Identifying the Most Influential Physical-Environmental Subcomponents of Social Housing on Users' Place Attachment (Case Study: Shiraz) [1]

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ABSTRACT

Different components and sub-components are important in the design of residential spaces. Social housing is important in terms of creating living spaces with collective uses for certain groups, which the government plays an important role in creating. Considering the proven role of environmental psychology in space design, the upcoming research has been carried out with the aim of identifying the most influential physical-environmental sub-components on the place attachment of their users as one of the important issues related to environmental psychology. The research method used in the current study was descriptive-analytical with the method of collecting information in the form of library and survey studies with the help of relevant scientific texts and also a researcher-made questionnaire. After collecting related materials and categorizing the components related to the subject, a researcher-made questionnaire was developed and its validity was determined by Delphi method by experts and its reliability was determined by Cronbach's alpha. According to Cochran's formula, it has been randomly distributed among 387 users of social housing complexes in Shiraz, who were identified with the help of Expert Choice 11 software based on the AHP model. The data from the questionnaires were analyzed by Excel and SPSS software with the help of ANOVA, Pearson correlation coefficient test and multiple regression tests. The findings have determined that the most influential physical-environmental sub-components include: 1- "Hierarchy"; 2- "feeling of comfort"; 3- "dimensions and size" and "view and landscape" (on the same level); 4- "personalization" and 5- "material type".

Keywords: *Social Housing Design, Place Attachment, Physical-Environmental Subcomponents, Emotional Attachment, Local Identity.*

1. Introduction

One of the important and influential meanings in the relationship between man and the environment, which has also attracted the attention of designers, is " place attachment" [28;14], which as a multidimensional concept with personal

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dimensions, psychological and spatial process, is Checked. Until today, studies have been conducted in the field of " place attachment" and experts in various fields of design, psychology, environmental psychology, sociology and communication have conducted many researches and analyzed the environmental and human aspects of this relationship [28].

Among the places with which people are connected, their place of residence and life is considered among the most prominent places that can be examined at various levels including: home, neighborhood, city and wider levels [9] But until today, there has been little understanding of the formation of the attachment of users of residential spaces; So that this issue has reduced the loyalty, efficiency and use of residential spaces, less than what it should or can be.

On the other hand, housing, as one of the most important basic needs of man, plays an important role in his protection and security, and as a determining element in the social organization of space, it plays an important role in the formation of individual identity, social relations and collective goals of people [9].

Attachment to a residential place shows the feeling of belonging that people have towards their residential neighborhood. These emotional links are especially related to memories, experiences and important events in people's lives. Attachment to residential environments is important because it facilitates collective action, promotes organizational participation, encourages investment, and provides a favorable opportunity for social growth and development of residential areas [3]. Therefore, the present research was conducted with the aim of determining the most influential physical-environmental sub-components on the place attachment of social housing users, focusing on the social housing of Shiraz city (as one of the metropolises of Iran) and sought to answer these questions: 1- How is the relationship between the physical-environmental component and the sub-components of attachment to the place of social housing users? 2- What are the most influential physical-environmental sub-components on social housing users' place attachment?

The background of the upcoming research is categorized and presented from the most up-to-date sources in the field of relationship between physical-environmental sub-components and place attachment in Table 1.

Table 1. Background of research in the field of relationship between physical-environmental component and place attachment

Result	research method	The names of the authors	Title
"Type of access" and "view and landscape" indicators among the six indicators including: "facilities and amenities", "quality of indoor spaces", "organization", "type of access", "social interactions" and "view and view" as Effective indicators in promoting the sense of attachment to the place are known.	Correlation	[37]	Studying the relationship between skeletal scheme of residential complexes and sense of interest to the place among the residents Print
Public open areas of colleges have a significant effect on students' place attachment, which can be explained by meeting spaces with artistic or architectural elements and desirable green spaces that play an important role in increasing students' social interactions.	Descriptive-analytical using structural equations	[40]	The Role of Faculties' Public Open Spaces on Students' Place Attachment; Case Study: Faculty of Fine Arts of the University of Tehran
Green design (including biophilic design and creating opportunities to connect with nature, etc.) increases attachment to a place.	Descriptive-analytical	[6]	Place attachment in green buildings: Making the connections

