

Perceptual Analysis of Fast and Irregular Transformations in Historical Urban Landscape (Case Study: Historical-Religious City of Ray and *Shemiran* District-Tehran)

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Abstract

In the recent century, Tehran has been confronted with urban sprawl and rapid population growth that have caused urban landscape transformation, which is different in various parts of Tehran based on specific economic, cultural and social situations. What is important in this essay is the human perception of their landscape in this process of transformation; therefore, the purpose is analyzing landscape perception in order to answer the following questions: "What are the effective landscape elements on perception in this changing landscape?" To answer the question, two historical parts of Tehran, *Tajrish* and Ray, were examined through an interview. In order to analyze landscape perception in these two case studies, 6 main factors including constructed landscape elements, rootedness, attachment to place, social relations, and adaptability of use and landscape satisfaction were selected and evaluated by a questionnaire. Results in *Tajrish* have shown that elements of the past, even though destroyed or hidden, form people's perception. However, in Ray elements from recent constructions have mostly affected people's perception. Consequently, discovering the effective elements, which are directly influenced by the context, is a significant factor to know how people perceive their landscape. With the consideration about people's perception in each specific context, landscape designers would be able to design valuable landscapes and enhance the quality of urban places.

Keywords: Landscape Perception, Urban Landscape, Urban Transformation, Historical Landscape

1. Introduction

Landscape may generally be considered as the study of anything in connection with the appearance of a space or environmental context or visualizing and experiencing it (Francis, 2012). In this respect, urban landscapes offer this experience to their users. Based on the definition of landscape by the European convention of landscape, "Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors (ELC, 2000).

Scientists from different fields such as ecology, urban science, environmental science, and landscape architecture have studied landscape from different aspects. Generally, all studies have defined landscape from three perspectives. The first one is the physical view that is addressed mostly by biologists, landscape ecologists and landscape architects. In the second view, landscape is studied as a perceptual reality whose features result from economic activities, social interactions, and personal experiences and preferences. According to the third, combined view, fragmentation should be examined in terms of both physical (ecological) and perceptual (sociocultural) aspects (Assar Khaniki, et.al, 2015). All these perspectives are defended by some scientists and many studies have been done on all dimensions of the landscape. One of the landscape aspects that does not receive significant attention in urban studies is the perceptual dimension.

Urban landscape is directly linked to the citizens' perception and memories as well as city context. It has been discussed by various theorists in the course of time. Gordon Cullen and Kevin Lynch are two theoretical pioneers in this field who addressed urban landscape in their books "The Concise Townscape" and "The Image of the City." In his book, Cullen considered landscape to be useful since it makes us recall our memories and experiences, i.e. the same internal emotional reactions that can disrupt our thoughts when they emerge (Gosling, 1996). Chokor emphasized landscape assessment quality as well as the participation of the users of the space. In fact, he held that pleasant, beautiful urban landscapes with high environmental quality may be achieved only in case efforts are made to create them as a sign of people's taste and demand in new environmental initiatives and reconstruction and enhancement plans of the residential community (Chokor, 1990). Belanger also emphasized the existence of special signs in urban landscape. There are indeed elements in urban landscape, including natural and artificial elements, urban spaces, people's perception and mentality of the spaces, events that occur, time, identity, culture, history, holy things, and signs that call memories to the mind. Physical, environmental elements are directly perceivable by human senses. Physical contact can certainly have a positive effect

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on the health of the users of the space (Philip, 2014). There are traditionally two schools of thought concerning landscape interpretation and human perception, namely global preferences and personal preferences.

1.1. Global Preferences

In global preferences, theorists such as Appleton, Berlin, Wilson, Howard, and Kaplan investigated landscape perception according to common human features. They believe landscape perception to be mainly affected by landscapes that provide humans with survival opportunities. Smith studied human preferences and interpretations of the environment according to neuropsychology. In this theory, the brain processes of human perception of the environment are examined. As a geographer, Appleton put forward prospect-refuge theory. He believes humans enjoy the landscapes that fulfill their biological needs (Porteous, 1996). This theory also states that people are more interested in the landscapes that allow them to take shelter while looking at the scenery (Fisher and Naussar, 1992; Kaymaz, 2012).

