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Comparing Semantic and Semiotic Indices in Visual System Focusing on Identity Formation (Case Study: Fahadan and Posht-e Bagh Comparison)

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Research Article

Abstract

City as a combination of natural and social factors and environments recognized by human in which a resident population has been centralized has a special identity. An identity has distinguished city from other cities and gives meaning to the population residing in it, identity in the appearance of environments built by humans is always taken from the parameters of human and behavioral sciences that this identity is more valuable in neighborhoods with historical oldness and historical context due to more application of semantic and identity signs attributed to culture. The semantic and semiotic indices have been different from each other considering neighborhoods and their types but it seems that indices with high coefficient have been used to design the centers of these neighborhoods. This study aims at extracting variables with high coefficient in all neighborhoods to be used in the flagship development of other neighborhoods. Concurrent nested mixed research method has been used in this study that variables and indices extracted in qualitative part and compared in quantitative part, semi-structured interview used in qualitative part to explore and scrutinize variables and in order to facilitate this, Atlas. ti has been used to reduce data. The results compared in qualitative part using ORIGINPRO, sample size achieved using snowball system with theoretical saturation in qualitative part and Morgan Table used in quantitative part. The results show that all spaces are axial and central (1.000), specifying,

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explaining and defining each path (0.958) and inner value (0.921) have the highest coefficient of determination and effectiveness in Posht-e Bagh neighborhood and the least effectiveness is related to conceptual richness (0.246) but all spaces are axial and central (1.000), inner value (0.978) and special arrangement and order (0.920) have the highest coefficient of determination in Fahadan neighborhood and the least one is related to motifs taken from nature (0.254).

Keywords: Semantic Indices; Semiotics; Visual System; Identity Formation

1. Introduction

Human in naturally a meaning-maker creature and creates meaning through producing and interpreting "signs". Peirce says: "nothing is sign unless we interpret it as a sign" (Laripour and Dadvar, 2019: 72). Sign-modern semiotics is founded in "School of Paris" and based on the theories of Greimas (Zohurian, 2016: 2). Urban signs are elements and components of urban environments that as physical points in these environments cause nostalgia and readability of cities and identify formation of their different parts. In order to stabilize rich identity and culture, as well as urban elements it is necessary that readability has meaning and concept related to the culture of the residents of that city (Izadpanahi, 2016: 40). In the structure of each city, semiotics is so considerable to analyze the identity of city (Nasr, 2016: 189). Human action and desire relate meaning to sign and turns sign into an experienced element. Sign influences human mutually and guides human values and concepts by its meaning. Therefore, sign identity has been related to personal identity and grows as a result of directly experiencing physical environment. Thus, identity is a reflection of social and cultural aspects of urban sign (Poujafar and Montazerolhojjat, 2010: 50). In fact, what make a city dynamic and attractive and satisfy citizens are history, rich culture, beauty and visual quality of urban space appearing in the elements and signs of each city structure, semiotics is so considerable to analyze the identity of city (Nasr, 2016: 189). The successful neighborhoods have indices with high coefficient that using them may increase profitability and efficiency of neighborhood. Their existence considered as neighborhood desirability. Aiming at extracting the most effective indices, this study makes attempt to answer this question that which indices and signs have the most effectiveness in successful neighborhoods?

2. Theoretical Basics

2.1. Semiotics

Every sign refers to a unit of information that their configuration next to each other has meaning. The first models investigated the stricture of sign belongs to Swiss linguist "Ferdinand de Saussure" and American philosopher "Charles Sanders Peirce" (Majedi and Zarabadi, 2010: 51).

"Semiotics" has Greek root which is in the realm of "sign" and "meaning" (Amiri, Khoshkar and Vandadi, 2016: 425). Thanks to Charles Sanders Peirce (1839-1914) to have semiotics as a scientific major; on the other hand, he believes that semiotics is a referential framework which covers any other study. Almost at the same time with Peirce, Saussure (1857-1913) also considered semiotics. He considered language a system of signs which demonstrates thoughts (Ghashghaei et al., 2018: 448).

a) Diversity Types in Semiotics

A sign's physical identification may be derived from two categories of variables, including (Caduff and Timpf, 2008: 251):

1) The sign's physical characteristics, i.e., the variables belonging to the sign element itself that are part of its existential nature

2) The characteristics of the sign's contextual role, focusing on the type of relationship between the element or context and the surrounding texture; the second feature includes visibility and how the volume is combined with the adjacent texture. It shows a quality display that is the consequence of distances and angles of view to the urban sign, a part of the urban perspective defined by the visual and movement sequences (Mohammad Hasani et al., 2016: 66).

A semiotic element's functional differentiation arises from three types of importance (Van Lenthe, 2016: 765):

First: mere functional importance (depending on the type of use and its intensity);

Second: functional importance (focusing on the time dimension of use);

Third: The importance created by the type of users in an artistic element, leading that element to become a sign.

These features have begun from three parameters and reach smaller variables. Appleyard (1970) considers characters which make an urban element memorable and symbolic in people' mind, form distinction, apparentness (visibility) and enjoying symbolic and operational importance. At least form distinction and visibility are categorized in the physical field of signs (Appleyard, 2002: 79). Effective factors on form distinction are: size, shape, color, materials, the style of construction and external furniture. Also, visibility is evaluated in relation to the position of that element to vision centers and focuses and citizens activities (Mohammad Hassani et al., 2016: 64). Human is obsessed with meaning-making and creates meaning through producing and interpreting "signs" (Chandler, 2015: 46). Linguistic approach shows architecture that it is able to consider city and its buildings as a text and interpret it. Text is a physical phenomenon, thus every artifact encrypted with a performance and a message, is considered a text (Hamdjani et al., 2017: 48).

Like a text in front of audience, architecture reminds a world of thoughts and values of design and has a language behind of its veils which talks to audience (Zalnejad et al., 2013: 42). The words of this text are structural elements, buildings, mass and volumes, collective spaces, open spaces, access ways and knots that besides semantic interrelationship with each other, they show a unique generality (Frank, 2006) and they transfer their message through logical, aesthetic and social codes, therefore, what is identifiable in architecture as a meaning-maker factor of sign is appeared in three forms of "icon, sign and symbol" (Kumer, 2009: 17).

