

## Research Paper

# Investigation of the place attachment process in neighborhood with a cognitive psychological approach (Case study: The Gharebaghis' neighborhood of Tabriz)

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### Abstract

The key issue in the design of today's living spaces is the cognitive and socio psychological gap towards individual and social needs of today's human. Place attachment as a quality of urban space has a kind of product-oriented output and requires careful attention to the stages and process of attachment. In the analysis of this process, familiarity with cognitive structures and novel research methods in the field of cognitive psychology, provide designers with valuable information. The main aim of this study is to investigate the role of cognitive psychology approach in the process-oriented study of place attachment. The research tries to address the issue that "how does the process-oriented model is realized in place attachment with an approach of cognitive psychology?". Research is a combination of qualitative (interview) and quantitative (questionnaire) methods. In order to determine the appropriate number of participants, first a pretest was performed as a pilot study on 40 residents of the neighborhood and after the estimation of variance for the initial sample ( $S^2$ ) at the confidence level of 95%, the number of the sample was increased to 297. The findings of this study suggest that the most influential criterion on the attachment of residents, is the affect (0.97) dimension; Behavior (0.86) is the second and cognition (0.74) is the third one identified in terms of process dimensions. This research introduces influential criteria in the promotion of affective, cognitive, and behavioral dimensions of the place attachment process and also investigates the effectiveness degree of each dimension.

**Keywords:** Place attachment, Process, Cognitive psychology, Neighborhood, Tabriz.

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## 1. INTRODUCTION

Place attachment, the bonding that occurs between individuals and their meaningful environments, has gained much scientific attention in recent years. This definitional diversity reflects the growing interest in place attachment, and can be seen as progress in the concept's theoretical development. Researchers have highlighted different places, and people involved in person-place bonding, but merely conducting a product -

oriented investigation on dimensions of place attachment is not sufficient. Place attachment is a quality of urban space that both has a kind of product-oriented output and requires careful attention to the stages and processes involved in attachment to place.

Architects and urban designers need to consider the both process-oriented and product-oriented aspects of environmental qualities to find it possible to achieve a comprehensive and holistic perspective in their designs.

In the analysis of this process, the cognitive sciences are one important means through which researchers and practitioners can attain that better understanding. Cognitive psychology, as a subset of a greater field of cognition science, focuses on the interplay between individuals' mental processes and their surroundings; thus familiarity with cognitive structures and novel research methods in the field provide designers with valuable information.

The main focus of this paper is process-oriented study

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of place attachment which is investigated through psycho-cognitive approach. This research examines the relationships between cognitive, affective, and behavioral dimensions with in the process of place attachment and cognitive psychology as a scientific approach overlaps the cognitive dimension of this process. The structure of the research is divided into conceptual and evidential approaches. In the conceptual section, the background of the subject is addressed together with the theoretical principles behind place attachment and cognitive psychology with a qualitative approach. These topics include: the three-dimensional process of place attachment, cognition process and the research methods used in cognitive psychology. Based on review of literature and the research background in this field, the position of the cognitive psychology in the process-oriented study of place attachment has been analyzed for content, and the result is presented in the form of the research theoretical framework. Within the evidential section, the procedures of theoretical framework testing and data analysis, implemented in the case study (Gharebaghis' neighborhood), are explained. In the following, findings of the research are extracted using Structural Equation Modeling (SEM), and based on this the research conclusion is provided. Figure 1 demonstrates structure of the research.

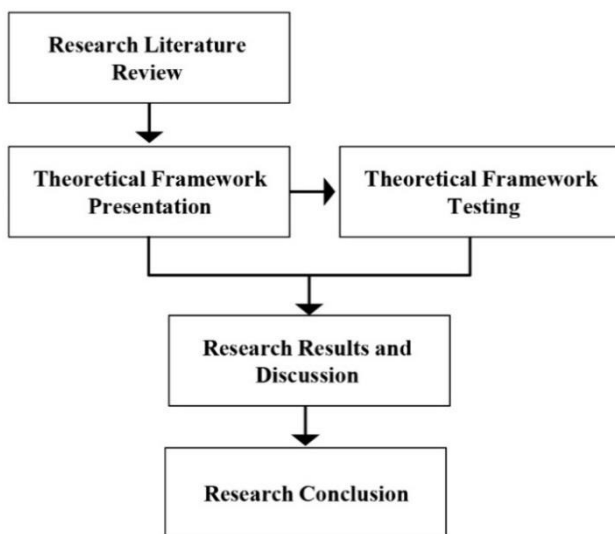


Fig. 1 Research Structure

## 2. QUESTIONS AND HYPOTHESES

This text tries to answer the following questions assuming that application of cognitive psychology as a scientific approach in the process-oriented study of place attachment results in a profound and scientific understanding of human beings in the context of environmental studies:

- How is a process-oriented model realized in place attachment studies with a cognitive psychology approach?
- To what extent the dimensions of place attachment process affect the realization of place attachment?

