

Mental images and congruence strategies: An investigation of congruence between residents and private open spaces in three dominant housing patterns of Yazd

Elham FALLAH¹, Isa HOJAT²

¹ elhamfallah@ut.ac.ir • Department of Architecture, Faculty of Fine Arts, University of Tehran, Tehran, Iran

² isahojat@ut.ac.ir • Department of Architecture, Faculty of Fine Arts, University of Tehran, Tehran, Iran

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Abstract

Residents usually try to establish congruence between their own needs and the affordances of the open space in order to satisfy their needs and achieve a better living environment. This congruency, being affected by some differences between the residents' mental ideal images of open space and the actual open space, can be achieved by different strategies. The present study aims at investigating how congruence is established between residents and open spaces in three dominant housing patterns of Yazd, as a traditional city in Iran. This study is a qualitative research, adopting an ethnographic approach. The results revealed that when the residents' actual open space is more similar to their desired and ideal open space, they establish a two-way relationship with the space, adapt their behaviors to the space or change the space according to their needs. However, the more the open space is different from the residents' ideal of open space, the more their relationship becomes one-way and the residents are obliged to change their needs and behavior according to the affordances of the environment or move from their houses to another one having their ideal open space.

Keywords

Congruence, Housing, Mental image, Open space, Resident.

1. Introduction

Open space is considered as one of the main elements of a building in the traditional architecture of hot and dry climates. A perfect organization of this spatial element as well as the other elements of a house provides residents with a secure and peaceful atmosphere to be convenient and suitable for performing various activities. In recent years, several factors in Iran, including particular governmental policies, development of modern technologies regarding iron and glass (Mirhoseini, 2007, 56- 62), the issuance of specific regulations and incentive plans and granting facilities for mass housing (grant and loan) (Falamaki, 1992, 21), have made some specific changes in the housing pattern, increased mass housing and apartment living, decreased the size of houses (Ghanbari & Zaheri, 2010) and led to the obligation of construction in 60% of the land plots in different parts of the country (Aghalatifi, 2012). As a corollary, open space patterns also have drastically been altered such that houses' open spaces moved from the middle to the either side of the house and buildings with central courtyards were almost forbidden. Today, in many cities of Iran like Yazd, the contemporary housing patterns exist alongside the traditional patterns and families with diverse needs and lifestyles reside in them. Notably, these families interact differently with their housing open space. According to Morris and Winter, residents are always striving to establish congruence between their needs and the affordances of the open space in order to satisfy their needs and achieve a more convenient living environment (Morris & Winter, 1975). Many researchers have focused on the concept of congruence and using different strategies to establish congruence between housing and residents (e.g., Omar et al., 2012; Priemus, 1986; Fleury-bahi, Felonneau, & Marchand, 2008; Crull, Bode, & Morris, 1991; Baum & Hassan, 1999; Morris & Winter, 1975). Most of the researchers investigating the resident-housing congruence have studied the congruency methods only with regard to the factors influencing houses and residents in the time span of the study (culture, technology, society, economics, ...), while men-

tal ideal images of the residents formed during their whole life and since their childhood have not been taken into consideration in these studies.

On the other hand, resident-open space interaction is mostly investigated in studies conducted on the resident-housing interaction (Omar, Endut, & Saruwono, 2012), (Jusan, 2010). However, the studies specifically dedicated to scrutinizing the congruence between residents and their private open space are rare. Considering the importance of open space as one of the main elements of a building in satisfying qualitative and quantitative needs of the residents highlights the importance of conducting further studies specifically on this topic.

In this regard, the aim of the current study was to answer this question: "How do the residents' ideals of open space affect the resident-open space congruence in the three dominant housing patterns of Yazd?". As this study is informed by the premises of qualitative research, adopting an ethnographic approach (Groat & Wang, 2002), first the concept of congruence and mental ideal image were explored and the theoretical model of research was proposed. Then, based on the theoretical model, the residents' strategies to establish congruency between their own needs and the affordances of private open space in three dominant housing patterns of Yazd were studied.

2. Literature review

2.1. Person- environment congruence

In psychology, congruence means a proper coordination and correspondence between a person's needs and priorities and the affordances of the environment. Tinselly refers to it as a suitable relationship between the environmental supplies and demands (Spokane, Meir, & Catalano, 2000; Edwards & Shipp, 2007, Tinselly 2000). As the same way, Lynch (1981) defines congruence as coordination between the physical characteristics of an environment and activities performed in that environment. Moore also (2005) describes congruence as the level of conformity of human needs with the capacity of the environment. Regarding the residential

