	0.307	0.482	0.341	0.779*	0.229	0.057	0.229	0.057	0.170	0.468*
Hallway	0.259	0.054	0.618*	0.539*	0.097	0.287*	0.097	0.287*	0.061	0.171
Drawing Room	0.189	0.267*	0.172	0.814*	0.136	0.108	0.136	0.108	0.099	0.483*
Kitchen	0.583*	0.262*	0.502*	0.507*	0.146	0.371*	0.146	0.371*	0.657*	0.383*

* (p<0.05): Significant Correlation

Coefficients between the presence of light and the sense of security according to the residents of traditional houses, there has been a significant positive relationship between the sense of security and the presence of light in different places of these houses including bedroom, entrance, hallway, drawing room, and kitchen.

The relationship between light and the increase of efficiency in traditional and contemporary houses; Since there is no significant correlation between light in the spaces of contemporary houses and the increase of efficiency at 95% confidence level, it can be stated that in contemporary houses, there is no significant relationship between the presence of light in any of the spaces and the increase of efficiency. However, in traditional houses, there has been a significant positive relationship between the presence of light in the bedroom, hallway, and kitchen and the increase of efficiency in them.

The relationship between light and anxiety and confusion in traditional and contemporary houses; Considering Pearson's correlation coefficients, there is no significant relationship between the presence

of light and the indicator of anxiety and confusion in any of the spaces of contemporary houses while considering the same coefficients between the presence of light and anxiety and confusion from the point of view of the residents of traditional houses, there has been a significant positive relationship between anxiety and confusion and the presence of light in different places of traditional houses such as bedroom, hallway, and kitchen.

The relationship between light and a sense of satisfaction in traditional and contemporary houses; Considering the significant correlation between the presence of light in the bedroom and kitchen in contemporary houses and the sense of satisfaction at 95% confidence level, it can be stated that in contemporary houses, there is a significant positive relationship between the presence of light in the bedroom and kitchen and creating the sense of satisfaction. Also, in traditional houses, there has been a significant positive relationship between the presence of light in the bedroom, entrance, drawing room, and kitchen and creating a sense of satisfaction in them.

