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CASE STUDY

The effect of environment and behavior synomorph based on the type of activity selected in urban space

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ABSTRACT

BACKGROUND AND OBJECTIVES: Urban space is like a living thing that affects the behavior of participants and is also influenced by their behavior, whether it affects the body or the meaning of the space. The importance of this issue has laid the foundation of environmental psychology, so that it has attracted the attention of designers and urban planners to the application of the basic components of this branch of psychology in the design of urban spaces and public open environments. The purpose of this study is to investigate the effect of environment and behavior synomorph on the type of activity of users. The case study was Enghelab Street as an urban space has a historical background and a trans-regional functional scale was located in center of Tehran is suitable for examining patterns of environmental psychology, types of activities and their behaviors, as well as suggestions from field studies conducted.

METHODS: This research is a descriptive-analytical research based on the basic-applied purpose. In data collection, quantitative-qualitative method was performed using exploratory studies and questionnaire analysis with SPSS software and analysis (version 22.0).

FINDINGS: The growing number of participants respectively, make use of this space for compulsory, social, and optional activities. According to the required activities such as roundtrip time from work, most periods are between 7 to 11 a.m. after 6 to 9 p.m. The results obtained from the implementation of the Kruskal-Wallis test on the data show that the use of sample space for doing purpose compulsory, optional, and social activities is of equal importance in the sense that designing urban space following behavior and need is equally important among the users of space who choose with different purposes of social, optional, and compulsory activities. In more detail the differences in the indicators were in the intimacy component (Sig: 0.024).

CONCLUSION: These findings may provide that it is not important in what propose person use the place, the quality of urban place should be presented in the design of all public spaces of the city.

NUMBER OF REFERENCES

41

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9

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6

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INTRODUCTION

With the spread of urbanization and urbanism in today's world, the expansion of economic and physical structures of cities, the dimensions of their psychological effects on citizens expand, urban spaces play an essential role as a place to reduce psychological pressures on citizens, increase the quality of urban life in various dimensions and expand social interactions. Urban spaces are just environments in different objects but with similar functions that incorporate the psychological consequences of urban life problems (Krampen, 2013). Streets as urban spaces are where people spend most of their daily time can be one of the strongest and most effective environments that can play a significant role in controlling individual and collective behaviors of citizens (Gifford, 2014). Designing the body of urban space as a place in which many everyday events of space take place is very important in shaping and directing the behaviors of urban society (Stavrides, 2016). Therefore, it can be concluded that the design of flexible spaces, under the hierarchy of human needs that every citizen unconsciously or consciously seeks to meet, is an integral part of the city. The purpose of this study is to investigate the effect of environment and behavior synomorph on the type of activity of users. Therefore, based on the literature review, it seems necessary to explain the criteria required to design an urban space under citizenship perspectives and enrich their needs. What criteria should be observed to design a lively and dynamic environment that can meet the different needs of society and what indicators should be paid special attention to or avoided? In previous studies in various fields of social and environmental psychology, theorists have pointed to different patterns in the design of environments appropriate to human perception and behavior, which can be a roadmap for the final goal of this study (Lewin, 1944; Barker, 1989; Rogers, 1989). Now, the main question of the research is whether the type of selected activity based on the reason for its presence affects the importance of environmental and behavior synomorph in urban space? To answer this question, the need to pay attention to environmental psychology in synomorph between the body of the environment and human behavior based on his/her needs is important. Today, many urban spaces are not designed to meet the needs of users and the environment cannot meet the needs of its audience.

In the long run, functional burnout will occur in these spaces and they will lose their function as different activity destinations. This study, with special attention to human needs and factors that shape human behavior based on these needs, can play an effective role as a guide for designing or redesigning similar spaces. Table 1 presents the history of research in the field of perception, behavior, and synomorph of environment and behavior over different periods. Looking at the two-way effects of the environment on behavior and vice versa has been discussed in line with design theories. Attention to different senses and their role in perception is not only important but the view that the senses are not limited to the five main senses and in today's researches other senses such as the sense of revelation are effective in perceiving an urban space, makes it to pay attention to the category of perception and subsequent behaviors in space in designing the space.

Theoretical Foundations
Urban space and its features

Space in its material sense alone does not present any particular feature, but as soon as a human group begins activity in a place, the symbolic meaning of space emerges. From now on, space becomes a bedrock for the occurrence of human behaviors (Habibi, 2020). The urban space is vast and includes aspects of space including artificial and natural elements. They are places where most acts and communications occur in them between citizens and create the main platform for functional and ceremonial activities of citizens (Andalib, 2010). Public areas are the most important part of cities and urban environments (Karndacharuk *et al.*, 2014). In such areas, most contact, communication, and interaction between humans occur. These areas include all parts of the urban context to which people have physical and visual access (Heidari *et al.,* 2013). Classification of urban spaces according to the totality of theories proposed in this filed, including entrance, nodes, paths, water edges, and stairs that are common to most of the features expected by users of these spaces, and their differences are more evident in the physical aspect of these spaces. Here, the path, which is a strong element and effective urban space that citizens have the most connection and the amount of use of this space in daily life, has been researched and its characteristics are classified based on the

Table 1: Selected literature in the field of perception and behavior

Theorists	Research	Emphasis
Javanmardi *et al.* (2020)	The results of research show that the components of identity and desirable visual quality have the greatest impact on attracting users to the city entrance spaces. Moreover, the visual quality of landscapes and the surrounding views are directly related to space presence and space. The influence of this component is greater than the effect of other components such as privacy and spatial layout	- Physical factors - Environmental perception - Behavior patterns
Lee *et al.* (2018)	In a study entitled "Perceptions of walkability and determinants of Walking Behavior among Urban seniors in Toronto, Canada", the authors investigated the effect of people's perception of using the sidewalk to travel, especially for the elderly, using a questioning technique. Finally, researchers have pointed to the direct relationship between objective and mental components along the way and have examined indicators such as color, materials, readability, etc. in terms of components affecting perception. The general result of the study is the effectiveness of perceptual criteria in promoting walking in the sample community	- Physical factors - Psychological dimensions of current activities
lang (2018)	Lang in the book "Creation of Architectural Theory: The Role of Behavioral Sciences in the Environmental Design": tries to express the role of behavioral sciences in architecture and aims to increase the ability of behavioral sciences to enhance the design of interiors, buildings, residential complexes, environment, and landscape. Therefore, it emphasizes the two-way effect of the physical environment and current patterns of behavior and considers behavioral settings as a container for synomorph between the two	- Behavioral science - Physical environment behavioral patterns
Roberts *et al.* (2018)	In "Identifying effective behavior change techniques inbuilt environments interventions to increase use of green space" examines long-term studies over fifteen years on the use of green and open spaces, the behaviors that take place, and the interventions needed to encourage the use of such spaces. At the end of the research, referring to the effect of open spaces on the mental health of users, the author considers the two basic strategies of "adding objects to the environment" and "physical reconstruction" as the basis for inviting the population to space and represents modifying these two factors as the beginning of population space.	-physical foundation -Perception and mental health
Motahari Rad (2016)	The study of "Components affecting perception and visual communication in the historical urban landscape" examines the situation of cities with historical landscape and development problems in the landscapes of these cities, by examining the perception process and explaining the attainment of behavior to the center of this process by maintaining the historical landscapes of cities. Finally, tries to explain the conceptual model of perception, behavior and urban landscapes that this series of effective measures are effective on the preservation of these landscapes for today and future generations.	- Perception from an urban perspective - Perception of historical contexts Behavior-based on perception
Shahcheraghi *et al.* (2016)	The book "Enclosed in the Environment" examines the human interaction with the environment as well as the learning that occurs from this attitude in humans. In line with the topics of environmental psychology, it deals with issues such as environmental behavior and behavioral environment and discusses different dimensions of perception in the environment. In the continuation of the analysis of environment and perception, it discusses the perception and sense of place, and to conclude it presents all the topics of psychological design and creation of beauty of the environment in different scales, especially the city.	-Environmental psychology - Enclosed in interior and exterior environments
Lawson (2001)	Space is an important and constructive component of the setting; the behavior takes place in the setting. Assigning a time and place to a behavioral setting is one of the most prominent views on synomorphs of the physical environment and human behavior. It also expresses the language of space, including the space setting, people, and their activities; settings, whether they are part of a particular realm or not, are important as a way to generate security. Culture plays a role in the readability of the settings; how to behave in a setting and the effect of space on the behavior of people under the title of "space language" which expresses its non-verbal nature and control over how to behave properly in space.	-Language space: interaction of Behavior on space and space on behavior Behavioral settings