## 3. LITERATURE REVIEW

### 3.1. Theoretical framework of place attachment

Place attachment has been of great importance in psychology and environmental studies. The term "place attachment" is defined as the deep emotional bond that individuals form toward a place over time through positive interactions with both their social and physical surroundings [1, 2, 3, 4, 5 and 6].

Place attachment is indeed a multifaceted and complex phenomenon that incorporates several aspects of people-place bonding, including behavior, affect and cognition which are central to the concept. It involves the interplay of affect and emotions, knowledge and beliefs, and behaviors and actions in reference to a place [1 and 7].

The various definitions of the concept are reviewed and synthesized into a three-dimensional, person– process– place organizing framework<sup>1</sup>. The person dimension of place attachment refers to its individually or collectively determined meanings. The psychological dimension includes the affective, cognitive, and behavioral components of attachment. The place dimension emphasizes the place characteristics of attachment, including spatial level, specificity, and the prominence of social or physical elements [8].

Earlier studies on place attachment have addressed person and place dimensions in terms of output and product [9]. In order to achieve a comprehensive and holistic perspective of the attachment, process-oriented studies needs to be conducted to investigate the process components. The dimension of process encompasses affective (emotional), cognitive, and behavioral components of attachment. This dimension concerns the way that individuals and groups relate to social and physical aspects of a place in the form of cognitive, behavioral and affective interactions. The result of these interactions is attachment to the place [10, 11, 12, 13 and 14].

### 3.2. Cognition process in cognitive psychology

Cognitive theorists have developed a number of hypothetical models to explain cognition and to guide the development of instruction [15, 16, 17, 18 and 19]. Although differences exist among theorists, most models include sensory, memory and processing components (see Fig. 2) as a part of the overall cognitive processing system.

The sensory component is the site through which information enters the cognitive system in the form of coded messages before being transferred, after a very brief period (milliseconds) to the memory.

The memory component is the location of both the short-term and long-term memory. The short-term, or working memory, is theorized to be the site where information is stored momentarily as it is processed and transferred into the long-term memory [19]. Because working memory is very limited, some information received from sensory receptors are transferred to the short-term memory [20]. *Attention*, is a selection attempt to concentrate on sensory or mental surrounding events

which has to be maintained at a certain level of awareness [21]. The permanent, or long-term memory is theorized to be the site for both the storage and retrieval of all information that has been learned. Information is thought to be stored in highly organized association [19].

Entrance into long-term memory may occur through a variety of processes. Conceptualization, mental imagery, and cognitive map are among the functions of a mind to encode and store the information. In this regard, the mind uses templates and rules to categorize information in a simple, brief; and meaningful way, and locate and store them within the files in the mind [21].

The mental process of simplification and organization of information is called *conceptualization*. *Conceptualization* is influenced by individual's causal knowledge and

(perceptual) similarity relations between objects. The code used as one word for the phenomenon or as a category for a group of phenomena is called *concept* [22].

Mental images are complex mental products, inner representations where information on the actual perceptual appearance of objects can be described and transformed [23]. Visual mental images correspond to short-term memory displays, which are generated from more abstract representations in long-term memory [24 and 25].

*Cognitive maps* are internal representations of our physical environment, particularly centering on spatial relationships [26]. Cognitive maps refer to individual knowledge of spatial and environmental relations, and the cognitive processes associated with the encoding and retrieval of the information from which it is composed [27].

