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Measuring the Effectiveness of Spatial-Phyical Components Affecting the Interaction of Human Energy with the Environment in the Traditional Houses of the Qajar Era with an Emphasis on the Three Groups of Designers, Users, and Space Users

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Research Article

Abstract

The science of interaction of energy in the environment is called feng shui, and this has led to the emergence of an ancient philosophy in China, which is used to find the correct arrangement in residential houses so that it can have the best effect on (chi). Residential houses, as the main center of human life, should have the highest level of peace. Historical and traditional houses have a hidden peace inside them, which has diminished with the passage of time. This research has been carried out with the aim of extracting the environmental components effective on the interaction of energy with the surrounding space in residential environments and examines three communities. The research method is a combination of nested qualitative and quantitative type, which first begins with a systematic study in this area to extract effective environmental components, and then the components are extracted, and in the quantitative phase, the verification of the environmental components is focused on feng shui. At this stage, ATLASTI and ORIGINPRO software are used for ease of work. In the group of designers, the lowest coefficient of determination is related to the structure with a value of (0.218) and the highest is related to materials and the presence of nature and furniture with a value of (1.000). In the group of users, the lowest is related to volume

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combinations with a value of (0.356) and the highest is related to compatibility with the background and color with a value of (1.000).

Keywords: Spatial Components; Interaction of Human Energy with Environment; Feng Shui

1. Introduction

Everything seen in the world is made of electromagnetic energy vibrations, with different frequencies that vary depending on sound, light and color. The electromagnetic field in the form of a halo surrounds all objects in the world, which science has proven and certainly accepts. The ancient Chinese know this energy as Chi energy (the vital energy of the world that flows inside every being). The energy that connects everything to one another (Rappaport, 2009: 197). Ancient people were probably able to detect its movement, sites such as Stonehenge, Karnak, Egypt, the Nazca lines along the so-called Endo built-up layer seem to indicate a base concentration of energy. Maybe they were made as a channel of this energy and maybe their creators were in contact with the flow of this energy and knew how to penetrate it (Memarian, 1999: 21).

in the far east; Understanding and controlling energy flows is considered basic and traditional healing systems such as acupuncture, Shiatsu and Kanji (Japanese massage technique) and martial arts such as Tai Chi, Chi Kung and Aikido can be mentioned in this category.

This energy has different names; It is known as "Chi" in China, "Ki" in Japan, and "Perina" in India, but there is no specific name for it in the West, although it can be described with terms such as "atmosphere" or "vital force" (Brown, 1996). Chi is centered in the East as in Oriental astrology and feng shui and is mainly located inside the human body, plants or buildings but some of them are constantly flowing and some flows from other objects. The energy of human "chi" is always mixed with the "chi" around the human being and thus the person is immediately connected to the environment and finally to the whole existence. It can be said that the energy from a distance reaches the person as a wave of "Chi" and very sensitive people may be able to receive this energy which can be seen in the form of prophecy or telepathy and inspiration and insight. For thousands of years, humans have been aware of the energy moving through existence and connecting everything in it like a big computer network.

It can be said that this energy is transferred from one institution to another and this process is the basis of Feng Shui. "Chi" energy is formed from the environment and affects human beings, mood, emotions, physical energy and over time affects human health. This energy is moved through the environment by wind, water and the energy of the sun, light and sound, and unlike some energies, it can also be transferred through solid matter. But some "chi" can enter and exit through walls, such as weather and tidal currents and the movement of air around the earth (Hale, 2001). This research aims to extract and evaluate the spatial components of the residential houses of the Qajar period, which is the most important to influence Feng Shui among these three groups.

2. Theoretical Foundation

2.1. Feng Shui

Feng Shui in Chinese (K) which means wind and water is an ancient philosophy and technique in China and is used to find the right decoration and the right arrangement of objects in residential buildings, commercial buildings, gardens, etc. to have the best effect on health, happiness, success, harmony and overall positive energy.

Kevin Lynch, a pioneer of environmental behavior research in his book The Image of the City, concluded that feng shui is an open-ended analysis of the environment in which new meanings, new poems, and subsequent developments are always possible (Lynch, 1960). Anderson and Anderson (1973) recognized that feng shui is an aspect of Chinese cultural ecology and called feng shui "the traditional Chinese science of spatial planning that contains an organized body of knowledge that is highly applied in practice and with specific goals" (1995). stated that feng shui is a system that expresses the relationship between man and nature in an environment of comprehensive thinking and human and environmental perspectives are linked in a stable system of order" Mack and Jay (2009). Today, as many researchers seek to create a deeper understanding of these relationships between the human and natural environment, architects and building professionals begin to identify feng shui as a broad pattern related to the environment and architecture (Dickinson, 1998). Huangbo (1999) believes that the practice of feng shui is an intuitive matter that includes the choice of place and spatial organization and has strong similarities with the western concept of geometry in architectural design (Robert Chuckrow, 1998: 17). Feng Shui leads us to the precise use of light, the color of materials, and the furniture of the furniture, eliminates the negative energy and provides the health and blessing of the home environment. Feng Shui reflects the increasing awareness that everything in the world is related to your feet is a very important art that is a very important art. It is a method that has been proven for centuries. Jalili and Akbari (2014), the most important thing to observe is avoiding disorder and any accumulation, using the right colors of curved lines, considering the right directions (Haeri Mazandarani, 2009: 83).

