

# Investigation the speed of pedestrians on experience mental time perception (case study: 17 Shahrivar street, Tehran)

Maryam Ghalambor Dezfuly <sup>a,\*</sup>, Hedieh Kasraei <sup>b</sup>

<sup>a</sup> Department of Urban Planning, Pardis Branch, Islamic Azad University, Pardis, Iran.

<sup>b</sup> Department of Urban Planning, Science and Research Branch, Islamic Azad University, Tehran, Iran.

Received: 28 October 2024 - Accepted: 13 March 2025

Doi:10.71879/soij.2025.1188716

## Abstract

The perception of mental time among pedestrians is an often-overlooked aspect of urban planning and design, yet it plays a crucial role in how individuals experience and navigate urban spaces. This study investigates the relationship between the physical-spatial structure of urban environments and pedestrians' perceptions of time during their movement. Specifically, it explores how variations in speed and stopping behavior shaped by the physical and functional attractiveness of locations affect mental time perception. Employing the continuous/stop-move (CSM) walking technique, data were collected from a sample of 20 pedestrians (10 males and 10 females) along the 17 Shahrivar pedestrian street in Tehran. The findings reveal that female participants typically moved at a speed of 0.5 m/s and engaged in stops for various reasons, including viewing local attractions and shopping, with durations varying significantly based on the type of location. Conversely, male participants exhibited similar speeds but different stopping patterns, often related to window shopping and rest breaks. This analysis highlights the influence of gender and environmental context on mental time perception, demonstrating that the experience of time is not uniform but rather shaped by the interaction between the individual and their surroundings. These results align with existing literature that underscores the importance of physical design in shaping pedestrian experiences. The implications of this study extend to urban planning practices, suggesting that a nuanced understanding of mental time perception can enhance the design of pedestrian-friendly environments. By integrating psychological insights into urban design, planners can create spaces that not only facilitate movement but also enrich the overall pedestrian experience.

**Keywords:** Pedestrian; Perception; Mental Time; 17shahrivar Street.

## 1. Introduction

Pavements play an important role in facilitating human presence in cities. However, the lack of attention to human needs and the factors which are affecting the perception of pedestrian has caused a significant decrease in their use compared to population growth. Various factors play a role in people's perception of time when navigating urban environments, and these factors can massively affect their experience. Humans rely on their five senses to perceive the urban environment, and eyesight is especially important in creating their perception, on the other hand, other parameters such as time have a pivotal role in shaping the perception of people in movement. Humans, like other creatures, have unique physiological characteristics that correspond to the physical capabilities and characteristics of the spaces in which they live. By realizing these human characteristics and applying the principles of planning and urban design, it is possible to manipulate the psychological perception of time for pedestrians in urban environments such as sidewalks and show their experience of passing through spaces longer or shorter than real time. The inclusion of the subjective perception of time as a criterion for the design of physical structures indicates a new approach in urban design. This approach empowers designers to manipulate the perceived length of pedestrian paths,

thereby influencing the subjective experience of time. While the urban design literature extensively examines various aspects of time, the specific issue of using pedestrians' subjective perception of time has received relatively little attention. Consequently, there is a need to explore practical ways to integrate the concept of subjective time perception into urban design practices. The purpose of this study is to investigate how the physical dimensions and spatial structure of the built environment affect pedestrians' perception of time while moving in urban spaces. 17 Shahrivar pedestrian street suffers from the lack of presence in the urban space, which is primarily due to inappropriate design and lack of attention to pedestrian circulation. Unfortunately, the presence and behavior of people in the urban environment has been neglected in the design of this street. The design should be covered the needs of all users.

## 2. Research Background

Time perception, particularly how individuals experience the passage of time during physical movement, has been a topic of interest in cognitive and behavioral studies. Anderson et al., (2017) investigated the influence of walking speed on attention and decision-making, finding that individuals walking at a faster pace tend to perceive time as moving more quickly. Similarly, Brown and Johnson (2019) explored the impact of walking pace on temporal awareness, though their focus on natural

\* Corresponding Author Email: [Mary.Ghalambor@iau.ac.ir](mailto:Mary.Ghalambor@iau.ac.ir)

environments may have introduced factors such as the calming effect of nature, which could influence time perception differently than in urban settings. Studies like Garcia et al., (2020) extended this work by examining time perception during treadmill walking, providing valuable insights in controlled settings but lacking real-world application. From a neurocognitive perspective, Lee and Thompson (2021) explored how the brain encodes time during movement, using simulated environments to demonstrate that increased speed alters mental time perception. However, these studies have not fully addressed how pedestrian speed in everyday urban environments, where external factors like traffic and social interactions come into play, impacts subjective time perception. The study by **Jiang and Liu (2020)** examines the impact of urban subdivisions on pedestrian movement. The findings reveal that the design and layout of urban environments significantly influence pedestrians' movement patterns and walking speeds. Specifically, well-designed urban spaces enhance the walking experience and perception of time for pedestrians. To fill this gap, the present study investigates the influence of walking speed on mental time perception in real-world urban settings, offering a more comprehensive view of how speed affects temporal experience.