Physical components such as: "coherence and unity", "privacy", "facility management and supervision", "natural and green elements", "visual richness" and "ability to navigate and read" are the most effective physical components on the sense of attachment to a place.	Causal-comparative	[32]	Evaluation of the Effect of Physical Components on Place Attachment in Communal Spaces of Selected Residential Complexes in Tehran
Physical, perceptual-emotional and functional-activity dimensions have a significant relationship with the concept of place attachment. The type of materials, facade color, coordination with native and contextual dimensions, existence of full and empty surfaces, terrace and porch, facade texture, aesthetic characteristics and green facade have the greatest effect on people's attachment to a place.	Descriptive-analytical	[42]	Explaining the role of urban views in creating place attachment for citizens (Case Study: Tehran Residential Views)

Paying attention to accessibility, green space, aesthetic dimensions, materials, privacy, cohesion and unity, facility management and supervision, readability, color, etc. are all physical-environmental sub-components that have been less addressed in social housing complexes. Therefore, users become less loyal to the environment and make less effort to maintain it, which are the results of users' low attachment to the place.

According to the background of the research conducted in the field of the relationship between the physical-environmental component and attachment to the place, it has been determined that so far, the influence of some of the physical-environmental components has been discussed in residential complexes, colleges, green buildings and urban facades; But the use of social housing has not been analyzed so far. Therefore, in the present study, firstly, the relationship between the physical-environmental component and the sub-components of place attachment has been determined, and then, the most effective physical-environmental sub-components on the place attachment of social housing users have been determined so that the results are consistent with the results of other researches in this field. , to be compared.

2. Literature Review

2.1. Social housing from the perspective of thinkers

Various thinkers and theorists have presented theories about social housing, which can be seen in summary in Table 2.

Table 2. Theorists' opinions about social housing

Source	Theories
[21]	A special type of housing provision, provided primarily by local or national government and aimed at housing low-income groups.
[30, p 134-135]	Due to social goals, based on acceptable minimums and sometimes lower than the standards of the housing consumption pattern, the users include: young couples, low-income groups and families without a guardian, the residence of the users with a maximum of 30% of their income in these housings in the form of rent.
	Social housing according to housing policy makers: units with a useful infrastructure area of 50 square meters, mass construction, construction with the participation and intervention of the government, especially in urban centers.
	Social housing, one of the solutions of social support in the field of housing; providing affordable housing for the needy; Considering how social housing projects can benefit the housing sector (for example, by bringing together expertise related to management);

[31, p 30, 40-41, 125]	Integrating social housing with other policies, especially government employment, urban planning and transportation; Social housing planning with a long-term perspective and according to the demographic trend and according to the increasing trend of elderly people in the society; Integration of social housing with other types of housing with the aim of avoiding social segregation in residential areas; Attention to capacities with the aim of reducing inequalities in welfare and income; avoiding social polarization; mutual support to achieve common goals; feeling of belonging to a similar society; strengthening bonds and social trust between people (social capital); Integrity and civic responsibility
[17, 39]	Dealing with social deprivation; Linking social housing with employment opportunities in the region for the possibility of achieving social integration (through the labor market)
[19]	Public, government and affordable housing

In general, it can be said that social housing is considered a type of housing that is usually provided by governments with their support for the use of its users, including: the financially vulnerable sections of the society, which has the minimum possible construction, equipment and facilities.

2.2. Physical-environmental component and its sub-components in social housing design

The physical-environmental component is one of the effective components in the design of social housing, which according to the conducted researches, it has been determined that the sub-components of the physical-environment effective on the design of social housing include: safety [24], low fear of crime [16], security (no house burglary at night, no car theft and no attacks) [12, 16, 24], social control (surveillance) [16], green spaces and natural landscapes [6; 12; 24; 32], comfort [24], personalization [12], dimensions and size of spaces [2; 33], scale and night light [2], attention to Maslow's pyramid at the first level: physiological needs in design (proper ventilation, need for lighting and light suitable, compliance with climatic conditions, required area) [4], view and landscape [37], access to services and facilities (public transportation, etc.) [2; 24; 32], the type (how) of access (on foot and on horseback) [37], privacy [34; 12], cohesion and unity [32], the type of materials [42] and so on.

