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A Comparative Study of Persian Gardens Values based on the Indicators of Prospect-Refuge Theory

Kamyab Kiani[a]- Mohammad Reza Bemanian[b*]- Mansour Yeganeh[c]

[a] Ph.D. Researcher in Architecture, Faculty of Architecture and Urbanism, Imam Khomeini International University (IKIU), Qazvin, Iran.

[b] Professor, of Architecture, Faculty of Arts, Tarbiat Modares University, Tehran, Iran (Corresponding Author).

[c] Associate Professor, of Architecture, Faculty of Arts, Tarbiat Modares University, Tehran, Iran.

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ABSTRACT

Explanation of the Persian garden's objective-subjective values derived from the indigenous and Iranian identity has been always considered by landscape and green space architects, and many Persian garden designers and researchers have regarded them as identity indicators to design spaces. Therefore, analysis of the Iranian garden using the indicators of prospect-refuge theory (a theory in the field of green space design), can reveal these values as much as possible. In the present study, the indicators are derived from the prospect-refuge theory, considered one of the main theories in landscape design. The research's main question is to what extent can the indicators of prospect-refuge theory explain the quantitative/qualitative values of the Persian garden? It is a descriptive-analytical study in which comparative analysis and logical reasoning have been used. The qualitative data has been collected by reviewing relevant texts and documents and library studies. The analyses have been done at two descriptive and inferential levels using the comparative analysis logic. The indicators relevant to the Persian garden include vastness and spaciousness, orientation, comfort and tranquility, eternality, endlessness, the concentration of attention, attractiveness and harmony, and centrality and organization of space, and indicators related to prospect-refuge including complexity, view and landscape, security and refuge, and the mystery of space. The results indicate that the qualitative nature and values of the Persian garden cannot be explained by the indicators of prospect-refuge theory, and only its general attributes shared with green spaces can be evaluated using this approach. The Persian garden has unique qualities and characteristics that cannot be measured and evaluated by quantitative and calculative approaches.

Keywords: Persian Garden, Prospect-Refuge Theory, Comparative Analysis, Objective-Subjective Values.

* E_mail: bemanian@modares.ac.ir

1. INTRODUCTION

Examination of the quality criteria of the landscape is one of the design challenges in the recent period, considering the diversity and variety of the methods and approaches. Each of the existing approaches expresses the characteristics of a desirable environment through the provision of some indicators and criteria. One of the considerable approaches that have been a basis for the formation and design of urban landscapes is the prospect-refuge theory (Dosen and Ostwald 2013). This theory is one of the most important theories in landscape perception literature in the recent period. It considers landscape perception to be the result of mutual interaction between man and the environment. The emergence of this theory led the designers to somehow use the teachings of this theory (Kaplan 1989).

This theory was developed by Appleton through an investigation of the relationship between man, the environment, and animals (Appleton 1975). The four concepts of security and refuge, view and landscape, complexity, and mystery are considered to be the quality criteria of the landscape and spaces (Appleton 1984). Regarding this theory, it is noted that in addition to the internal conflict between these concepts and the complexity of achievement of these four components and creating an equilibrium between them, its comprehensibility and power to explain all dimensions of the landscape, and generally, the objective-subjective dimensions of the landscape, are under question. Accordingly, the efficiency of this theory in the explanation of the Persian gardens' values has been analytically investigated. These values have two objective and subjective dimensions. The objective dimension includes the entrances, walls, and physical elements, while the subjective dimension includes non-tangible elements such as orientation, eternality, and endlessness.

The main objective of the present study is to examine the efficiency of the indicators of the prospect-refuge theory in landscape design, express its strengths and weaknesses in landscape design, examine the special values of the Persian garden, provide its unique strengths and values, and provide a framework for the comprehensive examination of the qualities and elements of the Persian garden to use its patterns and concepts in the design of contemporary spaces. In line with the present study, it is implied that what components have formed the Persian garden? Another question is that, as a widely-used contemporary theory in the environment and landscape design, how can the indicators of prospect-refuge theory be effective in the identification and explanation of objective-subjective values of the Persian garden?

To investigate and answer these questions, the values of the Persian garden and its quality components, the characteristics of the prospect-refuge theory and its characteristics and components, and the constituent environmental elements of these components have been analytically investigated. Finally, the extent to which the values of the Persian garden are explained by the indicators of this theory has been comparatively analyzed.

2. RESEARCH BACKGROUND

Iranians have been long interested in the construction of gardens. Based on writings of Greek historians, nearly 3000 years ago, most Persian houses had been surrounded by gardens or paradises (Mehdizadeh, Seraj, and Nkoogoftar 2011). Garden construction in different regions of Iran, which were compatible with the climate and characteristics of their contexts, represents a different world full of emotions, tranquility, and comfort, . Among the signs of garden construction, one can mention the works of the Sumerians who, in their writings, mentioned building heavenly gardens by the order of the god of water built by the god of the sun (Moynihan 1982). Garden construction can be seen in all cultural regions of the world and is a demonstration of the cultural-social landscape of the societies. In garden construction, the most important factor forming its existence is the set of religious and cultural foundations, due to existential reasons (Bemanian et al. 2007). The present study has specially aimed to analyze the values of the Persian gardens to examine their quality criteria. Examination of these criteria has been facilitated by the indicators of the prospect-refuge theory.

Table 1. The Persian Garden

Research Title	Descriptions
Learning From the Past: Recreating Historic Persian Gardens in Downtown Tehran (Shayanfar 2019)	1. Persian garden is a cultural, historical, and identity phenomenon. 2. The geometric division of the Persian garden is done by streams of water. 3. The identity and design of the Persian garden are influenced by deep spiritual principles that are rooted in Iranian culture and identity.
Thermal Comfort Characteristic of 5 Patterns of a Persian Garden in a Hot-Arid Climate of Shiraz, Iran (Ojaghlou and Khakzand 2019)	1. The geometry of the Persian garden is the main concept of its identity, and the quadrilateral design is the main theme of the formation of the Persian garden.

