

Article

Assessment and Analysis of Citizens' Perceptions of Visual Corridors in Tehran City [†]

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[†] This research is derived from a research design entitled "Assessment and analysis of citizens' perceptions of visual corridors in Tehran City" managed by Tehran Urban Research and Planning Center in Municipality.

Abstract: Today, in many cities, urban facades are typically forming according to the high-level codes, while citizens' expectations and preferences are different from them. According to the studies conducted theory, using a conceptualization technique, related dimensions are assessed. For details, each facade is divided into three parts: ground floor, body, and coping. The individuals' perceptions are investigated using electronic questionnaires and with panoramic photos. To assess vision while moving, studies are carried out at the sites (6 selected streets in Tehran) using semi-structured interviews as well as photographing the preferred scenes and the worst scenes (VEP method). According to the analyses, the main result of this research shows that overall perception was greater than in partial. The order in urban facades will not necessarily be perceived by the alignment of the openings and the creation of a uniform skyline, or restrictions on the color and type of facade materials. This is the same damage mentioned in the critique of the upper-level design codes in the present study. Therefore, it is better to consider only a limited number of various items in building facades, that people can perceive, fixed and controlled, and leave the rest to the owners and designers. In this way, the private rights of the owners and the art of the designers can be respected by observing the facade as a common area between private privacy and public privacy.

Keywords: facade; corridor of vision; perception; citizens; street

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1. Introduction

Undoubtedly, the ultimate goal of all urban planning and design documents is to improve the quality of life and enhance citizen satisfaction. However, the development, approval, and communication of the relevant rules and regulations sometimes become a time-consuming and complicated process, and this leads to the main audiences being forgotten.

Today, in many Iranian cities, urban facades are typically and similarly forming, regardless of the cultures, comparative advantages, climatic conditions of cities, etc., according to the high-level codes and standards, and sometimes through a time-consuming and costly process, while citizens' expectations and preferences are different from them and even their priorities may not be according to the urban planning assumptions.

In the development and revision of the aforementioned documents, applying a participatory approach in urbanism studies can improve the outcomes and even result in economic efficiency. In this regard, one of the important issues is how citizens perceive urban facades. This issue addresses the following questions: To what extent are the facades implemented in urban spaces (especially key spaces) according to citizens' preferences? Are the concerns of urban facade design consistent with citizens' preferences and priorities? In addition, to what extent is there a need to develop accurate codes and standards for urban facades?

In general, in the Iranian legal documents related to urban facades, the experts have made a relatively inflexible perspective on the issue of the urban landscape and the concept

of urban facade common. This perspective seems to be far from the perception of the urban landscape, in general, and the perception of urban visual corridors and facades from the view of their audiences, i.e., citizens, in particular.

Many experts have examined the factors affecting the step-by-step perception of the environment at various levels to find a way to perceive the environment. For example, one can refer to Ittelson's perceptual theory (1987) according to which an individual's perception of the surrounding environment can be examined at four levels: cognitive, affective, interpretive, and evaluative [1]. Many studies have examined the criteria effective in better perception of this mental order and high-quality experience of the environment. Cullen's theory of spatial sequence is one of the most important theories in this field. It emphasizes the concept of movement in the environment. It is one of the most important theories in this field [2].

What makes this study necessary is to improve the quality of the perception of vision corridors and urban facades, which is feasible by adapting citizens' preferences to the common principles and standards for designing visual corridors and urban facades. Therefore, the present study attempts to methodically analyze the abovementioned discussion and present relevant suggestions.

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1.1. Theoretical Foundations and Concepts

Given the complexity and multiplicity of information obtained from urban visual corridors, it is essential to find a way for citizens to perceive this information. To perceive urban visual corridors, in addition to examining the facade, as one of the factors affecting the visual perception of the corridor, in the pause mode, it is required to examine the experience of the environment while moving in it, according to the theories of people such as Gibson, Cullen, Bacon, and Bentley. Of course, in this regard, it is possible to study landscapes (with emphasis on three-dimensional vision), which is beyond the scope of this study. The Chart 1 briefly presents the three urban visual corridor categories, each of which will be discussed in detail below.

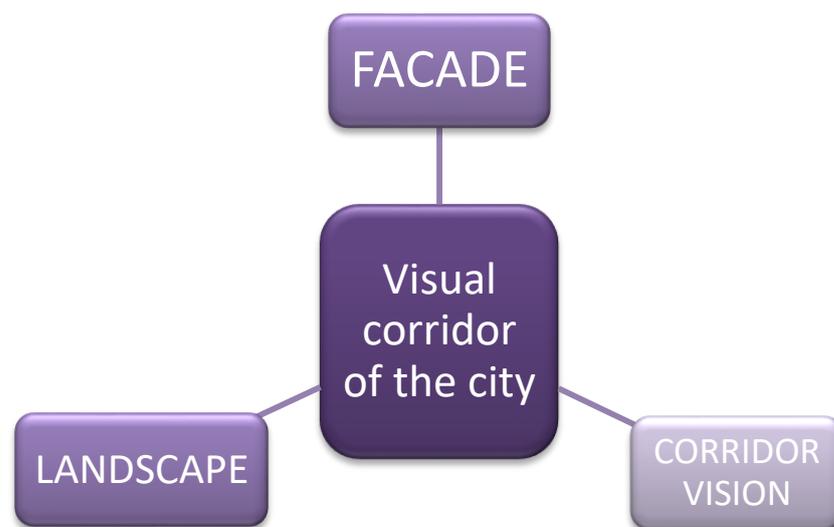


Chart 1. The categorization of urban visual corridors into three categories with an emphasis on the movement of the observer [3].

1.2. *The Need to Pay Attention to the Citizens' Perception of the Environment*

Perception is part of the human essence, by which environmental information is collected through sensations. Cognition, a method for acquiring, storing, organizing, and retrieving perceived information on the environment and sensation, is part of the innate human reaction to the environment [4]

Research by Kevin Lynch and Donald Appleyard imply that the environmental perception of citizens should be heeded notwithstanding the perception of urban specialists who obtain the perceptual structure of citizens. Lynch examined the cognitive image of American citizens originating from two factors: the person's memories, relationships, experiences, and expectations (perceptual set in the person's connection with landscape) and the three-dimensional data received from the landscape [5]

Appleyard and Lynch's urban-scale visual study entitled "The View from the Road" was published in 1963 [6]. It emphasizes the environment's visual-perceptual highlights relative to the rider's movement. To determine the cognition of citizens, Lynch and Appleyard's visual perception has two parts:

The identity of the visible environment (what is present).

The environmental values perceived by the audience (what was received).

Obtaining the environmental values perceived by citizens is as important as the perception of the existing quality [7].

Appleyard believes that totalitarian and pluralistic urban designs are distinguished by the exclusion or inclusion of various groups from the design process. Despite the essential role of people in pluralistic urban design, designers also have their rightful place. Initially, designers vertically visualize the site on maps, whereas native residents trace and see the environment from a pedestrian's point of view [5].

According to Ittelson (1987), an individual's perception of the surrounding environment can be examined in four dimensions:

Cognitive dimension: It includes thinking about environmental stimuli, organizing, and storing. In fact, this dimension helps us to make the environment meaningful.

Affective dimension: It includes our emotions affecting our perception of the environment and our perception of the environment also influences our emotions.

Interpretive dimension: It includes the meanings and concepts obtained from the environment. In this dimension, we rely on our memories and mental reserves to compare and interpret new environmental stimuli.

Evaluative dimension: It includes the values and preferences forming the good and the bad [1].