Due to the increase in population in the world and the shrinking of people's residences and the increase of people's working hours outside of their residences, the human spirit and psyche has suffered and this has manifested itself in industrial societies and the rate of depression has increased in young people and caused the loss of motivation to continue living. (Also, due to the sensitivity of the issue of energy supply and maintaining and guiding it, we should try to make the best use of what we have in order to reach the point of comfort (Day, 2012: 216). There are various ways for this. Among them is Feng Shui, which is available to everyone; and everyone can use this knowledge according to what they have (Swami, 2013: 79). The possibility of creating houses with maximum energy, health and harmony is available to human beings and it leads us to the accurate use of light, color, materials and furniture placement, it removes negative energy and provides inner peace, health and blessing in the home environment. Feng Shui reflects this growing awareness that everything in the world is connected from the inside (Moran and Yu, 2005: 141).

What is important in using the knowledge of feng shui is to match it with the available facilities. It may be that the place where you live is a small rented room or an apartment or a large villa or yard. The most important thing is to make the best use of what you have and to adjust your place, sleep, work and study as much as possible so that you can have enough comfort and peace by living in that building and know what things to collect around you will cause trouble and what things to add can change your mood. Kasegar Mohammadi and Tawfiq Bakht (2014). By using the science of Feng Shui, you can find positive and negative energies and the way to attract and repel them and use them in the design of your spaces so that the desired goals for a happy and peaceful life are realized for all people in their living environment (Loretta, 2012: 76).

2.2. “Chi” point in Feng Shui

Feng shui is based on the movement of qi, which is actually a type of energy that exists everywhere and is constantly moving from one space to another. Now this energy can have two states: positive (sheng) and negative (sha). The positive type of chi energy actually indicates that

this energy is flowing correctly in the home environment, that is, the interior arrangement of the house has been done correctly and none of the household items are placed in such a way that they are an obstacle to the free movement of this energy. However, if the internal arrangement of the devices is not done correctly, this energy will subsequently have a very irregular flow or even remain stagnant somewhere and become a destructive so-called negative energy (Yang, 2016: 8).

Residential house is the center of human life, the house must have conditions that can act as a place of human relaxation. Since the relationship between man and the environment is a reciprocal relationship, the role of the interior of the house in inducing a sense of calmness in the residents is undeniable. Khadim) Mohammadi and Safari (2014) the proper and correct flow of "chi" in the house is very important and vital (Lloyd and Sivin, 2002: 342). If "chi" cannot flow in the house, it stagnates and turns into destructive energy or "shachi". This negative energy can cause bad luck, depression and lack of health and wealth. It flows along curved lines, while "Shachi" acts like an invisible beam along straight and straight lines. That is why straight and straight lines are rarely used in oriental garden decorations. In Eastern philosophy, everything that is alive has "chi" and "chi" also has two opposite but complementary poles, which are known as "yin and yang" (Ames and Hall, 2001). According to Liu (1995), the theory of chi affects three aspects of feng shui:

Chi becomes the ontological foundation of Feng Shui. This leads to the development of the living life theory in feng shui. It is the general criterion for judging the performance of Feng Shui (Hall and Ames, 1998: 36).

2.3. Basic Concepts of Feng Shui

Feng Shui, the ancient Chinese knowledge that aims to create harmony between heaven, earth and humans, has influenced the traditional built environment design in China for thousands of years. The five basic concepts of Feng Shui in terms of environmental design are summarized below.

A. Unity between heaven and man This is the basic principle of feng shui, which means harmony between the world, earth and human energy. Energy in both physical and invisible forms, which is known as "chi" in traditional Chinese feng shui culture, natural energy or the breath of life, is valued. Feng shui designs are designed to create a balanced and harmonious environment. It can produce a lot of good qi and filter out bad qi (Brown, 1996: 174).

B. The five elements in Feng Shui Elements play a very important role in Feng Shui. The five Chinese elements are water. Fire soil wood. metal (Hale, 2001: 36)

The main part of feng shui is based on the relationship between the forces of nature, which is represented by the 5 elements (Wushing). In the tradition of the westerners, the 4 elements of earth, air, water and fire are mentioned, but in the eastern culture, these elements are 5 which have great value and importance, the Orientals believe that these elements indicate changes and they make each other, respectively, water, wood, fire, earth and metal (Webster, 2005: 163).

C. Harmony of Yin and Yang: The ancient Chinese believed that there are two opposite parts in everything: Yin and Yang represent the active principles in nature, which are displayed in the form of darkness, cold and humidity. On the human level, Bain is a symbol of femininity and passivity and also represents the realm of the dead. Bang represents the active principles in nature that are exhibited by light, heat and dryness. On the human level, Bang is a symbol of masculinity and being active and also represents the realm of life. Bin and Yang are about balance and harmony in a space that is designed to balance the lives of users when engaging in space (So, 2015: 76).