Table 1. Physical and semantic components of urban sign and its variables (Source: Mohammad Hasani et al., 2016: 67)

<table>
<tr><th colspan="2">Sense</th><th colspan="3">Body</th></tr>
<tr><td rowspan="2">Collective memories</td><td rowspan="4">Evocative</td><td colspan="2">Color</td><td rowspan="3">Essential physical characteristics of the sign</td></tr>
<tr><td colspan="2">Material</td></tr>
<tr><td>Collective memoirs</td><td colspan="2">General shape</td></tr>
<tr><td colspan="2"></td><td colspan="2">Size and scale</td><td>Essential physical characteristics of the sign</td></tr>
<tr><td>Non-verbal behaviors</td><td rowspan="3">Perceptual</td><td>Evocative</td><td rowspan="2">Visible</td><td rowspan="3">Essential physical characteristics of the sign</td></tr>
<tr><td>Activities</td><td>Angles of view</td></tr>
<tr><td>Behavioral camps</td><td colspan="2">How to combine volume with adjacent texture</td></tr>
</table>

2.2. Perception of the Environment

In the process of recognition and perception of the environment, the sense of physical elements in the urban space is the first step (Mousavi Sarvineh Baghi and Sadeghi, 2016: 101). The human mind at this stage seeks to visualize the visual order and organization through interpreting the relationships among the urban space elements as well as establishing a meaningful relationship between them (Kazemi and Behzadfar, 2013: 74). This way it can be claimed that human psychological effects of the perception of the urban space elements are divided into two categories: "perception of the semantic quality of the environment" and "perception of the visual quality of the environment" (Laripour and Dadvar, 2019: 86).

a) Perception of Environment Semantic Quality

From the second half of 20th century and after the decline of rationalistic thoughts in the framework of modernistic art inclinations and tendency to post-modernistic approaches in the literature of architecture and urbanism, the concept of meaning appeared in the quality of environment. The findings of studies by Lynch, Rapoport, Lang, Schulz, White, Relph and Appleyard show that perceptional and reminding aspects of meaning have been interrelated to each other (Kalin and Yilmaz, 2012: 241) and the difference among perceptional qualities makes these qualities remind audience of "meanings" in combination with each other (Kouhifard, 2018: 12).

Lynch believes that "perception" is the objective demonstration of "meaning" and the meaning of environment determined due to presence at space and perceiving it (Lynch, 2016). Kalin considers visual and perceptional literacy an important factor in making the sense of satisfaction of individuals in contact with environment (Ameri Siahuei et al., 2017: 1). So, factors like the effect of physical place on feeling, emotion, and sense of belonging, general satisfaction and human health are ignored in designing environment (Majedi and Zarabadi, 2010: 52). This is while spaces like city, street, neighborhood, building and room people live in is the civil part of an individual's life, in fact spaces are created and take meaning but individuals ignore them (Dulabi et al., 2015: 40). Taking a phenomenological look at environment, Schulz believes due to presence at space, human is trying to make his existence meaningful and achieve a base in space and in time (Laripour and Dadvar, 2019: 86).

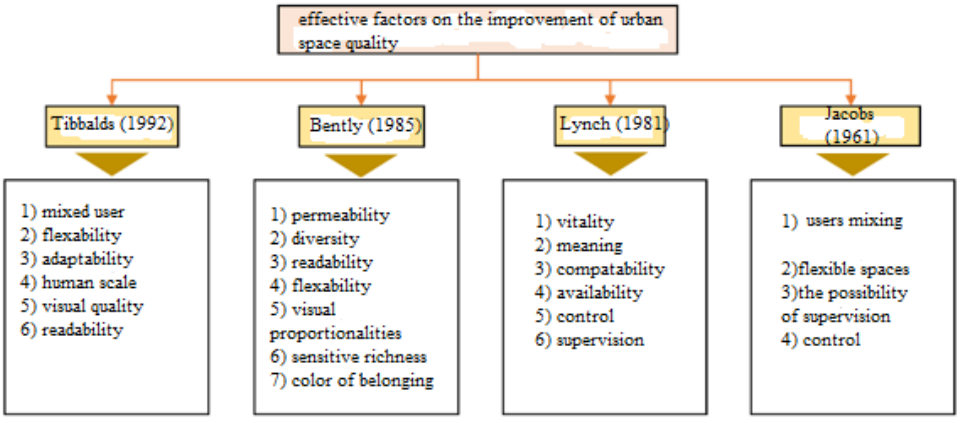

Fig 1 The diagram of effective factors on the improvement of urban space quality (Source: writer, 2020 narrated by Vahdat and Rezaei Raad, 2017: 70)

Schultz considers semantic quality of space as one of the features in turning environment into an effective place. The surrounding environment may turn into a meaningful one when provides rich facilities in determining identity and establishes an association full of meaning with a world consisted of different things. "Parimusic" maintains that: "meanings have existed before us (Kalali and Modiri, 2012: 45). In fact, the cultural characteristics of the society penetrate into the body of the place like the soul and are manifested in it and appear in local and spatial backgrounds (Vahdat and Rezaei Raad, 2017: 71). As a result, the semantic parameter of place is a qualitative and metaphorical background and is derived from the presence of events and group memories and generally from that group of features that place has become meaningful due to them (Ghashghaei et al., 2018: 448). Kevin Lynch has considered the improvement of urban life quality due to five criteria of vitality, meaning, compatibility, availability, control and supervision and maintains that the simplest form of meaning to the limited concept of this general term is identity (Lynch, 2016). Compatibility, transparency and readability are components of meaning which express the explicit relationship of a habitation with non-spatial concepts and values (Rezvani, 2016: 64).