### *2.1. Pedestrian*

At the end of 1960, negative impacts of using cars appeared in Europe and then in the United State, and it leads to a vision created in the development of pedestrian paths in urban space (Mofidi & Kashani Jou, 2010:121). The importance of pedestrian space in contrast with the consequences of speed and mechanization in the urban space caused absorbing the attention of public opinions for the modification and installation of safe and controllable sidewalks for pedestrians (Thomas, 2010:63). Sidewalks are enclosed streets that are off-limits to vehicles, although emergency vehicles are allowed access (Pakzad 2006:282). These streets are especial and due to having some specific function, all hours of the day or night, or part of them, are completely closed to the passage of vehicles and are completely reserved for pedestrians (Kashanijo, 2010:44). Pedestrian is a place where people of all ages can experience a safe, comfortable, and attractive walk (Abbaszadeh & Tamri, 2011: 2). It is said that pedestrian is one of the most important urban areas and is known as memorable and identity-giving elements, nowadays (Kashanijo, 2006: 46). In these streets, pedestrians have freedom of action to stop, pause, change direction and contact others directly. According to elders, who believed that the freedom of movement of pedestrians in the city and urban space is a good feature of the civilization of that city, it can be said that the existence of sidewalks the city, it is the manifestation of civilization and civility and the identity of every city (Pakzad, 2006:282). From the past until now, sidewalks have been a wide range of different function such as physical, social and cultural. Many interactions and social connections take place in these places. In the past few decades, the sidewalk has been one of the important concepts of sustainable urban development and its space is beneficial for the health of the environment and the economy (Knight T et al., 2010). Tibald believes that sidewalks are more than just a collection of shops. These places provide cultural, recreational, leisure, sightseeing, civil life and exchange of views, ideas and opinions of society (Tibald, 2004). Therefore, sidewalks are a part of urban spaces because of special reasons and certain potentials; they are completely closed to using vehicular for part of the day and night and dedicated to pedestrians' movement. Experts and specialists in this field believe that the social aspect of the creation and development of sidewalks is very important, as it is possible to establish and strengthen the basic philosophy

of the existence of these pedestrian-oriented urban spaces, not just the physical and communication functions economic uses and issues, but also the expansion of social-cultural communication and interactions and the creation of a human scale in the public arena.

### *2.2. Time perception*

How to perceive the environment is one of the important concepts in human-environment interaction studies. Humans' perception of the environment is the cause of behavior in that environment, when the person recognizes the cause of a behavior in the environment, conscious understanding takes place. As a result, the design of that environment in such a way as to facilitate conscious functioning must depend on the knowledge of the processes that determine how an event is related to the cause of its cause. The key to understanding this process may be understanding the relationship between environmental factors and capabilities. Merleau-Ponty, in examining the epistemological discussion of the senses as a part of the process, perception and inflection, pays attention to the fact that perception always provides a whole vague gestalt of the object of experience, and emphasizes the interconnectedness of the senses. According to him, the senses are concrete and indistinguishable at the level of perception of a whole, or they cannot be analyzed apart from the position of the document, also the senses have a close and inseparable relationship and translate each other (Ghahremani et al., 2014:201). In the perception of stimulus objects or events outside the observer, means that, the observer on one side and the subject is observed on the other side, and the characteristics of the stimulus and the observer can be examined separately or in mutual relation. Yet in the perception of the environment, the perceiver is considered a part of the observed environment and finds an effective role in defining its limits and other characteristics with his behavior and movement in the space. In other words, the observer's behavior and goals play a fundamental role in defining the boundaries of the environment and spaces. The urban space is felt and perceived through various senses, and the more sensory organs are stimulated in the perception of the space, the more effective the space will be understood completed, and the possibility of the space being attractive, inspiring and memorable will increase, according to Bentley (1945), the quality of sensory richness increases the variety of sensory experiences that bring pleasure to users. Sensory richness is not just a purely visual matter, but a wide and deep sensory experience caused by other senses such as movement, smell, hearing, therefore should be provided the options of choosing various sensory to satisfy sensory richness in the design. Thus, it is said that the sensory landscape and the degree of application of different human senses is one of the qualitative qualities of measuring space (Lotfi and zamani, 2014). The study by **Han et al. (2025)** explores the impact of urban environments and multisensory perception on pedestrian behavior and temporal experience in public spaces. The findings indicate that sensory factors such as sound, light, and scent in urban spaces can significantly influence pedestrians' behavior and their perception of time. The study suggests that urban design that incorporates these sensory elements can enhance pedestrians' overall temporal experience. Khajeh hasani et al.,(2022) examine how multisensory landscapes (visual, auditory, olfactory, and tactile) influence pedestrians' perception in urban spaces. It presents a conceptual model showing how these sensory interactions create a cohesive and enriching experience. The study highlights that well-designed multisensory environments in traditional markets enhance pedestrian behavior and temporal experience. The five

senses (taste, smell, vision, hearing, and touch) which were classified for the first time by Aristotle, along with the sense of time, are the basis of the sensory landscapes considered in this article. There is a two-way relationship between the

characteristics of the environment and perception, cognition, evaluation and human behavior was expressed in the form of the following figure. (Figure 1)

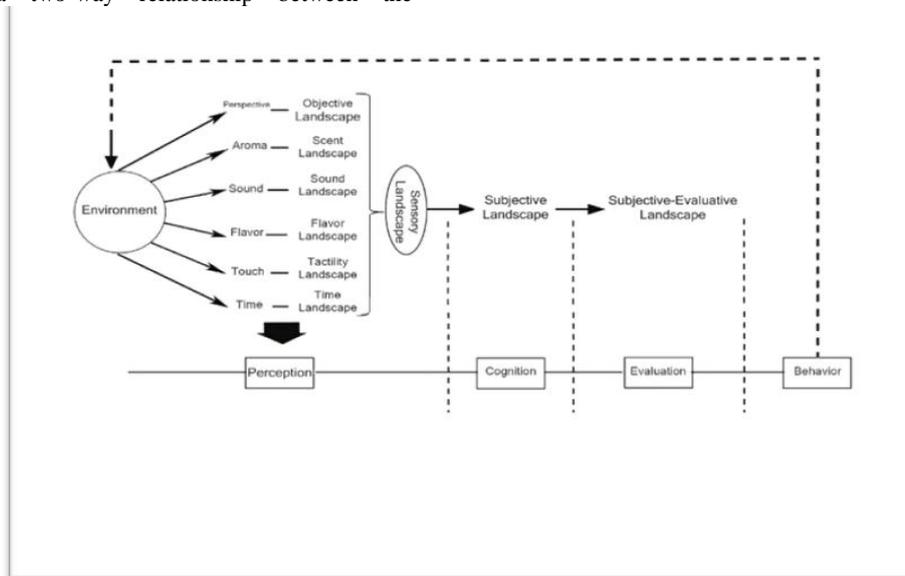


Fig. 1. Human-environment interaction process  
 (Source: Lotfi and Zamani, 2014)

