Analysis on Defense Safety Design of Building’s Outside Environment of Semi-gated Residential Community in Changchun in the Perspective of Weakening Fear of Victimization

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Abstract: The spatial environment is the carrier of urban crime. Improper spatial environment provides conditions and opportunities for urban crime, which is the main factor that triggers residents’ fear of victimization. With the aid of the “CPTED” and the “vulnerable to crime” theories, the author proposes that the spatial position, the spatial morphology and the spatial atmosphere are three physical properties of buildings’ outside environment that affect residents’ fear of victimization, after teasing out the environmental characters that influence residents’ fear of victimization, such as accessibility, visibility, identifiability, territoriality, positivity and imagery, etc. The author puts forwards some defense safety design strategies on weakening residents’ fear of victimization for a typical semi-gated residential community in Changchun.

1. Introduction

Quick and rough urbanization has given rise to a new type of urban structure in China, and it also causes a lot of morbid spatial environment problems, which not only affects the incidence of crime, but also influences people’s fear of victimization. The fear of victimization is the psychological perception of the environmental safety, a sense of fear for being victim of the offender, a kind of perception and emotional responses, a sort of presentiment, emotional anxiety and uncomfortable feelings about safety or threaten of their personal or property. The fear of victimization is an important quality measure index of building’s outside environment, which not only affects people’s quality of life, but also restricts people’s behavior choice. The research on the fear of victimization (also known as fear of crime) is going deep gradually accompanied by the research of CPTED (short for “crime prevention through environmental design”) [1][2][3][4][5], but the related research in China is still at its basic stage. Through the defense safety design[6], to restrict and eliminate crime conditions and opportunities, we can increase the difficulties and risks of crime, as well as lessen the stimulations of situational crime. At the same time, we can also weaken the fear of victimization on the psychological level.

2. The spatial properties and environmental characteristics that influencing fear of victimization

2.1 Spatial properties

Residential buildings’ outside environment is important component of urban space, and the space
environment quality directly affects the residents’ fear of victimization. Good space environment can weaken residents’ fear of victimization. Spatial properties such as position, morphology and atmosphere\cite{7} are important influencing factors to defense the safety of space, the restricts opportunities and conditions of situational crime. And they are also important attributes that influence the fear of victimization. Spatial position refers to the layouts and locations of building structures, landscape sketches, entrances and exits and all kinds of identification marks, which affects the visibility, accessibility and identifiability of space environment. The spatial morphology refers to the concave and convex of buildings and structures, the size and flourishing degree of landscape plants, and so on, it affects the visibility and accessibility of space environment, and the like; Spatial atmosphere mainly refers to the cognition and the feelings of psychological and the emotional aspects as well as person involved in the space, such as the sense of belonging, controlling, safety, attraction and cohesion, etc., We can strengthen or weaken the spatial characteristics by dividing inside and outside spaces, through the definition of the transitional space, or the conversion of spatial function, such as territoriality, positivity and imagery, etc.

2.2 Environmental characteristics
The spatial environment characteristic in the city has the function of informing of safety or dangerous. On one hand, it influences the potential offenders criminal opportunities. On the other hand, it affects the degree of people’s fear of victimization. The main factors that influence the fear of victimization in residential buildings’ outside environment include visibility, accessibility, identifiability, territoriality, positivity, imagery, etc.

3. The investigation and analysis on fear of victimization of building’s outside environment in a typical semi-gated residential community
There are mainly three types of residential areas in Changchun city, namely, the gated residential community, the non-gated residential community and the semi-gated residential community. The fear of victimization in three types of residential community is different. The spatial properties and environmental characteristics of buildings’ outside environment in the semi-gated residential community are important elements that impact the fear of victimization.

3.1 Investigation and analysis on the fear of victimization of research object

Figure 1. Analysis on sense of safety, satisfaction and affecting factors of residential environments.
Fuhao garden settlement is a typical semi-gated residential community. The author investigated the community many times, and a total of 100 copies of questionnaires which focused on the related factors of the spatial environment that influence the fear of victimization were released and taken back. The results are shown in the Figure 1.

The result shows that the residents’ feelings of the community’s overall sense of safety and the index of environmental satisfaction is at common level. The order of the various factors that influence residents’ sense of safety of buildings’ outside environment is as follow: “lush degree” (58%), “lighting conditions (38%)”, “health environment” (34%), “traffic” (32%), domination boundary, spatial blind zone and other affecting factors are decline in turn. According to the conclusion drawn from the data, the main environment influencing factors of the fear of victimization of semi-gated residential community’s outside environment are as follow: the visibility, accessibility, identifiability and imagery. Logistic regression analyzed by SPSS software shows that the fitness of the model is good. All the factors can enter into the model and the value of sig is significant (p < 0.05), as it is shown in the Figure 2.