Research Title	Descriptions
The Role of Historical Persian Gardens as Urban Green Spaces: Psychological, Physical, and Social Aspects (Aliyas and Masoudi Nezhad 2019)	1. The Persian garden is a link between place (as a psychological factor) and a sense of security (as a social factor). 2. The connection between man and nature in the Persian garden is the connection between freshness and tranquility.

Table 2. The Prospect-Refuge

Research Title	Descriptions
An empirical research study on prospect–refuge theory and the efect of high-rise buildings in a Japanese garden setting (Senoglu, Ekin oktay, and Kinoshita 2018)	1. Increasing environmental safety by preventing visual disturbances caused by environmental elements. 2. Increasing the subjective aspect of safety (perceived safety) in relatively open environments.
A Prospect-Refuge Approach to Seat Preference: Environmental psychology and spatial layout (Psathiti and Sailer 2017)	1. The interaction between the mind, behavior, and the world forms the basis of the identity of environmental psychology, which are one of the main elements that form the prospect-refuge theory.
A Parametric Design Model for Numerically Measuring the Design Attributes of Prospect-Refuge (Hwang and Lee 2018)	1. Prospect-refuge is a concept to explain the preferred environment that increases concentration and security, which ultimately increases comfort.

Investigation of the research background indicates that the studies conducted in this field have comparatively analyzed the efficiency of a theory in the explanation of the values of landscape architecture. The innovation of the present study is the development of the prospect-refuge theory for the investigation of Persian garden quality.

3. METHODOLOGY

The present study is developmental, seeking to develop the environmental design theories for green spaces and contemporary Persian gardens. The methodology is based on specialist analyses and descriptions. The data required has been collected by the library method and reviewing various documents. Using logical reasoning and comparative analysis, the values of the Persian garden have been investigated based on the indicators of prospect-refuge theory. The analysis unit in the present study is the Persian garden as well as its components, elements, and values.

In the research process, first, the problem statement and its necessity and importance have been investigated and presented in the form of the questions and objectives in a general research structure. To investigate the theoretical and empirical background of the subject, the theoretical literature of the Persian garden as well as the prospect-refuge or safe landscape have been studied. Accordingly, an objective-subjective-analysis indicator has been extracted. Also, also, the indicators for reviewing prospect-refuge theory have been extracted, and by the combination of two dimensions, the comparative framework of the values of the Persian garden has been introduced based on this theory. Afterward, the indicators relevant to each indicator of the Persian garden and the components of the prospect refuge have been formulated. Finally, the explainable values of the Persian garden as well as the positive characteristics of the prospect-refuge theory that can be used in other relevant studies have been presented.

4. THEORETICAL FOUNDATIONS OF THE PROSPECT-REFUGE THEORY

The prospect-refuge theory is one of the most important theories in landscape perception literature in the recent period which considers landscape perception to be the result of mutual interaction between man and the environment. This theory was first developed by Appleton based on environmental studies and the synergy between man and animal behaviors (Appleton 1975). This theory believes that aesthetical perceptions are rooted in human biology (Porteos 2010). This theory was first focused on the role of man in the prehistoric period, both as a hunter and prey in nature. Appleton has implied the importance of "seeing without being seen" for hunting without being hunted (Appleton 1975) and expressed that the natural choice leads to the preference for those settings in the settlement in which the human has the opportunity to see (prospect) without being seen (refuge). Therefore, the landscapes in which man can feel aesthetical satisfaction should possess some characteristics relevant to prospect and refuge in an equilibrium (Senoglu, Oktay, and Kinshita 2018).

The indicators of prospect-refuge theory are derived from the 19th century's anthropological belief in

human survival instinct (Darwin 1958) which directly investigates human reaction to environmental stimuli. Nevertheless, at least in the philosophical tradition of the west, this theory can be rooted in the intellectual concepts of René Descartes, separation of mind, and Cartesian dualism.

Later, based on logical studies, Edmund Hussrel (1913) proposed a phenomenological philosophy that was related to the interaction between man and the environment. Martin Heidegger has described the connection between man and the environment as one of the elements of existence; an unparalleled continuous process between the body (subject) and the environment (objects) (Appleton 1984). Since the advent of phenomenology, many other theories have described the human body as an examination of environmental relations. For example, studies on proportion have developed a wide range of form theories in architecture. In 1949, Rudolf Wittkower published the book "The architectural principles in the age of humanism" in which he investigated the search for symmetry, equilibrium, and proportional relations as a fundamental part of human nature. In addition, he argues that the concepts and beliefs about order should be extracted from men and their relationship with the environment.

On year later, Le Corbusier (1950) suggested the modular as a universal tool and therefore, promoted a solution for the geometry or aesthetics between the body and the architecture. Christopher Alexander (1959) provided another suggestion for mathematical analysis of the ideal and practical dimensions to indicate a flexible domain of significant dimensions (Alexander 1959). Alexander's job is important since it widely and symbolically expands the environmental relations that dominated architecture from the renaissance period so that it could cover more psychological issues. However, until the 1960s, Christian Norberg-Schulz linked the philosophical tradition of phenomenology to the architectural theory which claims men only perceive their environment as a structured whole, not as random sequences of personal views. Norberg-Schulz (1985) developed this idea for the description of the "spirit of a place" as a result of acceptance of the natural potential of the site and compatibility with the weather and traditional construction patterns (Appleton 1984).