In the first stage, environment exposes geometry and tangible features such as visual, audio, smell, etc. to the five human senses. The product of the interaction at this stage is a phenomenon referred to as "Objective Perception". In the second stage, the environment is recognized by the individual. At this stage, the person's mind creates an image of the environment based on environmental data, mental schemas, previous experiences and memories and attaches a certain meaning to the environment. The product of the interaction between the environment and a person's mind is a phenomenon called "Cognition view". In the third stage, a person's mind reacts positively or negatively to the environment based on the knowledge it acquires from the environment and based on impression and evaluative processes. The products of the interaction between the evaluative mental environment of the individual at this stage is a phenomenon that Jack Nesser calls with the term "mental-evaluative landscape". At this stage, if it is possible to find semantic similarities between the evaluated subject and the mental concepts of the observer. The fourth stage is perception, and finally, in the fifth stage of the interaction between human and the environment, a person acts on a certain behavior based on his evaluative mental contents, which shows the probability of possible events in the place (Abedi, 2008).

**• Quantitative human changes over time**

When discussing human changes over time, the first thing is changing ages. Over time by increasing age, human gains various experiences and his abilities increase. Generally, according to John Lang: Human competencies are formed to face the environment. Some of these competencies are biological and some are social and cultural. These skills are different in people. These differences are how to perceive the environment, it means they influence people's perception of the environment and how to use it. The environment of people's growth shapes these competencies, because our knowledge and what we have learned and pay attention to is influenced by the capabilities of the environment. It is possible that people understand the

capabilities of the environment but are not able to use it due to lack of competence, these obstacles can be cultural pressures or lack of financial and time resources. The lower the competence of a person, the more limited he is in terms of using behavioral opportunities and the more pressure is put on him. One of the factors that are effective in changing competencies is the change in human cognitive capacity. Perceptual capacity is the ability that an observer has to perceive the environment in a special space. Based on this, human perception readiness increases with the increase of his perceptual capacity (with increasing age) and he becomes more sensitive to his environment and environmental experiences. In fact, as people age, their competencies also increase and the use of the environment becomes wider (Lang, 2003). While human capabilities are reduced when ageing or suffering from accidents or diseases, and as a result, environmental restrictions increase. Therefore, there is a direct correlation between different periods of a person's life, his physiological capabilities and activity systems. On the other hand, the indicator of each stage of an individual's life is a specific activity, such as growing up, becoming independent, raising a child, etc. Different patterns of urban areas constructed, such as suburban, playgrounds, city centers, commercial complexes, provide different experiences and physiological capabilities for different periods of human life. Youth and elderly people use the spaces of the residential neighborhood considerably. Some environments provide well-behaved children while other environments are not. Children are in the period of psychological and spiritual transformation and can turn any situation of the environment into an opportunity to play. Young people and teenagers turn away from boring environments and look for opportunities to explore and do individual work, and if these opportunities are not provided to them, they turn to creative work and anti-social behaviors. The elderly have their own needs. In the old age, due to the limitation of abilities (physiological ability), the environment and its facilities, which include the type and amount of public transportation, the obstacles in the environment, creating

opportunities for leisure time and meeting the needs of daily life, it is very effective (Lang, 2003)

Generally, lifetime of human can be divided into three periods: Childhood, youth and adolescence, old age, we made this division because the characteristics and characteristics of each category of the ages are significantly different from each other.

**• Changing mental image of the environment in human over time**

According to Lynch, along with the necessity of having a clear mental image of the place, it is also necessary to have a clear mental image of time. That is, a phenomenon cannot be separated from its time and place, and expected to form in the mind completely (Lynch, 2008). Regarding the change of mental image over time, Appleyard says that mental image is not static and evolves. He considers two categories of evolution for it:

1) Androgenetic growth; which is caused by the psychological development of the person. A person's mentality is related to his mental map and mental image, and as a result, with the psychological growth of a person, his mental image and mentality also grow.

2) Micro genetic growth: This growth is caused by the change of location. When a person enters a new place, he needs to change his mental image and adapt it to the new environment. Researchers have shown that this work requires time, and as a result, it can be said that the mental image of new and old residents is different from each other. As a result, we can see that the points with which a person has the first and most contacts have a significant impact on the formation of his mental image and become meaningful to him faster.

In this way, expectation is the linking factor of past, present and future, here man can surpass time because the mind is not bound by time like the information sent from the environment. As a result, it can be said that a person's mental image of the environment is the result of two main actions. On the one hand, memories, experiences, wishes and expectations, which all form a perceptual set, establish the link between the person and the environment, and on the other hand, the three-dimensional information sent from the perspective that draws the image (Pakzad, 2003).