Table 2 A review on the views of scientists in relation to the concept of meaning and effective factors on its formation, sustenance or diversity (Source: writer, 2020 narrated by Kazemi and Behzadfar, 2013: 79)

Scientist	Definition of meaning	Effective factors on the formation of environment meaning	Factors of sustainability or variability of meaning
Lynch (1997)	Clarity in comprehending the whole and the components of environment in time and place and its relationship with non-spatial values	Dependent on social, personal, cultural and physical conditions	Creation or reaction of mental image shared with the factor of sustainability of environment meaning
Rapoport (2006)	The result of non-verbal communication of human-environment, the adaptation of mental images with physical elements of environment	Cultural backgrounds/ traditions, social interactions, perceptual conditions, time/ environment reminding dimensions	Social, professional, relative, sexual groups/ multiplicity and diversity of symbols/ variability factor of meanings shared among historical environments
White (2006)	Meaning is the result of observer's perception	Experiences, individuals' perceptual differences	Temporal differences Cultural differences as meanings variability factor
Degen (2008)	Environmental meanings are reflective of social values	Perceptual differences	Different human capabilities like age, the level of physical ability, ethnicity and gender as meanings variability factor
Schultz (2009)	A qualitative matter formed from the special relationships of things with each other in environment	Mental organization of environmental hints	Environment symbolization as meanings sustainability factor/ values continuation as meanings variability factor

Relph (2009)	Environmental meanings are rooted in humans' presence at spaces	Memory, sense of identity, phenomenological approach to things, environment reminding dimensions	Individuals' attitude change as meanings variability factor
Appleyard (2009)		Experiences, mentalities, perceptual space	- Social classification as meanings diversity factor - Age, gender, education, familiarity with agent environment - Meanings variability
Rezazadeh (2011)	Definition of meaning	Dependent on culture, interests and viewpoints of different people	

b) Perception of Environment Visual Quality

The phenomenon of perception is a mental process in which sensitive experiences become meaningful and through which human comprehends the relationships between affairs and the meanings of things. Sensitive experiences, concepts and imaginations resulted from that and the motivation of individual and the position in which perception has happened interfere in it (Ghashghaei et al., 2018: 448). Environmental perception in this relationship is a process that human comprehends necessary data and mental imaginations from environment and combines them with his cognition of environment; which is the result of sensitive perception and cognition interaction. Environmental perception is based on human five senses and objective aspects and vision plays the most role in the visual perception of urban environments (Vahdat and Rezaei Raad, 2017: 71). Kevin lynch (1960) considers the quality of a city possible only through seeing it by citizens. He believes that this is formed by mental image and environmental perception of people of where they live. In relation to the visual qualities of city, he refers to different factors like readability, transparency and visual clarity (Lynch, 2016). Coulomb (1961) represents the theory of "serial vision" in the field of city visual aspects and refers to parameters like visual continuity, visible landscape, existing landscape and… in the visual perception of environment (Coulomb, 2011: 71).

Table 3 Effective factors on the improvement of the visual quality of urban spaces (Source: Vahdat and Rezaei Raad, 2017: 73-74)

Experts	Year	**Effective factors on the improvement of the visual quality**
Lynch	1960	Readability, visual clarity, transparency
Cullen	1961	Sequence, continuity, motion, hidden landscape, diversity in the path of movement
Spreiregen	1965	Landscapes, different visual experiences
Lerup	1972	Continuity, readability, capability of prediction
Lynch & Hack	1985	Unity, readability

Bentley et al	1985	Visual proportionalities, visual sensory richness, readability, visual compatibility
Gehl	1987	Beautiful vision and landscape
Lang	1987	Figures, proportionalities, rhythm, scale, complexity, colour
Tibbalds	1988	Visual desirability, readability, scale, enclosure
South Worth	1989	Vision, landscape
Marcus & Francis	1990	Visibility, desirable light, landscape, facilities
Carr et al	1992	Exploration and secret
Leonard & Lenaard	1993	Direction, readability
Nasar	1994	Figures, proportionalities, rhythm, scale, colour, lighting, shade, hierarchy, spatial communications, ambiguity, innovation, compatibility and wonder, enclosure
Punter & Camrona	1997	Visions quality, skyline, landscapes, controlling and establishing symbolic high-rise buildings
Lokaitou – Sideris & Baberjee	1998	Availability, readability, continuity, services, body beauty
Montgomery	1998	Creativity in architecture, pieces diversity
Oldenburg	1999	Suitable background, readability
DETR/CABE	2000	Visual diversity, readability, continuity, enclosure
PPS	2001	Readability, continuity, diversity, greenness, suitable appearance
Carmona	2003	Roof appearance, skyline, Cornish line, urban walls, floor, ground appearance, natural and artificial elements
Steadman	2004	Landscape
Hoehner	2005	Environmental beauty, continuity and path readability
Hooker	2005	Lighting, public equipment and facilities
De Bourdeu Dhuji	2005	Streets joints, continuity
Burton	2016	Cleanliness, aesthetics
Van Lenthe	2005	Landscape quality
PPSI	2005	Visual attraction, architectural composition, landscaping
Ramirez	2006	Air quality (pollution), street furniture, climatic conditions
Frank	2006	Environmental beauty, adjacency with historical elements
Lee	2006	Environmental beauty, readability
Pikora et al	2006	Diversity in architectural styles
Frank	2006	Joints of passages network, continuity
Carmona	2007	Identity formation factor, relationships of physical components with each other and with the whole
Forsyth & South Worth	2008	Urban furniture, landscape, cleanliness, street visual quality
Kumar	2009	Architectural appearance and walls continuity

c) Identity of Environment

Identity refers to the sense of belonging to a material and spiritual set with elements already formed (Hamdjani et al., 2017: 48). Accordingly, it should be noted that like other objective phenomena, each of the environmental appearance elements has an identity, if on the one hand, they are objectivity independent, and on the other hand, individuals are present in the environment as objective objects and the individuality of individual elements, first recognizing the environmental appearance and then adapting it to their mind (Kalali and Modiri, 2012: 51). In this state, the individual transforms part of the objects of the environment into a mental image; thus, the best way to assess the status of identity will be possible in the two ways below (Doulabi et al., 2015: 40):