The five elements, the number five in Chinese knowledge is a sign of luck. The five elements are wood, fire, soil, metal, water. According to Chinese knowledge, the above five elements represent

change (Xu, 2003: 107), which means that one creates another. These elements complement or oppose each other, and every object in a room is a combination of one or more elements. According to Feng Shui theories, it is able to fulfill certain purposes. The placement of objects in the room can be designed in such a way that according to their elements, they neutralize or intensify each other's effects and finally indirectly affect the state of the person who works there (Walter, 2006: 154).
Constructive cycle: Water nourishes wood, wood is the fuel of fire, fire creates earth in gray form. Soil creates metal, metal can flow like water (Lao, 2004: 66).
Destructive cycle: Water extinguishes fire, fire melts metal, wood and soil wear out, soil pollutes water (Mahdavi and Gholamali, 2004: 195).

3. Research Methodology

This research is in terms of applied-developmental nature and in terms of the combined method of the nested type. First, in order to obtain the basic concepts in the field of Feng Shui, a systematic review of first-hand and second-hand sources is carried out, and based on the basic concepts and definitions, semi-structured interview questions are formulated, and in order to extract spatial-physical environmental components that are effective on Feng Shui, questions are asked from thinkers in this field. The selected houses of the Qajar period are selected with the preference system in Delphi future research and with the Kendall coefficient. Interview texts are entered into ATLASTI software, and with the help of Grand Theory techniques (open, axial coding), data reduction is started and the components are extracted and categorized. Then, based on the extracted components, a questionnaire with a Likert scale is compiled and it is given to the community of designers, space users, and users. 384 people are selected for each group. which is the upper limit of Morgan's table, validity was measured by CVR formula and its value was 0.768 and reliability was measured by Cronbach's alpha and its value was 0.811. The results are entered into the JMPSAS16 software and analyzed numerically with inferential statistics (correlation and regression).

4. Study Area

4.1. Selected Buildings of the Qajar Period

In this part, the Delphi system is used with a panel of experts to select the buildings of the Qajar period. The working method is that the panel of experts is first selected and the residential buildings of the Qajar period that meet the conditions are introduced to them.

Table 1 Selected buildings of the Qajar period

Building Name	Building Location	Kendall Coefficient	Building Introduction	Images
The house of Qawam Al-Dawlah	Chirag Bargh St., (currently Amirbir), between Sarcheshme and Amin Huzoor three roads, Shahid Javaidi Street, Mohammad Shah Qajar Period, has been built into an administrative organization, the ICOMUS Cultural Institute.	0.741	The house of Qawam al-Dawlah was built in 1253 AH, during the time of Muhammad Shah Qajar, for Mirza Muhammad Qawam al-Dawlah Ashtiani, and after him it passed to his son Motamed al-Sultaneh, one of the late Qajar rulers, and after that to his grandson, Watuq al-Dawlah. Then the house was purchased by the Ministry of Culture and Art from the heirs of Watuq al-Dawlah, and the National Organization for the Protection of Antiquities under the supervision of Professor Mohammad Karim Pirnia carried out repairs on it, and after that the building was used by cultural institutions. It was placed in various places and finally the secretariat of ICOMOS was established there	 

Imam Juma's house	The eastern part of Nasser Khosrow Street, below Imam Khomeini Square, Imam Juma Street, this building was built during the reign of Naseruddin Shah Qajar. It has turned into the administrative organization of the research and library department.	0.652	This house is attributed to the Friday Imam of Tehran during the time of Naser al-Din Shah Qajar. The building is related to the years 1280 to 1300 A.H. and considering the location of this house near the Government House and the Tehran Citadel, and the fact that Imam Juma was considered a noble at that time, as well as some details of the plan, it can be assumed that a part of the current building was part of a more elaborate house, and probably its inner part was separated and the rooms around the house were destroyed.	 
Kha Nakho Mushir al-Doulah (Pyrenees)	Saadi Street, Manochehri Street, Lalhazar No Street, Pirnia Street were built in the historical period of Naseruddin Shah Qajar. Its main use is currently the Institute of Islamic and Complementary Medical History Studies	0.711	This building is originally attributed to one of the prominent men of the Qajar era, Behnam Hassan Pirnia Molaq b. to Mushir al-Doulah, the son of Mirza Nasrullah Khan Mushir al-Doulah, the chancellor. He was born in Tabriz city in 1290 AH and died on 22 Aban 1314 AH after 62 years of age.	

Amir Bahadur's house	Chirag Bargh Street (currently Amirbir), between Sarcheshmeh and Amin Hozur intersection, Javidi Street No. 107, this building was built during the time of Naser al-Din Shah Qajar.	0.684	The design of this house is an example of design in the late Qajar period; That is, when the old patterns were not used in organizing the design and the visual pattern did not replace them. This building, which has been the office of the National Artifacts Association for three decades, was a part of the house of Mirza Hossein Pasha Khan, nicknamed Amin Bahadur, the court minister of Muzaffar al-Din Shah Qajar in the years 1313 to 1324 AH.	
Hidayat's house	South Saadi St., Shahid Taqvi St., No. 3, the main use of this building is the library site and reservoir and the library hall, and it was built in the Qajar period.	0.589	The building under study is attributed to the late Sadegh Hedayat, one of the famous contemporary writers. Sadegh Hedayat was born on Tuesday, February 28, in his father's house in Tehran. His father Hidayat Qoli Khan Hidayat (Itzad al-Molk) was the son of Jafar Qolikhan Hidayat (Nir al-Molk) and his mother, Mrs. Ezri Zur al-Molik Hidayat, the daughter of Hossein Qoli-Khan Mokhbar al-Doulah II. Sadegh's mother's father is a descendant of Reza Qolikhan Hedayat, one of the most famous writers, poets and historians of the 13th century in Iran, who was one of the survivors of Kamal Khojandi.	
Colonel Iraj's house	Pamnar, above the Pamnar Mosque, Sufiai Street, Shirazi Street, It is the construction period of Ahmad Shah Qajar. It is owned by the Cultural Heritage and Tourism Organization	0.642	The estimated age of the building is about 90 years, and it is very likely that the building was built during the years AH). The original owner of 1329 the building is not known, but according to the documents presented, this collection was in the hands of Colonel Iraj, one of the experienced officers of the first Pahlavi era, for 60 years.	