space, Festinger (1962) defines congruence as coordination between the mental desired image of a living environment built in the residents' mind (ideal environment) and the actual residential space. Most of the researchers consider congruence as the degree of compatibility between human being's needs and environmental affordances (French, Rodgers & Cobb, 1974). In this connection, Lawton and Nahemow believe that people seek out coordination between personal needs and environmental resources (Lawton and Nahemow, 1973 in Moore, VanHaitsma, Curyto, & Saperstein, 2003). In addition, Moore also believes that people feature a set of competences, and the environment also has a demand character (Moore, 2005, 331-333). Gibson (1979) interprets the environmental resources and demands as Environmental affordance (Lang, 2007). If there is person-environment congruence, the environment provides individuals with affordances; thus, they can express their values and needs and feel more satisfaction with their lives. However, when environmental affordances are superior, inferior, or incompatible with human being's needs, people experience incongruence (Musiol & Boehnke, 2013, 57). Our focus in this research is mainly on the congruence strategies. As a matter of fact, these strategies refer to the actions and reactions of the residents for adapting their needs to their environmental affordances or adapting environmental affordances to their own needs". In this regard, the strategies of establishing person-environment congruence are different and may be subsumed under one of the following categories:

1. Adapting the environment to one's needs: modifying the affordances of the environment (Omar et al., 2012, 329; Galster & Hesser, 1981; Steggell et al., 2003, 8; Fleury-bahi et al., 2008, 670; Brown & Moore, 1970; Shin, 2016, 16),

2. Adapting one's needs to the environment: changing behaviors (Spokane et al., 2000, 142; Priemus, 1986, 41; Omar et al., 2012, 329; Galster & Hesser, 1981; Shin, 2016, 16), adapting mental image of an ideal environment to the actual current environment (Fleury-bahi et al., 2008, 670; Brown & Moore, 1970), changing values, norms and priorities,

to adapt to the environment (Steggell et al., 2003, 8; Shin, 2016, 16).

3. Abandoning the environment or moving into a different environment (Omar et al., 2012, 329; Galster & Hesser, 1981; Steggell et al., 2003, 8; Fleury-bahi et al., 2008, 670; Rossi, 1955, 10; Brown & Moore, 1970; Eichner, 1986).

2.2. Residents' mental image

Mental imagery is a *quasi-perceptual experience which* resembles a perceptual experience, but occurs in the absence of the appropriate external stimuli. It can be considered as a form of representing reality (Colombo, 2012). Therefore, mental image is the re-creation of perceptual experience (Kosslyn, Ganis, & Thompson, 2001; Pearson, 2007).

Residents attribute different values and concepts to their living environments and create a mental image out of it as their ideal living environment, which highly affects their relationship with that environment. Notably, different factors are involved in the formation of these mental images such as past memories, culture, values, norms, tradition, family structure, household size, lifestyle, etc. (Priemus, 1986, 36). It is worth mentioning that these mental images are usually making people's needs and expectation of the environment. Studies conducted in this connection have revealed that residents constantly compare their housing with their mental image of their ideal house and their satisfaction is contingent upon the extent of similarity between their ideal and actual living environments (Galster, 1987; Mridha, 2015, 43; Shin, 2016, 19). The more residents' ideal house is different from their house in reality, the more the anxiety and incongruence are observed in resident-housing relations (Mohit, Ibrahim, & Rashid, 2010), (Sirgy, Grzeskowiak, & Su, 2005). In this condition, residents attempt to make congruence between their needs and the affordances of their current living environment (Priemus, 1986, 37) to bring their ideals of an environment and the reality closer.

According to the theoretical foundations, one model is proposed for the resident-housing congruence process (Figure 1). In this model, the following issues are taken into account:

- Residents' actual open space and their ideal image of housing open space are affected by common factors including economy, politics, technology, culture, family structure, household size, Lifestyle, etc. Each factor is, in turn, affected by various factors depicted in Figure 1. The study of these factors is beyond the scope of this study.
- The difference between the ideal open space in residents' mind and their actual private open space determines the extent of observed incongruence and the type of relationship between the residents and open space.
- Residents' mental ideal image of a housing open space determines their needs and expectations of the open space. To provide congruence, residents should establish congruence between their needs and open-space affordances.

3. Case study

The region under investigation in this study is the city of Yazd, a traditional city in Iran. An attempt is made to investigate the congruence between the residents and houses' private open space in the contemporary era of this city. Here, open space includes not only the courtyards but also balconies and terraces. In fact, private open space refers to any open spaces belonging to a single unit. Thus, public open spaces in apartments and residential complexes used by all members are not considered as housing open space here.

