Ontology Space International Journal
ISSN: 2345-6450
OISSN: 2423-7299
Summer 2022, Vol. 11, Issue 3, No. 42, Pages: 75- 86
Journal homepage: soij.qiau.ac.ir

Proposing a Conceptual Model of the Effects of Nature on Residential Satisfaction Case Study: Selected Residential Complexes in Tehran

Mohammadhossein Azizibabani [a], Mohammadreza Bemanian [a,*], Mansour Yeganeh [a]

[a] *Department of Architecture, Tarbiat Modares University, Tehran, Iran.*

Received: 04 August 2022- Accepted: 03 November 2022
Doi: 10.22094/SOIJ.2022.1964784.1508..

Abstract

This research aims to explain the mechanism of the effects of the architectural application of Nature (AAN) on residential satisfaction (RS) at the scale of residential complexes and to identify key components in improving the quality of housing architecture through AAN. This research is mixed in terms of data type. It employs the causal-comparative research method. Variables and components affecting RS have been extracted from reviewing the theoretical foundations and literature. to provide a conceptual model, the relational mechanisms between these variables have been explained through logical reasoning. To validate the conceptual model, a field study was conducted in five residential complexes in Tehran and a questionnaire was used to collect data. The results show that RS at the scale of personal, cultural, architectural, and environmental factors is a function of the variables of adherence to theIslamic lifestyle (lifestyle at the structural level), residential desires related to the AAN, perceived quality of AAN, and perceived quality of housing architecture. In proportion to the increase in adherence to the Islamic lifestyle, residential desires related to formal and semantic components of the AAN have increased, and in the case of quality deficiency of these components, perceived quality and consequently RS will decrease. In addition, the key components of the AAN in improving the quality of formal, functional, and semantic components of housing architecture were recognized as unity, adaptability, and hierarchy.

Keywords: Architectural Application of Nature; Residential Satisfaction; Perceived Quality; Islamic lifestyle; Residential complexes

1. Introduction

Residential satisfaction (RS) is the result of people's understanding of the differences between their preferences and aspirations and standards and the actual housing conditions (Campbell, et al., 1976; Galster, 1987a). This concept is one of the criteria for determining the quality of life, which is based on the perception of space. Therefore, in addition to architectural and environmental factors, personal and cultural factors that play roles in the degree of qualitative perception of various components of architectural and environmental design are effective in determining the level of RS. Gifford (1997) considers demographic factors, personality, values, expectations, comparisons with other settlements, and hopes for the future to be among the individual characteristics that affect RS. Rapoport (2005) also considers the cultural factors that are effective in shaping the home space and residents' satisfaction, including the way of doing the main activities, family structure, the role of genders, attitude to privacy, and the process of social relations. Generally, RS is the result of the comparison between residential conditions, and residential desires that several factors, including cultural, economic conditions, and social status of residents are effective in this analogy. Therefore, the compatibility of housing, especially its qualitative aspects with cultural characteristics and residential needs, is important in providing RS. The impacts of personal and cultural factors in explaining the theoretical framework and conceptual model of the factors affecting RS are undeniable. Personal and cultural factors affecting residential desires and consequently the perceived quality of the components related to the design of the environment are numerous, so it is not possible to include all of them directly in the models of predicting RS. In this regard, the lifestyle concept at the structural level, which is a subset of culture, is proposed in this research.

Lifestyle is a reflection of a particular kind of thinking about self, others, and the universe, which is manifested in the objective world (Saforaee & Akhlagi, 2020). This concept is defined in the relevant literature at four levels; global, national or structural, level related to subcultures and social situations, and individual level (Jensen, 2007). Due to the existence of subcultural diversity in the population of today's metropolitan areas, especially Tehran, the study of the lifestyle concept at the structural level is more relevant to cultural aspects of housing studies in such contexts. At this level of the lifestyle concept , the differences and similarities in the customs, beliefs, and living habits of people belonging to a country,

* Corresponding Author Email Address: bemanian@modares.ac.ir

a society, or a culture are investigated. In addition, various studies have been conducted to measure the degree of adherence to different lifestyles at the structural level around the world, including Iran, and the measurement methods in these studies have good validity and reliability that can be useful in tests of the RS model. Islamic lifestyle is a concept that has been placed at the structural level of lifestyle classification due to the predominance of Islamic ideology in Iran. The ontological, epistemological, and anthropological foundations of this lifestyle are based on Islamic thought, and consequently, the hierarchy of needs and the extent of residential desires will be different according to the degree of adherence to this lifestyle. In this research, authors investigated the variable of adherence to Islamic lifestyle, which includes personal and cultural characteristics affecting the perceived quality of environment design, concerning the RS concept . Therefore, the effects of personal and cultural factors on RS have been considered in the theoretical framework.

Nature has been the context of human activities and the establishment of any kind of architecture whose main purpose is to meet human needs and desires requires touching Nature and concentrating on the threefold relationship among man, Nature, and architecture. Considering the place of Nature in the basics of Islamic lifestyle, inspiration from the qualities and laws of Nature in housing design, which in this study is considered as the architectural application of Nature (AAN), is one of the other pillars of providing residential needs of different levels of human existence and consequently providing RS. Most researchers have investigated the objective aspects and functional qualities of housing architecture as effective factors in measuring RS and fewer researchers have investigated the effects of perceived quality of housing architecture, especially non-functional aspects, which are more affected by personal and cultural factors, on the concept of RS. This research intends to complete the gap in the RS literature through the in-depth study of the components affecting the quality of housing architecture in functional, formal, and semantic dimensions. The general purpose is to explain the mechanism of RS resulting from the perception of the quality of factors related to architectural design at the scale of residential complexes in today's metropolises. In this regard, recognizing the components of the AAN and their related indicators and examining how the qualities of different dimensions of housing architecture are affected by these components, are the specific objectives of this research. To achieve these goals, it is necessary to answer the following questions.

- What components of the AAN play a key role in improving the quality of various dimensions of housing architecture?
- What is the influencing mechanism of the AAN on RS from the Islamic lifestyle perspective?

