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MEASURING CRIME PREVENTION THROUGH ENVIRONMENTAL
DESIGN (CPTED) IN SHOPPING CENTERS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Criminal Justice

by
Anchalee Roongsitthichai

December 2008

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Oct 16, 2008
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ABSTRACT

Crime Prevention Through Environmental Design (CPTED) has been in the crime prevention strategies over thirty years. It is routinely implemented in development and planning (Schneider, 2005) to deter crime and to prevent opportunity for criminals. Although CPTED has been implemented for years, there are a few numbers of studies, conducted to evaluate the effectiveness and efficacy of CPTED (Lim & Minnery, 2005). Thus, this research investigated the effectiveness and level of CPTED used.

Shopping centers were selected for the study as they are important places where Americans spend most of their time after home and school or work (Goss, 1993). There are a variety of activities occurring at the malls as well as many types of crimes. Shopping mall management applies different kinds of strategies (e.g. escort, patrol, CCTV) including CPTED in preventing crime and promoting safety feeling to customers and shoppers. However, how much CPTED is applied and how effective it is are questionable. Therefore, this study examined the level of CPTED used in shopping centers in the assessment of public fear of crime.

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CHAPTER ONE

INTRODUCTION

Shopping is the second most important leisure activity for Americans after watching television at home (Goss, 1993). Shopping centers are the places where most Americans shop, socialize, seek entertainment, and conduct their businesses. Americans spend time in shopping centers follow only where they spend time at home and at work or school. Many of them think shopping centers are safe places due to the ambience, attractive design, temperature, and music. In fact, shopping centers are dangerous places (Kiger, 1998). Many spots in shopping centers are either or both attractor and generator of crime due to a variety of targets under unguarded environment (Tseng et al., 2004).

Crime Prevention through Environmental Design (CPTED) becomes a part of planning and development in community and neighborhood problem solving (Zahm, 2005; Schneider, 2005). It has been implemented in crime prevention over 30 years. However, there rarely are research and study to evaluate the effectiveness and efficacy of CPTED (Lim & Minnery, 2005). Therefore, this study assessed the CPTED used in

shopping centers and its efficacy with public fear of crime.

Four regional shopping centers in the area of Inland Empire (Riverside and San Bernardino) California, U.S.A. were examined. One hundred and two participants at site locations were surveyed with regard to their feeling of fear of crime toward design and physical environment in shopping malls. Two surveys were used—a CPTED Observational Survey and Social Attitude Survey: Public Fear of Crime to capture information for this project; items used in both instruments were adopted from prior research looking into fear of crime and environmental design issues. Statistical analyses were average, bivariate statistics, and Pearson correlation.

On average, the sample shopping malls showed some evidence of being built according to CPTED design standards; the average score was 62 out of 100 points. Respondents indicated feeling moderately low levels of fear related to specific design features. The average score on fear of crime was 44 out of 100 points. The majority of participants were young, single, and educated above a high school diploma. Most of them were less likely to have experiences of being a victim of crime.

Three of the six hypotheses were significantly related to fear. There was a statistically significant relationship between overall CPTED application and public feelings of fear of crime. It was assumed that as the CPTED scores increased, the level of fear of crime decreased. In this research, the direction went to the opposite way. Specifically, the level of fear of crime also increased if CPTED score increased. In addition, this interesting result was also found in the hypothesis six, which stated that shopping centers with high score on CPTED application at ATM would have low scores on the customers' fear of crime at ATM. The hypothesis three, which stated that shopping centers with high score on CPTED application at bus stop would have low scores on the customers' fear of crime at bus stop, was only hypothesis supported in the right direction.

In the further exploration of the opposite relationship, it was found that age and race ethnicity were important factors that created this direction of relationship. These findings were consistent and supported by the previous studies of fear of crime (Clemente & Kleiman, 1977; Schafer et al., 2006). Those researchers found that social vulnerability factors (e.g. age, gender,

marital status, and level of education) were related to level of fear of crime.

Participants felt indifferent to the design and physical environment in shopping centers in the areas of parking facility, restroom, and food court. There were many factors that may influence this finding. Their social vulnerability factors (Schafer et al., 2006) and prior victimization (Baumer, 1978; Skogan & Maxfield, 1981) could be main reasons to explain this outcome. Due to the fact that majority of participants were young, 18 to 40 year of age (62.7%), they were least likely to feel fear of crime (Lee, 1983). Therefore, this study did not find a statistically significant difference between the level of fear of crime and CPTED at parking facility, restroom, and food court.

CHAPTER TWO

LITERATURE REVIEW

Shopping can be done through many means such as telephone or online. However, most shopping activities take place in the shopping centers. Currently there are 1,800 enclosed shopping centers in the country (Urban Land Institute, 2006). The average American goes to a shopping complex 36 times a year (Kiger, 1998). This number does not include seniors at the resting areas and teenagers at the video-game arcades.

"Most people consider the mall to be a safe environment" (Fernando, 1995, p.1). However, there are misperceptions of malls. Shopping centers are not the sanctuary but can be dangerous places (Kiger, 1998). Brantingham and Brantingham (1995) stated that a shopping mall is one of the locations where many crimes occur. Shopping malls are considered as crime generators due to the known opportunities for particular types of crime. Also, the malls are crime attractors because they are places where the concentration of people and targets in settings are conducive to particular types of criminal activities.

Auto theft and crimes at parking lots are the most prevalent criminal incidents that have occurred at shopping centers (Securitysource, 2007). Vehicles parked at lots in shopping centers and national chain stores (e.g. Wal-Mart, K-mart) become targets because the environment of the parking facility provides several vehicle choices in unguarded settings (McKee, n.d.). In addition, due to the music, the temperature and the ambience, people enjoy the surroundings and feel relaxed. They lose their awareness of being criminal targets. Shoppers become victims of pick pocketing, particularly during holiday seasons. Victims are more likely to be women and about 75 percent of the victims are tourists or shoppers from the suburbs (Bue, 1991).

Shopping centers are becoming targets for criminal activities (Fernando, 1995). It is crucial for businesses that invite customers onto their premises to have a safe, secure reputation among the public. Shopping centers must maintain their business' reputation as a good place for spending time and money. The effects of crime can damage the image of the business and devastate the sales and profits of the business (Alrich & Reiss, 1976; McPherson,

1978). There would not be anyone to come shopping at a shopping center where people feel unsafe.

The Theory of Fear of Crime

Fear of criminal victimization threatens the quality of life for many Americans (Gallup Poll, 1989). People feel unsafe in the neighborhood where they shop, work, go to school, and entertain (Bureau of Justice Statistics, 1984; Fisher, 1991). They are afraid of areas where they think crimes happen frequently and especially where they could be victimized (Fisher, 1991).

According to Furstenberg (1971), fear of crime is an affective state related to worry about personal safety. The causes of fear of crime are due to many factors. Schafer et al. (2006) pointed out that individual physical and social vulnerability (e.g. gender, age, race, income, level of education, marital status), and prior victimization are primary determinants of fear of crime. Women (Clemente & Kleiman, 1977) and the elderly (Lee, 1983) evaluated themselves to be more fearful of crime and more vulnerable to be victimized than younger people. They felt they have a low capacity to defend themselves against a perpetrator (Fetchenhauer & Buunk, 2005). Fear of crime

is higher especially after dark (Box, Hale, & Andrew, 1988; Fisher, 1991; Skogan & Maxfield, 1981; Warr, 1984).

Fisher (1991) found that people, who shop in their neighborhood businesses, feel somewhat safe during daytime while they feel very unsafe at nighttime.

Prior victimization (Baumer, 1978; Skogan & Maxfield, 1981) may lead some people to believe that they are at greater risk for future victimization while those who have experienced prior victimization might also avoid certain areas or people they deem dangerous. Furthermore, informal social network and media are the approaches to enhance an individual's fear of crime (Eschholz, 1997; Skogan, 1986, 1990). People who talk to a recent victim of a crime or hear about others who have been victimized, read a great deal of printed media, and often watch television may heighten their perception of risk. More importantly, these behaviors lead people to have higher levels of fear (Stafford & Galle, 1984). Rader (2004) stated that when people are aware of possible victimization they respond to this fear by avoidance and/or protection. For example, they avoid fear of crime by not visiting certain places or people but staying at home. They protect themselves from

being victimization by buying a gun, installing more secure locks on doors and windows.

Taylor and Hale (1986) found that the presence of neighborhood deterioration and incivilities generate the highest level of fear of crime in a community.