Qavam al-Sultaneh house	No. 59, Sitir St., not far from Jumhori St., this building is owned by the Cultural Heritage and Tourism Organization and was built during the period of Ahmad Shah Qajar.	0.588	The building that is used as a museum today was built for the personal use of Qawam al-Sultaneh and after that It was sold to the Egyptian embassy and was in the hands of the Egyptians for about seven years, then with the deterioration of the relations between Iran and Egypt and the closure of the Egyptian embassy in Iran, the commercial bank bought the mentioned building and after that it bought the former office of Farah Pahlavi and it has been used as a museum until today.	
Reza Khan's house	Imam Khomeini St., not reaching Hassan Abad Square, Nemati St., No. 46, this building is owned by the Cultural Heritage and Tourism Organization. It was built during the period of Ahmad Shah Qajar.	0.691	Reza Khan's house belonged to the Ministry of War and its construction date was between 1334 and 1339 AH. This building is almost related to the late Qajar period.	
Moghaddam House	The north side of Imam Khomeini Street is between Sheikh Hadi Street and Waliasr Street. It has turned into a museum of movable and immovable works. It was built during the period of Ahmad Shah Qajar.	0.742	The Moghadam house is one of the luxurious houses of the Qajar era, belonging to one of the courtiers of that time named Mohammad Taqi Khan is considered to be al-Mulk. The collection of buildings of the Moghadam House, owned by the late Dr. Moghadam, the son of Taqbar al-Mulk He is a great scientist and researcher. He has collected movable and immovable works of art from different historical periods and kept them in this valuable collection.	
Jalal Al Ahmad's house	Khayyam St., Shahid Haj Taghi Tarkhani Street, Shahid Karkan Esasi Street, No. 7, empty, the janitor's department is in a part of the house, and it was built during Ahmad Shah Qajar period.	0.721	The foundation of this building is related to the Qajar era and the unsuccessful reign of Ahmad Shah. The building belongs to Al Ahmad family Its original owner is Seyyed Ahmad, Al Ahmad. After that, he was transferred to Jalal Al Ahmad. Generally in the year It was renewed in 1310 AH	

5. Qualitative Findings

5.1. A Summary of the Interview

The total volume of houses consists of rectangular spaces. The circular form of one of the ponds and the octagonal form of the gardens and the other pond are built in a complementary way. Mesh windows in the basement of Motaman al-Atabah house are for attracting light and air flow and seeing the scenery outside. Mesh windows create a balance between outside and inside light. This balance makes the person who looks from inside to outside not tired of the sunlight. The designs used in making mesh windows are often designed to regulate the light inside the room. The windows in this house include doors that have windows due to the bottom being closed and the light passing through them. Symmetry, repetition and rhythm are observed in the north, east and west facades. Halls and large foyers along with the central stairs in the houses have created an elongated plan along the facade. The spatial confinement in this house is such that about a quarter of the building is closed and semi-closed space and about three quarters of the building is open space.

There are turquoise-colored tiles in the form of Fakhrumedin mesh in the basement windows. Plaster decorations can be seen on the capitals and fronts in the north facade of the Weber on the fireplaces inside the building and are seen in the form of slime motifs. Brick decorations are used in the basement ceiling. There are wooden decorations on the basement doors as well as inscriptions on the top of the cupboards.

In the entrance area, there is a large shallow rectangular pond (it was deeper in the past). A two-story building, both of which have a large long porch. Full symmetry is seen. The lower porch has eight rectangular columns and the upper porch has two rectangular columns and six elongated and long plaster hexagonal columns with Corinthian leaf capitals. On the left side of the building there is a small door with five steps leading to the basement and two windows can be seen on the sides of the door. The entrance stairs are located right after the pond and in the middle of the building (this part is outside of the facade of the building).

There are two entrances for two rooms on the sides of the main door, and each of the rooms leads to another room, which is made of eight small rooms, i.e. in human dimensions. But from the main door that has been explained, we enter the main middle room or Hozkhaneh. A square room with a brickwork basin in the center with pathways that show water entering and exiting it.

Going up the stairs, we enter a small corridor, from the left side we reach the four rooms that are located on the lower four rooms, and from the right side we enter a king's house, which is a room with three doors that sits on the pond and opens to two porches from the north and south, and the eastern corner is another staircase. In the west wall, there are three shelf niches, the ceiling of Shahneshin is also wooden and framed (in a lattice shape), pea-colored and brown, which is worked in the middle of each flower frame, and in the center, it is decorated with an octagon with a rich and prominent wooden slime.