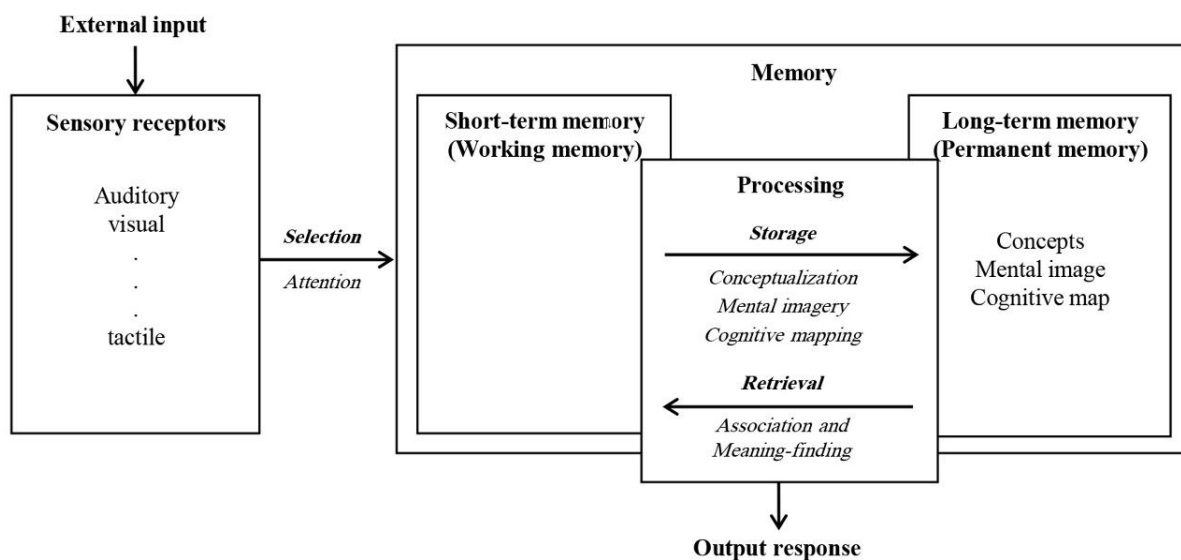


Fig. 2 The process of cognition in cognitive psychology (Source: Based on [20])

Information transferred and processed from permanent memory can be retrieved again. Retrieval is the process in which information in memory can be recalled [20]. When two events are repeated frequently either simultaneously or with short intervals, some links are created in our neurological pathways to retrieve them. This process is called association and *Meaning-finding* is one of the mental functions during the association of a phenomenon [21]. The retrieved information is transferred to short-term from long-term memory and eventually emerges as output response (affect and behavior).

### 3.3. Research methods in cognitive Psychology

Based on the research core logic, research methods in cognitive psychology can be categorized into the following: *causal attribution*, *interpretation*, *contextualization*, and *prediction*. The research core logic is directly related to the research objective incorporated in the research question. For this purpose, the most appropriate research core logic should be chosen for the explanation and analysis of the questions.

In *causal attribution*-based research, the possible causality regarding the effects of the independent variable/s on the dependent variable is deduced. This research is usually done quantitatively and based on scoring and statistical analyses. They need systematic and controlled procedures to help validation. In an *interpretive* research, human being is regarded as social, autonomous, and dynamic creature who has certain wants and needs, and is constantly interacting with his/her surrounding environment (physical and social), where distinctive concepts about a specific context take shape in his/her mind. In this kind of research, some interpretations are presented regarding the processes that are the basis of the research conducted [28]. In research based on the *contextualization* logic, multiple resources and evidences are used in studying a phenomenon in its real context. This research tries to contextualize case studies. The *prediction* logic is usually used in modeling or simulation studies to predict the performance and future variations [29]. Table 1 summarizes the descriptions of research methods applied in cognitive psychology.

**Table 1** Research methods in cognitive psychology (Source: Based on [20])

Research Method	Research Method Subtype	Brief Description of Research Method	Core Logics	Methodological Tools
Controlled Laboratory Experiments	-	The experimenter manipulates the independent variables and controls for the effects of irrelevant variables and observes the effects on the dependent variables.	Causal attribution	- Direct observation - Instrumental observation
Psychobiological Research	-	Through psychobiological research, researchers study the relationship between cognitive performance and cerebral events and structures.	Causal attribution	-Advanced hardware and software programs
Textual and Narrative Studies	Content/textual analysis	Users' reports about their own current understanding of the environment and/or memoirs are interpreted.	Interpretation	- Survey attitude instruments - Interview techniques
	Discourse/conversational analysis			
	Biography; Historiography			
Naturalistic Observations	-	Researcher observes the individual behaviors in the environment. Then he/she poses inferences regarding origins of the behavior.	Interpretation	- Direct observation - Instrumental observation
Case studies	Single/multiple case studies	Conducting intensive studies on the individuals and comparing case studies, researcher seeks to contextualize cognitive processes.	Contextualization	- Direct observation - Instrumental observation - Survey attitude instruments - Interview techniques
	Comparative case studies			
Computer Simulations and Artificial Intelligence	-	After recording real environmental status and individuals' functions, a dummy model is constructed by computer to simulate the individuals' cognitive functions to predict behaviors of the future users in the environment.	Prediction	-Advanced hardware and software programs

Although the nature of this research is qualitative, a combination of qualitative and quantitative approaches are used because to extract measurable and quantitative criteria. In order to collect convergent evidence to support the research hypotheses, multiple cognitive research methods with different core logics are used. The *case studies* method (with the contextualization core logic) and *textual and narrative studies* plus *naturalistic observations* (with the interpretation core logic) are the methods employed in this research. Each of these methods are organized into self-reports (by participant) and non-self-reports (by researcher) according to data collection and the analyses. They are usable in the process of research owing to the nature of questions and the objectives of the research.