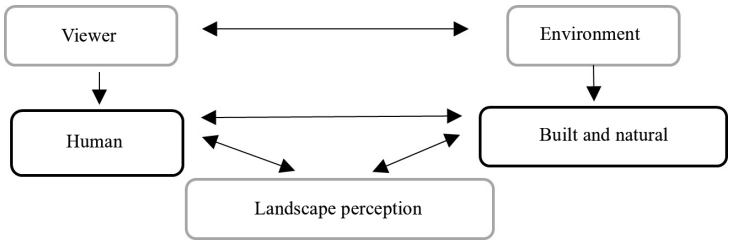


Fig. 1. Landscape Perception Process

Table 3. Theoreticians

Theatricians	Year (AD)	Description
Hussrel	1913	Phenomenological philosophy: Human-environment interaction
Rudolf Wittkower	1949	The architectural principles in the age of humanism
Le Corbusier	1950	Modular as a universal tool
Darwin	1958	Human survival instinct
Christopher Alexander	1959	Relationship between the environment and the architecture
Christian Norberg-Schulz	1960	The link between architecture and the philosophical tradition of phenomenology
Appleton	1975	Biological studies between humans and animal behavior
Christian Norberg-Schulz	1985	Spirit of environment
Grimm	2009	Beauty is the relationship between the viewer and the environment

Appleton considers the existence of the symbols to be an effective factor in space perception. He suggested this theory can be used in various fields for aesthetical analysis of the environments. In this regard, this theory was widely used in landscape and architecture design. The research on the indicators of prospect-refuge theory indicates that concepts and subjects such as the refuge, open and closed space, seeing or being seen, paths, edges, physical signs, security, and mysteriousness have been investigated (Chiang 2014;

Harvey 2015; Richthofen 2018; Dawes 2014; Gue 2018; Amati 2018; Baran 2018; Dosen 2016).
Appleton explains that the priority of the natural environment as an intrinsic trait of humans can influence social, historical, and cultural effects, too (Heerwagen 2008). Appleton proposed two theories of habitat and landscape in response to the questions "What type of landscapes do we like and why do we like these types? (Dosen and Ostwald 2013).

The light and lighting methods can be important in terms of both quantity (bright, dim) and direction (seeing the front or back). Another environmental characteristic that can possibly influence security is ecology. Therefore, under the prospect-refuge theory, the aesthetical preference for the environment is a function of determination of the possible secure or dangerous places (Stamps 2008).

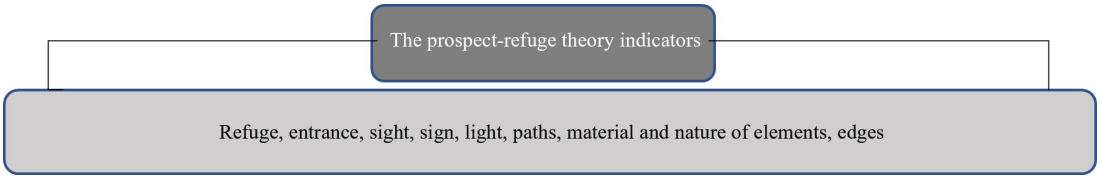


Fig. 2. The Indicators of the Prospect-Refuge Theory

Table 4. Key Components of the Prospect-Refuge Theory

Elements and Qualities	Subcategories Complexity		Complexity		Security and Refuge		Prospect and Landscape		Space Mysteriousness	
Characteristics			Strengthening	Weakening	Strengthening	Weakening	Strengthening	Weakening	Strengthening	Weakening
Refuge	Built		*	*	*	*	*	*	*	*
	Wall-less		*	*	*	*	*	*	*	*
	Enclosed		*	*	*	*	*	*	*	*
Entrance	Significant		}{	}{	}{	}{	}{	}{	}{	}{
	Non-Significant		}{	}{	}{	}{	}{	}{	}{	}{
	Main		}{	}{	}{	}{	}{	}{	}{	}{
	Secondary		}{	}{	}{	}{	}{	}{	}{	}{
Prospect	Continuous		≠	\\\	\\\	≠	\\\	≠	≠	\\\
	Interrupted		\\\	≠	≠	\\\	≠	\\\	\\\	≠
	Wide	Horizontal	≠	\\\	\\\	≠	\\\	≠	≠	≠
		Vertical	\\\	≠	≠	\\\	\\\	≠	\\\	≠
	Limited	Horizontal	\\\	≠	≠	\\\	≠	\\\	\\\	≠
		Vertical	\\\	≠	≠	\\\	\\\	≠	\\\	≠
Sign	Natural (trees)		()	()	()	()	()	()	()	()
	Artificial		()	()	()	()	()	()	()	()
	Symbol		()	()	()	()	()	()	()	()
Light	Natural		#	#	#	#	#	#	#	#
	Artificial	Direct	#	#	#	#	#	#	#	#
		Indirect	#	#	#	#	#	#	#	#

Elements and Qualities	Subcategories Complexity	~~Complexity~~		Security and Refuge		Prospect and Landscape		~~Space Mysteriousness~~	
Characteristics		~~Strengthening~~	Weakening	Strengthening	~~Weakening~~	Strengthening	~~Weakening~~	~~Strengthening~~	Weakening
Paths	Main	⌗	⌗	⌗	⌗	⌗	⌗	⌗	⌗
	Secondary	⌗	⌗	⌗	⌗	⌗	⌗	⌗	⌗
Material and Nature of Elements	Diversity	»«	«»	»«	«»	«»	»«	«»	»«
	Similarity	«»	»«	»«	«»	»«	«»	«»	»«
Edges	Visible	><	><	><	><	><	><	><	><
	Invisible	><	><	><	><	><	><	><	><
Symbols	Presence of Refuge * Absence of Refuge * Direct Entrance }{ Indirect Entrance }{ Prospect \\\ Lack of Prospect \\\ Significant () Non-Significant () Light # Darkness # Direct Path ⌗ Indirect Path ⌗ Similarity »« Non-Similarity «» Presence of Edge >< Absence of Edge Light ><								

5. THEORETICAL FOUNDATIONS AND BACKGROUND OF THE VALUES OF THE PERSIAN GARDEN

The Persian garden has a phenomenological and semiotic nature. The Persian garden is an area enclosed by mysteries and secrets. This place is a memory that does not remain within its borders. Its domain goes beyond the walls and its restrictions such as natural and cultural pillars and the potential of its surroundings (Rahnama 2013). Examination of the values and textual analysis of the Persian garden are done through layered semiotics. This semiotic examination allows for the distinguishing mutual expectations of the textual layers from each other.

The most important principle of the Persian garden is its formation based on a main axis. The main axis as the main path and the branching of secondary paths from it will create a transparent structure in the geometry and spaces of the garden (Mansouri et al. 2016). This axis which plays the main role in both plan's geometry and the deep vision of the viewer in the garden space is considered to be the main structure of the garden. In fact, this axis, which is placed along the main entrance, leads to the perception of the chosen landscape, which is the main landscape and memory of the garden, by the targeted management of audience movement. On the other hand, the placement of the important components of the garden such as the water stream, a row of trees, and the pavilion building on this path, in addition to their value regarding the role they play in the garden, leads to significant incidents that form the individual's perception of the space and occur on this axis (Mansouri et al. 2016).