Hierarchy discussion is a conversation between inside and outside, because the sense of outside space cannot be found in the song of inside mood, and in other words, inside lacks these properties and outside conditions cannot be allowed inside. This evolution plays a role in the hierarchy, because the entrance threshold is the condition of entry and transformation, which was placed after the door and in a space such as the vestibule (the main entrance space that is usually placed after the front door), the outer courtyard, the vestibule and the rope; But during the Pahlavi period, this structure collapsed as the inner and outer spaces became more extroverted. Most houses have 3 entrances: the entrance of the crew, the entrance of the north yard and the entrance of the south

yard. Designed for all three vestibule entrances. The story of full-fledged color can be seen in the color of the glasses of Iranian sashes, which present an image of heaven to every viewer. This celebration of color, in which no two moments are alike, actually brings joy and happiness to the residents of the house in the colors of red, green, yellow and blue.

The colored glass of the mentioned houses is a good example of the use of color in an Iranian house.

Symmetry also brings balance and diversity in Iranian houses with its beat and rhythm, because with the loss of color of the main spaces such as the tanbi house (which is considered the main core and heart of the house) and the spaces of the headlands and the integrated porch and the colorful sashes of the sub-axis also disappeared, and with the placement of some secondary elements such as the staircase in the central axis, as it should be, this sense of symmetry that gives a concept of stability in the home arena It was also forgotten. In these houses, there is complete symmetry in single spaces, including the king's room, and relative symmetry in the entire building. It is the same in views.

A porch is a roofed semi-open space that is limited on three sides and open on one side. In the houses of the Qajar period, the south porches show the view of the house behind its curtain, a view in which usually tanbi (a large and main room of the house, which is often located in the heart of the house and has a sash window), kaleh (a room located on both sides of the tanbi on the upper floor, which is created as a result of the high height of the tanbi and often overlooks it), hozkhaneh (a covered and elevated space with a pond in between) and usually associated with other spaces) and there are other elements of the house. Of course, in the late Qajar period and the early Pahlavi period, the huge verandas of this decade turn into small verandas that are only for one room and one space, and naturally, the transparency of the space also undergoes changes in terms of area during this period. Selected Qajar houses mostly have small verandas for the rooms next to the rope on the north side and a veranda for the crew.

In early Qajar architecture, the space of the house included two main and secondary axes, where the space of the house was in line with the main axis; On both sides of this axis, in the western and eastern fronts, secondary spaces were placed, which in a way adds to the sense of symmetry in the building plan. Even in the late Qajar and early Pahlavi periods, this axial pattern had an effect on the landscaping of Iranian houses, to the extent that this pattern was in the form of English and French landscaping with wide lawns, ornamental trees and shrubs, small and large rectangular ponds and ponds, flowers The work of gardens and the general lines of landscaping and gardening, which are partially out of axis, have been seen in these buildings.

After extraction and open and axial coding, a number of 38 codes were extracted, and after clarification based on the basic concepts and the main research question, 31 codes remained and the rest were deleted. The number of 13 cases is related to spatial and 18 cases are physical. The most prominence in spatial codes is related to spatial arrangement with the number of 19 and the least prominence is related to changeability with the number of 7. In the physical codes, the most prominence is related to the presence of nature with the number of 21 and the least prominence is related to the colors with the number of 6.

