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The Relationship between Crime Prevention through Environmental Design and Fear of Crime

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Abstract

The built environment especially in terms of the residential design is believed to be one of the factors influencing crime and the level of fear of crime (FOC). People's perception of FOC varies considerably depending on their attitude and practices towards environmental conditions. CPTED is one of the most effective mechanisms to reduce FOC. Therefore, this paper investigates the relationship between practices and attitudes of CPTED and FOC in gated and non-gated residential areas. This study found that CPTED perception has a positive relationship with FOC ($r=0.36$, $p<0.01$) while CPTED practices has a negative relationship with FOC ($r=-0.40$, $p<0.01$).

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1. Introduction

The escalating rate of crime has become a major concern in most countries. This is because it has led to rising fear of crime amongst residents who feel that they are constantly at risk (Nasar & Jones, 1997). As such, the relevant authorities have invested large sums of money in crime prevention efforts to overcome this phenomenon. These investments have, however, fallen short of expectations as crime rate keep increasing throughout the world. These acts of crime are believed to be related to the physical environment (Cozens et al., 2005; Liebermann & Kruger, 2004; Merry, 1981). Cozens et al. (2005) and Liebermann & Kruger (2004) postulated that if an opportunity exists in a conducive environment, it will

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encourage a criminal to act on a targeted victim besides being influenced by the criminal's willingness and ability to act as well as the targeted victim's vulnerability that attracted and induced the act of crime. Apparently, the environmental element is one of the factors considered by criminals in deciding whether or not to commit an act of crime (Anastasia & John, 2007).

Various studies have found that the built environment do influence criminal behaviour (Cozens, David, & Gwyn, 2001; Liebermann & Kruger, 2004; Merry, 1981) where housing areas that are not guarded or patrolled are more prone to become targets for acts of crime. In forming such control, interaction among factors including physical, social, environmental, individual, and community form the basis for environmental design and management as one of the strategies to prevent crime. This may be related to the place-based method of crime prevention which refers to the steps taken to prevent or mitigate crime before it happens. This form of crime prevention focuses on all efforts aiming at reducing crime rates and fear of crime. Various crime prevention efforts such as Crime Prevention through Environmental Design (CPTED) focus on criminal spatial dimension and combine various strategies with the objective of changing criminal behavior. This study aims to investigate the relationship between CPTED's practices and attitudes of CPTED and fear of crime (FOC) in gated and non-gated residential area.

1.1. Literature review

The concept of Crime Prevention through Environmental Design (CPTED) focuses on areas that often become the targets of acts of crime and then emphasizing on techniques that can reduce acts of crime in the affected areas (Taylor & Harrel, 1996). CPTED was first introduced in 1971 by the criminologist and sociologist Ray Jeffery (1971) who was inspired by Jane Jacobs (1961); in his study which correlates crime with road layouts and land uses in American cities developed for public safety. This study was further expanded by Newman (1972) who introduced the 'Defensible Space' theory through studies on effects of environmental physical construction on acts of crime. This was later followed by other researchers (Brown & Bentley, 1993; Shaw & Gifford, 1994); who focused more on factors believed to play the role as mediators in reducing acts of crime.

CPTED is a different approach in crime prevention. It may be expressed as physical environmental designs that may reduce opportunity for criminal acts and thus reduce fear of crime through natural, mechanical and procedural means. This is based on physical environmental characteristics that influence opportunities for crime to happen and affecting the criminal's perception on their targets for criminal acts (Taylor, 1996). Various studies have found that CPTED involves four main elements namely territoriality, surveillance, maintenance and access control. Territoriality can be defined as a concept that reinforces the notion of proprietary concern and a 'sense of ownership' by legitimate users of space, thereby reducing opportunities for offenders by discouraging illegitimate users (Perkins et al., 1992). However, Surveillance is based on the physical design which enables the capacity to promote informal or natural surveillance opportunities for residents and their agents, thus making surveillance a part of capable guardianship. If offenders perceive that they can be observed, they may be less likely to offend, given the increased potential for intervention, apprehension and prosecution (Boeting, 2006; Cozens et al., 2005). Maintenance is to promote a positive image and to routinely maintain the built environment to ensure that the physical environment continues to function effectively and transmits positive signals to all users (Cozens et al., 2005; Crowe & Zahm, 1994). The last element is Access Control which refers to reducing the opportunities for crime by denying access to potential targets as well as creating a heightened perception of risk (Brantingham & Brantingham, 1993).

