

Comparison of Pedestrian Safety in Old and New Neighborhoods (A Case Study of Qazvin)

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Abstract

Sense of security is one of the basic human needs and the most influential social components of urban life. Perhaps it can be the most important factor in promoting or hindering walking in cities. In other words, if the neighborhoods of a city have a good level of security, the presents of pedestrians can be seen in local streets even in the late night hours. In this regard and to the answer to this question that what kind of structure can be the supplier of pedestrian safety, the present study deals with comparison of an old neighborhood and a newly built neighborhood in the city of Qazvin by utilizing the Analytical Hierarchy Process(AHP) and also spatial analysis with GIS software. Initial hypothesis is based on the assumption that organic older neighborhoods bring safer feel in comparison with new neighborhoods for pedestrians and neighborhood residents. The results largely confirm the hypothesis and also show that nowadays, the old neighborhoods in cities has changed and distanced from the primary structure which require some reforms. At the end of the research, new ways to strengthen the sense of security in the new neighborhood and improvements of old ones are offered. It is hoped the issue analyzed in this study, helps the promotion of pedestrian life in cities.

Keywords: Sense of Security, Pedestrian Life, Analytical Hierarchy Process (AHP), The City of Qazvin

1. Introduction

What kind of structure can really provide pedestrian safety? Answering to this question it is important because feeling safe is a main factor for pedestrians' life and one of the best and most efficient tools for urban planners is organizing and designing the structure of neighborhoods. On the other hand, according to the good history of the old organic neighborhood in responding to this need and not so successful experiences in new ones, comparison between these two areas is definitely useful and helpful. To do this, relevant theories are reviewed and scientific models have been used to study the samples. Therefore, methods such as analytic hierarchy process (AHP) and spatial analysis and software of GIS and Expert Choice has been used.

2. Literature

Urban security in different periods, have always been subject to numerous theorists. The result of these discussions and votes, before taking shape as schools and documented opinions, were expressed by theorists and experts individually. What follows is discussing the formation of opinion and a summary of the most important scholars in the field of security and crime in urban areas.

Theoretical background of criminology at least returns to Chicago sociology school, urban issues and initial studies of urban ecology. Urban ecology arose for the first time in the field of urban studies in 1916 and during 1920s, the social ecology of cities heavily influenced by the Chicago School. Urban ecology founded by Robert Park. (Shkvy, 1369: 131) Park, in his famous book, "Recommendations for research on human behavior in the city", proposed the city as a laboratory for the study of human behavior. Later in this context, in urban sociology and then in criminology a new school created which is the school of urban ecology. This school focuses on human behavior in city environments. In other words, although the city is the effect of and made by human will, as an important factor it could imposed its dominating rules upon the inhabitants and affect human behavior.

The strength of the ecological perspective, is paying attention to the physical characteristics of the cities which cause social anomies. In fact physical, social and economic characteristics which influence city governing are investigated according to the specific areas of city in risk of anomies (Kalantari, 1380: 76-75). School of urban ecology in its evolution, were occupied specifically to the

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study of social phenomena such as crime and mental illness in towns and cities and different parts of them and to draw related maps in which some inner urban areas were reported as areas of crime and mental illness (ibid.)

The theory of mental health offered a variety of opinions. This report studied urban collections according to its echoes on human behavior. The central concept here is the notion of "mental health." It seems that the integration of human behavior in the urban environment particularly depends on the environment. Planning a safe and a logical segmentation of urban space is not enough for the residents to feel safe or freedom of choice in the activities and to provide the entertainment by itself singly; while these factors are essential for physical health. (Shuai, 1375: 62-61).