Studies on housing patterns in the city of Yazd indicate that the following three dominant housing patterns could be distinguished with different open space patterns¹:

The First housing pattern: This housing pattern dates back to the first Pahlavi era, lasted for hundreds of years. Having a central courtyard in a rectangular shape have made them substantially different from their subsequent patterns. Other elements surrounding the courtyard also follow its geometry. Thus, in addition to having a specific structure, the courtyard can be envisaged as an element that organizes its surrounding spaces. Further-

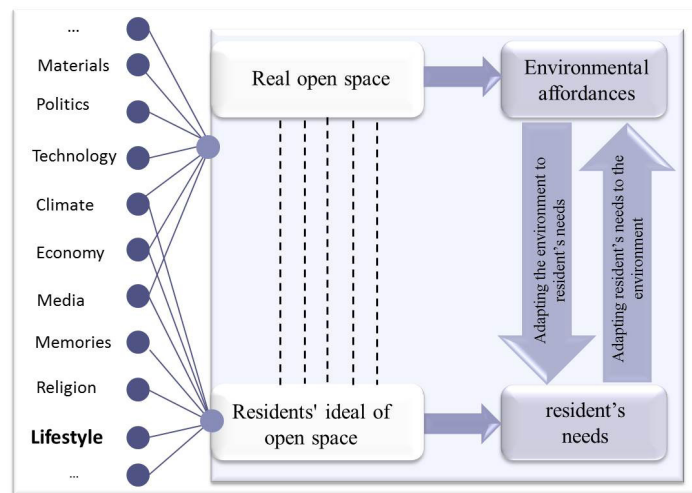


Figure 1. Theoretical model of resident-housing congruence.

more, other spaces are defined, and characterized with different qualities and functions according to their position in the courtyard: summer living quarter (back to the sun), winter living quarter (facing the sun), the western front and the eastern front (Memarian, 2006, 15). These spaces are directly connected to the courtyard and even are named based on the number of their doors opened to the courtyard: se-dari (three-door rooms) and panj-dari (five-door rooms). The main spaces of a house and porch are placed at the northern and southern end of the courtyard. These spaces could be connected to the courtyard by big windows which were extended to the ceiling (Ghazizadeh, 2011, 68). In these houses, the courtyard, besides organizing other elements of the house, provides residents with a peaceful and safe space to perform different activities (Daii Poor, 2014, 52). In traditional houses, the porch or Tallar is mostly located on the south side of the courtyard. Given its depth and location, the porch provides residents with a safe space for gathering the family members together, sleeping or even doing manufacturing activities during the day (Khaghani Poor & Shah Rezaii, 2017, 100). This element can be considered as an interface or a spatial filter interacting between open and closed space (Nazif, 2013, 66) which can be connected to the interior or exterior space and extend the interior space to the exterior space (Ghazizadeh, 2011, 66) (Figure 2 & Table 1).



Figure 2. Open space in the first housing pattern (left side and center: the courtyard, Right side: Tallar), (2017). Source: Author.



Figure 3. Open space in the second housing pattern (right side: the courtyard, center: patio, left side: backyard), (2017). Source: Author.