#### 4. THEORETICAL FRAMEWORK

Following the research literature review in two fields of cognitive psychology and place attachment, the position of this approach in theoretical frameworks of place attachment can be investigated in terms of epistemology

and methodology.

- From *epistemological perspective*; this approach makes it possible to study the cognitive process of place attachment by defining the process of cognition (see Fig. 2) and helps to fill the gap within the process-oriented study of place attachment. In the study of cognition process, cognitive psychology introduces the components of attention, conceptualization, mental imagery and cognitive map, association, and meaning-finding. These components are open to evaluation through personal and local factors influencing them within the framework of environmental studies such as urban spaces.
- From *methodological perspective*; this approach provides researchers with various scientific methods and instruments to study the cognition process and its components by introducing research methods in cognitive psychology. The presented research methods can be applied in the study of the different stages of cognition process based on the research core logic and be useful in responding to cognitive issues.

The theoretical framework of this paper suggests

cognitive psychology as a scientific approach that relates to the process dimension of place attachment in the study of the cognition process. It also provides the possibility for the evaluation of cognition process in place attachment with a cognitive approach by defining the components of attention, concept, cognitive map, meaning and assessing each of them with their proper research methods. Figure 3 shows the conceptual model of the relationship between the place attachment framework (including three

dimensions of person, place; and process) and demographic assumptions of cognitive psychology in the study of neighborhood areas. To validate the research theoretical framework experimentally; some measures have been defined to evaluate each of these cognitive components according to authors' interpretation and analysis from the conducted tests at neighborhood level (see Fig. 4), and the appropriate cognitive research methods have been specified to evaluate these measures within the neighborhood.

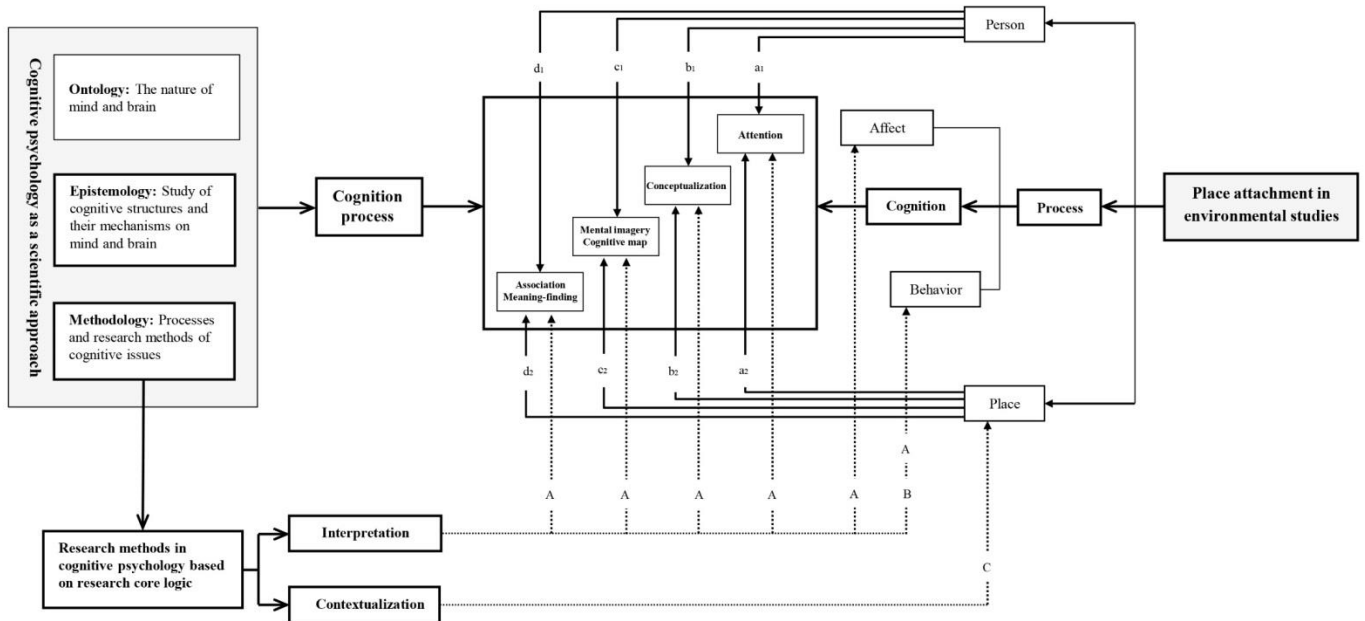


Fig. 3 The theoretical framework of place attachment

A	-Textual and narrative studies	
B	-Naturalistic observations	
C	-Case studies	
a1	Individual factors	a2 -Neighborhood appearance -Neighborhood social places -Neighborhood functional places
b1	Individual factors	b2 -Neighborhood physical characteristics -Neighborhood social characteristics -Neighborhood functional characteristics
c1	Individual factors	c2 -Landmark knowledge -Route-road knowledge -Survey knowledge
d1	Individual factors	d2 -Symbolic buildings of neighborhood -The name of neighborhood places - Neighborhood social places