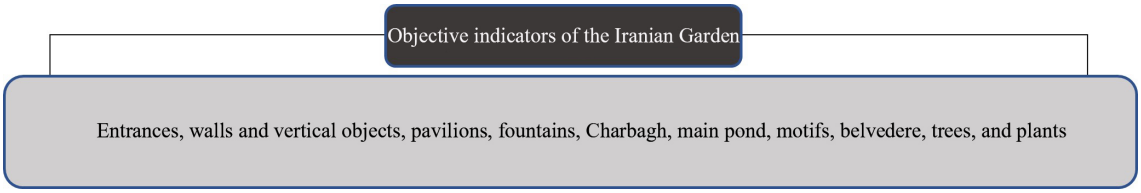
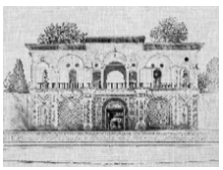
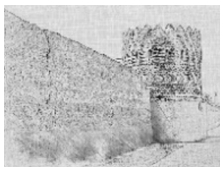
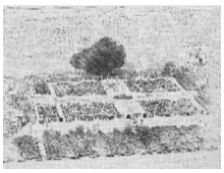
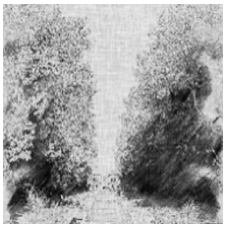


Fig. 3. Objective Indicators of the Persian Garden

Table 5. The Persian Garden Elements

Features	Aesthetical Aspect	Symbolic Indicator	Location	Functional Aspect	Elements	Diagrams
Entrances	- Location of the crew - Entering the garden - Decision-making place (only government garden)	- The lowest part of the garden - Placement at the beginning of the main axis of the pavilion	- Greatness - Emphasis on the horizontal axis of the garden	- The identity that separates the garden from the outside world - The separation of the gentle world from the harsh world (at the entrance, from hell to heaven)	- The entrance is the first stage in the hierarchy of entering the Persian garden - Mainly concrete materials - Emphasizing the axis-orientedness of the garden	 Mahan's Sahzdeh Garden Entrance

Features	Aesthetical Aspect	Symbolic Indicator	Location	Functional Aspect	Elements	Diagrams
Walls and Vertical Objects	- Providing security - Creating privacy	- Located all around the Persian garden	- The brick material of the walls (symbol of the identity of the Persian garden)	- Separating the spiritual space from the mundane (the sublime position of the garden)	- Enclosing and separating the Persian garden from the outside world	 Outer Wall of the Arg-e Karimkhani
Pavilion	- Place of residence and rest of the ruler	- In front of the main pond - Located on the entrance axis	- Placement on the main axis of the garden - Placement on the highest part of the garden	- Creating a sense of climbing to the viewer from the garden entrance - Creating a sense of greatness in the viewer from the garden entrance	- The octagonal shape of the pavilion is a reflection of the divine throne (according to the Islamic traditions and hadiths of the world, it is placed on the shoulders of eight angels)	 Dolatabad Garden Pavilion
Water Streams	- Water transfer from the tank to different areas in the garden	- In general, from the entrance to the pavilion	- Water movement - The sound of water and poppling (Bongardia)	- Creating a sense of movement in the garden - The water streams are like blood in the veins of an Persian garden	- Stitching the earth and the sky with the turquoise color of the bottom of the ponds	 The Water Path of Negarestan Museum Garden
Fountains	- Water discharge with clay pots (aquifer, fountain, and trap)	- The intersection of the main and side streams	Water poppling	- Creating a sense of dynamism and excitement in the garden - Create a soundscape in the garden	- As a show of the high status of water in the eyes of Iranians	 Negarestan Museum Garden Aquifer
Charbagh (A special Persian Garden Pattern)	- Division of Persian garden - Forming the garden paths	- Shaping the main structure of the garden	- Formation by the intersection of garden axes	- The best manifestation of form and meaning derived from the belief of Iranians - Derived from the four heavenly water streams in the Torah and the four rivers in the Holy Qur'an	- The divider of the Persian garden with a special meaning and concept that originated from the belief of Iranians.	 Charbagh Shape of Amer Fort India
Main Pond	- Water storage - Creation of water stop points	- Placement in front of the main pavilion	- Special square, hexagonal, and... forms	- Creating a pause space - Shaping water to the form of the pond - Creating a turning point	- Symbol of the introversion of the Persian garden - An emphasis on the unseen world and an interpretation of divine attributes	 Fath Abad Garden

Features	Aesthetical Aspect	Symbolic Indicator	Location	Functional Aspect	Elements	Diagrams
Motifs	- Expressing a narrative story - Adding beauty to the Persian garden	- Placement on the garden wall - Placement on the pavilion wall	- Using different colors	- Creating a narrative landscape for the viewer - The combination of colors adds beauty to the garden	- Creating variety in the walls - Beautiful collocation of handicrafts and nature in the garden	 Dolatabad Garden
Belvedere	- Creating a broad view of the Persian garden	- Placement in the highest part of the garden	- Being in a higher place than the rest of the garden - Having a good view of the garden	- Showing the greatness of the Persian garden - Inducing a spatial sense of the garden being separated from the universe	- A framed view from the pavilion to the garden (a selected view and landscape from the garden)	 Mahan Shazdeh Garden
Plants and Trees	- Making shades - Emphasis on vertical and horizontal axes - Plotting - Emphasis on eternality with evergreen trees	- Placement in different parts of the garden depending on the type of use - Placement on the main axis	- Use of deciduous trees - The use of evergreen trees makes the garden constantly fresh	- Creating greenery and freshness - Transforming the Persian garden into a paradise in the heart of the earth	- The greater ratio of nature to the pavilion in the Persian garden (the high place of nature in the eyes of Iranians)	 Mahan Shazdeh Garden