The mental image of the environment is the result of a process through which personal experiences of the environment along with the value system of each person, play a major role in the perception of environmental stimuli [8].

According to Carmona, who described three of four dimensions of Ittelson's perceptual theory, the affective dimension includes emotions influencing the perception of the environment. The interpretive dimension includes the meaning or association resulting from contact with the environment to find meaning by relying on memory and previous experiences. The evaluative dimension also includes values and tastes and determines and records the good and the bad [9].

1.3. *Individual Factors Affecting the Perception of the Environment*

"Places reflect identities, differences, and competition in different groups based on gender, class, religion, ethnicity, culture, and represent individuals' political orientation, power, freedom, interests, social system, and common interests in consumption motivation," says Dovey [10]. To explain personal traits and their role in how to interact with a place, various factors such as age, gender, income, marital status, education, social class, and occupation have been mentioned. In this regard, even the individual's diet, smoking, exercise, and physical movement have also been assessed to be effective [11]. The individuals' mental and physical abilities can be also added to the abovementioned factors.

However, these are not all the personal traits, and public health, individual distinctions, needs, preoccupations and the individual's definition of them, thinking, perception, ideas, and individual intentions in relation to place, backgrounds, beliefs, and individual values also play a role in the individual's perception of the environment. Of course, it should be noted that in the present study, due to the text length limitation, the results of the analysis of individual factors are not mentioned [12]

1.4. Theories and Concepts Related to the Perception of Visual Corridors

Given the importance of the "movement" component in the perception of visual corridors as well as the role of adjacent walls of movement axes or in other words, the components and elements of urban facades in building the visual qualities of urban corridors and citizens' sensory and visual perception of visual corridors, many of the issues raised are interrelated and separating the two concepts is not without its disadvantages. Here are just a few of the most important relevant theories:

Vision, visual axis, and vision corridor in Gibson's theory.

As mentioned, the idea of visibility analysis comes from Gibson's theory. According to his theory, the visual flow directs the individual in the environment, and he describes the relationship between evidence and the environment [13]. Movement is considered the main carrier or facilitator of this process. In this theory, the experiences of people moving from one space to another become the focus, because moving in space provides the user with all directions, reveals different points, not just new perspectives, through the elimination of the covering surfaces, and subsequently enriches the perception [14]. The vision corridor is formed when the line of sight is strongly controlled and guided by edges on each side [15].

Gordon Cullen's serial vision: According to Cullen, sensory reactions can generally be examined in three different ways: vision, attention to place, and attention to content. In his discussion of vision, he introduced the concept of "serial vision". According to him, the city visually consists of two groups of elements: "existing landscapes" and "emerging landscapes". That is, a random chain of events, i.e., the art of relations in his opinion, can turn the city into a harmonious scene with skillful manipulation [16].

According to Gordon Cullen's theory of "serial vision", the criteria of visual beauty quality include 1. sequence, 2. complexity, and 3. surprise.

Edmund Bacon's theory: According to Bacon, the perception of space occurs only by moving in it, and this experience must be continuous. Such an experience is not only visual, and for the perception of space, all the sensory organs and human emotions are involved. According to Bacon, movement actually leads us to perceive continuous elements rather than separate elements.

Amos Rapoport: In his book, Rapoport adopted a non-verbal approach and considered meaning as a communication issue. In his view point, the meaning of environment is achievable through direct observation of the environment and see references in it and interpret them. Thus, cities can identify by seeing the type of clothing of its inhabitants, its type of buildings, shops, etc. [17].

Jan Gehl's Theory: Jan Gehl considers human emotions and how people move as a starting point. Undoubtedly, man is a pedestrian and his senses are designed in a way that enables him to walk about 5 km/h [18]. Today, traditional architecture, which was designed according to the walking speed of pedestrians, has changed to architecture developed considering the travel speed of 60 km/h. This change represents wider streets, bigger advertisements, and taller buildings, meaning that humans cannot see details at this high speed [19]. He also divided human activities in urban spaces into three categories: essential, selective, and social [20].

2. Research Background

In this section, to summarize and better apply the achievements and methods of relevant studies, the Table 1 reviews the most effective backgrounds in this study.

Table 1. Summary of research background review (Source: Authors, 2021).

Study	Year	Method and Tools	Key Axes and Achievements
Restudying The Perception Components Of Active Frontages In Streetscape Design (Case Study: Khayam Street In The Middle Urban Fabric Of Shiraz, Iran) [21]	2019	Observation and survey in the research field, Field studies	Introducing the ground floor of the street as an interface connecting indoor and outdoor spaces and the most effective factor in shaping people’s mental image of an urban landscape. The components of street landscape perception assessment are divided into three categories: contextual, functional, and physical components. The design process should be based on an organic understanding of these three parameters.
Design Control Challenges: Understanding what people want and how to achieve it [22]	2016	Descriptive method using documentary studies and library tools Field activities questionnaire (illustrated)	Despite the fact that people and experts have the same opinions in most cases, it is important to note that experts are more critical in their opinions (they have more positive and negative opinions than ordinary people). People prefer the traditional design, which includes integrated street facades and discrete openings. Design control challenges are divided into three parts: 1. Motivation of manufacturers, 2. commitment to design control, 3. professional culturalization.
Ground-floor façade design and staying activity patterns on the sidewalk: A case study in the Korba area of Heliopolis, Cairo, Egypt [23]	2019	Documentary studies and observations Behavioral mapping (recording activities)	The relationship between the ground floor facade of buildings and the durability of activities on sidewalks. Introducing characteristics promoting the staying of activities. Introducing characteristics decreasing the staying of activities.
Improving the visual quality of the street by proposing codes for signs, Lyon, France [24]	2014	Descriptive method	Use signs to emphasize important functions and uses in general throughout the country.

In summary, research on visual corridors can be divided into the following categories:

1. Studies mainly concerned with the physical examination of visual corridors and urban facades while focusing on the different features and components of visual corridors and the qualities that affect perception.
2. Studies that have examined the cognitive and physiological process and how citizens, as primary users, view perceptual corridors and urban facades.
3. Studies on the visual preferences of citizens and their valuation of visual corridors and urban facades and its relationship with the qualities that influence design.
4. Studies on the relationship of the physical qualities of urban visual corridors and the responsiveness of spaces and desire of citizens to presence in the spaces.

This study mainly belongs to the third category and can be used to confirm or reject similar studies. In addition to analyzing vision corridors, this study also examined urban facades in the form of panoramic images and electronic questionnaires.

Although one of the reviewed studies entitled “Identification of urban landscape design criteria with an environmental response approach (2016)” emphasized the compatibility of building styles, this study stressed the contrast and variety of styles. As mentioned earlier, compatibility in style also seems ambiguous and may not necessarily mean to follow or imitate the adjacent style. Moreover, the study entitled “Design control challenges: Understanding and attaining what people demand (2016)” has the opposite view, namely the preference of low height difference between buildings compared to the presumption that height difference is of relatively low importance in this field study.

Finally, the study entitled “Enhancing the visual quality of street by proposing rules for urban signs in the city of Lyon, France (2014)” is mostly focused on the role of signs in

emphasizing function and distinguishing building functions, the idea inspiring this study. This study also examined the identification of building function from facade and made recommendations for distinguishing important functions.

Critique of 30 General Urban Facade Design Codes Developed by Tehran Municipality

In this section, according to the objectives of the present study, some general urban facade design codes developed by Tehran Municipality (the capital of Iran), which is a more advanced city than many other cities, are criticized as examples [25,26]. The Table 2 represents some sample clauses criticized by category and type of requirement.