Fig. 4 Measures of evaluating cognitive components

### 5. CASE STUDY

The aim of research case study is to evaluate the effect of cognitive components on place attachment process. To eliminate local factors and minimize socio-cultural variables affecting the attachment process, only one place (the neighborhood of Gharebaghis) with purposeful sampling was chosen as the research case study. Thus it was possible to examine individual's cognition of the neighborhood and focus on the cognitive components.

Gharebaghis neighborhood as one of the central and historical neighborhoods located in Region 8 of Tabriz, encountered with wearing-out issue which led to texture reconstruction. As a result the neighborhood structure is now the combination of two various structure forms: Organic and checkered textures. By checkered network, organic texture has some changes in terms of texture efficiency. In regular and checkered sections, the main passages are active in terms of performance but in organic texture, the old regions are isolated. (see Fig. 5).

One of the characteristics of this neighborhood is the presence of the old residents in spite of renovations and transformations in texture. It seems that the study of the

attachment process in a neighborhood with such properties can provide us with valuable information.

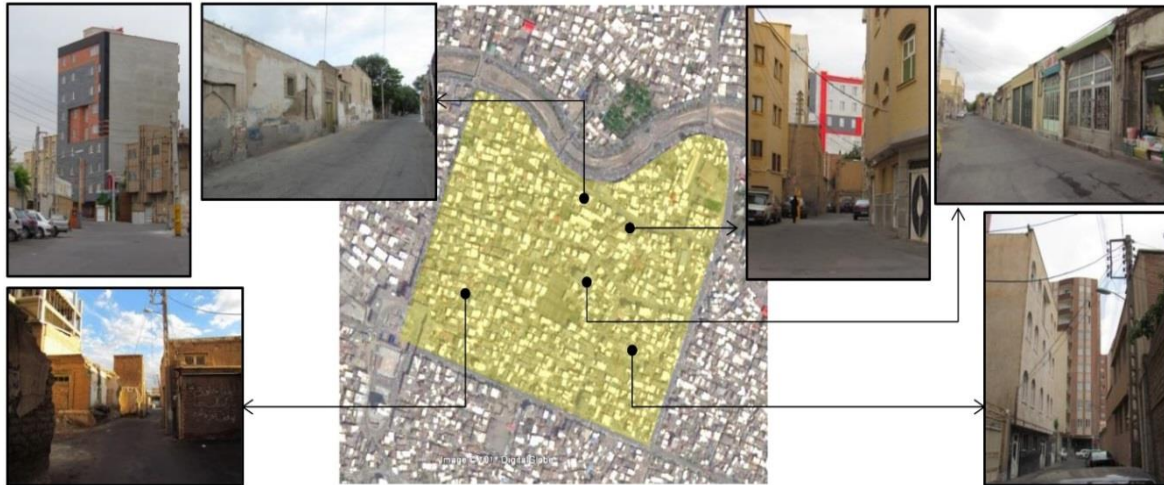


Fig. 5 Images of Gharebaghis' neighborhood

### 5.1. Participants

In order to determine the appropriate number of participants, first a pretest was performed as a pilot study on 40 residents of the neighborhood and after the estimation of variance for the initial sample ( $S^2$ ) at the confidence level of 95%, the number of the sample was increased to 297<sup>2</sup>.

Therefore, considering the multiplicity and the variety of questions, in order to validate and increase the reliability of results and to dispel ambiguities for participants, the test was conducted on 297 residents of the neighborhood in the form of questionnaires and individual interviews by the authors. Semi-structured interviews were conducted in person by the authors about the reasons argued by the participants.

### 5.2. Data analysis

For the final evaluation of the research theoretical framework and simultaneous determination of the correlation between the independent and dependent variables, the multivariate “*Structural Equation Modeling*” method has been used which benefits from a combination of factorial and path analyses. In the first stage, the factorial analysis was used for the fitting evaluation of the models measuring latent factors. It was further investigated that whether the observed factors can measure the validity of the hypothesis latent structure. In the second stage, the structural equation modeling was utilized for the hypothetical model evaluation.