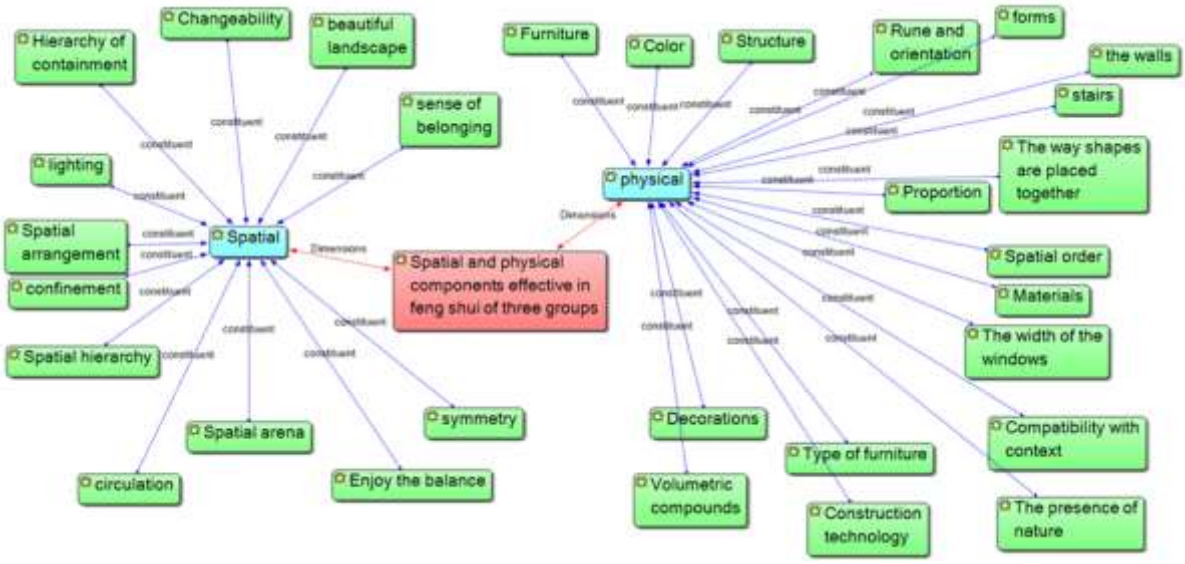
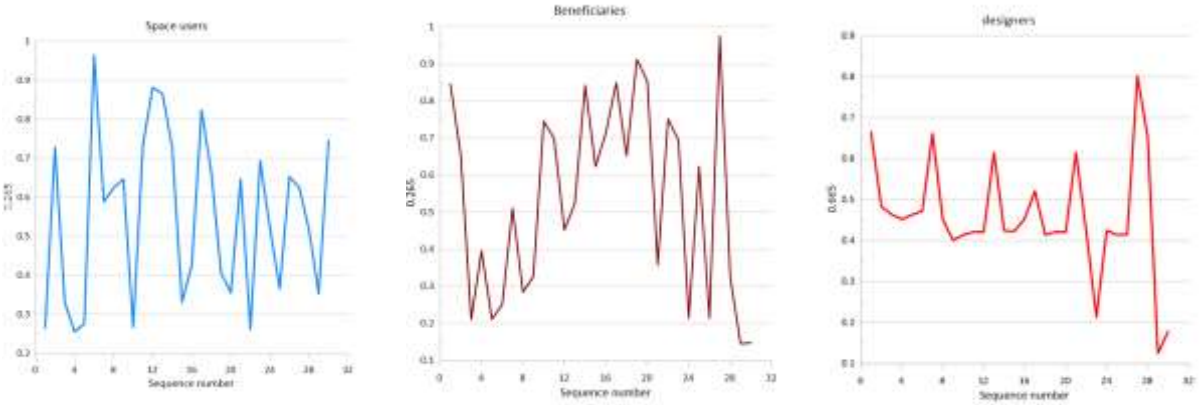


Fig 3 Classification of physical and spatial components based on axial classification and coding

6. Quantitative Findings

According to the descriptive statistics, 253 people (70.7%) of the sample population were men and 131 people (29.3%) were women, and 74.4% were in the age group of 20-30 years. The working method is such that the question is formulated according to the number of components. And each question has an answer between 1 and 5. The sum of the scores of indicators of a component means the score given by each person to the desired quality. So, the score that can be obtained for each quality varies between 5 and 25. Based on this, we create a category in such a way that the people who gave a total score of 5 to 11 to a factor, estimated it poorly, 12 to 18 average opinion and 19 to 25 good opinions about it. The results of descriptive statistics showed that the most frequently obtained data distribution in the group of designers has a certain order and it seems that the component was used in their design. The highest frequency is related to circulation with a value of 1840 and the lowest is related to the use of balance with a value of 1011. In the group of spatial users, the data distribution value has a relatively significant distance from the moving average, and the highest frequency among them for energy interaction with their surroundings in these houses is related to the type of furniture with a value of 1814 and the lowest is related to materials with a value of 986. Visitors, the highest frequency is related to the collation process with the amount of 1694 and the lowest is related to the materials with 1054.

Table 2 Data distribution diagram in three selected groups



7. Inferential Statistics

7.1. Spearman Correlation

At this stage, after selecting the selected variables with the Delphi method, a questionnaire is compiled and randomly distributed among three groups of space users, users, and designers. The results are entered into the ORIGINPRO software, predictive relationships (regression) and correlation relationships are used for analysis. Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 3 Kolmogorov-Smirnov test to check the normality of physical and spatial variables

p	Z Kolmogorov Smirnov	Standard deviation	Average	Variable
0.314	0.793	23/3	77/27	Interactions of human energy with the environment (designers)
0.306	0.706	86/1	87/25	Components of human energy interaction with the environment (beneficiaries)
0.307	0.685	66/2	21/20	Components of human energy interaction with the environment (space users)

As can be seen in the table above, the Kolmogorov Smirnov test for the scores of the mentioned components in the three groups are not significant (p=0.314), (p=0.306), and (p=0.307) and therefore the internal and external indicators of desirable housing do not have a normal distribution and non-parametric analyzes should be used for it.

Table 4 Correlation coefficient of physical and spatial components of selected Qajar houses affecting Feng Shui

Dimensions	Components	Correlation coefficient of designers	Correlation coefficient Beneficiaries	Correlation coefficient Space users	Significance level (sig)
Spatial components	symmetry	0.254	0.662	0.845	0.001
	Spatial hierarchy	0.781	0.406	0.653	0.001
	confinement	0.645	0.355	0.211	0.001

