



## **Explaining the Components of Synomorphy in the Outdoor Behavior Setting of Residential Complexes: A Case Study of Kerman Residential Complexes**

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### **Abstract**

This study seeks to evaluate the correlation between the pattern of interactive behavior and the pattern of physical environment and subsequently improve the quality of residential complexes. Open spaces between residential buildings are the bedrock for residents to connect with nature and spend their leisure time outdoors and in the immediate vicinity of the house. Also, paying attention to the position of behavioral sciences in urban design and planning, and how space affects the occurrence of human behavior are among the items that need to be studied and reviewed conceptually and operationally regarding designs. The main problem in this article is to explain the correlation between the pattern of interactive behavior and the pattern of the physical environment of open spaces in the selected residential complexes in Kerman. The overall objective of the present study is investigating the effect of behavior characteristics on three outdoor samples of selected residential complexes in Kerman and improving the use of environment by examining the influential components in the open space of residential complexes and reaching the desired open space by identifying the effect of behavior and physical environment and capabilities of the environment. The main question which is raised in this study is that what factors are effective in creating Synomorphism in the open space of the selected residential complexes in the city of Kerman. The research method is descriptive-analytical. Data were collected through a questionnaire, and structural equation tests were used to measure the variables and research hypotheses using Amos 24 software. The results indicate that the higher ratio of residential open space in the behavioral setting creates meanings for explaining the behavioral-physical components.

**Keyword:** *Synomorphic, Behavioral Environment, Outdoor Residential Complex, kerman*

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### **1. Introduction**

The strategy of building large residential complexes, which was invented in modern architecture as a logical response to the housing needs of rapidly growing populations, has been criticized and revised since the mid-1970s due to social problems. Criticisms in this field abound and include several specific cases (Lang & Moleski, 2010; Coleman, 1985; Jencks, 1985; Jacobs, 2002; Lang, 2004; Newman, 1989; Jalili, Einifar & Talischi, 2013). On the other hand, fundamental indexes in the field of environmental psychology were raised in these residential complexes. Behavioral sciences, in addition to psychology, include knowledge such as anthropology, sociology, and even political science and economics. This is because a number of Peugeot enthusiasts prefer human studies in the environment to a more environmentally-behavioral study pattern or EBS (Motalebi, 2015). The quality of life is a complex and multidimensional concept that is influenced by components such as time and place, individual and social values, and therefore different meanings for different individuals and groups on it.

Some have interpreted it as the viability of an area, others as a measure of attractiveness, and some as public welfare, social welfare, happiness, satisfaction, and the like (Epley, D. & Menon, M, 2008). In the present study, the perspective of alignment in the behavioral base is considered, and in order to achieve the desired behavioral and high alignment behavior and to achieve permanent behavioral patterns, the influential components and the dependence of behavioral-physical place should be investigated. For this reason, most Peugeot enthusiasts refer to "environmental psychology as a subset of behavioral sciences." In fact, knowledge of environmental psychology is the discovery and redesign of one of the dimensions of the behavioral environment that has been forgotten in general psychology. But now, as a science between knowledge and multi-knowledge, both psychologists and environmental designers, especially architects, landscape designers and urban designers, are contributing to its advancement. With this new look at environmental psychology knowledge, the science examines the interactions between humans and the environment.

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## 2. Literature Review

The beginnings of ecological tendencies in psychology date back to the 1940s and were influenced by one of the most important psychologists of the time, Kurt Lewin (1902-1947), who published an article entitled "Psychological Ecology" in 1944. In this article, he emphasizes the study of environmental opportunities and constraints as the first step in understanding the behavior of individuals or groups. In the 1950s, a group of psychologists at the Midwest Research Center in Olathe, Kansas, began a study that focused on understanding what influences human behavior in everyday life. They found a two-way relationship between behavior and the physical environment, and found out that the impact of situations on a person's behavior is much greater than the effect that personal characteristics have on his or her behavior. In a similar environment, they are very similar in behavior. The most important achievement of their research in this database is the theory "behavioral setting". Roger Barker (1903-1990), an American psychologist, one of the founders of environmental psychology and ecological psychology, is best known for his theory of behavioral setting (Golrokh, 2012). We know more about the theory of behavior and ecological approach in urban architecture and design, with the name of John Lang and his writings. He has developed and expanded these concepts in the theory of Architecture and Urban Design. One of the most important concepts related to behavioral campus, in ecological psychology, is the concept of "environmental affordability" or environmental capability. The environment is influenced by the capabilities and choices of humans (Ghaedi, 2014). Allan Wicker, in defining ecological psychology, considers it the study of the interrelationships between the purposeful actions of individuals and the behavioral locations in which these actions occur (Wicker, 1979). Wicker worked with Barker from 1964 to 1967 at Midwest Station. According to Wicker (2011), traditional ecological psychology defines the behavioral setting as its structural elements and ignores other important aspects.