1) Addressing the expectations from an environmental objective element; 2) Adapting it to the ideas arising in the individuals' minds (Kamvarshalmani and Hanachi, 2015: 67). Place is the most significant feature in transforming the environment into identity. The environmental semantic quality becomes meaningful when having an identity and roots. Korpela has defined any artificial or natural body to recognize place through time for environment "sense of self" (Korpela, 1998: 144). City is a set of living and dynamic agents whose identity has been transferred through time and the components and elements of its environments including buildings, passages and squares are the product of the creative soul of its residents. If city is considered a set of buildings and urban elements and centers, an appearance has to be given to it which is able to be unique, if identity is given to it or it is built or any other action (Shahabian and Golipour, 2017: 6). In the process of designing based on structural methods through identity measurement, features and mechanisms have been considered for different places which makes them different from each other. Transparency, forms distinction, functions, landscapes and mental imaginations, capabilities, desirability, efficiency improve place in the axis of meaningfulness. All of them are a part of components providing a background to improve the quality of environment which is the objective of environment and urban designers (Kouhifard, 2018: 11).

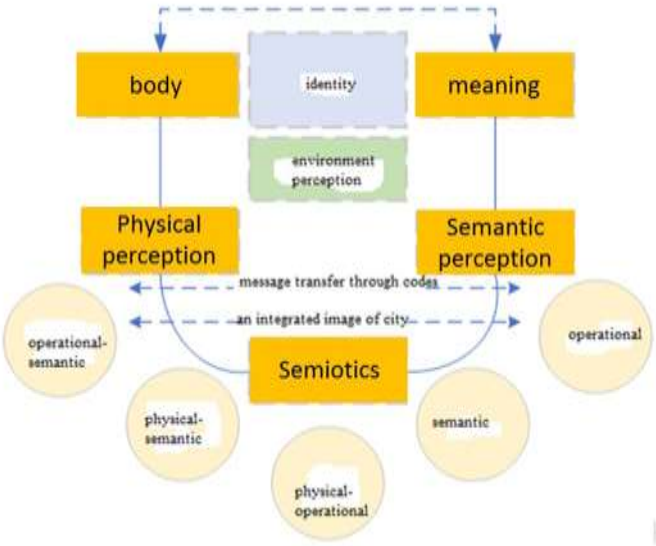

Fig 2 Research conceptual model

3. Research Method

This is an applied study which uses concurrent nested mixed research method with casual-comparative approach in quantitative part and also semi-structured interview used to scrutinize variables extracted from basics and also to allocate basic variables to case scalp and in order to facilitate encoding, the results entered ATLASTI, open encoding used to extract variables, the interviewees have been selected based on the following table and inclusion criteria are having scientific-research studies in relation to the subject and expertise in this field, snowball system used to introduce them. A questionnaire prepared in quantitative part using variables in Likert scale and divided among spatial users in two stages.

Table 4 Expertise of the interviewees

Interviewees	N	Frequency	Cumulative percentage
Professors of architecture	16	34.8	34.8
Professors of landscape architecture	9	19.5	54.3
Professors of urban design	12	26.2	80.5
Professors of urban planning	9	19.5	100
Total	46	100	-

High level of Morgan Table which is 348 is used to sample in quantitative part. Validity confirmed using CVR=0.76 formula and Cronbach's alpha used to confirm reliability as 0.78. Regression coefficient of determination and also graphic correlation coefficient have been also used.

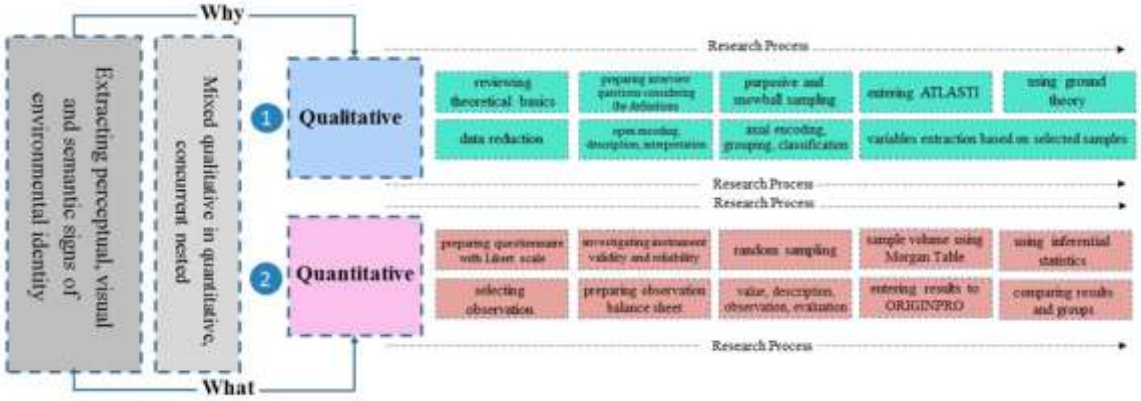

Fig 3 Research process diagram

3.1. Scope of Study

Fahadan is the name of one of the oldest neighborhoods in Yazd, located near the neighborhoods of Bazarno, Shah Abolghasem, and Kooshakno. Also known as Yuzdaran neighborhood, this neighborhood was previously the residence of nobles, elders, and dignitaries. Established in the early fifth century AH, Fahadan neighborhood is surrounded by four main streets named Imam Khomeini, Qiam, Seyed Gol Sorkh, and Fahadan. It is limited to Fahadan Street from the north,

Qiam Street from the south, Imam Khomeini Street from the east and Seyed Gol Sorkh Street from the west. Major uses in the collection include residential, commercial, educational, cultural, administrative, tourism, warehouse, and ruined uses. The main activity points inside the texture include Jame' Mosque complex (including Jame' Mosque, Seyed Rokanuddin Tomb, Vaqat Al-Saat Square, Bazaar and Chahar Sooq Shahi, Religious Islamic School, and Vaziri Library). Fahadan Neighborhood Center (including Davazdah Imams (Twelve Imams) Tomb, Iskandar Prison, Fahadan Hosseinieh, and Fahadan Hotel) is a collection of elements related to cultural heritage and part of the market.

