Creating Secured Residential Places: Conflicting Design Elements of Natural Surveillance, Access Control and Territoriality

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Abstract. Territoriality, natural surveillance and accesses control are the preeminent strategies of most place-based crime prevention theories and practices. They have been extensively applied as non-detachable part of defensible space and Crime Prevention Through Environmental Design (CPTED). Even though, a large body of knowledge confirms the effectiveness of these three strategies in preventing residential burglaries, yet, they frequently diminish each other’s effect. Besides, there are divergent views about their implementation, which often brings about contradictory designs and planning decisions, all of which have left architects and planners with a state of ambiguity on hiring felicitous physical elements which prevent burglaries. Hence, the current paper aims to find the design elements of the CPTED strategies which are in conflict in creating security. The study employs the qualitative method of systematically reviewing and critically analysing the literature on the subject. Conjointly, the physical features and design elements of natural surveillance, access control, and territoriality are extracted from the evidence in the literature. The results of the analysis show that the design elements of natural surveillance and access control are more recognized and employed since they are easier to understand as compared to territoriality. Furthermore, it was found that some of the physical elements of access control territoriality conflict with surveillance design elements or diminish the effects of natural surveillance on burglary prevention. Conversely, the social aspects of territoriality design strengthen the effects of natural surveillance. Therefore, the study concludes that the burglary prevention design should consider all the strategies simultaneously. Hence, it is recommended to combine the physical aspects of natural surveillance and access control with the social aspects of territoriality for successful burglary prevention. This study contributes to the body of knowledge related to CPED by shedding light on the deployment of its main strategies without conflict in their effects. However, there is a need for furthered evidence of the design elements of natural surveillance, access control, and territoriality. Only a thorough examination and comparison of the impacts of their design elements on a residential burglary in a single context could further confirm the literature findings of the present study.

Introduction

Surveillance, access control, and territoriality are the non-detachable components of the crime prevention theories such as ‘eyes on the street’ [1] ‘defensible space’ [2], CPTED [3], and other situational crime prevention practices [4]. These strategies are known to discourage crime and urge perceived safety and security against incivilities [5]. Two design elements of
defensible space related to territoriality and natural surveillance are the demarcation of areas, which are under the influence of inhabitants to create territorial attitudes and the arrangement of buildings’ windows to allow natural surveillance [6, 7]. Likewise, the physical environment level of situational measures of crime places is mainly based on territoriality, surveillance, and pedestrian and traffic flow [7]. In parallel with other theories, CPTED which was formed based on the idea of defensible space [8] consists of natural crime prevention techniques, which are achieved as a “by-product of the normal and routine use of the environment”. Wherein, natural surveillance and natural access control which are mutually supportive of each other are known as the primary concepts and territoriality as the complimentary design concept of CPTED [9].

Although, natural surveillance and territoriality have been extensively applied in environmental criminology theories and burglary prevention practices, there are different perspectives about their deployment in the design of residential places. Followers of defensible space concept with ‘territoriality dominant’ perspective advocate that stronger territorial areas with a limited number of outsiders are less vulnerable to burglary. Newman In his book, creating defensible spaces [10] stated that an increase in a number of the non-legitimate users of the environment reduces the sense of territoriality, which ultimately leads to lower security and higher number of crime. On the same basis, Newman [11], Poyner [12], and Poyner Wedd [13] recommended restricting pedestrian movements through residential neighborhoods through the demarcation of the spaces. ‘Defensible space’ design techniques encourage more closed space configuration [14]. On the contrary, the followers of ‘eyes on the street’ concept by Jacobs [1] with surveillance dominant perspective believe in higher admittance of people through residential spaces to prevent burglary. Jacobs also suggested placing residential blocks towards the streets to keep eyes on the streets and passers-by. Her design ideas promoted more open space configurations with emphasis on the use of surveillance elements. This controversy suggests that there could be other divergent views and elements with regards to natural surveillance, access control, and territoriality. According to [14], such a controversy is subjected to scrutiny by scholars. Hence, this paper sought to identify the spatial layouts and physical features of the environment, which have been designed to serve surveillance access control and territoriality strategies along with their influence on residential burglary. Moreover, divergent evidence in support of each strategy is compared and analysed.