### 2.1 Synomorphic

Rapaport considers adaptable flexible designs and complementary designs to be more compatible with space and behavior (Subadra Abioso & Triyadi, 2017). Barker considers this concept to be a "unit of behavior" and environment or "behavioral place". Behavioral sites have social and cultural characteristics and aim at appropriate results between the behavior of individuals and the setting of the setting and synchronicity. It is defined as behavioral-environmental alignment (Synomorphic). Synomorphic is the stage at which interdependence occurs between the pattern of behavior of individuals and the setting of behavioral

context. Symmetrical or Synomorphic means that without our structural connection between territory and human behavior, it is not possible to form a stable behavioral place (Salehinia, 2012). Adaptability is the set of components of an action that creates a relationship between the system of action and its external environment. Adaptation includes functions that adapt the system to its environment, its requirements, its bottlenecks, and its limitations. Achieving goals is the second dimension of any action system (Afshari et al., 2015). In fact, the ultimate goal of design is to achieve a form. In other words, a designer, in dealing with a design issue, seeks the answer in its appropriate form. Alexander considers it in the book "The City is Not a Tree" and in its "compatibility" with the context in which it is to be built and at the same time designed for it. In other words, design work is an attempt to achieve compatibility between the form and its context. And human beings in this field are among the components associated with successful design. Synomorphy expresses the compatibility between people's behavior in the use of the building (form, function, etc.) and its suitability in behavioral camps.

### 2.2 The Concept of Morph

The morph definition in the Cambridge dictionary is as follows: "Gradually change or change someone or something from one thing to another - gradually change in shape or form." (Cambridge Dictionary), an image of a page, to gradually change to a different image, gradually and completely from one thing to another usually looks surprisingly or magical (Meriam Webster), to create a new look. Either change something else or do something like this (Longman). Based on the definitions of the present study and based on the theory of Roger Barker, the study of behavioral and Synomorphic camp is done as above and the rate of absorption of Synomorphic circuit with the power of each component of the behavioral camp, using behavioral tools, helps to identify the effects of each component.

### 2.3 Open Spaces in Residential Complexes

Residential outdoor space is a new concept that has replaced private courtyards as a result of today's collective life and complexity. Although there are many differences between the two in terms of substance and form, they are expected to have similar applications in terms of performance. However, these substantial differences have overshadowed their performance, and as a result, in many of the existing residential complexes, the passage or stopping of the car has declined (Ghazizadeh, 2011) and at the same time has caused separation between residents and the open space and physical environment. The Kurdish variable constructs the complexity of the relationship between

social and physical space (Madanipour, 2000). Claire Marcus (1998), by dividing the urban open space into seven, has researched how urban space is used to create crowded spaces. Bahreini (1996) in his book "Analysis of Urban Spaces in Relation to Users' behavioral patterns" provides appropriate design criteria with quantitative and qualitative analysis of street space and behavioral patterns of users, especially pedestrians. (Delake et al., 2017). In his 2009 book "City: Rediscovering the Center", William White cites his study of the behavior of pedestrians, and he believes that the behavior of environmentalists is important for creating the 100 percent of place final where people want to be. Paying attention to the needs of users is necessary according to this porportion (Mansouri Nia et al., 2016). Ecological psychology is contextual and sees the relationship of behavior with the environment (ARAÚJO DAVIDS, 2009). In architecture, space is categorized into three categories: open, semi-open, and closed. The term outdoor space was probably first used in England in 1833 (Monk Theoretical, 2014). Residential complexes can be considered as a number of building blocks that can include different types of housing (single family, short and high-rise apartments). In these complexes, apartment blocks are placed on a plot of land based on a pre-planned design. The blocks can be combined in different ways and the outdoor space can be significantly connected with the buildings. Other features of residential complexes include their specific boundaries and boundaries of urban contexts, which in some cases can be defined as a physical-social island in the city (Einifar & Ghazizadeh, 2010). Living in a crowded residential complex can cause irreparable damage to the social connections of its inhabitants. Researchers believe that one of the negative effects of population density is a decrease in one's social relationships (Huang, 2006). Many apartment complexes have witnessed the distance and alienation of neighbors. While they are physically close and spiritually, cooperation, collaboration and empathy are miles apart (Nasri, 1995). Therefore, outdoor space is very important in residential complexes. The layout of organizing open residential spaces (Formal typology) in theories and index projects of the twentieth century are reviewed (Muzaffar & Asadpour, 2012).