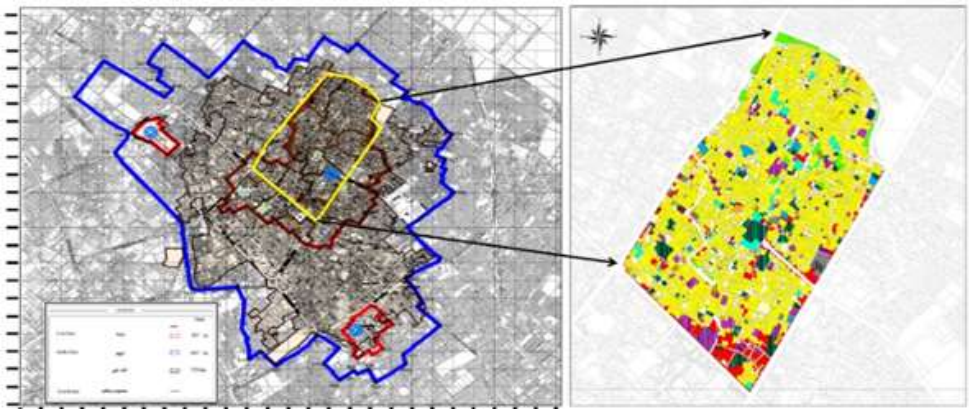

Fig 4 Scope of study (Source: Authors)

3.2. Posht-e Bagh Neighborhood

Posht-e Bagh neighborhood is in Azadi Square (National Garden), Iranshahr Intersection, Shahid Beheshti Square and some parts of Aab Taft Alley and Hashem Khan and is limited to Garage Naji Alley from the east and to Imamzadeh Jafar Blvd. from the north and to Farrokhi St. to the south and to Iranshahr St. and Araghpazha and Golchinan Aleis and Musalla, Mir Ghotb Alley to the east and to Motahhari St. and Chahar Manar Neighborhood from the west. It is worth mentioning that Posht-e Bagh neighborhood has been changed after the establishment of new streets and is consisted of different allies such as Khatib Alley and Musalla Godal and Atigh Musalla neighborhoods and Golchinan Alley, the main position of Posht-e Bagh neighborhood is that is has been a garden established by Ezzoddin Langar of Yazd Atabakan known as Ezzabad Garden which has been dried and destroyed later that only two pieces of arid lands have remained from it which is called Baghok-e Posht in Yazdi ascent that is small garden which was a cemetery that people went there and prayed for the dead there and right now it has become Shahid Rajaei Vocational School. When building the Vocational School ordered by Ayatollah Haj Sheikh Gholamreza Faghih Khorasani, all bones of the dead buried in Hussainiya Ghaemiyeh. According to Yazd local history, Ezzoddin Langar was of Yazd Atabakan Dynasty, he established a vast garden and high and beautiful mansion outside the city for his residence and called it Ezzabad Garden, a famous neighborhood called Khalf Ezzabdad Garden built in that place, it is called this considering the position of this neighborhood behind the mentioned garden, although Posht-e Bagh neighborhood doesn't enjoy high social position these days, and less noble people have lived in this alley at the present generation, the existence of buildings like caravansaries and bazaars, mosques and Hussainiya, tombs and luxurious houses and Ab anbars shows that this neighborhood has been

commercially and religiously important not a very long time ago. The job of residents of Posht-e Bagh neighborhood in the past and especially Khatib alley and allies around the small garden behind Posht-e Bagh was textile (weaving) and people in other parts including big alley behind Posht-e Bagh and Naghshin Hussainiya and Posht-e Sahra neighborhood and etc. were involved in coppersmithing which is demonstrative of that medium and medium-low classes of people have resided in these allies, this complex is consisted of:

Koocheh Yatim Mosque, Hussainiya and Ab anbar of Koocheh Yatim Mosque, big mosque of Posht-e Bagh and its Ab anbar, Khatib Alley Mosque and Hussainiya, Posht-e Bagh bath, historical bazar of Posht-e Bagh, Posht-e Bagh Hussainiya, Masoodi Caravansary, Papoli Caravansary, Imam Hassani Mosque, Naghshin Ab Anbar, Fatheh, cultural and Arabs Houses, Naghshin Hussainiya and Masoodi Ab Anbar (Shahbazi et al., 2017: 69).

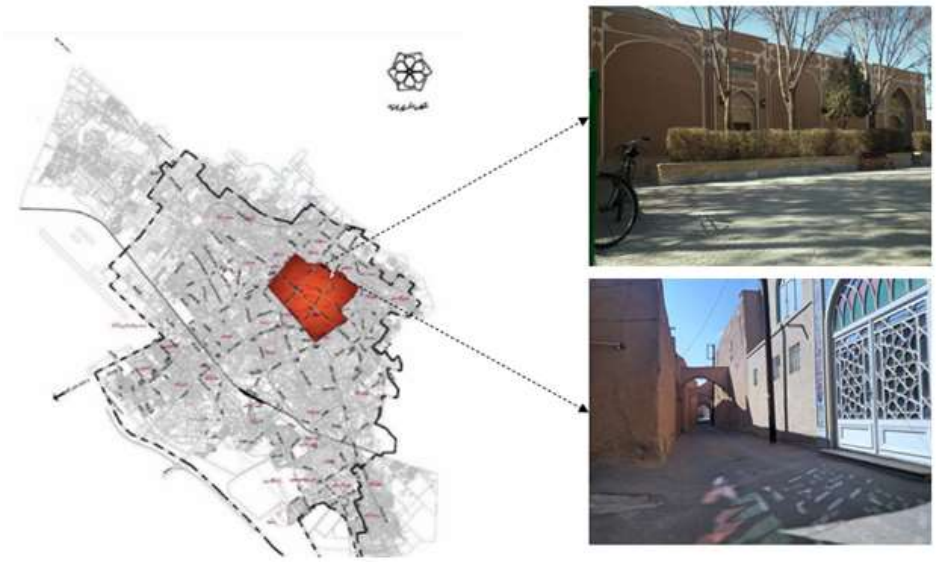

Fig 5 Posht-e Bagh neighborhood (Source: Authors)