**. Perception of movement in urban space**

Perception of motion deal with highly complex interactions of several different senses and organs which include vision, muscle receptors, eye movement control and movement. For example, we rarely perceive the world around us when we are not moving. In daily life, walking in the urban environment, getting around the city, driving car, taking train, talking to others, we move Table 1

The relation between the observer and the object in the subject of motion

The relation between the observer and the object	Immovable observer looks at immovable object
	Immovable observer looks at movable object in immovable background
	Movable observer looks at immovable object
	Movable observer looks at movable object

**3. Theoretical Framework**

Based on the purpose, research can be divided into two categories: fundamental and functional, and based on the nature of the data, it is divided into three categories: qualitative, quantitative, and mixed. In terms of the macro-classification of the method based on the objective, this research is classified as exploratory-qualitative research. In fact, as the definition of this type of research also states, exploratory research, as its name

head and body. Therefore, according to this problem, we find that if we consider movement as only the passage of objects in front of the retina, this factor is considered a very small factor in the study of different interactions of movement .

**. Different reasons for moving the image of the object on the retina and perception of motion**

There are five different reasons why the image of an external object may move on a person's retina: (Eshelman-Haynes, 2009, 11)

- 1- The object has moved;
- 2- The person has moved in his position;
- 3- The person has changed his field of vision by moving and rotating his body (except for the head);
- 4- The person has moved his head in relation to other parts of his body;
- 5- The person has moved his eyes towards his head.

Obviously, two or more of the above cases can happen at the same time, and even by accident or by design, they can cancel each other's effect and thus no retinal movement is created.

Therefore motion leads to:

- 1) It can help to distinct the object from the background.
- 2) Movement provides information to interact with the environment. When we walk on the sidewalk or drive down the street, movement causes things to flow and pass us by. This flow provides information that helps us stay on track and avoid crashing into objects (Goldstein, 2006, 265).
- 3) Movement can act as a sign for grouping objects in an environment which is referred to as integration.
- 4) The motion of an object can affect the perception of the movement of other objects. Things that move with each other, It seems to be related to each other and things that are near moving objects. They can perceive as movable objects. (Eshelman-Haynes, 2009, 13)
- 5) Movement can provide information regarding the structure of objects located in our surrounding environment. For example, spots that move in different patterns can create the perception of a three-dimensional object.
- 6) Movement in urban space can provide the information regarding depth perception for observer. Urban design can deliberately apply changes in the perception of the depth of space by controlling the movement of the observer in the space by taking into account the speed, direction of movement and his perspectives.

suggests, seeks to discover things that occur and the question is about them. What is very important in the perception of space and should be analyzed and investigated includes: the observer. Subject of observation.

The perception of time for humans occurs in two ways. One through rhythmic repetition such as breathing, sleeping and waking up, hunger, change of seasons, etc. or through progressive and irreversible changes such as ageing, wear and tear, growth, destruction, etc. Humans are continuously dealing

with the subject of time and they involved and always pays attention to its passage and measures it. Considering Lynch's view there is a difference between mental time and real time for humans. Real time is the time that is measured by the clock, and mental time is the time that seems to have passed in the human mind. This time does not necessarily correspond to the real time and can pass faster or slower. For example, being in an environment where many events are going on attracts the person so much that the person probably does not notice the flow of time. On the contrary, in an environment where there are no touristic or recreational attractions, a person spends his time of the day and year with difficulty and slowly only by having a territory or limited facilities at his disposal. (Lynch, 1972). Based on the analytical diagram and analysis of the behavior of the observer in the environment, the observer is placed in the environment and perceives the environment with the five senses. The perception of time is based on the real time and the mental time of the observer, and these two times may not coincide with each other. Also, each observer takes into account the repetition of the times he has been in that environment and the age of the person, leading to a mental pattern in the person and, behavior occurs after evaluation of the person from the environment.

**4. Research Methodology**

In this research, in order to investigate the effect of factors on the time perception of the sense of sight, the method of continuous stop/motion walking (CSM) has been used. Collecting sensory data is more accurate in this method. The role of movement and the effect of movement speed on the sensory perception of the landscape is evident in this method. The researcher walks twice alone on a predetermined path. The walking route is pre-determined. The researcher has tried to give importance only to sensory experiences and not to refer to past knowledge and memories and not to involve mental presuppositions.

-The first time is continuous movement on the path without pause, and after walking, he notes the sensory perceptions.

-The second time is by stopping at predetermined places on the route (specified time and place intervals) and recording sensory perceptions while walking.

Steps: In the second walk, the researcher uses writing, drawing and photos. In the first time, most of the sensory perceptions happened, in the second walk, more experience and meditation took place, and the person's background is involved.

By comparing two researches with this method, the results are obtained: the identity of the observer is not an effective factor and the individual's movement makes the difference. Using the interview method as before.

According to the findings of the theoretical foundations, among the factors affecting the perception of the movement of the mouth are:

- 1) movement; 2) effective range of the eye (distance and length of time seen); 3) speed; 4) rhythm and tempo; 5) Consecutive visions. (Table 1). Also, on the other hand, people's age, gender, purpose of tourism, previous familiarity with the space is also effective on perception.

20 people were selected as the statistical population, who have never come to 17 Shahrivar street, and had no idea about this street. The age range of these people is between 20 and 40 years, with the purpose of tourism, 10 male and 10 female researchers have performed this test by using the technique (CSM), walking continuously/stop-motion.