According to Berlin's theory, landscape perception hinges on the conflict and uncertainty therein (Chang, 2009 in Kaymaz, 2012). According to his theory, four factors define the stimulation potential in a stimulus: complexity, novelty and freshness, lack of congruence, and remarkableness. According to Kaplan's information processing theory, humans gather information from their environment via their senses. This information is mainly visual. They hold that the environment structure is important because it affects the meaning that the observer attaches to the environment (Martindale, 1996). In Wilson's Biophilia hypothesis, human biologically inherits the need for a relationship with the nature and living creatures. It thus seems reasonable that humans feel bonded with nature and living creatures. In this regard, Ulrich (1993) explained that specific natural processes have brought advantages for human during evolution. Hence, human tends to nature. On the other hand, Howard brought up the discussion on signs within the framework of secondary landscape (Howard, 2011). According to Howard's viewpoint, the observer can perceive an improved landscape, a greater number of or different landscapes by adopting signs. Other studies conducted by Stephan and Rachel Kaplan demonstrate how landscape design with the aid of environments with reconstruction capability and attention restoration theory has deeply affected the relationship between human and nature. In this respect, they presented three components to analyze what transforms a natural environment into an effective environment in mental restoration: 1- being distant, freedom, peace of mind; 2- expansiveness, vastness, or breadth; 3- compatibility and conformity (Kaplan, 1983). Kevin Lynch introduced one of the most fundamental theoretical concepts in the behavioral theory of perception, i.e. the concept of

"readability" in urban space, denoting a relationship that social players (citizens) can potentially or actually establish with urban space via "reading" (Fokouhi, 2004). Lynch considered the five constructive factors of urban spaces to be roads, borders or edges, neighborhoods, nodes, and signs. In his view, signs are spots with a certain density of semiological meanings among all urban signs.

1.2. Personal Preferences

In personal preferences, the effects of culture and personal experience on perception are studied. The most important theorists of this school are Gibson and Tuan. According to Gibson's environmental capability theory, environmental perception is a process through which human selects the data obtained from the environment in light of his needs. Thus, human perception invariably involves knowledge of the surrounding environment (Gibson, 1966). He investigated the meaning of perception by discussing the concept of capability. As Gibson explains, when we perceive a thing or subject, we indeed observe its capability, not its particular quality. Environmental capabilities hint at both the environment and the observer. This means that they both have objective and subjective characteristics and equally include environmental and behavioral facts (Gibson, 1979). The observer is of great consequence to Gibson. Therefore, for a given society, the applied knowledge of environment and landscape capabilities may differ from those of other people or societies because, in his view, it is defined by social, cultural, economic, and human context of the environment as well as climatic and local factors of the environmental context (Kyttä, 2002, p.109). On the other hand, Tuan highlighted the cultural aspects of landscape in topophilia theory. At the same time as a daily event repeats itself in an environment, a special character forms in that place. This theory points toward the historical aspects of landscape as well as the cultural signs that are influenced by landscape perception in a specific culture. Fokouhi, Belanger, Johnson, Appleton, Nassaur, Rachel, Silverman, Howard, Schwarz, and Rapport advocate cultural-historical perception theories. According to cultural-historical perception theory, perception of space may differ to various degrees depending on culture and even subculture. This may be rooted in symbolic, mythical, religious, political, economic, and social beliefs (Fokouhi, 2004). In the viewpoints of Belanger and Anouk, common values and hope for future may be related to urban landscapes in a memorial way (Belanger, A, 2002). As described in the historical section on landscape perception studies, Johnson, Appleton, and Howard also believe in Tuan's

theory. Accordingly, they make use of historical evidence such as written documents and ancient works for landscape perception analysis (Rachel M., 2012). Schwarz also holds that open spaces perceptions of the residents (Schwarz et al., 2012). In Nassaur's view, people make the landscapes according to their beliefs and what their neighbors think. Moreover, in his viewpoint, cultural customs and habits directly affect human behavior regarding landscape construction, especially local landscapes. Culture filters landscape perception, just as landscape was influenced by literature and new cultural filters in the nineteenth century (Nassaur, 1995). Influenced by Carl (1970) and Wohlwill (1973), Rappaport also addressed people's subjective perceptions and their effects on residential complexes and the way environment is formed. Residential complexes are designed just like all other synthetic environments, meaning that they involve special decisions, selections, and methods of performing tasks (Rappaport, 1987).

1.3. Landscape Analysis Frameworks

In landscape analysis studies, some theorists have put forward frameworks established on the basis of people's mental structures, landscape visual characteristics, or landscape attributes. They have each presented certain components given the content of the studies. In this regard, mental structures generally emphasize landscape perception components such as effective elements, attachment to place, rootedness, and what forms social relationships (Soinia K. et al., 2012). According to Ode's framework, the visual characteristics of landscape imply such attributes as complexity, integrity, disturbance, supervision, visualization, visual scale, naturalness, and transience (Ode et al., 2008). According to Coeterier's framework, landscape attributes suggest unity, use, naturalness, linear and cyclic time sequence, spaciousness, and sensory representations (Coeterier, 1996). Factors such as cultural and ethnic characteristics are highly important in the context under study with respect to determining components for different frameworks.