2.3. Place attachment

Many thinkers have expressed opinions about the concept of "attachment to a place". In Table 3, these ideas are summarized, categorized and presented.

Table 3. The point of view of different theorists about place attachment (author taken from [2; 13; 29; 33; 34]

Theories	Theorists
Positive emotional dependence between person and place, influenced by social groups, physical desirability, person's personality and the position received from the place of residence	Shumaker & Taylor (1983)
Interactions of feelings, beliefs, knowledge and behaviors in reference to a place	Proshansky& Fabian& Kaminoff (1983)
Place attachment and identity as a common concept	Brown & Werner (1985)
One of the scales of sense of place	Shamai (1991)
Emotional involvement with place	Hummon (1992)
A person's cognitive and emotional connection with a specific territory	Low (1992)
Symbolic connection with a place, giving emotional and common cultural sense meanings to a specific place, subject or mentality with time variation	Low & Altman (1992)
place attachment, part of place identity	Lalli (1992)

An emotional engagement with a place	Hummon (1992)
The creation of dynamic and long-lasting positive links over time and sometimes unconsciously among individuals or groups with social-physical environments	Brown & Perkins (1992)
A deep human characteristic, the concept of giving a place a home	Jacobs (1995)
An effective connection or link between a person and a specific place	Twigger- Ross & Uzzell (1996)
Affective complex relationship with the physical environment	Klatenborn (1997)
A person's emotional connection with the environment giving meaning to that environment by the person	Milligan (1998)
Emotional attachment to a particular place, becoming a person as a part of the identity of the place, the result of that feeling and interest towards the place	Bonaiuto et al (199)
Place attachment and identity, dimensions of a higher order concept	Jergensen and Steadman (2001)
Dependent on two concepts: place identity (emotional attachment) and place dependence (functional attachment) to be operationalized	Vaske & Kobrin (2001)
A positive emotional relationship between a person and a particular place (tendency to maintain closeness to a place: the most important characteristic of that place)	Hidalgo & Hernandez (2001)
A dimension of the overall sense of place, positive emotional dependence between place and person	Stedman (2003)
Creating connections between people and meaningful environments	Giuliani (2003)
The limit led to self-identification by the environment and valuing it	Kyle, Graefe, Manning& Bacon (2003)
A person's sensory connections with a place based on "self" and the person's internal interactions, depending on the person's level of social belonging	Kyle et al (2004)
Place identity is part of place attachment	Kyle, graefe & Mannin (2005)
Place attachment and place identity, two different ways of relating to places	Hernandez (2007)
Communicating effectively with a certain territory and as a result, staying in that territory and feeling safe and comfortable	Hernandez, Hidalgo & Salazar-Laplace (2007)
Effectively connecting people with places	Florek (2010)
Experience an impactful and long-term connection with a specific geographical point and the meaning associated with this connection	Morgan (2010)
Establishing a link between a person and his/her meaningful environment	Scannell & Gifford (2010)
The emotional connection between a person and the physical environment around him/her causes: the awakening of personal identity, giving meaning to life, facilitating societies and influencing performance	Manzo & Devine-Wright (2013)

2.4. Factors influencing place attachment

According to various theories, researches and sources, various components and sub-components are effective in attachment to a place. In Table 4, these items are categorized and presented.