**5. Case Study**

In this research, the studied area is Hefdeh Shahrivar pedestrian street, this pedestrian street is located in the 13th district of Tehran and the border between the 13th and 12th districts of Tehran (Figure 3). The pedestrian plan of 17th Shahrivar of Tehran was prepared in 2013 under the management of Tehran Municipality Beautification Organization by consulting engineers "Bavand" and "Arcolog". This plan has a vision of a cultural and ritual pedestrian walkway, and according to the project managers, it has a long history of study, compliance with existing documents and coordination with the demands of the citizens of Tehran (Khairuddin et al., 2020). (Figure 4)

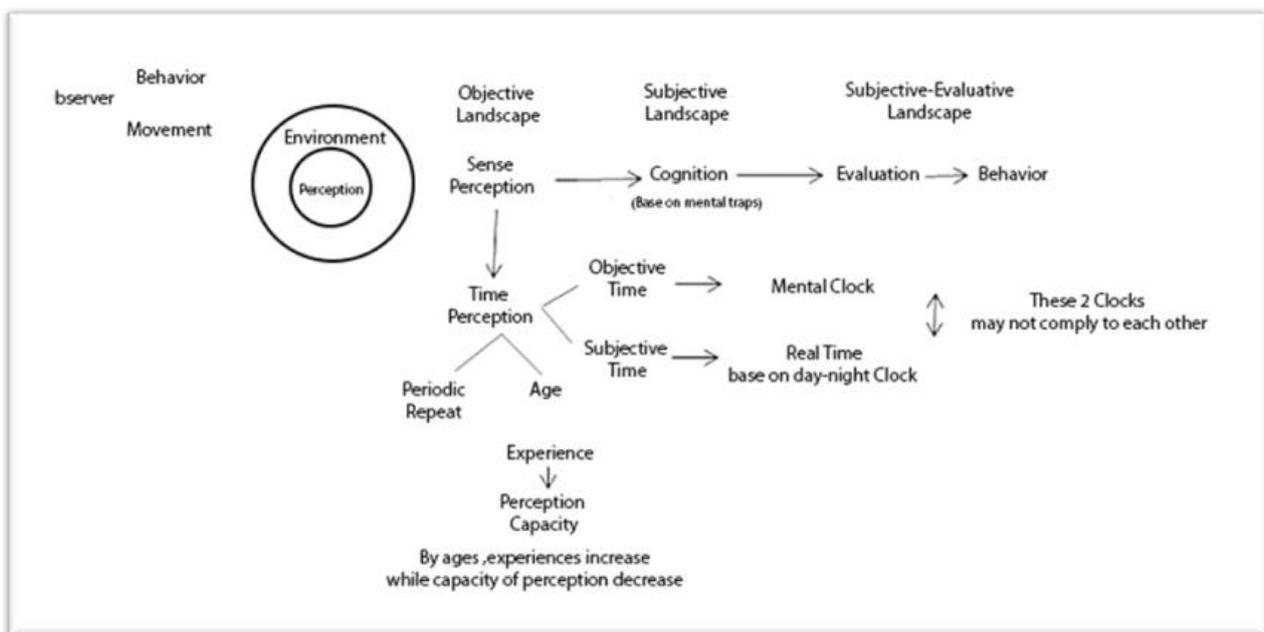


Fig. 2. Analytical model diagram

Table1  
 Analytical model

Sub set	Factors Affecting Perception
1- The object has moved 2- The person has moved in his position. 3- The person has changed his field of vision by moving and rotating his body (except the head). 4- The person has moved his head in relation to other parts of his body. 5- The person has moved his eyes towards his head.	Movement
The most effective.....up to 100 meters It is possible to create a reaction... up to 1500 meters away	Scope of Eye
The higher speed, the less the possibility of vision and perception; The lower speed, the greater the perception of space	Speed
Narrowing or widening the spaces; Lowering or raising space; Apply changes in color with light and...	Rhythm & Beat
Diagonal movements; Scenery emerging;	Sequential Views