historical background of the site as well as the mental

1.4. Landscape Perception Variables

Landscape generally consists of three important variables with which it may be known: 1. Components: Distinct factors and elements including distinguished, eye-catching components such as hills, valleys, forests, trees, buildings, and roads that form landscape. These elements may be measured and are easy to describe. 2. Characteristics: The combination of components creates landscape characteristics, such as a sense of place, and a feeling of being in a natural environment. 3. Identity of landscape: Identity is the distinguished, recognizable pattern of components that occur sustainably in a certain type of landscape and this pattern is perceived by people. There are variables in any landscape for analysis such as physical, biological, and human variables. Examples of physical variables are mountains, valleys, width of valleys, and altitudes and types of mountains. Examples of biological variables are vegetation close to water flows, biology of water, and biology of mountain sides. Examples of human variables are factors that change the landscape such as memorability of a location. In various landscape studies, different components are selected and investigated according to research objectives. Accordingly, landscape perception analysis components need to be discussed in light of the objectives of this research.

2. Material and Methods

2.1. Materials

From the time it was selected as the capital of Iran and especially since the beginning of the nineteenth century, Tehran confronted many events and physical changes. These changes are different in various parts of Tehran based on specific economic, cultural, and social situations. In this essay, in order to examine people's perception of these changes, two parts of Tehran, presenting outstanding historical and cultural features, are selected as the case studies (Figure 1).

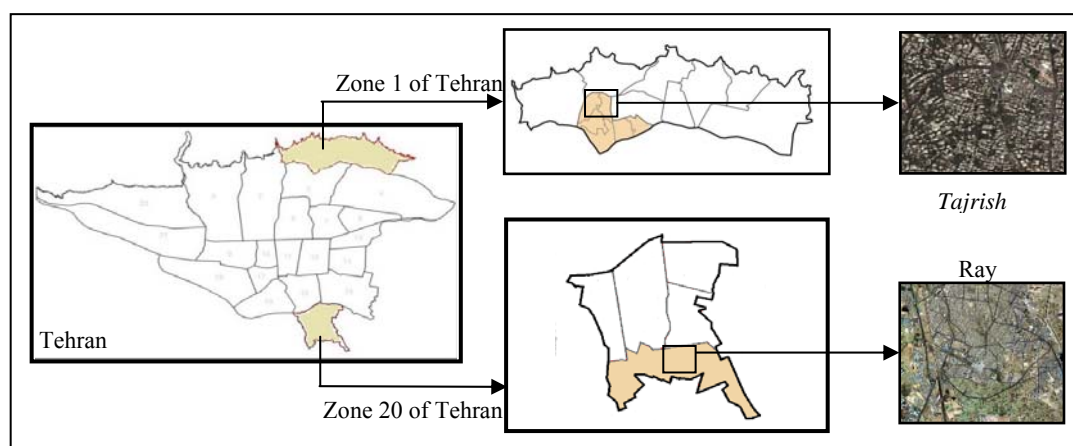


Fig. 1. The location of each case study in relation to Tehran

Tajrish is located in the north and Ray is in the south of Tehran. *Tajrish* in Tehran has an altitude of 1800 meters on the north, is met by Modarres, Sadr, Chamran and Babayi Highways on the south, is met by Lashgarak Road and Ghoochak Forest Park on the east, and is met by Darband River on the west. The area is located at the foothills of Central Alborz Mountains, which has unique natural potentials and capacities. An analysis of *Tajrish* neighborhood's landscape was carried out in micro scale. The existence of gardens, wells, rivers, and proximity to the foothills has made *Shemiran* a favorable countryside when the weather is hot although, during recent decades, rapid changes have changed the future of the landscape and, as a result, many gardens and historical elements were removed. Today's landscape is affected by exorbitant constructions and new elements.

Ray in the south of Tehran has an average altitude of 1064 meters, met by Azadegan Highway on the north, Shahid Avini Highway on the South, Sorkheh Hesar Canal on the east, and Shahid Rajaee Highway on the west. Today, the area borders with farmlands on the east and the south. Additionally, in the past the area was totally surrounded by farmlands. Now, as a result of urban sprawl and uncontrolled constructions, most of the farmlands are replaced by high-rise buildings. Many historical elements such as Karvansara and historic roads are hidden among massive buildings, and the only existing element of the past is the shrine that has lost its previous role in the local people's life. In addition, narrow memorial streets are replaced with highways, putting the residential district apart from preserved farmlands. Current heterogeneity has shaped a new landscape facing crucial challenges from natural structure and function up to the identity problem which creates a suitable place to study the relation of landscape changes and people's perception.