Incivilities and neighborhood disorder include unsupervised teens, loud noise, public drinking, abandoned houses, and excess litter (Hunter, 1978). These environmental cues are signs of crime associated with dangerous areas (Stinchcombe et al, 1980). These signs serve as early warning signals of impending danger because people associate them with things they fear; perceptions of disorders as serious problems have been found to be strongly related to high levels of fear of crime (Baba & Austin, 1989; Lewis & Maxfield, 1980; Skogan & Maxfield, 1981). Taylor and Covington (1993) also found that neighborhood variations are related to fear of crime. The degree of socioeconomic status, stability, and social integration elevate concerns about personal safety. The concentrated poverty (Covington & Taylor, 1991) and neighborhood racial composition (Covington & Taylor, 1993) have been linked to fear of crime. Chiricos, Hogan, and Gertz (1997) found that perceived neighborhood racial composition predicted fear

for Whites but not for African Americans. The perception that one's community is being invaded by nearby residents of a differing class, or even living in close proximity to racial and ethnic minorities, can translate into concerns about crime and fear (Skogan, 1995).

In addition, there are links between the built environment, feeling of vulnerability, and fear of crime at a specific location (Taylor & Gottfredson, 1986). Fisher and Nasar (1992) studied the relationship between the design of built environment and fear of crime on campus. The researchers found that the physical features influence the level of fear of crime of students especially after dark. The fear was heightened by inadequate lighting, and blocked escape for the passerby. Moreover, fear was increased when there appears to be a hiding place or concealment for a potential offender. However, the fear of crime can be reduced through planning, design and maintenance.

The Theory of Crime Prevention Through Environmental Design (CPTED)

An increasing number of planning and design professionals are being asked to participate in crime prevention as a part of community and neighborhood problem solving (Zahm, 2005). Crime prevention through environmental design (CPTED) becomes part of decisions related to planning and development, and is routinely implemented (Schneider, 2005). Although CPTED has been populated in the family of place-based crime prevention theories and techniques over 30 years, the theory has rarely been evaluated to assess its effectiveness or efficacy (Lim & Minnery, 2005). Therefore, this study objected to determine the use of CPTED measures applied to regional shopping centers in the assessment of fear of crime.

CPTED was originated in the 1970s by C. Ray Jeffery. Jeffery and Zahm (1993) pointed out that the physical environment plays a fundamental role in the criminal event and that design professionals could therefore shape environments to mitigate crime opportunities. CPTED is the proper design and effective use of the built environment that can lead to a reduction in the fear and incidence of

crime, and an improvement of the quality of life (Crowe, 2000).

Crowe (2000) proposed three strategies in CPTED. They are 1) Natural Access Control, 2) Natural Surveillance and 3) Territorial Reinforcement. Each strategy is described below.

Natural Access Control

Natural access control is a design concept directed primarily at decreasing the opportunity of crime. It is a use of design to deny access to a crime target and to create a perception of risk in offenders. Natural access control employs elements like doors, shrubs, fences, and gates as the strategy. People are physically guided through a space by the strategic design of streets, sidewalks, building entrances, landscaping and neighborhood gateways. These designs indicate public routes and discourage access to private areas. In addition, physical and mechanical means of access control-locks, bars, and alarms can supplement natural access control measures if needed. A fence around a neighborhood playground is an example of an access control measure that protects children from wandering off and inhibits entry of potential offenders.

Natural Surveillance

Natural surveillance is a design concept directed primarily at keeping intruders under observation. This strategy utilizes design features to increase the visibility of a property or building. The proper placement and design of windows, lighting, and landscaping increases the ability of those who care to observe intruders as well as regular users, and thus provides the opportunity to challenge inappropriate behavior or report it to the police or the property owner. When natural surveillance is used to its greatest advantage, it maximizes the potential to deter crime by making the offender's behavior more easily noticeable to a pedestrian, individual or security guard.

Territorial Reinforcement

The primary concept of territorial reinforcement is to contribute a sense of ownership. Physical design can create or extend a sphere of territorial influence and potential offenders perceive that territorial influence. This strategy employs design elements such as sidewalks, landscaping, and porches to help distinguish between public and private areas and help users exhibit signs of ownership that send messages to would-be offenders.

Maintenance

The theory of broken windows (Willson & Kellig, 1982) described the relationship of physical incivility, physical disrepair, and deterioration in an area that encourages the criminal incident. The researchers pointed out that a broken window left unrepaired implies that social control is weak and no one cares about deterioration in a neighborhood. Offenders are more likely to break other windows. In addition, the broken window theory found that physical incivilities (trash, graffiti, abandoned buildings, disrepair, unkempt lots) and social incivilities (rowdy behavior, drug dealing, public drunkenness, prostitution, panhandling, and loitering) result in higher crime and resident fear (Skogan, 1990).

Prince William County Police Department (2005) proposed that maintenance helps CPTED to be more effective. Proper maintenance prevents reduced visibility due to plant overgrowth and obstructed, or inoperative, lighting, while serving as an additional expression of territoriality and ownership. As a result, offenders believe someone controls the area and their opportunities of committing crime are reduced.

The Rational Choice Perspective

Since 1970's, a number of empirical researchers presented architectural and planning designs that have created areas that facilitate the opportunity for crime (Becker, 1975; Bennet & Wright, 1985; Brantingham & Brantingham, 1978; Saville & Wong, 1991; Zehring, 1994). The theoretical basis of these studies emerge from Rationality models (Cornish & Clarke, 1984). The theory described that a criminal makes rational decisions based on the extent to which he or she expects the choice to maximize his or her profits or benefits and minimize the costs or losses. In other words, criminals will evaluate alternative courses of action, weigh cost and profits, and chose the target.

A decision making process of committing crime is influenced by environmental factors (Brantingham & Brantingham, 1978). Selected targets are based on environment such as whether the environmental land uses and neighborhood image encourage or discourage the commission of a crime. Design of parking lots in shopping malls with plenty of natural surveillance reduced crime opportunities of auto theft and auto burglary. Additionally, targets might have been made more difficult for offenders by the

use of enhanced lighting, security locks, and fences to control access into residences and apartment buildings (Saville & Cleveland, n.d.). These are examples where the rational choice has supported the theory and practice of Crime Prevention Through Environmental Design (CPTED).

Shopping Center Study

Shopping centers had been developed more than 1,000 years in several forms such as ancient market squares, bazaars and seaport commercial districts (International Council of Shopping Center, 2000). Today modern shopping centers vary from the archetypal suburban shopping malls, neighborhood and community centers to more specialized forms such as power convenience, entertainment, outlet, town center, resort, transit-oriented, off-price, and specialty centers (Urban Land Institute, 2006).

The Nature of Shopping Center

Urban Land Institute (2006) defined a shopping center as

a group of architecturally unified commercial establishments built on a site that is planned, developed, owned, and managed as an operating unit related by its location, size, and type of shops to

the trade area that it serves. The unit provides on site parking in definite relationship to the types and total sized of the stores (p.5).

Rabianski and Vernor (1993) asserted that a shopping center is more than a collection of retail uses. It includes a unified architectural design and site plan. Also, a shopping center is comprised of sign control, landscaping, and unified management policies.

Shopping centers are divided into three categorizes: regional, community, and neighborhood (Urban Land Institute, 2006). They are distinct in function, trade area and tenant. Specifically, identifying types of shopping centers depends upon six criteria based on Rabianski and Vernor (1993). Size of the shopping center, site size (defined by gross leasable area, GLA¹), the anchor tenant, type of products sold, distance and travel time, and customer base will identify types and characteristics of shopping centers.

Regional shopping centers are considered as large size which is determined by the gross leasable area (GLA).

¹ Gross leasable area (GLA). The total floor area designed for tenants' occupancy and exclusive use, including any basements, mezzanines, or upper floors, expressed in square feet and measured from the centerline of joint partitions and from outside wall faces.

Typically, regional shopping centers contain a GLA of about 300,000 to 2 million square feet. The anchor tenant, a major tenant or traffic generator (Rabianski & Vernor, 1993), plays an important role to draw shoppers to the centers. In regional shopping centers, there usually are two or more department stores. They provide a variety of shopping goods, general merchandise, shoes, clothing and accessories, home furnishings, gifts and specialty items, and electronics. Additionally, they also attract customers with food, personal services, and entertainment. Regional shopping centers are usually located on busy roads and on major highway intersections (Geason & Wilson, 1992).

Travel time and distance are an important factor which determines types of shopping centers. They are also the measure customers' consideration of where they will go to shop. Customers for regional shopping centers will often travel approximately 25 to 30 minutes with 12 mile radius to reach the center (Urban Land Institute, 2006). In addition, customer base or the population within the distance or travel time is included to consider an analysis of shopping centers. Regional shopping centers require an excess of 150,000 customers to support the centers.

Community shopping centers can be defined as the second largest after regional shopping centers. Community shopping centers, typically, have a GLA of about 100,000 to 450,000 square feet. This type of shopping center does not have a department store. It provides a wider range of facilities and merchandise for the sale of wearing apparel for men, women, and children and the sale of hardware, furniture, garden and building supplies. Travel time and distance of customers at their original points are 10 to 20 minutes with 3-5 mile radius to reach the center (Urban Land Institute, 2006). Community shopping centers require 40,000 to 150,000 customers to support the centers.