Table 2. Criticized clauses of the 30 general urban facade design codes developed by Tehran Municipality (Source: Author).

Category	Type of Requirement	Criticized Clauses	Critique
Materials (form, type, and color)	Obligatory	Do not use unconventional and uncoordinated colors in the building facade. Avoid using multiple materials in the building facade (maximum 4 types). Do not use unconventional and unfamiliar forms (such as ships, sculptures, fruits, etc.) in the design and construction of buildings.	The conventional or unconventional range of colors is unknown. The roof has a maximum of 4 types of materials, while a wide range of materials may be compatible. The definitions of unconventional and unfamiliar forms are unknown based on citizens' perceptions.
	Recommended	Do not use multiple colors on the dominant facades	The concept of multiple colors is not known (multiple colors will not necessarily cause confusion if the color harmony is observed).
Protrusion and openings	Obligatory	Do not use openings with different and unfamiliar geometries in the facade.	Different geometric shapes do not necessarily cause irregularity and disorder in the facade, and the term "unfamiliar" also seems vague.
Roof	Obligatory	It is required to coordinate the form, facade, color, and roof shape with the architectural features dominant in Tehran.	The architectural features dominant in Tehran are unknown due to the multiplicity and diversity of existing features.
	Recommended	Recommendations: To coordinate roof flooring with the roof flooring of neighboring properties if they are appropriate.	The criterion of the appropriateness of the quality of neighboring properties is known.

3. Methods

In this section, according to the studies conducted in the form of theoretical foundations, research background, and theoretical framework, the criteria and sub-criteria effective in assessing the overall perception of the facade are extracted considering Ittelson's perceptual theory and Cullen's theory of serial vision, using a conceptualization technique. Of course, in this research, the four parts of Ittelson's theory are presented in three main categories. In fact, due to the closeness of the nature of the two affective and interpretive dimensions in assessing the meaning of the environment, these two dimensions are merged and the three cognitive, semantic (interpretive and affective), and evaluative dimensions are assessed.

Moreover, to assess the observers' preferences for the details of the facades, each facade is divided into three parts: ground floor, body, and coping. The individuals' perceptions of facades are investigated using electronic questionnaires developed on the 5-point Likert scale and with panoramic photos of the facade or wide photos prepared by the camera. These questionnaires also include the personal characteristics of the respondents. This

research method was selected due to the lack of bias and orientation of the questionnaire containing panoramic photos (where the subject or background and any other factor is not highlighted) and the possibility of distributing the questionnaires electronically among the generalizable sample size obtained according to Cochran's formula considering the COVID-19 pandemic to obtain the opinions of a wide range of people (regardless of their attendance in the place).

In fact, this way allows examining the experimental model of assessing the perception of the facade based on the items extracted from previous chapters, in the form of questions. It should be noted that in this study, based on the research requirements, several visual corridors in different areas in Tehran, which can largely represent the urban facade of Tehran, were selected as samples to study the citizens' perceptions of visual corridors.

However, to assess vision and due to the need to examine the perception while moving, field studies are carried out at the sites of selected samples using semi-structured interviews as well as photographing the preferred scenes and the worst scenes. The reason for choosing this method to assess vision is the need for the presence and movement of respondents in the selected sites and directly recording their opinions at the moment. Semi-structured interviews also allow the researcher to design specific questions with a predetermined purpose to discover the concerns and priorities of the respondents after talking to them.

The VEP method is also one of the approved methods used to indirectly assess respondents' preferences and is used even for children or those who are not able to express their opinions and preferences directly and correctly. Therefore, it can be a useful method to assess the outcome of the factors affecting the positive or negative opinion of the respondent without imposing or directing his opinion by the questioner. Moreover, the interviews and photos taken by observers are qualitatively analyzed and interpreted by the research team and are concluded along with the quantitative results obtained from the analysis of the perception of facade questionnaires.

The VEP is a method for preference tests. To access valid data, it relies on evaluations obtained from general samples through "the observer's preference of existing samples" or "personal photography to identify the preferred sample", instead of relying on an expert.

Of course, there are methods such as using Eye Tracker devices that physically record brain changes due to looking at a certain scene, but they are costly and in this study, due to the limited budget, it was not possible to use them.

It should be noted that to analyze the vision, before conducting an in-depth interview, citizens were asked to take photos of their favorite scenes of urban bodies and facades while moving within the corridors.

Here are some examples of semi-structured interview questions to measure vision (perception during movement):

- What are the best and the worst scenes in your opinion when walking down Street X? Why?
 - Which building in your preferred scene (or worst scene) is important for you and why?
 - When seeing a building, which of the following options do you remember the most? Why?
- Building shape Building color Building use (residential/commercial/administrative, etc.) Building location (protrusion and recess of the buildings compared to the sidewalk) Heights of the buildings Building materials
- What features of the building do you usually use to address on Street X? (For example, do you refer to its location? Do you refer to its use? Do you refer to its color? Or)
 - If you want to take a selfie on Street X, which building do you prefer to stand in front of in your photo?
 - If you want to make an appointment with your friend on Street X, where do you prefer to be and why?
 - Is it your daily commuting path or did you cross it by accident?

Development of the Questionnaire Based on Criteria for Assessing Perception and Preferences

These illustrated questionnaires (with panoramic photos of facades) allow assessing a wide range of respondents, regardless of their attendance in place or previous experiences and mentality. In the process of scrutinizing the questionnaire questions, a new division is considered to clarify the research path and design the questions. All questions should be divided into three groups of overall perception, partial perception, and individual characteristics of the respondent in the “dimensions of perception” section as well as two groups of urban facade or vision corridor in the “individual’s preferences” section. In this comprehensive classification, the criteria mentioned in this section and the dimensions of perception are classified based on Ittelson’s perceptual theory, as presented in Table 3.

Table 3. Items in the research questionnaire (Source: Authors).

	Dimension	Criteria
Overall perception	Cognitive	Sequence
		Complexity
		Surprise
	Semantic (interpretive and affective)	The individual’s feeling Being diverse or boring Pay attention to generalities or details Facade legibility Preferring old or modern facade Recognition of building use (function)
		evaluative (assessment of people’s preferences)
Partial perception	Ground floor	Entrance Executive details View into the ground-floor interior
	Body	Type of facade materials Facade color palette Observing the alignment of the openings Existence of vases and flower boxes Existence of balconies Uniformity of the shop signs Columns
	Coping	Skyline (uniformity or diversity) Being sign of the coping
Contextual features	Individual	Characteristics and traits of the audience Motivation to explore
	Temporal	Lighting status The length of time a person stays in the place and the length of time he/she watches the facade

4. Survey Studies

Selection of Case Studies

In this section, according to (a) the urban fabric and the identity of the field in which the street is located (peripheral, middle fabric or city center), (b) the type of uses and (c) the width of the passage, (d) full and empty spaces, (e) facade continuity (connected or disconnected) shown in Table 4, areas are selected as case studies that are located in pairs in the same urban fabric and have similar and different aspects to be compared. The map in Figure 1 shows the locations of these 6 areas.