2.2. Research Method

Since measuring people's landscape perceptions a survey and considering the fact that landscape perception is a complex issue related to people's senses (sight, hearing, smell, touch, and even taste) (Howard, 2011; Strang, 2004; Jessel, 2006; Carles et al., 1992; Eiter, 2010; Bell, 1996), the field method of interview was selected to gather information. In order to gain information about people's perception and mentalities, 6 main factors including

3. Results & Discussion

3.1. Landscape Perception Analysis in Samples under Study

According to the method proposed in this research, landscape spatial elements need to be identified. It should become clear which of the spatial elements in the site affects people's mental perception of the space. These elements may include all spatial elements or a part of them. That is, certain elements may be physically present in the landscape; however, they may exert no effect on people's perception of the space. The identification of these mental elements results in gaining knowledge about a mental diagram that demonstrates people's perception of

constructed landscape elements, rootedness, attachment to place, social relations, adaptability of use and landscape satisfaction were selected and evaluated by a questionnaire. The first part of data gathering, which led to gaining historical and cultural knowledge about each sample, was a desk study through image reading, use of maps, statistics reading, and use of diagrams. To measure people's mental perception, data was collected using the field method of interview as mentioned above. Sampling was done according to the unique characteristics of each sample via combined classified method, snowball method, or a mixed method.

Snowball sampling was adopted. Depending on the time and place in which a person lives, specific components will be of importance; hence, 30 people from the residents of the neighborhood who had lived in that place since childhood were selected. In this respect, attaining a mental map of the elements and components affecting mental perception in samples under study will be possible by analyzing the results of interviews (according to the highlights obtained and short answers to questions without considering explanations) with the statistical population.

3.2 Data Analysis

Landscape analysis on the basis of people's mental structures is emphasized in this study. People's mental perception could be analyzed using a number of effective factors including natural, synthetic, and mental elements that are obtained from people's perception of their surrounding environment and landscape (Gohari, et al., 2016). Each of these factors could be in relation to some particular elements in places where local people have lived for a long time.

The interview questions were designed in view of landscape perception variables and according to the three main frameworks by Coeterier (1996), Ode (2008), and Soinia (2011), each of which presented components to analyze landscape perception. In line with the research objective and in light of the historical and cultural characteristics of Iran, certain topics, which may be seen in Table 1, were extracted from the presented models upon which landscape perception analysis was based. The residents' perception and mentality about the elements and spaces in urban landscape were extracted via these topics and given the components constituting each of them. the space and determines important elements of the space as seen by users.

In view of identification studies, current spatial elements existing in the landscape were extracted for each sample under study (Table 2). These elements were measured in connection with factors and components put forward in Table 1 (Table 3). The results of Table 3, which provide the factors affecting people's perception, are shown as distinct diagrams for each sample in Figures 2 and 3. Finally, to develop the mental diagram, the elements affecting people's perception were categorized into three groups, namely natural, synthetic, and mental (Diagrams 1 and 2).

Table1
Significant factors of mental perception adopted (Source: Soinia.K., et al.2011)

Factors Components	
Constructed landscape elements	Yards and gardens
	Old production buildings
	Old streets and specific vegetation
	Old houses and the ways between gardens
	River
Attachment to place	Topography
	I prefer these landscapes to any other.
	I'm happy when I'm looking at this
	This landscape evokes many memories
	I miss this landscape when I'm away.
Rootedness	I feel that I can be myself in this region.
	My roots are here.
	This region is important because my family My livelihood is dependent on the region.
Social relations	I care about the future of this landscape.
	I feel a part of the local community.
	I'm not moving away from this region in the
Adaptability of use	There aren't any disturbing details in the
	I feel like I'm able to move freely in the
Landscape satisfaction	I don't miss my childhood landscape
	I like the landscape topography.

Table 2
Spatial elements existing in *Tajrish* and Ray, (Source: The Authors)

Tajrish ID	Ray ID
	Yards & Gardens1Farmlands8
Spatial elements	Valiasr Street2New highways and
	Upper and Lower 3New constructions10
	Old houses4Bazaar11
	Darband River5Historic roads12
	Land topography6The holy shrine13
	Tajrish district7New districts14
	Old district15

Table 3
Effective elements which make people's perception in *Tajrish* and Ray, (Source: The Authors)