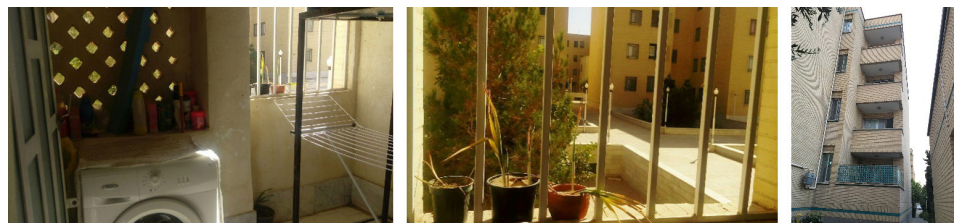


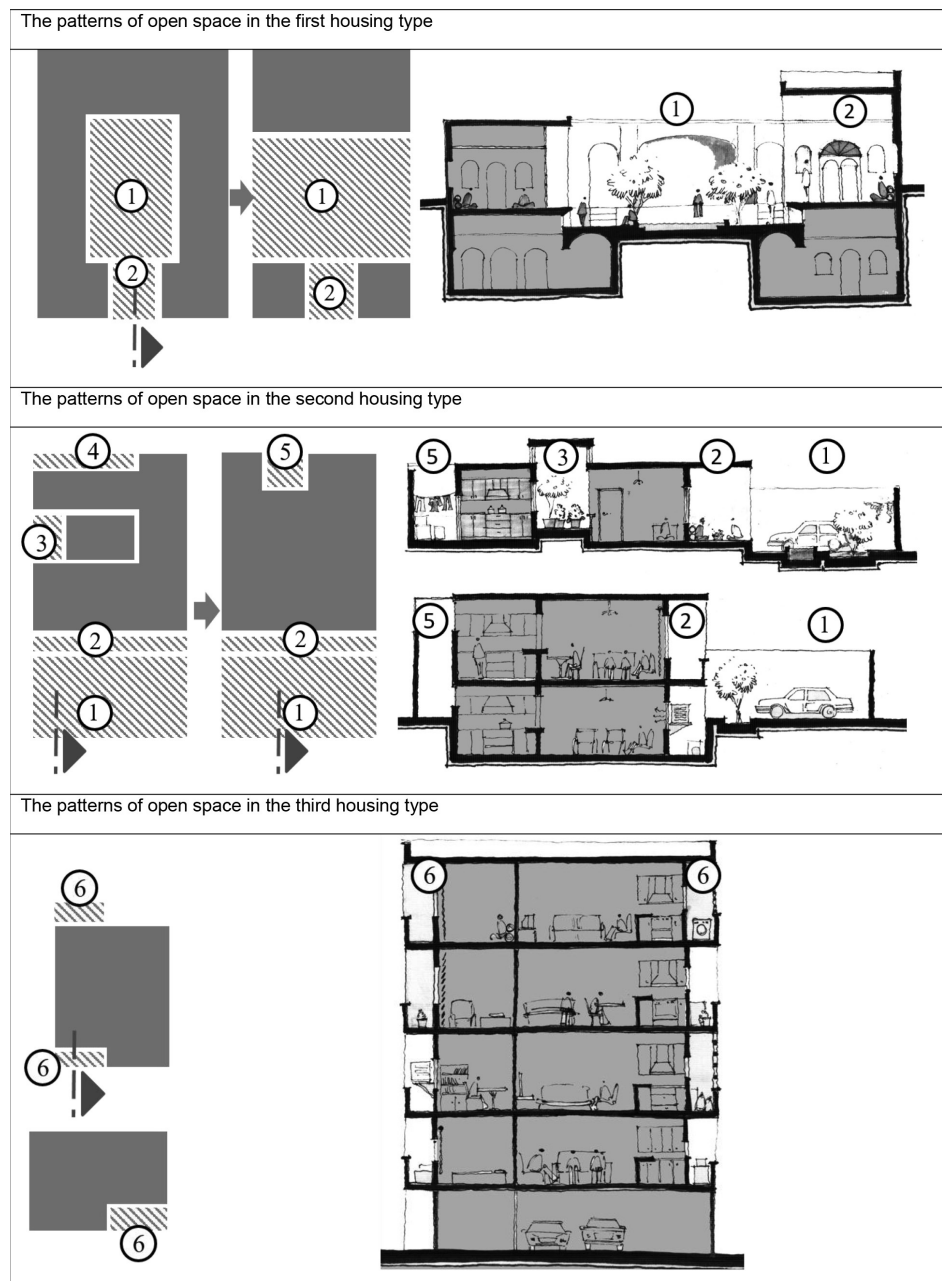
Figure 4. Open space in the third housing pattern, (2017). Source: Author.

The second housing pattern: In this housing type, affected by the rule of obligatory construction in 60% of the building lands, the courtyard is moved from the central part to one side of the house and is usually connected to a closed space by a semi-open porch place. In these houses, the courtyard, besides providing a place for family members to be gathered during some hours of the day, is sometimes used as parking area. Notably, while obeying the municipality laws and regulations, these houses are often built according to the residents' taste and, therefore, allow having the semi-traditional lifestyle. This housing pattern was formed at the end of the second Pahlavi era and is still being built with some small changes. In the first models of these houses, the omission of the central courtyard and the residents' need for having a central area led to the formation of the central halls (central enclosed spaces connected to all rooms). Moreover, the need for light and a place for keeping

the plants inside the houses led to designing patio next to the central hall. In addition, backyards were located next to the kitchen, at the end of the house, to provide the kitchen with suitable light and services. The main courtyard, as it was stated, was located on one side of the house and was adjacent to the alley or to the neighboring house by a wall. In the recent examples of this housing pattern, which are still being constructed, backyards are replaced with skylights and patios are omitted. (Figure 3 & Table 1)

The third housing pattern: Apartments or multi-floor buildings with a common open space for residents constitute the third type of house patterns. They are nowadays built in all cities with almost the same pattern. In these houses, the private open space is the balcony which is a small roofed space constructed for each housing unit so that the residents have access to it from the inside of their house. (Figure 4 & Table 1)

Table 1. Patterns of open space in the housing of Yazd (1. Yard, 2. Tallar or porch, 3. Patio, 4. Backyard, 5. Sky light, 6. Balcony), (2017). Source: Author.



3.1. Method

As it was stated, the present study is a qualitative research that adopts the ethnographic approach (Groat & Wang, 2002). At this stage, the samples were selected by purposeful sampling. The sample selection process continued until data saturation and theoretical saturation were achieved. As for data collection, in-depth and semi-structured interviews, and non-participant and participant observations were used. For each housing pattern, five samples were selected and their residents were interviewed.