**Surveillance and Inter-visibility**

Natural surveillance is the primary and conspicuous design concept of the physical environment for crime prevention, which facilitates observation of intruders [9]. It can be promoted through physical design that provides opportunities of watching the environment by residents and their agents as a part of capable guardianship [14]. Inter-visibility is the main component of surveillance, which is referred to the provision of self-surveillance to the legitimate users of the residential area through windows [15], visibility, and clear lines of sight without obstacles [16]. Good inter-visibility is mentioned as an inherent quality of non-burglarized houses in many Researchers’ works such as [17, 18]. High degree of inter-visibility is known to be a beneficial crime prevention strategy due to the generation of the mechanisms of informal (natural) surveillance generated in the area [19]. Researchers such as [2] emphasized on strong inter-visibility of enclosed areas facilitated to only legitimate users and the arrangement of buildings’ windows to allow natural surveillance of public areas. The inter-visibility within outward facing blocks in the immediate surroundings of residential places allows residents to guard strangers [20]. Furthermore, non-burglarized houses were confirmed
to have greater visual contact with neighboring houses [21] and are located in areas with a high level of inter-visibility [19].

**Surveillance and Accessibility**

Crowe (2000), in explaining crime prevention through environmental design concepts mentioned that natural surveillance and access control components of CPTED are complementary and their design elements are not exclusive to each other [9]. Surveillance may act as the access control strategy by keeping intruders away due to an increased perception of risk [9]. Another way, the level of access control decides the level of surveillance by allowing the number of passers-by into a residential neighbourhood. The accessibility features, which promote surveillance, are the permeability, integrity, and intelligibility of the environment.

With regards to permeability, the ‘eyes on the street’ concept of Jacobs supported the accessibility of public and flow of passers-by through streets of residential areas to guard the neighbourhood, which attracts more eyes from buildings to watch the streets [1]. She recognized the existence of a sheer number of people as the potential witnesses, whom their intervention prevents crime [22]. Researchers like [23] predicted that certain critical levels of street activity and population density were linked to a crime. A critical crime zone of intensity was, therefore, one that could support low numbers of people but insufficient densities to contain both victims and offenders. Similarly, DanzlGer In his work, “Explaining crime rate”, concluded that population density influences crime rates [24]. Similarly, [25], asserted that property crimes without contact, such as residential burglary, have a negative correlation with population density. His statement was later supported by [19], which claimed that population density is shown to be inversely related to household larceny and burglary due to the improvement in visibility of crime scene to passers-by in high-density areas. In a relatively recent [25, 26] study, no correlation could be found between crime and density, however, it was confirmed that crime has a strong correlation with pedestrian movement. Moreover, [27] confirmed that chances of burglary are lower at houses with people on the street. Table1 summarizes the core findings of researches related to residential burglary; highlighting the characteristics and physical elements of surveillance in non-burglarized houses and their environment.

**Table 1.** Physical features and design elements of accessibility promoting natural surveillance

| Attributes of secured residential places | Elements of surveillance involved in designing safe residential places | Authors |
|-----------------------------------------|--------------------------------------------------------------------|---------|
| Permeable to people and bystanders for increasing witnesses and informal social control. | Residential block facing the street | Jacobs (1961) |
| Increased natural surveillance of inhabitants on public spaces. | Proper arrangement of windows for surveillance | Newman (1972) |
| Relatively populated areas | Increasing the number of people wherever needed | Shu (2009) & Angel (1968) |
| Increased Inter-visibility | Designing for inter-visibility | Decker et al. (1982) |
Following Hiller’s statement with regards to the strong correlation of pedestrian movement and crime rates [26]. The pedestrian rate to a great extent was shown to be influenced by the integrity and the intelligibility of a residential neighborhood. By and Large, Integrated areas, allow easier flow and movement of people and they turn out to be less vulnerable to burglary than the segregated areas; particularly in the low and middle-income areas [21]. Contrariwise, Segregated streets, allow fewer people to enter the areas and they turn out to be more vulnerable than integrated ones. In fact, those Integrated areas that offer higher accessibility and are associated with adequate inter-visibility, can be very safe [19]. Intelligibility is another known attribute of locations with a low level of crime; having no hidden corners or dead areas. A study across six areas of a metropolitan city by [27] revealed that intelligible areas that enable more people to easily access and enter the area are less vulnerable than less intelligible areas. Indeed, houses located in more intelligible areas with good surveillability and accessibility with a greater number of people and passers-by are least at risk of burglary [17]. Moreover, the existence of passengers on accessible streets creates a vital dwelling area. The physical environment can facilitate, on street population, pedestrian rates, permeability, integrity, intelligibility, and inter-visibility of the residential neighborhood via designing an appropriate spatial setting.