Through investigation, combine with the field interviews of the residents. The residents pointed out the areas with higher fear of victimization on community plan, as it is shown in the figure 3, and the analysis of the spatial properties and environmental characteristics of these areas. The main problems are found as follows.

1) The defense safety problems related to spatial position. From the perspective of spatial visibility, the community has some spatial blind zones, such as the sink space, which weaken spatial control and natural surveillance. The tall green beside road corner and residences weaken the permeability of line of sight. Some lush plants are close to the building, where block the window of the buildings and weaken the natural surveillance. Some critical positions in the area lack of lighting, especially the position access to a garage with no lighting equipment. From the viewpoint of accessibility of the space, the entrances and exits of the community are lack of management. The passageway on the east side is lack of control it enhance the possibility of potential offenders close to criminal target. From the perspective of spatial identifiable, the residential layout is complex and lack of indicator system. The landscapes and roads are complicated and the indicator system are scare.
(2) The defense safety problems related to spatial morphology. From the perspective of spatial visibility, the residential buildings have excessive turn corners, concave and convex and redundant internal corner spaces. All these are easy to form a spatial blind zones. There are many tall shrubs have lush branches and leaves in the area. The plants around the small entertainment square are too lush. From the defense safety perspective, plants keep out of sight, hinder the natural surveillance. From the perspective of accessibility on the space, community’s road forms are complex and space domination is weak. From the perspective of spatial identifiability. The public space of the community is in single form and lack of variations. The sense of distance and identification are not strong and the attraction is insufficient. From the perspective of defense safety, the space with lower identifiability is not easy to produce a sense of identity, affiliation and belonging, and then influences the fear of victimization.

(3) The defense safety problems related to spatial atmosphere. From the perspective of spatial territoriality, the public spaces in the community is not divided clearly and they are lack of transition spaces. From the perspective of spatial positivity, the community is lack of infrastructure and the spaces are less attractive. From the perspective of defense safety, less attractive space is lack of popularity, which is not conducive to natural surveillance and form deterrent effect to crime. From the perspective of space imagery, the quality of community environment needs to be improved. The paths to the central plaza surrounded by plants, are long and narrow and vehicles park everywhere randomly, which leads to a negative the environment image and weaken resident’s intention of activities and communication, and the identity of space along the road.

4. Defense safety design strategies of building’s outside environment for semi-gated residential community based on reducing fear of victimization

People’s awareness of environment has subjectivity and a good environment can bring about psychological safety. Proper outside environment design of residential building can reduce crime opportunity. Therefore reducing the occurrence of crime can promote the neighborhood relationship and weaken resident’s fear of victimization. In view of the defense safety issues mentioned above, we can use below mentioned CPTED strategies to achieve the goal of weakening fear of victimization by improving the spatial properties and environmental characteristics.

4.1 The design strategies in view of spatial visibility

Aiming at the spatial visibility problems of Fuhao garden community, according to the natural surveillance and the image building strategies of CPTED theory, the author proposes the following improvement strategies.

(1) Reduce the space blind zones by optimizing the architectural plane forms. Some are strewn at random sawtooth shape residential buildings, and the corner to corner plane layout of the building,
give rise to some spatial blind zones in building’s outside environment. To specific to this kind of problem, we can combine the buildings and landscapes to optimize the building’s layout form and fill internal corner through planting hedgerow. As it is shown in the Figure 4, which guides the streamline of activities and improve psychological safety.

(2) Increase the spatial visibility by improving the layout of landscapes. To improve the arrangement of landscape around the center square, the designers can choose different height and different forms of plants to enclose the square space, which enhance the permeability of the square space and visibility.

4.2 The design strategies in view of spatial accessibility

Jane jacobs pointed out that “a well-used street is apt to be relatively safe from crime, while a deserted street is apt to be unsafe”[8]. As resident’s travelling through the path of daily life, the roads with reasonable structures and the clear traffic flow can effectively weaken the fear of victimization by using the strategies provided by the CPTED theory, such as access control. To prune the mixed and disorderly growth plants appropriately is as well as to rich the sense of depth of the plant and increase the space interestingness. To minimize the plants that blocking the sight line, strengthen the permeability of the line of sight and improve the ability of natural surveillance and territorial reinforcement, the author puts forward the following improvement strategies.

