

# Role of Outdoor Space Affordances in the Activity Patterns of Various Age Groups; Case Study: Ekbatan Residential Complex\*

Neda Mansour Hosseini<sup>a</sup>- Ali Javan Forouzandeh<sup>b\*\*</sup> - Ghasem Motalebi<sup>c</sup>- Masoumeh Yaqoubi<sup>d</sup>

<sup>a</sup> Ph.D. Candidate of Architecture, Department of Architecture, Technical and Engineering Faculty, Ardabil Branch, Islamic Azad University, Ardabil, Iran.

<sup>b</sup> Assistant Professor of Architecture, Technical and Engineering Faculty, Ardabil Branch, Islamic Azad University, Ardabil, Iran (Corresponding Author).

<sup>c</sup> Associate Professor of Architecture, College of Fine Arts, University of Tehran, Tehran, Iran.

<sup>d</sup> Assistant Professor of Architecture, Technical and Engineering Faculty, Ardabil Branch, Islamic Azad University, Ardabil, Iran.

Received 22 February 2022; Revised 13 October 2022; Accepted 12 December 2022; Available Online 21 September 2023

## ABSTRACT

It is highly important to focus on environmental components and the human-environment relationship in architectural design. The literature has investigated various concepts affecting this relationship and its application in the architectural design process. One of the most influential concepts in this connection is the concept of affordance. Despite many studies conducted on the relationship between human and the environment, the concept of an environmental affordance in architecture and constructs affecting this concept in forming design guidelines have less received attention. This article aimed to investigate the significance of affordance in environmental design to examine the aspects of this concept and its structural relationship with the components of activity, fabric and meaning. For this, the article aimed to explain the affordances of outdoor spaces (as building blocks constituting meaning) in the Ekbatan Residential Complex and presented a communication model of affordance components in design to examine the role of these components and their impacts on design. This study fell under quantitative and qualitative research and was an applied study. After data were collected and summarized, the article began to classify statistical data, which was performed by tabulating the frequency distribution of activities. Quantitative data of the questionnaires were then analyzed by the statistical-analytical SPSS software. In sum, the correlation relationship, effects and differences between the variables were measured. Another section of qualitative findings resulted from data extracted from semi-structured interviews and observations. Findings revealed that the concept of affordance played a major role in linking users and residential environments. This concept tends to focus on subjective-cognitive dimensions in children and adolescents, while stressing physical and activity aspects of space affordances in adults and the elderly.

**Keywords:** Activity, (Subjective-Objective) Affordance, Outdoor Spaces of Residential Complexes, Ekbatan Township.

\* This article is taken from the doctoral dissertation of the first author entitled "Analyzing the Concept of Environmental Affordance in Forming the Meaning of Outdoor Spaces in Residential Complexes (Case Study: Ekbatan Residential Complexes)" under the supervision of the second and third authors and the advice of the fourth author at the Islamic Azad University, Ardabil branch, Iran.

\*\* E\_mail: alijavanforouzandeh@gmail.com

## 1. INTRODUCTION

The rising populations of cities, followed by changing apartment-construction patterns in the form of residential complexes, and the emergence of disharmonious and inappropriate physical growth, which have resulted in a quantitative approach to physical components as suggested by modern thinkers, have brought about dissatisfaction and the estrangement of residents from the outdoor spaces of residential complexes. Recent research on residential complexes has shown that the outdoor spaces of these complexes facilitate activities, the inculcation of subjective images, social interactions and increase comfort and satisfaction for all age and gender groups in these spaces.

Man is a complex creature with material, psychological and spiritual needs and motives. Accordingly, modern designers and architects have specifically focus on understanding human's behavioral-psychological aspects and their perception of residential spaces (Lelhaj and Mousavi 2018, 86). Designing outdoor spaces based on user needs and demands reveals potentials that meet human behaviors (Motalebi 2001, 62). For this, environmental affordances are objectified once they are represented in the interaction with user behaviors. Environmental Affordance Theory, as raised by the literature, helps investigate all human needs and their relevant affordances in the environment (Khalilneghad 2016, 1). However, emphasis on environmental affordance theory less deals with a practical and effective concept (Daneshgar Moghadam and Islampur 2012, 78). Hence, it is necessary to study the concept of the environmental affordance within the human life context and to pay attention to various age groups and their perception of their activities in these environments.

The outdoor spaces of residential complexes will be successful once they are capable of providing ways for social interactions between users of space, while engaging them in doing various activities. Outdoor spaces, even accessible by users, won't be used if they fail to meet the needs and demands of residents (Hadari, Kaplan, and Hunter 2015, 19). Outdoor spaces should not be limited to some specific age and gender groups; rather, they should be used by all groups with different needs, characteristics and capability. The affordances of outdoor spaces may be activated through activities and opportunities offered to users. Of course, affordances are pre-requisites to activities, and presence in a situation that provides an affordance does not mean that an activity occurs, though it helps it occur (Greeno 1994, 340).

Activities that have occurred in outdoor spaces fall under three necessary, optional and social activities, each requiring its special fabric (Gel 2008, 3). In high-quality urban areas, optional-individual activities occur, in addition to necessary activities; in the meantime, in poor-quality areas, only necessary

activities are performed (Gel 2008, 3). On the other hand, in addition to the parameter of the qualitative affordance of space and the individual characteristics of users, the relevancy and appropriateness of the physical indicators of outdoor spaces influence the occurrence of activities.

The literature has indicated that social activities in man-made environments play a major role in forming semantic relations and creating high-quality spaces (Javan Forouzandeh and Motalebi 2012). The quality and nature of the activities that occur in public urban spaces depend on cultural and environmental factors, as their effects on the type of activities may vary (Nozari 2004, 43). Affordances help provide a wide range of activities and other physical and activity characteristics for meeting the comfort and pleasure of people in these environments (Kharkhchian and Daneshpur 2009, 71). It should be reminded, however, that the occurrence of activities is not only influenced by the parameter of affordance but also by such parameters as individual characteristics, needs, activity and outdoor space indicators. The physical affordances of outdoor spaces may go beyond what a designer has in mind. This study aimed to investigate the affordances that the designer had previously considered for certain activities and explained some affordances of spatial components that can be explored by users' creativity and skills based on their needs in the space.

Simple attention to formative and functional problems in designing residential complexes and failure to consider the needs, demands and desires of users and ignoring residents' activity patterns could undermine the affordances of outdoor spaces and prevent users from presence in those spaces. Outdoor spaces in residential complexes serve as secondary spaces, viewed by most designers as the link and the intermediary between residential blocks in complexes. These spaces play a major role in creating interactions, social contacts and the meaningfulness of place for residents. Hence, it is very important to understand and investigate modern solutions in designing residential complexes, especially by paying attention to the environmental affordances of outdoor spaces in residential complexes for increasing the satisfaction of all age and gender groups, the sense of attachment and environmental sustainability. Despite many studies conducted on outdoor spaces and explaining physical components affecting their formation and the fact that no study has ever investigated the role of the affordance of outdoor spaces in residential environments in increasing residents' tendency to use outdoor spaces, the present study aimed to emphasize the concept of affordance to investigate this concept in modern human environments and to deal with the effects of this concept on environmental meaningfulness for residents. For this, the present study aimed to evaluate and criticize the concept of

environmental affordances in the physical form of the outdoor spaces of residential complexes; thus, due to lack of research in this regard, this study analyzed factors and roles of this concept by emphasizing the individual characteristics of various age and gender groups. The study begins by raising the question: “How do some of the affordances of the outdoor spaces of residential complexes turn into effective affordances that can be welcomed by people?” and then continues by investigating physical and individual parameters and learning their effects on the occurrence of various age groups.

## 2. THEORETICAL FOUNDATIONS

In recent decades, research on Environmental Psychology has, on the one hand, shown how designers design residential spaces and, on the other hand, represented user encounters with and behaviors in these spaces. Basic debates in environmental psychology include the perception of environmental affordances, the user's subjective link with them and the subjective and objective representation of perception in the form of activities. Ecological Psychology, as a sub-discipline of this body of knowledge, emphasizes the relationship between people and the semantic characteristics of the environment, and is aimed to study human's manners of perception, practice and meeting his goals in various environments, especially in residences (Gibson 1986, 8). The concept of affordance is one of the major concepts of ecological psychology, which was first developed by Gibson. Gibson used this concept to answer the key question: “Why does human changes objects and forms in his environment?” (Gibson 1986, 130). He responds by saying: “To change the affordance that objects provide”. This question is noteworthy because designers influence the relationship between the environment and the people by way of conscious and unconscious designs. Gibson reasons that design and architecture lack a considerable theoretical basics in this connection and states that ecological psychology and the concept of affordance, in specific, can provide the basic for this (Gibson 1986, 11). A review of the previous literature on the subject of affordance indicates that this concept, while being simple, poses a basic and challenging notion in environmental design theory. This concept has been interpreted differently due to its various implications. Also, experts have provided different classifications of this concept, which will be discussed below. In addition to dividing affordances into physical and non-physical groups, Motalebi classifies them into three different levels: affordances that people need to physically interact with the environment; affordances that people need for social interactions and inter-personal communications, and affordances that people expect for satisfying their symbolic desires and interactions, together with cultural and spiritual aspects (Motalebi

1998, 100).

Itiel E. Dror and Steven Harnad divide affordances into five groups; Biological affordances, which are based on biological or living processes; physical affordances, which are aimed at skills, mainly imposed by physical constructs; perceptual affordances, which are mainly provided through spatial maps; cognitive affordances, which are created by cultural customs, and mixed affordances, which come from combining physical and cognitive affordances (Dror and Harnad 2008, 143). Ding, Wei, and Xia Lin divide affordances into two categories: explicit affordances, including real elements and metaphorical affordances, including a set of visual signs and concepts. They have also suggested that these two categories of affordances can be combined to provide better results. Metaphorical affordances, which may contain many data, should not be expected by users to be easily received (Ding and Lin 2009, 75). Yilmaz et al. divide affordances into two categories, also: objective and subjective affordances. Objective affordances refer to affordances envisaged by the designer in the potential environment for users, while subjective affordances refer to unplanned affordances explored through the creativity, skills and needs of users (Yilmaz, Mumcu, and Cigdem 2017, 4).