The data were prepared by *SPSS Statistics 21* and then formulation, recognition, estimation, testing, modification and final validation of the theoretical framework were performed by *EQS 6.1* which uses a combination of path analysis, causative modeling with latent variables and multiple regression.

### 5.3. Validity

The first factorial analysis for variance is the *KMO* and *Bartlett's test of sphericity*. When the *KMO* value is larger than 0.6, it is easily possible to do factorial analysis. The higher this value, the greater is the competence of sampling. In this research, this factor is 0.841. To confirm the validity of the results, the proper fitting factors for the model including *Goodness of Fit Index (GFI)*, *Adjustment Goodness of Fit Index (AGFI)*, *Comparative Fit Index (CFI)*, *Root Mean Square Error of Approximation (RMSEA)* and  $X^2$  have been used. A model is said to have good fitting if the value of its *GFI* and *AGFI* are greater than 60%. For this model the values are: *GFI* (0.731), *AGFI* (0.693), *CFI* (0.749), *RMSEA* (0.151), and *Df.* (5.58). According to the results of *Confirmatory Factor Analysis (CFA)* and evaluation indices, the measurement models have an acceptable fit.

## 6. RESULTS AND DISCUSSION

For the experimental evaluation of the research theoretical framework, this model was reevaluated with the information extracted from the case study using equation structural modeling. In the stage prior to the evaluation of the hypothetical model, the confirmatory factor analysis was used to validate the fitness of the latent factors in the theoretical framework. To achieve a fit model, *screening* was done and the measures inconsistent with the fitting of the data set were removed.

In this model, at first **place attachment** was evaluated in terms of three criteria: *a desirable place to live*, *preference to other places*, and *suggestion of the place to others* (see Table 2). Next, this model was integrated with the three-dimensional evaluative model of the place attachment process and the contribution of every dimension was assessed in the evaluated attachment. The

correlation between the predicted attachment and the evaluated attachment was 97% with a *significance level* of 0.05, suggesting that attachment is high in this

neighborhood. In this model, affect, cognition, and behavior are the latent variables within the attachment process (see Table 3).

**Table 2** Factor loadings of place attachment measures

Measure	Factor loading	Significance level
Desirable place to live	0.80	<0.0001*
Preference to other places	0.89	<0.0001*
Suggestion of the place to others	0.67	<0.0001*

\* Correlation is significant at a 0.05 level ( $P < 0.05$ )

**Table 3** Factor loadings of place attachment latent variables

Latent variables	Factor loading	Significance level
Affect	0.97	<0.0001*
Cognition	0.74	<0.0001*
Behavior	0.86	<0.0001*

\* Correlation is significant at a 0.05 level ( $P < 0.05$ )

In the screening stage of the confirmatory factor analysis, to obtain an optimal model, the question of "neighborhood functional places" with a loading of 0.36 in the latent variable of attention and the question of "neighborhood physical characteristics" with a loading of

0.30 in the conceptualization latent variable were removed<sup>3</sup> (see Table 4). Thereafter, the fitted model was used in the structural equation modeling to evaluate the theoretical framework.

**Table 4.** Factor loadings of measures in place attachment evaluation

No.	Group	Measure	
1	Place attachment	Desirable place to live	0.80
2		Preference to other places	0.89
3		Suggestion of the place to others	0.67
4	Affect 0.97	Happiness	0.78
5		Sense of pride and prejudice	0.85
6		Senses of love	0.82
7	Attention 0.77	Defending from the place	0.80
8		Neighborhood appearance	0.62
9		Neighborhood social places	0.68
10	Cognition 0.74	Neighborhood functional place	0.36
11		Neighborhood physical characteristics	0.30
12		Neighborhood social characteristics	0.80
13	Cognitive map 0.58	Neighborhood functional characteristics	0.60
14		Landmark knowledge	0.81
15		Route-road knowledge	0.85
16	Association and Meaning-finding 0.95	Survey knowledge	0.89
17		Symbolic building of neighborhood	0.75
18		The names of places in neighborhood	0.62
19	Behavior 0.86	Neighborhood social places	0.82
20		Protection of privacy	0.51
21		Participation in the neighborhood renovation	0.90
22	0.87	Participation in the neighborhood social events	0.87
23		Lack of movement	0.74

In the investigation of affect, cognition, and behavior dimensions in the process of attachment to the Gharebaghis' neighborhood, the most influential dimension was **affect (0.97)**. The most important criterion in this dimension is the *sense of pride and prejudice* (0.85) toward the neighborhood. The *senses of love* (0.82),

*defending from the place* (0.80), and *happiness* (0.78) come next in the evaluation of residents' feelings. The interpretation of the authors is that personal possession and long length of residence in the neighborhood are the factors that create the sense of pride and prejudice toward it. The information obtained from semi-structured

interviews with residents imply that the positive feeling of residents towards the neighborhood is associated with the social relations existing in the living place. In other words, who suggest that prolonged positive interaction with the environment contributes to enhanced sense of attachment in individuals [30]. Similarly, this confirms the findings by Nielsen et al (2010), Knez (2005), and Erkip (2010) regarding the importance of time as a positive factor in attachment to a place [31, 32 and 33].