The content analysis of the Persian garden indicates that a collection of objective and subjective elements are the main constituent elements of the values and qualities of the Persian garden. The geometry, axis, plants, building, and water are among the most important elements of the Persian garden. Geometry, as an important factor in the formation of architecture, is a base for the form of the Persian garden. The most important feature and indicator of the Persian garden is the full geometry and the pre-planned and organized space. This geometric base plays an important role in the design of concepts, principles, and construction of garden materials. Moreover, it affects the combination of these elements which finally determines the general form of the garden (Nassehzadeh 2010). The axis in the Persian garden is the backbone and the location to place important and forming elements of the garden (Mansouri 2005, 59). The plant (trees and flowers) is another main element in Persian gardens. In the ancient civilizations of Iran, the plants had a special position (Haghighat et al. 2012). The studies on the plants and trees in the Persian gardens indicate that the plant species can be divided into fruit and decorative types (Khalilnezhad and Tobias 2015). Since water is among the main elements of the Persian garden, the space formation cannot be realized without water in the Persian garden construction. The studies show concepts and subjects such as geometry, water, axis, plants, healing, renewing, city garden, usefulness, motifs, reliefs, and Persian garden worldview have been investigated (Mohammadzadeh and Noori 2017; Etezadi 2016; Asadpour 2018; Abdollahi 2015; Sheibani and Hashemzadegan 2016).

Another important objective of the design of the Persian garden is a rectangular landscape in front of the garden. The front area of the building contains an open and high space at the main location of the landscape. Short plants are planted to avoid creating an obstacle on the opposite side of the garden (Nassehzadeh 2010). The buildings are another important element in the Persian garden. These buildings are built on different parts of the garden for various purposes. Sometimes, the main building is on one side and other buildings are built around it with some passages. The main view is located on the longitudinal axis. In some gardens, the palace is located on the longitudinal axis with a one-third ratio, the inner buildings are located at the end of the garden, and the main view is located on the opposite side of the inner buildings (Nassehzadeh 2010).

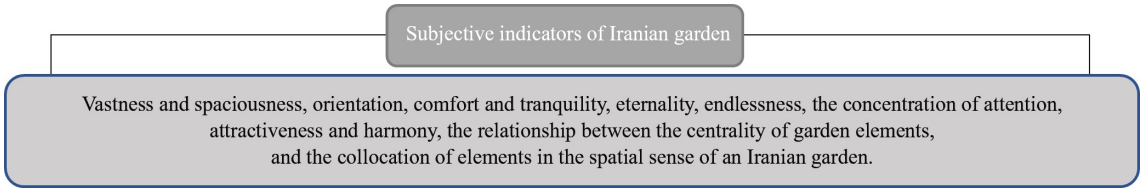


Fig. 4. Subjective Indicators of Persian Garden

Table 6. Values of Persian Garden

Aesthetical Aspect	Functional Aspect	Symbolic Indicators	Qualities
Vastness and Spaciousness	The collocation relationship in the Persian garden exists in layers such as the science of perspectives in an intensified form: 1. The depth in the environment, the slope of the land in a natural way, the stair geometry of the garden 2. The placement of the pavilion at the highest point and the entrance at the lowest point 3. The difference in the angle of human vision on the skyline makes the garden more spacious	- Greatness - Making the collection look wider	- Likening the Persian garden to a paradise garden - Creating a high position in the minds of the audience from the Persian garden
Orientation	The attraction of the audience towards a higher position than the world: 1. Integration of the water axis with motion axes	- Directing the audience to the main pavilion	- Creating a focused vision of the pavilion
Tranquility and Comfort	1. The order of nature 2. Nature design in different layers	- Creating geometric order - The use of uncomplicated forms to increase the sense of environmental tranquility	- Symmetry and geometric order always make beauty
Eternality	1. Evergreen trees	- Emphasis on axes (using evergreen trees)	- The greenness and dynamism of the Persian garden
Endlessness	1. The broad axes from the garden entrance to the pavilion in the Persian garden point to the endlessness of the Persian garden 2. The water is the life origin in the Persian garden, which, by passing through the garden, has found a spiritual place for Iranians 3. The movement of water toward the lower lands of the garden, which shows the expansion of the Persian garden toward infinity	- The mental orientation of the audience toward the main pavilion - Creating the main axis	- The geometric system of the Persian garden which is a beautifying union
Concentration of the Senses	In the Persian garden, natural and built elements are specially designed and placed according to the five human senses: 1. The scent of plants and trees 2. The sound of poppling water 3. Row arrangement of trees 4. Creating the main axis with garden elements 5. Creating a pond to touch the water	- Engaging the audience with all the elements in the Persian garden, including water, soil, etc.	- A unique combination of the interaction of water, soil, plants, sounds, etc.

Aesthetical Aspect	Functional Aspect	Symbolic Indicators	Qualities
Attractiveness and Harmony	The complex and simple rhythmic repetition of the following components produces beat, harmony, and weight in the garden: 1. Placement of trees in parallel rows on the paths 2. The row placement of fountains in the main path and the main axis of the Persian garden 3. Repeating the stepped geometry of the Persian garden	- Creating a harmony that unconsciously directs and attracts the audience	- It always evokes the rhythm and harmony of a mental order for the audience, and this order is in the number of trees, etc., which together create a beautiful harmony.
The Relationship between the Centrality of Garden Elements and the Colocation of Elements in the Spatial Sense of the Persian Garden	1. The centrality of the factor of composition and organization of elements in the Persian garden 2. Emphasizing the most important function and space of the garden 3. The principle of centrality is often combined with the principle of symmetry in many Persian gardens. 4. A symbol of monism in Islam 5. Full and empty spaces organizing spatial unity 6. Square and rectangular ponds, a symbol of stability and an element of order when placed in the center	- Creating focal points by ponds - Using the identity of focal points (centers) as a basic element of the existential space - The presence of centrality in pavilions and ponds	- Point and axial symmetry in the Persian garden, which directs the audience's mind to understand the beauty of the Persian garden.