Table 4. sub-components of place attachment

References	Subcomponents	component
[11; 32]	Continuity Meaning Distinction Honor	
[11]	Identification Homogeneity	
[15; 22; 23; 24]	Sense of Place The memories	Local identity
[12; 35]	Individual and collective memories and values	
[32]	The ability to perceive and imagine the place	
[32]	Feeling attractive and understanding the invitingness of the place Creating a pleasant feeling due to being in the place	
[11; 18; 22; 24; 32; 41]	Satisfaction with the place	
[5, 11; 32]	Ownership of the place	
[7; 11; 20, p 39; 23; 24; 27; 32; 36]	Duration of residence/stay time The length of stay after each visit	
[1]	Behavioral loyalty (favourability and place preference) Past and present: interest in family roots Past and present: interest in historical (traditional) places.	Spatial dependence
[20, p 64-65, 74]	The superiority of the residential complex where you live compared to the surrounding residential complexes	
----------	Biological patterns and changes (good weather)	
[12; 24; 36]	Social relationships and interactions	
[25]	Creating passive and active social interaction and areas for relaxation	
[10]	Social bond	
[38]	Social symbol Quality of interaction	Attachment and social bonds
[32]	The amount of interaction	
[20, p 13]	Specification Spatial interaction	

	Place extraction (random meeting of friends, meeting, etc.)	
[20, p 80]	Collective efficacy (empowerment) [2]	
[20, p 81]	Neighborliness [3]	
[20, p 82]	Citizen participation [4]	
[7]	How humans and places interact	
[26]; [20, p 82-83; 18]		
	The social capital of the place [5]	
[5]	Family ties	
[5]	Seasonal celebrations	
[36]	Getting to know the residents	
----------	Proximity and ease of travel of relatives and friends	Attachment and social bonds
	Positive talk about where to live from others	
[7; 24; 41]	Participation (ability to participate in activities)	
	The intimacy of the local community	
	Collective behaviors [6]	
[16]	Number of relatives [7]	
	Daily encounters [8]	
	Collective assets [9]	
[20, p 39;5]	Information and communication technologies	
[11]	Emotional bond	
	Cognitive link	
	Realization of place (enjoying the place)	emotional attachment
[20, p 13]	Creating a place (doing the most appropriate planning and design for the place due to the hope of improving it)	
	Location improvement (preserving the location and improving it)	

[2] People's trust in the effectiveness of collective activities organized with neighbors, the right to express opinions and choose, for social development and environmental protection.

[3] on three levels: 1- social support and network connections (social capital of bonding at the community level), 2- cognitive mapping of the physical environment and symbolic communication (spatial interdependence and spatial identity), 3- emotional attachment to neighbors and place (sense of community) and spatial linkage) (Brwon et al, 2003)

[4] Individual and social participation in local voluntary associations (such as civil and religious organizations, local environmental protection groups) and other intermediary structures through the capacity of residents to respond, individually and collectively, to environmental hazards and the capacity of local and social institutions to respond to the victims and participate giving them input into decision making (Manzo & Weinstein, 1987; Rich et al, 1995).

[5] Social capital includes: public/institutional trust, charitable/religious/philanthropic participation, social support, social cohesion, social relations and social bonds (Habibian and Hataminejad, 2019).

[6] Collective behaviors

[7] Number of relatives

[8] Daily encounters

[9] Collective possessions

By examining the theoretical foundations, it can be concluded that the effective subcomponents of place attachment include: place identity, place dependence, attachment and social bonds, and emotional attachment. In the data analysis, the relationship between them and physical-environmental variable should be considered.

3. Methodology

The current research method is applied and combined (qualitative-quantitative) from the methodological point of view. The research method used in the current study was descriptive-analytical with the method of collecting information in the form of library and survey studies with the help of books, articles and related written sources, as well as a researcher-made questionnaire. According to the Cochran formula, the questionnaires were randomly distributed among 387 users of social housing complexes in Shiraz, who were selected with the help of Expert Choice 11 software based on the AHP model (the full description of which is given in the thesis of the first author) (Table 5).