In addition to providing illumination to indoor spaces and natural ventilation, residential open spaces are also an opportunity to connect more with nature and a place for social interactions. Due to the limitations of the interior space of residential units and the traditional history of the presence of the yard in Iranian life, outdoor space is an opportunity to expand the function of the interior space and its relationship with the outdoor space (Shafaei & Madani, 2010).

### 3. Research Methodology

In this study, three case studies are examined. These samples are Saba residential complex, Ciman residential complex and Parsian residential complex which are located in Kerman.

#### 3.1 Saba Residential Complex in Kerman

This complex was constructed in 2005 in the area of Motahhari town and is considered as a subset of Mehr Housing Project in Kerman. The site has an area of about 45,600 sq. meters and a population of about 640.

#### 3.2 Ciman Residential Complex in Kerman

It was built in 2000 on a land with an area of 11,000 sq. meters for a population of about 265 people and an average density.

#### 3.3 Parsian Residential Complex in Kerman

Parsian residential complex was designed in 2004 in an area of about 19200 sq. meters and with a population of about 265 people. Appropriate level of occupancy and optimal density: Density, as one of the most important tools of urban planning, affects the form, performance and quality of residential complexes in various dimensions. For example, the density and level of occupancy of a building on the ground determines the amount of open space that can be used for green space, leisure space, and access. Based on the available research, the optimal density and control variables can represent items such as enough light, air and open spaces to use all residential units, and enough space for all services and facilities, necessity of urban neighborhoods, creating a sense of openness and providing private space for residents (Azizi & Malek Mohammadnejad, 2007). The information of the above residential complexes is summarized in the Table 4.

Designers have used techniques to help understand the relationship between variables. Multidimensional matrices make it possible to show the relationship between the elements of a problem. Cognitive morphology analysis has been used for a similar purpose. (Lang, 1987:62) Morphological analysis or general morphological analysis is a way to examine possible solutions to a complex multidimensional and non-quantitative problem.

#### 3.4 Structural Equations of Independent and Dependent Variables of the Research; The KMO Test and the Cruit Bartlett's Test:

In order to evaluate and analyze the confirmatory factor of the main hypothesis and research variables, before testing the variables in structural equation software, in order to validate the research data to measure the confirmatory factor analysis, it is necessary to measure the KMO test and Cruit Bartlett's test by SPSS software to ensured that the factor

analysis test is accurate. Based on the output of the above table, the adequacy of the Kaiser-Meyer-Alkin sample ( $KMO = 626$ ) and the Cruitt Bartlett's test ( $59324/870$ ) at a significant level ( $0.000$ ) were obtained. If the KMO value is adequate and the Cruitt Bartlett's test is significant, the correlation matrix is suitable for factor analysis (Rabbi and Sohrabi, 2016).