6. THE COMPARATIVE ANALYSIS OF PERSIAN GARDEN VALUES BASED ON THE PROSPECT-REFUGE THEORY

Comparing the quality analysis of Persian garden elements with the features and elements of the prospect-refuge theory, we can compare qualities such as vastness and spaciousness, orientation, eternality, endlessness, the concentration of senses, attractiveness and harmony, and compare the subject of centrality with features such as complexity, security and refuge, view and landscape, and the mysteriousness of space. Also, the constituent elements of these qualities in the Persian garden, which include entrances, walls and vertical objects, pavilions, water streams, springs, Charbagh (one of the types of Persian gardens), the main pond, motifs, belvederes, and trees and plants, were compared with the constituent elements of refuge, including shelter, entrance, prospect, sign, light, paths, the nature of elements and symbols.

Orientation: In the prospect-refuge theory, mysteriousness includes both leading and misleading features. The issue of orientation in the Persian garden, which can be achieved mainly through movement axes, can be explained by using path elements, and edges which signifythis theory.

Vastness and spaciousness: The indicators of prospect-refuge theory can be explained using a balanced combination of indicators related to two dimensions of prospect, which include continuous, interrupted, wide and limited prospect.

Comfort and tranquility: the comfort and ecological dimension of the space cannot be explained at all using this theory. Regarding the criteria of tranquility, a major part of these qualities can be explained through indicators related to security and prospect, however, psychological tranquility caused by the presence of attractiveness in the space cannot be achieved well through this theory.

Eternality in space: This quality originates from transcendental thoughts in Iran and has no place in the principles of prospect-refuge theory.

Endlessness: Despite the limited space of the Persian garden, one of the best qualities of the Persian garden is its endlessness. From one aspect, the complexity of the space can also be analyzed using the mysteriousness indicators. However, the endless nature of the Persian garden and its sense of calmness and cheerfulness is the difference between the sense of mysterious and ambiguous spaces resulting from the theory of prospect-refuge.

The concentration of attention: one of the most important defects of the prospect-refuge theory in explaining the qualities of the Persian garden is its focus only on the visual sense and the concept of seeing and not being seen, which is mainly based on the subject of prospect and the sight, while the Persian garden is based on the participation and concentration and involvement of all five human senses in the process of perception. In other words, the perception of space based on the indicators of prospect-refuge theory is mainly based on visual experience, and the quality of space is also caused by the desired view

and landscape, while the Persian garden involves the concentration of the senses and the perception of the space through the senses.

Attractiveness and harmony: Spatial attractiveness is one of the important components of the prospect-refuge theory. The attractiveness of the space can be explained by using the complexity and mysteriousness, but the attractiveness of the space in the Persian garden is the sense of balance and the harmony of the components, while in the indicators of prospect-refuge theory, the attractiveness is not necessarily a product of harmony and may be achieved in different ways. The result is that the attractiveness caused by harmony has a more lasting effect on a person, while the attractiveness caused by complexity and mysteriousness disappears after the space becomes normal.

Centrality and organization: The issue of the centrality of the elements of the Persian garden and the collocation of the elements in creating a favorable sense of the Persian garden is developed by using the organization of the space and emphasizing the most important functions of the garden and the balanced arrangement of the mass and space system. The organization of space based on the indicators of prospect-refuge theory does not have a clear and regular pattern, and different and sometimes unfamiliar and incongruous patterns form the structure of the space. Since this theory does not have organizational patterns for landscape design, it cannot explain this quality of the Persian garden.

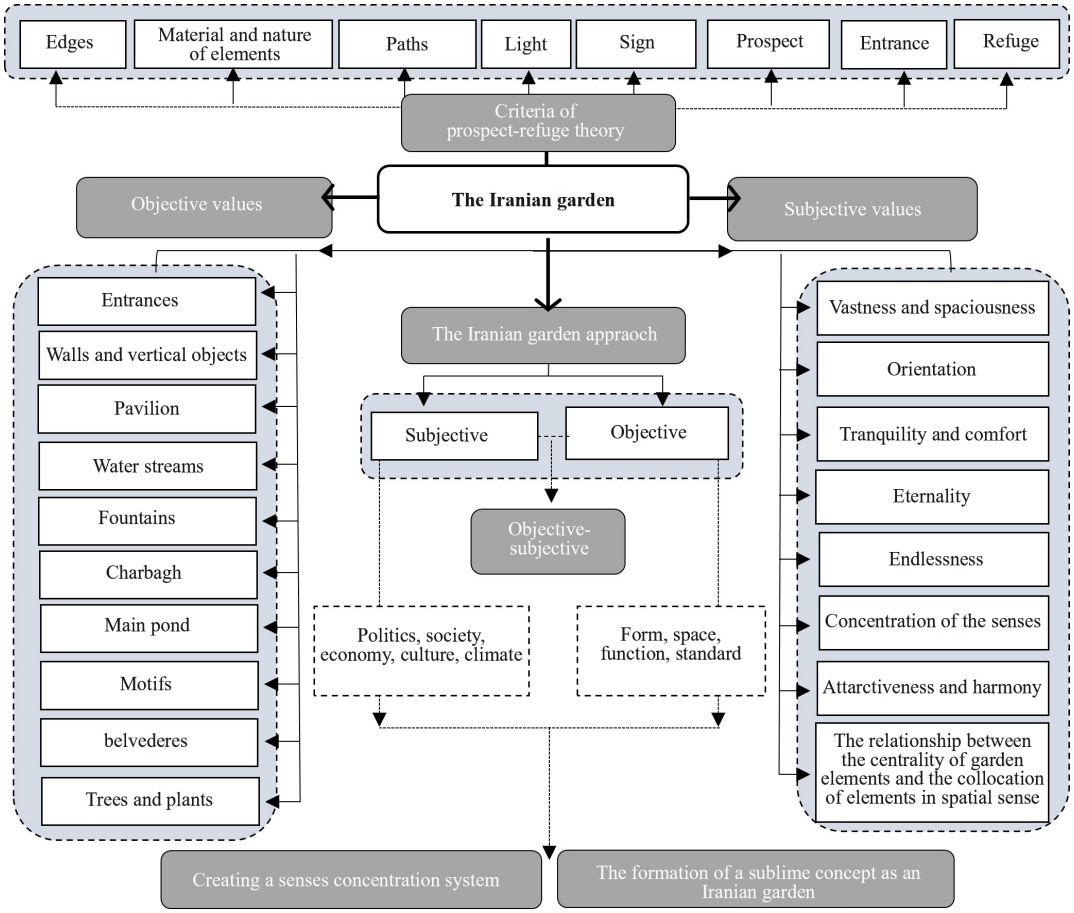


Fig. 5. The Comparative Analysis Framework of Persian Garden Values based on the Indicators of the Prospect-Refuge Theory