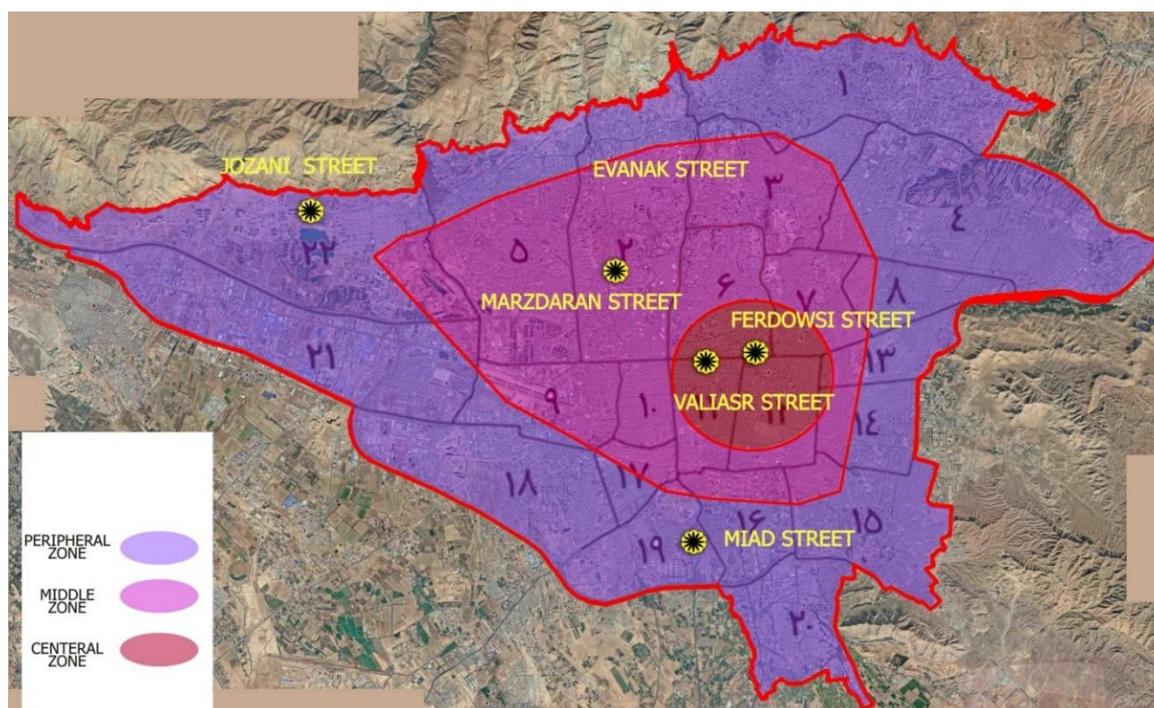


Figure 1. Locations of selected case studies for field studies (Source: Authors).

Table 4. Specifications of the case studies (Source: Authors, 2021).

No.	Case Study	Location	Historical Features	Use	Passage Width	Full and Empty Spaces	Façade Continuity	Motor/Pedestrian Traffic	Specifications
1	Mia'ad Khani Abadno Street	Peripheral	No	Commercial Services Residential	Average	yes	Disconnected	Pedestrian and motor	Non-special residential buildings, mostly inhabited by locals
2	Jozanji Street in District 22	peripheral	No	Cultural Residential	Large	Yes	Disconnected	Pedestrian and motor	Existence of Chitgar Lake in its vicinity
3	Ferdowsi street	Central	Yes	Commercial administrative	Large	Yes	Disconnected and connected	Pedestrian and motor	Existence of architecturally valuable and outstanding buildings

Table 4. Cont.

No.	Case Study	Location	Historical Features	Use	Passage Width	Full and Empty Spaces	Façade Continuity	Motor/Pedestrian Traffic	Specifications
4	Valiasr Street	Central	Yes	Commercial Cultural	Large	Yes	Disconnected and connected	Pedestrian and motor	Existence of city theater, old trees
5	Shahrak-e Gharb Ivanki Street	Middle	No	Residential	Large	Yes	Disconnected	Pedestrian and motor	Existence of villas with special architecture
6	Marzadaran Street	Middle	No	Commercial residential	Average	Yes	Disconnected	Pedestrian and motor	Existence of a kind of congestion

The following table also shows the specifications of the selected case studies:

Adaptive Considerations in Select Samples of Field Studies

A Comparison of Miad Street and Jozani Street (marginal site)

Similarities:

1. Relatively new urban fabric
2. Easy access to the Tehran Beltway
3. Absence of distinctive architecture

Differences:

1. The population density of Jozani St. is less than that of Miad St.
2. Miad St. is often a passage for local residents whereas Jozani St. is also a passage for visitors from other regions to Chitgar Lake.
3. The buildings on Jozani St. are taller than those on Miad St.

B Comparison of Marzadaran Street and Eivanaki Street (middle fabric)

Similarities:

1. Residential use.
2. Relatively new urban planning and street design.
3. Both are boulevards.
4. Relatively similar passage widths.

Differences:

1. With respect to access to local businesses, Marzadaran St. has more facilities and diverse functions.
2. There is an as-of-yet unopened metro station in Marzadaran St.
3. Marzadaran St. is busier than Eivanaki St.
4. Buildings on Eivanaki St. have more distinct facades than buildings on Marzadaran St. with many filled and empty spaces.
5. There are buildings with distinctive architecture on Eivanaki St. (eastern body) that are not present in Marzadaran St.
6. Eivanaki Street (eastern body) has significantly more green space than Marzadaran Street.

C Comparison of Ferdowsi and Valiasr Streets (central fabric)

Proposal to examine Ferdowsi Street (from Imam Khomeini Sq. to Manochehri St.) and Valiasr St. (from Valiasr intersection to Jomhuri):

Similarities:

1. Top-tier main streets
2. Both have historical identity
3. Ending at a city junction (Imam Khomeini Square and Valiasr intersection).
4. Relatively wide sidewalks with a view to the opposite side.

5. Commercial ground floors and spaces for selective and social behaviors.

Differences:

1. Ferdowsi St. has administrative buildings such as banks and museums whereas the same section of Valiasr St. has cultural buildings such as the city theater.
2. Ferdowsi Street does not have as much marginal green spaces and waterways as Valiasr St.
3. Valiasr Street has a paved pedestrian walkway whereas Ferdowsi Street has a worse pedestrian section.
4. There is a view of Imam Khomeini Square and the Telecommunications Building to the south of Ferdowsi St., but there is no landmark to the north or south of Valiasr St.
5. The two streets have marginal buildings of different heights, and Valiasr Street has taller buildings.
6. Also Figure 2 shows some examples of street images to introduce their views.

Miad Street



Jozani Street



Eivanak Boulevard



Figure 2. Cont.



Figure 2. Sample photos of selected streets.

5. Results and Discussion

As mentioned, in the present study, semi-structured interviews were used. In this type of interview, the researcher seeks specific information to be able to compare it with the information obtained from other interviews.

It is required to ask similar questions in each interview. However, since the researcher still wants the interview to remain flexible, he/she performs the interview in a way to extract important information from the heart of the interview even in such circumstances. The exploration method in this type of interview is very useful, meaning that although the general structure of the interview is the same for all participants, the interviewer can ask other questions when necessary. Compared to the structured interview, its advantage is that it is performed in a free environment. It should be noted that the questions of the interviews are given in the research method section.

5.1. Results of the Analysis of Interviews on Vision Analysis

In this research, interviews are analyzed using interpretive methods. According to Rubin and Gilham, for interpretive analysis of the texts of the notes, the researcher must go through the following steps:

1. Review the implemented texts in order.
2. Highlight, underline, or bold the critical statements in each text. In addition, ignore repetitive, parenthetical, deviant statements, and other irrelevant data.
3. Identify some similar statements that seem to suggest something new.