The data from this study were edited using the data standardization method in the analytical path of regression analysis in SPSS and the data that were in the range of 3+ to 3 were used. In this research, one data has been deleted and the rest of the data ranged from 3+ to 3. In this section, the results of the confirmatory factor analysis of each of the research variables by Amos 24 software are generally presented for the independent and dependent variables. It should be noted that in order to reduce the variables and consider them as a variable, the resulting factor load must be more than 0.3. In examining each of the models, the fundamental question is whether this model has a proper measurement. To answer this question,  $k^2$  and other criteria for model fit should be considered. In this way, it is a suitable model that has the following optimal states. The lower the Chi-square test, the better, because this test shows the difference between the data and the model. The lower the RMSEA test, the better, because this is the average value of the model error. The diagram and tables below show the fit indicators of the analytical model in the causal research model: (figure6,7, Table 6). As can be seen in the above tables, the statistical value of Chi-square in the model is 64.356 and the degree of freedom is 22, the ratio of which is 1.620, which is about the acceptable value. The p-value obtained in this model ( $0.033$ ) indicates that the model is approved in the p-index. As shown in Table 8, all the operating loads obtained in the final output of the standard model state that all the components of the research variables have a factor of more than 3 tenths of a factor, which has a significant effect on the interaction of the research variables. In fact, the more the time a factor is obtained than three-tenths, the greater the significance and impact of the components of the research variables. Comparing the average satisfaction, Table 9 shows that satisfaction in the outdoor scale of residential complexes is higher than the interior space of apartments in the neighborhood, and also the result obtained shows that the average satisfaction in Saba residential complex with the average of 4.712 and the standard deviation of 0.037 has the highest average among the complexes and the Ciman residential complex with an average of 3.688 and the standard deviation of 0.495 in the second place and Parsian residential complex with the lowest average of 3.268 and the standard deviation of 0.757 stands in the third place.

Table 1. With Emphasis on Environmental- Behavioral Influences (Siahkali, Bemian & Mahdavi Nejad, 2016)

| Theorists      | Year | Theory                                | Key Components  |
|----------------|------|---------------------------------------|---|
| Kevin Lynch    | 1960 | The image of the city                 | Path, landmark, edge, node, and district  |
| Erving Goffman | 1967 | Study of behavior in public spaces    | Attitudes toward each other and strengthening social tendencies   |
| Roger Barker   | 1968 | Behavior settings                     | Continuous activity, territory of the environment, structure of the place- behavior environment, and time sequence  |
| Irwin Altman   | 1975 | The environment and social privacy    | Personal space, territory, crowding   |
| Amos Rappaport | 1977 | Human aspects and city form           | Non-passive position of man against the pedestrian navigation environment in urban environments, culture, perception, cognition, behavioral environment and the built environment |
| J. Gibson      | 1979 | Ecological approach                   | environmental affordance  |
| Habermas       | 1980 | Instrumental and human communications | Human communication with environment  |
| Romedi Passini | 1984 | Wayfinding in architecture            | people orientation in space and paying attention to the special needs of users  |
| Jan Gehl       | 1987 | Life between buildings                | Three groups of activities in the area of behavior (essential, selective and social)  |
| John Lang      | 1987 | Creating the architectural theory     | Get people out of space, people's perceptions of the environment as a kind of mental scheme   |

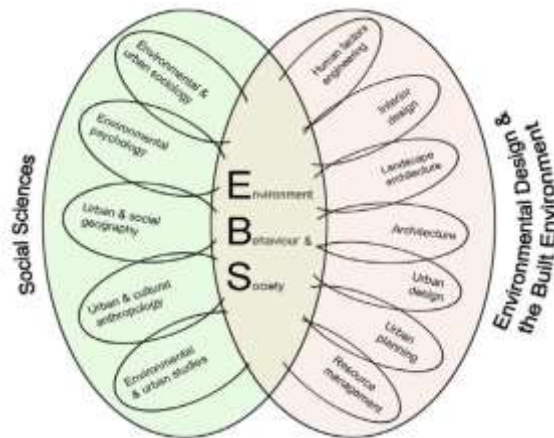


Figure 1. Environment, Behavior and Society (EBS) Research as the Confluence of Many Parts of the Social Sciences and the Built Environment (Moore & Gary, 2004)