2. Research Background

The literature on RS can be divided based on Table 1

Table 1
Categorization of RS research

	Descriptions	Authors
General view	RS is a criterion for determining the quality of the living environment	(Marans & Rodgers, 1975; Galster & Hesser, 1981; Cutter, 1982)
	RS is a predictor of the residents' behavior regarding residential mobility, improving housing status, or adaptation to the current situation	(Separe, 1974; Premius, 1986)
Objectives	Determining the relationship between factors affecting RS	(Garcia, 1994; Amerigo & Aragones, 1997; Varady, et al., 1998; Parkes, et al., 2002; Choudhury, 2005; Fallahi, et al., 2015)
	Predicting RS in residential environments	(Theodori, 2001; Ogu, 2002)
	Investigating settlements based on factors affecting RS	(Lu, 1999; Russell & James, 2008; Azimi & Esmaeilzadeh, 2017)
Scale	Investigation of the RS at the scale of urban apartments to residential complexes	(Zabihi, et al., 2011; Abbaszadeh, et al., 2017, Azizibabani et al.,2021)
	Investigation of the RS at the neighborhood or urban scale	(Dekker , et al., 2011; Azemati, et al., 2017)
	Investigation of the RS at the urban geography scale	(Theodori, 2001)

The emergence of the concept of RS coincided with the presentation of Reimer's (1943) theory, based on which the variables that determine human needs in the field of housing are considered as a subset of two factors, time and type of household. Rossi (1955) defined residential mobility as a natural part of every family life cycle. Therefore, people change their place of residence to meet their residential needs that are affected by time. Wolpert (1966) believe that environmental stress is a determining factor in residents' behavior regarding residential mobility in an urban environment, and some of the sub-factors of stress include heavy traffic, noise, light, air and water pollution, and lack of outdoor space. He developed an environmental model which showed the impact of these variables on the migration decision of residents. Morris & Winter (1975) believe that each family evaluates its housing according to cultural and family norms and seeks to meet the normative housing deficits. Residential mobility, relocation based on household needs, or adjustment of the family desires and needs based on current housing status are some of the measures that can be taken in this regard which may be

done when restrictions prevail over behavioral patterns. Marans & Rodgers (1975) have presented a conceptual framework based on Maslow's (1958) theory of the level of human needs to determine the quality of urban life in three spatial scales. These three spatial scales include community (country-city), neighborhood, and private home. According to this theory, people's assessment of their satisfaction in the three mentioned scales depends on their personal characteristics, and RS in every scale affects the others. Galster (1985) introduces a new social index to assess the residential preferences of individuals under the title of "marginal residential improvement priority". According to the psychological structure of this index, people consciously or unconsciously prioritize different aspects of the residential environment based on their preferences. According to the results of galster's field study, regardless of the dissatisfaction in which aspect of the living environment, people prioritize improving the quality of the housing unit to improve the level of RS. Amerigo & Aragones (1997) believe that the objective attributes of the residential environment, when evaluated by the person, become subjective and bring a degree of satisfaction. Thus, mental characteristics are influenced by the personal characteristics of individuals, which include such things as personal, social, and demographic characteristics, the pattern of quality of housing, and how to compare with other residential environments. McCrea (2007) believes that there is a weak correlation between the objective dimensions of the environment and the subjective assessments based on it. This indirect relation arises from the effect of people's comparative standards on their mental perception of the objective aspects of the environment.

Reviewing the literature on RS, there is evidence of the impact of two main factors on this concept. The first factor is the residential desires of the target community and the other factor is the perceived quality of various aspects of the residential environment. Residential desires form a mental comparison basis in individuals and are influenced by personal and cultural characteristics that can be summarized in the form of adherence to lifestyle at the structural level. The perceived quality of different aspects of the residential environment, in addition to being influenced by personal and cultural factors due to the residential desires, is influenced by the intrinsic quality of various aspects of housing architecture. These aspects are collected in three formal, functional, and semantic dimensions as described in the indicators introduced in the first part of Table 2.

Cultural and geographical context of this study is Tehran, so the variable of adherence to the Islamic lifestyle defined at the structural level is considered as the factor reflecting the personal and cultural characteristics of the target community. The response of housing to the residential needs arising from this type of lifestyle, defined in three material, psychological and spiritual dimensions, constitute the relevant indicators of RS as shown in the second part of Table 2.

Table 1
Indicators of the quality of housing architecture and residential satisfaction based on responding to the residential need.

	Qualitative aspects of housing architecture	**No**
Semantic quality	Application of motifs raised from the indigenous architecture	1
	Referring to the semantic dimensions of landscape elements such as water, light, etc.	2
	Expression of different meanings due to different geometric shapes in spaces	3
	Expression of different meanings due to different colors and textures	4
Functional quality	Providing physical security and environmental comfort	5
	The adaptability of the dimensions of the spaces with their intended functions	6
	The quality of functional relations between different spaces	7
Formal quality	The quality of static and visual balance in architectural forms	8
	The aesthetic quality of the design	9
	The adaptability of architectural forms with the surrounding urban fabric	10
	Residential satisfaction indicators based on meeting residential needs	No
Residential needs of the material dimension	The quality of responding to physical functions related to residential spaces	1
	The quality of providing physical security against natural hazards	2
	The quality of providing daylight in residential spaces	3
	The quality of providing climatic comfort in residential spaces	4
Residential needs of the psychological dimension	Preservation of individual and family boundaries	5
	Providing a context for understanding sensory beauty	6
	Inducing a sense of peace and mental safety	7
	Providing a context to promote social interactions	8
Residential needs spiritual dimension	Providing a context for individual and family privacy	9
	Providing a context for understanding the concepts of natural phenomena	10
	Providing a context to understand the spiritual beauty and flourishing of cultural values	11

Derived from: (Altman, 1975; Fakouhi & Ghaznavian, 2012; Naghizadeh, 2012; Raeisi, 2019; Pirnia, 1997; Raeisi, 2019;Azizibabani & Bemanian, 2022, Azizibabani et al., 2022) From the residents' perspective , the qualitative aspects of housing architecture should be considered simultaneously in designing a residential environment. Thus determining their importance hierarchy by direct questions could not bring reliable answers. Considering the position of Nature in determining the quality of housing architecture, the two variables of perceived quality of AAN and residential desires related to AAN are considered as mediating variables in the relation between the other two variables of perceived quality of housing architecture and adherence to the Islamic lifestyle.