In 2003, Hartson divided environmental affordances into cognitive, physical, sensory and functional affordances. According to this classification, physical affordances refer to utility, while sensory affordances relate to the physical characteristics of spatial components such as color, etc. (Turner 2005). Using Gibson's theory, Donald Norman developed an affordance in a prescribed form, relating it to perceptual qualities and real nature of objects.

In the article, “Affordances, Conventions and Design”, Norman uses a perceived affordance to distinguish his definition from that by Gibson. For him, designers tend to focus on the behaviors of users that can be easily perceived (Norman 1999, 39). The perceived affordance denotes affordances or functions that the user perceives its feasibility in dealing with a hand-made set. Norman distinguishes the perceived affordance from a real affordance, which is concerned with functions actually feasible in dealing with a hand-made set (Mohamadi, Nadimi, and Thaghafi 2017, 24). The key difference between these two definitions being that Gibson believes that an affordance is the possibility of an action, while Norman maintains that an affordance is both a possibility of an action and a manner in which the possibility of an action is transferred to the user or is revealed (McGrenere and Ho 2000, 3). Gaver divides affordances into three categories based on perceptual information in the environment: precipitable affordances in which there is perceptual information for an affordance; false affordance that arises when there is no affordance in the environment, but there is information that indicates the presence of that affordance, and hidden

affordance that is concerned with an affordance available but conditions surrounding its determination are not available (Mohamadi, Nadimi, and Thaghafi 2017, 25). According to expert views concerning the concept of affordance and relevant classifications (Table 1), affordances can be divided into two general categories of objective affordances (e.g., physical,

explicit, known meaning and convergent) referring to affordances envisaged by the designer in a potential environment for the user, and subjective affordances (e.g., non-physical, metaphorical, symbolic and divergent) referring to unplanned affordances explored through creativity, skills, experiences and needs of users.

**Table 1. Classification of Affordance from Expert Views**

Theorists	Affordance
Gibson 1979	Physical
William Gaver 1991	Perceptible, False, Hidden
Moore & Maranz 1997	Animate and Inanimate Qualities
Motalebi 1998	Physical and Non-Physical Capabilities
Motalebi 1998	Physical, Social and Symbolic
Norman 1999	Perceived and Real
Jan Lang	Known and Symbolic Meanings
Ying Chi Liu & Su-ju	Convergence and Divergence
Hartson 2003	Physical, Cognitive, Functional and Sensory
Turner 2005	Simple and Complicated Levels
Motalebi 2006	Physical, Cognitive, Functional Cultural and Semantic
Itiel E. Dror & Steven Harnad 2008	Physical, Biological, Cognitive, Perceptual and Mixed
De Wing & Istalin 2009	Explicit and Metaphorical
Yilmaz, Mumcu, and Cigdem 2017	Objective and Subjective

### 3. CONCEPTUAL FRAMEWORK OF THE STUDY

In recent centuries, with the rising urban populations and the dominance of modernist thinking on human lifestyles, conventional housing patterns in various countries underwent serious changes. Living in apartments has been a major outcome of human settlement processes over the years. In Iran, too, a spike in population in cities prompted a series of measures and policies to increase housing in the form of residential complexes as a solution to measure housing needs (Azizi and Malek-Mohamadneghad 2007). On the other hand, changing new urban life mechanisms caused by the introduction of modernism in living spaces not only has changed the political and economic status but also resulted in a new thinking foundation about the process of designing residential spaces. Apart from an entire set of human's needs, this foundation deals with special needs, while discarding other needs.

The Pruitt-Igoe Building (Jencks 1991, 9) was dynamited due to its failure to adapt its fabric to the needs and demands of relatively poor and black residents (Ghobadian 2014, 140). The demolition of this apartment was indicative of designers' ignorance

of place from a human perspective. Modernist design criteria, which were generally based on primary human needs and emphasized human's physical aspects, could not meet the construction of a place that could fit modern life. The 60s and 70s thinking movements following human post-modernism debates and criticisms of modern society laid the ground for more focus on interdisciplinary research to deal with major concepts discussed in various disciplines (Motalebi 2006, 61). In the late 60s, Environmental Psychology became an independent sphere and such concepts as the environmental affordance debated the human-environment relationship and the way users behave in the environment (Daneshgar- Moghadam and Islampur 2012, 74).

#### 3.1. Affordance Theory

In sum, there are three types of human perception: inferential (as suggested by Helmholtz), organizational (as suggested by Wertheimer and others in the Gestalt School) and ecological (as suggested by Gibson) (Jenkins 2008, 34).

Ecological psychology studies manners of perception, action and meeting the goals of humans and other animals in various environments. This branch of psychology focuses on the relationship between

people and the semantic features of the environment to emphasize the human's manner of action (Mohamadi, Mohamadi, Nadimi, and Thaghafi 2017, 21).

The concept of the environmental affordance is a major concept of ecological psychology (Turner 2005, 790). The concept of affordance was first raised and developed by Gibson (Gibson 1979, 197). For him, this term refers to both the environment and the animal in a way that no other term can imply. This denotes the complementarity of animals and the environment (Gibson 1986, 127). The major point about the environmental affordance is that they are real and physical in a realistic way; however, in essence, an affordance is neither a realistic quality nor a subjective one, or let's say both of which. An affordance transcends the objective-subjective duality and shows us ineffectiveness. An affordance is

similarly a reality of the environment and a behavioral reality. It is both physical and mental, while being none of which. An affordance refers to both of which, to the environment and the observer (Gibson 1986, 129).

Gibson borrowed the concept of affordance from Lewin's concept of *Afforderungscharakter*<sup>1</sup>; however, Gibson and Lewin differ from each other over the usage of this concept. Lewin maintained that the valence of objects was proportionate to the needs and values of people, as objects change when the valence of objects change, whereas *Afforderungscharakter* does not change. Meanwhile, Gibson argued that determining *Afforderungscharakter* was based on the needs and capabilities of users and that they would learn the affordances of the environment and times at which they use them (Lang 2009, 93).

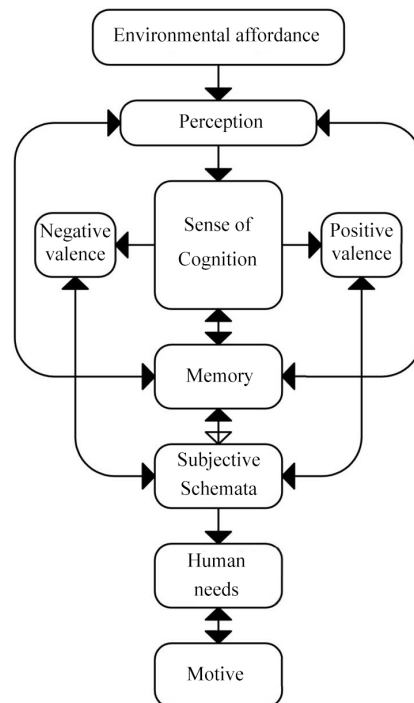


Fig. 1. Model of Perceiving Environmental Affordance

### 3.2. Environmental Affordance Perception

Not all people perceive potential affordances in space and may not use them if they do (Motalebi 2006). To Kotamens, perceived affordances may be used contrary to the views of designers (Kim et al. 2010, 182). With the change of environmental affordances and attention to human motives in relation to the environment, the dimensions of the environment in relation to the human will be different, while being proportionate to the meaning of place in relation to the environment. The more environmental affordances are proportionate to human motives and involve potential environmental dimensions, the more the contain potential environmental meanings and can

lead to sustainable environments (Motalebi 2001) (Fig. 1).

To Motalebi, understanding an environmental affordance requires the physical capability of the environment and also the individual's psychological capability, as no behaviour may arise even if there is a physical capability or no individual capability. Man receives information from the environment to satisfy his needs, which consequently results in the perception of the environment. After perceiving the environment, man gains cognition and accordingly behaves in the environment (Khalilnaghad 2019, 1). In this process, the environment becomes meaningful for users. The environment serving as a source of meeting human needs requires having affordances to meet the needs

of all age and social human groups (Fig. 3). This study divided environmental affordances into two objective and subjective categories. The objective category refers to affordances envisaged by the designer in a potential environment for people. These affordances include such features as forms, mass, numbers and location in space and time, which are fixed and similar for all perceivers. Their fixed nature reveals that these features are some qualities of objects themselves, which can be described regardless of peoples' views (Daneshgar Moghadam and Islampur

2012, 75). On the other hand, the subjective category of affordances is unstable and varies by the creativity needs and skills of perceivers. To strengthen these two types of affordances in outdoor spaces, their components should also be developed. An explanation of the objective and subjective affordances of spatial physical components can be key for designers to consider possible and feasible activities for users within their design processes (Liu and Su-ju 2009, 43) (Fig. 2).