Previous research demonstrates the relationships between elements of CPTED with fear of crime and crime itself. Some research shows findings by Blobaum & Hunecke (2005), and Schneider & Kitchen (2007) on the relationships between surveillance and fear of crime, territoriality and fear of crime and

crime itself (Aldrin, 1999; Newman, 1972; Perkins et al., 1992) and maintenance with fear of crime (Cozens, Hillier, & Prescott, 2001; Craik & Appleyard, 1980). However, research relating all the CPTED elements with fear of crime is limited. Recently, several studies have linked the relationship between CPTED elements with fear of crime (Clontz, 1995; Hedayati, 2009; Minnery & Lim, 2005; Mohammad Abdul Mohit & Elsayahli, 2010). Fear of crime is defined as a perception that fear of crime is related to emotional reactions, feeling of fear and distrust towards anything that may cause injury brought about by assault (Pain, 2000).

With relation to CPTED, the focus of the previous studies (Aldrin, 1999; Blobaum & Hunecke, 2005; Chang, 2011; Cozens, Hillier et al., 2001; Craik & Appleyard, 1980; Hedayati, 2009; Minnery & Lim, 2005; Newman, 1972; Perkins et al., 1992; Schneider & Kitchen, 2007) was on CPTED practices rather than taking into consideration the respondents' perceptions on CPTED. Moreover, studies that examine the perception of CPTED and its relationship with CPTED practices and fear of crime are still rare. This assumption is in line with The Theory of Planned Behavior as proposed by Fishbein and Ajzen (1975) which proposed that a person's perception of a subject may motivate that person to act on the subject. For instance, a person who believes that the element of territoriality is able to reduce acts of crime will apply elements of territoriality at his residence to prevent acts of crime. Based on Fishbein and Ajzen's (1975) theory, planned behavior is important to be considered in studying relationships between CPTED and fear of crime.

There is a large body of literature that supports the effectiveness of CPTED elements on fear of crime (Blobaum & Hunecke, 2005; Pain, 2000; Perkins, Wandersman, Rich, & Taylor, 1993; Schneider & Kitchen, 2007). A study conducted by Schneider and Kitchen (2007) regarding the relationship between CPTED elements with fear of crime indicated that some elements of CPTED can reduce fear of crime. More specifically, Schneider and Kitchen (2007) found that good surveillance using lighting at night is able to improve visibility of the surrounding area especially at the pedestrian area thus reducing fear of crime. Clear nocturnal visibility at a certain distance enables a person to act quickly against any action perceived to be a bodily threat to him (Blobaum & Hunecke, 2005). This view, however, contradicts the assumption by Pain (2000), that clearer visibility of the surrounding area may cause higher feelings of fear of crime. This may be more relevant in areas with high deterioration such as at rubbish dumps, vandalised areas, abandoned buildings and so forth that gave rise to the perception that there are criminal activities in this area.

Elements of territoriality which is termed 'territorial functioning' is a social perspective which has significance in the advancement of the human lifestyle (Taylor, 1988). This is related to the management of a space that requires the owner's actions and responsibility to ensure that that space is always cared for by displaying ownership characteristics; such as displaying signs of ownership, garden decorations, water features, landscaping and so on (Taylor, 1988). This territoriality spatial formation enforces spatial limits which are believed to provoke defensive actions by the owner in the event of criminal trespass of ownership, by calling the police or the neighbours (Perkins et al., 1992). In addition, Brown and Altman (1981) found that a house that has been burglarised are most often houses that have weak territoriality space qualities such as signs of non-occupancy. However, a study of council housing estates in Sheffield, UK, found that there is no significant relationship between territoriality with fear of crime (Aldrin, 1999). This finding was believed to have been influenced more by the owners' personalities than their sensitivity towards spatial defence in preventing acts of crime (Aldrin, 1999).