7. CONCLUSION

The analysis of the findings indicates that the prospect-refuge theory is focused on the material and environmental elements of the space. In this theory, dealing with amphibology, metaphor, allegory, and symbolism, as well as the sensual and emotional dimensions of human beings, has been neglected. The comparative investigations indicated this theory is very capable regarding the quantitative aspects. Components such as a secure space, desirable prospects, complexity, and optimality of the space structure can be used for the design of spaces that need quantitative measurements and examination of its indicators. Regarding the comparative study of the utilization of this theory for the explanation

of the qualitative values of the Persian garden, it can be said that it can only be highly usable for the explanation of the objective aspect of the Persian garden. However, the subjective aspect and semantic and semiotic dimensions of the Persian garden are beyond characteristics of this theory. The qualities of the Persian garden which are products of harmony, proportion, and geometry are more permanent while the qualities resulting from the complexity and mysteriousness of the prospect-refuge theory are temporary and will fade with the repetition and passage of time.

The objective-subjective approach in the epistemological framework of the "garden-an-allegory-of-paradise" can represent all material and semantic aspects of the Persian garden. The Persian garden cannot be explained and examined with a this-worldly epistemological framework and only its emotional and perceptual aspects can be explained by it. Its intuitive and mystical aspects can be understood through decoding and simulating it with exemplification.

Regarding the results of the identification of the efficiency of the prospect-refuge theory for examination of the values of the Persian garden, it can be said this theory only explains the emotional and perceptual aspects of the Persian garden. Also, concerning the comparison of the present study with similar works, its innovation can be the determination of more precise objective-subjective indicators of the Persian garden as well as identification of the emotional-perceptual and allegorical-intuitive aspects of it to make it compatible with the contemporary theories.

REFERENCES

- Alexander, Christopher. 1959. Perception and Modular Coordination. *RIBA Journal* 66(12): 425-429. https://ci.nii.ac.jp/naid/10018724797/
- Aliyas, Zeinab, and sara Masoudi Nezhad. 2019. The Role of Historical Persian Gardens as Urban Green Spaces: Psychological, Physical, and Social Aspects. *ENVIRONMENTAL JUSTICE* 12(3). https://www.liebertpub.com/doi/abs/10.1089/env.2018.0034
- Amati, Marco, Ebadat Ghanbari Parmehr, Chiris McCarthy, and Jodi Sita. 2018. How eye-catching are natural features when walking through a park? Eye- tracking responses to videos of walks. *Journal of Urban Forestry & Urban Greening* (31): 67-78. https://www.sciencedirect.com/science/article/pii/S1618866717303540
- Appleton, Jay. 1975. Landscape evaluation: the theoretical vacuum. *Transactions of the Institute of British Geographers* (66): 120-123. https://www.jstor.org/stable/621625
- Appleton, Jay. 1984. Prospects and Refuges Re-Visited. *Landscape Journal* 3(2): 91-103. http://lj.uwpress.org/content/391/2/.short
- Asadpour, Ali. 2018. Phenomenology of Garden in Assyrian Documents and Reliefs; Concepts and Types. *Bagh-e Nazar* 15(60): 51-62. http://www.bagh-sj.com/article_62765.html.
- Baran, Perver K., Payam Tabrizian, Yujia Zhai, Jordan W. Smith, and Myron F. Floyd. 2018. An exploratory study of perceived safety in a neighborhood park using immersive virtual environments. *Journal of Urban Forestry & Urban Greening* (35): 72-81. https://www.sciencedirect.com/science/article/pii/S1618866717307458
- Bemanian, Mohammad Reza, Ali Akbar Taqwaei, and Mohammad Sharif Shahidi. 2008. A Study on Cultural and Environmental Basics at Formal Elements of Persian Gardens (before & after Islam). *Environmental Science and Technology* 10(1): 103-112. https://www.sid.ir/fa/journal/ViewPaper.aspx?id=73889.
- Chiang, Yen-Cheng, Jack L. Nasar, and Chia-Chun Ko. 2014. Influence of visibility and situational threats on forest trail evaluations. *Journal of Landscape and Urban Planning* (125): 166-173. https://www.sciencedirect.com/science/article/pii/S0169204614000280
- Dawes, Michael, and Michael Ostwald. 2014. Prospect-Refuge theory and the textile-block houses of Frank Lloyd Wright: An analysis of spatio-visual characteristics using isovists. *Journal of Building and Environmet* (80): 228-240. https://www.sciencedirect.com/science/article/pii/S0360132314001760
- Dosen, Annemaris, and Michael Ostwald. 2013. Prospect and refuge theory: Constructing a critical definition for architecture and design. *The International Journal of Design in Society* 6(1): 9-23. https://www.researchgate.net/publication/286123657_Prospect_and_refuge_theory_Constructing_a_critical_definition_for_architecture_and_design
- Dosen, Annemaris, and Michael Ostwald. 2016. Evidence for prospect-refuge theory: a meta-analysis of the findings of environmental preference research. *Journal of City Territ Architecture* 3(4): 1-14. https://cityterritoryarchitecture.springeropen.com/articles/10.1186/s404101-0033-016-
- Etezadi, Ladan. 2016. Studies on Persian gardens and the fallacy of "Baghshahr". *Soffeh* 26(72): 65-85. https://www.sid.ir/fa/journal/ViewPaper.aspx?ID=283740.
- Goodarzian, Shervin. 2014. The Comparison of Concept of Belvedere in Iranian and Indian Gardens. *Eastern Art and Civilization* 2(3): 32-39. http://www.jaco-sj.com/article_5681.html.
- Gue, Xiaoying, Yuhuan Qian, Liang Li, and Akira Asano. 2018. Assessment model for perceived visual complexity of painting images. *Journal OF Knowledge-Based Systems* (159): 110-119. https://www.sciencedirect.com/science/article/pii/S0950705118303150
- Haghighat bin, Mojtaba Ansari, Clemens Steenbergen, and Ali Akbar Taghvaee. 2012. Innovations in the charbagh axis of the safavid period. *International Journal of Architectural Engineering & Urban Planning* 22(2): 79-90. http://ijaup.iust.ac.ir/browse.php?a_code=A-111-266-&sid=1&slc_lang=en
- Hwang, JI-Hyoun, and Hyunsoo Lee. 2018. A PARAMETRIC DESIGN MODEL FOR NUMERICALLY MEASURING THE DESIGN ATTRIBUTES OF PROSPECT-REFUGE. *23rd International Conference on Computer-Aided Architectural Design Research in Asia: Learning, Prototyping and Adapting*, CAADRIA 2018, Beijing, China. http://papers.cumincad.org/cgi-bin/works/201520+%dave=2:/Show?caadria2018_059
- Harvey, Chester, Lisa Aultman-Hall, Stephanie Hurley, and Austin Troy. (2018). Effects of skeletal streetscape design on perceived safety. *Journal of Landscape and Urban Planning* (142): 18-28. https://www.sciencedirect.com/science/article/pii/S0169204615001139
- Heerwagen, Judith. 2008. *Psychological Value of Space.* published by the National Institute of Building Sciences. last accessed 07/04/2011. http://www.wbdg.org/resources/psych-space_value
- Kaplan, Rachel, and Eugene J. Herbert. 1988. Familiarity and preference: a cross-cultural analysis. In *"Environmental aesthetics",* edited by Jack L. Nasar, Cambridge University Press, 379–389. https://ci.nii.ac.jp/naid/10020944621/