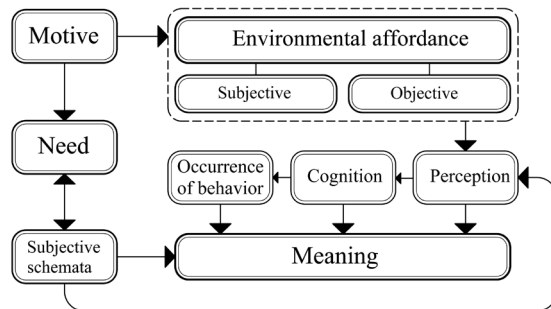


Fig. 2. General Classification of Environmental Affordances

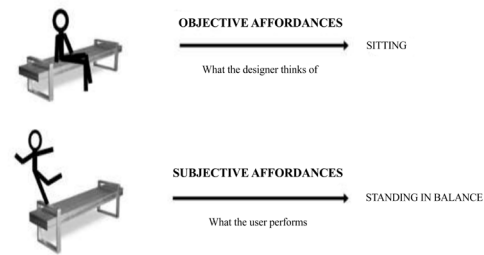


Fig. 3. Model of Perceiving Environmental Affordance (Yilmaz et al. 2017)

### 3.3. Parameters Affecting the Perception of Environmental Affordance

For Gibson, the environmental affordance is concerned with the human perception of a fabric proportionate to an activity or function; it is a concept that is, on the one hand, external and apart from human existence, while, on the other hand, a function of human needs and motives, if understood. Thus, understanding the environmental affordance is both influenced by the material environment and its various aspects (structure, form and organization) within an external dimension, and human needs and motives based on human internal behavior. This denotes that perceiving the environmental affordance is a function of the user's psychological capability and also the physical capability of the environment. In fact, physical capabilities denote an environmental affordance for the occurrence of activities. However, affordances are not the causes of behavior, with behavior occurring based on the user's individual capability, motive, skills and experiences. To Gaver, affordance is distinct from the faculty of perception. Affordances are there even if they are not perceived by users. Gaver asserts that the true perception of affordances is partly influenced by the effects of peoples' experiences, culture, destinations and social background (Gaver 1991, 81).

Affordances imply the relations on perceiving people, suggesting that an environmental characteristic may bring about specific potentials and advantages for an individual based on some certain structural

and functional characteristics, but may not produce the same effects for the other one (Heft 2001, 124). People's motives, experiences, values, costs and rewards receivable from taking part in activities and their aesthetic interpretation of the surrounding environment could determine the extent to which they use the environment (Lang 2009). Environmental affordances, good or bad, refer to what the environment provides for animals. A generated environment proportionate to human needs enjoys some affordances that help facilitate human behaviors. Therefore, a behavioral place has various and partly unlimited potential capabilities, as using these capabilities require the following:

1. User's needs and motives
2. Physical, intellectual and psychological abilities (character and psychological capability)
3. User's experience of those affordances (pre-experienced meanings)
4. The formative arrangement of the used environment (Physical capability) (Motalebi 2006)
5. Individual characteristics (age, gender, education, etc.)
6. Individual capability

As a result, users of outdoor spaces will highly likely perceive the affordances of a space that meet their needs and expectations in dealing with that space. A review of the literature reveals the parameters affecting the perception of the environmental affordance, as illustrated in the following figure (Fig. 4).

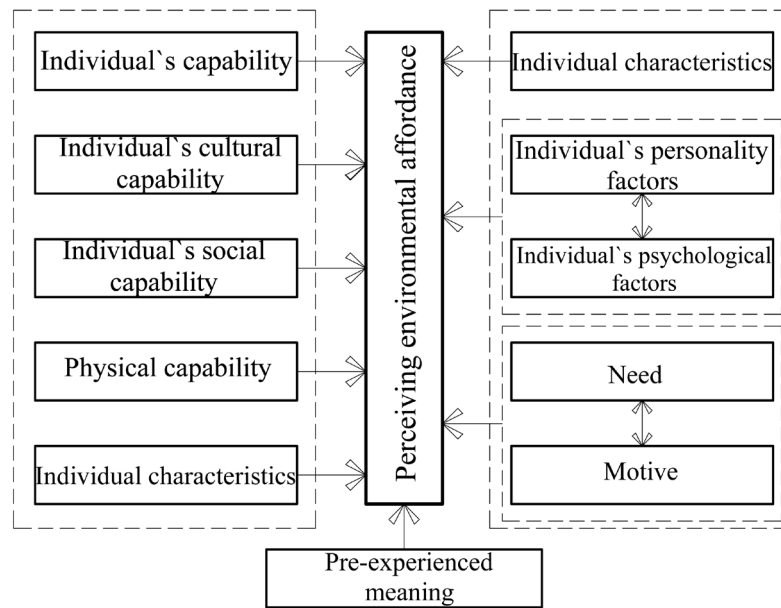


Fig. 4. Diagram of the Parameters Affecting the Perception of the Environmental Affordance

Exploring the concept of the environmental affordance and the parameters affecting its perception indicate that the relationship and correlation between the environmental functions of affordances and the spatial physical form are influenced by various components that arise from human needs and motives, creativity, individual and collective capability. Hence, the architectural space functions of environmental affordances do not play a central role and the

possibility of the occurrence of an activity relative to the other depends on the voluntary needs, motives and demands of users and their individual capability. The process of perceiving environmental affordances and the effects of users' individual capability and the environmental physical capabilities on the occurrence of activities are presented in the form of a model, as illustrated by Figure 5.

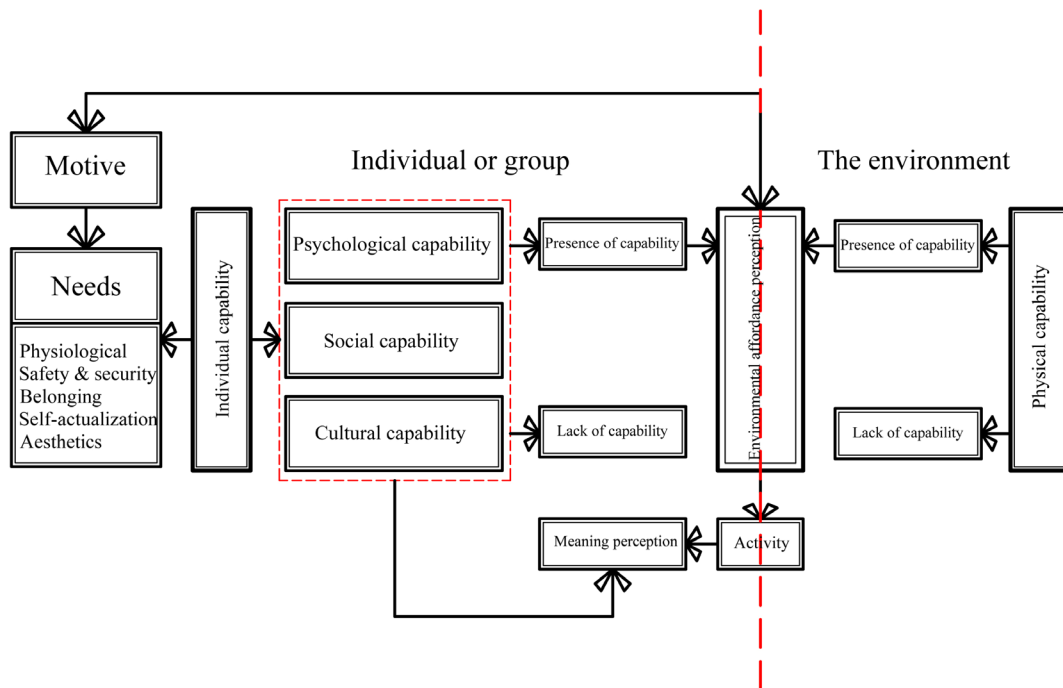


Fig. 5. Model of the Effects of Individual Capability and Physical Capability on Affordance Perception

### 3.4. Classification of Activities

As stated, activities in outdoor spaces are divided into three groups: Necessary activities that people can provide for themselves; for instance, going to school or work, waiting for the bus, producing goods for customers, etc. These activities can be done under any conditions; optional activities are those in which people may be interested in such as recreational activities; for instance, walking, sitting and enjoying a landscape, standing and watching a scenery, enjoying good air, etc. These activities are done outdoors under appropriate conditions. Optional

activities are generally concerned with opportunities provided by outdoor spaces for people. However, the scope of these qualities and opportunities is determined by making decisions. For this, urban outdoor spaces allow people to walk and to take part in urban life actively (Gel 2008, 3). At last, there are social activities that depend on the presence or lack of necessary and optimal activities. Social activities usually include all the activities done through social sharing and interactions, such as greeting, passive interactions, etc. such as watching ceremonies and talking to others (Table 2).

**Table 2. Classification of three Types of Activities in Residential Environments**

Activities		Outdoor Spaces in Relation to each of the Activities	
Necessary		Educational Services; Treatment Services; Shopping and Commercial Services	
Optional		Sports Activities; Cultural Activities; Religious Activities	
Social	Individual Motives	Culture of Sociability; Social Sociability; Social Security	- Public Meeting Places
	Social Similarity	Social Identity; Social Belonging	- Gathering Places Outdoors
	Time	Duration of Stay	

(Gel 2008)

### 3.5. Outdoor Spaces of Residential Complexes

Residential complexes are one of the most important and complicated architectural functions that affect the relations and types of residents' behaviors (Zahidi 2010). Residential complexes are a combination of various interwoven indoor and outdoor spaces that interact with each other. Outdoor spaces are inseparable parts of residential complexes in terms of urban structure and landscape (Marcus & Sarkissian, 1986). Outdoor spaces create appropriate ground for the formation of social life and help increase spatial meaningfulness and quality (Jalili, Einifar, and Talischi 2013, 57). In fact, outdoor spaces in residential complexes provide situations for creativity and social interactions among people and thus represent a collective life (Nozari 2004).

### 3.6. Role of the Affordances of the Outdoor Spaces of Residential Complexes in the Occurrence of Activities

The basic role of outdoor spaces is first and foremost to meet functions (Francis 2003, 30-33). In other words, outdoor spaces are designed consciously to provide a place where special activities occur,

while supporting some behaviors (Gel 2008, 48). Using outdoor spaces for performing a variety of activities is a major requirement in converting residential spaces into meaningful and attractive and consequently vital environments (Jalili, Einifar and Talischi 2013, 58). For outdoor spaces to be places for the occurrence of optional-individual environments, they must perform affordances that go beyond necessary activities. The limited possibility of performing optional-individual activities in one single space has roots in the inadequate physical and social quality. Meanwhile, increasing the quality of outdoor spaces in residential complexes increases the number of possible optional and individual activities and thus increases opportunities to discover the users' subjective capabilities of spaces. However, when adequate objective affordances that can meet peoples' expectations are lacking, people will by themselves create affordances based on their own needs and demands and change spatial capabilities proportionate to their own preferences. This study deals with objective affordances considered by designers. If there is no or inadequate objective affordance in space, the possibility of subjective affordances will also decline (Fig. 6).