Natural surveillance is believed to influence lack of criminal activities, which is related with community relationship (Merry, 1981). Natural surveillance is a strategy that gives a perception to the potential criminal that there exists a risk that he will face in an area, making him feel that he is being watched; thus discouraging criminal intentions (Cozens et al., 2005). The routine activities theory stated that surveillance is the main determining factor whether a criminal will commit an act of crime (Boeting,

2006). Surveillance can be achieved through natural and mechanical means. Natural surveillance involves the local community actions, the buildings' physical openings, and police patrol (Cozens et al., 2005; Perkins et al., 1993). Mechanical surveillance, on the other hand, involves the use of surveillance tools such as CCTV (Jensen & Anderson, 2004; Kajalo & Lindblom, 2010). Increased surveillance coupled with lighting system at night will reduce feelings of fear of crime (Perkins et al., 1993), as they create visual clarity to the surrounding area thus enabling defensive actions in the face of personal safety threats (Liebermann & Kruger, 2004).

Maintenance at the dwelling area helps the owner to give out a signal to outsiders that his dwelling is always maintained and under watch (Cozens et al., 2005). Attention to the cleanliness of the dwelling and its surrounding areas expresses stronger place attachment, which is related to crime and incivilities (Brown et al., 2004). A good image in terms of maintenance in the neighbourhood, will create a perception that there is low social problems in the area (Crowe & Zahm, 1994). In the context of maintenance, it was stated in the Broken Windows theory that a poorly maintained neighbourhood sends out a signal that there is lack of care by residents, hence giving rise to other environmental issues (Wilson & Kelling, 1982). Furthermore, poor maintenance is believed to invite targeting of crime (Crowe & Zahm, 1994; Wilson & Kelling, 1982). Clontz (1995) found that a dwelling that is poorly maintained has three times higher risk of being burglarised than a dwelling with a better image and which is better maintained. In terms of maintenance, Brown et al. (2004) found that physical incivilities such as improperly disposed garbage are important "signs" of acts of crime either in dwellings or in neighbourhoods. Research has shown that poorly maintained neighbourhoods are perceived as spaces that are less defended and more prone to acts of crime (Cozens, 2002).

Access control is a strategy aimed at reducing opportunities for commission of acts of crime by giving a perception to offenders of the risks they will face (Brantingham & Brantingham, 1993; Cozens et al., 2005). These obstructions to target areas are in the form of fencing, solid walls, automatic locks, padlocks and alarm systems that obstruct and hinder burglary (Hirschfield, 2004). Various studies have proven that unsecured dwellings or properties have three times (Budd, 1999), and six times (Clontz, 1995) higher probabilities of being burglarised than properties with basic security equipments.

Based on the foregoing discussions of study findings, no assertive conclusion could be made as to the relationship between CPTED and fear of crime. Research has shown that some elements of CPTED were able to reduce or mitigate acts of crime (Brown et al., 2004; Crowe & Zahm, 1994; Kajalo & Lindblom, 2010; Perkins et al., 1993; Taylor, 1988; Wilson & Kelling, 1982) which were also perceived to reduce fear of crime (Newman, 1972). Recent research discussing the relationship between CPTED and fear of crime are by Hedayati (2009), as well as Minnery and Lim (2005) which found that fear of crime do not have a significant relationship with CPTED in dwelling areas. According to Hedayati (2009), this finding could be related to other factors such as speculations on crime, and social and psychological factors that have higher influences on fear of crime. In this context, it can be seen that elements of physical environment have the ability to mitigate and prevent the commission of acts of crime.