"F. L. Svytzi" raised comparative ecology and urban pathology school in 1965 for awareness of ecological cities construction and its purpose was to use concepts that helps people living in different urban neighborhoods. Accordingly, the urban pathology studied development, quality, crime distribution, disease and civil unrest in different cities of the world. Almost simultaneously with these studies and perhaps a little ahead of it, "Jane Jacob" survived the matter of savagery in the street. According to her idea fear of violence and harassment of urban environment existed. If people due to the unfavorable or fear of a place, do not use it, public spaces are out of the profit. In Jacob's theory the requirement of a good and successful neighbor was feeling of safety and security of the person among the stranger on the street. Task of the streets is not only to defend the city against dangerous and agitator strangers but also support honorable and pro-peace strangers who choose streets to ensure their safety as well. (Carmona and others, 2003: 120-123)

In fact, Jane Jacob played a very remarkable effect on urban criminology theories with her ideas in her book entitled *The Death and Life of great American cities*. In her theory, it was admitted that monitoring and surveillance of the street need eyes. Those eyes can be called natural owners of streets. A street should make a clear distinction between the public space and the private space and sidewalks should be more desirable ways for people to use. Therefore, it's necessary for the streets to have attractive sidewalks and to provide some public places that are open in the evening and darkness of the nights. Jacob's expressed urban park as an environment conducive to juvenile delinquency and believes that zoning, according to the perspective of human and security is a disaster. (Shuai, 1375: 376)

Researchers such as Jane Jacobs (1961), Oscar Newman (1972), Ellis Coleman (1985) and others have criticized modernist's designs that explicitly caused unfamiliar with the environment and were associated with crime and vandalism. Their criticism made it possible for some guide books which often are given empirically recommendations about how to ensure safer

environments, to be published (Phenolic, 1989; Noble, 1989; Crowe, 1991; Clark, 1992; Chytam, 1994).

Several factors may result in a crime, but the foundation of all crimes can be attributed to three main elements: the offender, the victim and the crime scene. In the absence of any of these elements, the crime does not occur (Snyder, 1385:2).

Pat Brngtinham, Paul Brngtinham, Gerald Saville Paul Wong from 80s onward did encourage researches in the field of crime prevention. British criminologists, Patricia Mahow and Ronald Clark have done extensive research on situational crime prevention. Crowe's book *Criminology* in 1991 called "crime prevention through environmental design: applications of architectural and space management concepts" was introduced as the leading textbook in this field. Stan Carter and Sherry Carter were the pioneers of CPTED in Florida. Professor Jrdá Vkrá, Professor Caroline and Tyzmn developed it in Toronto and implemented it in urban design in order to secure women. International CPTED Association was founded in 1996 by Gerald Saville. Now, more than four hundred participants from thirty-five countries are members. Saville cooperation with the Advance Research Center for Public Safety at the University New Haven and the efforts of Australian scientist, Gerald Cleveland, entered customary CPTED to its new world, which deals with emotional issues (Schneider, 1385:14,1).

Different approaches to environmental planning, such as crime prevention through urban design and the prevention of crime related to specific locations, are now main parts of environmental criminology (Madani Pour, 1387:119). The thing that should be considered in crime prevention through environmental design is that both physical and social aspects of environmental design should combine together to prevent crime.

In 1971, when Jeffrey Ray Article first published "Crime prevention through environmental design", an important milestone occurred in association with social abnormalities of anomic behavior and illegal acts. While to earlier studies dominant view in criminology topics was studying just crime, this paper developed criminology theory. Although Jeffrey's innovative theory in criminology gradually became very famous among academics and influence greatly among public agencies, designers, architects, legal entities and officials, his efforts in the development and implementation of it in twenty-five years in the field of criminology, remains at the least of attention among criminologists. (Robinson, 1996:1)

Therefore, in 1996 Matthew Robinson presented an article about the causes of failure of Jeffrey's theory in criminological theories. In this paper He assessed root causes of different reactions to Jeffrey's theory of government, architects, legal entities and university officials indicated. These reactions, over a period of twenty-five years have become as a general concept theory (CPTED) and developed.