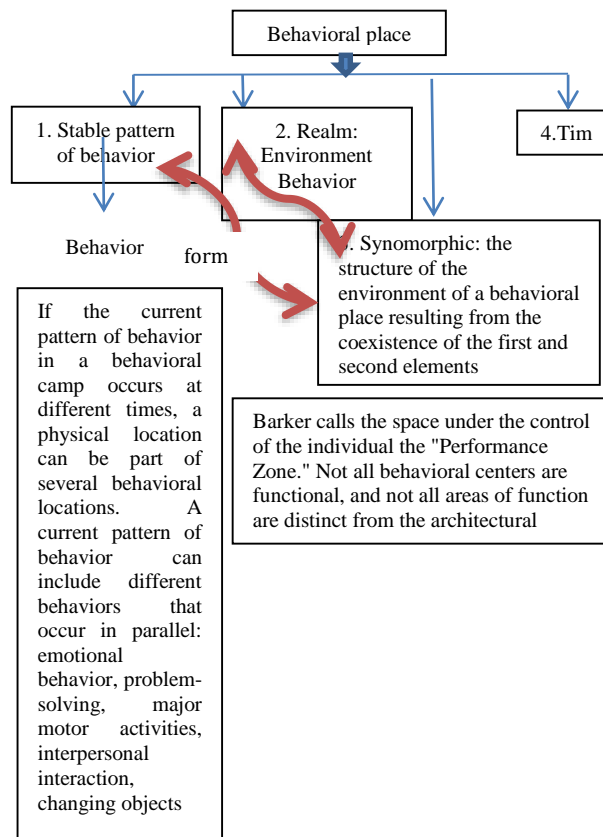


Figure 2. Behavioral Setting (Source: Authors)

Table 2. In Summarizing the Components of the Environment, the Following Criteria Can Be Proposed, (Reference: Shahcheraghi, Bandar Abad, 2016)

| Environmental Components  |                      |                        | environment |
|---|----------------------|------------------------|-------------|
| An environment without human intervention despite water, air, vegetation, land shape, etc.  | Unchanged elements   | natural environment    |             |
| Man consciously or unconsciously intervenes in this environment. An understanding similar to the geographical environment of Sanfeld and the terrestrial environment of Gibson.   | Modified elements    |                        |             |
| Everything that man has produced or designed, including artificial environment, clothing, machinery, all kinds of goods, buildings, cities, etc. Kraik calls this environment "the environment of a physical and artificial phenomenon" and Gibson refers to it as the "terrestrial environment." |                      | Artificial environment |             |
| Psychological environment is the experience of each person, such as gender, age, disability and the context of perception, cognition, meanings, symbols, attitudes and personality of individuals, which is similar to Kraik's personal concept.  | Personal environment | Human environment      |             |
| Interpersonal relationships in groupings, their organization, status, role of social class, etc., are similar to the concepts proposed by Altman and Proshansky.  | Social environment   |                        |             |
| The immaterial consequence is cultural things, such as texts, art, etc., which makes it a human environment. It is similar to the cultural and living environment of Gibson.  | Cultural environment |                        |             |

Table 3. All Kinds of Residential Outdoor Spaces (Source: Authors)

| Collective organization             | Central organization pattern | Linear organization pattern | Network organization pattern |                 | layout        |
|-------------------------------------|------------------------------|-----------------------------|------------------------------|-----------------|---------------|
|                                     |                              |                             | Irregular                    | Regular         |               |
|                                     |                              |                             |                              |                 | Graphic model |
| Smart city<br>Village city<br>..... |                              |                             |                              |                 | theory        |
|                                     | garden city                  | Linear city                 | Broadway city                | industrial city |               |



Figure 4. Ciman Residential Complex in Kerman (Source: <https://earth.google> and

Figure 3. Saba Residential Complex in Kerman (Source: <https://earth.google> and authors, 2020)



Figure 5. Parsian Residential Complex in Kerman (Source: <https://earth.google> and authors, 2020)

Table4. Information of the Above Residential Complexes, Ciman, Saba, and Parsian (Source: Authors)

|   | Features reviewed                 | Parsian Residential Complex                         | Ciman Residential Complex                            | Saba Residential Complex  |
|---|-----------------------------------|---|--|---|
| 1 | Building design and layout        | 2004  | 2000   | 2015  |
| 2 | Number of units                   | 192   | 72   | 180   |
| 3 | Population                        | 265 people  | 265 people   | 640 people  |
| 4 | Area                              | 19200   | 11000  | 45600   |
| 5 | Number of building blocks         | 4   | 9  | 13 three-bedroom blocks and 17 two-bedroom blocks                   |
| 6 | Number of blocks                  | 5 floors (parking lot, pilot and 4 floors of units) | 5 floors (underground parking and 4 floors of units) | Three floors (ground floor, first floor)                            |
| 7 | Total number of residential units |   | Three bedrooms                                       | 78 three-bedroom units - 102 two-bedroom units                      |
| 8 | Open space between blocks         | 11600   | 8320   | 37800   |
| 9 | Area of residential units         | 139 to 142 meters                                   | 157 to 160 meters                                    | Three bedrooms 154m <sup>2</sup> and two bedrooms 99 m <sup>2</sup> |