general characteristics of urban spaces. Features of open space to attract people are: easy and increase access. Urban spaces should be accessible to all at different times of the day. Location: Physical access to space, psychological and visual access to space, environmental awareness, monitoring in others view, presence of shops and regular customers, presence of people at night, access control and permeability, management, and maintenance. Sensory richness: In examining the sensory richness of urban spaces is the visual proportions. The concept of proportion and proportionality is in the relationship between the dimensions of an intrinsic composition (Mohammadi *et al.,* 2016). Based on all the above explanations, the features of urban space can be categorized and differentiated based on the needs of users. These needs are categorized in different levels from personal and basic needs to social needs of culture, which include the cornerstone of the characteristics of urban space.

Perception, from nature to theories of environmental perception

The subject of perception, on the one hand, includes the discussion of the physical characteristics of the stimulus or transmitter and how a person responds to it, and on the other hand, includes the psychological characteristics, learnings, experiences, and motivations of the individual in social situations and his/her perception (Pakzad, 2018). When it comes to perception, it should be noted that humans are not affected by a single stimulus or transmitter, but they are affected by a collection of information sent by senders at different times and places that form a phenomenon in their mind. Therefore, without selecting the message from specific senders and without perceptual organization and permanent activities of the mind, perceptual is not possible (Pakzad, 2018). In art and architecture, the perception and thinking were the basics of the process of urban planning and continue to be, as architecture throughout history, has been a vehicle for expressing the innate human thoughts and desires that have tried to crystallize their intellectual and cultural themes to draw and visualize material symmetry. Therefore, with this view, the city can also be considered the crystallization of ideas, historical backgrounds, and cultural roots of society (Abbasi *et al.,* 2015, 293). In terms of perception type,

Nasar (2014) believes three types of environmental perception theories have ideas for urban design: The first is the level of adaptation theory, which indicates that people adapt to the level of dominant stimuli. The second theory is the ecological approach to perception, which considers the environment to be composed of meaningful structures and stimuli. The active observer recognizes the structures of the environment and provides a basis for his or her search. The concept of environmental capability plays an important role here. One first perceives the nature and levels of collections and objects by examining their appropriateness to one selves. The pioneer of this theory, which is a leading approach, is Gibson (2014). Gibson's view of perception, with its emphasis on movement and how to use perspective, explicitly relates perception to the direct experience of the environment. The third theory is Probabilistic functionalism that believes that human evaluation of the environment has probabilities that depend on people's perception of physical clues, which also depends on the probabilities that have always been placed next to the physical characteristics of the environment. This model which has been invented by Brunswick (1956) suggests that designers focus on outstanding features in people's perception, evaluation, and discussion (as cited in Feizi *et al.,* 2013). Following the theories proposed in the field of environmental psychology, theories of environmental perception are discussed in Table 2. Perception in all issues can be considered as a basis for behavior, which by accepting this issue, behavior in the environment can also be considered a function of environmental perception. Behaviors are actions that motivate the user to perform compulsory, optional or social behaviors in a space-based on perceptions influenced by environmental design components. Table 2 summarizes the theories put forward in the field of environmental perception.

The science of environmental psychology has different dimensions, one of which includes environmental perception. According to theories about the perception of the environment, all theorists agree without disagreement about the data that humans receive from the environment, the difference in the views of these theorists is in the type of perception or understandings made by the receiver. Brunswick (1956), for example, sees the type of data receiving as scattered and orderly

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Table 2: Environmental perception theories

	Theorists	Views
Environmental perception	Brunswick (1956) Lens pattern	Use of irregular and scattered received data of environmental stimuli and categorization and refinement perceptually in an orderly and integrated manner
	Ittelson (1960) Perception interaction	Perception is a part of the life process in which each person, from a specific theoretical point of view, imagines a world in which her needs are met.
	Lynch (1960) Space resolution	Five factors: path, node, edge, sign, and area increase the level of readability and of course ease of navigation
	Berlyne (1971) Attractive features	Environmental characteristics can be: a) Have a physical-psychological nature (such as rank, intensity); b) Have an ecological nature or c) Have a structural and social nature
	Gibson (2014) Environmental capabilities	Capability: Recognizing the capabilities of an object or environment is based on the characteristics, experiences, competencies, and needs of the observer

in different categories, which is eventually received and then perceived as a whole, while Ittelson (1960) sees perception based on an individual theoretical perspective. Contrary to popular belief, these similarities and differences in each theory not only do not cause a rift between the topics of receiving and perceiving environmental messages, but each of them completes the information about the cycle of sending, receiving, and perceiving in the view of researchers and has created a single expression of this issue. Therefore, to better understand this issue, it is necessary to examine all these dimensions together and in a single sequence.

Behavior, from nature to how it occurs in the environment

Human behavior is the result of a person's motivations and needs, the capability of the environment, a person's mental image of the outside world, resulting from his/her perception and the meaning that this image has for him/her, which occurs in public spaces, with the presence of humans in one space and one time (Askarizad *et al.,* 2020). Therefore, behavior, while having a tangible and known nature, has a very complex mechanism (Shahcheraghi *et al.,* 2019). Behaviors are formed to satisfy human needs. Human needs can be classified into different categories, one of which is a hierarchical model of needs, which Maslow has developed and used in environmental design disciplines (Pakenjad *et al.,* 2018). All human actions that are performed to meet one of his/her needs are called activity and how to perform an activity is called behavior. Human

behavior is the result of a person's motivations and needs, the capability of the environment, a person's mental image of the outside world resulting from his/her perception, and the meaning that this image has for him/her. Therefore, each activity under the influence of the above conditions can take different forms and cause various behaviors. Activities are the basis of the structure of a space. The fact that there is something to do causes people to have a reason to enter and leave space (Haji Ahmadi Hamedani *et al.,* 2015). Some behaviors are related to activities that do not take place in urban space and all these behaviors are outside the scope of this discussion. What falls into this category are behaviors resulting from activities in the urban space. Lack of proper planning for people's behavioral patterns in public spaces causes anomalies. If the factors affecting people's behavioral patterns in daily life are not properly planned, consequences will occur such as crime, fear, stress, reduced security, and consequently the loss of social stability among citizens (Askarizad *et al.,* 2020). According to Gehl (1987), people's activities in public spaces can be classified into three groups, each of which requires different characteristics in the physical environment: compulsory activities, optional activities, and social activities. It is obvious that the combination of these three types of presence in space, which are the result of the characteristics of the structure of spatial psychology, affects the understanding of the identity of the place. The environment refers to what is around and potentially communicates with the individual. However, it is not possible to receive all the available information. The