Factors	Components	Spatial elements														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Attachment to place	I prefer these landscapes to any other.	●	●		●		●					○				○
	I feel that I can be myself in this region.	●						●				○				○
	This landscape evokes many memories within me.	●		●	●			●					○	○		
	I'm happy when I'm looking at this landscape.	●			●			●				○				○
Rootedness	My roots are here.	●	●		●			●								○
	This region is important because my family originates from here.			●												
	My livelihood is dependent on the region.		●	●				●				○				○
Social relations	I care about the future of this landscape.	●	●	●		●	●	●				○	○			○
	I feel a part of the local community.											○				○
	I'm not moving away from this region in the near future.										○	○				○
Adaptability of use	There aren't any disturbing details in the landscape.	●										○				○
	I feel like I'm able to move freely in the landscape.							●		○	○					○
Landscape satisfaction	I don't miss my childhood landscape elements.	●	●	●												○
	I like the landscape topography.							●								

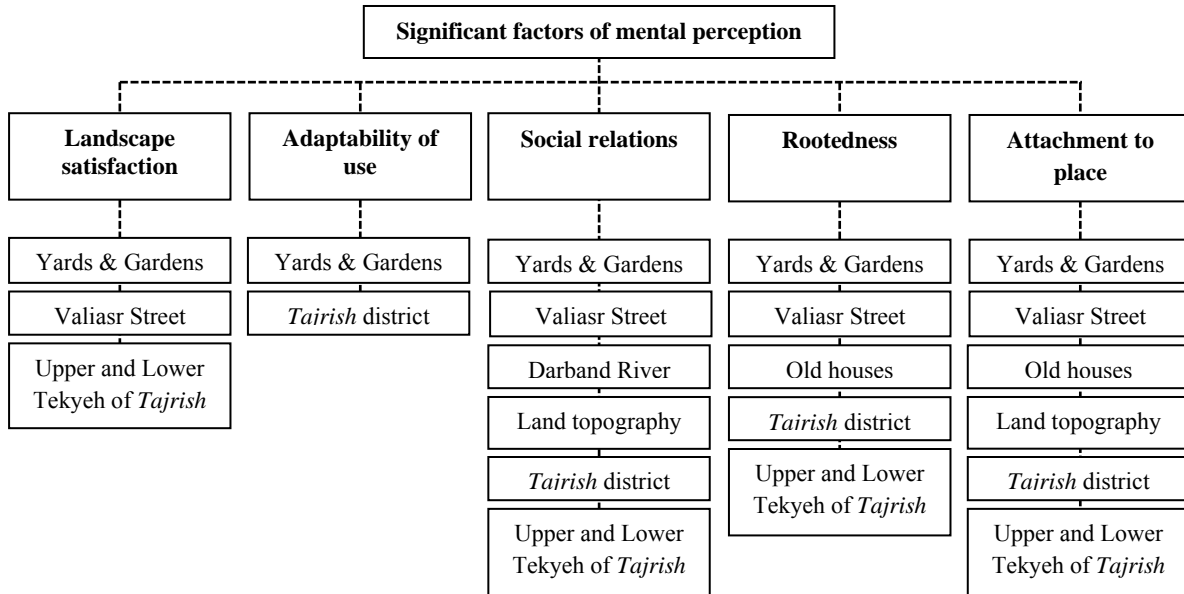


Fig. 2. The factors affecting people's perception in *Tajrish* district, (Source: The Authors)