3. Theoretical Framework

The number of studies on RS, especially experimental ones, is large, but few studies have investigated the impact of Nature and especially its qualitative aspects on RS. DeLauer, et al (2022) investigated the effect of the natural environment and compliance with the principles of biophilic design on the physical and mental health of the residents of student dormitories and came to the conclusion that the application of these principles has reduced stress-related behaviors and provided a platform for the growth of students' creativity. Ta, et al (2021) have investigated the role of green spaces in the suburbs of Shanghai on residential satisfaction. In this research, the components affecting the quality of green spaces are the structure of the plant community and their leafing habits, which are influenced by the aesthetic preferences of people. The results indicate that the effect of the quality of green space on residential satisfaction is greater than the effect of its quantity. In this regard, the role of sheltered plants has been greater than other green space elements (trees, shrubs, etc.). Azizibabani et al (2022) have identified the indicators of nature's presence methods in housing design to explain a theoretical model concerning their effects on providing residential needs regarding the Islamic lifestyle. According to the results of this research, the presence of the conceptual aspects of nature has had the greatest impact on accommodating residential needs. Kaplan (1985) has investigated the impact of the natural environment around residential apartments on RS. Based on the results, the pristine Nature left around the living environment is not necessarily a factor in RS. Rather, the provision of communal gardens by providing the possibility of social interactions with other residents along with the quality of trees, landscape design, and appropriate walking paths have been the main factors in promoting RS. Taylor, et.al (1998) believe that integrating urban housing projects with the surrounding Nature leads to a better relationship between neighbors, reducing abnormal behaviors and increasing RS. Kearney (2006) has investigated the effects of density and its relationship with Nature in residential environments on RS. Indicators related to the human-Nature relationship in this study are mainly discussed in the form of green space per capita, quality of vegetation, the existence of playgrounds and natural and artificial ponds, etc. The main reason for promoting satisfaction with the existence of such spaces is from providing the necessary platform for interaction with neighbors. Hadavi, et.al (2017) believe that measures such as the proper design of sidewalks, increasing the quality of vegetation, and reducing barriers to visual and physical contact with elements of Nature, are essential for RS at the neighborhood space scale. Other studies in this field have reached similar results (Kaplan, et al., 2004; Ellis, et al., 2006; Kaplan & Kaplan, 1989; Ward Thompson & Aspinall, 2011; Berien, 2005).

Nature has always been respected in the cultural context of Iran and constructive interactions with it in activities related to housing construction have been considered valuable . This value has influenced the norms, ideals, and perceptions of Iranian society. In historical houses of Iran, the house is not separated from Nature and the presence of representatives of Nature within the spatial organization of the house is mandatory (Haeri, 2009). Most of the components and indicators of the AAN can be extracted by investigating the patterns of four-season houses in Iran. In this regard, the components of AAN include the three primary, secondary and abstract appearances of Nature, and the qualities and laws of Nature that improve the quality of housing architecture.

Table
Components and indicators of AAN.

Components of architectural application of Nature	Architectural indicators	Source	Description - Examples
Primary appearance	Maintaining visual relations with natural elements from living spaces	(Spirn, 2000; Pirnia, 1997; Makinejad, 2008)	Refers to the concept of Nature that has not been transformed by man
	Placing pool, waterfront, trees, and plants in the open spaces		
	Providing airflow and sunlight in the living space		
Secondary appearance	Using natural-based and vernacular materials		Manifestations of Nature transformed by man, whether in the form of natural-based materials or
	Using shrubs and plants in open and semi-open		

	areas		cultivated plants and shrubs.
Abstraction appearance	Using abstract forms of natural elements in motifs and decorations		In the abstraction of Nature, Nature is represented by a human definition by simplifying, separating features, and in some cases geometry of shapes.
	Using abstract forms of natural elements in the forms of some components of the building		
Adaptability	Achieving compatible architectural forms with climatic characteristics	(Pirnia, 1992; Pirnia, 1997)	Adaptability means the ability to respond to environmental stimuli and is a feature that has been institutionalized in the evolution of living organisms for survival.
	Determining the appropriate orientation based on climatic characteristics		
	Achieving the appropriate type of materials for the climate		
Balance	Moderation in the use of decorations	(Noghrekar, 2008; Stewart, 2001)	The quality of balance, which is the manifestation of justice in the universe, means that each component is in its place; In architecture, from a geometric point of view, every building needs balance to stand first.
	Observing the principle of local symmetry and balance in geometric forms		
	Maintaining geometric balance in forms by placing bearing elements on top of each other and using self-static forms		
Repetition and rhythm	Applying similar shapes and forms in details and decorations	(Sadighakbari & Kazemi, 2014)	Repetition and rhythm are other qualities that are found in abundance in natural structures and patterns, which have been used in architecture and other visual arts.
	Using similar forms and shapes and create rhythm in their repetition		
Unity	Modular Design	(Pirnia, 1997; Hejazi, 2009; Vincent, 2014; Ansari & Ebrahimi, 2010)	Leibniz believes that monads, as inseparable components in Nature, have unity (Copleston, 1993).
	Coordination with urban fabric in terms of orientation, materials, full and empty space, the form of openings, and ...		
	Applying logical, arithmetic, and geometric proportions in the dimensions of spaces		
	Applying similar proportions in decorations and geometric structure		
Hierarchy	Functional and visual separation of different areas outside and inside the house	(Shia, 2007; Pirnia, 1992)	Hierarchy is one of the principles governing collections, components, and phenomena that either exist naturally in the universe as a whole or are designed and created by human beings and in the case of Nature, the principle of hierarchy always prevails.
	Customary separation of outdoor spaces		
	Avoiding visual relation from the entrance to inner spaces through joint spaces		
Transparency	Reducing mass due to the dominance of space over the mass (installation of the central courtyard, etc.)	(Noghrekar, 2008; Momeni, 2018)	Transparency and the absence of clear boundaries are obvious features in most natural landscapes.
	Visual continuity due to the sequence of spaces and the permeability of facades (installation of porch, terrace, etc.)		
	Using the phenomenon of reflection and translucent openings		
Honesty	Compatibility of the facade and its backspaces	(Pirnia, 1997)	Nature is the manifestation of God, free from all lies and inaccuracies. Therefore, if aspects of Nature and the function of related phenomena are hidden from view, the reason is the inadequacy of human knowledge and awareness or the functional mechanism of natural phenomena for adaptation and survival.
	Using functional elements in the building		
	Demonstrating the transfer of forces in the structure of the building		
	Applying the primary texture and color of natural materials		

The main purpose of being inspired by the phenomena and laws of Nature in architecture or the AAN has been to improve the quality of architecture in various dimensions to respond to human residential needs. The quality of housing architecture includes three formal, functional, and semantic dimensions that are effective in meeting the residential needs of the psychological, material, and spiritual dimensions of human beings and, consequently, promoting RS. The components of the AAN, depending on the type of indicators and their Nature, exclusively or Multi-functionality, play roles in improving the quality of formal, functional, and semantic dimensions of housing architecture and directly affect the RS variable . Residential desires related to the components of AAN

which are directly affected by the degree of adherence to lifestyle at the structural level (Islamic lifestyle), form the basis of the initial expectations of the target community in the process of quality assessment of housing. In proportion to the increase in residential desires towards one of these components, qualitative deficiencies in their indicators will become more pronounced due to the increase in the level of initial expectations. Therefore, the way of influencing the perceived quality of the AAN by personal and cultural factors is through residential desires. Based on the above, the conceptual model of the effects of the components of AAN on RS can be presented in Figure 1.