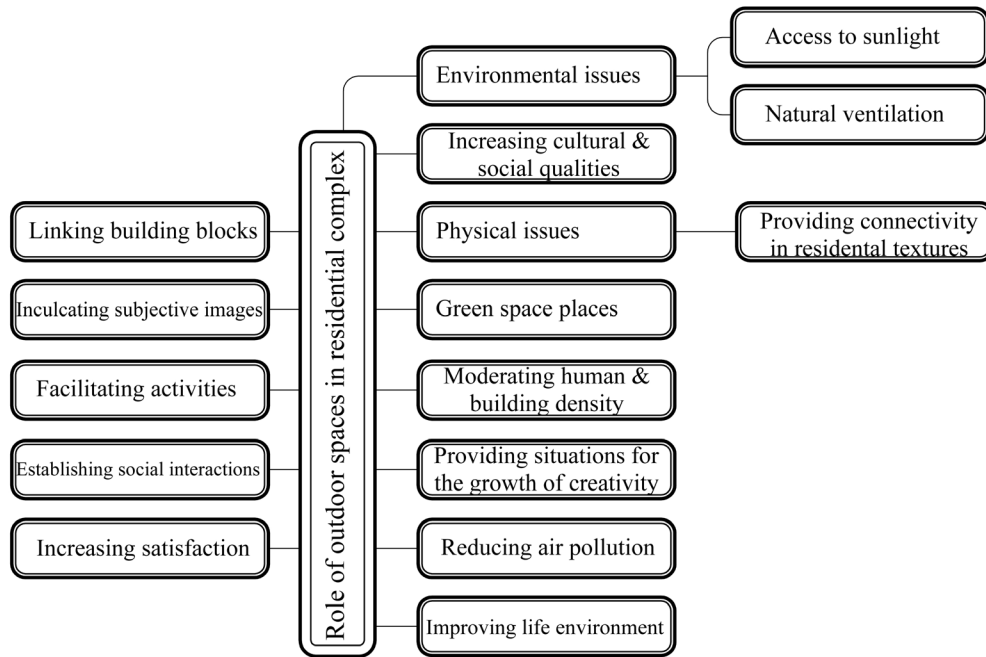


Fig. 6. Diagram of the Role of Outdoor Spaces in Residential Complexes

According to reviews and models presented, Figure7 can be considered as the final model of the relationship between environmental affordances and the occurrence of activities. This two-part model, which includes the environment, the individual and the group, illustrates the role of individual needs, demands and characteristics in perceiving the environment and consequently perceiving the

environmental affordance. Different individual characteristics cause a different range of activities by the users of outdoor spaces. According to the objective and subjective classifications of environmental affordances, if the affordance is objective, it helps activities occur; however, if there is no affordance or a mismatch between spatial fabric and user needs, no activities will occur.

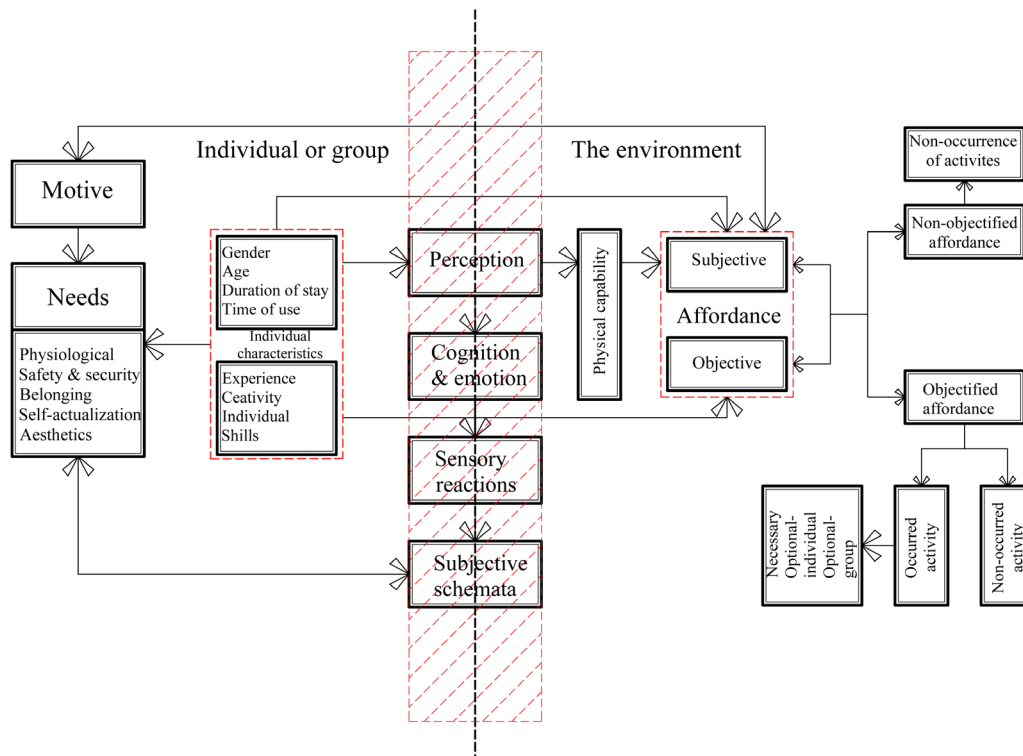


Fig. 7. Model of Environment Perception and Its Role in the Occurrence of Activities

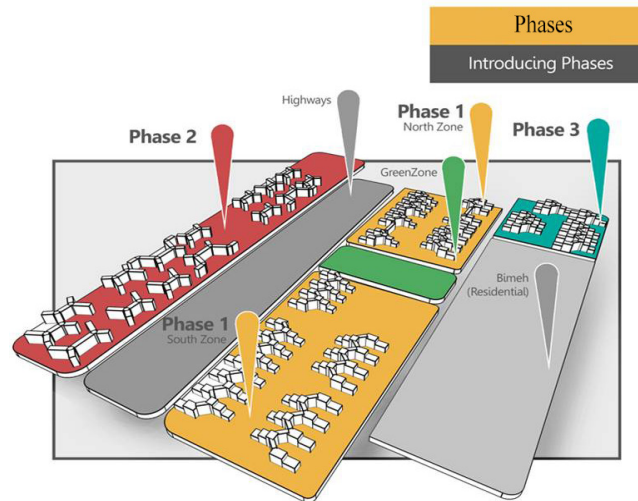


Fig. 8. Introducing the Phases of Ekbatan Township

([www.memarima.ir](http://www.memarima.ir))

#### 4. STUDY PROCEDURE

In the Ekbatan Residential Complex, the second phase of the complex was selected due to its large and extended outdoor spaces, height of its buildings and the large lobbies of the blocks where interviews could be easily conducted. The second phase consists of 19 residential blocks with an approximate geometric shape of 12 stories, in addition to a lobby floor and two underground floors, with some blocks assigning one single story to parking lots. Out of the 19 blocks of this phase, the outdoor spaces of the five blocks of 15, 16, 17, 18, and 19 of the second phase were selected as case studies. Interviews, note-taking, and questionnaires were administered on the users of these outdoor spaces over the weekdays from 9 a.m. to 12 p.m. and 5 p.m. to 8 p.m. during summer days. The time and season selected was due to age groups' maximum use and presence in space. The effects of various hours of the day and seasonal changes on the activities of age groups and their perception of affordances were not examined due to the extent of the components under consideration. In addition, monitoring over age groups was performed in different hours of the day. Based on observations in person, considering the age range of users in the

outdoor spaces of the Ekbatan township, the activities performed by each age range based on the physical components of these spaces are given in Table 6. Data acquired were analyzed in two stages; in the first stage, the frequency of activities (objectified affordance) that occurred in space was examined by note taking (Table 3) and then open- and close-ended questionnaires and semi-organized interviews were administered to examine actual affordances for space users and their activities using the three-part classification of activities. In the second stage, objective and subjective affordances were classified based on the spatial components and their features in accordance with age groups using outdoor spaces. In the last stage, a close-ended questionnaire was used to evaluate the effects of physical indicators and individual characteristics on the occurrence of user activities. Cochran formula was used to determine the number of the members of the statistical population, which amounted to 299 people. Because a number of questionnaires were unusable, a total of 320 questionnaires was randomly distributed, as 306 ones were finally analyzed by SPSS software. Out of the 306 samples under study, 194 people were women and 112 were men, including 90 adolescents, 95 young, 68 adults, 9 middle aged, and 44 elderlies.

Table 3. Frequency of Activities (Objectified Affordance) in the Outdoor Spaces of Blocks 15, 16, 17, 18 and 19 of the Ekbatan Township

Frequency of Activities in Outdoor Spaces (15, 16, 17, 18 and 19 Blocks)	
Accessibility, eating and drinking, playing Li Li <sup>2</sup> , playing basketball, football, volleyball, collective morning sports, hide and seek games, playing tennis, waking, sitting, cycling, skating, gardening, shopping, sliding, sleeping/resting, taking photos, playing with animals, graffiti, studying.	Climbing the trees, picking up and eating fruits, peddling, smoking, using drugs, watching landscapes (nature), watching people, listening to the sound of the nature, playing music, talking, meeting with others, doing sports exercises with sports devices, social gatherings, cultural gatherings, thinking, going up and down the staircases, doing acrobatic activities, doing harmonious movements, painting, running and holding Chaharshanbe-Souri ceremony.