	lighting	0.653	0.646	0.395	0.001
	Spatial arrangement	0.746	0.262	0.211	0.001
	Spatial order	0.473	0.735	0.251	0.001
	Hierarchy of containment	0.631	0.881	0.511	0.001
	Beautiful landscape	0.683	0.843	0.284	0.001
	circulation	0.473	0.982	0.326	0.001
	sense of belonging	0.623	0.274	0.745	0.001
	Spatial arena	0.836	0.374	0.699	0.001
	Changeability	0.721	0.921	0.452	0.001
	Use the balance	0.425	0.421	0.523	0.001
Physical components	Proportion	0.482	0.246	0.842	0.001
	Decorations	0.415	0.821	0.623	0.001
	stairs	0.411	0.285	0.714	0.001
	Structure	0.443	0.675	0.849	0.001
	Volumetric compounds	0.711	0.754	0.652	0.001
	thigh	0.562	0.921	0.912	0.001
	Materials	0.945	0.421	0.853	0.001
	the walls	0.615	0.216	0.358	0.001
	Furniture	0.465	0.524	0.751	0.001
	The width of the windows	0.543	0.688	0.695	0.001
	fan made	0.605	0.295	0.215	0.001
	How shapes are placed together	0.217	0.855	0.623	0.001
	The presence of nature	0.464	0.742	0.214	0.001
	Compatibility with context	0.781	0.922	0.975	0.001
	Color	0.645	0.629	0.325	0.001
	forms	0.653	0.252	0.145	0.001
	Type of furniture	0.746	0.982	0.141	0.001

Based on the results of Spearman's correlation, it was found that in the group of designers, the highest correlation is related to materials with other components with a value of 0.945 and the lowest is related to the way shapes are placed together with a value of 0.217. In the group of users, the lowest is related to the walls with a value of 0.216 and the highest is related to the type of furniture with a value of 0.982. In the group of space users, the lowest is related to the type of furniture with a value of 0.141 and the most compatibility with the context is with a value of 0.975.

7.2. Regression

To use the type of linear or multivariate regression, the internal correlation matrix diagram of the variables is used. After drawing the correlation matrix diagram, it was found that the factors have no linear relationship, so it is correct to use multivariate regression.

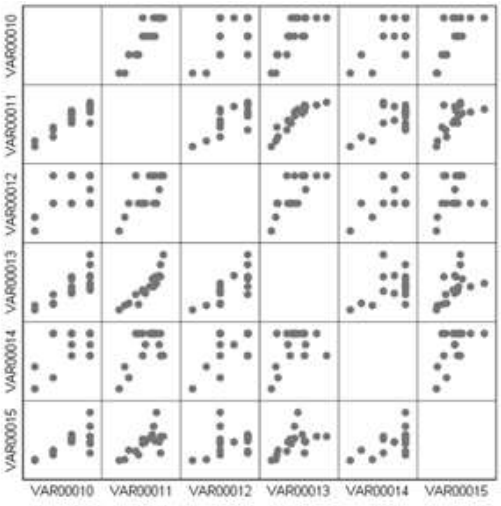


Fig 5 Diagram of correlation matrix of factors

Based on the results obtained from the multivariate regression, it is clear that in the spatial components of the designer group, the beautiful landscape component with a value of (1.000) has the greatest effect and spatial regularity with a value of (0.373) has the least effect on the interaction of the individual's energy with the environment. It is from balance with value (1.000) and the lowest is related to spatial hierarchy with value (0.354).

In the physical components, in the designer's group, the lowest coefficient of determination is related to the structure with a value of (0.218) and the highest is related to materials and the presence of nature and furniture with a value of (1.000).

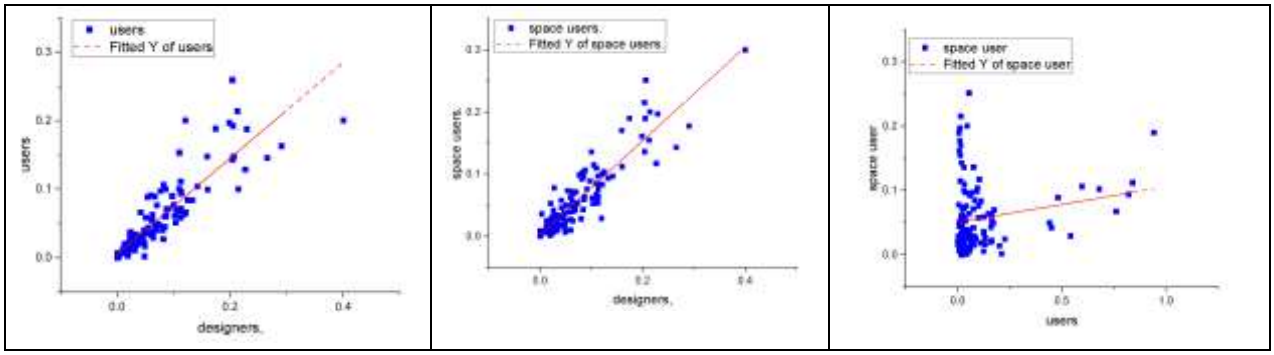
Table 5 Multivariate regression of spatial and physical components effective in feng shui of Qajar houses

Dimensions	Components	coefficient of determination	F	meaningful	coefficient of determination	F	meaningful	coefficient of determination	F	meaningful
Spatial components	symmetry	0.615	222/527	0.001	0.672	501/318	0.005	0.757	245/627	0.008
	Spatial hierarchy	0.451	122/405	0.005	0.820	801/544	0.004	0.354	255/428	0.001
	confinement	0.846	343/217	0.008	0.789	857/369	0.004	0.659	383/527	0.005
	lighting	0.746	943/199	0.007	0.658	506/710	0.005	1/000	911/259	0.002
	Spatial arrangement	0.762	612/201	0.009	0.815	289/658	0.003	0.974	564/243	0.007
	Spatial order	0.383	623/643	0.002	1/000	526/689	0.004	0.711	611/621	0.008
	Hierarchy of containment	0.753	683/849	0.001	0.895	314/278	0.003	0.569	619/872	0.007