2. Methodology

The study was conducted in Putrajaya and Bandar Baru Bangi, which are located in the central part of Malaysia. Putrajaya is the administrative center of the Malaysian Federal Government which is located due south of Kuala Lumpur city center (Putrajaya, 2009). Located strategically within the Multimedia Super Corridor (MSC), Putrajaya is considered as Malaysia's first Intelligent Garden City and is developed on 3,232.5 acres of land. It is a model city which is the heart of the nation and has gone on to become an attractive place to live and work in. The development of Putrajaya consists of 20 precincts with residential areas being focused on Precinct 9 (44.60 percent), Precinct 11 (26.30 percent) and

Precinct 8 (14.90 percent) (Putrajaya, 2009). The total number of residents in Putrajaya is 49,452. The study area in Putrajaya is Precinct 9 Road B, which was the first neighbourhood to be built in Putrajaya (Roslan Talib, 2009) with 275 dwelling units. The area consisting of purely landed properties is a typical medium-high income housing area with two-storey terrace houses.

The other study area was Bandar Baru Bangi which is located near Putrajaya at a distance of approximately 15 kilometres (Putrajaya, 2009). Bandar Baru Bangi was also based on the Garden City concept as a new township located in the District of Kajang under the jurisdiction of Kajang Municipal Council (MPKj) and consists of 9,298 hectares of development. Bandar Baru Bangi is also known as a Satellite City and is the second largest city in Malaysia after Shah Alam. The development of Bandar Baru Bangi consists of 16 Sections; of which 10 Sections are developed with residential areas namely Sections 1, 2, 3, 4, 5, 6, 7, 8, 14 and 15. The study area in Bandar Baru Bangi is Section 4 Road 4/7, which was purely landed properties in a typical medium-high income housing area with two-storey terrace houses; which is similar with the study area in Putrajaya. The study area in Bandar Baru Bangi consists of 201 dwelling units.

The two selected study areas consist of a population of 476 residents and this study consists of a population survey since the population is small. However, 20 households were excluded from the study as these are unoccupied residences, such as vacant residences, nurseries and etc. This study included a structured questionnaire, which was administered in the context of face-to-face structured and formal interviews. The survey was completed over a period of 114 days beginning in January of 2010 and concluding in May of 2010. The respondent in this study is comprised of the main breadwinner in the household. Hence, either the husband or the wife was selected as the study's respondent on account of their responsibility towards the residence. The response rate for this study was 38% whereby only 171 respondents were interested to participate in this study.

3. Result and Discussion

The CPTED practices construct is based on four dimensions, namely; (a) territoriality, (b) surveillance, (c) maintenance, and (d) access control. Meanwhile, CPTED perception construct is based on three dimensions; (a) territoriality, (b) surveillance and, (c) maintenance. The perception of fear of crime (FOC) construct is based on three dimensions; (a) physical environment, (b) social environment and, (c) indirect victimization. The validation and confirmation of all constructs were done using Confirmatory Factor Analysis (CFA). CFA is a measurement model which is developed by the correlation between latent variables and several indicators (items) or known as variable and error manifests. The CFA method is able to ensure and validate the items used in measuring latent variables by taking into account the value of the variances as opposed to the factor analysis (FA) which only explores an item and suggests a factor for each of the items (Joreskog & Sorbom, 1993). The result for the level of reliability was found by calculating the Cronbach's Alpha. The dimensions of construct have a good reliability value as the Cronbach's Alpha value exceeds 0.60 (Nunnally & Bernstein, 1994). The results indicated that the Alpha values for CPTED practices dimensions were territoriality (0.32), surveillance (0.65), and maintenance (0.62) and access control (-). The access control dimension involves only one item that do not require any reliability test and measurement model analysis to be done, hence the Alpha value could not be developed. The territoriality dimension, meanwhile, has an Alpha value of less than 0.60 ($\alpha=0.32$) which is related to the total number of item which was inadequate to measure the construct (Hair et al., 2006). This is because the Cronbach's Alpha value was sensitive towards the number of items used whereby if the number of items was small in the scale used, the Cronbach's Alpha value must therefore be small (Pallant, 2005). Based on this situation, the item to item correlation value from 0.2 to 0.4 are acceptable

values to show the correlation between items (Pallant, 2005). The surveillance and maintenance dimensions meanwhile achieved good reliability levels (Nunnally & Bernstein, 1994).