The researcher needs to enter the categories of each question in an analytical table (Write the titles of the categories above and the names or codes of the respondents next to it). Then, in each cell, enter what the respondents have said or a part of them [27]. By following the abovementioned steps, the obvious content of the texts is analyzed and described. Now, to analyze the true meaning of what the respondents have said, the researcher must put together what they have said about each category differently to understand their latent meaning. This is a difficult task when people have used different words and different forms of expression to talk on the same subject [28]. Therefore, using tables similar to the abovementioned table, the interview texts were highlighted and summarized. For example, in the first interview performed on Marzdaran street, the text of the respondent's speech was as follows:

“A 29-year-old woman who lives in the area and is relatively familiar with the area, believes that when crossing this street, she paid a lot of attention to the building facades and mostly looked for new shops and stores or newly established hairdressers. She knows stylish and new buildings as the best scenes, and the dirty buildings as the worst scenes, which will look much better if they are repainted and repaired. She also believes that the colors and shapes of the buildings are more in her mind and if she wants to give an

address, she more refers to the colors and uses of the buildings. To take a selfie, she chooses more beautiful places in the street, and for example, in Marzadaran Street, the florist shop is one of these beautiful places. According to her, chain stores like Janbo, which have logos and signs, are a good place for making an appointment with friends, and if she is delayed, she can purchase food. She pays more attention to the functions of stores and what is placed in their showcases or how their showcases are decorated when moving in the street, and in general, her good memories include her memories of walking and purchasing”.

It should be noted that again, due to the prevalence of the COVID-19 disease, people have a low tendency to give long answers and talk, and the answers of the respondents were relatively concise and useful. In the next step, some tables are prepared to summarize the key axes of each answer by the questions. Moreover, for example, the best and worst photos taken by an observer are presented in Figure 3.



Figure 3. An example of the best and worst scene of urban facades photographed by an observer while moving for analysis using the VEP method (sample of Ferdowsi Street).

The results of the analysis of the above and other photos recorded using the VEP method and semi-structured interviews are qualitatively summarized in analytical tables using the method described above.

5.2. Results of Analysis of Perception of Urban Facade Questionnaires in 6 Selected Streets

In this section, based on participatory studies conducted in the 6 selected streets as case studies and completed questionnaires related to assessing the perception of urban facades, quantitative (statistical tests in SPSS software environment) and qualitative analyses (interpretation of results, and drawing graphs and analytical tables) are performed.

Validity and Reliability of Scales

Regarding reliability, reliability is important to examine whether the chosen method accurately assesses the subject matter. One of the methods for determining the reliability of items is Cronbach's alpha method. In fact, we want to see to what extent the respondents have had the same perception of the questions on an index.

In the pretest, a questionnaire filled out by 30 people was tested and the spectra were tested for reliability. For this purpose, Cronbach's alpha coefficient was used. It determines the reliability coefficient of the whole spectrum. Next, inappropriate items that reduced the spectrum reliability were removed and the remaining items in the questionnaire were tested for reliability. The results indicate that the alpha coefficients of all questions were above 0.86.

Analysis of the Descriptive Statistics Obtained from the Distributed Questionnaires.

To keep this study brief, this section presents examples of descriptive statistics for different areas of citizens' perception. For example, for measuring facade perception in Eivanaki St. (one of the six field samples), first, the demographic information of respondents is presented in the Table 5.

Table 5. Gender frequency of respondents.

Gender	Frequency	Percentage
Male	46	46%
Female	54	54%
Total	100	100.0

Then, the first index, namely perception, is presented in the Table 6 as an example and Also, a sample of descriptive statistics is given in Table 7:

Table 6. Frequency distribution of cognitive index.

Observed Variables	Non-Standardized Coefficients		Standardized Coefficients	t	sig	Priority
	B	Std Error				
Complexity	0.327	0.023	0.406	14.194	0.000	2
Sequence	0.269	0.021	0.406	12.736	0.000	3
Surprise	0.475	0.035	0.471	13.704	0.000	1
N	Valid				99	
	Missing				1	
	Mean				3.3636	
	Median				3.0000	
	Std				0.97368	
	Min				1.00	
	Max				6.00	

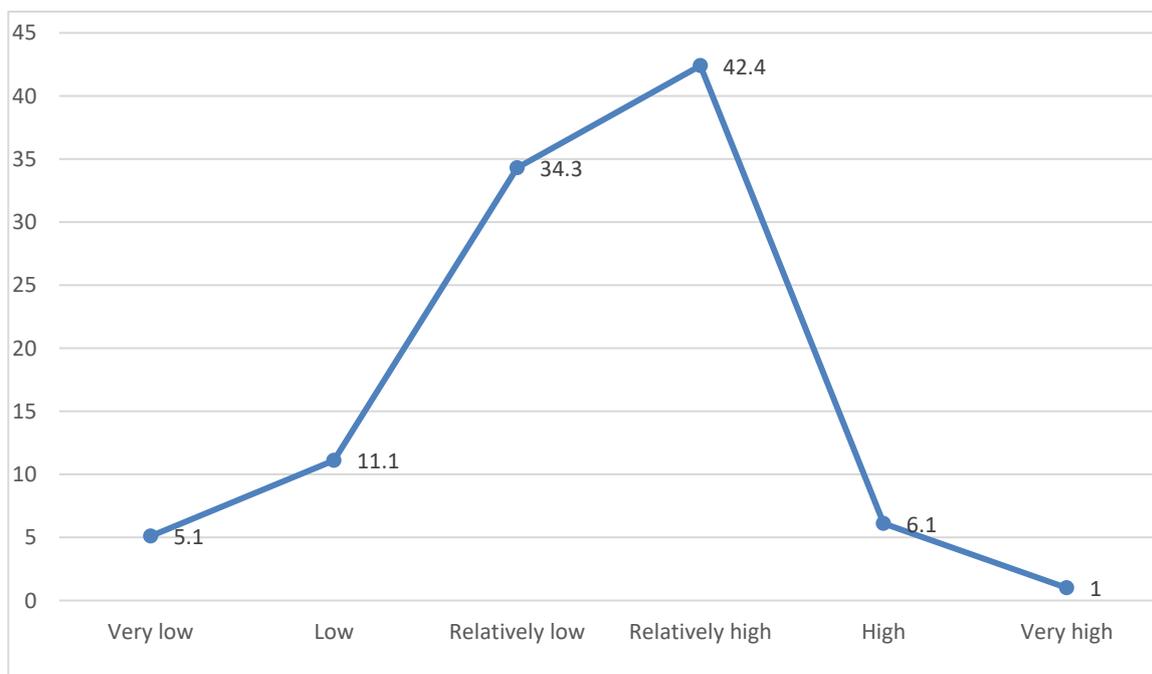
Table 7. Frequency distribution of the perception index.

Level	Frequency	Percentage
Very low	5	5%
Low	11	11%
Relatively low	34	34%
Relatively high	42	42%
High	6	6%
Very high	1	%
No response	1	1
Total	100	100%

As shown in the table, the percentage of respondents who would like to see a larger portion of the sky is 4% to a very high and high degree, 18% to a relatively high degree, 53% to a relatively low degree, and 24% to a very low and low degree.

This problem is caused by the width of the street and the high road width to body height ratio of Eivanaki St. making the sky more visible to the observer. Therefore, in general, there is no greater desire for seeing a larger portion of the sky in this range.

The graph for the data in Table 7 is presented in the Chart 2:

**Chart 2.** Frequency distribution of the perception factor.

After extensive analysis of all aspects and criteria, there was an adaptive evaluation of all six samples.