Table 3: Theories of behavior in the environment

	Theorists	Comments
Behavior in the environment	Lewin (1944) (Psychology of the field)	"Bio space": person's beliefs about the environment, which are mentally represented, affect his/her behavior more than the environment itself
	Barker (1989) Ecological Psychology	The environment creates behavioral settings and is more important than the individual in determining behavior. That is, the behavioral setting context determines the range of behaviors that may occur
	Sitte (2015)	Emphasis on creating desirable effects in the human mind street panorama design
	Rogers (1989)	A person's perception of self and her/his environment is the main and determining factor of behavior

environment is all the information that is sent from around. However, only some of them are absorbed in the selection of perception (Khatibi, 2013). In the category of activity that can be observed, behaviors in the same format can be divided into compulsory, optional, and social behaviors. It should also be noted that behaviors in different situations of a person can be normal or abnormal, which depends on the type and extent of perception of the environment and current activities in it. With all the interpretations of behaviors derived from current activities and the nature of the environment, it is necessary to focus more on theories of behavior in the environment and considers the most important of them. Lewin (1890-1947) considers behavior as a function of the living space and states that behavior is a function of the perceived environment. He believes that behavior is a function of the interaction of factors that originate from the individual on the one hand and from the environment on the other. For stating the event resulting from the interaction of individual and environmental factors, he says: "Whenever we want to predict someone's behavior, we have to use the mathematical symbols to reflect all available factors in the 'psychological field' " (Lewin, 1944). This theory is known as the Kurt Lewin psychological field theory. In parallel with this topic, Barker's "ecological theory" or "ecology" is introduced, which examines the behavioral processes that occur collectively and occur in specific behavioral settings. The field of ecological psychology emphasizes the role of physical position in creating human behavior and the impact of the physical environment on the people who benefited from it. "Ecological psychology has made fundamental changes in traditional approaches to psychological research. This approach, instead of studying the behavior of the individual in the laboratory, focuses

on ultra-individual behavior in everyday life" (Lang, 2018). According to Barker (1989); "To gain scientific knowledge about the average indicators of psychological phenomena and their diversity in the population, it is necessary to study behavior in the context of its natural environment, because with the help of laboratory research it is not possible to understand how much love, pressure, conflict, play, punishment, or encouragement is in the world" (as cited in Mortazavi, 2001). In addition to the theories presented above, theorists such as Sitte (2015), and Rogers (1989) also point to the effect of the physical environment on an individual's behavior and vice versa, that is, the effect of behavior on the physical environment through the environmental perception that occurs in a person and confirms it. Table 3 demonstrates the theories of behavior in the environment.

Theories of behavior in the environment, which are considered as branches of environmental psychology, are very diverse and wide. However, due to the criteria of the research, Barker (1989) ecological theory has been used. Barker's theory, which is also a basic theory for research, deals with behavioral settings, in which the synomorph of the environment and the behavior are inseparable and obvious parts of these settings. If behavioral settings are considered as components of urban space, then it can be said that urban space is a space that acts as a whole with the characteristics of the behavioral settings that form it.

Performing activities and behaviors based on needs
Human needs to be based on Maslow theory

According to Maslow (1996), each person has an innate tendency to achieve self-actualization, reaching the highest level of human need involves
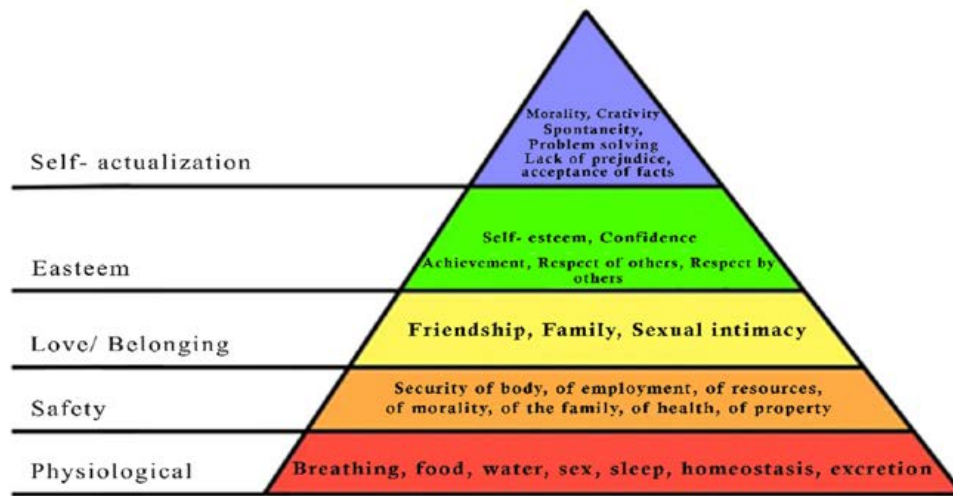
Fig. 1: Maslow needs pyramid (Maslow, 1996)

the active use of all qualities and capabilities that is the realization of all potential talents. To be self-actualizing, it is necessary to satisfy the needs that are at the lower levels of the hierarchy of needs (Schultz *et al.*, 2016). Maslow did not discuss the hierarchy of needs as a dry and inflexible set, meaning that a person can to some extent satisfy the lower needs and then allow the higher needs to be partially activated. The lower needs of the organism eliminated the shortages and the higher needs are transformations that depend on increasing the attraction and breadth of the spiritual horizon. Maslow's criteria are integrity, perfection, justice, beauty, creativity, and truth. Maslow also argues that the extent to which needs are met in human behavior is that meeting low-level needs, even on a large scale, is far less effective than meeting a small number of high-level needs (Khodapanahi, 2008). Classification of needs according to Maslow's theory is classified in 5 parts: 1- Physiological need, 2- Needs for safety and comfort, 3- Needs for love and affection, 4- Needs for self-esteem and 5- Needs for Self-actualization. This classification of needs is based on sociological theories and is made based on them. Equivalent to the needs of the Maslow pyramid (Fig. 1) in urban spaces can be presented in a similar category and with design literature. A) Physiological needs in urban space mean that an urban space must have healthy and sufficient air with heat and humidity in the range of comfort. This comfort is needed to establish the biological and

mental balance so that the users can find the space suitable for their use. B) The need for safety and comfort in the form of urban space can make sense as needs for safety and security. The physical dimension of space design that provides safety, along with the psychological dimension that provides security, has a great impact on the dynamism and attractiveness of the space population. C) The middle layer of Maslow's pyramid of needs and synonymous with the need for love and affection in urban space can be meant as the need to belong. A sense of belonging that, despite the intimacy, family presence, and self-concept of a space, induces a pleasant feeling when using the space to the audience and will result in the use of different gender and age groups of that space. D) As the approach is headed to the top of the pyramid, needs also take on a different nature. The need for self-esteem in an urban space is manifested in the need for respect and value from oneself and others, the respect that the designer gives to users by observing scale, landscaping, etc. and respect for the privacy that each person should have for other people is another manifestation of human needs in Maslow's theory in the form of urban space design. E) Finally, there is the need for self-actualization, which is an urban space is synonymous with the possibility of performing the in-time function for each of the audiences of the space, enriches this feeling. Creating a variety of activities, the ability to change the position and access to different parts of the space

due to this need, and the possibility of enriching it by designing the space, can create a turning point in its dynamism and vitality. All this transformation in the form of a space design language specifies the components needed to measure an urban space, which provides the indicators and items needed for space design to designers and planners in a suitable range.