Neighborhood shopping centers are considered as the smallest size of shopping centers. They have a typical GLA of about 30,000 to 100,000 square feet. They offer the sale of convenience goods such as food and drugs, and personal services. A supermarket or superstore that has pharmacy is the major anchor tenant. Geographical convenience is the most important factor to customers' consideration. Travel time and distance to a neighborhood shopping center is an indication. Customers for neighborhood shopping centers will often travel approximately 5 to 10 minutes with 1.5 mile radius to reach

the center (Urban Land Institute, 2006). Neighborhood shopping centers need approximately 2,500-40,000 customers to support the center.

As limitations of resources, this study focused only on regional shopping centers. That is due to the business size and the variety of activities. Thus, the following discussion is only related to regional shopping centers.

Design of a Shopping Center

According to Urban Land Institute (2006), the original concept of shopping centers was a linear building with parking in the rear, at the sides, or in front. The "L", "U" and "T" footprints were variations designed to fit restricted sites and special locations with respect to adjacent streets. The "Mall" footprint is referred to a type of building configurations. It is a walkway between two facing linear buildings. In other words, it is a pedestrian street for back-and-forth shopping movement. The mall building configuration has become the standard pattern for the regional center. However, it is not necessary to be an enclosed building. This is one reason as to why the regional shopping center is called a mall or shopping mall.

Typically, the designs of shopping centers are created after anchor tenants are placed. The anchor or key tenants, which are department stores, will be located in different corners of the center, because anchor tenants encourage business flows. The main tenants can draw customers from a corner and pass other small tenants on the way to reach another anchor tenant. Once anchor tenants are located, the other elements will be placed to fit with the rest of the space.

The elements are designed to be attractive and pleasant for shoppers. In addition, designs for safety and reducing opportunities and fear of crime must be applied to the business due to the city's regulations (Zahm, 2005). For shopping mall businesses to maintain a reputation as a place for spending time and money, crime prevention through environmental design becomes part of the shopping center's development. Although CPTED strategies are required to apply in the overall development of shopping malls, CPTED in locations where crime is most likely to occur are discussed. Five spots of interest will be a 1) parking facility, 2) bus stop, 3) restroom, 4), food court and 5) ATM machine.

1) Parking Facility

According to Urban Land Institute (2006), the act of parking marks customers' first contact with the shopping center, and the experience should be pleasant. The parking area should support the center's prime role, specifically to provide an attractive and convenient marketplace.

Parking requirements vary according to size of the center and types of retail use. Requirements for parking design consist of a parking area, driveway layout, access aisles, individual stall dimensions and arrangements, pedestrian movements from the parking area to the center, grading, paving, landscaping, and lighting.

Parking designs typically include multi-storey, surface and underground facilities (Smith et al, 2003). Parking facilities in shopping centers are usually designed as ground parking lots 360 degrees surrounding the mall building (Urban Land Institute, 2006). Regional shopping centers require 1.5 square feet of parking space for every square foot of GLA (Smith, 1996) for providing the adequate parking for customers, tenants, and employees. A shopping center should separate parking lots for employees from customers because a lot will be taken for an entire day by

an employee. In addition, gates and attendants should be present.

According to the U.S. Department of Justice (1992), parking facilities are ranked as the second most frequent place where nonviolent crimes took place. About one third of all motor vehicle thefts occur in driveways and lots surrounding homes and apartment buildings, while another third occur in public parking lots and garages (Smith, 1996). In addition to auto theft, parking structures become good places for burglary, assault, kidnapping and vandalism (OSU Police Department, 1996).

Parking lots and garages are known to be likely settings for crimes because there are many appealing targets under unobserved places (San Diego Police Department Neighborhood Policing Resource Team, 2005). Smith (1996) found that because the parking facility is open to the public, it also open to criminals. Moreover, because of long hours of parking where people go shopping and see movies at shopping malls, a criminal has plenty of time to commit a crime in the surrounding of various choices of vehicles. Felson and Clarke (1998) found that opportunities for auto theft tend to shift by the hour of the day and day of the week as changes in the risk of

offending and the availability of attractive targets. Auto theft peaks on Friday and Saturday between 8 am to 6 pm while less occurred on Tuesday and Wednesday (Henry & Bryan, 2000). This pattern reflects the pursuit of weekday activities such as school and work, while Friday and Saturday are transitional days for the weekend activities (LeBeau & Langworthy, 1986). Interestingly, Thursday night is the highest time that auto theft occurs in suburban shopping malls with late night shopping (Henry & Bryan, 2000). Moreover, Clarke (2002) pointed out that parking facilities become targets for criminals because they are often poorly secured, particularly in the case of lots, many of which have poor lighting, and blind spots and nooks where cars cannot easily be seen.

Crowe (2000) stated that CPTED can significantly reduce crime in parking facilities. The good design for shopping mall parking should be enclaved in relation to business entrances. The multi-level parking structures, reinforced concrete retaining walls, are commonly used and reduce surveillance opportunities. This creates the perception of lack of safety for the normal user and low risk for abnormal users. In fact, retaining walls do more to hide the automobile than to assure safety. Retaining

walls should be replaced with stretched cable of railings that allow for maximum surveillance and illumination.

Tseng et al. (2004) found that the chain-link mesh inserted in the low level wall openings in the parking garage at Ohio State University provide more visibility particularly during times when the sun goes down. These practical approaches increase feelings of safety for mall customers.

Rabianski and Vernor (1993) recommended that parking bays should not be in obscure locations that are not visible or too far away from building entrances. Poor visibility and long walking distances represent potential dangers and can drive customers elsewhere. Customers should be able to walk directly to an entrance of an anchor tenant or the entrance to the enclosed mall. The most distant parking spaces should be 300 to 350 feet from the entrance (Urban Land Institute, 2006). Moreover, parking lots may require other forms of security (Clark, 2002; Rabianski & Vernor, 1993). Regional shopping centers are encouraged to provide customers parking lot patrols. Some shopping centers may provide space to local police departments for a precinct office or substation to have a police presence on site.

In addition to structural designs of parking facilities, Crowe (2000) stated that lighting is used to create an image and character for the shopping centers while proper lighting will help people feel more comfortable and less fear of crime. Tseng et al. (2004) found that lighting was the most significant factor in users' perception of parking garage safety when compared to other environmental factors: visibility, garage color, location of entrances and exits, and design of elevators and stairways. In addition, Smith et al. (2003) found that lighting system and environmental factors (e.g. access control, cleanliness, laid-out parking site) are strongly associated to fear of crime. The level of fear of crime in parking facilities is heightened where there is inadequate lighting. Moreover, people's level of fear of crime varies upon previous experience of victimization, gender, and the overall crime rate of the area.

Smith (1996) pointed out that lighting is universally considered to be the most important security feature in a parking facility. The effective lighting system helps to deter crime and to generate a feeling of safety to users. According to Smith (1995), level of service is applied to the standard of the lighting system in parking facilities.

The horizontal illuminance² at pavement average in covered parking areas is 6-7 foot candles, surface parking areas is 2 foot candles, stairwells and elevator lobbies is 12-14 foot candles. The vertical illuminance above pavement average in covered parking areas is 1.2 foot candles, surface parking areas is 0.25 foot candles, stairwells and elevator lobbies is 1.6 foot candles.

Garage walls and ceilings with highly reflective white paint should be applied to the parking garages due to an increase of the brightness and illumination (Tseng et al., 2004). However, white painted walls encourage graffiti, which tends to hurt the perception of security (Smith, 1996). Anti-graffiti coatings may be applied to enable quick and easy cleaning.

Furthermore, Prince William County Police Department, (n.d.) found that light poles should be placed in islands at the ends of parking bays. The light poles in the parking areas should be separated from the landscape to prevent trees from growing up into the light fixtures. Type of light bulbs is important as well. Martin (2001) stated that light from low-pressure sodium, which makes

² Illuminance is referred to the intensity of light falling on a surface, measured in footcandles (English units) or lux (metric units) (Smith, 1995).

objects appear black and white, should be changed into metal halide. Light generated by metal halide provides true colors. This is very helpful for CCTV use. In addition, Urban Land Institute (2006) recommended that sodium lighting, which has been commonly used in many locations, should be avoided, because it renders color poorly. Furthermore, the sodium lighting makes people appear sinister and creates a menacing atmosphere. White lighting is encouraged to use because it is cost effective and is more appealing to customers.

2) Bus stop

Although shopping centers are considered as private property (Crime Prevention Service School of Criminal Justice Rutgers University, n.d.), there is an incorporation of public transportation. With an expectation of an increase of customers, the mall management provides shoppers easy access to the mall with bus stop inside the mall's area. On the other hand, this convenience accessibility often brings as many non-shoppers as shoppers into the mall. In addition, public transportation brings congestion and crowds.

Crime Prevention Service School of Criminal Justice Rutgers University (n.d.) pointed out that bus stops

usually are located in isolated spots for various reasons. First, loitering and rowdy groups of people can disturb other shoppers or block their paths to the mall entrances. Second, bus stops are likely to generate graffiti and trash. This creates shoppers with a bad impression and fear of crime.