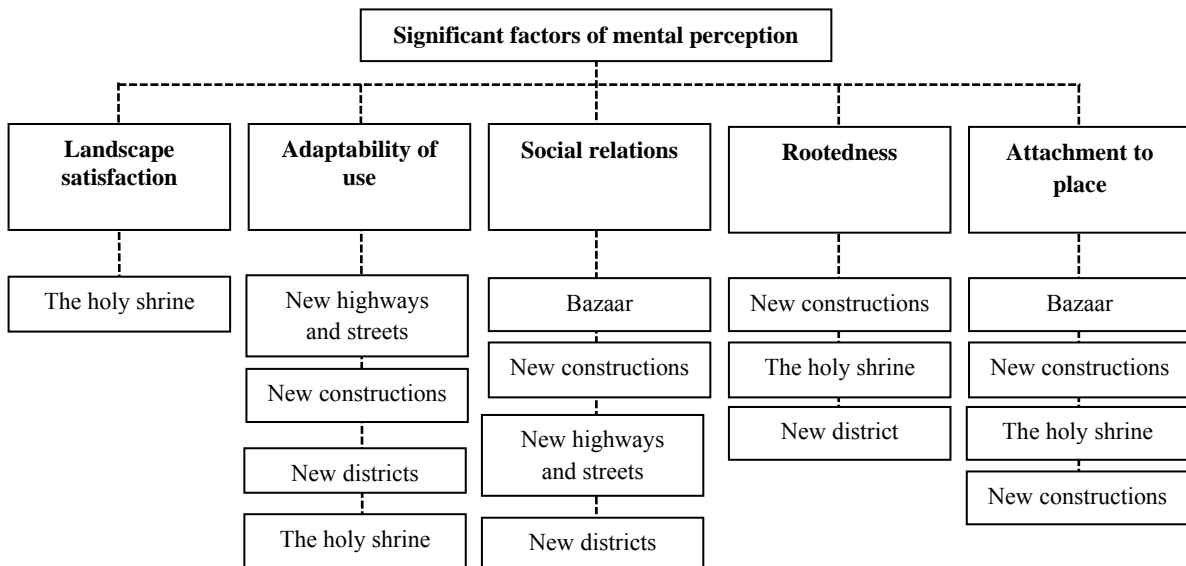


Fig. 3. The factors affecting people's perception in Ray

3.3. Perception Analysis of the First Sample

In general, when people perceive their surrounding environment, they establish a close relationship with it. These perceptions can be investigated in terms of living conditions, demands, and mentalities; therefore, in *Tajrish* district there are some significant elements which are mentally valuable and have had vital effects on people's perception. These effective elements, which have remained in mentalities from the past until the present time in *Shemiran* landscape (*Tajrish* district), are such elements as Valiasr Street plane trees, fruit trees, scents and odors of nature, water and its freshness, farmlands, Ferdows Garden, Emamzadeh Saleh Mosque, Upper and Lower Tekyeh of *Tajrish*, garden-houses, and old qanats. According to the information obtained from Table 3, the mental diagram obtained from neighborhood residents may be seen in Figure 4.

3.4. Perception Analysis of the Second Sample

As per the information attained from Table 3, the main, effective elements constituting the majority of the mentalities of local people of this area are as follows: The shrine of Shah Abdolazim, new highways and streets, the Shrine market (Bazaar), new districts and neighborhoods that occupy a considerable percentage of urban space and new constructions. In fact, these elements have the highest priority in the people's mind, and what they have in mind as the city of Ray is a combination of the Shrine, constructions, and new neighborhoods and roads. This is because people are satisfied with recent transformations. New highways have made their living place more convenient and connected to Tehran. Recent constructions and changing the land use of farmlands to residential use have had many economic profits for them. Moreover, they do not have any attachment to previous agricultural

landscape since they were somehow useless because of the drought and people's new lifestyle. Further, people's

mental diagram is put forward on the basis of effective elements Figure 5.