Behavioral settings

According to Barker (1989); the environment creates behavioral settings and is more important in determining behavior than the individual. That is, the behavioral setting determines the range of behaviors that may occur. In his opinion, every behavioral setting has recognizable stimuli that include both physical and social aspects. Therefore, by changing the objects in a behavioral setting, it is possible to change the behavior in it (Imamgholi *et al.,* 2012). Humans are social beings, and behavioral settings are important dimensions to understanding this (Ma *et al.,* 2020). Lang (2018) defines behavioral settings as follows: "Behavior settings or places are considered to be a stable combination of activity and place, which includes the following components: a recurring and repetitive activity or current pattern of behavior, a specific design of the environment or physical environment, compatible relationship between the two or synomorphy, specific period". Lawson (2001) offers a different definition of behavioral settings: "space is an important and constructive component of the setting; behavior takes place in the setting; settings, whether they are part of a particular realm or not, are important as a way to generate security; Culture plays a role in the legibility of the setting; How to behave in a setting and the effect of space on people's behavior is called "space language", which expresses its non-verbal nature and control over how to behave properly in space". According to the Barker (1989) theory, a behavioral setting is a space that is related to two sets of elements: psychological elements and non-psychological elements. The psychological element refers to a particular form of behavior according to Barker, and the non-psychological element includes material objects that facilitate the occurrence of certain behaviors. It was seen that the probability of a particular behavior occurring in a particular behavioral setting is greater than the probability of

another behavior. Such a probability of a behavior is directly related to our understanding of the identity of the place. The relationship between environment and behavior has been classified into three levels: This relationship is demonstrated by examining the two categories of "the relationship between the two issues" and "reactions following the environment (Khatibi, 2013). One of the characteristics that Barker has proposed for behavioral settings and it can be called the most important feature of behavioral settings is called synomorph or coordination of environment and behavior. At every moment, the entanglement of human behavior and the body within it occurs. With this concept, it becomes clear that behavior and body are two components that are integrated into one time and place (shahcheraghi, *et al.,* 2019). Depending on the degree of dependence on other synomorphs, the synomorphs in which the component and the environment surrounding the pattern of behavior may or may not be like an independent and self-sufficient behavioral setting. In short, the synomorph relationship is the structural homogeneity between behavioral patterns and environmental components (Barker, 1989). Roger Barker cites the eight factors of physical forces, social forces, physiological processes, visual perception (the appearance of the environment), the learned reactions (learning), selection of settings by the person, selection of persons by behavior settings, and the influence of behavior on the physical container as the most important factors which form the synomorph (Shahcheraghi *et al.,* 2019). Later, Schoggen, who is theoretically very similar to Barker, examines behavioral settings in two structural and dynamic dimensions. This study is also true in the field of synomorphs and two new factors add to the characteristics of Synomorph: the beginning and end of behavioral settings and the non-transferability of current patterns of behavior. Based on all the definitions of Synomorph in behavioral settings, it can be argued that the synomorph of environment and behavior is a powerful indicator of behavioral setting design in different scales and considering its items makes it possible to control social anomalies, crimes, and offenses without physical interference. In addition to anomalies and attention to the negative aspects, its positive effects on population, dynamism, and vitality of urban space are inseparable and it is a very important tool to create places 24 hours a day.
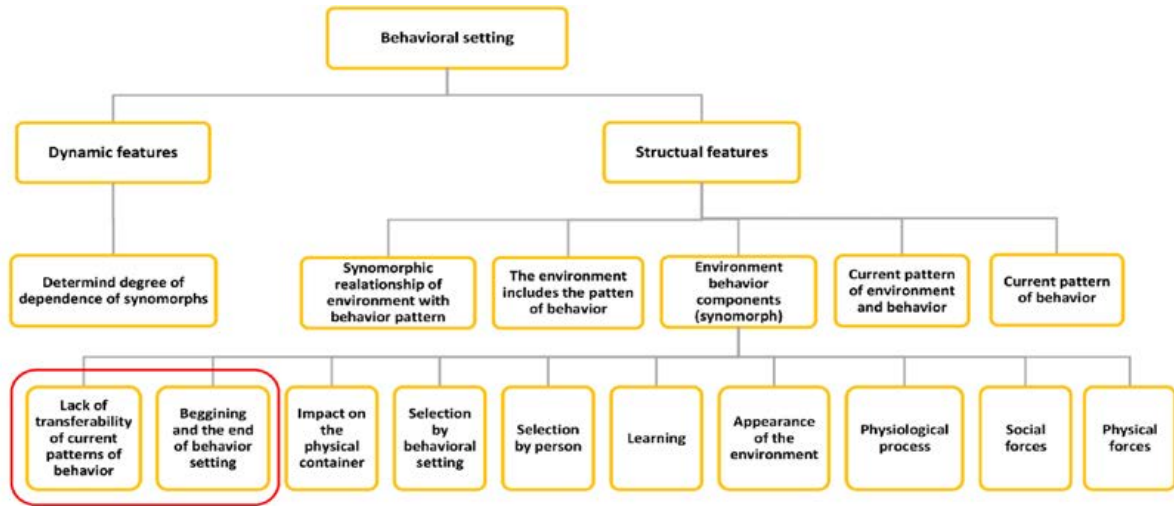
Fig. 2: Recognition of the behavioral settings of Barker theory from Schoggen's point of view (Shoggen, 1989)

According to Fig. 2, not only the components of the synomorph are influential in the occurrence of this synomorph within a behavioral setting, but they also have interrelationships, both overt and implicit (Shoggen, 1989). For example, the mental and educational contexts that are formed in the subconscious of individuals have a direct effect on a person's visual perception of the environment, or on the other hand, social and physiological forces have an undeniable effect on the individual's selection. Therefore, these indicators can be considered as continuously related to each other, which adds the complete concept of environment and behavior synomorph to the behavioral setting.

Developing a theoretical framework

The main purpose of this study is to investigate the impact of human needs on behaviors performed in an urban space. Behavioral settings are components of a whole, which is known as urban space or public space. The use of urban space is based on one or more human needs, which are categorized according to Maslow's theory. The transformation of a need for behavior goes through a cycle in which environmental and social factors are the most important components influencing this cycle so that one must rely on the factors that affect the occurrence of behavior before the behaviors are performed (Fig. 3). Users of space perceive from two components, the physical container in which they are placed and the activities that take place in it. The components of the environment, whether artificial or natural, provide a meaningful framework for space perception. It can lead a person to the desired type of behavior, force him/her to do something, or allow him/her to perform various behaviors, which in the long run can also have a direct impact on a person's behavioral framework and even learning. In the second place, it is possible to perceive the types of activities carried out in space. As mentioned, the activities that take place in space are divided into three categories: compulsory, optional, and social. At this point, the perception of activity in the current environment takes place and shapes the behavioral frameworks of individuals. For example, in a park, the behavior is usually fun and leisure, but if a classroom is set up in a park, the students' behavior in that park will be matched to what they do in the classroom, given the perception of the environment as a park. Of course, it should be noted that this perception in different people depends on several factors, including different perceptual tools (human senses), age, gender, etc. Needs are different at different ages and genders, so the behaviors to address them are different from each other, and each person's sensory tools are different according to the archives he/she has with him/her and his/her learning contexts, which can also be an effective factor in perception, therefore human needs are emphasized in this study. The current research was conducted in 2020 in Tehran.
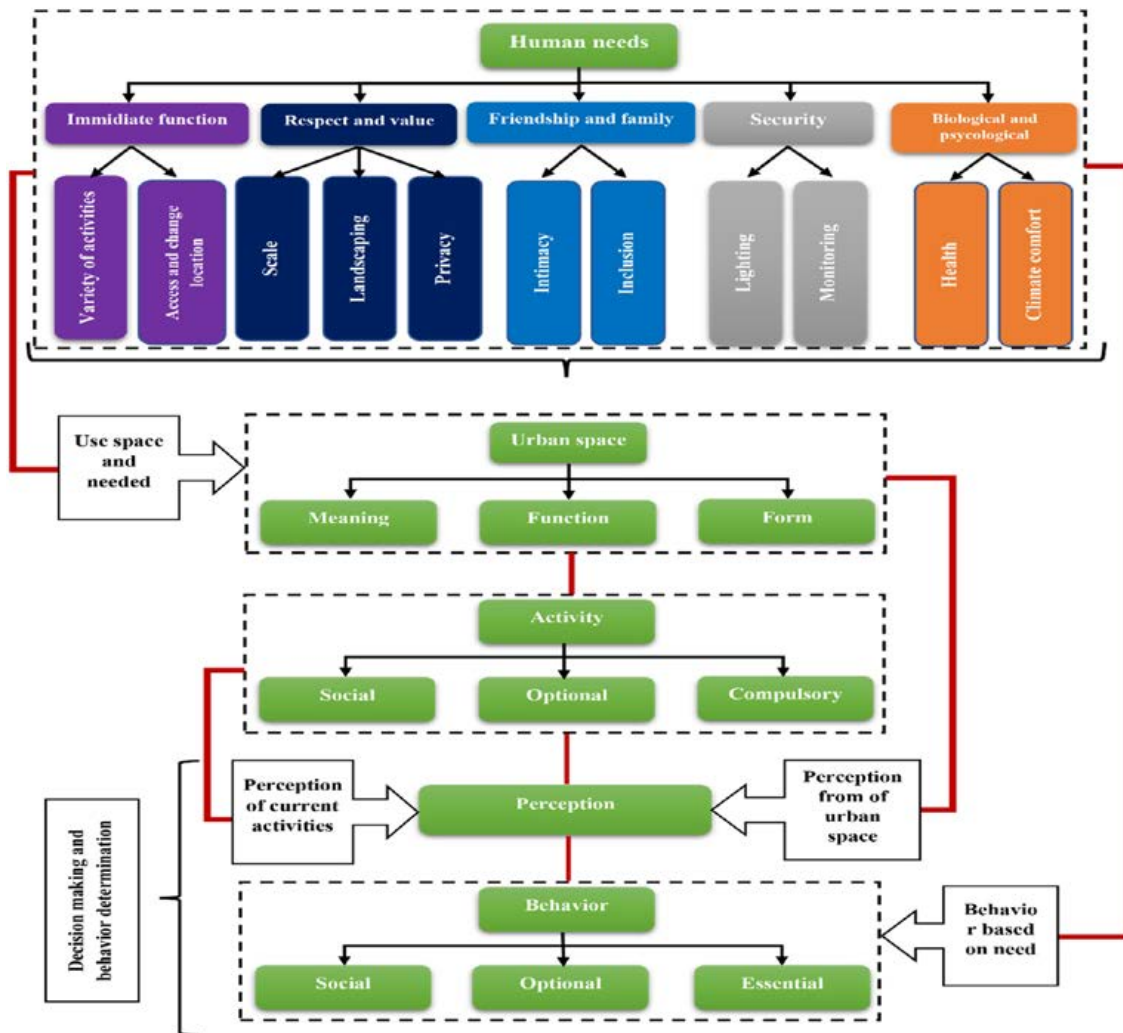
Fig. 3: Hierarchy of Need to Behavior