5.3. Comparison of 6 Streets Studied in the "Perception of Facade" Criteria

In this section, based on the results of the T-test obtained in the "perception of urban facades" assessment, 6 sample streets are compared in terms of the criteria affecting the perception of urban facades and the results are interpreted to be used in similar studies.

5.4. Cognitive Criterion

In this section, as can be seen in Chart 3, the comparative comparison of 6 streets has been analyzed in cognitive criteria.

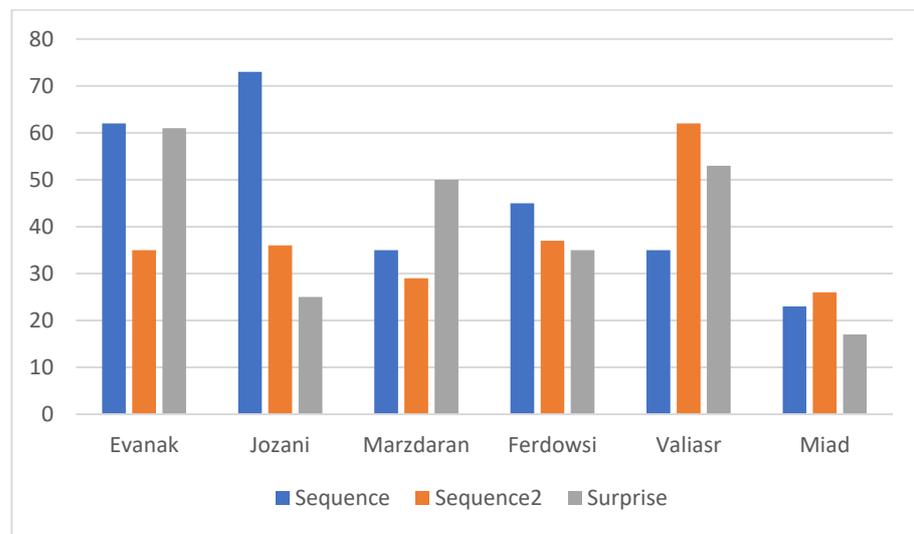


Chart 3. Comparison of streets in the cognitive criterion (Source: Authors).

According to the respondents, Jozani Chitgar Street has the highest score in terms of the sequence of urban facades. According to the following photos captured when moving on this street, the enclosure created by tall buildings, the physical connection between the street components, and the order and proportion along the path have formed this feature.

Complexity is a quality that is perceived by the audience on Valiasr Street. According to what is mentioned in the previous sections based on Cullen’s theory, complexity includes the presence of outstanding elements with different architecture, diversity in natural and built landscapes, and diversity in properties and territories.

The changed (reduced) height of most buildings and their different styles, creating visual barriers due to the presence of natural elements, and changing the slope and using stairs in the passages are among the factors that can be considered the reason for choosing Ivanak Street in Shahrak-e Gharb with the highest score in the quality of surprise compared to other streets.

5.5. Semantic Criterion

In this section, as can be seen in Chart 4, the comparative comparison of 6 streets has been analyzed in semantic criteria.

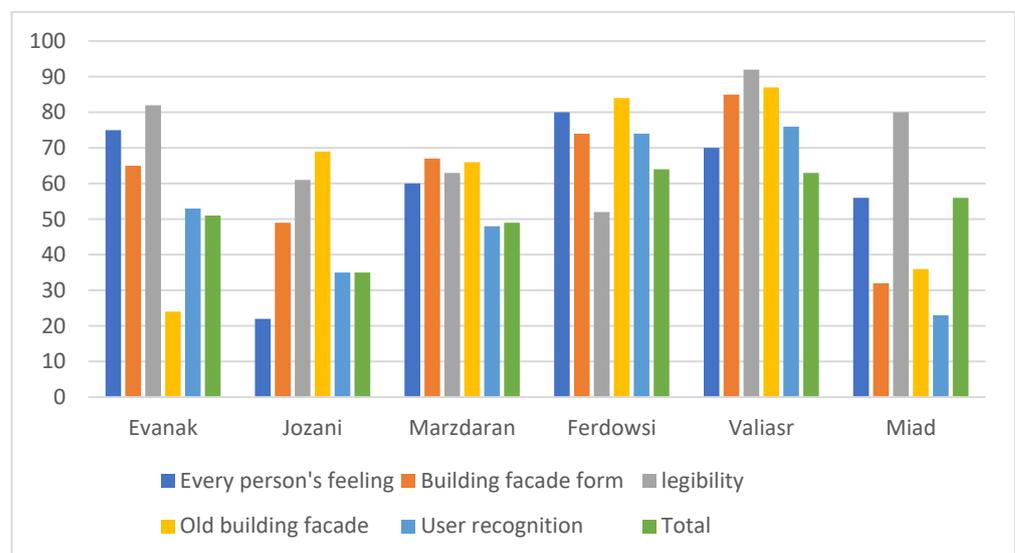


Chart 4. Comparison of streets in semantic criterion (Source: Authors).

According to the respondents, it seems that among the six streets studied, the respondents perceive more tranquility and excitement from the facade of Ferdowsi Street, and the most unpleasant city wall for them is Jozani Chitgar Street. On Ferdowsi Street, respondents also prefer old facades to new ones.

As shown in the chart, Valiasr Street is preferable to the respondents in terms of semantic features (interpretive and affective features) with a slight difference from Ferdowsi Street compared to other streets. Respondents less preferred Mia'ad and Jozani streets in this criterion. Obviously, the existence of cultural buildings such as the city theater at Valiasr Intersection and the National Bank Museum with its unique architecture on Ferdowsi Street has played an important role in this preference. Considering that the respondents considered Jozani and Mia'ad streets to be less valuable, it can be pointed out that the urban facades of modern or new buildings built in these two streets do not have an outstanding feature reminding the respondents of a pleasant experience or semantic identity.

5.6. Evaluative Criterion

In this section, as can be seen in Chart 5, the comparative comparison of 6 streets has been analyzed in evaluative criteria.

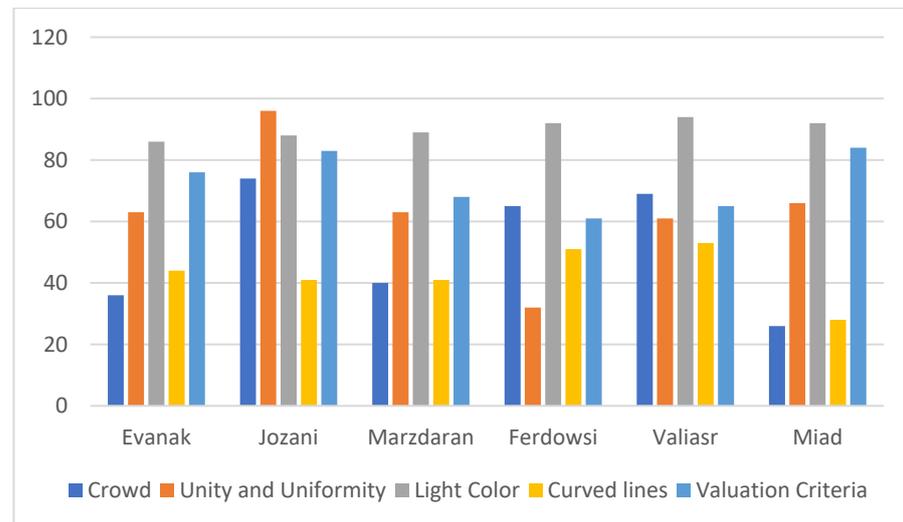


Chart 5. Comparison of streets in the evaluative criterion (Source: Authors).