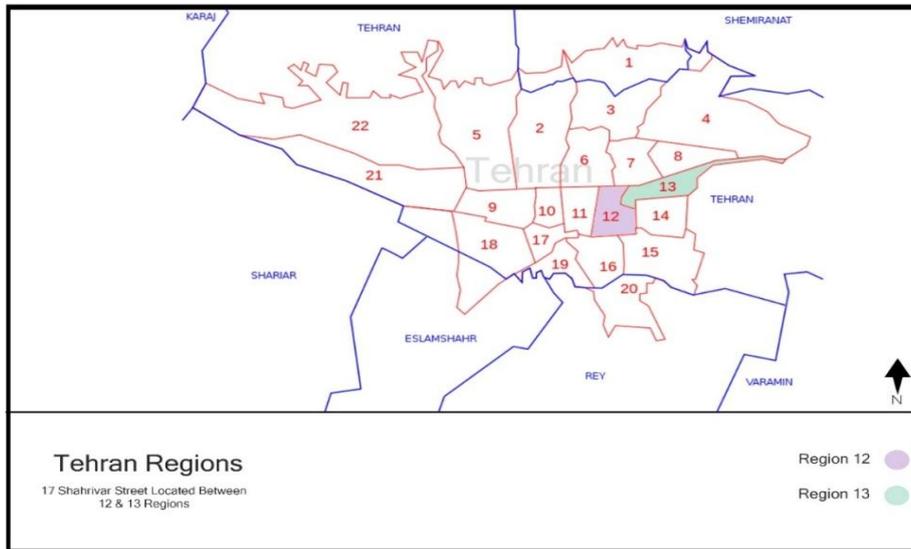


Fig. 3. The position of case study in Tehran

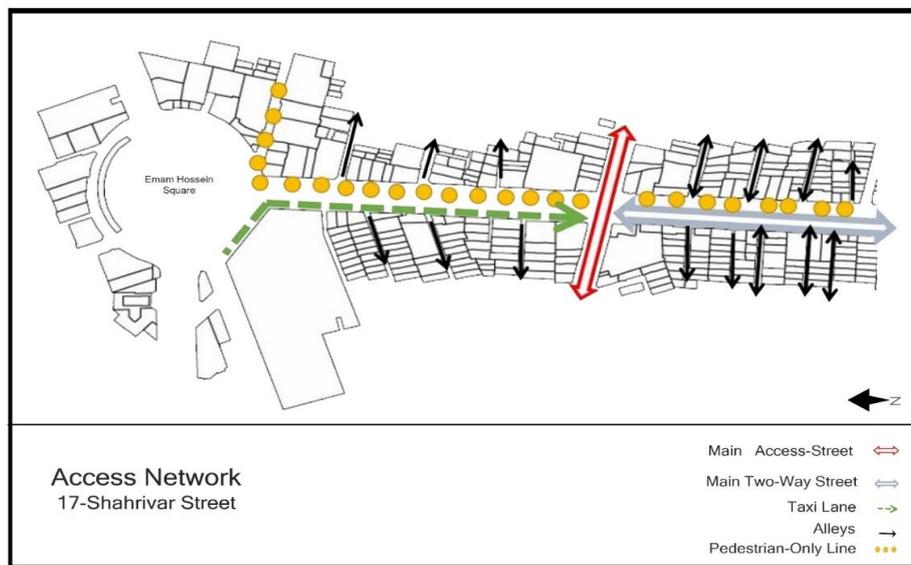


Fig. 4. Access network in 17-Shahrivar street

### 5. Results and Discussion

Figure 5 shows the movement path of the statistical population, which as can be seen is more movement on the side of the path. In examining the qualitative characteristics of environmental design on mental time perception, several key points can be extracted:

1. **Walking Speed:** A lower walking speed (0.5m/s) can lead to a heightened sense of time and a deeper understanding of the environment. This suggests that environmental design should encourage individuals to explore more.
  2. **Stopping Places:** Stopping in places like shops and cafes may enhance social interaction and positive experiences. These locations can significantly influence time perception.
  3. **Gender Differences:** Males tend to stop in areas with visual activities, such as car displays, while females are more likely to stop in shops and retail spaces. This indicates that environmental design should consider a diverse range of locations.
  4. **Stopping Time:** Spending more time in specific locations reflects their attractiveness. Design should be oriented to maintain this appeal and encourage more stops.
- This analysis can assist designers in creating spaces that enhance users' perception of time and foster positive experiences. The analysis of the 17 Shahrivar pedestrian street reveals that while the stopping points along this route share similarities, the consecutive views differ primarily due to the spatial functions

rather than physical attributes. This street, which connects to the square from the east side, is particularly attractive to tourists due to its colorful umbrella canopy, creating a visually appealing environment that enhances the pedestrian experience. However, many shops along the street are currently closed for renovations, detracting from its vibrancy.

The existing footpath and street flooring are generally suitable, and users express satisfaction with the urban furniture, including adequate lighting and benches. Nevertheless, there is only a single row of benches on one side of the street, limiting options for rest and relief from fatigue. Importantly, participants reported a lack of sufficient safety regarding the movement of motorcyclists, which has contributed to dissatisfaction with the pedestrian path.

To improve the pedestrian experience and enhance the perception of time, it is recommended to create successive views along the route through varied flooring designs and directional movement options. Incorporating rhythmic design elements on the sidewalk could further slow pedestrian movement, allowing for increased engagement with the environment. Additionally, the introduction of attractive uses and amenities along the path can draw passersby and serve as a critical factor in reducing walking speed, thereby enriching the overall experience on 17 Shahrivar pedestrian street.

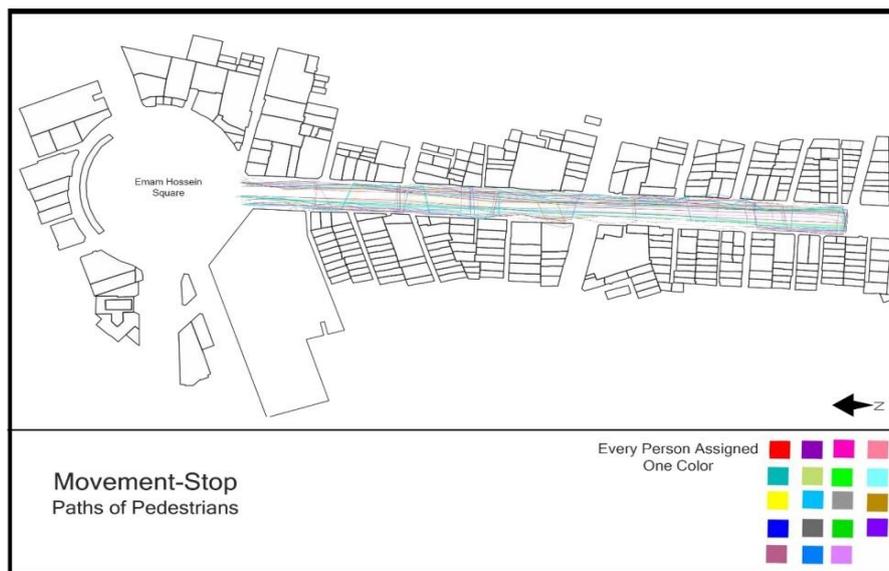


Fig. 5. The observers movement pat

Table 2  
The analyses of observers movements

Observers	Reason of Stops	Act	Stop Time	Sum(minutes)	Speed-Walking	Gender	Color
Observer 1	View of Mountain (Emam Hossein Square )	Formal	2Minutes	11	0.5m/s	Female	Red
	Jewelry Store	Functional	4Minutes				
	Confectionery	Functional	5Minutes				
Observer 2	Retail(Fruit)	Functional	2Minutes	7	0.5m/s	Female	Purple
	Fortune-Teller	Functional	2Minutes				
	ATM Use	Functional	3Minutes				