**Territoriality**

Territoriality is “the capacity of the physical environment to create perceived zones of territorial influence” [2] with controlled access [32, 33], which is under the supervision and responsibility of specific groups of people. Territorial reinforcement uses the physical elements

| Accessibility/More passers-by | Through streets instead of Cul-de-sacs | Van Nes and Rueb (2009) | [20] |
|-------------------------------|--------------------------------------|-------------------------|------|
| Permeability & Integrity      | More integrated areas, higher number of passersby | Decker et al. (1982) | [28] |
| Permeability, Intelligibility | Intelligible deformed grid streets & outward facing block | Hiller (2004) | [29] |
| Permeability & high pedestrian movement | Traditional through street pattern over the modern hierarchical layouts | DanzlGer (1976) | [26] |
| Permeability & high pedestrian rate | Cul-de-sacs combined with footpath network | Montoya et al. (2016) | [30] |
| Intervisibility, intelligibility & high pedestrian rate | Surveillable houses and accessible streets | Cozens et al. (2005) | [17] |
| Permeability, inter-visibility & high pedestrian rate | “Cal-de-sac complex combined with footpath network” | Shu and Huang (2003) | [31] |
| Permeability & inter-visibility | Adjacency of streets to main routes & vital dwelling area | Change (2009) | [18] |
| Intelligibility | More people on the street | Shichor et al. (1979) | [27] |
and certain activities to promote the sense of control and proprietorship in legitimate users of the environment and perception of risk in potential offenders [9]. It focuses on the manipulation of physical design to provide a controlling power to inhabitants for making the space less vulnerable [34]. [35] emphasized on the importance of specific architectural elements which can influence the level of social control by affecting residents’ social life. The researchers who related territoriality with the low level of crime, often involved residents, dwellings, and their environment as design elements to create territorial influence in residential neighborhoods [36-39]. Concerning with dwelling design and its surroundings, ‘territorial functioning’ mechanism uses fences, boundaries, and other signs to mark the private areas and exclude unwanted people [35]. The demarcation of private areas as a part of the people’s territory, shapes the ‘defensible spaces’, which are actively defended and policed by residents [2]. While the presence of “residents showing territorial concern” and “neighbors who would react”[40] will increase the perception of risk in offenders, who would want to perform any form of territorial intrusion.

In addition to the physical elements, territorial functioning has social components, such an attitude, behavior, and markers [35], which explains how people occupy, use, and manage their living spaces. A study by [21] showed that burglarized houses possessed “salient public territorial qualities” and cues of openness and unoccupied appearance. In contrast, non-burglarized houses had primary territorial qualities, such as territorial markers, communicating privacy, and inter-visibility. [41] believed that areas with higher crime level certainly require more territorial markers. Territorial access control is referred to discouraging the presence of non- legitimate users of a neighborhood by controlling the flow of vehicle and passers-by. [2] Strongly, believed in demarcating the areas, which are under the influence of inhabitants to create territorial attitudes, and added the separation of semi-public and semi-private to Jacob’s basic idea of separating public zones from private zones [1]. Design should limit access paths or pathways to achieve territoriality. Empirical studies by [42] and [16] show that higher permeability of a residential neighborhood permitting more strangers increases the opportunities of property-related crimes. Hence, access control must promote territoriality to achieve safety. The design elements to achieve this sort of territoriality access control are territorial markers such as physical barriers.

Results and Analysis

Paradoxical Features of Security

Natural surveillance, access control, and territoriality complement each other, thus, designing one shouldn’t decrease the strength of the other [9]. However, these strategies were taken from defensible space elements, which contain contradictions within themselves [43]. Thus, there are cases, where the design for territoriality may conflict with surveillance. For instance, physical barriers, which keep intruders out, simultaneously block visions [44]. Other physical barriers, such as walls, fences, solid gates, and landscape elements used in defining a territory reduce the inter-visibility or surveillability of one house from other neighboring houses and streets (especially on entrance and exit points). Hence, burglars are often attracted to a residence with high fences, which block neighbour’s views [45]. As several contextual shreds of evidence showed that physical territorial elements, such as actual and symbolic barriers increased house vulnerability to burglary [17]. Other elements, such as ‘demarcation of spaces’ were supposed to evoke the sense of territoriality in an entire neighbourhood, but instead, only the private areas marked as ‘defensible space’ were looked over actively, whereas other areas were often ignored by the residents, so were referred as ‘confused spaces’[17]. The wall
marking the garden of the detached house could not add to the security against burglary, instead it could be climbed and then provide concealment [26]. For a fair comparison, the space characteristics, which have been designed according to territoriality and access control versus natural surveillance and accessibility along with their conflicting design features have been summarized in table 2.