MATERIALS AND METHODS

Cochran sampling method

Calculating the sample size is very important in statistical inference and findings. In this research, Cochran model has been used. This model is used to estimate the sample size with statistical population information and 5% estimation error. Given the population of 39841 people in the study area, to collect information, 384 people should be interviewed based on the calculation of the Cochran model.

Questionnaire

Relying on the main purpose of this research, to examine the components of the Maslow needs pyramid, an attempt has been made to design questionnaire using items that can be converted into statistical data. The completed questionnaire collected from the target communit, assesses the need for assessment of these needs from each of the five classes of Maslow's human needs from different components and different items according to the Likert scale to assess empathy between body and behavior based on the type of activity. The statistical population was 384 who randomly been selected from the inhabitants of this area. Due to the timing of the outbreak of the COVID19 virus, those questionnaires were collected virtually from the sample

Table 4: Cronbach's alpha calculation (Reliability Statistics)

Cronbach's Alpha	N of Items
.789	14

community via an Internet link. Finally, SPSS software was used to analyze statistical data, classify, perform tests, and convert them into analyzable information. Cronbach's alpha test in SPSS was used to evaluate the reliability and validity of the questionnaire used in this study. The results obtained in this test are presented in Table 4, which with an alpha value of 0.789, was acceptable in terms of reliability and the data collected from the received responses were suitable inputs for other statistical tests and data analysis.

Likert Scale

The Likert scale is a psychometric scale that is frequently used in research questionnaires. The Likert scale is commonly used to measure views, feelings, opinions, and the like that are not visible but can affect audience behavior. This scale is a type of score classification that classifies the intensity and weakness of an index into 5 levels: very low, low, medium, high and very high and prepares this data for statistical tests. Further to these questions, the level of satisfaction with the current situation in the Likert spectrum has been measured. The very low, medium, and very high options respectively mean the least satisfaction, the relative satisfaction, and complete satisfaction with the current situation

Kolmogorov–Smirnov (K-S) statistical test

When choosing a statistical test for research, it must be decided whether to use parametric or non-parametric tests. One of the main criteria for this choice is the Kolmogorov-Smirnov test, which shows that the distribution of data is normal or not. That is, it compares the distribution of a property in a sample with the distribution assumed by the sample society. If the data have a normal distribution, it is possible to use a parametric test, otherwise a non-parametric test should be used. In SPSS software and in the result page of Kolmogorov-Smirnov test, if this test is significance (sig<0.05), which means that the data distribution is not normal and non-parametric tests must be used. Conversely, if this test is not significance (Sig>0.05), parametric tests should be used to analyze the data (IBM SPSS).

Kruskal-Wallis statistical test

The Kruskal-Wallis test is a non-parametric test used to compare three or more independent groups measured at the rank level. This test is in fact equivalent to the non-parametric independent F test in one-way analysis of variance. Kruskal-Wallis test is used when the basic assumptions of analysis of variance such as normal data distribution and equality of variance of groups are not established, for this reason, this test is sometimes called "analysis of variance ranking". This test can be applied to continuous data (distance or relative), in which case it should be noted that the data is converted into grade data and used. Hypothesis zero in this test is that there is no difference between the groups in terms of the sum of their rankings.

Case Study

Enqelab Street (Fig. 4d) is an urban space that, along with its special uses that many people visit for different purposes every day, can be suitable areas for examining the effective factors and codifying these patterns in the tradition of creating a quality urban place. Each research, according to the goals that it seeks to achieve, adopts its appropriate strategy to advance the research and achieve the desired goals. The strategy of the present study is ethnography and case study. According to the objectives of this research, it is practical in terms of purpose, in terms of nature is descriptive-analytical and the type of research is quantitative-qualitative research that seeks to investigate the relationship between research components and the whole subject. In simpler terms, it can be stated that all studies follow two types of applied and theoretical studies and seek to solve problems. The variables studied in this study are qualitative and discrete that the information needed to study them was collected by studying and reviewing library resources, using images, maps, and text, taking notes from sources, and extracting the necessary data from the collected answers of a distributed questionnaire. The study area of this research is from Vesal Shiraz Street to Hafez Street, the axis of which and one of its important edges is Valiasr crossroads (Fig. 4d). Enghelab Street is known as an important axis in mega city of Tehran (Fig. 4b) (capital of Iran) in terms of public transportation as well as functional direction. It is noteworthy that the study area is located between the two districts 6 and
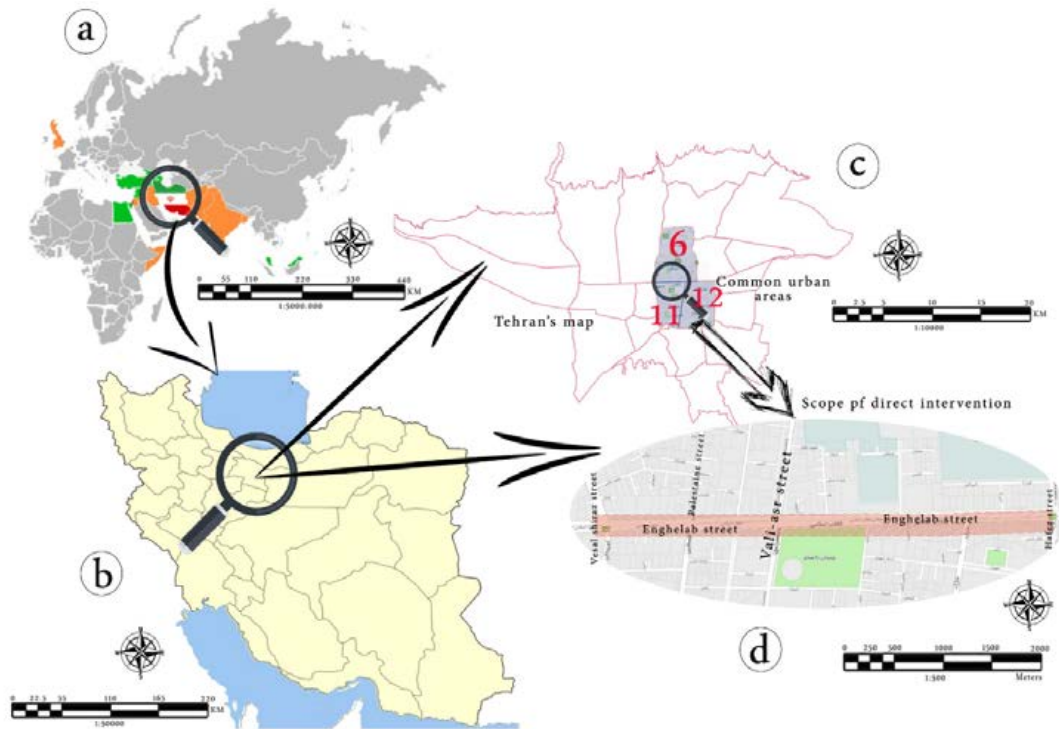
Fig. 4: Location of the scope of direct intervention in Tehran