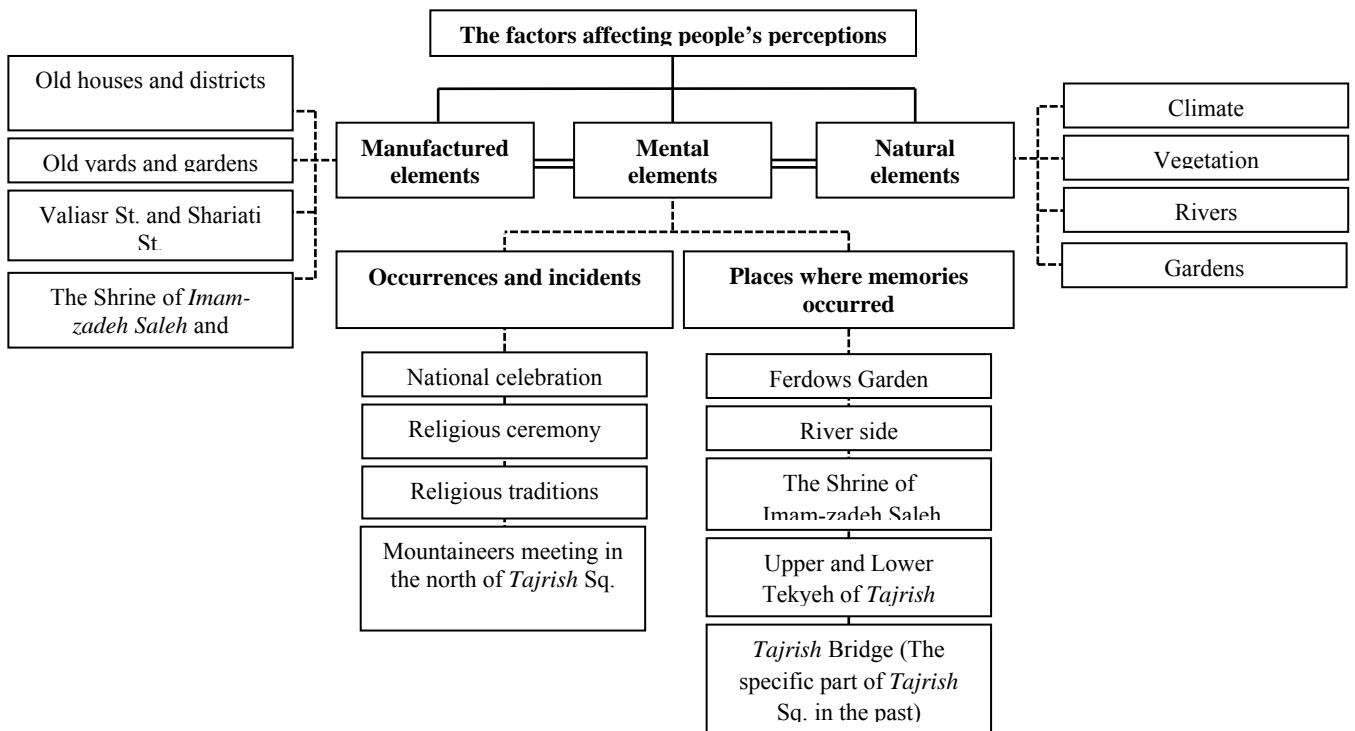


Fig. 4. The mental diagram achieved from people's perception in *Tajrish* district

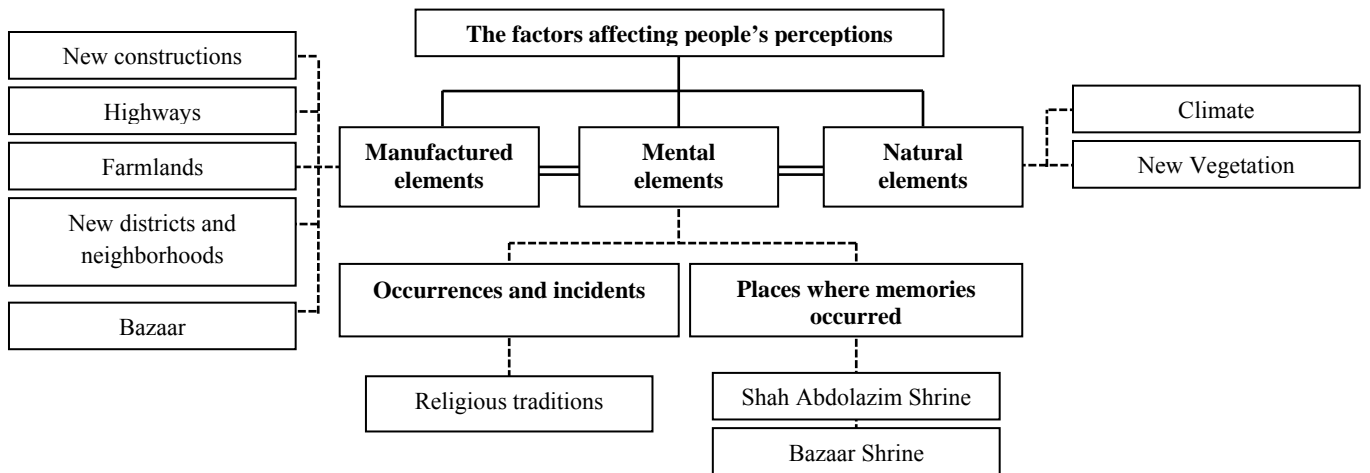


Fig. 5. The mental diagram achieved from people's perception in Ray

4. Conclusion

People's perception of urban landscape transformation was investigated in two different samples, both of which have a historical background; however, the extent of variations differs in them. People's mental perception was analyzed with the aid of a number of effective elements including natural, synthetic, and mental elements. Accordingly, a mental map of people's perception of the surrounding environment and landscape was developed. The results indicated that gardens, old buildings, temples, and streets, which contain a great deal of memories,

exerted the greatest effect on people's mentalities of urban landscape regarding *Tajrish* sample. These signs cause people to care about what happens to urban landscapes. However, as a result of the effects of the development of Tehran on the existing landscape and these old, effective elements losing their significance owing to new constructions, social relationships have declined and, consequently, there is no attachment to the existing landscape. This has caused a decrease in conformability with space and, as a result, the residents

have decided to leave their place of living. In the second sample, the constructions, roads, and highways built in recent decades as well as the Shrine have produced the greatest effect on people's mentalities of urban landscape. In light of the results, contrary to the first sample, the new elements have brought about the greatest effect on people's perception in this sample. Even though old elements have lost significance, the positive effect of new constructions on people's life has caused the existing landscape to have a greater effect on people's perception. That is why they place more importance on it. Comparing the results of these two samples shows that in every place based on the context, there are specific perceptions causing people to have different evaluation of particular spatial elements in different landscapes. These results greatly affect future decision makings about the landscape in landscape planning and design works that should care about people's perceptions and what they value in order to protect them in their future decisions and designs.