Observers	Reason of Stops	Act	Stop Time	Sum(minutes)	Speed-Walking	Gender	Color
Observer 3	Shopping Supermarket	Functional	2Minutes	2	1m/s	Female	
Observer 4	Grocery Store- Fast Food- Laugh at Billboard	Functional	40 Sec	5	0.5m/s	Female	
	Peddlers	Functional	2 Minutes				
	Sit on Bench	Formal	2 Minutes				
Observer 5	Drugstore	Functional	1Minute	7	0.5m/s	Female	
	Jewelry Store	Functional	6 Minutes				
Observer 6	Retail(Fruit)	Functional	2 Minutes	15	0.5m/s	Female	
	Jewelry Store	Functional	4 Minutes				
	Shoes Store	Functional	5 Minutes				
	Sit on Bench	Functional	4 Minutes				
Observer 7	1-Bank	Functional	2 Minutes	6	1m/s	Female	
	2-Super Market	Functional	4 Minutes				
Observer 8	1-Look at Mountains and Flags	Functional	2 Minutes	10	0.5m/s	Female	
	2-Jewelry Store	Functional	4 Minutes				
	3 - Peddlers	Functional	2 Minutes				
	4- Retail(Fruit)	Functional	2 Minutes				
Observer 9	1- Peddlers	Functional	3 Minutes	10	0.5m/s	Female	
	2- Retail(Fruit)	Functional	1 Minutes				
	3- Peddlers	Functional	2 Minutes				
	4 -Jewelry Store	Functional	4 Minutes				
Observer 10	1-Jewelry Store	Functional	2 Minutes	2	1m/s	Female	
Observer 11	1-Kiosk	Functional	2 Minutes	6	0.5m/s	Male	
	2-ATM	Functional	3 Minutes				
	3- Cars Store	Functional	1 Minutes				
Observer 12	1-Window Shopping	Functional	8 Minutes	12	0.5m/s	Male	
	2-Super Market	Functional	2 Minutes				
	3 - Sit on Bench	Formal	2 Minutes				
Observer 13	1-Cars Store	Formal	2 Minutes	8	1m/s	Male	
	2-Kiosk	Formal	3 Minutes				
	3-Peddlers	Functional	1 Minutes				
Observer 14	1- ATM	Functional	2 Minutes	5	1m/s	Male	
	2-Stop & Rest	Formal	1Minutes				
	3- Retail(Fruit)	Functional	2Minutes				
Observer 15	1-Shoes Store	Functional	2Minutes	3	0.5m/s	Male	
	2-Super Market	Functional	1Minutes				

Observers	Reason of Stops	Act	Stop Time	Sum(minutes)	Speed-Walking	Gender	Color
Observer 16	1-Shopping Center	Functional	7Minutes	9	0.5m/s	Male	
	2-Kiosk(Buy Cigarette)	Functional	2Minutes				
Observer 17	1-Shopping Center	Functional	5Minutes	11	0.5m/s	Male	
	2-Cars Store	Functional	2Minutes				
	3-Retail(Fruit)	Functional	1Minutes				
	4-Shoes Store	Functional	3Minutes				
Observer 18	1-Window Shopping (Male Cloth)	Formal	1Minutes	11	1m/s	Male	
	2-Cars Store	Functional	2Minutes				
	3-Shoes Store	Functional	6Minutes				
	4-Stop & Sit on Bench	Formal	2Minutes				
Observer 19	1-Shopping Center	Functional	7 Minutes 4 Minutes 4 Minutes 7 Minutes	22	1m/s	Male	
	2-Sit on Bench	Formal					
	3-Kios(Buy Cigarette)	Functional					
	4-Shopping Center(Male Cloth)	Functional					
Observer 20	1-Kiosk	Functional	4 Minutes	7	1m/s	Male	

## 6. Conclusion

The findings of this study indicate that several factors significantly influence pedestrian perception and behavior in urban environments. Notably, gender plays a critical role; females generally exhibit slower movement speeds compared to males, leading to more frequent stops and a greater awareness of their surroundings. This difference emphasizes the need for urban designers to consider gender-specific behaviors when creating pedestrian spaces. Moreover, the scope of the eye influences pedestrian decision-making, as attractive functional distances of approximately 20 meters encourage individuals to alter their paths. The presence of formal features or scenic views within this range can prompt stops, enhancing engagement with the environment. Conversely, the study highlights that increased walking speed correlates with shorter pauses, indicating that faster pedestrians miss opportunities for interaction. The rhythm

created by uniform elements, such as similarly sized trees, can lead to monotony and a constant walking speed, potentially reducing the desire to explore. This rhythmic consistency may result in disengagement, as pedestrians encounter fewer stimulating elements. Furthermore, the lack of absorbent or engaging features within a distance of 50 meters encourages diagonal movement patterns, suggesting that strategically placed visual elements can enhance pedestrian experiences. In summary, the interplay between gender, visual stimuli, speed, rhythm, and consecutive visions plays a vital role in shaping how pedestrians perceive and interact with urban environments. These insights can inform urban design strategies aimed at creating more engaging, inclusive, and stimulating pedestrian spaces that encourage exploration and social interaction.

Table  
The results of Factors Affecting Perception

Factors Affecting Perception	Results of research
Gender	Gender has influenced movement Most stopping reasons for women relate to shopping and viewing stores, while men pay attention to resting and looking at cars.
The scope of the eye	Changing the path because of attractive functional distance about 20 meters or Stopping to walk because of a formal or a view. Women generally allocate less time for stops, whereas men, especially in shopping centers, spend more time
Speed	The speed affects the pause (the higher the speed, the shorter the pause) Gender affects speed (women move at a slower speed compared to men) Both genders seem to have similar speeds (0.5m/s and 1m/s), but their stopping patterns differ.
Rhythm and beat	The presence of the rhythm of trees causes boredom and movement at a constant speed Activities for women are more related to shopping, while men tend to focus on observation and resting.
Consecutive visions	The absence of absorbent elements at a suitable distance has caused diagonal movement at a distance of less than 50 meters (movement on the sides)