Table 5. Information related to the investigated social housing

Zoning Of Shiraz Municipality	Location	The Name Of The Residential Complex
7	Shiroudi Boulevard., Forsat Shirazi Square, Fazel Street., Dana Street	Eskan 1
	Shiroudi Boulevard., Forsat Shirazi Square., Fazel Street., Alley 9	Eskan 2
	Shiroudi Boulevard., Forsat Shirazi Square., Fazel Street	Eskan 3
		Eskan 4
		Bo-Ali 1
	Shiroudi Boulevard., Zamzam Crossroads	Bo-Ali 2
		Bo-Ali 3
9	Mianroud., West Baharestan Boulevard	Esar
3	Salman Farsi Street (Pirnia)	Salman Farsi (Eram)
11	West Abo Nasr Boulevard., Alley 22	Sadaf 1
	West Abo Nasr Boulevard., Mououd Street	Sadaf 2

The data obtained from the questionnaires were analyzed by Excel and SPSS software with the help of ANOVA and multiple regression tests. It is worth mentioning that the independent variable of the research is the physical-environmental subcomponents and the dependent variable of the research is place attachment. Figure 1 shows the conceptual model of the research. It is worth noting that the mentioned sub-components were determined according to the opinion of experts based on Delphi validity.

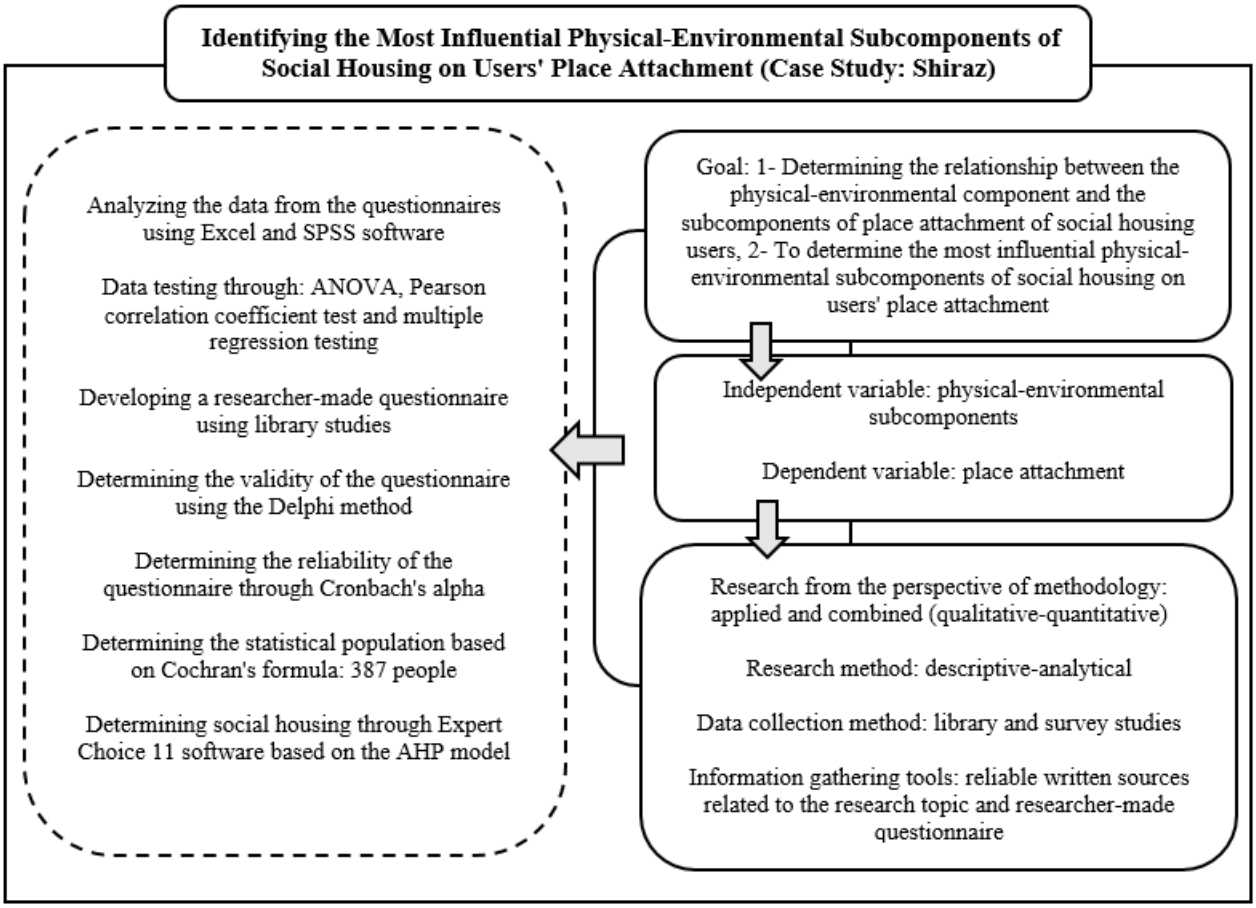

Figure 1. Conceptual model of research

Reliability and validity of the questionnaire:
After collecting the related materials and categorizing the components related to the topic, a researcher-made questionnaire was developed and its validity and reliability were determined by experts and Cronbach's alpha, respectively, using the Delphi method (Table 6).

Table 6. Reliability of the questionnaire "Evaluation of social housing design features"

Cronbach's alpha	Questions	Components
0/855	19	Physical-environmental component
0/791	6	Place Identity
0/844	7	Spatial dependence
0/825	10	Attachment and social bonds
0/815	4	emotional attachment

Considering that Cronbach's alpha coefficient is higher than 0.7 in all sections, the reliability of the questionnaire is suitable.

4. Results

The test of Pearson's correlation coefficient (Table 7) and the significant number (sig) observed (decision criterion) shows that the obtained value is lower than the standard significant level (a=05) and this indicates the existence of a significant relationship between the components. Physical-environmental and various Subcomponents of users' attachment to the place are at the 95%

confidence level; This means that the H0 hypothesis, which states that there is no significant relationship between the physical-environmental component and various Subcomponents of users' attachment to the place, is not confirmed at the 95% confidence level, and we conclude that there is significant relationship between the physical-environmental component and various Subcomponents of attachment to the place. In the following, the correlation coefficient between the physical-environmental component and the various Subcomponents of attachment are presented in table (7), which, due to the positivity of the resulting coefficients, all relationships are direct and positive.