Many efforts have done in the framework of the theory of CPTED, to understand the relationship between place and crimes. Jeffrey and Jacob's ideas had a fundamental role in its formation and development. CPTED is a design methodology proposal. Based on it and by using an appropriate and targeted design of man-made environment, architecture and urban planner can reduce the opportunity for crime and the fear of crime and improve the quality of life. In this context, special projects of CPTED use three basic strategies, natural access control, natural surveillance, and strengthening regional. (Atlas, 1999:11)

Almost simultaneously, Hillier criticized defensible surrounded spaces, which prevent the natural movement of people by depriving all strangers whether they are criminals or ordinary people. He noted that people existence increased sense of security in public places and is the primary tool by which the natural protection of environment is provided. The more natural people existence eliminate, the more risk will appears. He studied the relationship between the spatial position and movement and came to this conclusion that some spatial characteristics increase the presence of people and thus will increase feeling of security. His research also showed that range of theft in low-density areas is higher than in areas with a high density. (Carmone and others, 2003:127)

As noted above, various theories about reduction of crime fertility in urban spaces are presented. The most complete of these opinions, is the theory of crime prevention through environmental design or CPTED. Implications of this theory expressed in terms of three major criteria and two minor criteria as follows:

- A - Territorial reinforce
- B - Control Access
- C - Natural surveillance
- D - Social Activities
- E - Maintenance

It should be noted that determining the relationship between each of these components and any particular anomic behavior specially in urban crimes, is facing with a major problem which is the impossibility of determining a direct linear relationship (Deterministic). The nature of such relationships in the planning and design of our environment is not much clear; But what is certain is that this type of communication is more like a probabilistic and possibilistic than a cause and effect relationship. (Bahraini, 1377: 58)

Crime prevention through environmental design is an approach to problem-solving that considers environmental conditions and the opportunities they offer for crime or other unintended and undesirable behaviors. CPTED attempts to reduce or eliminate those opportunities by using elements of the environment to (1) control access; (2) provide opportunities to see and be seen; and (3) define ownership and encourage the maintenance of territory.

CPTED is unusual when compared with other crime prevention or security measures because it specifically focuses on aspects of the design, while the other measures tend to be directed at target hardening, i.e., denying access to a target using locks and bars, or using sensors and cameras to detect and identify an offender, supported by security guards.

CPTED is unusual also when compared to some police activities. This is because CPTED encourages prevention and considers design and place, while policing has traditionally valued an efficient and effective response to incidents, and the identification and arrest of offenders.

Crime prevention through environmental design examines crime problems and the ways in which various features of the environment afford opportunities for undesirable and unwanted behaviors. CPTED attempts to remove or reduce these opportunities by changing various aspects of the building, the site, the location, and how that place is used. These changes are directed toward three basic objectives, each of which is described briefly below, including examples of CPTED strategies:

1. Control access by creating both real and perceptual barriers to entry and movement. The environment must offer cues about who belongs in a place, when they are supposed to be there, where they are allowed to be while they are there, what they should be doing, and how long they should stay. Users/guardians can also serve as access control if they pay attention to people and activities and report unwanted behaviors to the appropriate authorities.
2. Take advantage of design to provide opportunities to see and be seen. This includes opportunities to see from adjacent properties or the site perimeter onto the site, and possibly to see parking areas and buildings; opportunities to see from one part of the site to another; and opportunities to see parking, walkways, and other areas of the site from various locations inside the building. These design elements need to be supported by potential observers (they actually need to look for and then report unusual behavior), and by policies and procedures, for example, related to landscape maintenance.
3. Use design to define ownership and encourage maintenance of territories. As mentioned previously, the design should provide cues about who belongs in a place and what they are allowed to do. Administrative support in the form of rules and regulations about use and maintenance can be critical to the success of various design applications.

In other categories there are four underlying CPTED concepts:

1. Natural Surveillance
2. Natural Access Control
3. Territorial Reinforcement
4. Maintenance

1. Natural Surveillance

Natural surveillance is a design strategy that is directed at keeping intruders under observation. Designing for natural surveillance involves providing ample opportunity for legitimate users, engaged in their normal activities to observe the space around them. Natural surveillance is the placement of

physical features and/or activities, and people that maximizes natural visibility or observation.