According to the chart above, respondents prefer light colors on all streets, and curved lines on all but Mia'ad Street. Moreover, in their opinions, Jozani and Ferdowsi streets have the most and the least unity, respectively. In addition, on all the streets, except for Mia'ad, Marzdaran, and Ivanak streets, the respondents preferred complexity to simplicity.

5.7. Analysis of Overall Perception

Since the "overall perception" component is composed of the result of cognitive, evaluative, and semantic criteria, the following question is raised: which of these components has the greatest impact on the respondents' overall perception? To answer the question, the criteria were ranked using multivariate regression analysis, as discussed below:

1. There is a significant relationship between all observed variables (cognitive, evaluative, and semantic criteria) and the latent variable (overall perception) ($p \leq 0.05$).
2. According to the obtained beta coefficients that indicate the effect of the observed variables on the latent variable, the importance of each variable is listed in the "priority" column in the table below. As seen in the table, the most effective variable on the overall perception is the evaluative component.

The beta coefficients of the criteria constituting the overall perception shown in Table 8.

Table 8. Beta coefficients of the criteria constituting the overall perception (Source: Authors).

Prioritize Variables	sig	t	Standardized Coefficients	Not Standardized Coefficients		Observed Dimensions
				B	Std Error	
2	0	8.033	0.408	0.315	0.024	Cognitive
1	0	8.371	0.445	0.37	0.038	Evaluative
3	0	6.187	0.301	0.344	0.041	Semantic

Finally, the value of the coefficient of determination (R^2) indicates what percentage of the variation in the dependent variable is explained by the independent variable. In other words, the coefficient of determination indicates “how much of the variation in the dependent variable is affected by the relevant independent variable and the rest of the variation in the dependent variable is influenced by other factors. In this section, R^2 was obtained to be 0.91, meaning that 91% of the variation in the overall perception variable is predicted through these variables and 9% of its variation can be predicted by other variables.

5.8. Partial Perception

The “partial perception” component is the result of the ground floor, body, and coping sub-criteria. Therefore, the following question is raised: which of these sub-criteria has the greatest impact on the respondents’ partial perception. To answer this question, similar to the previous section, the sub-criteria were ranked using multivariate regression analysis, as discussed in Table 9:

Table 9. Beta coefficients of the criteria constituting the partial perception (Source: Authors).

Prioritize Variables	sig	t	Standardized Coefficients	Not Standardized Coefficients		Observed variables
				B	Std Error	
1	0	12.621	0.354	0.326	0.076	Ground floor
3	0	6.43	0.253	0.221	0.023	Body
2	0	9.285	0.322	0.312	0.097	Coping

Here, R^2 was obtained to be 0.85, meaning that 85% of the variation in the partial perception variable is predicted through these variables and 9% of its variation can be predicted by other variables.

In this section, people’s partial and overall perceptions are examined:

The main results of comparing the 6 streets studied in terms of the perception of the facade details are as follows:

Ground floor: According to the chart comparing the studied streets in the partial perception for the ground floor, the details and invitation in Valiasr and Ferdowsi streets were more attractive to the respondents. Moreover, with a relatively large difference between these two streets and other streets, the openings in them were more aligned. In addition, the respondents preferred greenery in all streets, except Valiasr Street, and the kind and color of the materials used in urban facades were important to them.

Body: According to the chart comparing the studied streets in the partial perception for the middle part (body) of urban facades, the respondents preferred the balconies in Ivanak, Mia’ad, Jozani, Marzdaran streets, and the uniformity of the signs in Ferdowsi and Mia’ad streets was important to them. In general, the importance of this part of the building in Ivanak, Marzdaran, Mia’ad streets has been more than it in Valiasr and Ferdowsi streets.

Coping: According to the chart comparing the studied streets in the partial perception for the coping (upper part) of urban facades, although in Valiasr and Ferdowsi streets, the skyline was preferred, it was less important in them compared to other streets. In Ivanek

and Mia'ad streets, the skyline was important for the respondents. According to the chart, the upper part of the urban facades on Jozani Street has had the least importance and in general, this part has been very important for Valiasr and Ferdowsi streets.

In total, the results of the T-test for 6 streets also showed that in Valiasr and Ferdowsi streets, the respondents perceived more details, followed by Marzadaran street, while in Ivanak and Jozani streets, the details were not significantly important for them.

In general, according to the Table 10, the difference between the case studies in overall perception was greater than it in partial perception.

Table 10. Ranking of the total scores obtained for the overall perception compared to the scores obtained for the partial perception.

Prioritize Variables	sig	t	Standardized Coefficients	Not Standardized Coefficients		Observed Variables
				B	Std Error	
2	0	6.152	0.101	0.261	0.023	partial perception
1	0	14.248	0.522	0.317	0.037	overall perception

Here, R^2 was obtained to be 0.86, meaning that 86% of the variation in the perception variable is predicted by these variables and 14% of its variation can be predicted by other variables.

6. Conclusions and Suggestions

According to the literature, the visual evoked potential (VEP) method includes collecting public perceptions of landscapes by distributing cameras to respondents and asking them to take pictures of a landscape related to research objectives. This method was selected due to its emphasis on indirectly measuring people's preferences and perceptions regardless of the researcher's opinions. Of course, as mentioned in the beginning, there are also methods, such as the use of eye trackers, that can produce a cognitive map based on people's perceptual preferences of a scene. Despite their costliness, they yield interesting results for analyzing vision and perception in motion. If used in similar studies, this tool will present more accurate results. Moreover, analyzing the perception of urban views with various samples of urban spaces such as squares, parks, and sidewalks, which was not feasible in this study due to cost and time constraints, will produce a more comprehensive study.

Finally, based on the studies (especially the review of overseas experiences) and the results of field studies in the six studies, the following conclusions were reached.

Based on the investigations carried out in this research in the two sections of perception of "vision" and perception of "facade", first, it was attempted to identify people's preferences on urban facades while moving or in general, as discussed in the first section. Then, in the second section, based on the structure defined for assessing the perception of urban facades in the form of a table of criteria and sub-criteria, it was attempted to present necessary suggestions for improving the perception of urban facades based on the data of the previous section. Finally, the required suggestions for improving the perception of urban facades from the observers' perspective were presented.

6.1. Priorities Identified in the "Perception of Vision" Section from the People's Point of View

In this section, based on the method used to interpret the interviews, as described earlier, the important and frequently repeated points in the texts related to the interviews on the perception of vision are listed below:

In the examined streets, in terms of vision, people paid more attention to commercial units or those with public activities than the urban facade in the body of buildings, and the coping of buildings is the next priority.

Socially prosperous streets with shops, stores, and restaurants have attracted more people's attention and the building uses and activities were more important to people than building facades.

The showcases and their decorations were the most attractive to the observers on the ground floor, followed by the entrances of public buildings and their portals and columns.

Seeing a lot of billboards on the vertical surface of the facade caused a sense of clutter for observers.

The same color and uniformity of the shutters of shops and signs were interesting for some people and boring for others.

Chain stores, florist shops, pharmacies, mosques, confectioneries, banks, and gas stations have been memorable uses in the minds of observers.

A large number of observers could not find the use they needed by seeing building facades. This is true especially for administrative and multi-purpose buildings including medical offices.

There were different opinions about the preference of modern or old buildings depending on the taste and age of people and there was no specific rule of thumb.

Restoration and maintenance of urban facades, especially for dirty facades (which were near crowded streets) was one of the observers' priorities.