Table 7. Correlation test results between physical-environmental component and different subcomponents of place attachment

		Physical-Environmental	Local Identity	Spatial Dependence	Attachment And Social Bonds	Emotional Attachment
physical-environmental	Pearson's correlation coefficient value	1	0/716**	0/699**	0/693**	0/740**
	decision criterion (meaning)		0/000	0/000	0/000	0/000
	Sample size	387	387	387	387	387

The presence of significance coefficient (0.000) indicates that there is a significant relationship between the variables. The significance coefficient between the physical-environmental component with the Local identity subcomponent is equal to 0.716, the significant coefficient between the physical-environmental component with the spatial dependence subcomponent is 0.699, the significant coefficient between the physical-environmental component with Attachment and social bonds subcomponent is 0.693 and he significant coefficient between the physical-environmental component with emotional attachment sub-component is equal to 0.740.

Table 8 shows the results of the Anova test and the significance of the analysis of variance, which was used due to the presence of more than two housing groups under investigation. It shows the between group variance (dispersion of the average data in different groups, for example, residential complexes: Eskan, Sadaf and other housings under investigation) and the within group variance (the average dispersion of data within each group, for example, Eskan 1 to 4 and so on).

Table 8. Anova analysis results

Model		Sum Of Squares	Df	Mean Square	F	Sig.
1	between groups	112/058	14	8/004	65/038	000/0b
	within groups	45/782	372	0/123		
	Total	157/840	386			

a. Dependent Variable: Place attachment

b. Predictors: (Constant), hierarchy; light and brightness; type of access; temperature, comfort and ventilation; cohesion and unity; feeling comfortable; scale and night light; Personalization; surveillance and security; type of materials; dimensions and size; confidentiality; view and landscape; safety

According to the test result in Table 8 and that the significant value is less than 0.05, we conclude that there is a significant difference between the average data in the area of attachment to the place and physical-environmental sub-components within the groups and between the groups.
According to the results obtained and the results of the test and the regression coefficients obtained in tables 8 and 9, as can be seen, the sub-component " hierarchy" has a greater effect (compared to other sub-components of the physical-environmental component) in users' attachment to the place and After that, the "feeling of comfort" sub-component had the greatest impact. According to Table 9, the sub-components which sig value is greater than 0.05 have no effect on users' attachment.