As the samples were owner-occupied houses, all of the selected participants were the owners of the houses. The interview questions were organized into three sections. The first part was concerned with the personal information of the interviewee and his/her family members. The second part relied primarily on questions trying to clarify how the residents interact with the open space, by emphasizing the behavioral patterns and lifestyles of the residents. The third part, finally, included some questions that tried to identify the residents' mental image

of ideal open space, the changes that they have made in their open space, the changes in their ideals or behaviors, the reason behind these changes, and the interviewees' level of satisfaction or dissatisfaction with their open space. In this research, we studied the lifestyle of residents to find their congruence strategies. In this regard, the researcher accompanied the residents and participated in their ceremonies and activities, observing their lifestyle directly (participant observation). The data collected from the interviews and observations were coded and analyzed in three main categories: space functions, residents' mental ideal image and congruence strategies.

3.2. Results

In this section, in order to better understand the open space in three housing patterns of Yazd city, first the current functions of these spaces were studied. Then, the mental ideal images of the residents of mentioned three patterns were examined through doing interviews. In another section, residents' congruence strategies were evaluated through observing their lifestyles and interviewing them.

3.2.1. The functions of open space in three housing patterns

As it was stated, the open space in the first pattern includes a central courtyard and a Talar located next to it. This courtyard is a place where trees and flowers are planted (rather than merely keeping them), in that the residents consider planting trees or caring for flowers as one of the activities which have to be done in a courtyard. In all of these houses, the courtyard provides a place for family members to gather together and perform collective activities such as religious ceremonies,

wedding ceremonies, etc. in addition, talar as well as the traditional bed gardens in the courtyard are also the place where family gathers together and rests during the evenings and nights of spring and summer. (Figure 5)

In the second housing pattern, the courtyard has been moved to one side of the house. Although the courtyard is still used for planting trees or flowers; its other functions such as being a place for collective activities, children's playing, gathering together, and resting have not been common anymore. The main function of the courtyard in these houses is mostly providing a car parking area. In the first examples of these houses, built about 30 years ago, the porch was the same as talar in the first housing type; however, in more recent examples of this housing type, the porches have lost their former functions. As mentioned, some examples of these houses have a backyard and patio. The backyard provides the kitchen's light and is sometimes used as a warehouse for keeping kitchen's equipment. The Patio, likewise, provides the house's light and is used for keeping plants and flowers². (Figure 6)

In the third housing pattern, there is usually a common open space for all units (Figure 4), and the dedicated open space of each unit is just its balconies far removed from the concept of courtyard in traditional and middle housing (Figure 2 & Figure 3). In fact, the lack of the main elements of the courtyard, such as flowers, trees and howzes, along with its very small dimensions and overlooking of the surrounding buildings have made them considered not seriously as before. In most houses, balconies only meet the basic needs of residents for open spaces, such as drying clothes, washing and lighting the house (Figure 7).



Figure 5. Frequency of open space functions in the first housing pattern.



Figure 6. Frequency of open space functions in the second housing pattern.

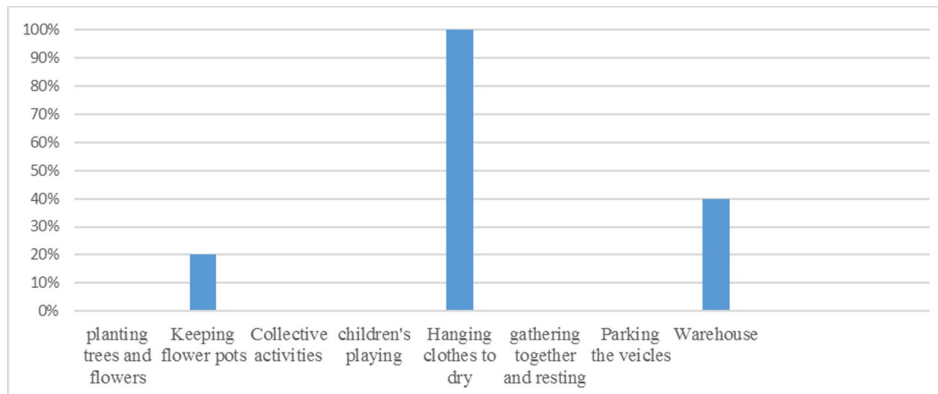


Figure 7. Frequency of open space functions in the third housing pattern.

3.2.2. Residents' mental ideal image of housing open space

In the residents' imagination of an ideal open space, the residents referred to gardens, trees, flowers, a porch, and a howz (pool). Regarding the main functions, likewise, the residents of these three patterns referred to some activities such as gathering together in the open space and playing children. The residents of the first housing pattern considered the open space of their houses as being ideal. Notably, in depicting the characteristics of an ideal open space, they referred to their own courtyard's features. However, the residents of the second and third housing pattern, did not consider their houses' open space as being perfectly ideal or close to their mental image of an ideal open space (Table 2).