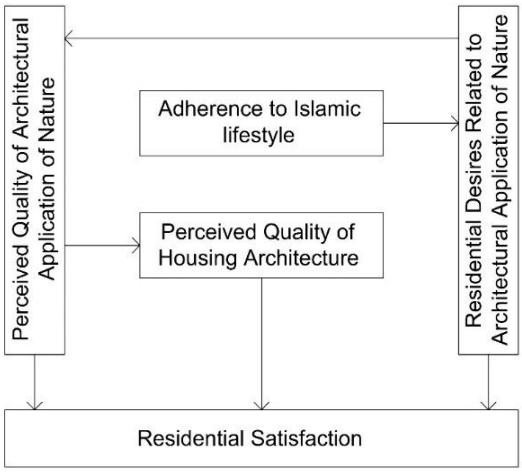

Fig. 1. The conceptual model of the effects of the AAN on RS.

4. Research Methodology

The general strategy of this research is reproductive . its ontological and epistemological foundations are derived from the philosophical approach of scientific realism. This research uses a mixed (quantitative and qualitative) method in terms of the nature of the data and the research method is causal-comparative. In the context of discovery, the authors seek to provide a conceptual model of the relationship between the components of the AAN and RS in the scale of factors related to the quality of residential complexes' architecture. Theoretical foundations and literature have been reviewed through the qualitative content analysis method to extract the components and indicators related to the research variables and the relations between the variables have been interpreted by logical reasoning. to test the conceptual model of the research, five residential complexes in Tehran have been selected. The data collection instrument was a questionnaire based on a 5-point Likert scale. Concerning the variable of adherence to the Islamic lifestyle, the relevant indicators are inherently taken from the Glock & Stark (1965) Religiosity Questionnaire and adapted to Islam. The reliability of this part of the questionnaire has been proven in several studies (Bagheri Khalili, 2009; Serajzadeh, 2005). The period for collecting and analyzing these data was from March 2021 to November 2021. The test of the conceptual model is based on the data obtained from the field study and through the path analysis method using Amos-Version24 software and the fit indexes of the experimental model were analyzed.

5. Survey

To validate the conceptual model of the research, five residential complexes in Tehran have been considered that the indicators related to research variables, especially the indicators related to the AAN have been of relatively good quality. These complexes include the following:

- Phase one of Ekbatan residential town
- Baghe Behesht residential complex
- Baghe Zaferaieh Residential complex
- Baghe Vanak Residential complex
- Niavaran Residential complex

Another feature of the design of these complexes, especially the last three, is a special consideration for the initial vegetation of the site in architectural design that the volumetric concept has been formed on this basis. The locations of these complexes, except Ekbatan residential town, located in the West of Tehran, are mainly in the Northern and Northwestern regions of Tehran. To measure the variables related to the conceptual model, a questionnaire was used with the participation of 448 people in five case studies. The average percentages of components and dimensions related to research variables are presented in Figure 2.

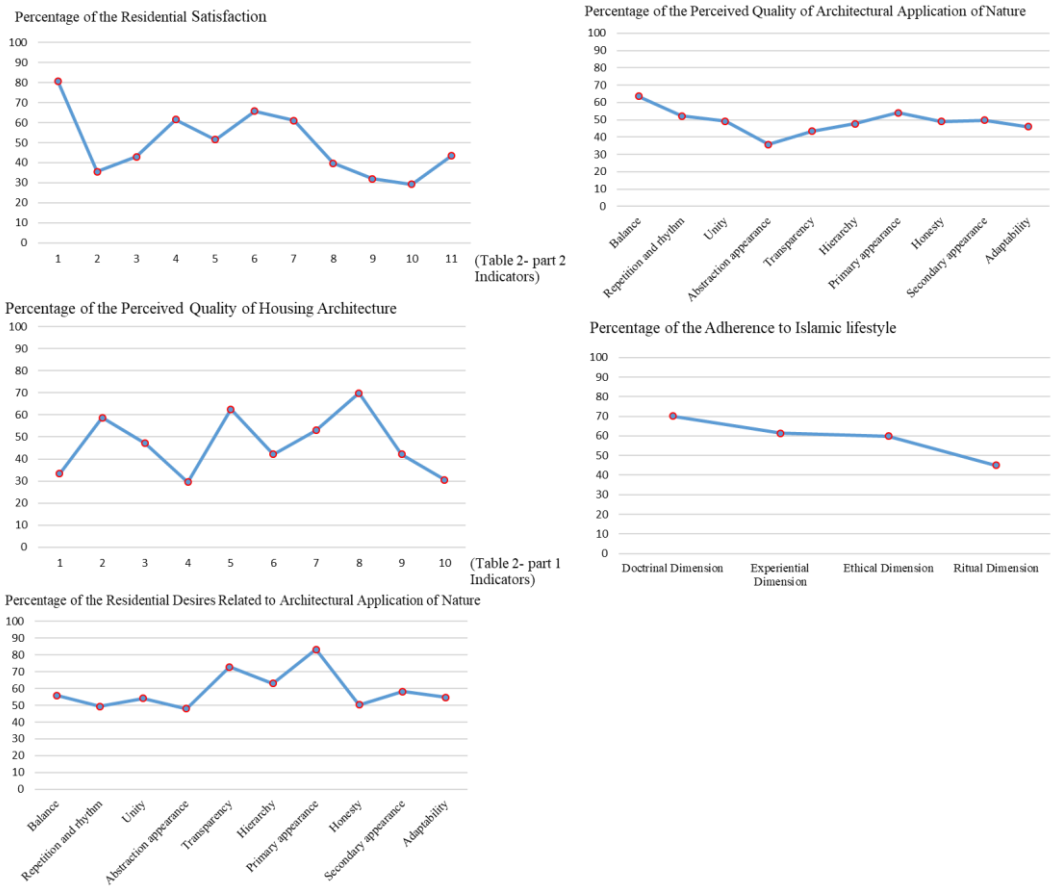

Fig. 2. Average percentages of indicators related to research variables

6. Findings

To answer the first question, three regression models are considered in which the predictor variables are the components of AAN and the dependent variables in each model are formal, functional, and semantic dimensions of housing architecture quality. First, the degree of correlation between the predictive components of each qualitative dimension of housing has been investigated. In all cases, there are significant correlations between the components that can be a feature of a suitable regression model. The regression analysis results of the relationship between formal, semantic, and functional dimensions of the quality of housing architecture with the mentioned predictor variables are described in Table 4.