4. Findings and Discussion

4.1. Qualitative Findings

In conclusion, all the codes extracted from the interviews related to the role of functional planning in creating sustainable buildings are provided in the figure below.

a) Open Coding

At this stage, the collected data have been frequently reviewed and considered from various angles. Now, the researcher attempts to identify the hidden concepts of the collected data by reviewing them. Finally, with the data obtained from interviews with professors and experts, 27 concepts related to the semantic and visual perception signs in identification were extracted through open coding. This experience structure was according to the type of meanings derived from positive experience and all the complex connections of various dimensions forming the main nature of the signs of semantic and visual perception in identification. The main sections of the resulting space became the fundamental issue for discussing the effective dimensions of the semantic and visual

perception signs in identification and the questions proposed in this regard. Subsequently, the classes formed in open coding were compared and their relationship with their subclasses was investigated. Similar classes were then merged and categorized into an axial class.

b) Extraction of Descriptive-Interpretive Codes in Open Coding

At this stage, the interview transcription is first carefully studied and word-by-word in search of topics related to the research questions, and at each point in the interview where a topic is found, that part of the interview is chosen and a descriptive topic is assigned to it. Descriptive coding of the interview transcriptions is followed by interpretation of their meanings. In the following, a descriptive and interpretive coding of some of the interview transcriptions is presented.

Table 5 Excerpts from concept codes extracted from the interviews text

Extracted conceptual code	Statements taken from the text of the interview and impressions
Symbolic meanings Hierarchy of presence	The components of the environmental significance provide a platform for reaching the perception of the meanings of existence in place, resulting in the creation of place's value and symbolic meanings in the mind. Then the sense of place is achieved from the result of internal relations among various levels of meaning of place, the hierarchy of human presence in various places and levels.
Visual appearance	The human vision structure affects the formation of criteria of the urban wall design and visual perception. The visual environment is analyzed based on its conformity with the human's physiological and visual mechanism and identified in accordance with the visual standards in understanding the image of the visual environment for human eye.
Physical identity Semantic identity	Iranian urban space has identity and its identity is manifested in culture, environment, body, and meaning; while it is not in this way in today's urban space.
Visual manifestation of unity	To preserve the identity and organize the visual system for reading the meanings of the historical context, the lasting values of the neighborhood must be preserved; and attracting and retaining the neighborhood visual cues, creating the spatial unity of the collection, restoring the social and historical identity of the neighborhood, reviving neighborhood units, passages, and historic accesses must be considered.
Perceptual richness Environment readability	Architectural signs of the city cannot provide a meaning appropriate to the individual's culture and identity, and in today's cities, urban spaces lack a clear sense of place and identity. Outstanding buildings and urban signs may play a significant role in enhancing the quality of urban spaces, while being a step towards giving meaning to space as well as creating a sense of place in the audience and making urban spaces readable and understandable, besides creating a sense of place in them.
Sense of ownership Knowledge of the environment	Every age has its own identity and signs; however, where rupture occurs, instances of identity crisis in individuals and the constructed environment show themselves. Thus, although the city is constantly changing, the rate of change in elements, signs, and meanings is not the same; accordingly, its originality and identity is preserved, indicating that the sense of ownership and knowledge of the environment is of paramount importance in the viewer's visual vision.
Harmony between body and meaning	With a cultural pattern, a city cannot be implemented anywhere on the earth, and the identity of each city differs from another city. Human, culture, and human behaviors are considerable components in an environment's identity; hence, the urban environment with an identity can be as a link between the individual and society, the individual and history, past, urban life, time, environment, and nature around him/her. Before focusing on the mentioned content factors, today's urbanization is summed up in physical manifestations. Thus, no concept can be considered for it, since the

	uniformity of the texture of cities, the mismatch of the apparent form of space and its meaning, lack of attention to the concept of culture in the body and meaning can be observed in it.
Harmony between body and building function	In architecture, everything begins from meaning, and indeed, it means that it constitutes the spirit governing human societies as well as every human thing and its crew even man-made buildings. The issue always occupying the architects' minds and causing their viewpoints to collide with each other is whether the form must eventually follow the function or it must be a function of beauty and the function follows the form.
Environment readability Knowledge of the environment	The individuals' positive presence and consequently the promotion and amplification of the level of social relations between individuals in society rely on a correct perception of the environment as well as the attention to the constructed space's signs and semantics. The space structure and its components' accompaniment guide the environmental social action and perception by citizens in defining space besides reading its spatial identity.
Perception of the environment	Signs may play a significant role in the design process to increase the sense of place and build a better quality about the architectural space; hence, the evocative meanings play a significant role in the design of architectural space and the audience's perception.
Natural elements Visual appearance	Human's behavior in the city relies on his/her perception of the environment and the perception phenomenon is a mental process in which sensory experiences become significant, through which human recognizes the relationships of things and the meanings of objects. Thus, it is a sign of a natural element, different from the environment in terms of form and function and employed to induce a sense of place and guide visual meanings in the audience eyes.