In terms of the CPTED perception construct, reliability results for every dimension were indicated as follows: territoriality (0.75), surveillance (0.74) and maintenance (0.60). All these dimensions achieved good Alpha reliability levels (Nunnally & Bernstein, 1994). The fear of crime (FOC) construct meanwhile shows Alpha reliability levels on three dimensions namely physical environment (0.93), social environment (0.93) and indirect victimisation (0.94). All FOC dimensions achieved good Alpha levels (Nunnally & Bernstein, 1994).

Based on a population study, from the data of 171 respondents of this study, there was a significant difference between CPTED practices and type of residence ($t(169)= 4.11$; $p=0.00$) whereby respondents living in individual gated residential areas (IGR) ($M=7.76$, $SD=0.57$) have higher CPTED practices as compared to respondents living in individual non-gated residential areas (INR) ($M=7.41$, $SD=0.52$). Additionally, the CPTED practices dimension-dimension mean score of surveillance (INR: $M=8.07$, IGR: $M=7.70$), access control (INR: $M=3.79$, IGR: $M=3.16$), and maintenance (INR: $M=7.80$, IGR: $M=7.73$) were higher at individual non gated residential areas (INR) compared to individual gated residential areas (IGR). However, territoriality dimension's mean score was found to be higher in individual gated residential areas (IGR: $M=0.94$, INR: $M=0.44$). These findings are shown in Figure 1.

This study also found a significant difference between CPTED perception and type of residence ($t(169)= -3.80$; $p=0.00$). This finding shows that respondents living in IGR ($M=6.44$) type of residence has a higher CPTED perception compared to the respondents living in INR ($M=5.98$) type of residence. Furthermore, the CPTED practices dimension-dimension mean score of territoriality (IGR: $M=6.68$, INR: $M=6.16$), surveillance (IGR: $M=6.26$, INR: $M=5.87$), and maintenance (IGR: $M=6.61$, INR: $M=5.99$) were higher for individual gated residential areas (IGR). This finding is shown in Figure 2.

The study found a significant difference between fear of crime (FOC) and the type of residence ($t(146.17)= -8.59$; $p=0.00$). Respondents living in IGR type of residence have higher FOC as compared to respondents living in INR type of residence. This is based on a FOC mean score of ($M=5.92$) on IGR type of residence which is higher than a FOC mean score of ($M=3.92$) on INR type of residence. Besides that, the FOC dimensions of physical environment (IGR: $M=5.80$, INR: $M=3.85$), social environment (IGR: $M=6.01$, INR: $M=3.99$), and indirect victimisation (IGR: $M=5.74$, INR: $M=3.73$) were also higher for respondents living in IGR. This finding is shown in Figure 3.

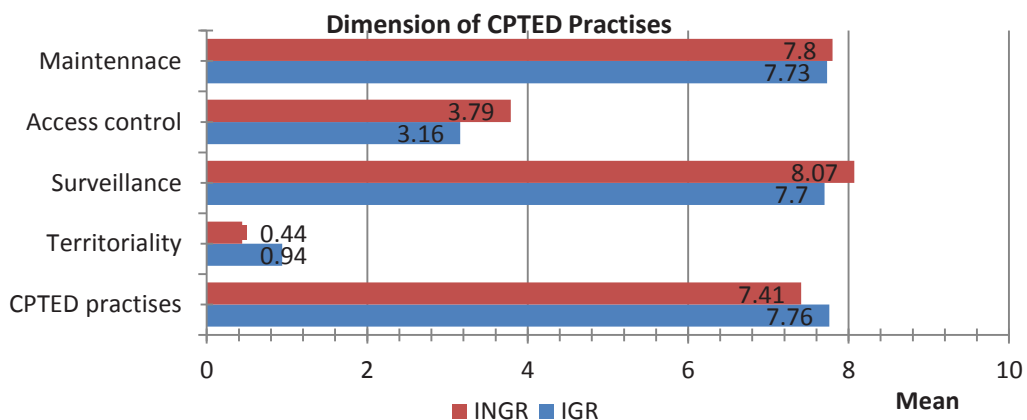


Fig. 1. Differences between CPTED practices at individual gated residential areas and non-gated residential areas with their dimensions