To answer the second research question, the explained conceptual model should be tested. In this regard; the path analysis method and Amos-Version 24 software have been used. The results are shown in Figure 3 and the model fit indexes that determine the degree of compatibility of the conceptual model with the experimental model are obtained in three parts: absolute, comparative, and parsimonious fit indexes as described in Table 5.

Table 4
Regression models of the relationship between formal, semantic, and functional dimensions of the quality of housing architecture variable with the components of AAN (predictor variables).

Model	**R**	**R Square**	**Unstandardized Coefficients**			**Standardized Coefficients**	**t**	**Sig.**
				B	Std. Error	Beta		
Model (1): Regression of the relationship between the formal dimension of housing architecture quality (dependent) with the variables of balance, repetition and rhythm, unity, and abstract appearance of the components of architectural application of	0.733	0.537	(Constant)	0.102	0.019		5.268	0.000
			Balance	0.081	0.032	0.092	2.514	0.012
			Repetition & Rhythm	0.192	0.026	0.259	7.265	0.000
			Unity	0.367	0.027	0.506	13.428	0.000
			Abstract Appearance	0.086	0.021	0.138	4.029	0.000

Nature							
Model (2): Regression of the semantic dimension of housing architecture quality (dependent) with the variables of unity, abstract appearance, transparency, hierarchy, primary appearance, and honesty of the components of architectural application of Nature	0.790	0.624	(Constant)	-0.153	0.022	-6.904	0.000
			Unity	0.174	0.03	0.179	5.74	0.000
			Abstract Appearance	0.140	0.026	0.167	5.352	0.000
			Transparency	0.229	0.024	0.295	9.390	0.000
			Hierarchy	0.301	0.027	0.344	11.012	0.000
			Primary Appearance	0.194	0.027	0.229	7.147	0.000
			Honesty	0.213	0.032	0.209	6.717	0.000
Model (3): Regression of the functional dimension of housing architecture quality (dependent) with the variables of primary appearance, honesty, secondary appearance, and adaptability of the components of architectural application of Nature	0.709	0.503	(Constant)	0.081	0.020	4.075	0.000
			Primary Appearance	0.145	0.024	0.218	6.037	0.000
			Honesty	0.216	0.030	0.268	7.226	0.000
			Secondary Appearance	0.171	0.029	0.227	5.897	0.000
			Adaptability	0.364	0.038	0.344	9.459	0.000

(Source: Authors)

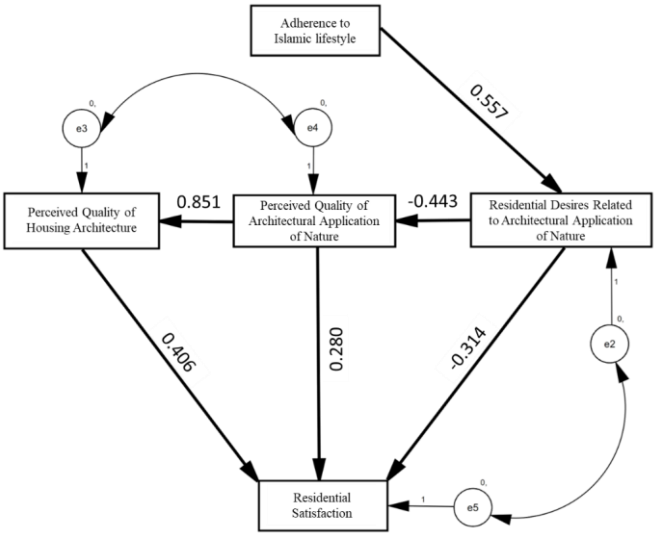

Fig.3. Testing the conceptual model of research.

Table 5
Evaluation of model fit indexes

	Indexes	Abbreviation	Acceptable range (Hine, et al., 2016)	Value in the experimental model
Absolute Fit Indexes	Chi-square	Chi²	More than 5%	5.685
	Goodness of fit index	GFI	More than 0.90	0.994
	Adjusted goodness of fit index	AGFI	More than 0.90	0.954
Comparative Fit Indexes	Normed Fit Index	NFI	More than 0.90	0.995
	Comparative Fit Index	CFI	More than 0.90	0.997
	Relative Fit Index	RFI	More than 0.90	0.977
	Incremental Fit Index	IFI	More than 0.90	0.997
Parsimonious Fit Indexes	Parsimony Normed Fit Index	PNFI	More than 0.50	0.199
	Root Mean Square Error of Approximation	RMSEA	Less than 0.10	0.071
	Normed Chi-square	Chi²/df	1-3	2.843

6. Discussion and Conclusion

The variable of RS in the scale of the architectural quality of residential complexes is a function of the variables of residential desires related to the AAN, the perceived quality of AAN, and the perceived quality of housing architecture. RS is also affected by the variable of adherence to lifestyle at the structural level (Islamic lifestyle in this study), through residential desires, and in this way, the effects of personal and cultural factors on RS are considered. In this context, the perceived quality of the AAN leads to the perception of the quality of housing architecture. Residential desires related to the semantic and formal components of the AAN have been influenced by personal and cultural factors through adherence to the Islamic lifestyle variable. In the case of quality deficiency of these components, residential desires related to them will have a negative impact on the perceived quality and, consequently, RS. It is important to note that there is a causal relationship between the variables that must be discussed.