Another important point is the fact that, to understand the residents' mental image of the ideal open space, direct questions are not enough. For this reason, the researchers asked the interviewees to describe the desired open space that they have experienced so far. In this description, the residents of all three housing patterns pointed to such elements as gardens with trees, large howzes and porches. In fact, in all

three patterns, the residents described a desired housing open space as a large space with lots of gardens and trees, a large howz and a porch (Table 3).

3.2.3. The congruence strategies

As mentioned, one of the most important concepts in relation to the congruency in housing studies is housing satisfaction. Satisfaction or dissatisfaction with housing is determined as a result of the residents' qualitative assessment of housing characteristics, and indicates the degree of adaptation of the users' needs and requirements with the facilities and affordances of the environment. In this regard, Musiol & Boehnke have mentioned the relationship between the users' needs and living environment and, using quantitative methods, proven the positive relationship between the congruence of residents' needs and residential environments and their satisfaction with that place (Musiol & Boehnke, 2013).

Therefore, to assess the extent of congruency with the open space, people's satisfaction or dissatisfaction with their housing open space was studied.

With regard to satisfaction with the houses' open space, the results showed that one of the residents of the first

Table 2. Mental image of open space for the residents of the three housing patterns.

Housing Type	Case study	Physical elements				functions		
		Gardens and trees	Flowers and green space	howz	The porch or a place for gathering together	Providing a place for gathering together	Providing children's playing space	Providing Parking space
third	P ₁	*			*			
	P ₂		*	*	*	*	*	*
	P ₃	*	*	*	*	*		
	P ₄	*	*	*	*	*	*	
	P ₅	*	*	*	*		*	
Second	P ₁	*		*	*		*	
	P ₂	*		*	*	*	*	
	P ₃	*	*	*	*		*	
	P ₄	*		*	*	*		
	P ₅	*	*	*	*	*	*	
First	P ₁	*	*	*	*	*		
	P ₂	*	*	*	*	*	*	
	P ₃	*		*	*	*	*	
	P ₄	*	*	*	*	*	*	
	P ₅	*		*	*	*	*	*

Table 3: Experienced ideal open space for the residents of the three housing patterns.

Housing Type	Case Study	Physical elements				Functions		
		Gardens and trees	Flowers and green space	howz	Tall or porch and a place for gathering together	Providing a place for gathering together	Providing children's playing space	Providing Parking space
third	P ₁	*		*				
	P ₂	*	*	*	*	*		*
	P ₃	*		*	*	*	*	
	P ₄	*	*	*	*		*	
	P ₅	*			*	*		
Second	P ₁	*			*			
	P ₂	*		*	*	*	*	
	P ₃	*		*		*		
	P ₄	*	*	*				
	P ₅	*	*	*			*	
First	P ₁	*	*	*				
	P ₂	*	*	*	*	*	*	
	P ₃	*		*	*	*	*	
	P ₄	*	*	*	*	*	*	
	P ₅	*		*	*	*	*	*

housing pattern was slightly dissatisfied with his house. He reasoned that having access to different parts of the house is difficult during the winter, since the courtyard is located at the center of the house and having access to other parts of the house requires crossing the courtyard. Most residents of the second pattern were satisfied with their housing open space. Undesirable features of open spaces of the second housing pattern include: the limited connection between open

and closed spaces, narrow porches and open spaces overlooked by their neighboring buildings. The residents of the second pattern believed that these undesirable features prohibit adopting a lifestyle previously existed in the courtyard of the first housing pattern. Regarding the third housing pattern, all respondents were dissatisfied with their housing open space. The residents referred to the narrowness of the balconies and being viewed by strangers as the undesirable character-

istics of these houses. They believe that these disadvantages hamper bringing life to the balconies. Given that other houses overlook the balconies, the windows to the balconies are always covered by curtains and open spaces, instead of providing a private space for family members, intervene between the interior and exterior spaces of the house (Table 4).

In this section, three strategies are studied to achieve person-environment congruency, namely modifying affordances of environment, changing behaviors and abandoning the environment or moving (Table 5). Of course, there are other strategies to achieve congruency such as adapting the mental image of an ideal environment to the current environment, changing values, norms and priorities to adapt to the current environment, which are mentioned in the literature. Since these strategies are not easy to be examined and are not important for the results of this study, they have not been considered here.