Glazing and proper placement, selection, and maintenance of plant materials should be considered to maximize natural surveillance opportunities.

2. Natural Access Control

Natural access control is a design strategy that is directed at decreasing crime opportunity. The primary goal of an access control strategy is to deny access to a crime target and to create a perception of risk to the offender. It does this by using design features to deny offenders access to targets, reduce escape opportunities and guide legitimate users through the environment.

3. Territorial Reinforcement

Territorial reinforcement is a design strategy that realizes that physical design can create or extend a sphere of influence over a property. Territoriality is a concept intended to clearly delineate a space as public, semi-public, or private space and to create appropriate ownership of that space. This sense of ownership fosters a behavior that challenges any abuse or unwanted acts that may occur in that space. It further creates an environment where strangers or intruders stand out and are more easily identified. Territoriality often embodies natural surveillance and natural access control strategies. Maintenance is an important part of territoriality.

4. Maintenance

Maintenance allows for the continued use of a space for its intended purpose. It also serves as an additional expression of ownership. A well maintained home, building or community creates a sense of ownership, which helps to deter criminals. A good maintenance strategy directly impacts the fear of crime in a community due to residents' perceptions of responsibility and caring in the neighborhood.

Lighting

Good lighting is one of the most effective crime deterrents. When used properly, light discourages criminal activity, enhances natural surveillance opportunities, and reduces fear. The type and quantity of required light will vary from application to application. To the degree possible, a constant level of light providing reasonably good visibility should be maintained at night. The object is to light up the criminal without spotlighting the victim. Lighting also has the ability to influence an

individual's feelings about his environment from an aesthetic as well as a safety standpoint.

5. Analytical framework

According to the opinions of experts in the field of crime prevention and their agreement on the completeness of the theory of CPTED, this study analytical model is largely taken from this theory. The difference is that according to the case features and to localization the theory, the model is modified. Also at this stage, AHP method utilizes to achieve efficient and accurate scientific results and to determine importance coefficient of model criteria and sub-criteria. Binary comparisons and judgments were made with Expert Choice software. As outputs of software show, all disagreement coefficients are under 0.1 which means the accuracy of the results is acceptable and reliable. The final model is presented in table 1. Accordingly three main criteria of 'territorial reinforcement', 'natural access control' and 'natural surveillance' are defined and sub-criteria has been extracted of the relevant literature on urban security. To evaluate the sub criteria some indicators defined and are studied by the questionnaire and observation checklist. Samples selected randomly and questionnaire have distributed in the same number in different parts of neighborhoods. Age restriction for respondents was over 15 years and there were no limits on gender.

Malek Abad neighborhood is in the old quarters of Qazvin and shaped with fully organic texture in the city's core development and in spite of recent construction and renovation, it still retains its old identity and composition. Overall, the neighborhood can be considered as a mix of residential homes, public places and local land uses. Molla Sadara neighborhood is placed in the new texture of Qazvin and has been formed quite checkered. Observations and studies show that the majority of neighborhood residents are educated and government employees and are considered in the middle and upper financial levels.

6. Discussion

a) Territorial reinforcement

Sense of ownership by residents, is associated with a sense of territory and a sense of place. Therefore, the following indicators of 'neighborhoods boundaries in the minds of residents', 'dating residents settlement (sustainable residence)', 'the relationship with the neighbors', 'the number of objective and subjective common signs of the neighborhood' and 'separation of private and public spaces' were assessed through interviews and questionnaires. The results show that most of the neighbors in Malek Abad (over 77%) know each other in an acceptable level, which confirms a history of

over 11 years living of about 70% residents and is a significant factor in promoting the sense of ownership.

obtained from the residents mental division of public and private space and also, observations show that separation of spaces has well been done. These results are not very desirable in Mollasadra. Sense of ownership is in a moderate level (rating of 3 on the Likert) and with an attention to the same passages and illegible alleys, territorial reinforcement is evaluated as weak (score of 1).

b) Access control

This criterion based on the model concludes from 3 sub criteria which are survived during observations and then analyzed using GIS software. The results of 2 studied neighborhoods are shown in maps below.