The results of the survey shows that the increasing adherence to the Islamic lifestyle leads to an increase in residential desires for the semantic and formal components of the AAN, and no significant relationship was found for purely functional components. In the theoretical interpretation of these relations, it should be acknowledged that in the foundations of Islamic thought, Nature is the main source of responding to human needs and cognition through observation and thinking about the phenomena of creation. Consequently, in a lifestyle based on such an idea, Man always tends to communicate with the manifestations of Nature to meet the needs of different dimensions of his existence. Semantic components have multiple functions in meeting human residential desires and needs, so in proportion to the increase in adherence to the Islamic lifestyle, residential desires related to these components will increase more compared to other components. Therefore, according to the research model, most of the effects of the variable of adherence to the Islamic lifestyle on the variable of residential desires depend on the role of semantic components of the AAN.

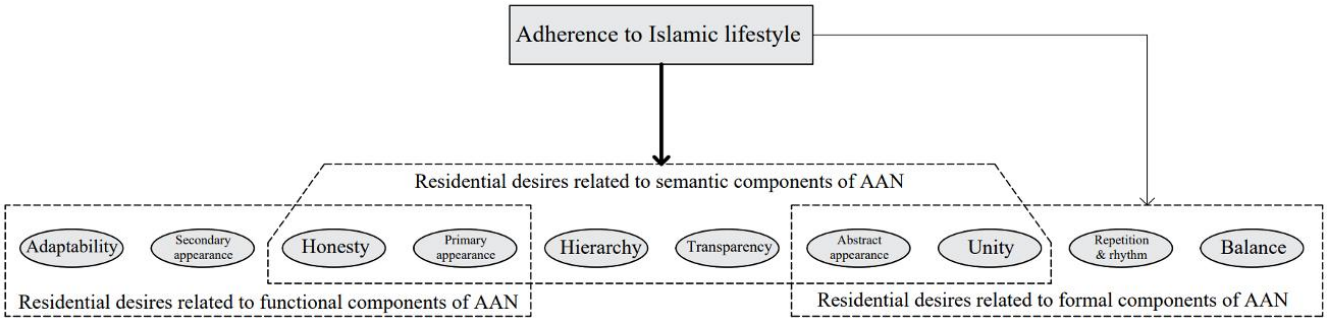

Fig. 4. Relationship between adherence to Islamic lifestyle and residential desires related to different components of the AAN.(The thicker arrow indicates a stronger relation)

Perceived quality of the performance of a product, in addition to the main performance, depends on cultural backgrounds, personal factors, and subjective comparisons with other similar products. The perceived quality of the AAN, which affects the various dimensions of housing quality, is no exception to this rule. In the theoretical framework of this study, the effects of personal, cultural, and demographic factors on perceived quality are hidden in the relationship between the variables of adherence to Islamic lifestyle and residential desires related to the AAN. The relationship between the two variables of residential desires and the perceived quality of the AAN should be investigated in different dimensions. Since the provision of basic residential needs of the human material dimension is based solely on sensory perceptions and human physiological characteristics determine the level of satisfaction with the provision of these needs, RS in terms of material needs is less affected by personal and cultural factors. Nevertheless, the influence of demographic and cultural factors in responding to human psychological and spiritual residential needs is undeniable. The results of the survey show that as the residential desires related to formal and semantic components of AAN increase the perceived quality of these components decreases. Increasing the level of initial expectations, which plays an important role in the mental evaluation process and, consequently, the amount of perceived quality, has been the main reason for the decrease in the perceived quality of these components. This fact also indirectly affects the quality of housing architecture due to the relationship between the two variables of the quality of AAN and the quality of housing architecture.

The RS variable results from comparing perceived quality with initial expectations, so the variable of residential desires related to the AAN, which represents the level of initial expectations of people about the qualitative characteristics of housing, directly affects RS. It was found that the level of RS will decrease with increasing residential desires related to the components of AAN, the reason is similar to the effect that this variable has on the perceived quality of AAN, which is more about formal and semantic components than functional ones. The important point about the inverse relationship between the variables of residential desires and the perceived quality of AAN with RS is that this inverse relationship is mainly due to the deficiencies caused by low-quality components of AAN. If the quality of these components are at an acceptable level, this relationship either does not exist or will not necessarily be inverse.

The variable of perceived quality of AAN has a less direct effect on RS compared to the other two variables (Perceived quality of housing architecture and residential desires). Nevertheless, due to its indirect effect on RS through the variable of perceived quality of housing architecture, this variable has a key role in determining the level of RS on the scale of qualitative factors related to the architecture of the residential environment, compared to the other two variables.

Regarding the effect of functional components of the AAN on the functional quality of housing architecture, the component of adaptability was identified as the key factor. This component includes or underlies the application of other functional components of the AAN. Thus, the process of adapting systems to the natural environment has always been aimed at maintaining the survival and operation of the systems. In a situation where housing is considered as a system to respond to human residential needs, the main function of the component of adaptability is using the potentials and laws in Nature to provide environmental comfort in housing and respond to residential needs of the material dimension of Man. Utilization of these potentials, either due to the compatibility of form and materials with the climate or through the use of functional elements and details to provide passive cooling and heating, includes the characteristics of the components of honesty and application of primary and secondary appearance of Nature. The result of using formal components of the AAN can be summarized in the form of the unity component, which is effective in improving the formal quality of housing architecture. Therefore, the unity component is a key factor in the relationship between formal components of AAN and the formal quality of housing architecture. Regarding the relationship between the semantic components of the AAN and the semantic quality of housing architecture, the hierarchy component was identified as a key factor. In this regard, it should be acknowledged that the perception of different semantic layers can be different according to the mental preparation of individuals. A part of this mental preparation is related to providing environmental conditions. Qualitative improvement of the characteristics related to the hierarchy component makes it possible to understand the semantic layers of housing architecture that exist through applying other semantic components of the AAN.

In general, effective factors in determining the level of RS in the scale of the architectural quality of residential complexes were identified in two categories: personal-cultural factors and architectural-environmental factors. Personal-cultural factors were considered in the theoretical framework of the research in the form of adherence to lifestyle at the structural level (Islamic lifestyle in the context of Iran). It was found that these factors indirectly and through the variable of residential desires in conditions of qualitative deficiency of formal and semantic components of the AAN, affect the perceived quality and the level of RS. Because increasing adherence to the Islamic lifestyle leads to an increase in residential desires related to the AAN and in the mentioned conditions, leads to a decrease in the perceived quality and the subsequent level of RS.