**Behavior (0.86)** is the second influential dimension in the evaluation of place attachment in the neighborhood. In the study of behavioral dimension in place attachment process, the most influential factors are *participation of residents in the neighborhood renovation* (0.90) and *the neighborhood social events* (0.87). *Lack of movement* (0.74) and *protection of privacy* (0.51) come next. In the Gharebaghis' neighborhood there is a high level of sense of possession toward the neighborhood because of high rate of home ownership and long-term residence. This sense manifests itself in the form of responsive and positive behaviors toward the neighborhood such as participation in renovation and social events. This finding is in line with the one by Vaske and Korbin (2001) who reported the positive relationship between place attachment and responsive behaviors toward the place [34]. Similarly, the following study also confirm the findings by Rivilin (1987) regarding presence in the process of place creation as a positive factor in place attachment [14], the one by Low and Altman (1992) on the positive relationship between participation in social activities and place attachment [1]; the results obtained by Walker and Ryan (2008) about the protective behaviors toward the place and lack of movement as place attachment factors [35].

The contribution of the **cognition (0.74)** is less than other dimensions involved in the attachment process. It is possible to attribute this result to the destructions over the last decade. Since more than half of the participants (56%) consist of middle-aged adults and elderly people, their image of the neighborhood is related to the intact and historical texture of the neighborhood. The young class of the residents also consisted of employees and students who spent a significant time outside the neighborhood for education or job purposes, and had a poor cognition of the neighborhood. On the other hand, due to the lower mobility among women compared to men, the cognitive maps of women were limited to certain places in the neighborhood, to and from which they commuted. Therefore, women had cognitive maps with a lower width but greater details compared to men. In the investigation of the cognitive process the *association and meaning-finding* (0.95), *conceptualization* (0.89), *attention* (0.77), and *cognitive map* (0.58) are respectively the most influential components. These factors are further investigated in the Gharebaghis neighborhood based on the stages involved in the cognition process:

**Attention:** The results obtained from the quantitative analyses show that the *social places of the neighborhood* (0.68) have a larger contribution in attracting the attention of the residents compared to the *appearance of the neighborhood* (0.62). According to the statistical

social bonds and relations develop this feeling by promoting the sense of social attachment. This finding is in line with the research by Barrie and Roggenbuck (2001) information of participants, the number of retired residents is high among men and the housewives among women. The social places such as parks and green areas are regarded as a forum for this group of residents. The direct observations of the authors during the research also confirms this issue. In addition, regarding the large number of married residents and residents with children, the extent of participation of this group in social places such as kids' park is high in the neighborhood. The results obtained from the investigation of social places criterion in the Gharebaghis' neighborhood is in accordance with those by Brown and Werner (1985), where the extent of participation in group activities and collective ceremonies has been shown to be a positive factor in place attachment [36]. In the analysis of the appearance criterion in the Gharebaghis' neighborhood, according to the idea by Bonaiuto et al (1999), physical characteristics such as green areas and existence of beautiful buildings play a positive role in attachment to the neighborhood and can attract the attention of the residents [13].

**Conceptualization:** Within the component of conceptualization, the *neighborhood social characteristics* (0.80) have the highest contribution in the formation of residents' mental concepts toward the neighborhood. In explanation, it can be said that in attention stage as the first stage of the cognition process, the criterion of social places had the highest influence in attracting the attention of residents; therefore within the stage of conceptualization the effect of social concepts is the highest in encoding and storage of information. In the result analyses, according to the attention stage, physical concepts were expected to be the second effective factor in conceptualization; however, in the present study, no strong correlation was obtained between this measure with the component of conceptualization, and *functional characteristics of the neighborhood* (0.6) has been introduced as the next effective criterion in the evaluation of residents' mental concepts. In the analysis of this results it seems that environmental information are noticed through social and physical characteristics, but stored in mind through the social and functional concepts. In other words, the appearance (the physical concepts of the neighborhood) is regarded as normal by residents with the passage of time, while social and functional concepts do not lose their significance owing to the social and welfare needs of the residents. This confirms the results by Filkins (2000) and Riger and Lavrakas (1981) regarding the effect of social relations and interactions among residents on local attachment [37 and 38]. This is also in accordance with the result by Levine (1986) which shows that the facilities in a public place directly affects the sense of attachment [39]. Similarly, the findings by Jorgensen et al (2001) confirm the positive role of access to facilities on local attachment [40].