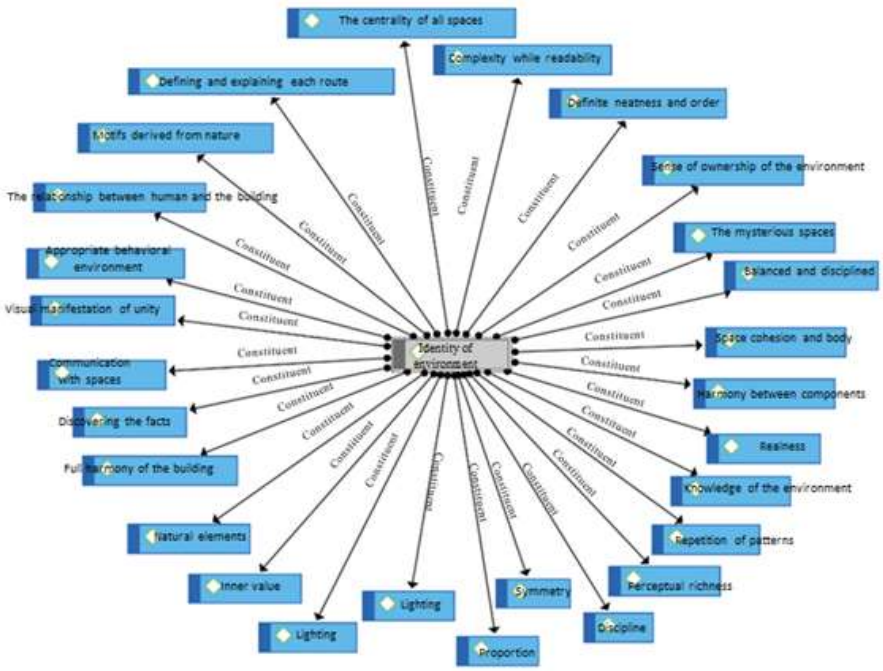

Fig 6 Open coding of variables extracted from the interview transcription

4.2. Quantitative Findings

a) Descriptive Statistics

According to descriptive statistics, 253 (70.7%) of the sample population were men and 131 (29.3%) were women and 74.4% were in 20 - 30 age range. The methodology is that questions have been prepared as much as the number of variables; and each question has a response range from 1 to 5 Likert scale. The total scores of the indices of a parameter means the score that each person has given to the considered quality. So obtainable score by each quality varies from 5 to 25. Accordingly, those have scored 5 to 11 evaluated it weak, those scored it 12 to 18 evaluated it medium and those scored it 19 to 25 have evaluated it good. The results of descriptive statistics showed that the most frequency of data achieved from semantic signs and cognitive visual signs variables in Posht-e Bagh neighborhood belongs to balance and order (1901) and the least frequency is related to natural elements (1048). In Fahadan neighborhood, the most frequency is related to proportionality (1899) and the least one is related to motifs taken from nature (1017). Considering the drawing line of variables mean, it is revealed that all variables in Posht-e Bagh enjoy higher coefficients.

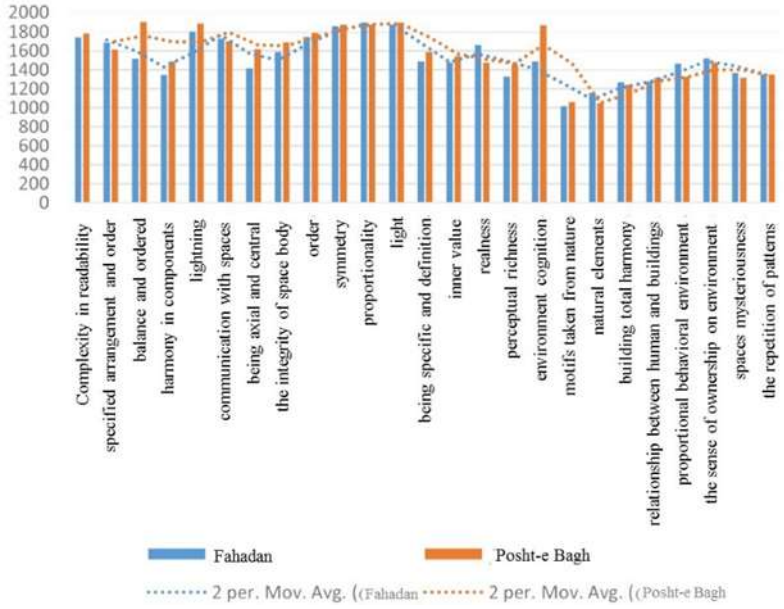

Fig 7 Frequency of variables

Complexity in readability, specified arrangement and order, balance and ordered, harmony in components, lightning, communication with spaces, being axial and central, the integrity of space body, order, symmetry, proportionality, light, being specific and definition, inner value, realness, perceptual richness, environment cognition, motifs taken from nature, natural elements, building total harmony, relationship between human and buildings, proportional behavioral environment, the sense of ownership on environment, spaces mysteriousness, the repetition of patterns Posht-e Bagh, Fahadan.

b) Inferential Statistics

Correlation: The results of questionnaire entered Sigma plot after numbering, prediction relations (regression) and correlation relations used for analysis. Two- Sample Kolmogorov-Smirnov Test used to investigate the parametric and non-parametric type of data.

Table 6 Kolmogorov-Smirnov Test to investigate normality of semantic and semiotic indices in visual system

Variable	Mean	SD	Kolmogorov-Smirnov	p
Semantic and semiotic indices in visual system	65/35	47/1	576/0	366/0

According to the above table, Kolmogorov-Smirnov Test is significant for the score of ecological architecture variables in different seasons of architecture (p-0.318) and so they don't enjoy normal distribution and they have been used for non-parametric analyses.

Inferential Statistics: Variables internal correlation matrix used for linear regression and or multivariate regression. After drawing the diagram of correlation matrix, it was revealed that the factors lack linear relationship so it is correct to use multivariate regression.

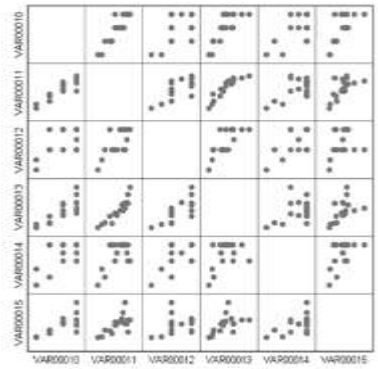

Fig 8 Factors correlation matrix

According to regression coefficients achieved from variables in both Posht-e Bagh and Fahadan neighborhoods, it was revealed that all spaces are axial and central (1.000), specifying, explaining and defining each path (0.958) and inner value (0.921) have the highest coefficient of determination and effectiveness in Posht-e Bagh neighborhood and the least effectiveness is related to conceptual richness (0.246) but all spaces are axial and central (1.000), inner value (0.978) and special arrangement and order (0.920) have the highest coefficient of determination in Fahadan neighborhood and the least one is related to motifs taken from nature (0.254).