(1) Reduce the hidden paths by optimizing route selections. Too many traffic paths are not only convenient to the residents, but also facilitate to potential offender at the same time. We can use landscape sketch, plant greening to guide the pathline of people, and try to cut down the hidden pathline which are seldom used, or improve the hidden pathline into pathway that people often use. These measures can effectively boost the natural surveillance, increase the risk of crime, and improve the sense of safety.

(2) To improve the structure of road network and adopt the Radburn Principles, reasonable road structure can optimize the trafficability of the space and also can improve the road safety. The designers can set landscape sketch at proper places along the ring network road and change part of the road into cul-de-sac so as to control the accessibility of road. The designers can also make functional partition on the road to distinguish the pedestrian and the driveway by setting the hedgerow, landscape zone, or changing the material or color of the road, etc.

4.3 The design strategies in view of spatial identifiability

Urban space with poor identifiability provides people bad feelings such as tension and uneasiness because of it is hard to position oneself in there. It will give rise to the sense of fear to the environment. The poor identifiability makes the space lack of cohesion and the sense of community, which weakens...
the perception and controlling ability to the space. Schweitzer et.al put forward that “crime and the fear of crime may also be related to the sense of community that exists in a neighborhood. The sense of community makes people feel more in control of their communities”[9]. Using the strategies of CPTED theory, such as “territorial reinforcement”, “facilities maintenance” and “activities support”, the author proposes the following improvement strategies in view of the defense safety issues of Fuhao garden residential community.

(1) To increase identifiability marks and optimize the spatial subarea, space with higher identifiability can soothe people’s emotions. Setting up a distinguish sign with description of the space character at nodes of different function switch region is conducive to improve residents’ sense of familiarity and identity to the environment. To set up the direction or warning signs at foot path crotch spots, the central plaza, surrounded by the pool, critical point between sinking space and other space can clear spatial information and improve resident’s power of observation and control to environment.

(2) To improve the regional nodes and rich space level, besides the central square, the using ratio of other building groups public spaces are not high. In order to use the space reasonably, local public space should be redesigned, such as sinking square. The space can be divided into some subareas, for instance the children’s play area, fitness area, rest or waiting area and landscape area. Meanwhile, outdoor entertainment facilities for different kinds of residents should be laid out. We can enrich the spatial diversity, boost up spatial attraction, and improve the voltility and defense capabilities of the space through design of the green, sketch, pavement, etc.

4.4 The design strategies in view of spatial imagery
Bad environmental image and the lack of lighting are important factors that affect residents’ fear of victimization. Good living environment can promote residents’ spontaneous activities. However, pathological physical environment with lower identifiability brings about the residents’ psychological feeling of rejection to the environment and gives potential offenders a hint of lack of monitoring here, at the same time. British scholar Painter and Farrington found that: “the insufficient light, the more community crime, improvements to street lighting can help to ease the public’s fear of crime,better light’ enhances safety”[10]. Using strategies of CPTED theory and focusing on “image build” and “facilities maintenance”, the author put forwards the following improvement strategies which aim to solve the defense safety problems mentioned above.

(1) Improve the cohesion of space by optimizing environmental quality. Through the improvement of environmental quality, the affinity of environment can be improved. Garbage spot should be set up in the fixed place and garbage should be manage uniformly. Setting up centralized parking spaces and local road parking spaces to make vehicles park orderly to improve the sense of safety and separate vacant space using landscape or fence, etc.

(2) Boost up the safety sense of space by improving the lighting effect. Laying out the position of the lighting reasonably and selecting suitable light intensity can effectively improve people’s psychological feelings. In order to boost up the visibility of the garage entrance, we can set up night light integrated with the layout of low plant at the entrance of garage. Also, we can set energy-saving landscape lamp on both sides of main roads in the residential community according to the reasonable distance so as to improve visibility and imagery, and then ease residents’ fear of victimization.

5. Conclusion
Through improving the spatial properties and environmental characteristics of building’s outside environment, to reduce the opportunities and conditions of crime, and change the undesirable spatial environment into a relatively safe behavior environment that meets people’s psychological safety requirements, these thinking and methods can not only foil crimes, but also weaken residents’ fear of victimization. The position, the morphology and the atmosphere of spaces in residential community are important spatial properties that influence resident’s fear of victimization. The visibility, imagery, accessibility, territoriality, identifiability and positivity are important environmental characteristics that affect the fear of victimization. To the semi-gated residential community, the major defense safety
design strategies of building’s outside environment can be mainly summed up as the “strategies in view of the spatial visibility”, the “strategies in view of the spatial accessibility”, the “strategies in view of the spatial identifiability” and the “strategies in view of the spatial imagery”.

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