11 (Fig. 4c), which puts the area in a special position in terms of managerial decision making.

As shown in Fig. 5, this street include a wide range of commercial, administrative and service activities, educational and cultural, green space and tourism, which expands the scope of its uses, and leads to guiding people with various activities including compulsory, optional and social activity to be in this street and the range of various behaviors in this space can be seen.

RESULTS AND DISCUSSION

Descriptive analysis

In addition to the questions raised in the Likert scale, questions that are important and significant in the use of a space, such as a gender, hours of space usage and type of activity can be directly related to synomorphs. According to the results obtained from the statistical population in question, 56% were men and 44% were women, which is a small difference indicating appropriate participation in terms of gender. One of the most important questions that

has been assessed and determined the reason for the presence of people in space and have been showed (Fig. 6), 44% of the statistical population are present to do something in space (compulsory activities), 25% for walking and recollection of memory goes to Valiasr crossroads (optional activities) and 35% of people who participate in a socio-cultural event or a celebration choose the Valiasr crossroads (social activities). Fig. 7 also shows the use of space in different time periods through which the ability of the studied space to accept the population in different times can be inferred. By separating these questions from the category of spectral questions about human needs, in Table 5, the distribution of answers to the status of each of the items considered has been developed for the needs codified in the theoretical framework of the research.

An overview of the responses received from the sample community showed (Table 5) that from the perspective of all three categories of activities, the status of indicators that meet human needs in the physical space is average. Of course, these answers
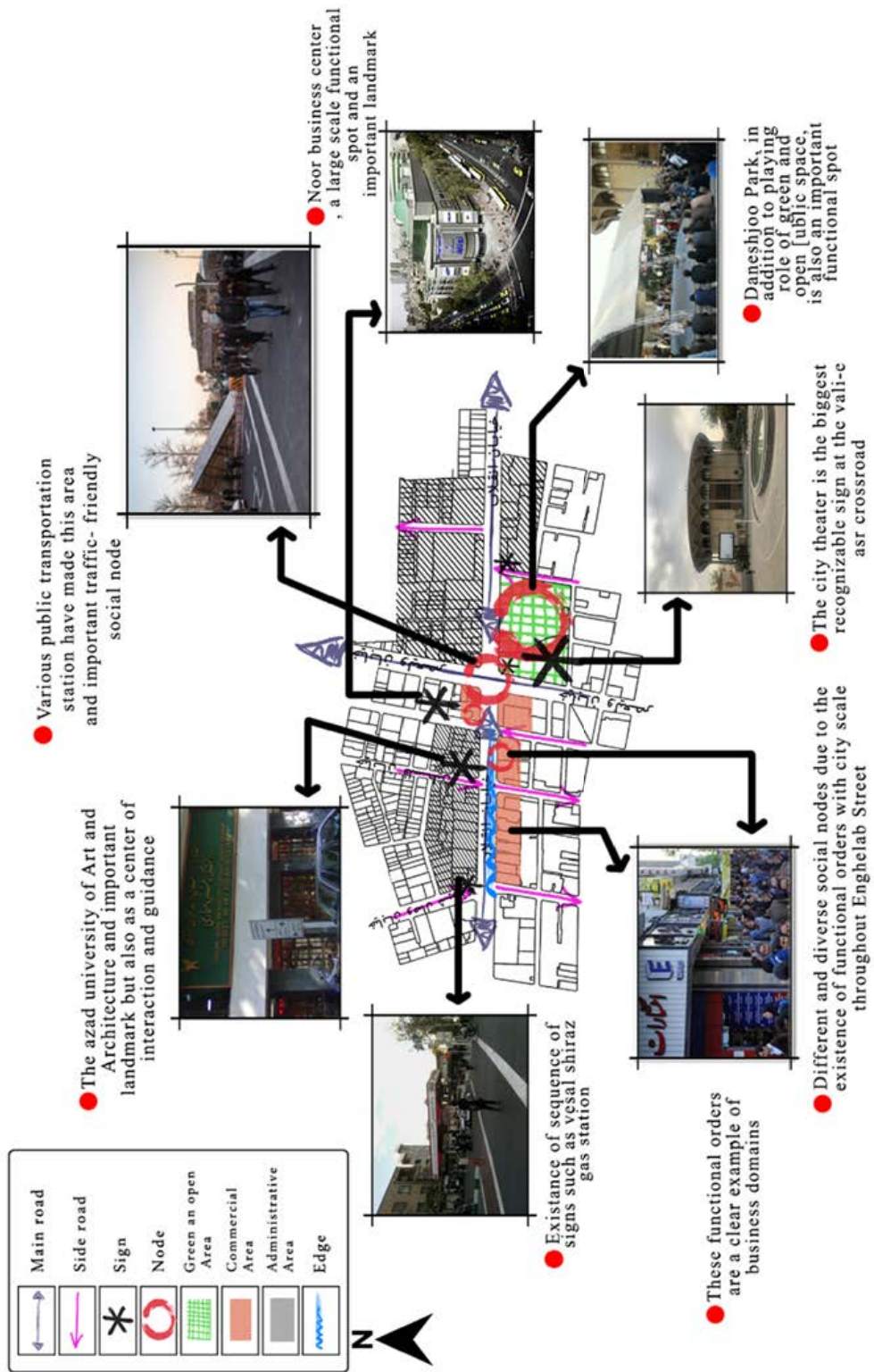
Noor business center , a large scale functional spot and an important landmark

Daneshjoo Park, in addition to playing role of green and open [ublic space, is also an important functional spot

Various public transportation station have made this area and important traffic- friendly social node

The city theater is the biggest recognizable sign at the vali-e asr crossroad

The azad university of Art and Architecture and important landmark but also as a center of interaction and guidance

Different and diverse social nodes due to the existence of functional orders with city scale throughout Enghelab Street

Existance of sequence of signs such as vesal shiraz gas station

These functional orders are a clear example of business domains

| Main road |
| Side road |
| Sign |
| Node |
| Green an open Area |
| Commercial Area |
| Administrative Area |
| Edge |