The U.S. Department of Transportation (2001) study of bus and bus stop designs related to perceptions of crime found that fear of crime at the bus stop can be reduced by CPTED strategies. People feel less fear if the bus stop makes sense by looking like a safe small home. A bus stop that looks like a safe building or home, has a name, features a bus schedule, perhaps includes a map and is well lit, provides people the necessary information to feel in control of their environment and themselves. They feel less vulnerable related to crime because they know where they are based on information at a stop.

The study found that a bus stop, which provides a safe feeling, should be built with brick or masonry. People are mostly to feel the strength of bus stop. The U shaped bus stop, which faces the street, is preferred because it provides people the feeling of protection. Also, people can see and sense danger or trouble from the U shaped bus

stop so they can escape if there is a problem. People also feel safe if the back wall is open. However, a bus stop with no sidewall provides the feeling of possibly being mugged. People feel vulnerable of someone walking behind especially when a bus stop is crowded. They are fear of being a victim of pick pocketing and purse snatching (Levine & Wachs, 1986).

Trees and bushes or dense vegetation near the bus stop heightens people's fear of crime (Kuo, Bacaicoa & Sullivan, 1998; Nasar & Fisher, 1993) because people are afraid that someone will attack them or drag them to the bushes. Benches should be designed for sitting or leaning not for lying down or sleeping. Routine maintenance could make the bus stop feel safer. Garbage, graffiti, multiple old posters, residue of tape from posters or cloudy and dirty appearing plexiglass should be removed. More importantly, there should not have advertisement or flyers on the wall of bus stop.

3) Restroom

According to Crime Prevention Service school of Criminal Justice Rutgers University, (n.d.), a shopping mall is considered as public spaces but controlled by a corporation of real estate developers. The investors'

primary concern is maximizing profit per foot. The developers and their fiscal concerns influence even the most mundane details. Most shopping malls do not pay attention to restrooms because of business reason and no one really cares about locations of restrooms (Crowe, 1991). Due to the fact that restrooms generate no profit, they are located in hidden places or at the end of corridors to prevent the use of non-shoppers. From the developers' point of view (Kolhatkar, 2004), "the bathroom is a necessary evil with no sales potential; they have zero incentive to make it comfortable" (p.2). Rather, customers should appreciate that a mall provides public restrooms.

Restrooms at any shopping center are unpleasant, out-of-the-way corridor, so isolated that shoppers fear of crime such as drug abuse and assault (Felson et al, n.d.), illicit sexual activities (Johnson, 2005), rape and robbery (Crowe, 2000). Felson et al. (n.d.) conducted the study of the Redesigning Hell: Preventing Crime and Disorder at the Port Authority Bus Terminal, New York. The researchers found that restrooms in the Port Authority Bus Terminal had been taken over by illegal and disorderly activities. Travelers were afraid to enter and use the restroom. After the restroom was improved, customer rating on insecurity in

the restroom at the Port Authority Bus Terminal during 1991-1994 was decreased by 21%. Felson et al (n.d.) stated that fear in public restrooms can be reduced by design in several ways. First, sinks should be large enough for only one user. It is because large sinks could be used as bathtubs instead for hand washing. Second, stall walls need graffiti resistant panels due to the fact that graffiti tends to create the perception of crime (Smith, 1996). Third, ceiling panels need to be secured instead of removable ones to prevent the entering and hiding of someone. Fourth, tile squares should be large and bright for the ease of cleaning. Tops and bottoms of toilet-stall doors and partitions should be open to show a standing person's feet and head (San Diego Police Department Neighborhood Policing Resource Team, 2005). Importantly, the restroom should always be clean. Restrooms typically, should be located in the most convenient and accessible location to increase use, which increases the perception of safety (Crowe, 2000). Attendants (e.g. retail stores) should be set up near restroom entries for an increase of natural surveillance. Abnormal users will feel at greater risk of detection.

4) Food Court

A food court is consisted a cluster of quick-service food stands grouped around a common or public seating area. It becomes a major component of many regional malls and specialty centers. The design of a food court should provide a theme and a festive ambience; a high -quality design together with a proper tenant mix can often allow a food court to function as an anchor for the center (Urban Land Institute, 2006).

The location of a food court is very important with respect to CPTED. A food court tends to be one of the places in shopping malls where crime highly congregates; assault and public nuisance (securitysource, 2007), chaos and riot (Tallahassee Police Department, 2000). The food court is counted as an anchor tenant so it should be a destination sited in a location designed to draw people past other shops. Typically, a food court is placed in an area that attracts the greatest number of people going from anchor to anchor. In other words, the location of a food court is in the most heavily trafficked area.

However, CPTED specialists argue that locations of food courts should be differently placed from the view of shopping mall management. A food court should be located

in a corner of the structure where there is low foot traffic (Crowe, 2000). It attracts walking customers. Food entrepreneurs and customers are able to observe unusual activity. This strategy enhances the natural surveillance to deter crime because criminals see the great opportunity of being detected.

Tallahassee Police Department (2000) found that a second floor walkway with a balcony overlooking the food court area causes traffic because people stop and yell at others on the first floor, and encourages people to throw items and garbage down to the food court. People in the food court were scared of the risk of injury. Sight barriers need to be utilized to protect the thrown items. In addition, the researcher found that the metal trash cans should be replaced with cardboard bins. People are frightened because the metal creates gunfire sounds. After the barriers are applied along the second floor balcony, traffic flowed and there were very few negative comments regarding the disturbance.

With regard to the tables and seats at a food court, design for an eating area is also to prevent opportunity of crime. San Diego Police Department Neighborhood Policing Resource Team (2005) recommended that chairs and tables

should be attached so people cannot move them to accommodate large groups, which encourage loud noise and disturbance to others. Importantly, the food court is always kept clean. People realize that this spot is being monitored.

5) ATM machine

ATM users annually conduct billions of financial transactions, mostly cash withdrawals. In the past, people would find ATMs only on bank premises. Today they find the machines almost everywhere-along sidewalks, in airports, grocery stores, nightclubs, and shopping malls. Bank customers have come to expect that they can access their funds virtually any time and any place. To some extent, they have traded safety for convenience.

ATM services are highly profitable for banks (Deitch 1994; DeYoung 1995), and banks aggressively market the use of ATM cards. ATMs that are off bank premises are usually more profitable for banks because they attract a higher volume of non-bank customers, who must pay service fees. Unfortunately, customers using off-premise ATMs are more vulnerable to robbery, mugging, and kidnapping (Drapkin et al., 1991). Scott (2001) pointed out that fear of robbery

at ATM is heightened to the public because people perceive that almost anyone can be robbed at the ATM machine.

Scott (2001) found that CPTED is the most common prevention measures for ATM robbery. Location, lighting, and landscaping play roles of preventing crime and of reducing fear of crime of ATM users. Locations of ATM machine in shopping malls are usually hidden at a corner and the end of corridor. Opportunity of crime at the ATM is increased due to lack of observation from pedestrians and shoppers. Locations for ATMs machine should be placed in areas of high pedestrian traffic (San Diego Police Department Neighborhood Policing Resource Team, 2005). People can observe suspicious behaviors or would-be criminals and help to deter crime.

Scott (2001) also found that adequate lighting at and around ATM machines allows users to see any suspicious people near the machine. Typically, the minimum light levels are 10 foot-candles within five feet of the ATM machine and two foot-candles for 50 to 60 feet away from the machine (CUNA Service Group, 1999; Ellis 1996; Illinois Office of Banks and Real Estate, 1999). Scott (2001) also suggested that landscaping around ATM machines should provide people good visibility. Trees and shrubbery should

be trimmed routinely to remove potential hiding places for offenders and ensure the ATM machine is visible to passersbys. Dumpsters, benches or walls that obstruct clear visibility of the ATM should be removed. Rearview mirrors on ATM machines should be installed for users to detect suspicious people and behavior (Drapkin et al, 1991; Scott, 2001).

Due to the fact that the previous studies recommended that the efficacy and effectiveness of CPTED have rarely been evaluated, this study examined those with six hypotheses:

Hypotheses

- H₁ Shopping centers with high scores on overall CPTED application will have low scores on the customer's fear of crime.
- H₂ Shopping centers with high scores on CPTED application of parking facilities will have low scores on the customer's fear of crime in parking facilities.

- H₃ Shopping centers with high scores on CPTED application of bus stops will have low scores on the customer's fear of crime at bus stops.
- H₄ Shopping centers with high scores on CPTED application of restrooms will have low scores on the customer's fear of crime in restrooms.
- H₅ Shopping centers with high scores on CPTED application of food courts will have low scores on the customer's fear of crime in food courts.
- H₆ Shopping centers with high score on CPTED application of ATM and will have low scores on the customer's fear of crime at ATMs.

CHAPTER THREE

METHODOLOGY

The study examined a scale for measuring levels of implementation of CPTED in the design of built environment at shopping centers, and assessed the level of public fear of crime at shopping centers. Regional shopping centers were examined due to the large size and variety of activities. In this chapter, population and sample, variables, research instruments, data collection and data analysis are discussed.