## References

- Abbaszadeh, S., & Tamri, S. (2011). Review and analysis of the influencing factors on improving the spatial quality of sidewalks in order to increase the level of social interactions: Case study of Tarbiat and Valiasr axes in Tabriz. *Journal of Urban Studies*, 1(4), 95-104. [In Persian]
- Abedi, M. (2008). Mental-evaluative landscapes: Understanding human-environment interaction. Urban Studies Press. [In Persian]
- Anderson, C. M., & Petty, R. E. (2017). Walking speed and time perception: The effects of walking speed on the perception of time in pedestrian decision-making. *Journal of Experimental Psychology: Human Perception and Performance*, 43(3), 525-532.
- Bentley, I. (1945). *Responsive environments: a manual for designers*.
- Brown, J. R., & Johnson, L. A. (2019). The relationship between walking pace and subjective temporal perception in natural environments. *Environment and Behavior*, 51(8), 912-933. <https://doi.org/10.1177/0013916518779081>
- Eshelman-Haynes, C. L. (2009). Visual contributions to spatial perception during a remote navigation task (Doctoral dissertation). Wright State University. Retrieved from [https://corescholar.libraries.wright.edu/etd\\_all/296](https://corescholar.libraries.wright.edu/etd_all/296)
- Garcia, S. M., Chen, Y., & Simon, M. (2020). Effects of controlled walking speed on time perception in a laboratory setting. *Perception & Psychophysics*, 82(4), 1512-1522.
- Gehl, J. (1987). *Life Between Buildings: Using Public Space*. Van Nostrand Reinhold.
- Ghahremani, A., Smith, J., & Doe, R. (2014). "The interconnectedness of senses in perception: A Merleau-Ponty perspective." *Journal of Phenomenological Psychology*, 45(3), 201-215.
- Goldstein, E. B. (2006). *Sensation and perception (7th ed.)*. Cengage Learning.
- Haynes, E. (2009). *Cognitive psychology: A student's handbook (6th ed.)*. Psychology Press.
- Kashani Jou, K., & Mofidi Shemirani, S. M. (2009). The Development Process of Theories Related to Intercity Transportation. *Hoviatshahr*, 3(4), 3-14. [In Persian]
- Kashanijo, K. (2006). *Theoretical basis & urban design process*. Tehran: Shahidi Publishers. [In Persian].
- Kashanijo, Kh., (2010). *Sidewalks from Design Basics to Functional Features (First Edition)*. Tehran: Azarakhsh Publications. [In Persian]
- Khairuddin, R., Haghbayan, R., & Shokouhi Bidhendi, M. S. (2020). Verification of failure components of the 17th Shahrivar pedestrian zone project in Tehran." *The Monthly Scientific Journal of Bagh-e Nazar*, 16(81), 53-62. [In Persian] doi: 10.22034/bagh.2019.158323.3872
- Khairuddin, R., Haghbayan, R., & Shokouhi Bidhendi, M. S. (2020). Verification of Failure Components of the 17th Shahrivar Pedestrian Zone Project in Tehran. *The Monthly Scientific Journal of Bagh-e Nazar*, 16(81), 53-62. [In Persian] doi: 10.22034/bagh.2019.158323.3872
- Knight, T., Buyung-Ali, L., Pullin, A., & Bowler, D. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning*, 97(3), 147-155.
- Lang, R. (2003). "The importance of environmental design in urban planning." *Urban Studies*.
- Lee, J. H., & Thompson, W. H. (2021). Neurocognitive perspectives on time perception during physical movement: A simulation study. *Cognitive Neuroscience*, 12(2), 73-81.
- Lynch, K. (1984). *The Image of the City*. MIT Press.
- Madanipur, A. (2011). *Urban design wisdom*. translated by Bahador Zamani. Tehran: Tehran university press. [In Persian]
- Montgomery, J. (2013). *Happy City: Transforming Our Lives Through Urban Design*. Farrar, Straus and Giroux.
- Nasar, J. L. (2011). "Environmental Psychology and Urban Design in *Companion to Urban Design*."
- Norberg-Schulz, C. (1980). *Genius loci: towards a phenomenology of architecture*.
- Norberg-Shulz, Christian, *Genius loci: towards a phenomenology of architecture*, 1980.
- Pakzad, J. (1999). *Theoretical Foundations of Urban Design*. Tehran: Shahid Beheshti University Press. [In Persian]
- Relph, E. C. (1976). *Place and placelessness*. London: Pion.
- Shakibamanesh, A., & Ajidanpour, N. (2021). "The effect of physical structure and urban configuration on the quality of pedestrian's soundscape experience in public spaces by using virtual reality: Case study of distance between Valiasr Square to Jihad Square, Tehran." *Journal of Architecture and Urban Planning*, 14(33), 31-56. [In Persian] doi: 10.30480/aup.2021.2872.1575
- Thomas, J. (2010). "The importance of pedestrian space in contrast with the consequences of speed and mechanization in urban space." In *Urban Design and Public Space* (pp. 63-72).
- Tibald, F. (2004). *Citizen-oriented urban design*. Ahmadinezhad, M. (Ed.). Tehran: Khak Publication. [In Persian]
- Tibbalds, Francis, *making people - friendly towns improving the public environment in towns and cities*, 2001. Tridib Banerjee and Anastasia Loukaniko-Sideris", London and New York, Routledge.
- Zamani, A., & Lotfi, N. (2014). Analysis and spatial-temporal assessment of the hierarchical structure of the urban system and urbanization in Kurdistan province (1355-1390). *Journal of Urban Planning*, 3(12), 57-82. [In Persian]
- Jiang, B., & Liu, Y. (2020). Perception of urban subdivisions in pedestrian movement simulation. *PLOS ONE*, 15(12), e0244099. DOI: 10.1371/journal.pone.0244099