**Cognitive map:** In the quantitative analysis of cognitive maps, *survey knowledge* (0.89) was evaluated as the most influential criterion in the assessment of the residents' mental images of the neighborhood. Survey



knowledge in mental imagery is a type of knowledge formed over time and grows through the development of commuting to and from a certain place, thus in the interpretation of this finding one can mention the length of residence. Based on the information about statistical data of participants, around 75% of the interviewees have been residents of this neighborhood for more than 5 years.

*Route-road knowledge* (0.85) and *Landmark knowledge* (0.81) are respectively the second and the third influential criteria in the evaluation of residents' mental images. Recent renovations, way widening, and destruction of many historical and symbolic buildings in the neighborhood have led to a mismatch between the current appearances of the neighborhood with the present mental images of residents. This is more evident in residents over 40 years of age, who are mostly the old residents of that neighborhood. Moreover, destruction of historical and symbolic buildings by weakening the landmark knowledge have resulted in enhanced route-road knowledge in mental images of residents particularly the young generation with a short-term residence in the neighborhood. This could be in accordance with the research results by Porteous (1971), where the elderly often show the images of dilapidated buildings in their mental images [41], while in the minds of younger ones, the images of under construction projects are more prevalent. Accordingly, the cognitive maps presented by this group will be different with the current situation of the neighborhoods.

**Association and meaning-finding:** The factors of association and meaning finding are the most effective criteria in the evaluation of cognition process in place attachment. This is in congruence with the result by Stedman (2003), who argued that place attachment is based on meanings which are attributed to the spatial environment [42]. Likewise, the research by Lewicka (2005) revealed that the presence of urban reminders in the living place is positively associated with place attachment and the larger the number of urban reminders, the higher the expected place attachment [43].

The results of quantitative analyses manifest that the *neighborhood social places* (0.82) have the greatest impact on the association of memories for the neighborhood residents. Therefore according to the components of attention and conceptualization, social places have the highest impact on association component. In the explanation of the relationship between conceptualization and association, it can be noted that association originates from the concepts and since social concepts had a greater impact on conceptualization, the role of social meanings is also more substantial in the association of concepts.

The criteria of *symbolic buildings* (0.75) and *the names of places* (0.62) where respectively the other effective factors in association of memories for neighborhood residents. It seems that symbolic buildings in neighborhoods are associated with social and functional meanings. In other words, concepts are associated based on the criteria stored in the mind. The names of places as a part of statement signs are effective in the association of meanings. In comparison

with visual signs, these signs have a lower impact on the association of memories for residents. It's interpreted that changes in the names of some places in the neighborhood and substitution of new names has resulted in a mismatch of meanings associated with these names within the minds of old residents in the neighborhood.

## 7. CONCLUSION

Urban design is regarded as one of the professions influencing the living environment and human activities. In the design of a city and urban space, the relationship between human and environment and the way this relationship is established is of significance. Urban designers should pay attention to the both process-orientated and product-orientated dimensions in the creation of quality in urban environments. In addition to designing a desirable place (product), they should also consider the aspects propounded in the stages of the desired quality (process). Through the process-oriented investigation of urban qualities and by considering the conditions of the case studies and variables affecting them, it is possible to achieve maximum spatial adaptation in urban spaces and provide residents with psychological and cognitive needs in a city.

Place attachment as a psychological phenomenon can be analyzed by different approaches. Each of these approaches explains human actions somehow differently and have a contribution to the imagination of researchers for the total understanding of the subject. Cognitive sciences with their current mastery over brain mechanisms of learning, memorization, thinking, reviewing, and mental formation in individuals, can propose guidelines for influencing, modifying or improving people's mind. Application of cognitive approach in urban studies provides a more comprehensive and systematic understanding of human mental processes in relation to urban space and at a superior level can culminate in the creation of efficient urban spaces consistent with the needs of their residents.

## NOTES

1. PPP is abbreviation for person- process- place
2.  $n = \frac{Z_{\frac{\alpha}{2}}^2 \times S^2}{d^2}$        $S^2 = 0.95$        $Z_{\frac{\alpha}{2}} = 3.84$        $d^2 = 0.01$        $n = 297.36 \sim 297$
3. The measures with a loading lower than 0.40 are screened out because of their minimal effect on the measurement of the latent variable.

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