Population and Sample

The population of this study involved regional shopping centers³. The sample was the enclosed regional shopping centers in the areas of Inland Empire (Riverside, and San Bernardino) California, U.S.A. There were four shopping centers:

1. Galleria at Tyler - Riverside
2. Inland Center mall - San Bernardino

³ Regional shopping centers are considered as large size. They contain a gross leasable area (GLA) of 300,000 to 2 million square feet. There are two or more anchor tenants or department stores and providing a variety of shopping goods (Urban Land Institute, 2006).

3. Moreno Valley mall - Moreno Valley
4. Ontario Mills mall - Ontario

Variables

The research measured the level for the use of CPTED in shopping centers in the assessment of public fear of crime. The relationship between independent and dependent variables were investigated as to whether they were correlated as stated in the hypotheses. The dependent variable was the public fear of crime at five locations of interest (parking facility, bus stop, restroom, food court, and ATM) in shopping centers. The independent variable is the level of CPTED application used in shopping centers.

Research Instruments

In this study, two sets of research instruments were created to test the hypotheses: 1) CPTED observational survey with score for five locations in shopping centers, and 2) the social attitude surveys focusing on public fear of crime. CPTED survey was comprised of questions about CPTED application to the locations of interest: parking facility, bus stop, restroom, food court, and ATM. The questions were drawn and adapted from the previous research

and study related to those spots (Appendix A). For example, the questions in the section of CPTED at ATM were adapted from the study of Scott (2001): Robbery at Automated Teller Machines. Score was ranked from 0 to 100 (Appendix A).

The second research instrument was developed to represent the dependent variable. The set of questions were related to the fear of crime and safety feeling, emphasizing the five locations of interest. The questionnaire was divided into three sections. The first section was a set of questions regarding the level of shopper's feeling of safety and fear of crime. The scale consisted of five levels: strongly disagree (0), disagree (1), neither agree nor disagree (2), agree (3), strongly agree (4). The second section was the spatial pattern information of shopping behavior. For example, how often do you come to this shopping mall, what day do you usually come to this mall. The third section was general information of shoppers. For example, gender, age, level of education, and marital status (Appendix B).

Validity and Reliability

The validity and reliability of this study relied heavily on the survey instruments in testing the hypotheses. The researcher developed both surveys (CPTED survey and fear of crime survey) because none could be found in the published literature or previous research that met the needs of this study. Nonetheless, the concepts of all questions in both surveys were drawn and adapted from many previous studies related to CPTED and fear of crime. In addition, questions and scales in the surveys were applied from the prior research focusing locations of interest (parking facility, bus stop, restroom, food court, ATM). For example, questions for CPTED survey at bus stop were drawn from the study of the U.S. Department of Transportation (2001) pertaining to the study of bus and bus stop designs related to perceptions of crime.

In this study, the fear of crime surveys were pilot tested prior to formal data collection with seventy four students in the classes of statistics and research methodology for criminal justice at California State University, San Bernardino. The pilot participants provided comments on questions asked and words used. The surveys were revised and corrected to be more

understandable for general public and participant at site locations.

Reliability or the consistency of measurement in this study was relied on the electronic equipment, professional painting shade and the internal reliability analysis (Cronbach's alpha). The digital light meter was used to measure the illuminance at light poles in parking facilities, at light bulbs in the locations of ATM. Moreover, professional painting shades were used to measure the difference of wall's color at parking facilities for four shopping centers. After both surveys (CPTED and fear of crime survey) were collected, internal reliability (Cronbach's alpha) was applied to measure the reliability of the instruments. The Cronbach's alpha values were presented in Table 1.

Table 1. Reliability Analysis

Variables	Cronbach's alpha for fear of crime survey	Cronbach's alpha for CPTED survey
Parking	.182	.983
Bus stop	.807	.558
Restroom	.842	.874
Food court	.513	.655
ATM	.754	.930

Data Collection

To test the hypotheses, data were collected from two sources. First, the CPTED observational survey was completed and scored by the researcher for all sampled shopping centers. Second, the fear of crime survey was voluntarily answered by people in shopping centers. There were a total of 102 surveys.

Data Analysis

The hypotheses were designed to investigate the level of use of CPTED in shopping centers (independent variable) in the assessment of fear of crime (dependent variable). The surveys were designed to collect scores for CPTED, and scores for fear of crime. Once the scores of both surveys were collected, they were analyzed to establish the average scores. Then, the average scores from CPTED survey were correlated with those from fear of crime survey by bivariate statistics.

CHAPTER FOUR

RESULTS

This study examined the level of CPTED use in regional shopping centers, and investigated the correlation between the level of CPTED use and the level of public feelings of fear of crime. Five locations: parking facility, bus stop, restroom, food court, and ATM at shopping centers were the focus of investigation. Four shopping centers in the Inland Empire area, California were studied. One hundred and two people at four shopping malls were randomly asked to answer the survey for fear of crime. Analysis of the data involved the average scores of the level of CPTED and of the fear of crime. Then, the Pearson bivariate correlation was used to determine the significant relationship between both variables.

Findings

In reference to the CPTED scores, it was found that shopping centers have applied CPTED on average about 62 of 100 possible points. By average, CPTED at ATM was most applied (75 points), while CPTED at restroom was least applied (51 points). Table 2 also provided the overall

CPTED scores and the scores at locations of interest (parking, bus stop, restroom, food court, and ATM).

Table 2. The Crime Prevention Through Environmental Design Scores

Variables	Scores Min - Max	Average scores	S.D.
Overall CPTED scores	56 - 68	62	4
CPTED scores at parking	55 - 74	64	6
CPTED scores at bus stop	51 - 59	55	3
CPTED scores at restroom	28 - 67	51	1
CPTED scores at food court	53 - 72	63	6
CPTED scores at ATM	47 - 100	75	21

With regard to the scores of public fear of crime it was found that the participants feel fear of crime at the level of 44 out of total 100 points. In addition, it was found that the score of fear of crime ranked from no fear (0) to very high (80-88) at four spots (bus stop, restroom, food court, and ATM). Parking facilities was the spot where people were more likely to feel fear of crime (19-78) than other spots (Table 3).

Table 3. The Scores of Public Fear of Crime

Variables	Scores	Average scores	S.D.
	Min - Max		
Overall scores	4 - 69	44	13
scores at parking	19 - 78	53	11
scores at bus stop	0 - 88	39	22
scores at restroom	0 - 81	38	18
scores at food court	0 - 80	47	16
scores at ATM	0 - 83	40	17

This study examined one hundred and two survey participants. The summary of demographic information was presented in table 4. Participants were 58.8% female and 40.2% male. Most of them were young to middle age between 18 to 40 years old (62.7%). Race ethnicity of sample was various. Half of them were Asian (28.4%) and Hispanic (23.5%), while the other half were African American, White, and Other. Majority of participants were single (61.8%), and married (21.6%).

Table 4. The Demographic Information of the Survey
Participants

Variable	Frequency	Percent
Gender		
Female	60	58.8
Male	41	40.2
Missing	1	1.0
Age		
18 to 25	39	38.2
26 to 40	25	24.5
41 to 65	6	5.9
Missing	32	31.4
Race/ethnicity		
African American	18	17.6
Asian	29	28.4
Hispanic	24	23.5
White	14	13.7
Other	14	13.7
Missing	3	2.9
Marital status		
Single	63	61.8
Married	22	21.6
Widowed	2	2.0
Divorced	4	3.9
Separated	2	2.0
Missing	9	8.8
Level of education		
Below high school	1	1.0
Some high school	6	5.9
High school diploma	16	15.7
Some college degree	28	27.5
College degree	28	27.5
Above college degree	16	15.7
Missing	7	6.9
Employment		
Yes	62	60.8
No	32	31.4
Missing	8	7.8

Table 5. The Experiences of Crime of the Survey Participants

Variables	Frequency	Percent
Family members become victims of crime		
Yes	14	13.7
No	74	72.5
Missing	14	13.7
Experiences of being assaulted		
Yes	16	15.7
No	77	75.5
Missing	9	8.8
Experiences of being robbed		
Yes	20	19.6
No	74	72.5
Missing	8	7.8
Experiences of being mugged		
Yes	12	11.8
No	81	79.4
Missing	9	8.8
Experiences of being pick-pocketed		
Yes	6	5.9
No	87	85.3
Missing	9	8.8
Experiences of being a victim of auto burglary		
Yes	16	15.7
No	54	52.9
Missing	32	31.4
Experiences of being a victim of auto theft		
Yes	4	3.9
No	65	63.7
Missing	33	32.4

Table 5 summarized the experiences of crime and prior victimization of survey participants. Almost all participants were less likely to have experiences of crime.

Experiences of being robbed were the highest frequency among other kinds of experiences, followed by experiences of being assaulted and experiences of being a victim of auto burglary.

To test the hypotheses, scores from CPTED survey (independent variable) and those from the survey of the fear of crime (dependent variable) were calculated for the average scores at parking facility, bus stop, restroom, food court, and ATM. After the average scores of both surveys were processed, they were correlated with Pearson bivariate correlation (Table 6).