## 5. FINDINGS

Stairs, edges, fences, rails, benches, fountains, empty land, passages, entrances, sport means, and trees in green spaces have all various affordances that are proportionate to users' demands and needs. As noted by Table 4, the diversity of affordances may create various activities (necessary, optional-individual, optional-group) for meeting the needs of age groups. According to reviews, children were recognized as the most creative people in using outdoor spaces. Based on in-person observations of these spaces, children were seen using the stairs for playing and

jumping, rails for sliding, lawn surface for rolling, trees for climbing and picking fruits and passages for cycling and skating.

Meanwhile, adults and the elderly used spatial components predicted by designers, while showing no skills like children in perceiving the subjective affordance of outdoor spaces. After observing objectified affordances (activities) and taking notes, all activities occurring in the outdoor spaces of the Ekbatan residential complex were classified based on the variable of age groups, as given by Table 5.

**Table 4. Classification of Activities by the Users of the Outdoor Spaces of Residential Complexes**

Activities		Objectified Affordance
Necessary Activities		Access, eating and drinking, sitting down to relieve fatigue, peddling, shopping, education and treatment
Individual-Optional Activities		Walking, taking a rest, taking a photo, playing with animals, cycling, individual sports, doing acrobatic activities, doing harmonious movements, graffiti, studying, skating, climbing trees, picking up and eating fruit, smoking, using drugs, watching landscapes and people, listening to the sound of the nature, doing sports activities and exercises, gardening, maintaining balance over edges, thinking, writing poems, and playing Li Li games
Group-Optional (Social) Activities	Individual Motives	Group morning sports, holding Chaharshanbe-Souri ceremony, playing basketball, volleyball, football, tennis, Takhteh (Backgammon game), chess, and holding boards of directors
	Social Similarity	Playing music, group walking, holding ceremonies for feasts, social and cultural gatherings
	Duration of Stay	Talking and meeting others

**Table 5. Affordances provided by the Outdoor Spaces of Residential Complexes for Various Age Groups**

Age Groups	Spatial Component	Objective Affordance	Subjective Affordance
Children	Stairways	Going up and down	Playing and Jumping
Adolescents and Young		Going up and down	Doing Specific Movements
Adults		Going up and down	-
The Elderly	Rails/fences	Going up and down	-
Children		-	Sliding and Climbing
Adolescents and Young		Increasing Security	Sitting
Adults	Edges	Increasing Security	Sitting for Taking a Rest
The Elderly		Increasing Security	Sitting for Taking a Rest
Children		-	Sitting, Playing Games and Maintaining Balance
Adolescents and young		Restricting	Skating, Graffiti
Adults		Restricting	Sitting for Taking a Rest
The Elderly		Restricting	Sitting for Taking a Rest

Age Groups	Spatial Component	Objective Affordance	Subjective Affordance
Children	Lawn and Green Spaces	-	Taking a Rest, Playing with Animals, Doing Acrobatic Movements, Doing Harmonious Movements
Adolescents and Young		Landscaping	Taking a Rest and Lying Down
Adults		Landscaping	Taking a Rest and Lying Down
The Elderly		Landscaping	Picking up Plants with Treatment Properties, Gardening
Children	Benches	Sitting	Jumping
Adolescents and Young		Sitting and Talking	Taking a Rest, Playing Music
Adults		Sitting, Taking Rest, Talking	Studying, Watching Landscapes and People
The Elderly		Sitting, Taking Rest, Talking	Playing Backgammon and Chess
Children	Fountain	Watching, Listening to the Sound of the Water	Touching, Throwing Stones and Removing Tree Leaves
Adolescents and Young		Watching, Listening to the Sound of the Water	Taking a Photo and Painting
Adults		Watching, Listening to the Sound of the Water	-
The Elderly		Watching, Listening to the Sound of the Water	-
Children	Empty Land	Jogging	Playing Li Li and Playing Football
Adolescents and young		Walking	Playing Football. Volleyball and Tennis
Adults		Walking	-
The Elderly		Walking	-
Children	Passages	Walking and Running	Cycling, Skating
Adolescents and Young		Jogging and Running	Cycling, Skating and Playing with Pets
Adults		Walking	Peddling
The Elderly		Walking	Exercise
Children	Entrances	-	Playing Hide and Seek
Adolescents and Young		Semi-Outdoor Space for Entering the Apartment	Appointing with Friends
Adults		Semi-Outdoor Space for Entering the Apartment	Holding Formal Sessions
The Elderly		Semi-Outdoor Space for Entering the Apartment	-
Children	Trees and flowers	-	Hiding, Climbing Trees and Picking up Fruits
Adolescents and Young		Shading, Air Conditioning, Space Creation	Sleeping, Climbing Trees, Painting and Taking Photo
Adults		Shading, air Conditioning, Space Creation	Sleeping under Tree Shade
The Elderly		Shading, Air Conditioning, Space Creation	-
Children	Sport Tools/ Means	-	Playing

Age Groups	Spatial Component	Objective Affordance	Subjective Affordance
Adolescents and Young	Elements	Exercises	Doing Acrobatic Movements
Adults		Exercises	Taking a Rest
The Elderly		Exercises	Taking a Rest
Children		-	Climbing
Adolescents and Young		Aesthetics and Meaningfulness	Taking a Photo
Adults		Aesthetics and Meaningfulness	Taking a Photo by an Element
The Elderly		Aesthetics and Meaningfulness	-

Reviews indicated that people have their needs change when they mature and have their social values increase. Adult activities in outdoor spaces are based on their experiences and affordances that space provide them with. In the meantime, children and adolescents explore new affordances to increase their level of activities in these spaces, while their failure to pay attention to social values in dealing with space may cause them to perceive more subjective affordances. Also, results indicated that adults perceive the environment with its affordances, whereas children and adolescents perceive the environment to be beyond objective affordances. They change and interpret the environment based on their needs and demands. As a result, environmental affordances perceived by people may not be perceived in life as based on changing individual needs and age.

### 5.1. Parameters Affecting the Occurrence of Activities in Outdoor Spaces

Findings from analyzing questionnaires, interviews and observations indicated that the occurrence of activities in outdoor spaces in residential complexes is influenced by the effects of various parameters such as perceiving the affordances of space components, physical indicators, user age and gender, the duration of stay in the complex and the time/duration of using the spaces (Fig. 9). According to Table 6 results, the highest average of activities done in outdoor spaces pertains to optional-group (social) activities with an average of 7.66, followed by the optional-individual activities, while the lowest average pertained to necessary activities with an average of 4.51.

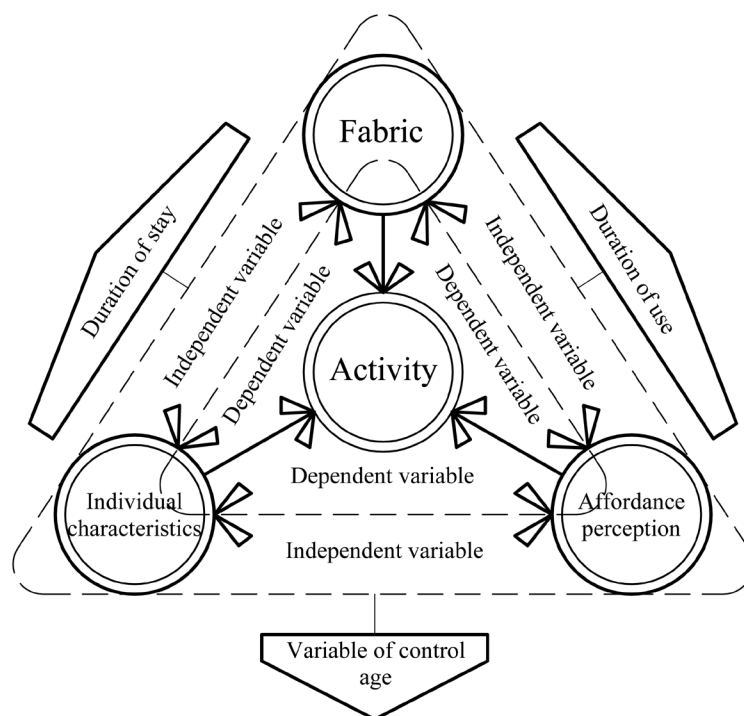


Fig. 9. Model of Parameters Affecting the Occurrence of Activities in the Outdoor Spaces of Residential Complexes

According to field observations and questionnaire analyses, the age groups of children, adolescents and young tended to use outdoor spaces for performing optional-individual and optional-group activities, while adults used them for necessary and optional-group activities. The elderly age group, as the group who most used the outdoor spaces, used the outdoor

spaces for performing groups exercises, walking, talking, interaction and meeting others, etc. A survey of the questionnaire indicated that the fabric of outdoor spaces, user age, the duration of stay, and duration of using those spaces were the most important parameters affecting the occurrence of the activities in these spaces.