N

Fig 5: Mental image map (Legibility map) from the field of direct intervention

Table 5: Assessing the status of space delivery to human needs from the perspective of the sample community

Row	Component	Item	Very high	High	Average	Low	Very low
1	Intimacy	Ability to sit and talk with others	3%	13%	58%	13%	13%
2	Intimacy	possibility to attend with family or friends to spend leisure time	1%	5%	45%	22%	27%
3	Health	The level of cleanliness of spaces and streets, comfort and ambient noise	1%	5%	49%	35%	10%
4	Landscaping	Urban furniture (benches, trash cans, mailboxes, etc. Use in places to rest on the bench, the possibility of throwing garbage	3%	15%	55%	20%	7%
5	Landscaping	The visual beauty of the street and the surrounding area and buildings	2%	14%	51%	27%	6%
6	privacy	Possibility of solitude and cozy places to relax, have lunch, work chats, and …	1%	7%	37%	41%	14%
7	privacy	Feeling suffocated and uncomfortable when moving or working in space due to population and construction density	3%	24%	37%	26%	10%
8	scale	The proportion of street width to the height of the surrounding buildings	4%	11%	56%	23%	6%
9	lighting	Light and lighting at night	4%	27%	49%	4%	16%
10	Monitoring	The degree of monitoring over businesses established by law enforcement forces (presence, distance, etc.)	12%	17%	38%	25%	8%
11	Inclusion	Possibility of activity, movement, and walking for all classes (both in terms of gender and age	1%	15%	47%	32%	5%
12	Climate comfort	Climate comfort (such as being safe from wind, sun, rain, etc.)	1%	5%	49%	18%	3%
13	Variety of activities	Existence of various activities to meet your needs, such as various shops and the existence of other uses such as medical, religious, etc.	2%	28%	49%	18%	3%
14	Access and change location	Possibility of moving freely throughout the space (such as crossing the street, moving freely in different parts of space, etc.	2%	14%	39%	36%	9%

(average option) can be considered as a middle ground for the situation, and the options that are prioritized after that, indicate the relative prediction of the future of space in the index. It can be found that in many fields, in particular, climate comfort, access and change of location, privacy, health, and inclusion are among the components that space has not been able to meet the needs of users, and

Table 6: Comparison of item rankings in the Kruskal-Wallis test

	Visual beauty	Urban furniture (benches, trash cans, etc.)	Environmental hygiene and noise pollution	Ability to attend with friends and family	Possibility of gathering and talking
Kruskal-Wallis H	.255	.389	.027	7.426	.413
Df	2	2	2	2	2
ASYMP. Sig.	.88	.823	.987	.024	.814
	Physical and non-physical monitoring of businesses	Light and lighting	The proportion of street width to building height	Population and building density	Possibility of solitude
Kruskal-Wallis H	3.958	1.173	2.491	3.106	1.827
DF	2	2	2	2	2
ASYMP. SIG	.138	.556	.288	.212	.401
		Ability to move freely	Variety in activities	Climate comfort	Possibility of activity and walking for everyone
Kruskal-Wallis H		.787	2.756	1.876	1.617
DF		2	2	2	2
ASYMP. sig		.657	.252	.391	.446
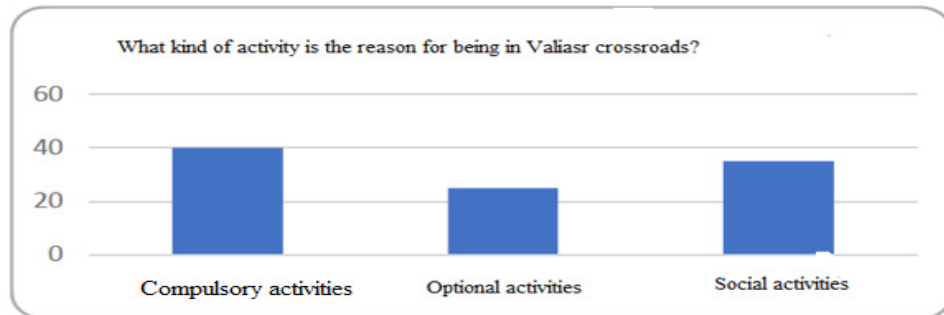
Fig. 6: Separation of sample community activities
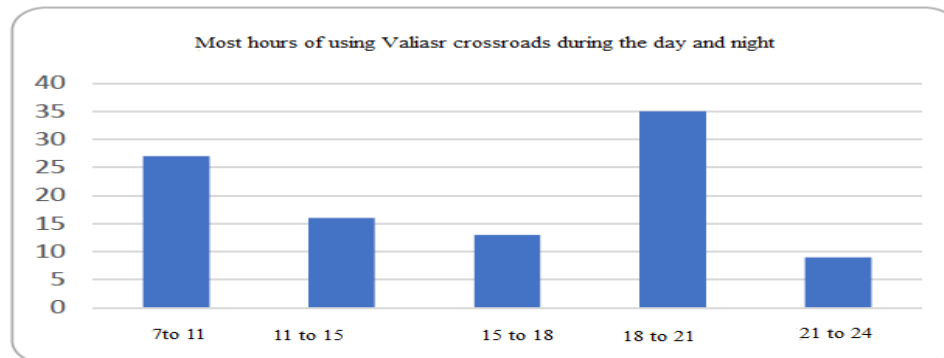
Fig. 7: Hours of community use of sample space
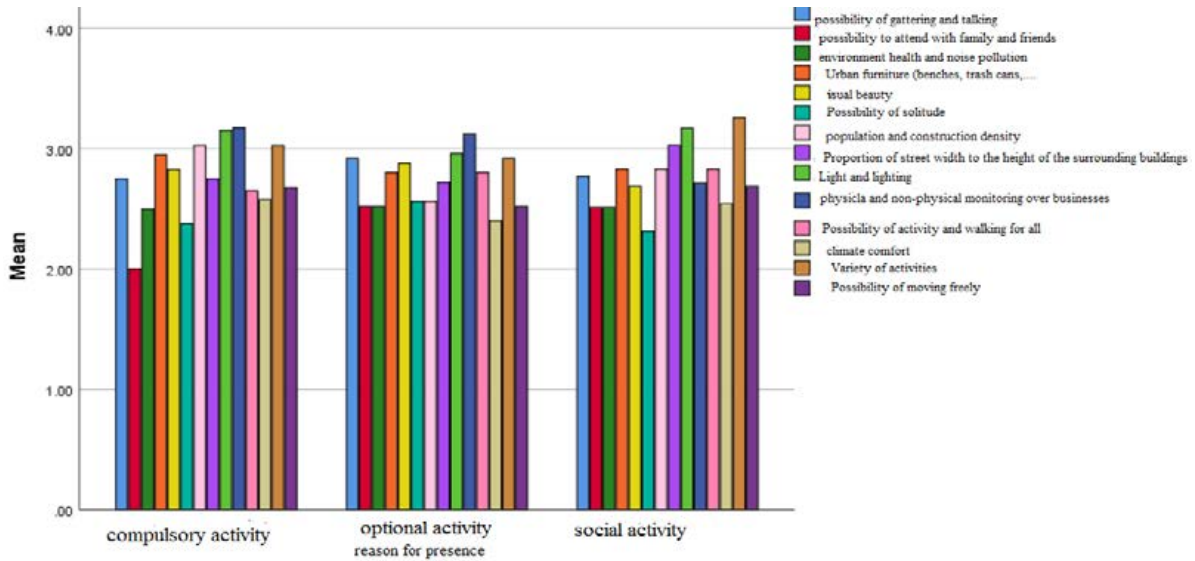
Fig. 8: Diagram of the difference between the independent groups in the Kruskal-Wallis test
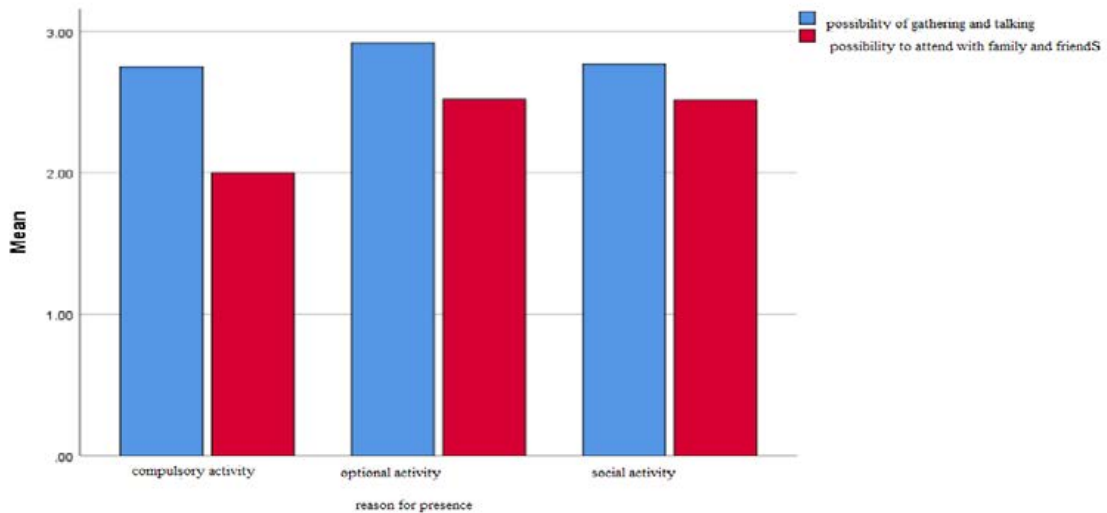