Table 6. Correlation Between the Crime Prevention Through Environmental Design Scores and the Scores of Public Feeling of Fear of Crime

Fear Scores		CPTED Scores
At overall area	Pearson Correlation	.379*
	Sig. (2-tailed)	.000
	N	102
At parking facility	Pearson Correlation	-.090
	Sig. (2-tailed)	.458
	N	102
At bus stop	Pearson Correlation	-.375*
	Sig. (2-tailed)	.035
	N	102
At restroom	Pearson Correlation	-.054
	Sig. (2-tailed)	.625
	N	102
At food court	Pearson Correlation	.068
	Sig. (2-tailed)	.520
	N	102
At ATM	Pearson Correlation	.290*
	Sig. (2-tailed)	.021
	N	102

*p<.05

According to the result, three hypotheses were supported and the other three were not. The findings of the first three were presented. Then, the non-significant hypotheses were discussed.

Hypothesis 1

Shopping centers with high scores on overall CPTED application will have low scores on the customer's feelings of fear of crime.

There was a statistically significant correlation between the overall CPTED scores and the overall scores for customers' feeling of fear of crime (Pearson=.379, p=.000, N = 102) as shown in table 7. The Pearson correlation .379 presented the positive relationship between these variables at the slightly moderate level (Pyrzczak, 2006).

Table 7. Correlation Between the Overall Crime Prevention Through Environmental Design Scores and the Overall Scores of Public Feeling of Fear of Crime

Scores of fear of crime	CPTED Scores
Pearson Correlation	.379*
Sig. (2-tailed)	.000
N	102

*p<.05

According to the hypothesis, it was assumed that the higher the scores on CPTED, the lower the scores of fear of crime would be. However, there was the support in the opposite way from the assumption. More specifically, as the CPTED scores increased, the scores of fear of crime also increased. The further analysis was processed to test what variables, which were suggested to be related to the level of fear of crime, drove the direction of this finding. It was found that gender and race ethnicity were the influence. Then, the process of dummy variables was performed to test the relationship between fear of crime and attributes of gender and race ethnicity. The results were shown in table 8 and 9.

Table 8. Correlation Between the Scores of Fear of Crime and Gender

Scores of fear of crime	Female	male
Pearson Correlation	.209*	-.209*
Sig. (2-tailed)	.037	.037
N	101	101

*p<.05

Table 8 presented the correlation between the level of fear of crime and gender. The results suggest that there were relationship between gender and fear of crime ($p=.037$). Pearson correlation presented their positive weak relationship (.209) between female and the level of fear of crime. In contrast, there was a negative weak relationship (-.209) between male and level of fear of crime. Based on this result, it could be concluded that the level fear of crime was higher if the participants were female, while the level of fear of crime was lower if participants were male. In other words, female rather felt fear of crime toward design and physical environment than male.

Table 9. Correlation Between the Scores of Fear of Crime and Race Ethnicity

Scores of fear of crime	African American	Asian	Hispanic	White	Other
Pearson	-.310**	.037	.073	.194*	.011
Sig. (2-tailed)	.002	.717	.471	.050	.911
N	99	99	99	99	99

* $p<.05$

** $p<.01$

The results from table 9 reported that there were statistically significant relationship between the level of fear of crime and being African American ($p=.002$) and White ($p=.05$). There were slightly moderate negative relationship between African American and the level of fear of crime ($-.310$), whereas weak positive relationship between White and level of fear of crime ($.194$). Based on the findings, it was concluded that the level of fear of crime toward design and physical environment in shopping centers would be low if subjects were African American. Meanwhile, the level of fear of crime would be increased if subjects were White. With regard to Asian, Hispanic, and Other race ethnicity, there was no relationship between these races and the level of fear of crime toward design and physical environment in shopping centers.

Hypothesis 3

Shopping centers with high score on CPTED application of bus stops will have low scores on the customers' fear of crime at bus stops.

It was found that there was a statistically significant correlation between the CPTED scores and the scores for customers' feeling of fear of crime at bus stop ($p = .035$). The Pearson correlation $-.375$ presented the

slightly moderate negative relationship as shown in Table 10.

Table 10. Correlation Between the Crime Prevention Through Environmental Design Scores on Bus Stop and the Scores of Customers' Feeling of Fear of Crime at Bus Stop

Scores of fear of crime at bus stop	CPTED Scores at bus stop
Pearson Correlation	-.375*
Sig. (2-tailed)	.035
N	102

*p<.05

Based on the table, the third hypothesis was supported in the right direction as stated in the hypothesis (Pearson = -.375). Specifically, as the CPTED scores were increased, the scores of fear of crime were decreased. In other words, customers at shopping centers felt less fear of crime if there were high CPTED strategies applied at the bus stop.

In the reference of significant result on this correlation, the variables suggested to be related to the level of fear of crime (i.e. age, gender, race ethnicity, and experiences of crime) were examined whether those

variables influenced the level of fear of crime. It was found that there was no variable or attribute that provided the difference. Rather, the design and CPTED themselves drove the direction of this finding.

Hypothesis 6

Shopping centers with high score on CPTED application at ATM and will have low scores on the customers' fear of crime at ATMs.

It was found that there was a statistically significant correlation between the CPTED scores and the scores for customers' feeling of fear of crime at ATM ($p = .021$). The Pearson correlation .290 presented the weak positive relationship as shown in Table 11.

Table 11. Correlation Between the Crime Prevention Through Environmental Design Scores on ATM and the Scores of Customers' Feeling of Fear of Crime at ATM

Scores of fear of crime at ATM	CPTED Scores at ATM
Pearson Correlation	.290*
Sig. (2-tailed)	.021
N	102

* $p < .05$

According to the table, it can be concluded that there was a statistically significant relationship between the CPTED scores and the customers' feeling of fear of crime at ATM. It was assumed that the higher the scores on CPTED, the lower the scores on fear of crime at ATM would be. This hypothesis was supported but in the opposite direction. In other words, as the CPTED scores increased, the scores of fear of crime also increased. After investigating the variables that were suggested to be related to the level of fear of crime (i.e. age, gender, and experiences of crime), it was found that there was no variable or attribute that provided the difference. Rather, the design and CPTED themselves drove the direction of this finding.

The following tables presented the hypotheses that were not found a statistically significant difference. They were the hypothesis two, four and five. The findings were shown in table 12.

Hypothesis 2

Shopping centers with high score on CPTED application of parking facilities will have low scores on the customers' feeling of fear of crime in parking facilities.

Hypothesis 4

Shopping centers with high score on CPTED application of restrooms will have low scores on the customers' fear of crime in restrooms.

Hypothesis 5

Shopping centers with high score on CPTED application of food courts will have low scores on the customers' fear of crime in food courts.

Table 12. Correlation Between Crime Prevention Through Environmental Design Scores and Scores of Fear of Crime at Parking Facilities, Restrooms, and Food Courts

Scores of fear of crime	CPTED Scores
At parking facilities	
Pearson Correlation	-.090
Sig. (2-tailed)	.458
N	102
At restrooms	
Pearson Correlation	-.054
Sig. (2-tailed)	.625
N	102
At food courts	
Pearson Correlation	.068
Sig. (2-tailed)	.520
N	102

According to the results in this table, there was no statically significant relationship between the CPTED scores and the level of fear of crime. The participants

had indifferent feelings toward design and physical environment. They do not feel fear or safe toward the design and environment including the strategies of crime prevention through environmental design (CPTED) and design at the parking, restroom and food court.

CHAPTER FIVE

SUMMARY AND DISCUSSION

Although CPTED is one of the most routinely implemented in the family of placed based crime prevention strategies over thirty years, there is rarely evaluation or assessment of its effectiveness and efficacy (Lim & Minnery, 2005). Thus, this study investigated the efficacy and effectiveness of CPTED in shopping centers with the assessment of public fear of crime. It was assumed that if a property applied a proper level of CPTED, people would not fear crime. In this study, four regional shopping centers in the Inland Empire, California were investigated by the CPTED observational survey and the fear of crime survey, which were created by the researcher by adopting items used in the previous studies. Five locations in shopping centers were examined: parking facilities (ground and multi-storey facilities), bus stops, restrooms, food courts, and ATMs. There were four investigations based on day of the week and time of the day. Public opinions with regard to fear of crime were measured by the survey of fear of crime. One hundred and two people at the site locations were surveyed. The researcher attempted to conduct the

survey based on day of the week and time of the day in the same manner of the CPTED observational survey. Due to researcher personal safety, the survey during nighttime was not collected.