Modifying affordances of the environment: Until now, substantial changes have been made to the first mentioned housing pattern to strengthen the building and adapt it to today's needs. However, the residents of the second housing pattern have not made considerable changes to their houses. The residents of the third housing pattern, likewise, have made some small changes to their houses so that most of the changes have been made to increase the safety, security and privacy

of their balcony. They have not made considerable changes in the open space of their houses to adapt its affordances to their needs. In fact, when they are asked "what do you intend to do to make your space more desirable?", they mention that they just attempt to keep it clean. They believe that an ideal open space is a courtyard. However, in mentioning the necessary elements of a balcony, they do not refer to the elements such as trees, flowers, and pools. They believe that these elements belong to a courtyard and balconies are very different in terms of function and physical features. One of the residents said: "every change made to a balcony makes it a better balcony; however, it can never become a courtyard" (Table 5).

Changing behaviors: Almost all residents of the first housing pattern have adjusted their behaviors with the affordances of the space. For example, one resident said: "Our courtyard is not accessible to cars. That's why I park my car in the neighborhood car parking area." "Because of the location of the courtyard in the center of the house, we changed the reception area for our guests. Many of our parties are held in the courtyard, and we don't use the rooms too much when the weather is good," said another resident. The residents of the second pattern have also changed some of their behaviors to fit the space capability. For example, one resident said, "The porch of these houses is very small. That's why we don't use the porch anymore to get together." In general, because the residents of the sec-

Table 4. Undesirable features of housing open space and the exerted changes.

Cases	The most undesirable features of the house	Exerted changes
Residents of the first housing type	<ul style="list-style-type: none"> - Having difficulty in accessing to different spaces of the house - Having difficulty in cleaning the big yards 	<ul style="list-style-type: none"> - renovation - changing the functions of the Tallar - moving the kitchen and the bathroom from the courtyard to the closed space - making the howzes smaller or omitting the howz and gardens - changing the entrance of the courtyard to make a parking area
Residents of the second housing type	<ul style="list-style-type: none"> - smallness of the porch - The high difference between the height of porch and courtyard - being viewed by strangers - limited connection between open and closed space 	<ul style="list-style-type: none"> - making the gardens smaller to provide a parking space for cars - increasing the number of gardens
Residents of the third housing type	<ul style="list-style-type: none"> - balconies are viewed by strangers - low-quality walls - not having a scene and a good view - smallness of the balcony 	<ul style="list-style-type: none"> - building fence in front of the balcony to ensure safety - building coverings in front of the balcony so that it is not viewed by strangers

Table 5. Congruence strategies of the residents' satisfaction in three housing patterns.

Housing Type	Case Study	Congruence strategies			Satisfaction
		Adapting the Behaviors	Modifying the Affordances	Moving to new house	
First	P ₁	*	*		*
	P ₂	*	*		
	P ₃		*		*
	P ₄	*	*		*
	P ₅	*			*
Second	P ₁	*		*	
	P ₂		*		*
	P ₃	*		*	*
	P ₄	*	*		*
	P ₅	*	*		*
Third	P ₁	*		*	
	P ₂	*	*	*	
	P ₃	*		*	
	P ₄	*		*	
	P ₅		*	*	

ond pattern are involved in the design and construction of their houses, they have made the open space as appropriate as possible. In the third type of housing pattern, the change in behavior has been such that the residents have limited their connection to the balcony or used it just as a warehouse.

Abandoning the environment or moving into a different environment: The residents of the third housing pattern believe that we will soon move into a house with a courtyard; however, most of the residents of the first housing pattern have all been living in their houses for a long time and they do not intend to move into another house (Table 5).

3.3. Discussion

Considering the residents of all three housing patterns, analyzing the results obtained from the questionnaires shows that their mental ideal images of the open space are relatively similar to each other. Notably, this image is showing a space known as the courtyard in the first and second housing patterns. It is a spacious, roofless space with a howz in the middle and gardens around in which fruit and flower trees are planted. This open space is separated from the closed space of the house by a covered porch. The porch is, in fact, a place for gathering family members on spring and summer nights. These features are all seen in the first housing pattern. In describing the ideal open space, the

residents of this housing pattern have also pointed to their courtyards and considered them desirable. Of course, today's lifestyle in traditional houses is different from that of the past, and the residents of these houses have changed some of their behaviors or made limited changes to their open space to satisfy their needs. However, there is still a good interaction between the residents and open space.

Developments in housing in recent decades have changed the spatial and physical characteristics of open spaces. In the second type of housing, the courtyards, that were in the middle of the house in the first housing pattern, have been moved to one side and connected to the alley through a door. Since some part of the courtyards has been allocated to car parking area, the size and number of gardens has been reduced, and the howzes have become smaller or been totally removed. The porches have also been narrowed, and because the surrounding buildings overlook, they no longer have enough privacy for the family. Therefore, the quality and functions of the courtyard in the second housing pattern is somewhat different from that of the first pattern. This point is quite evident by comparing figure 5 and figure 6. Open space in the second housing pattern has generally the same structure as the ideal image of open space in the minds of residents, but also qualitatively different. For example, the desirable open space

in their minds is larger, with more trees and flowers. In this housing pattern, the residents have made some changes or adapted their behaviors to the current space in order to bring their courtyards closer to their mental ideal image.