- Khalilnezhad, Tobias. 2015. The productive landscape in Persian Garden; Foundations and features. *Journal of Bagh-e Nazar* 13(38): 3-16. https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=507163
- Mansouri, Seyyed Amir. 2005. An introduction to the aesthetics of Iranian Garden. *Bagh-e Nazar* 2(3): 58-63. http://www.bagh-sj.com/article_1504.html.
- Mansouri, Seyyed Amir, Arash Zahedan, Mahmoud Teymouri, Aida Alehashemi, and Shervin Goodarzian. 2005. The Persian Garden of Dampezeshki; A new reading of Persian garden for today's life. *Manzar Magazine* (34): 6-17. http://www.manzar-sj.com/article_16645_efd185b2b2262fa6754ff4fe708488b3.pdf.
- Mehdizadeh Siradj, Fatemeh, and Atefeh Nikoogoftar. 2011. A Comparative Study on Approaches to Achieve Tranquility, Calmness and Meditation in Traditional Gardens of Iran and Japan. *Bagh-e Nazar* 8(17): 31-43. http://www.bagh-sj.com/article_111.html.
- Mohammadzadeh, Mahdi, and Soniya Noori. 2017. Study of Structure and Viewing Angles of Persian Garden in Persian Garden Paintings and Garden carpets in the Safavid Period. *Bagh Nazar* 14(52): 27-36. http://www.bagh-sj.com/article_50514.html.
- Nassehzadeh Sh, A'zami A. 2010. Analyses of Iranian Garden Design Art from Landscape Architecture and Urbanism View. *Journal of Energy and Environment* 1(4): 311-316. https://www.researchgate.net/publication/269873899_Analyses_of_Iranian_Garden_Design_Art_from_Geometrical_Structure_View_Case_Study_Shahzade_Mahan_Kerman_in_Iran
- Ojaghlou, Morteza, and Mehdi Khakzand. 2019. THERMAL COMFORT CHARACTERISTIC OF 5 PATTERNS OF A PERSIAN GARDEN IN A HOT-ARID CLIMATE OF SHIRAZ, IRAN. *A Journal of Landscape Ecology* 12(3): 1-33. https://sciendo.com/es/article/10.2478/jlecol-20190016-
- Porteos, J. 2010. *Environmental aesthetics: theories, policies and planning*. Translation: Mohammad Reza Masnavi. Jahad Daneshgahi of Mashhad. https://www.adinehbook.com/gp/product/9643241285.
- Psathiti, Chrystala, and Kerstin Sailer. 2017. A PROSPECT-REFUGE APPROACH TO SEAT PREFERENCE: Environmental psychology and spatial layout. Proceedings of the 11th Space Syntax Symposium. https://discovery.ucl.ac.uk/id/eprint/1568213/
- Richthofen, Aurel von, Katja Kencht, Miao Yufan, and Reinhard Konig. 2018. The 'Urban Elements' method for teaching parametric urban design to professionals. *Journal of Frontiers of Architectural Research* 7(4): 573-587. https://www.sciencedirect.com/science/article/pii/S209526351830044X
- Senoglu, Buket, Hilmi Ekin Okyay, and Isami kinoshita. 2018. An empirical research study on prospect– refuge theory and the effect of high-rise buildings in a Japanese garden setting. *City, Territory and architecture* 5(3): 2-16. https://link.springer.com/article/10.1186/s404103-0079-018-
- Sheibani, Mehdi, and Seyed Amir Hashemizadegan. 2015. Persian Garden, Ever-Renewed Being. *Bagh-e Nazar* 13(45): 5-12. http://www.bagh-sj.com/article_43399.html.
- Stamps, Arthur. 2008. Some findings on prospect and Refuge?. *Journal of Perceptual and Motor Skills* (107): 141-158. https://journals.sagepub.com/doi/abs/10.2466/pms.106.1.147162-
- Shayanfar, Azadeh. 2019. Learning From the Past: Recreating Historic Persian Gardens in Downtown Tehran. A thesis presented to the University of Waterloo in fulfillment of the thesis requirement for the degree of Master of Architecture. https://uwspace.uwaterloo.ca/handle/1001214375/

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