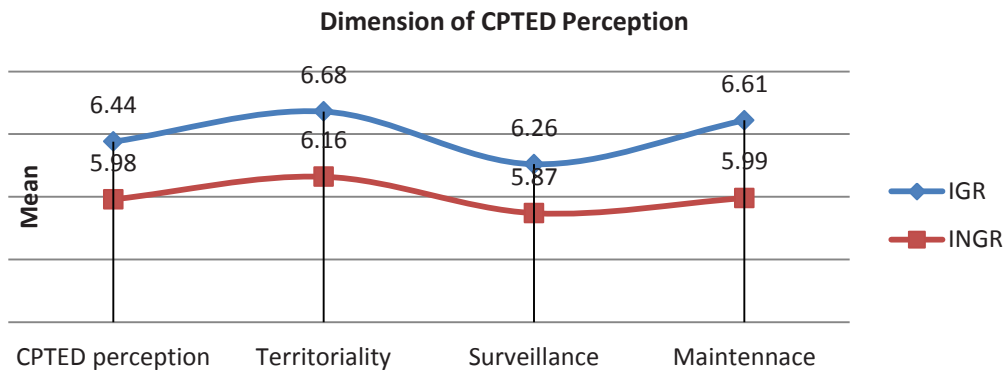


Fig. 2. Differences between CPTED practices at individual gated residential areas and non-gated residential areas with their dimensions

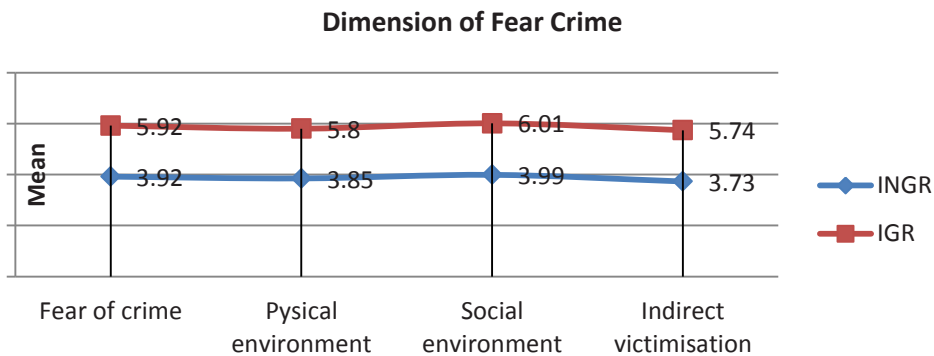


Fig. 3. Differences between Fear of Crime at individual gated residential areas and non-gated residential areas with their dimensions

Pearson’s correlation results on the correlation between the three constructs of CPTED practices, CPTED perception and fear of crime (FOC), indicated that CPTED perception has a medium strong, significant and positive relationship with fear of crime (FOC) ($r= 0.36, p<0.01$). These findings show that if a respondent has a high perception that CPTED is able to prevent crime in neighbourhood areas, fear of crime will be increase. Meanwhile, CPTED practices were found to have a significant but negative relationship ($r=-0.40, p< 0.01$) with fear of crime. This finding states that as CPTED practices increases, fear of crime will be reduced.

4. Conclusion

The objective of this paper is to investigate the relationship between CPTED practices with CPTED perception and fear of crime at two types of residences namely individual gated residential areas (IGR)

and individual non-gated residential areas (INGR). The findings of this study proved that there is a relationship between CPTED practices with CPTED perception and fear of crime. Simultaneously, this study also proved that high CPTED practices are able to reduce fear of crime. These findings support various previous studies that elements of CPTED are able to reduce fear of crime. In addition, this finding could also have implications for the parties that involved in the development as an architect, landscape architect, planner and developer to ensure the application of CPTED elements in residential areas to eliminate of crime. This paper also contributes to the body of knowledge which states that perceptions towards CPTED also have relationships with CPTED practices and fear of crime. It is recommended that in future studies, a detailed study on all three variables at different residential areas such as flats, semi-detached houses and terrace houses must be conducted to investigate the relationships between these variables.

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