Table 5. KMO and Cruitt Bartlett's Test (Source: Authors)

| Amounts   | Index                    |
|-----------|--------------------------|
| 626.      | Kaiser-Meyer-Ecklin test |
| 59324.870 | Cruitt Bartlett's test   |
| 10011     | Degrees of freedom       |
| 000.0     | Significant level        |

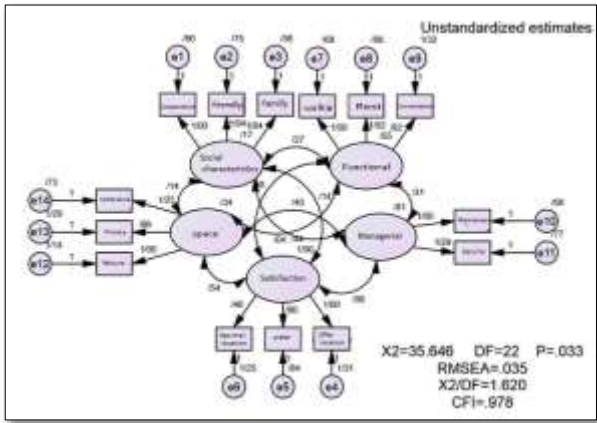


Figure 6. Model 1, Non-standard Structural Equation Model of Factor Analysis of Research Variables (Source: Authors)

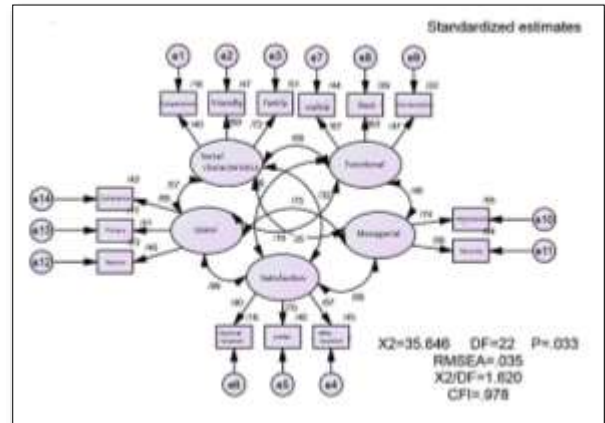


Figure 7. Model 2, Standard Model of Structural Equation of Factor Analysis of Research Variables, (Source: Authors)

Table 6. Indicators of Fit of the Original Pattern (Source: Authors)

| Desirability   | The amount of research found | Acceptable value  | Indicators |
|----------------|------------------------------|-------------------|------------|
| Model approval | 0.035                        | $rmsea > .07$     | RMSEA      |
| -              | 35.646                       | -                 | Chi-square |
| Model approval | 0.033                        | $p - value > .05$ | p-value    |
| -              | 22                           | -                 | Df         |
| Model approval | 16.20                        | $x_2 / Df < 3$    | $x_2 / Df$ |
| Model approval | .978                         | $CFI > .09$       | cfi        |

Table 7. The Factor Load of the Dimensions of the Adjusted Variables (Source: Authors)

| Factor load | Components         | Variable               |
|-------------|--------------------|------------------------|
| 0.65        | Coherence          | Spatial features       |
| 0.41        | Privacy            |                        |
| 0.48        | Naturalism         |                        |
| 0.74        | Maintenance        | Management features    |
| 0.80        | Security           |                        |
| 0.40        | Offered location   | Good satisfaction      |
| 0.70        | Place preference   |                        |
| 0.67        | Optimal location   |                        |
| 0.47        | Conversation       | Functional features    |
| 0.63        | Rest               |                        |
| 0.67        | walking            |                        |
| 0.72        | Family fit         | Social characteristics |
| 0.68        | friendly           |                        |
| 0.40        | Honest cooperation |                        |