Table 9. Summary of multiple regression test along with regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig
		B	Std. Error	Beta		
1	regression constant	-0/394	0/179		-2/203	0/028
	feeling comfortable	0/211	0/026	0/297	8/188	0/000
	Monitoring and security	-0/034	0/024	-0/047	-1/339	0/163
	Light and brightness	0/045	0/024	0/076	1/893	0/059
	safety	-0/020	0/025	-0/032	0/805	0/421
	Dimensions and size	0/105	0/021	0/190	5/094	0/000
	Coherence and unity	-0/007	0/027	-0/010	-0/267	0/790
	privacy	00/022	0/027	0/032	0/824	0/410
	Type of materials	0/047	0/020	0/084	2/371	0/018
	Scale and night light	0/019	0/025	0/025	0/756	0/450
	Temperature, comfort and ventilation	-0/015	0/024	-0/022	-0/624	0/533
	Personalization	0/115	0/022	0/179	5/270	0/000
	Access type	0/074	0/042	0/056	1/766	0/078
	sight and landscape	0/176	0/036	0/190	4/943	0/000
	Hierarchy	0/342	0/036	0/339	9/543	0/000

Dependent variable: place attachment

Table number 9 shows that the significance coefficient less than 0.05 includes 6 main sub-components. These 6 sub-components can be introduced as the most influential physical-environmental sub-components on place attachment, which include the following in order of influence:1- " Hierarchy" (0/339); 2- "feeling of comfort" (0/297); 3- "dimensions and size" and "sight and landscape" (on the same level: 0/190); 4- "Personalization" (0/179) and 5- "Type of materials" (0/084) are among the most influential physical-environmental sub-components in place attachment.

5. Conclusion

The present research was conducted with descriptive-analytical method with the help of information gathering method in the form of library and survey studies using books, articles and related written sources as well as researcher-made questionnaire. After collecting related materials and categorizing the components related to the topic, a researcher-made questionnaire was compiled and its validity was determined by Delphi method by experts and its reliability was determined by Cronbach's alpha and according to Cochran's formula among 387 users of social housing complexes in Shiraz who with the help of software Expert Choice 11 was distributed based on the AHP model. The data obtained from the questionnaires were analyzed by Excel and SPSS software and with the help of Anova, Pearson correlation coefficient test and multiple regression tests.

The results of Pearson's correlation coefficient have shown that there is a significant and direct relationship between all the components of attachment to the place with the physical-environmental component in a positive direction, and the following components have the most relationship with the physical-environmental component, respectively: 1- emotional attachment, 2- Local identity, 3- Spatial dependence, 4- Attachment and social bonds.

In the analysis to determine the most influential physical-environmental subcomponents on place attachment, Anova test was first used to determine the significance of the difference between the average data in the area of place attachment and

physical-environmental subcomponents within groups and between groups, and then Using the regression test, the most influential physical-environmental sub-components were determined. The findings have indicated that, respectively: 1- " Hierarchy"; 2- "feeling of comfort"; 3- "dimensions and size" and "sight and landscape" (on the same level); 4- "Personalization" and 5- "Type of materials" are among the most influential physical-environmental sub-components in place attachment.

The results of the present research are in line with the results of the research of [42] who considered "type of materials" and "green facade" as the most influential sub-components of physical- environmental on place attachment.

Also, the research results of [40; 37] have shown that "sight and landscape" are one of the most effective physical- environmental sub-components on place attachment. Therefore, it is on the same side with the results of the present study.

The researches of [6; 32] and have also proven that "green space" is one of the most influential physical-environmental sub-components on place attachment. Therefore, the results of the present study are on the same side as the results of the mentioned studies.

Future researchers can investigate other psychological and social issues related to the architecture of residential spaces (apartments or complexes), and the relationship between the architectural design features of the houses, with other important variables (for example: "social capital", "social justice" , "spatial dependence", "social stability", "social identity" and the like); In addition, they can conduct research with pre-test and post-test groups to analyze the mental and psychological reactions of users by making changes in the investigated spaces.

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