**Table 6. Results of the Test of Activities performed in the Outdoor Spaces of the Ekbatan Residential Complexes**

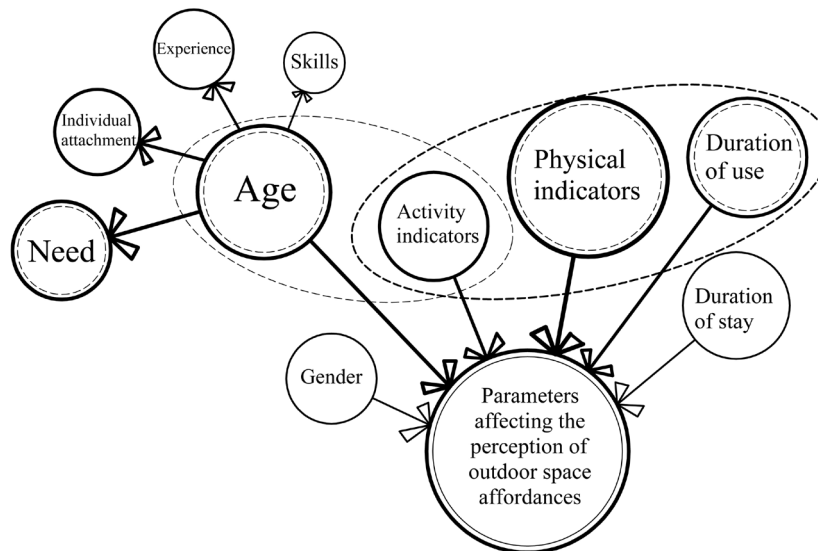
Statistics	Necessary Activities	Individual-Optional Activities	Group-Optional (Social) Activities
Mean	4.51	7.57	7.66
SD	0.67	3.84	3.81

## 5.2. Affordances of Outdoor Spaces

Any of environmental affordances provide potential activities for users. Affordances are the same potentialities that are perceived once spatial physical characteristics match with users' individual characteristics. In other words, affordances are opportunities and threats that provide all social, mental and physical conditions for people. Affordances, in the meantime, arise when peoples' various characteristics such as physical or skill aspects, social needs and personal goals are compatible with environmental characteristics. However, an affordance does not signify the occurrence of an activity; rather, the occurrence of an activity deepens

on individual capability, individual characteristics and peoples' needs. People do not perceive all outdoor space affordances and may not use all the perceived affordances. They just use affordances that satisfy their needs and demands. As a consequence, people are highly likely to perceive and use environmental affordances that meet their characteristics and expectations of space. For this, this study briefly enumerated the parameters affecting the perception of affordances as follows:

1. Based on needs (using activity-compatible physical indicators)
2. Based on individual characteristics (creativity, skills, age, gender, etc.) (Fig. 10)



**Fig. 10. Parameters Affecting the Perception of the Affordances of Outdoor Spaces in Residential Complexes**

## 5.3. Physical Indicators of Outdoor Spaces

A review of questionnaire results indicated a higher correlation between the component of fabric and activities in outdoor spaces. Forty-two percent of

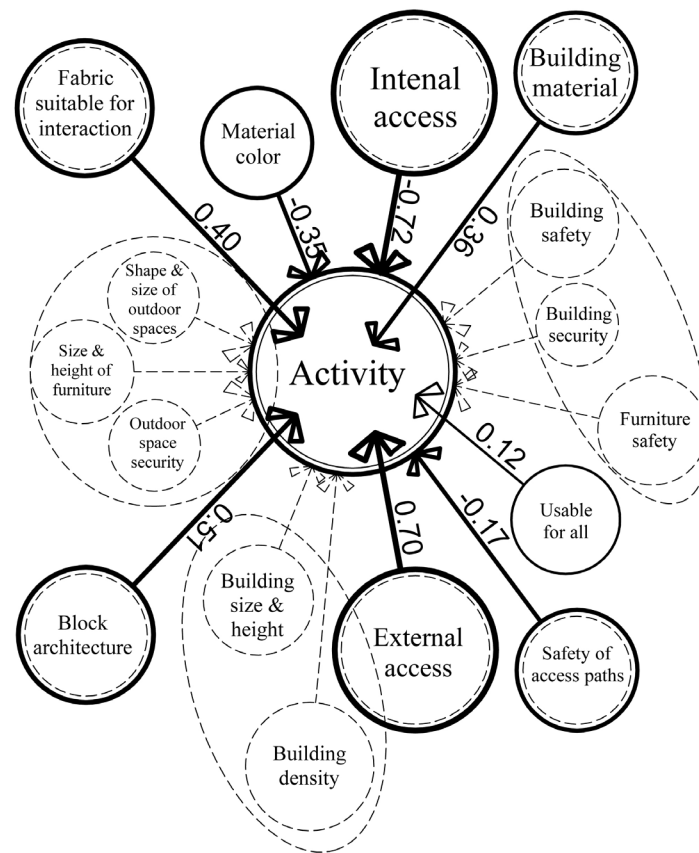
changes in the activity component in outdoor spaces were determined by physical indicators, suggesting the higher effects of the physical indicators of outdoor spaces on the occurrence of various activities (Table 8).

**Table 7. A summary of Multivariate Regression Model between Physical Indicators on the Activity of Outdoor Spaces**

Correlation Coefficient	Coefficient of Determination	Modified Coefficient of Determination
0.65	0.42	0.39

Multivariate regression analysis was used to determine the effects of physical indicators as predictive variables and components as the criterion variable. As given by Table 7, the p value obtained from these indicators was significant, except for the indicators of 2, 3, 4, 5, 11, 13, 14, and 15. Results indicated that the indicator of accessibility, which helps create places for walking affordances for residents, was one of the

most important parameters affecting the occurrence of necessary activities. Out of other physical indicators of outdoor spaces, the lack of barriers to performing group games and exercises and using appropriate materials on the wall and floors, was yet another major factor involved in the occurrence of activities (Fig. 11).



**Fig. 11. Effects of the Physical Indicators of Outdoor Spaces in Residential Complexes on the Occurrence of Various Activities**

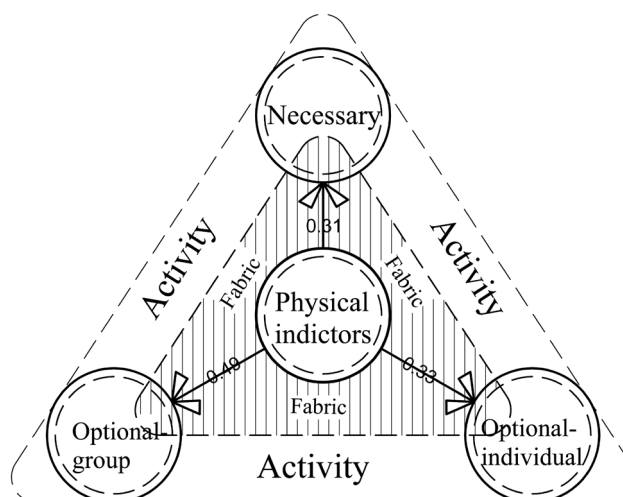
**Table 8. Multivariate Regression Analysis Results between Physical Indicators on Activities in Outdoor Spaces**

Indicators	Non-Standard Coefficients		Beta Standard Coefficients	t	Sig.
	B	SD			
Constant Values	2.204	0.221		9.977	0.000
1. The architecture of building blocks is appropriate.	0.230	0.043	0.51	5.290	0.000
2. The density of the buildings is appropriate.	-0.088	0.062	-0.24	-1.420	0.157
3. The size and height of the buildings in the complex are appropriate.	0.041	0.057	0.12	0.710	0.479

Indicators	Non-Standard Coefficients		Beta Standard Coefficients	t	Sig.
	B	SD			
4. The buildings enjoy appropriate security.	-0.013	0.036	-0.03	-0.349	0.727
5. The architecture of the buildings enjoys appropriate safety	0.042	0.043	0.09	0.971	0.333
6. Materials used on the façade are appropriate.	0.104	0.025	0.36	4.118	0.000
7. The color of the materials used on the façade is appropriate.	-0.094	0.023	-0.35	-4.050	0.000
8. External accesses of the complexes are appropriate.	0.246	0.041	0.70	5.931	0.000
9. Internal accesses of the blocks are appropriate.	-0.287	0.045	-0.72	6.326	0.000
10. The fabric of outdoor spaces allows for social encounters and meetings.	0.177	0.027	0.40	6.652	0.000
11. The shape and size of outdoor spaces are appropriate.	0.065	0.035	0.12	1.871	0.062
12. The pavement of the access spaces enjoys appropriate safety.	-0.065	0.029	-0.17	-2.227	0.027
13. The furniture of outdoor spaces enjoys appropriate safety.	-0.036	0.047	-0.08	-0.761	0.447
14. Outdoor spaces enjoy appropriate security.	0.047	0.044	0.10	1.057	0.291
15. The size and height of the furniture of outdoor spaces are appropriate.	-0.036	0.035	-0.05	-1.022	0.308
16. Outdoor spaces are usable for all age groups.	0.050	0.023	0.12	2.156	0.032

The good quality of the fabric of outdoor spaces for the conduct of various activities indicates that these spaces and their physical components (such as edges, benches, fountains, shading elements, elements, staircases, etc.) facilitate a large number of activities for users based on their demands and needs. Surveys have demonstrated that the physical

indicators of outdoor spaces have the highest effects on the occurrence of optional-group activities (Fig. 12). Results indicate that residents turn to outdoor spaces for doing optional-group activities such as group sports, cultural and religious gatherings, etc. (Table 8).



**Fig. 12. Effects of Physical Indicators on Various Activities in the Outdoor Space of the Residential Complexes**

As noted by Table 9 and considering the mean and significance value that is lower than 0.05, the mean of the component of activity in the outdoor spaces of the Ekbatan residential complexes was higher

than the median level, indicating that the fabric of the outdoor spaces could afford all the activities and the occurrence and/or non-occurrence of which was affected by other parameters.

**Table 9. One-Sample t Test Results of the Component of Activity in the Outdoor Spaces**

Activity and Its Classification in Outdoor Spaces	Mean	SD	Comparison Value=3			
			Mean diff.	t	Freedom Degree	Sig.
Activity	3.56	0.19	0.56	49.790	305	0.000
Necessary	3.72	0.25	0.72	50.636	305	0.000
Optional-Individual	3.39	0.36	0.39	18.976	305	0.000
Group-Individual	3.58	0.27	0.58	37.047	305	0.000

#### 5.4. Individual Characteristics of Users in Outdoor Spaces

One of the factors affecting the difference of the activity patterns of groups using outdoor spaces in the

sample under study is the difference of their individual characteristics. The following gives the relationship between activities and the variables of age, gender, the duration of outdoor space and the duration of stay in the residential complex.