Table 7 Coefficient of determination of multivariate regression of semantic and semiotic indices variables in visual system

Scale	Fahadan				Posht-e Bagh			
	t	β	F	Coefficient of determination	t	β	F	Coefficient of determination
Complexity despite readability	46/522	0/781	527/222	0/752	39/451	0/762	314/217	0/867

special arrangement and order	42/152	0/732	405/122	0/920	44/328	0/372	523/147	0/895
Balance and ordered	40/223	0/662	217/343	0/803	36/823	0/872	852/381	0.825
Harmony among components	38/239	0/648	199/943	0/746	39/362	0/685	298/921	0/625
lighting	8/958	0/664	201/612	0/681	18/958	0/597	247/257	0/612
Communication with spaces	11/134	0/662	643/623	0/816	16/644	0/436	644/321	0/656
All spaces being axial and central	18/441	0/652	849/683	1/000	21/422	0/852	845/523	1/000
The integrity of space body	19/144	0/665	349/603	0/846	19/144	0/665	754/254	0/645
Order	49/173	0/483	184/945	0/814	39/231	0/213	124/541	0/715
Symmetry	47/963	0/464	276/748	0/546	29/914	0/425	232/241	0/514
Proportionality	46/226	0/452	199/943	0/795	24/221	0/414	201/321	0/795
Light	47/228	0/463	499/034	0/243	48/248	0/421	443/124	0/323
specifying, explaining and defining each path	25/288	0/472	523/34	0/895	25/288	0/621	522/134	0/958
Inner value	45/256	0/661	147/258	0/978	65/254	0/615	229/265	0/921
Realness	41/552	0/452	321/564	0/462	49/517	0/424	323/412	0/421
Perceptual richness	21/356	0/401	492/371	0/331	25/326	0/423	441/211	0/246
Environment cognition	58/321	0/411	471/658	0/745	58/351	0/454	321/541	0/821
Motifs taken from nature	19/694	0/421	650/987	0/254	29/324	0/341	621/991	0/285
Natural elements	24/879	0/589	542/960	0/455	21/825	0/578	581/920	0/675
Building total harmony	44/587	0/521	214/362	0/781	31/586	0/514	218/654	0/754
Relationship between human and buildings	48/566	0/542	752/382	0/756	48/566	0/542	752/382	0/756
Suitable behavioral environment	23/658	0/545	699/301	0.645	25/618	0/541	514/321	0/661
The sense of ownership of environment	12/231	0/411	421/115	0/831	22/131	0/654	428/167	0/874
Spaces mysteriousness	16/897	0/309	411/325	0.315	287/861	0.221	431/175	0.265
Patterns repetition	36/458	0/517	161/415	0/811	43/418	0/521	154/425	0.727

Graphic correlation between two neighborhoods shows that they have 0.48 correlation coefficient.

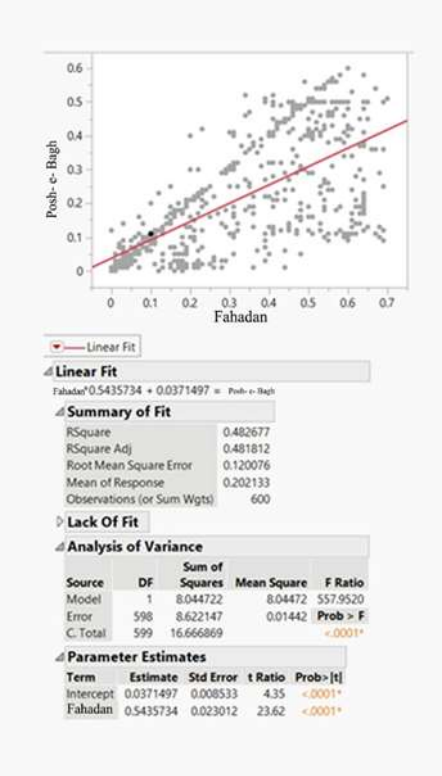

Fig 9 Graphic correlation of semantic and semiotic indices variables in visual system with Originpro

5. Discussion

Considering the results achieved in the last part, the variables of semantic and semiotic indices of visual system in neighborhoods totally lead to identity. These variables have high coefficient in both neighborhoods, graphic correlation confirms this, generally physical variables have high value in both neighborhoods and mystical variables have lower values. And also coefficient of determination achieved from variables in Posht-e Bagh neighborhood has higher mean, after extracting impact factor and investigating it, it was revealed that spatial users focus on spatial independence of each space to form identity and consider their presence next to each other as spatial desirability, in some parts of the neighborhoods using decorations as signs has created stronger and more powerful schema in the mind of audiences, it is doubtful that some users may perceive it.

6. Conclusion

Perceptual and visual signs play an important role in the identity formation of urban contexts and may be a way to induce identity, encourage and invite individuals to present at them in the centers of different neighborhoods, one of the ways of environmental studies in recognizing identity formation in neighborhoods is recognizing perceptual and semantic signs derived from visual systems, these signs exist in neighborhoods with spatial vitality and success to their different performance. But some of them have higher coefficients, it is different in all neighborhoods. The following strategies are recommended for environmental design based on perceptual and visual signs containing identity for different neighborhoods:

Independently designing spaces for supporting special activities.

Using native and national symbols in the decorations of neighborhoods buildings to induce identity.

Defining readable paths to make visual security and separating rider and walker in neighborhoods to deeply communicate with neighborhood and more sense of belonging.

Using special geometry to make independent graphic identity in the mind of spatial user and integrating culture with geometry elements like proportionality and balance.

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