Data from both surveys (CPTED and fear of crime) were processed to establish the average scores for overall scores, parking scores, bus stop scores, restroom scores, food court scores, and ATM scores. Then, the average scores of CPTED and fear of crime were correlated with the bivariate statistics. It was found that the sample shopping centers applied CPTED to their properties between 56 and 68 of possible 100 points. Average CPTED scores used in shopping centers was 62 points. Among all locations of interest (parking facility, bus stop, restroom, food court, and ATM), the average CPTED score at restrooms was the lowest (51 points), while CPTED scores were highest at the ATMs (75 points). In reference of the results for fear of crime, it was found that public expressed the level of fear of crime toward design and physical environment of shopping centers between 4 and 69 of possible 100 points. The average overall score of fear of crime was 44 points. The highest score of fear of crime

was found at parking facilities (53), while the lowest was found at restrooms (38).

Theoretical and Policy Implication

Lim and Minnery (2005) stated that CPTED has been in the crime prevention strategy over thirty years; however, there are a few of studies that evaluate the effectiveness and efficacy of CPTED. This study examined the effectiveness and efficacy of CPTED in shopping centers with the assessment of public fear of crime in different areas: parking facility, bus stop, restroom, food court, and ATM. The study revealed that there was a significant relationship between fear of crime and CPTED. However, they were not supported in the direction as hypothesized. It was assumed that as CPTED increased, fear of crime would be decreased. According to the results of this study, it showed that CPTED did not decrease fear of crime (Pearson=.379, $p=.000$). Rather, CPTED was correlated with increased fear to public in overall area and at ATMs. In other words, the result implied that the current CPTED strategies used in shopping centers are not effective or efficient in reducing fear of crime.

It is possible that fear factors such as physical and social vulnerability (Schafer et al., 2006) influenced these results. Clemente and Kleiman (1977) found that genders influenced level of fear of crime. Females are more likely to fear crime than males. This study found a significant difference between genders and fear of crime in the same manner as the previous study (Clemente and Kleiman, 1977). Females, who were major participants (about 60%), were more likely to fear crime as CPTED increased (Pearson=.209). In contrast, males were less likely to fear crime as CPTED increased (Pearson=-.209). Due to the sample size of female participants, this study found genders play important role in this finding.

Nonetheless, there are correlation between CPTED strategies used in shopping centers in some locations. CPTED at bus stop was only spot in shopping centers where public fear of crime decreased as CPTED strategies increased (Pearson=-.375). The result revealed that physical environment and design of bus stop were directly influenced the decreased level of public fear of crime. Thus, the CPTED used at bus stop should be maintained.

Based on the findings of this research, CPTED applications at parking facility, restroom, and food court

were not related to public fear of crime. On average, the CPTED scores at those locations were above 50 points, which was not low. However, the survey participants felt indifferent to physical environment and design of those locations.

One possible explanation for these findings is because of the characteristics of data. Data in this research were mainly received from the opinions of people who are young, single, and have no or less prior victimization and experience of crime. This group of participants (18 to 35 years old) was the majority of population (approximately 80%), while about two percents are senior citizen. Younger people are less likely to fear crime than the elderly (Lee, 1983). Thus, it was not unusual that there was no have a relationship between this group of people and CPTED scores at those locations.

Prior victimization is also influence fear of crime (Schafer et al., 2006). People will believe that they are at risk for future victimization if they experienced prior victimization (Baumer, 1978; Skogan & Maxfield, 1981). Most participants in this research had low experiences to crime and prior victimizations. Therefore, the characteristics of data particularly in age and prior

victimization could be the explanation why there was no relationship between fear of crime and CPTED at parking facility, restroom, and food court.

Media are another approach that elevates an individual's fear of crime (Eschholz, 1997; Skogan, 1986, 1990). People who read a great deal of printed media, and often watch television may heighten their perception of risk (Stafford & Galle, 1984). The study revealed that the level of fear of crime of participants was not related to media influence. Although most participants watched news everyday and read newspapers quite often (once or twice a week), they did not exhibit unusually high levels of fear of crime. It is possible that questions used failed to capture fear of crime at the study locations. There was no a question asked how often you watch TV, movie or read newspapers about crimes generally or at the study location. The results may come out differently if participants were asked these specific questions.

Another possible explanation is that fear of crime may not be the best variable against which to gauge CPTED effectiveness. CPTED may have a stronger relationship with criminal activity occurring inside or surrounding malls as measured through incident reports or calls for services.

The design features queried about during this project might be more closely associated with preventing actual crime rather than general fear of crime.

Commercial Implication

According to the results, the study found that there was a significant relationship between CPTED and public fear of crime, particularly where the CPTED applied at bus stops. Fear of crime was low when bus stops evidenced a high score on the CPTED index ($p=.035$, Pearson = $-.375$). This finding suggests that intermodal transportation nodes (bus stops mark a change from walking to movement by public bus) are amenable to CPTED strategies aimed at reducing fear of crime. As city planning departments work to generate transportation options, future retail development or renovation of existing facilities should endeavor to invest resources in the careful design of transportation hubs. These locations mark the entrance to shopping locations and can greatly impact on the perceptions of shoppers. The key implications of this finding are twofold. First, city code enforcement offices could develop standards for intermodal transportation sites located on private property. The existence of bylaws directly aimed at the maintenance of

these sites can be used by city officials to encourage management to properly maintain these locations. Additionally, proposals to develop or renovate shopping centers should incorporate CPTED features to promote safe shopping. Requiring a CPTED specialist, typically a trained police officer, to review all development proposals submitted to a city could potentially eliminate costly renovations and prevent crime problems from developing. Again, the development of building standards codified into city bylaws can aid this process.

Limitation

The primary Limitations of this study concern the methodology, specifically data collection and survey instruments. The surveys were initially designed to collect data based on day of the week and time of the day to obtain the variety of people's opinions toward physical design and environment of shopping centers. Prior research suggests that people would have stronger fear of crime during nighttime compared to daytime activity (Fisher, 1991). Unfortunately, the data could not be collected during nighttime for two reasons: due to scheduling issues and safety concerns. The researcher was alone most data

collection periods and was unable to collect data in the evening. Additionally, this research was carried out during the spring and summer months when there was extended daylight. During the pilot phase of the study it was found that there was rarely people at the study locations after sunset especially at bus stops because bus services terminated early. Therefore, nighttime survey was not collected.

The survey questions tapping into fear of crime were too general especially with regard to media influence. There were no items asking participants specific questions related to knowledge of crime at the malls. The results could be different if participants were asked how much news related to criminal incidents they consume (read, listen, and watch).

This study examined the use of CPTED in the area of Inland Empire, California, U.S.A. The findings may not be generalized to the shopping center nationwide or worldwide. Also, only regional shopping centers were investigated. The results may not be generalized to other types of shopping centers (neighborhood and community shopping centers).

Recommendation for Future Research

Although the study found that physical design and environment influence level of public fear of crime, the results did not have the direction as stated in the hypotheses. It was assumed that as CPTED increased, fear of crime would be decreased. The research interestingly found that the higher the CPTED, the higher the fear of crime would be, especially at ATM and overall area of shopping centers. These findings were opposite as hypothesized. It is possible that CPTED strategies trigger perception and sensibility of fear in shoppers rather than provide safety feeling. In the future study, CPTED may need to be investigated if CPTED is a trigger to fear or to safety feeling.

This study also found that gender and race ethnicity were important factors that influenced the level of fear of crime in overall area of shopping centers. There may be other factors, which could influence fear of crime. In the future research, other demographic variables should be investigated (e.g. type of job, major of study, etc.). People who work in criminal justice fields may have more or less fear of crime than other jobs, for example. Questions asked on the fear of crime survey may need to be revised.

Items should be directed and specific to fear of crime. For instance, items on the media influence should question the frequency of consuming news related to crime not general or entertainment news.

The nighttime data collection at the site locations is highly recommended. It was found that level of fear of crime elevates at nighttime and dark area (Fisher & Nasar, 1992; Tseng et al., 2004). The result may obtain more significant differences than this study.

Although this study revealed that CPTED (independent variable) is not effective when CPTED was assessed with public fear of crime (dependent variable), CPTED may be effective if compared to other dependent variables; criminal incidences inside a mall, crime statistics from jurisdiction, or calls for services. In the future research, those dependent variables are recommended.

Furthermore, this research found that level of fear of crime was increased as CPTED increased particularly at ATM. It is also found that there was no demographic variable that influenced the level of fear of crime at ATM. The design elements alone elevate fear of crime. In the future study, the researcher may focus what design features create fear or what design elements encourage safety feeling.

For example, the color of wall around the ATM or the color of lighting at the ATM.