**Table 10. T Test Results with two Independent Groups to Determine the Mean Difference of Activities by Gender**

Gender	No. of Sample	Activities in Outdoor Spaces	SD	Mean diff.	t	Freedom Degree	Sig.
Woman	194	3.58	0.21	0.07	3.409	304	0.000
Man	112	3.51	0.15				

The t test with two independent groups was used to examine the mean difference of activities outdoors among women and men. Table 10 indicated that the significance level of the test error at the confidence level of 0.95 was less than 0.05. Results suggested there was a significant difference between activity levels in terms of the gender of using groups, with women using necessary, optional-individual and optional-group activities compared to men.

Results also indicated that women tended to explore the unplanned affordances of the physical components of outdoor spaces (subjective affordances) based on

their needs, demands and experiences, while men tended to use outdoor spaces and their physical components to do their planned activities. For example, women used edges for sitting and taking a rest, elements and fountains for taking photos and painting and access paths for peddling and walking. Table 11 indicates that there is a significant difference between activities outdoors based on the variable of age. The highest mean outdoor activities pertained to adults with a mean level of 3.62 and the lowest to adolescents (Table 12).

**Table 11. One-Way Analysis of Variance (ANOVA) Test Results for Determining the Significance of the Mean difference of Activities by the Variable of Age**

Source of Changes	Sum of Squares	Freedom Degrees	Mean Squares	F	Sig.
Inter-Group	1.343	4	0.336	9.646	0.000
Intra-Group	10.478	301	0.035		
Total	11.821	305			

**Table 12. Duncan's Post Hoc Test Results for Determining the Mean Outdoor Activities by the Variable of Age**

Age Groups	No.	Prioritization	
		Classification 1	Classification 2
14-16 Years (Adolescents)	90	3.46	
65+ (the Elderly)	44		3.57
36-45 Years (Middle Ages)	9		3.57
20-35 (Young)	95		3.60
46-64 (Adults)	68		3.62

Results indicated that there was a significant difference between outdoor activities in terms of the duration of stay in this township (Table 13). Most users of outdoor spaces have been living in

the Ekbatan residential complexes for over 20 years, indicating their satisfaction with the environments and their higher sense of belonging (Table 14).

**Table 13. One-Way Analysis of Variance (ANOVA) Test Results for Determining the Significance of the Mean Difference of Outdoor Activities by the Variable of the duration of Stay**

Source of Changes	Sum of Squares	Freedom Degrees	Mean Squares	F	Sig.
Inter-Group	3.776	4	0.944	35.319	0.000
Intra-Group	8.045	302	0.027		
Total	11.821	305			

**Table 14. Duncan's Post Hoc Test Results for Determining the Mean Outdoor Activities by the Variable of the Duration of Stay**

Duration of Stay in this Complex	No.	Prioritization	
		Classification 1	Classification 2
16-20 Years	24	3.41	
6-10 Years	79	3.43	
1-15 Years	39	3.47	
20 Years and Higher	126		3.65
1-5 Years	38		3.67

Results suggested that there was a significant difference between levels of outdoor activities based on the weekly use of the outdoor spaces of the Ekbatan

residential complex (Table 15). Most users of outdoor spaces were found to use the spaces for over 15 hour a week (Table 16).

**Table 15. One-Way Analysis of Variance (ANOVA) test Results for Determining the Significance of the Mean Difference of Outdoor Activities by the Variable of Using the Spaces per Week**

Source of Changes	Sum of Squares	Freedom Degrees	Mean Squares	F	Sig.
Inter-Group	1.392	4	0.348	10.043	0.000
Intra-Group	10.429	302	0.035		
Total	11.821	305			

**Table 16. Duncan's Post Hoc Test Results for Determining the mean Outdoor Activities by the Variable of the Using the Space per Week**

Using Outdoor Spaces per Week	No.	Prioritization	
		Classification 1	Classification 2
2 Hours	5	3.49	
7 Hours	48	3.49	
10 Hours	27	3.57	
15 Hours	106		3.64
Over 15 Hours	120		3.66

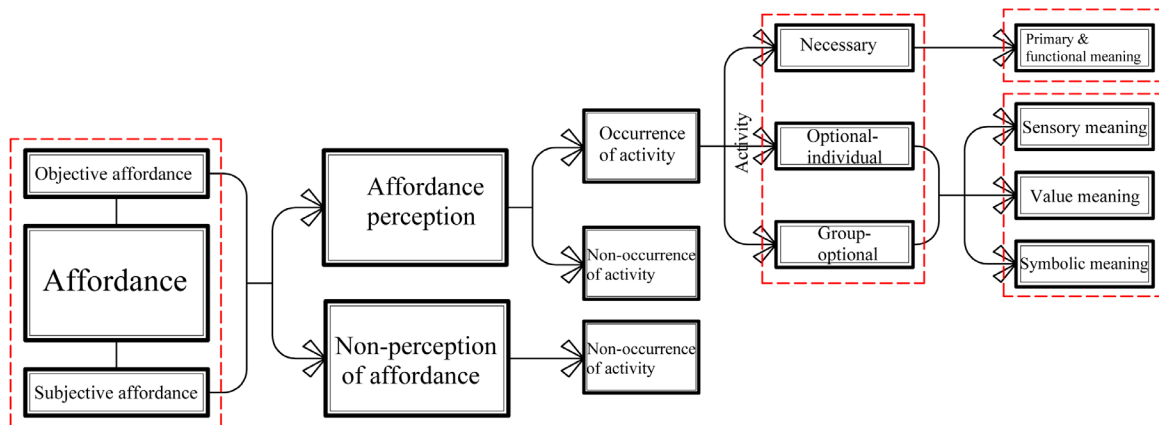
## 6. FINDINGS ANALYSIS

Understanding the activity patterns of age and gender groups and their needs and motives in dealing with outdoor spaces is one of the major factors contributing

to the perception of environmental affordances. Users of outdoor spaces have different needs and interests in various age periods; hence, they present different demands to deal with spaces. Designing the fabric of

outdoor spaces involving a wide range of necessary, optional-individual and group-optional activities could increase residents' involvement and the possibility of activities and their meaningfulness for these users, in addition to the individual parameters investigated, the perception of environmental affordances changes under the influence of prior experiences, skills and capacities. The subjective and objective affordances of outdoor spaces facilitate necessary activities to form primary and functional meanings. In this level of meaning, the

human-environment relationship is a factor affecting the formation of meaning. At the level of sensory meaning, the human-human relationship is a factor more important than the fabric of outdoor spaces in forming meanings, as attention to the cultural and historical indicators of the fabric of outdoor spaces helps the formation of value-based meaning levels. The subjective and object affordances of outdoor spaces stimulate human senses and evoke users' subjective memories to help form symbolic meanings (Fig. 13).



**Fig. 13. The Relationship between Environmental Affordances and the Occurrence of Activities and the Meaning Formation**

As noted by result analyses, all the parameters affecting affordance perception changed under the influence of the variable of users' age over time. The analysis of questionnaires indicated that age was a key parameter affecting the perception of the subjective and objective affordances of outdoor spaces. Various age groups use outdoor spaces differently. Adolescent and young groups most used outdoor spaces, spending over 15 hours a week doing various activities, including necessary and optional-individual activities (e.g., group games, meeting friends and talking to them, exercises, shopping, and access to educational facilities). The elderly was also found to use outdoor spaces for social cultural and religious gatherings and also holding official sessions and social interactions. The majority of the elderly who was in outdoor spaces had lived in the residential complexes for over 20 years. Adult also used the components of spatial fabric components for their own activities. Meanwhile, children adopted a specific subjective affordance based on their own needs due to their lack of knowledge about the functioning of some spatial physical components and lack of experience in this regard. Adolescents used outdoor spaces differently due to their lack of compliance with social values and some do's and don'ts.

Observations and interviews demonstrated that some parts of outdoor spaces in the Ekbatan residential complexes undermined the affordances of these

spaces and reduced children and adolescents' use of these spaces, due to the adoption of inappropriate measures by block boards of directors and the making of ineffective changes within the spatial configuration. In the meantime, environmental disruption, the separation of spaces, the creation of green spaces over access paths and children game spaces, single-functional aspects of flexible spaces, unsystematic land use changes, inappropriate physical distinctions for making spaces specific for a single age and blocking access paths (reducing space readability and accessibility) took place under conditions different from residents' activity and subjective patterns, which could undermine the environmental affordance for some using groups.

## 7. CONCLUSION

Compared to other spaces, outdoor spaces facilitate conditions for a wide range of activities or for users. These spaces include affordances that can be used by users to meet their needs and demands. Activities that have occurred in outdoor spaces may vary under the effects of such individual characteristics as the user's age, gender, needs and demands of the environment, the duration of using those spaces and even their time of stay in residential complexes. The variable of age, as compared to other variables, had a greater effect on the mean difference of the activity patterns of groups

using outdoor spaces. Since peoples' experiences, skills and needs change by increasing age, their perception of the subjective and objective affordances of outdoor spaces change, also. One of the major design parameters is to maximize compatibility between users' diverse activity patterns and behavior setting in residential complexes, which not only provide them with mental health but also expand their two-way relationship with the environment based on behavioral patterns. Results have indicated that focus on users' activity patterns in designing outdoor spaces and providing opportunities for social interactions through environmental fabric affordances are the main factors involved in increasing user activities in outdoor spaces and the meaningfulness of these spaces. The current patterns of activity in a physical environment depends on the affordances perceived by users, individual perceptual faculty, and their motivational reactions against environmental affordances in line with the satisfaction of their needs. The conformity of outdoor spaces with users' needs and demands could lead to the occurrence of activities and meaningfulness of outdoor spaces for age, gender and social groups. Results also indicated that the occurrence of subjective affordances pertained to the optional activities that space provided the user with. For the outdoor spaces of residential complexes to attract various age groups and lay the ground for optional activities, they should provide affordances

beyond necessary affordances. The little occurrence of optional activities in outdoor spaces originates from their inadequate social and physical quality. Increasing the quality of diverse outdoor spaces improves the individual and collective optional activities and thus help opportunities to emerge for the subjective affordances of various age groups. However, when space fails to provide adequate objective affordances for meeting user needs and expectations, people will by themselves create affordances for the occurrence of activities.