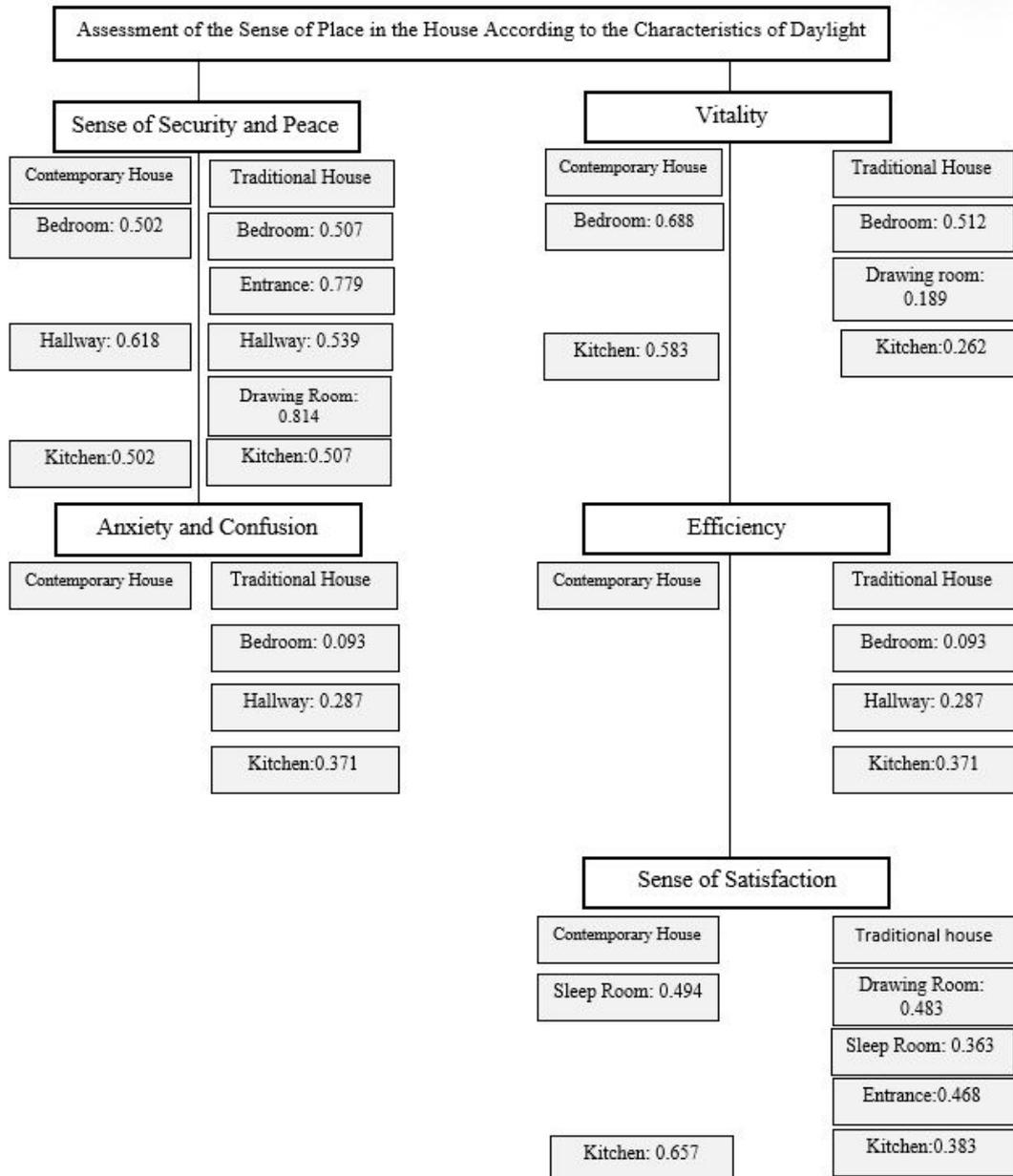


Fig. 2. Assessment of the Sense of Place in the House According to the Characteristics of Daylight

9. DISCUSSION AND CONCLUSION

The results of the present study indicate that the place of light in Iranian architecture originates from the combination of Iranian culture, religion, and art that has changed over time. Unidimensional and quantitative attitude towards residential environments, as a thought arising from the contemporary socio-economic context in Iran, has led to inadequate attention to the fundamental issue of the quality of the residential environments in the culture of contemporary architecture. Considering the impact of the quality of residential environments on residents' quality of life and health, this makes it necessary to present a systematic and comprehensive definition of quality of residential environments. Among the various housing

features that can be promoted and revised, daylight, as the most main component related to public and social health, can play a key role in enhancing public health and reducing depression through optimal and favorable design.

Improving the quality of housing is the same improvement of the soul in the body. According to the results obtained from the analysis of the questionnaires, it is found that in traditional and contemporary houses, subspaces, that are directly related to daylight, can provide a sense of vitality, a sense of security, a sense of satisfaction, increased efficiency and reduced anxiety and confusion for residents, all of which emphasize a sense of place. Therefore, according to the traditional architecture, in which there were certain criteria for designing houses, it can be said that in traditional

houses, there was a significant relationship between daylight and the sense of place, which has been faded in today's houses.

The investigations of the present study can provide suggestions for improving the quality of contemporary housing to enrich the sense of place according to the characteristics of daylight. These suggestions are including building orientation according to regional climate, use of elongated and free plans, use of central

courtyard and atriums to direct the light from the center of the building, organizing the building volume horizontally to benefit from maximum daylight, space syntax according to optimal lighting of subspaces, use of horizontal windows to provide uniform light in the building, use of movable awnings for adjusting daylight, increasing the ceiling height and placing the window at a higher elevation to allow more light enter the building.

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