In the third pattern of housing, open spaces have lost their main elements, including trees, howzes and porches. As shown in figure 7, in this type of housing, balconies have only practical functions³. Notably, balconies have a completely different structure and quality compared to the desired open space in the minds of the residents, because they do not have gardens, howzes and porches, they are very small and the surrounding buildings overlook it. The residents of the third pattern, to adapt to the open space, have completely changed their behavior in relation to this space and have even been forced to ignore or change most of their needs in relation to the open space and reduce them to some practical needs. Therefore, they do not make much changes in their open space to adapt to the affordances of the open space with their needs. They hope that they will soon move from this house to courtyard housing. In addition, they believe that this open space will not be able to be changed or approach their mental ideal images of an open space.

4. Conclusion

People always attempt to establish congruence between their needs and their living environment to make an optimal and desirable resident-housing interaction. Congruence between residents and housing can be established by different strategies. It is, in fact, a function of the physical and psychological environments as well as the past experiences of an individual. The results of this study revealed that residents, at first, compare their actual current environment with their mental ideal images and the extent to which the open space of their houses is similar to their ideal mental image determines the type of the strategy establishing congruency between residents and houses.

All the generations living in the city of Yazd have experienced living in or having interaction with open spaces of the first and second types of houses.

Therefore, some elements such as tree, garden, porch (or talar), and howz are involved in these people's conception of housing open space. They generally use the word "courtyard" to refer to the open space of the house, which has some specific qualities and physical characteristics in their minds. When one open space has these characteristics and is similar to the mental image of an ideal open space formed in their minds, they establish a two-way relationship with their environment. Moreover, to establish more congruency, they adapt their behavior to their environment and adapt the environment to their needs, in a two-way interaction. However, when the open space does not have elements which are construed as being the necessary elements of open spaces, residents do not consider it as the yard and to establish congruence they change their behavior towards this open space, and are even obliged to ignore some of their needs. Given that the existing open space is a far cry from their ideal open space, they do not make any attempt to change it to make it more compatible with their needs. However, they have an ideal image of open space in their minds and hope to move from their present house to another house with an ideal open space (Figure 8).

In the present study, the mental ideal images and the congruency-inducing behaviors of the generations who have the experience of living in the courtyard housing of the city of Yazd were studied.

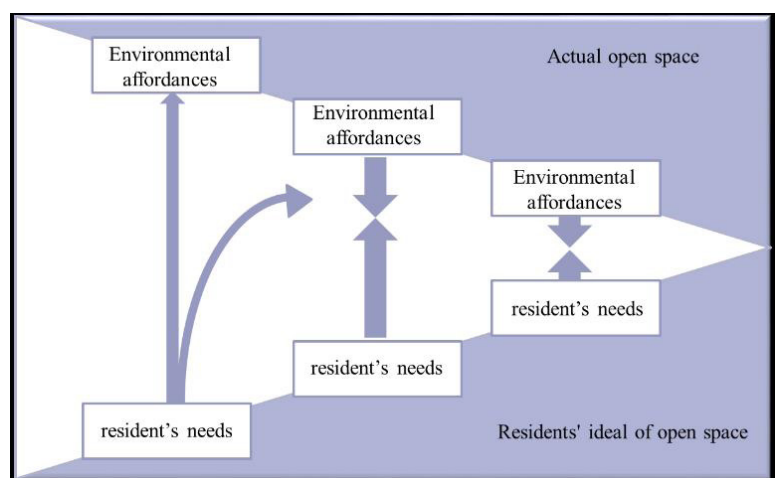


Figure 8. The effect of the extent of similarity between residents' mental ideal images of the open space and the real space on the congruence strategies between residents and houses' open space.

However, the next generation whose experience of the open space is based on the balconies of the apartments or open spaces of the residential complexes might have a different conception of the open space. Accordingly, the results of the present study can be of different consequences in different places and time periods. Furthermore, the theoretical model proposed for the congruence process between residents and housing is the other achievement of the present study which can be adopted in future studies conducted in this connection.

Endnotes

¹ Housing patterns of Yazd have been studied in the first Elham Fallah's thesis, in details. Notably, the patterns introduced in this section are the result of her extensive studies in Ph.D. thesis.

² Due to the small number of house patterns with backyards and patios in the samples, the related results are not presented in the charts.

³ Practical functions are related to the application of architecture as a tool to meet human needs. These functions have neglected many of the transcendental needs and desires of human being in relation to building environments. (Gharibpour, 1392, 65)

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