As spatial components increase, the objective affordances of spaces will get richer and as the objective affordances of the environment merge with the creativity and skills of children and adolescents, it could increase the richness of outdoor spaces in residential complexes, thus increasing the presence of various age groups in these spaces. Children use subjective affordance and adults and the elderly use activities that space provide them with to make life in outdoor spaces richer. On the hand, outdoor spaces, which include a variety of subjective and objective affordances for all age groups, can be more dynamic in terms of social aspects. Therefore, creating appropriate spaces commensurate with activity patterns in all age groups could increase peoples' relationship with their living environments, and thus increase human-human interactions and human-environment relationships.

## ACKNOWLEDGMENTS

This article wasn't supported by any financial or spiritual sponsors.

## CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

## ENDNOTE

1. Literally translating as affordance of objects
2. A game played by children, who throw a stone onto a set of joined squares drawn on the ground and jump on one leg and then on two legs into each square

## REFERENCES

- Azizi, Mohammad Mahdi, and Sarem Malek Mohamadneghad. 2007. Comparative study of two models of residential complexes (conventional and high-rise). *Fine arts* 32: 27-38. <https://www.sid.ir/paper/5696/fa>. [in Persian]
- Charkhchian, Maryam, and Seyyed Abdolhadi Daneshpour. 2009. Examining the design components of responsive public spaces. *Journal of Geography and Planning (Tabriz University)* 14(30): 53-85. <https://www.sid.ir/paper/203687/fa>. [in Persian]
- Daneshgar Moghadam, Golrokh, and Marmar Islampur. 2012. Analysis of the environmental capability theory from Gibson's point of view and its feedback in human studies and man-made environment. *Armanshahr architecture and urbanism* 5(9): 86-73. [https://www.armanshahrjournal.com/article\\_33213.html](https://www.armanshahrjournal.com/article_33213.html). [in Persian]
- Dror, Itiel E., and Stevan Harnad. 2008. *Cognition Distributed: How Cognitive Technology Extends Our Minds*. Library of Congress Cataloging-in-Publication Data.
- Ding, Wei, and Xia Lin. 2009. *Information Architecture: The Design and Integration of Information Space*. Morgan and Claypool Publishers.
- Gaver, William W. 1991. Technology Afoordances. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: Reaching through Technology*. New York: ACM press, 79-84. <https://www.lri.fr/~mbl/Stanford/CS477/papers/Gaver-CHI1991.pdf>.
- <https://www.lri.fr/~mbl/Stanford/CS477/papers/Gaver-CHI1991.pdf>
- Gehl, Jan. 2008. *Living in the space between buildings*. Shimashshati. Tehran: Jihad University Press. [in Persian]
- Gibson, James J. 1977. *The Theory of Affordance*. (R. Shawand, J.Bransford, eds), Perceiving, Acting and Knowing, New York: Halsted.
- Gibson, James J. 1979/1986. *The ecological approach to perception*. Hillsdale. NJ: Lawrence Erlbaum Assocites.
- Greeno, James G. 1994. *Gibsons Affordance*. Psychological review.
- Hadari, S., Rachel Kaplan, and M. Carol R. Hunter. 2015. Environmental affordances A Practical approach for design of nearby outdoor settings in urban residential areas. *Landscape and urban planning* 134: 19-32. <https://deepblue.lib.umich.edu/handle/2027.42/148509>.
- Heft, Harry. 2001. *Ecological Psychology in Context : James Gibson, Roger Barker, and the Legacy of William Jamess Radical Empiricism*. United States of America: Lawrence Erlbaum Associates, Inc. Publishers.
- Jalili, Mohamad, Alireza Einifar, and Golamreza Talischi. 2013. Open space of residential complexes and environmental response: a comparative study of three residential complexes in Hamadan city. *Journal of Fine Arts-Architecture and Urban Planning* 18(4): 57-68. [https://jfaup.ut.ac.ir/article\\_51682.html](https://jfaup.ut.ac.ir/article_51682.html). [in Persian]
- Javan Forouzandeh, Ali, and Ghasem Motalebi. 2012. The Role of Open Spaces in Neighborhood Attachment Case Study: Ekbatan Town in Tehran Metropolis. *International Journal of Architecture and Urban Development* 1(3): 11-20. [https://ijaud.srbiau.ac.ir/article\\_54.html](https://ijaud.srbiau.ac.ir/article_54.html)
- Jenkins, Henry. S. 2008. Gibsons Affordances: Evolution of a pivotal Concept. *Journal of Scientific Psychology* 34-45.
- Khalilneghad, Seyed Taher. 2016. Discovering the principles of environment design by examining the theory of environment capability. *International conference on architecture, urban planning, road and construction engineering, art, environment, Tehran, Iran*. <https://civilica.com/doc/607591/>. [in Persian]
- Kim, Yong Se, J.Y. Jeong, M. K. Kim, Sung Won Lee, and Myoeun Kim. 2010. Personal Cognitive Characteristics in Affordance Perception : Case Study in a Lobby. In *Emotional Engineering*. London. <https://www.researchgate.net/publication/278657570>.
- Lang, Jan. 2009. *The creation of architectural theory and the role of behavioral sciences in environmental design*. Translated by Alireza Eini far. Tehran. Tehran University Press. [in Persian]
- Lelhaj, Rafieh, and Mir Saeed Mousavi. 2018. Psychological attitude to the role of gender in architectural space perception capabilities. *Armanshahr architecture and urbanism magazine* 23: 94-85. [https://www.armanshahrjournal.com/article\\_69595.html](https://www.armanshahrjournal.com/article_69595.html). [in Persian]
- Liu, Ying-Chieh, and Lu Su-ju. 2009. An Investigation of Function Based Design Considering Affordance in Conceptual Design of Mechanical Movement. *8th international Conference Springer. germany*. 43-51. <https://www.researchgate.net/publication/221097262>.
- Marcus, Clare Cooper, and Wendy Sarkissian. 1986. *Housing as if people Mattered: Site Design Guildlines for Medium Density Family Housing*. (1 st ed). California: University of California press.
- McGrenere, Joana, and Wayne Ho. 2000. Affordances: Clarifying and Evolving a Concept. *Accepted for publication in the proceedings of Graphics Interface, Montral*. 1-8.
- Mohammadi, Mohsen, Hamid Nadimi, and Mahmod Reza Thaghafi. 2017. Inquiry on the application of the capability concept in the design and evaluation of the built environment. *Soffeh* 77: 21-33. <https://soffeh.sbu.ac.ir/>

- [article\\_100403.html](#). [in Persian]
- Motalebi, Ghasem. 1998. *A Theory of Meaning in Architecture and Urban Design: An Ecological Approach*.
  - Motalebi, Ghasem. 2001. Environmental psychology is a new science in the service of architecture and urban design. *Fine arts* 10: 52-67. <https://www.sid.ir/paper/5650/fa>. [in Persian]
  - Motalebi, Ghasem. 2006. A human-based approach to form-making principles of urban spaces. *Honarhaye ziba* (27): 57-66.
  - Nozari, Shole. 2004. Design guidelines for residential open spaces. *Soffeh* 39: 45-64. [https://soffeh.sbu.ac.ir/article\\_99978.html](https://soffeh.sbu.ac.ir/article_99978.html). [in Persian]
  - Norman, Donald Arthur. 1999. Affordance, Conventions & Design. *Interactions* 6(3): 38-42. doi: [10.1145/301153.301168](https://doi.org/10.1145/301153.301168)
  - Ghobadian, Vahid. 2014. *Basics and concepts in contemporary western architecture*. Tehran: Naqsh Iran Printing. [in Persian]
  - Turner, Phil. 2005. *Affordance as Context*. Elsevier. [https://www.academia.edu/17648650/Affordance\\_as\\_context](https://www.academia.edu/17648650/Affordance_as_context).
  - [www.memarima.ir](http://www.memarima.ir)
  - Yilmaz, Serap, Sema Mumcu, and Abdullah Cigdem. 2017. Determining The Affordances Provided by Urban Open Spaces to Different Age Groups. *Journal of Scienc. Part B*. 5(3): 1-12. [https://www.researchgate.net/publication/319776275\\_Determining\\_The\\_Affordances\\_Provided\\_by\\_Urban\\_Open\\_Spaces\\_to\\_Different\\_Age\\_Groups](https://www.researchgate.net/publication/319776275_Determining_The_Affordances_Provided_by_Urban_Open_Spaces_to_Different_Age_Groups)
  - Zabihi, Hosein, Farah Habib, and Kamal Rahbari Manesh. 2010. Investigating the relationship between the level of satisfaction with residential complexes and the impact of residential complexes on human relationships. *City identity* 8: 118-103. [https://hoviatshahr.srbiau.ac.ir/article\\_1153.html](https://hoviatshahr.srbiau.ac.ir/article_1153.html). [in Persian]

#### HOW TO CITE THIS ARTICLE

Mansour Hosseini, Neda, Ali Javan Forouzandeh, Ghasem Motalebi, and Masoumeh Yaqoubi. 2023. Role of Outdoor Space Affordances in the Activity Patterns of Various Age Groups; Case Study: Ekbatan Residential Complex. *Armanshahr Architecture & Urban Development Journal* 16(43): 259-280.

DOI: 10.22034/AAUD.2023.327860.2626

URL: [https://www.armanshahrjournal.com/article\\_178279.html](https://www.armanshahrjournal.com/article_178279.html)



#### COPYRIGHTS

Copyright for this article is retained by the author(s), with publication rights granted to the Armanshahr Architecture & Urban Development Journal. This is an open- access article distributed under the terms and conditions of the Creative Commons Attribution License.

<http://creativecommons.org/licenses/by/4.0/>