RS is also affected in three ways by the components of the AAN. The first way is the direct influence of the perceived quality variable from the AAN that there is a direct relationship between these two variables (As the perceived quality increases, so does the level of satisfaction). The second way is the indirect influence from the components of the AAN due to the variable of the quality of housing architecture (In proportion to the increase in the perceived quality of these components, the perceived quality of housing architecture and consequently the level of residential satisfaction will increase). The third way is the direct influence of the variable of residential desires related to the AAN in conditions of qualitative deficiency of formal and semantic components (In this condition, the level of residential satisfaction will decrease in proportion to the increase in residential desires related to these components). Subsequently, personal and cultural factors in the context of adherence to lifestyle at the structural level, affect the perceived quality of architectural and environmental factors by influencing residential needs of the psychological and spiritual dimensions of human existence. The severity of this effect will be greater in proportion to the increase in quality deficiency in architectural and environmental factors. Investigation of the presented model in this research in various cultural contexts and in other urban scales can be considered the subject of future research.

References

Abbaszadeh, S., Gohari, F., & Askari Rabori, A. (2017). Analysis of Environmental Quality towards Satisfaction of Users in Mashhad Housing Complexes. Geographical Urban Planning Research, 4(4), 653-671.

Altman, I. (1975). The environment and social behavior: Privacy, personal space, territory, crowding. Monterey (Cal): Brooks/Cole.

Amerigo, M., & Aragones, J. I. (1997). A theoretical and methodological approach to the study of residential satisfaction. Journal of Environmental Psychology, 17, 47-57.

Ansari, M., & Ebrahimi, A. (2010). The geometry of proportions in the architecture of Turkmens of the Qiyyunlu period, Kaboud Mosque (Turquoise Islamic World). Science and Technology Ketabmah, 35-45.

Azemati, H., Pourbagher, S., & Rostami, V. (2017). Evaluating the Satisfaction Rate in Affordable Housing Case Study: Ardabil Mehr Housing in Ardabil Province of Iran. Journal of Architectural Engineering Technology, 6(2). doi:0.4172/2168-9717.1000199

Azimi, N., & Esmaeilzadeh, Y. (2017). Assessing the relationship between house types and residential satisfaction in Tabriz, Iran. International Journal of Urban Sciences. doi:10.1080/12265934.2016.1273128

Azizibabani, M., & Bemanian, M., Yeganeh, M. (2022). The Effects of Nature's Presence Methods on Accommodating Residential Needs From The Islamic Lifestyle Perspective. International Journal of Architecture and Urban Planning, In press.

Azizibabani, M., & Bemanian, M. (2022). Role of the Architectural Application of Nature in Improving the Quality of Semantic Depth in Iranian Urban Housing. Journal of Sustainable Architecture and Civil Engineering, 30(1), 50-64.

Azizibabani, M., & Bemanian, M., Yeganeh, M. (2021). Investigation of the Effects of Applying Social Sustainability Components on Residential Satisfaction Journal of Sustainable Architecture and Civil Engineering, 29(2), 49-61.

Bagheri Khalili, A. (2009). The Study of Aspects of Religiosity of Hafez in Light of Glock and Stark's model of Religion, as a Multi-faceted Phenomenon. Literary Studies, 42(4), 27-52.

Berien, E. (2005). Combining Nature Conservation and Residential Development in the Netherlands, England, and Spain. Journal of Environmental Planning and Management, 48(1), 37-63. doi:10.1080/0964056042000308148

Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). The quality of American life Perceptions, evaluations, and satisfactions.. New York: Russell Sage Foundation.

Choudhury, I. (2005). A conceptual Model of Residential Satisfaction with Reference to Neighborhood Composition. Wirld Congress on Housing. Pretoria.

Copleston, F. (1993). A History of Philosophy, Vol. 1: Greece and Rome From the Pre-Socratics to Plotinus. Melbourne: Image.

Cutter, S. (1982). Residential satisfaction and the suburban homeowner. Urban Geography, 3, 315-327.

Dekker , K., de Vos, S., Musterd, S., & van Kempen, R. (2011). Residential satisfaction in housing estates in European cities: A multi-level research approach. Housing Studies, 26(4), 479-499. doi:10.1080/02673037.2011.559751.

Delauer, v., Mcgill-o'rourke, a., Hayes, t., Haluch, a., Gordon, c., Crane, j., Kossakowski, d., Dillon, c., Thibeault, n. & Schofield, d. (2022). The impact of natural environments and biophilic design as supportive and nurturing spaces on a residential college campus. *Cogent Social Sciences*, 8.

Ellis, C. D., Lee, S. W., & Kweon, B. S. (2006). Retail land use, neighborhood satisfaction and, the urban forest: An inveinvestigation into moderating and mediating effects of trees and shrubs. Landscape and Urban Planning, 74, 70-78. doi:0.1016/j.landurbplan.2004.10.004

Fallahi, B., Hariza, A., Husniyah, H., & Abdul Rahim, B. (2015). Relationship between Background Characteristics and Housing Satisfaction of Iranian Homeowners in Kuala Lumpur, Malaysia. Journal of Educational, Health and Community Psychology, 4(2).

Fakouhi, N. & Ghaznavian, Z. (2012). Anthropological study of desirable spatial diversity from the perspective of residents of urban houses in Tehran, Alborz, and Qazvin. Iranian Journal of Anthropological Research, 2(2), 29-52.

Galster, G. (1987a). Homeowners and neighborhood reinvestment. Durham, North Carolina: Duke University Press.

Galster, G. C. (1985). Evaluating indicators for housing policy: Residential satisfaction vs marginal improvement priorities. Social Indicators Research, 16(4), 415-448.

Galster, G. C., & Hesser, G. W. (1981). Residential satisfaction. Compositional and contextual correlates. Environment and Behavior, 13, 735-758.

Garcia. (1994). Urban environment evaluation: A study of environmental satisfaction and preference. PhD Disertation Universidad de-Santiago de Compostela Spain.

Gifford, R. (1997). Environmental psychology: principles and practice. California: Allyn & Bacon.

Glock, C. Y., & Stark, R. (1965). Religion and society in tension. Chicago: Rand McNally.

Hadavi, S., Kaplan, R., & Hunter, M. R. (2017). How does perception of nearby Nature affect multiple aspects ofneighbourhood satisfaction and use patterns? Landscape Research. doi:10.1080/01426397.2017.1314453

Haeri, M. (2009). House in Culture & Nature of Iran. Tehran: Road, Housing & Urban Development Research Center.