Also, 80 percent of respondents pointed to the five common signs of neighborhood. In addition, the matrix

c) Natural surveillance

Natural surveillance can be divided into 2 sub criteria of size and congestion of space and form of the space. The high congestion means an amount of population density in which personal distance observe 45 to 120 cm. The second sub criteria splits to 3 types: different horizontal levels, corner and types of U and L shaped. For surviving mentioned criteria, some sub criteria and indicators are used, such as: variety of active land uses, vibrant night life and existence of cozy dangerous and crime prone areas.

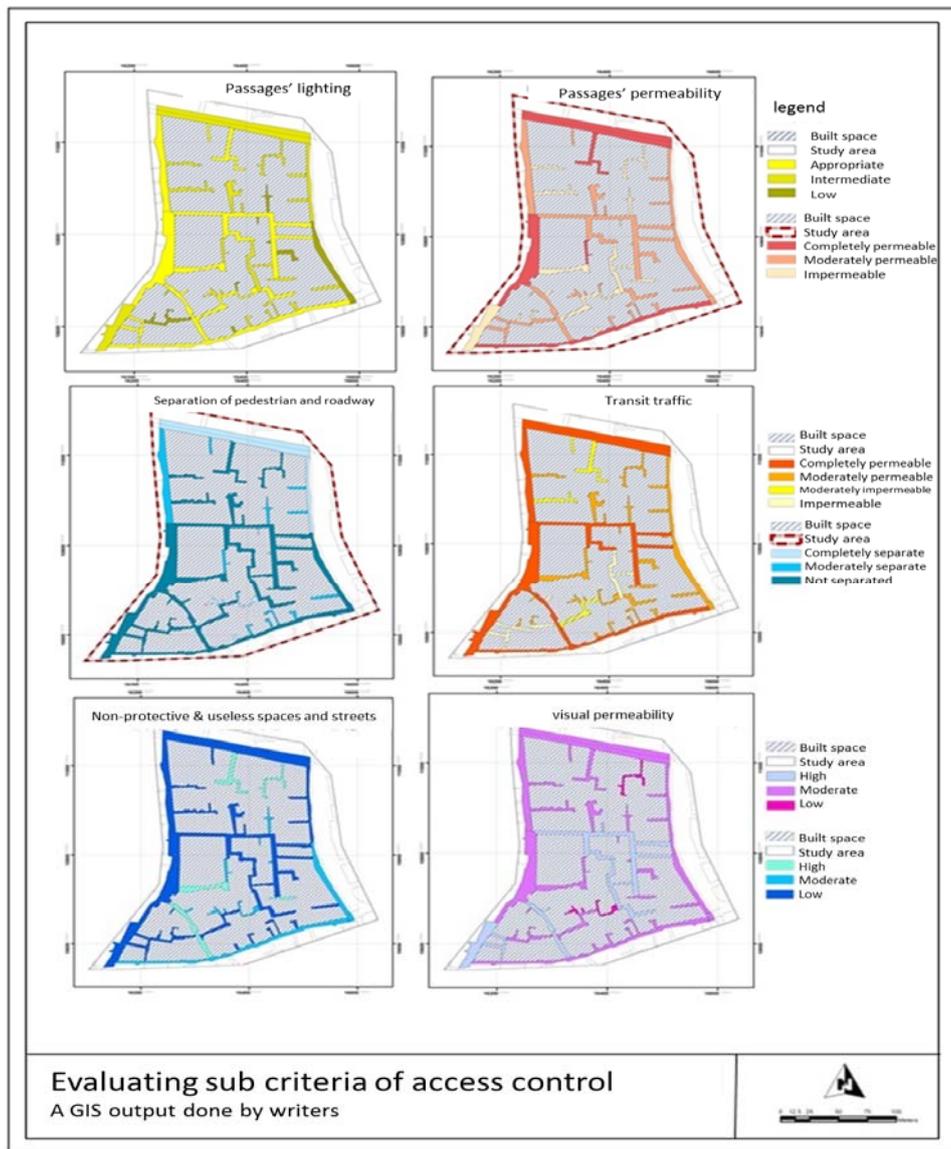


Fig.1. Evaluating sub criteria of access control : a GIS output

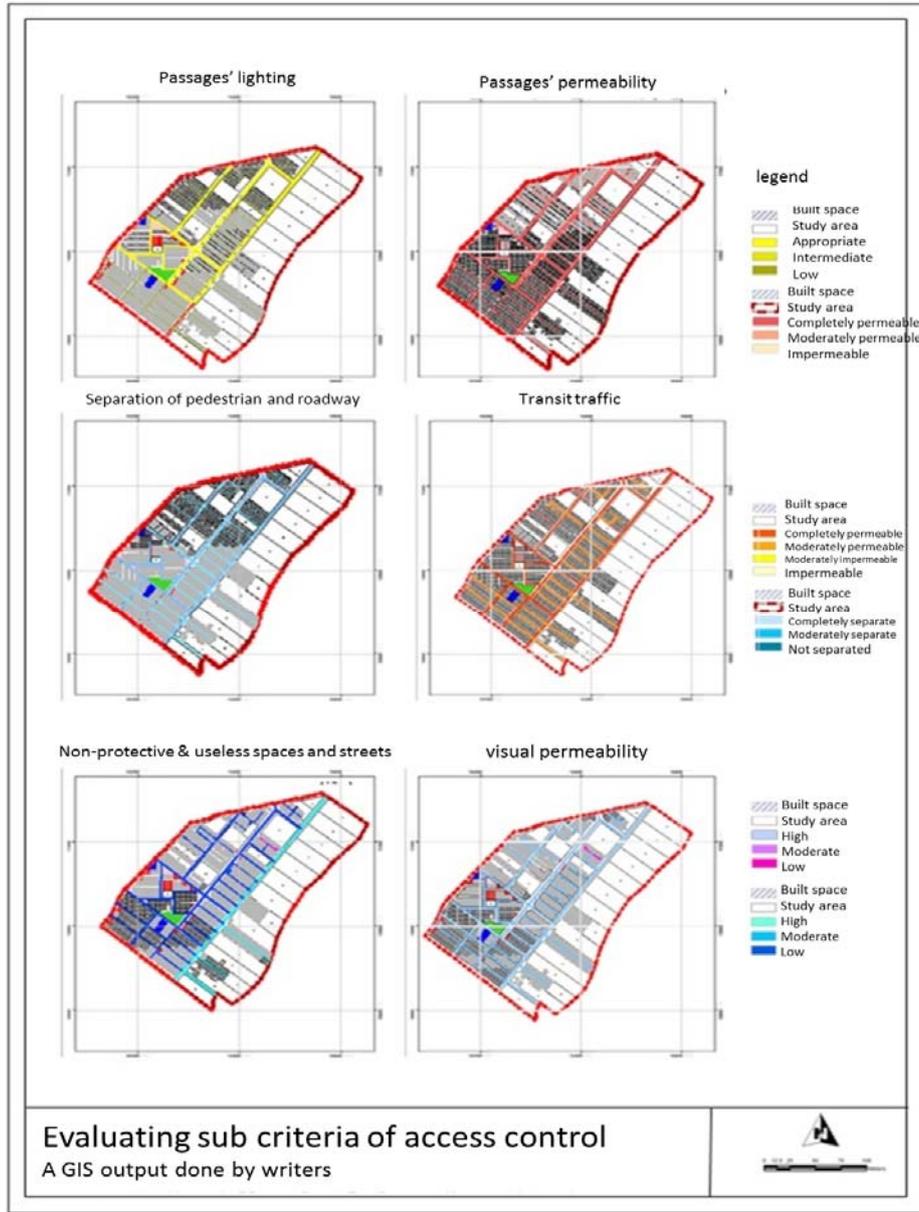


Fig.2. Evaluating sub criteria of access control : a GIS output

The combination and diversity of land uses in Malek Abad are very good and acceptable as well as their distribution in which active and semi-active land uses located in surrounding edge of neighborhood. In addition of creating the feeling of being looked in strangers or potential criminals and increasing sense of security, this form also results in a calm area at nights. However some other activities planned for the evening, including a group of people playing sports or walking which can attract people to neighborhood's spaces at night, don't seem enough. On the other hand, in this neighborhood due to the recent construction in the area and building's indent

and setback, there are a lot of "U" and "L" shaped surfaces and corners in all parts of neighborhood from the streets and to the impasses with more frequency on the main thoroughfares.