Fig. 9: The difference between items of intimacy component

in the medium and long term can be a threat to the vitality and dynamism of the space. In cases such as lighting and variety of activities, designers in space have been able to attract the relative satisfaction of citizens, which is one of the positive points of this environment, but it should be considered that all these threats can be modified by appropriate policy-making and corrective solutions for intervention and it will be possible to turn them into opportunities.

Statistical analysis of research

By confirming the initial condition of the K-S test and the significance value is less than 0.05, the non-parametric Kruskal-Wallis test was used for ranking between independent groups. This ranking is obtained for each item and separately for the activities performed in space (compulsory, optional, and social), which shows the importance and difference of these independent groups with

each item for the proposed activity categories. In addition to the specified ranking, there is a significant difference between each group that is ranked in this test which in Table 6 has been specified.

Due to the Sig condition being less than 0.05 for the significance of the statistical test, this condition is only in the item of "possibility to attend with family and friends" with a value of 024. The obtained is the null hypothesis for this index, which is the sub-component of intimacy in the classification of needs, and is rejected and shows that the ability to be with the family is not the same in terms of different activity categories. To explain this component, the phrase "possibility of gathering and talking" has also been used, and the test condition for it is .814 which is not true and the null hypothesis, like other indicators for this indicator, has been confirmed and opinions have been collected equally for all these indicators from different activity categories of the statistical community, and this has caused a significant difference between the two items. Fig. 8 shows the rank differences in general and in the form of a bar graph, which in Fig. 9 shows in more detail the differences in the indicators of the intimacy component. The test results prove the hypothesis that the importance of designing urban space under behavior and needs are of equal importance among space users who choose Valiasr crossroads with different social, optional, and compulsory activity purposes. Of course, only in the case of presence with family, this importance is different, so that the preference of those space users who have chosen Valiasr crossroads for a compulsory activity for any reason, choose this spaceless to be present with their family and friends.

Discussion

The results of this study, which are taken in terms of adaptation to human needs proposed in Maslow (1996) theory, who believes that the activities that humans do are in line with reaching to their individual to social needs, are consistent. In another dimension that pertains to perception of human about the environment, the agreement of this research can be seen with the Ittelson's (1960) point of view, who considers perception as a part of the process of each person's life, which is based on the needs of the individual and the imagination that he/she has of the world around him/her. According to Gehl (1987) the

types of the activities that take place in a space fall into three categories of compulsory, optional, and social, which in this study the indicators of human needs are analyzed above the three categories. What that complements the current research is also the Barker's (1989) thinking about occurrence of behavior in behavioral contexts, meaning that behavioral contexts are containers in which behavior takes place, and directly or indirectly affects an individual's behavior. However, it is important to note that this effect is reciprocal and, as Shoggen (1989) in complementing Barker's theory has put in emphasis, behavior has also affected on the environment in which the behavior has taken place. The result of these theories led to the formation of the structure of this research to achieve the overall goal of the research, namely the effect of coordination and environmental behavior on the activities selected by each individual**.**

CONCLUSION

The harmony between environment and behavior as a feature of behavioral settings has a substantial role in shaping the perception and behavior of users of a space. However, unfortunately in the design of today's environments, this issue has been much neglected, and the lack of attention to environmental psychology discourses is strongly felt in the design of public open spaces. The objective of this research is also to design urban spaces with an emphasis on the harmony between environment and behavior. The behaviors that are influenced by many internal and external factors, in addition to being affected by the surrounding environment, can also exert an effect on that environment. Hence, the design of the body of collective spaces can be considered as the first influential factor in shaping or guiding the behaviors exhibited in these spaces, on which other factors are somehow dependent. The results of the current study, considering the effective data received from the sample population in question, show that the study sample space (Enghelab St., between Vesal Shiraz to Hafez St.) in terms of meeting the needs of all classes of the Maslow Pyramid and compliance of these needs with the concepts of urban space design has a middle line in all indicators. This average that is in the minds of citizens can have a variety of reasons, which is not important for the design process of the source of reasons, but the effects it has on urban

space. So here, in addition to this moderation, attention can be paid to other perspectives that analyze the space in positive and negative directions. The threats and opportunities of urban space are also from the same points that show themselves and affect over time. When using different categories of activities (compulsory, optional, and social) in the discussed space, the same importance and public attention with different causes of presence that result from data processing, indicates that the sample space in the current situation can meet the current needs of users relatively, but this over time whether time will be like this or not depends on the ability of the space to adapt to new needs in different types of activities and its physical modification in different periods. These findings may indicate that in cases where a person suggests using the space does not matter, the quality of the urban space should be present in the design of all public spaces in the city. One of the most important factors in the destruction and loss of function of urban spaces is the lack of attention to human desires and needs at all levels. Just paying attention to design criteria without considering individual desires or paying too much attention to social interactions can also lead to a decline in space and bring as much division or separation of thoughts. As much as collective activities are needed, the same individual activities and solitude are necessary, like talking to others, watching, listening to music, and thinking. Therefore, in designing and redesigning urban spaces, all individual and collective needs of human beings should be examined from all aspects. The current research has two significant aspects in practical terms: A) Classification of the statistical community by activities that persuade them to use space to meet individual or collective needs and B) What are the strengths and weaknesses of human needs in the form of activities performed in a space and what behaviors will follow subsequently? Therefore, the results of this research could be laying the groundwork for future designs in different urban spaces. As mentioned in the materials and methods, the most obvious limitation of this study was the concurrence of the study with the epidemic of Covid 19 (Corona virus), which made it difficult to interview and question space users face to face and the questionnaires were collected electronically. This limited the choice of respondents and created many barriers to interviewing people with a thorough knowledge of the space.

AUTHOR CONTRIBUTIONS

S. Sharifkazemi performed the literature review, experimental design, analyzed and interpreted the data, prepared the manuscript text, and manuscript edition. M. Ghalambor Dezfuli supervised the experiments, literature review, data compiling and manuscript preparation.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely observed by the authors.

ABBREVIATIONS

K-S	Kolmogorov- Smirnov
Sig	Significance

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