References

- 1) Assar Khaniki, Z., Darabi, H., & Irani-Behbahani, H. (2015). Integrated Analysis of Urban Landscape Fragmentation (Case study: Historical-Religious City of Ray). *International Journal of Environmental Research*, 9, 511-522.
- 2) Belanger, A. (2002). Urban space and collective memory: Analyzing the various dimensions of the production of memory, *Canadian Journal of Urban Research* 11. 1: 69-92
- 3) Bell, S. (1996). *Elements of Visual Design in the Landscape*. London, E&FN Spon.
- 4) Carles J, Bernaldez F, de Lucio, J. (1992) Audio visual interactions and sound scape preferences. *Landscape Research*, 17/2, 6-52.
- 5) Chokor, B.A. (1990) Urban Landscape and Environmental Quality Preferences in Ibadan, Nigeria: An Exploration, *Landscape and Urban Planning*, 19, 263-280.
- 6) Coeterier, J.F. (1996). Dominant attributes in the perception and evaluation of the Dutch landscape. *Landscape and Urban Planning*, 34. 27-44.
- 7) European Landscape Convention, ETS 176, 20. X.2000.
- 8) Eiter, S. (2010). Landscape as an area perceived through activity: implications for diversity management and conservation. *Landscape Research*, 35:3, 339-359.
- 9) Fisher, Bonnie & Nasar, Jack (1992). Fear of crime in relation to three exterior site features, *Environment and Behavior*, 24, 35-65.
- 10) Francis, P. Hutchinson, P. J. (2012). Landscapes for peace: A case study of active learning about urban environments and the future, *Futures* 44: pp.24-35.
- 11) Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.
- 12) Gibson, J. J. (1966). *The Senses Considered as Perceptual Systems*. Boston: Houghton Mifflin.
- 13) Gosling, D. (1996). "Gordon Cullen: Visions of Urban Design", London, Academy Edition.
- 14) Gohari, A. Behbahani Irani, H. Salehi, I. (2016) Methodology of urban landscape perception in relation to collective mentalities and memories: Case Study of *Tajrish* district, *Journal of Environmental Studies*, Volume, 195-210.
- 15) Howard, P.J. (2011). *An introduction to Landscape*. Ashgate.
- 16) Jessel, B. (2006). Elements, characteristics and character; Information functions of landscapes in terms of indicators. *Ecological Indicators* 6, 153-167.
- 17) Kaplan, R. (1983). A model of person-environment compatibility, *Environment and behavior*, 311-332.
- 18) Kaymaz, I.C. (2012). *Landscape Perception*. Landscape Planning, In Tech.
- 19) Kaytta, M. (2002). Affordances of children's environments in the context of cities, Small towns, Suburbs and rural villages in Finland and Belarus, *Journal of Environmental Psychology* 22, number 1-2, 109-123.
- 20) Lynch, K. (1960). *The Image of the City*, the MIT Press, ISBN: 0-262-62001-4, USA.
- 21) Martindale, C. (1996). How can we measure a society's creativity? In: *Dimensions of Creativity*, M.A. Boden, 159-198, MIT Press.
- 22) Nassauer, J. (1995). Messy ecosystems, orderly frames. *Landscape Journal* 14 (2), 161-170.
- 23) Ode, J. Tveit, M.S & Fry, G. (2008). Capturing Landscape Visual Character Using Indicators: Touching Base with Landscape Aesthetic Theory, *Landscape Research*, 33:1, 89-1.
- 24) Philip, B., Emma, S. (2014), The power of perceptions: Exploring the role of urban design in cycling behaviors and healthy ageing, *Transportation Research Procedia* 4: 68 – 79.
- 25) Porteous, J. W. (1996). Dominance-One hundred and fifteen years after Mendel's paper. *J. Theor. Biol.*, 182, 223-232.
- 26) Rachel, M., Rachel E. S. (2013). Stumbling upon history: collective memory and the urban landscape, *Springer Science Business Media B.V. GeoJournal* 78: 791-801.
- 27) Rappaport, J. (1987). Terms of empowerment/exemplars of prevention: Toward a theory for community psychology. *American Journal of Community Psychology*, 15 (2), 121-148.
- 28) Schwartz, B. (1982). "The Social Context of Commemoration: A Study in Collective Memory.
- 29) Soini, K., H. Vaaralab and E. Poutaa 2011. "Residents' sense of place and landscape perceptions at the rural-urban interface." *Science Direct*.
- 30) Strang, V. (2004). *The meaning of Water*. Berg publisher.