According to its newly constructed buildings and urban design principles, Molla Sadra has much less cozy and dangerous spaces. But, the interesting point in this neighborhood is quiet and non-active residents and pedestrians in the neighborhood's public spaces and streets which result in low quality and rating in criteria of crowding in research model for Molla Sadra.

7. Conclusions and solutions offered

According to the analysis done before, we finally reach to below results presented in the table in which,

neighborhoods' points are given according to the range of 1 to 5 (Likret) with applying the importance weights of criteria and sub criterias.

Molla Sadra Points					Malek Abad Points					Importance Coefficient	Sub criteria	Importance Coefficient	criterion
5	4	3	2	1	5	4	3	2	1				
		✓				✓				0.6	Sense of ownership	0.25	Strengthening of territorial
			✓		✓					0.4	The definition of public and private domains		
			✓		✓					0.091	visual permeability	0.25	Access control
✓							✓			0.095	Separation of pedestrian and roadway		
			✓					✓		0.135	Lack of transit traffic		
				✓	✓					0.255	Lack of useless spaces and streets		
✓					✓					0.202	Prominent and visible entrance		
		✓			✓					0.222	Passages' lighting		
			✓				✓			0.7	Congestion, and the size of the space	0.5	Natural surveillance
✓								✓		0.3	Space form		
2.445					3.309					Weighted Average			

As the table shows Malek Abad neighborhood supplies a better level of security's standards and the research hypothesis that "organic and old neighborhoods, compared to new communities brings safer feeling for occupants and pedestrians" largely confirmed.

Among the proposed solutions, according to the theoretical discussion, the following can be mentioned:

1) First criterion: Strengthening territories

- a. Use guards and fences, landscaping in urban design
- b. The use of signs, symbols and visual cues from the art of visual communication.