Table 8. Comparison of the Average Satisfaction Rate in Three Residential Complexes (Source: Authors)

| Rank   | Standard deviation | Average | Name of residential complex |
|--------|--------------------|---------|-----------------------------|
| First  | 0.037              | 4.712   | Saba Complex                |
| Second | 0.495              | 3.688   | Ciman complex               |
| Third  | 0.757              | 3.268   | Parsian Complex             |

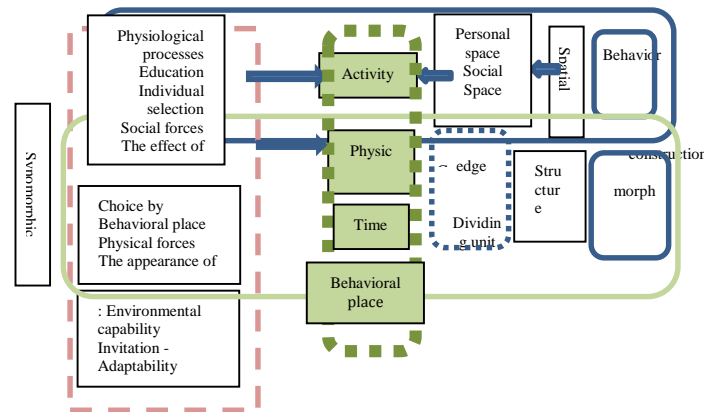


Figure 8. Theoretical Framework of the Model of Promoting the Interaction of Residents with Open Spaces in Residential Complexes (Source: Authors)

**4. Conclusion**

This study seeks to evaluate the correlation between the pattern of interactive behavior with the pattern of the physical environment and the subsequent improvement of the quality of residential complexes. Open spaces between residential buildings are the bedrock of residents' connection to nature and leisure in the immediate vicinity of the house. Therefore, it is necessary to reconsider and pay special attention to the design of the open space of residential complexes as a common and collective yard in many modern residential types. Satisfaction depends on different dimensions of human life, and a combination of different ranges of perceptions of everyday life shapes it. According to existing research, the main building blocks of a sense of satisfaction with outdoor space in residential complexes come from the design, performance, management and social dimensions. Based on this, a four-dimensional model was extracted to evaluate the interactional behavior with the residents' physical environment pattern. To test the theoretical model, three residential complexes were studied. Saba Complex in Kerman, which was located in 2005 in the area of Motahhari town and is

considered a subset of Mehr Housing Project. The site has an area of about 45,600 sq. meters and a population of about 640. The second complex, Ciman Residential Complex, was built in 2000 on a land with an area of 11,000 sq. meters for a population of about 265 people and an average density of 5 floors. And the third complex, Parsian Residential Complex, was designed in 2004 in an area of about 19200 sq. meters and with a population of about 265 people and was selected by a questionnaire. Field-based data were analyzed using structural equation modeling. The results of this study emphasize the importance of spatial features in evaluating interactive behavior with the physical environment pattern. Accordingly, managerial and social dimensions are other effective criteria. The presented results are the first step in analyzing and evaluating the open space of residential complexes. The results of this study can be considered as the starting point of the study in order to evaluate and review residential open spaces and become the basis for developing a design guide to improve the quality of residential outdoor space.