Colors and materials of the facades mostly remained in people's minds, followed by the building use, and the building form.

The shine and opacity of the building materials also remained in the minds of observers.

Observers preferred diversity in the vision corridors and felt more bored with the uniformity and color of the buildings.

A number of observers suggested establishing a canopy for shops on the sidewalk and considered the need for shading through the canopy or tree one of their most important preferences when moving, and of course, the symbolic role of colored canopies was also mentioned.

The existence of good green space on the street was a more important issue for many observers than urban facades.

The special elements in some commercial units, such as restaurants or hairdressers, remained in the minds of observers and were used as a sign (such as ship rudders, specific portals and signs).

In a sociable environment, many observers paid more attention to pedestrians and their behavior and clothing than to buildings while walking, especially if they frequently crossed that passage.

For older people, improper pavement and motor traffic (which may cause them to fall) were much more important than watching the neighboring facades.

Mosques were good signs for addressing and made the streets eligible.

Good memories of people mostly included watching shops, shopping, walking, and eating something in a restaurant or on the move and in public spaces and among other people.

The dominant color of buildings, if it attracts attention, is one of the most important factors in improving legibility. People preferred happy colors in the facades and are dissatisfied with the dull colors of the current facades.

Flashing and animated signs can be a factor disturbing the observers and in some cases, impose a feeling of dizziness. However, for the younger generation, the colored lights of some signs were described as their attraction.

The inharmonious appearances of the buildings was significant to a limited number of observers.

The street width, less sense of enclosure, and thereby seeing the sky had a great impact on the feeling of satisfaction with the street.

Non-Iranian elements in the facades of Ivanki Street were attractive for some observers.

The protrusion and recess of buildings and the presence of a cantilever were interesting and memorable for people.

Tall buildings (relative to the average height of the surrounding texture) have their fans and remain as signs in the minds of most observers. In particular, their copings, from a distance, and their ground floors, from a close distance, and of course their bodies, usually did not attract much attention.

Both the building height and the alignment and uniformity of the openings were rarely noted by observers.

Most people who have been on the streets for essential activities did not pay much attention to their surroundings, especially facades and non-functional elements (except for uses, signs, and addressing).

Historically valuable buildings and architecture such as the city theater, the National Bank, the Anthropology Museum and the newspaper office, etc. in Valiasr and Ferdowsi streets are very attractive to people.

The old trees in Valiasr Street remained in people's minds more than the facades of non-specific buildings.

6.2. Suggestions

In this section, research suggestions are presented based on the extracted criteria and sub-criteria for assessing the research subject:

The principle of unity in multiplicity is one of the key factors in designing urban facades. The multiplicity of factors in the elements and components of the facade should be managed in such a way that a general unity is maintained in an (especially connected) urban body. The unity can be created through color, texture, and materials or attached and decorative factors such as signs, awnings, flower boxes, lights, continuous lighting, so on. In general, the generalities of the facade are much more important than its details for people, and they should be more emphasized. There is no need to set codes to create the limits of ownership, and this goal seems to be automatically achieved by allowing the owners to use the styles according to their favorites. However, encouraging people to build buildings with a unique and special facade can surprise the observer and strengthen his sense of exploration. It is also recommended to create penumbra in facades and full and empty spaces. Using sabbat and colonnade in the streets with sidewalks can help create more penumbra.

Based on the investigations of this research, it is recommended to use signs in the facades to increase their legibility. Regarding the emphasis on recognizing the type of uses by seeing the facades, for example, the following suggestions can differentiate the important uses:

- For pharmacies, a large green plus sign
- For medical offices and buildings, a green arrow sign
- For food shops, a spoon and fork sign
- For bakeries, a bread sign

Another achievement of this study is that the limitation on the number of materials or colors used in the facades should not be required or recommended. Combining the harmonious and varied colors of the buildings can be the best factor for making a sign and enhancing legibility. Moreover, according to the results related to the alignment of openings, it is not very important for people that the openings (doors and windows) are aligned and in the same direction, and in fact, due to the difference between the building in elevation, it is not possible to align the entrances and windows in many cases.

Also about the skyline, there is no recommendation for the alignment of the skylines of the buildings. However, to avoid the waste of energy, it is better to avoid large differences in height in the connected facades or to take the necessary measures to reduce the heat exchange levels. It is also recommended to make copings special by considering tax incentives for buildings with specially designed copings. It is recommended to encourage constructing copings for outstanding high-rise buildings. The copings of these buildings are very important as urban landmarks. To promote the use of green space in building

facades (flower boxes or attached structures or green roofs), enhance their role of being a sign, and improve perception, tax incentives can be considered.

6.3. Epilogue

Based on all the investigations (especially the review of international experiences) and the results of field studies of 6 selected streets, it seems:

The order in urban facades will not necessarily be perceived by the alignment of the openings and the creation of a uniform (and sometimes boring) skyline, or restrictions on the color and type of facade materials. This is the same damage mentioned in the critique of the upper-level design codes in the present study. Therefore, it is better to consider only a limited number of various items in building facades, that people can perceive, fixed and controlled, and leave the rest to the owners and designers. In this way, the private rights of the owners and the art of the designers can be respected by observing the facade as a common area between private privacy and public privacy.

In fact, if, similar to some control codes, these codes are classified into two prescriptive and performance codes, the frameworks and flexibility can be managed simultaneously. The following is a brief definition of these codes:

- A Prescriptive codes: Prescriptive codes, such as a doctor's prescription, must be precise and uninterpretable, and clearly define the lines and boundaries. If there are some prescriptive codes under the performance codes, it is necessary to clearly state them.
- B Performance codes: These codes determine only the generalities and the main goals expected, such as what makes the skeleton of a body and the flexible tissue and flesh make the body flexible and leave it to the designer or the owner. In fact, controlling the whole structure of the city and its components can lead to uniformity and the loss of diversity and creativity. In fact, how to achieve the main design goals and details will be determined depending on the circumstances by the designer.

Of course, it is necessary to determine preconditions and design guidelines and red lines to prevent disorder and the creation of symbols and signs contrary to the cultural principles of the country. However, the ultimate goal of this research is simply that if there are 20 items in the facade of an urban body, it is better to design a limited number of them (for example, 3 to 4 items) in a fixed and regular form, and the rest are flexibly and freely designed by owners and designers. In this case, while maintaining the overall perceptual order, remarkable diversity and differences are also created. For example, one can refer to what happened in Yazd only because of the observance of the principle of unity in multiplicity in the use of materials or white buildings in Spain which indicate unity created only through the use of white color. The following are some of the key points that can be considered fixed and unchanged based on the above theory (in the order of their priorities):

Color

Materials

Functional signs and those helping to better identify important uses (such as pharmacy, medical office, bakery)

Extensions and decorations: for example, one can refer to shop shutters, single-color and plain canopies in showcases, flower boxes or uniform shop signs, so on. Of course, the design of uniform signs in urban facades has the disadvantage of impossible recognition of the use and function of the building from the side in front of the street, as mentioned in the results of the present study. Therefore, in the case of uniform signs, there should be signs to identify more important uses so that they can be recognized from the other side of the street.

It should be noted that among the above, the building color is of the highest importance in the people's perception of urban facades, making the planning and designing of the color scape of urban facades very important. Of course, based on the same principle mentioned above as well as the harmony of colors, which is observed in interior decoration, only one or two fixed colors should be determined for fixed elements and the rest should be

provided to designers in a color spectrum. This is also true for materials, and it seems sufficient to consider a few materials and textures fixed and to leave the rest free.

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