Hejazi, M. (2009). Sacred Geometry in Nature and Persian Architecture. History of Science, 6(2), 17-44.

Hine, D. W., Corral- Verdugo, V., Bhull, N., & Frias- Armenta, M. (2016). Advanced Statistics for Environment- Behavior Research: Multi- level Modeling and Structural Equation Modeling. In R. Gifford, Research Methods for Environmental Psychology (pp. 369-389). West Sussex: John Wiley & Sons, Ltd.

Jensen, M. (2007). Defining lifestyle. Environmental Sciences, 4(2), 63-73.

Kaplan, R. (1985). Nature at the doorstep: Residential satisfaction and the nearby environment. Journal of Architectural and Planning Research, 2(2), 115-127.

Kaplan, R., & Kaplan, S. (1989). The experience of Nature: A psychological perspective. New York, NY: Cambridge University Press.

Kaplan, R., Austin, M., & Kaplan, S. (2004). Open space communities: Resident perception, Nature benefits, and terminology problems. Journal of the American Planning Association, 70(3), 300-313.

Kearney, A. R. (2006). Residential Development Patterns and Neighborhood Satisfaction: Impacts of Density and Nearby Nature. Environment and Behavior, 38(112), 112-139. doi:10.1177/0013916505277607

Lu, M. (1999). Determinants of residential Satisfaction. Growth & Change, 30(2), 264-288.

Makinejad, M. (2008). Iranian Art History in the Islamic Era: Architectural Decorations. Tehran: SMT Publication.

Marans, R. W., & Rodgers, S. W. (1975). Toward an understanding of community satisfaction. (A. Hawley, & V. Rock, Eds.) New York: Halstead Press.

Maslow, A. H. (1958). A Dynamic Theory of Human Motivation. Cleveland USA: Howard Allen Publishers.

McCrea, R. (2007). Urban quality of life: Linking objective dimensions and subjective evaluations of the urban environment. Unpublished PhD thesis, The University of Queensland, Brisbane.

Momeni, K. (2018). The Comparison between the Transparency Principle in the Form and Design of Safavid and Qajar Homes in Isfahan. ournal of Researches in Islamic Architecture, 6(1), 23-42.

Morris, E. W., & Winter, M. (1975). A theory of family housing adjustment. Journal of Marriage and the Family, 37(1), 79-88.

Naghizadeh, M. (2012). Reflection on Understanding the Basics of Iranian Islamic Housing. Art Ketabmah, 170, 38-54.

Noghrekar, A. (2008). An Introduction to the Identity of Islamic Architecture in Architecture and Urban Development. Tehran: Ministry of Roads & Urban Development.

Ogu, V. I. (2002). Urban Residential Satisfaction and the Planning Implications in a Developing World Context : The Example of Benin City, Nigeria. International Planning Studies, 7(1), 37-53.

Parkes, A., Kearns, A., & Atkinson, R. (2002). What makes people dissatisfied with their neighbourhoods? Urban Studies, 39(13), 2413–2438. doi:10.1080/0042098022000027031

Pirnia, M. (1992). Introduction to Islamic Architecture. (G. Memarian, Ed.) Tehran: IUST.

Pirnia, M. (1997). Stylistics of Iranian Architecture. (G. Memarian, Ed.) Tehran: Sorush Danesh.

Premius, H. (1986). Housing as a social adaptation process. A conceptual scheme. Environment and behavior, 18, 31-52.

Raeisi, M. (2019). Architecture and urbanism in accordance with Islamic lifestyle. Qom: Qom university.

Rapoport, A. (2005). Culture, Architecture, and Design. Chicago: Locke Science Publishing Co.

Reimer, S. (1943). Sociological theory of home adjustment. American Sociological Review, 8(3), 272-278.

Rossi, P. H. (1955). Why families move: A study in the social psychology of urban residential Mobility. Free press.

Russell, N., & James, I. (2008). Investing in Housing Characteristics that Count: A Cross-Sectional and Longitudinal Analysis of Bathrooms, Bathroom Additions, and Residential Satisfaction. Housing and Society, 35(2), 67-82. doi:10.1080/08882746.2008.11430564

Sadighakbari, S., & Kazemi, M. (2014). Comparison of Musical Concepts of Traditional Context in Yazd and Tabriz. Hoviatshahr, 8(19), 101-110.

Saforaee, M., & Akhlagi, H. (2020). Theoretical foundations of life style in Qur'an's perspective. Quranic Studies, 3(5), 165-192.

Separe, A. (1974). Residential satisfaction as an intervening variable in residential mobility. Demography, 11, 173-188.

Serajzadeh, S. (2005). Challenges of religion and modernity. Tehran: Tarhe No.

Shia, E. (2007). With the city and region in Iran. Tehran: IUST.

Spirn, A. W. (2000). Language of Landscape (Later Printing edition ed.). New Haven: Yale University Press.

Stewart, I. (2001). What Shape Is a Snowflake? Weidenfeld & Nicolson.

TA, N., LI, H., ZHU, Q. & WU, J. (2021). Contributions of the quantity and quality of neighborhood green space to residential satisfaction in suburban Shanghai. *Urban Forestry & Urban Greening*, 64.

Taylor, A. F., Wiley, A., Kuo, F. E., & Sullivan, W. C. (1998). Growing up in the inner city: Green spaces as places to grow. Environment and Behavior, 3-27.

Theodori, G. L. (2001). Examining the effecty of community satisfaction and attachment on individual well being. Rural Sociology, 66(4), 618-628.

Varady, D. P., Preiser, & Wolfgang. (1998). Scattered site public housing and housing satisfaction. Journal of the American Planning Association, 64(2), 189-208.

Vincent, J. (2014). Biomimetics in Architectural Design. Intelligent Buildings International(12), 1-12.

Ward Thompson, C., & Aspinall, P. A. (2011). Natural environments and their impact on activity, health, and quality of life. Applied Psychology: Health and Well-Being, 3, 230-260. doi:0.1111/j.1758-0854.2011.01053.x

Wolpert, J. (1966). Migration as an adjustment to environmental stress. Journal of Social Issues, 22(4), 92-102.

Zabihi, H., Habib, F., & Rahbarimanesh, K. (2011). Relevance Between Acquiescence of Habitations and Impacts on Relationships (Case Study: Ekbatan and Behjatabad Tehran). Hoviatshahr, 5(8), 103-118.