- c. Continued use of urban space by users through environmental design
- d. Develop a sense of ownership through:
 - Social institutions
 - Color-coded residential neighborhood
 - Special entrances to the neighborhood
 - The use of joint projects in the district, distinct from other communities, development projects and new construction
 - Create civic pride
 - Community participation in the design of public spaces
 - Provide public art and public facilities.
- e. Define the exact boundaries physically controlled space

- Create defensible space buffer between the street and the homes and the main facade that separates the public spaces from private ones.
- 2) The second criterion: access control
- a. Adequate and proper lighting in entrances and access
 - b. Public awareness of the placement of input and output
 - c. Use appropriate materials for floor coverings, walls and landscaping
 - d. Clear definition of the input and output of buildings
 - e. Blocking other routes incoming and outgoing access to urban spaces and buildings
 - f. Allocate enough space, directly as possible without hiding place for pavements
 - g. Combine roadway and pedestrian traffic in an area
- 3) Third criterion: natural surveillance
- a. Considering how access to public places such as holy sites and public parking
 - b. Possibility of human presence in the region by service provision to increase public oversight
 - c. Considering the location of active land uses through urban planning
 - d. Enhancing the visibility of the orientation and location of buildings, parking lots through urban design
- Removal and replacement of obsolete and unused places
 - Reconsider and dismantling the vulnerable buildings and spaces

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