**Table 2: paradoxical design characteristics of security strategies**

| Territoriality and access control | Surveillance and accessoriy |
|----------------------------------|----------------------------|
| closed space configurations       | Open space configuration   |
| visibility to residents alone     | Visibility to everyone     |
| physical barriers                | Look through barriers      |
| Demarcation of private,          | Demarcation of private and public areas |
| neighbourhood/private and public areas | Company               |
| Privacy                          | Open environment          |
| Closed environment               | Permeable environment      |
| Impermeable environment          | Open to strangers         |
| Close to stranglers              | Accessible streets         |
| Less/Non-accessible streets      | More pedestrian flow       |
| Less/no pedestrian flow          | Integrated areas           |
| Segregated areas                 | Through streets: Gridiron Streets |
| Cul-de-sac; dead-ends;           | Connected streets          |
| broken up streets                | Permeable street pattern   |
| Non-permeable street pattern     |                            |

**Accessibility not escapability**

Offenders are very structured in selecting the location of their targets. Burglar’s attention is mostly on the vulnerable entry point and available escape routes [46]. Their concern is mostly on how quickly they can both get in and get out of the target and always determine the possibilities of getting caught while in a crime scene or leaving the scene [47, 48]. Burglars make use of every available escape routes. In case of burglary, the houses must possess easy access from the street [49] or be close to major traffic routes [50]. Offenders always look for an easy escape to the nearest highway to flee quickly. Hence, street barriers, reduction of unwanted traffic, and calming the traffic with barricade/pallet increase the difficulty of offender’s escape [51]. Studies show that “Through traffic, streets are far more vulnerable to residential burglaries than other types of routes, and especially T-type and dead-end”[52]. According to [53, 54], higher crime rates are seen in areas with the gridded network than areas with organic street patterns, as offenders prefer these less confusing escape routes over cul-de-sacs or complicated roads. Similarly, [42] mentioned that property crime is lower in houses located on a street with a complex network, traffic barriers, and road enclosures, which impediment access and vehicles flow. “Corner lots tend to be the most at risk for first-time burglaries” [55]. [56] also elaborated that houses at corner locations and close to the highway are more likely to be burglarized. This was further supported by [27], who showed that corner houses are more vulnerable to burglary to a significant extent. Hence, streets and the environment of residential area should control vehicle traffic and accessibility of vehicles to the houses to discourage the escapability of offenders. Study of middle-class houses by [57] asserted that the crime rate was high among the detached houses adjacent to main roads. Newman [32] in his study of Dayton’s Five Oak residential community found that vehicular
traffic was a major source of the neighbourhood problems. Therefore, the lack of access control and boundaries were meant to reduce the permeability of outsiders with vehicles. Hence, “the solution is to link the neighbourhood with pedestrian traffic, but disconnect from vehicular traffic” [58].

Conclusion

The main scholars in the field of CPTED believe that natural surveillance and access control must contribute to a “sense of territoriality”. The empirical tests have shown strong support for natural surveillance and access control for preventing residential burglary, unlike the physical features of territoriality, such as territorial displays and extra care for the house, which increase the vulnerability of a house by assuring burglars that a target is worth and profitable. The literature indicates that social functioning of territoriality has more influence on preventing a burglary than its physical elements. Hence, the design of the residential places should include the physical aspects of natural surveillance and access control and the social aspects of territoriality to avoid the paradoxical design elements, which diminish each other’s effects on burglary prevention. However, even the most exact physical design does neither guarantee the active and routine surveillance of the place and the intervention of the residents nor the control of access to the target of the offenders. Even though, the level of success of the burglary prevention strategies varies according to the contextual situations and the culture of the neighbourhoods, but the appropriate design of residential places, which consist of non-conflicting and pragmatic physical elements that facilitates good surveillance, controls the access of burglars, and motivates the sense of territoriality to a great extent. The study recommends the examination of the paradoxical design elements of natural surveillance, access control, and territoriality in a single context to understand a more realistic level of the effects of such elements on residential burglary prevention.

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