## References

- Abioso, Wanita & Triyadi, Sugeng. (2017). The Behavior Milieu Synomorphy of Communal Space in Desa Adat Tenganan Pegringsingan Bali Indonesia. *International Journal of Architecture, Arts and Applications*. 3. 11. 10.11648/j.ijaaa.20170302.11.
- Afshari, Mohsen , Purdihimi. Shahram & Saleh Sadeghpour. (2004) Bahram Adaptation of the environment with the method of human life (a theoretical framework, a case study), Residence and environment of the village.
- Alexander, Christopher.(2014) Architecture and the Mystery of Immortality
- Alexander. Christopher - Nature of Order - Translation: Reza Sirous Siri - Ali Akbaran Publications Shahid Beheshti University – 2013.
- Alexander. Christopher-2011-The City Is Not a Tree Translated by Farnaz Farshad and Shamin Golrokh Armanshahr Publications.
- Amos (1982)The meaning of the built environment:a nonverbal communication approach-translator:Farah Habib-1392
- behzadfar.mostafa. Rezayi .Ndoshen.Mohamad,Rezayi,.ahmad. Alam Memar Publications
- Carmona, Matthew. Heath, Tim. Oc, Taner& Tiesdell, Steve. (2009). Public Places. Urban Spaces. A Guide to Urban Design .Fariba Gharaei, Mahshid Shokouhi, Zahra Ahari& Esmail Salehi. Art University press.
- Einifar, Alireza (2012). Human Factors - An Environment Effective on the Design of Residential Complexes. *Journal of Fine Arts*.
- Epley, Donald R. & Menon, Mohan. (2008). A Method of Assembling Cross-Sectional Indicators into a Community Quality of Life. *Social Indicators Research* Vol. 88, No. 2 (Sep., 2008), pp. 281-296
- Gehl, Jan. Svarre, Birigitte. (2013). How to study Public Life.Island press
- Ghazizadeh. Seyed Neda-Ainifar. Alireza.(2010).Typology of residential complexes in Tehran with open space criteria Armanshahr. No. 5- Page number of the article35-45.
- Golrokh, Shamin (2012). A single behavioral site for environmental analysis. Publisher: Armanshahr.
- Huang L, et al. (2006) .The Kernel Energy Method: application to a tRNA. *Proc Natl Acad Sci U S A* 103(5):1233-7
- Jalili, Mohammad, Ainifar, Alireza, Talischi, Gholamreza. (2013). Outdoor residential complexes and environmental response: Comparative study of three residential complexes in Hamadan. *Journal of Fine Arts - Architecture and Urban Planning*, 18 (No. 4), 57-68. doi: 10.22059 / jfaup.2013.51682
- Lang.Jon.(2008). Creating Architectural Theory (The Role of Behavioral Sciences in Environmental Design) Alireza Eynifar.tehran university.
- Latifi, Amin, Sajjadzadeh, Hassan. (2014). Assessing the effect of environmental quality components on behavioral patterns in urban parks (Case study: Hamedan People's Park). *Quarterly Journal of Urban Studies*, 3 (11), 3-1
- Madanipour, Ali (2000), Urban Space Design (Attitude on Socio-Spatial Processes). Publications: Urban Processing and Planning Company affiliated to Tehran Municipality.
- Matlabi, Qassem (2006) A Humanistic Approach to the Formation of Urban Spaces - *Journal of Fine Arts* .
- Motalebi, Ghasem-Zarghami, Ismail-Saadat&Waqar, Pouria.(2015).The role of open space readability on creating social interactions in residential complexes (Case study: Saeedieh residential complex in Hamedan) -*Scientific Journal*
- Muzaffar, Farhang, Asadpour, Ali. (2013). The role of formal and social patterns in organizing open spaces of residential complexes (analogy of twentieth century urban planning experiences and Iranian examples). *Quarterly Journal of Urban Studies*, 1 (3), 3-12.
- Nasri, Seyed Reza (2019). Evaluation of components related to environmental psychology in various urban spaces.
- Pakzad, Jahanshah, (2006). "Theoretical Foundations and the Process of Urban Design". Shahidi Publications. Tehran.
- raheb. Ghibazal-Nazari.Mahya(2014). Investigating the factors affecting the work of the private semi-open space of residential units in Tehran-Armanshahr-No. 21-Page 48-39.
- Salehinia.M,Memarian.G.(2012).Sociopetaloid of architecture space; Synthesis and synomorphy of humane-physical factors- *International Journal of Architectural Engineering & Urban Planning*
- Shahcheraghi, Azadeh-Bandar-e-Abad, Alireza (2016). Enclosed in the environment (application of environmental psychology in architecture and urban planning). Public Jihad Publications.
- Siahkali, Mahsa, Mohammad Reza Bamanian, Mahdavi Nejad, Mohammad Javad (2017). Iranian Architecture and Urban Planning Magazine No. 16.
- Wicker, A. W. (2002). Ecological Psychology: Historical context, current conception