	Beautiful landscape	1/000	603/349	0.002	0.756	586/784	0.002	0.724	652/349	0.008
	circulation	0.571	945/184	0.001	0.723	695/174	0.001	0.882	941/285	0.007
	sense of belonging	0.770	748/276	0.001	0.745	261/824	0.002	0.514	763/786	0.009
	Spatial arena	0.795	943/199	0.005	0.795	316/512	0.004	0.823	943/153	0.008
	Changeability	0.893	034/499	0.008	0.355	255/984	0.006	0.676	624/485	0.008
	Use the balance	0.467	643/673	0.006	1/000	250/518	0.008	1/000	034/574	0.007
Physical components	Proportion	0.750	782/489	0.007	0.913	211/159	0.008	0.883	838/569	0.0085
	Decorations	0.674	782/489	0.003	0.522	588/453	0.003	0.823	864/921	0.009
	stairs	0.567	782/489	0.001	0.685	255/439	0.006	0.607	351/582	0.007
	Structure	0.218	412/382	0.009	0.695	565/325	0.008	0.518	658/447	0.007
	Volumetric compounds	0.732	782/656	0.001	0.356	551/825	0.009	0.685	958/683	0.008
	thigh	0.467	643/673	0.005	0.425	133/746	0.007	0.575	620/875	0.006
	Materials	1/000	715/645	0.003	0.706	655/145	0.004	0.874	362/325	0.008
	the walls	0.674	712/546	0.008	0.723	325/659	0.008	0.756	382/742	0.009
	Furniture	0.567	732/318	0.006	0.689	333/544	0.003	0.581	325/675	0.008
	The width of the windows	0.735	654/218	0.001	0.951	154/448	0.008	0.914	185/481	0.006
	fan made	0.211	382/752	0.006	0.869	183/532	0.005	0.273	365/251	0.008
	How shapes are placed together	0.744	321/514	0.003	0.661	425/186	0.002	0.747	469/815	0.005
	The presence of nature	1/000	167/428	0.006	0.581	441/139	0.005	0.581	742/251	0.007
	Compatibility with context	0.947	175/431	0.002	1/000	288/458	0.002	1/000	223/541	0.005
	Color	0.851	425/154	0.004	1/000	239/488	0.004	0.814	219/852	0.004
	forms	0.409	421/131	0.003	0.511	369/225	0.002	0.403	575/249	0.003
	Type of furniture	1/000	222/461	0.008	0.542	614/255	0.001	1/000	154/254	0.005

In the next step, it is necessary to explain the physical and spatial dimension, which used graphical correlation for this. The results show that the results of residents and designers are correlated with each other, but spatial users or visitors have not been able to communicate with other answers.

Table 6 Graphical correlation of physical-spatial components among different groups of respondents



8. Discussion

In this research, first, to extract effective physical and spatial components in Qajar houses, interviews with scholars are started. The extracted components show the greater impact of physical components compared to spatial ones, and it seems that in order to control the components, more attention should be paid to the physical dimension. According to scholars, the presence of nature in space can emphasize the principles of Feng Shui. The results of descriptive statistics and the degree of salience in the qualitative section can be inferred that the opinions of users and experts in architecture and urban planning are different from each other, also the answers obtained in the section of inferential and descriptive statistics are inconsistent with each other and the focus should be placed on the inferential aspects of the data. Based on the results obtained in the correlation section, it is clear that the spatial components generally have a lower average movement than the physical components, and the use of the basic principles of design and gestalt psychology such as symmetry cannot promote the principles of feng shui, and the area of spatial construction that creates functional dissonance and causes people to circulate around specific spaces to perform various types of activities is more effective. But in the physical dimension, the material and its type can strengthen other components in the first promotion of feng shui. Based on the regression results, it can be understood that the impact of spatial components is less. A beautiful landscape induces a sense of peace and comfort among people, which can be an important principle for maintaining energy and human interaction with the surrounding environment. In the physical dimension, the materials and their types are next to the furniture and the way the furniture is placed and the functional activities are next to the presence of nature.

9. Conclusion

There are always many energies in the vicinity of humans, which can be used to create peace and comfort in our living environment. In the past, our ancestors raised their quality of life by using this same energy and using new methods with minimal damage to nature. Part of which can be clearly seen in climate architecture. Now, by knowing the rules of feng shui and the elements that can affect them from space and body, it is possible to reach the point of comfort and peace to an acceptable extent. Feng Shui is an almost complex science, but knowing its physical and spatial dimensions and its existing components can help designers to pay attention to the components that can provide aspects of human interaction with their surrounding environment in their designs in the field of functionality and aesthetics, in addition to paying attention to beauty rules. Feng Shui creates balance and harmony in life. Qajar houses, due to the size and also the practical freedom that the designers had in spatial arrangement, continue to provide peace and comfort to their

residents after a long period of time, and examining its principles in the application of the basic concepts of the interaction of human energy with the environment can provide designers with strategies in small apartment spaces.

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