APPENDIX A
CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN
OBSERVATIONAL SURVEY

Crime Prevention Through Environmental Design
Observational Survey

Location: _____

Date: _____ Time: _____

CPTED for surface parking facility

All Time

1. The distance from building entrances to parking lots

<input type="checkbox"/>	Further than 350 feet	0
<input type="checkbox"/>	300 - 350 feet	50
<input type="checkbox"/>	Shorter than 300 feet	100

2. The visibility from parking lots to building entrances

<input type="checkbox"/>	The visibility is reduced by obscures (e.g. nooks, corners of building, overgrowth plants or thick and large volumes of landscaping)	0
<input type="checkbox"/>	The visibility is partially reduced by obscures	50
<input type="checkbox"/>	The visibility is clear, no obscure	100

3. The presence of security patrol in the parking (e.g. walking/vehicle police, security, escort)

<input type="checkbox"/>	None	0
<input type="checkbox"/>	Yes very rare	25
<input type="checkbox"/>	Yes sometime	50
<input type="checkbox"/>	Yes often	75
<input type="checkbox"/>	Yes all the time	100

4. The presence of graffiti in the parking

<input type="checkbox"/>	Everywhere	0
<input type="checkbox"/>	Many	25
<input type="checkbox"/>	Few	50
<input type="checkbox"/>	None	100

5. The presence of landscaping around light poles

<input type="checkbox"/>	Very thick and it obscures lighting	0
<input type="checkbox"/>	Thick but maintained	25
<input type="checkbox"/>	Some landscaping with the thin volume and maintained	50
<input type="checkbox"/>	No landscaping	100

Night Time

1. The presence of security patrol in the parking (e.g. walking/vehicle police, security, escort)
- | | |
|----------------------|-----|
| ___ None | 0 |
| ___ Yes very rare | 25 |
| ___ Yes sometime | 50 |
| ___ Yes often | 75 |
| ___ Yes all the time | 100 |
2. The level of service of illuminance
- | | |
|--|-----|
| ___ No lighting installed/out of service | 0 |
| ___ Below 2 foot candles | 25 |
| ___ 2 foot candles | 50 |
| ___ Above 2 foot candles | 100 |

CPTED for multi-storey parking facility

All Time

1. The number of entrances on each floor of parking
- | | |
|-----------------|-----|
| ___ None | 0 |
| ___ 1 | 50 |
| ___ more than 1 | 100 |
2. The distance from building entrances to parking lots
- | | |
|---------------------------|-----|
| ___ Further than 350 feet | 0 |
| ___ 300 - 350 feet | 50 |
| ___ Shorter than 300 feet | 100 |
3. The visibility from parking lots to building entrances
- | | |
|--|-----|
| ___ The visibility is reduced by obscures (e.g. nooks, corners of building, overgrowth plants or thick and large volumes of landscaping) | 0 |
| ___ The visibility is partially reduced by obscures | 50 |
| ___ The visibility is clear, no obscure | 100 |
4. The overall design of building walls
- | | |
|---|-----|
| ___ All concrete walls | 0 |
| ___ Some cables of railing/chain meshes and some concrete walls | 50 |
| ___ All cables/chain meshes | 100 |
| ___ Other specify: _____ | |

5. The brightness of wall color (measured by the painting color shade)

___	White-Smoke and above or other color	0
___	White-Dove wing	25
___	White-Bay oyster	50
___	White light	75
___	Clean White and above	100

6. The brightness of ceiling color (measured by the painting color shade)

___	White-Smoke and above or other color	0
___	White-Dove wing	25
___	White-Bay oyster	50
___	White light	75
___	Clean White and above	100

7. The presence of landscaping around light poles/voltages

___	Very thick and it obscures lighting	0
___	Thick but maintained	25
___	Some landscaping with the thin volume and maintained	50
___	No landscaping	100

8. The presence of graffiti in the parking

___	Everywhere	0
___	Many	25
___	Few	50
___	None	100

9. The presence of security patrol in the parking (e.g. walking/vehicle police, security, escort)

___	None	0
___	Yes very rare	25
___	Yes sometime	50
___	Yes often	75
___	Yes all the time	100

10. The level of service of illuminance

___	No lighting installed/out of service	0
___	Below 7 foot candles	25
___	7 foot candles	50
___	Above 7 foot candles	100

11. The level of service of illuminance at stairwells and/or elevators

___	No lighting installed/out of service	0
___	Below 12 foot candles	25
___	12 - 14 foot candles	50
___	above 14 foot candles	100

Night Time

1. The presence of security patrol in the parking (e.g. walking/vehicle police, security, escort)

___	None	0
___	Yes very rare	25
___	Yes sometime	50
___	Yes often	75
___	Yes all the time	100

2. The level of service of illuminance

___	No lighting installed/out of service	0
___	Below 7 foot candles	25
___	7 foot candles	50
___	Above 7 foot candles	100

3. The level of service of illuminance at stairwells and/or elevators

___	No lighting installed/out of service	0
___	Below 12 foot candles	25
___	12 - 14 foot candles	50
___	above 14 foot candles	100

CPTED for bus stop

All Time

1. The presence of graffiti at this bus stop

___	All over	0
___	Many	25
___	Few	50
___	None	100

2. The volume/dense of vegetations (e.g. trees, plants and bushes)

___	Very thick and reduced visibility	0
___	Thick but maintained	25
___	Moderate volume	50
___	Thin and maintained	75
___	No presence of landscaping	100

3.	Design of benches	
___	No bench	0
___	Large benches, which people can lay down	0
___	Benches with no back support/just for sitting	100
4.	The presence of a name of bus stop	
___	No	0
___	Yes	100
5.	The presence of bus schedule and map	
___	No	0
___	Yes	100
6.	The bus stop look like a small home	
___	No	0
___	Yes	100
7.	The bus stop is built with brick or masonry	
___	No	0
___	Yes	100
8.	Overall cleanliness at the bus stop	
___	Very dirty	0
___	Dirty	25
___	Clean	50
___	Very clean	100
9.	The presence of trash at the bus stop	
___	Small piles	0
___	Several pieces	25
___	Few pieces	50
___	None	100
10.	The presence of old flyers, residue of tape from posters	
___	Everywhere	0
___	Many	25
___	Few	50
___	None	100

Night Time

1. Overall cleanliness at the bus stop
- | | | |
|-----|------------|-----|
| ___ | Very dirty | 0 |
| ___ | Dirty | 25 |
| ___ | Clean | 50 |
| ___ | Very clean | 100 |
2. The presence of trash at the bus stop
- | | | |
|-----|----------------|-----|
| ___ | Small piles | 0 |
| ___ | Several pieces | 25 |
| ___ | Few pieces | 50 |
| ___ | None | 100 |
3. The presence of old flyers, residue of tape from posters
- | | | |
|-----|------------|-----|
| ___ | Everywhere | 0 |
| ___ | Many | 25 |
| ___ | Few | 50 |
| ___ | None | 100 |

CPTED for restroom

All time

1. The design of toilet-stall doors
- | | | |
|-----|---|-----|
| ___ | Toilet-stall doors obscure a standing person's feet and head | 0 |
| ___ | Toilet-stall doors show a standing person's either feet or head | 50 |
| ___ | Toilet-stall doors show a standing person's feet and head | 100 |
2. Each restroom is large for just a person
- | | | |
|-----|-----|-----|
| ___ | No | 0 |
| ___ | Yes | 100 |
3. The ceiling panes are secured (not removable)
- | | | |
|-----|-----|-----|
| ___ | No | 0 |
| ___ | Yes | 100 |
4. Size of sinks is small enough for one person use
- | | | |
|-----|-----|-----|
| ___ | No | 0 |
| ___ | Yes | 100 |

5. The restroom is located in the corner of building or end of corridor

<input type="checkbox"/> No	100
<input type="checkbox"/> Yes	0

6. The volume of the presence of attendants nearby the restrooms (e.g. retail stores, information desks, customer services, cashier registers)

<input type="checkbox"/> None	0
<input type="checkbox"/> Low	25
<input type="checkbox"/> Moderate	50
<input type="checkbox"/> Heavy	75
<input type="checkbox"/> Very heavy	100

7. The volume of the foot traffic and/or activities nearby the restrooms

<input type="checkbox"/> Very low	0
<input type="checkbox"/> Low	25
<input type="checkbox"/> Moderate	50
<input type="checkbox"/> Heavy	75
<input type="checkbox"/> Very heavy	100

8. Overall cleanliness of the restroom

<input type="checkbox"/> Very dirty	0
<input type="checkbox"/> Dirty	25
<input type="checkbox"/> Clean	50
<input type="checkbox"/> Very clean	100

9. The presence of graffiti in restrooms

<input type="checkbox"/> All over	0
<input type="checkbox"/> Many	25
<input type="checkbox"/> Few	50
<input type="checkbox"/> None	100

Night time

1. Overall cleanliness of the restroom

<input type="checkbox"/> Very dirty	0
<input type="checkbox"/> Dirty	25
<input type="checkbox"/> Clean	50
<input type="checkbox"/> Very clean	100

2. The volume of the foot traffic and/or activities nearby the restrooms

<input type="checkbox"/> Very low	0
<input type="checkbox"/> Low	25
<input type="checkbox"/> Moderate	50
<input type="checkbox"/> Heavy	75
<input type="checkbox"/> Very heavy	100

CPTED for food court

All time

1. The designs of chairs and tables in the food court

<input type="checkbox"/> Both tables and chairs are movable, not attached	0
<input type="checkbox"/> Some of tables and chairs are attached and some are not	50
<input type="checkbox"/> Both tables and chairs are attached (cannot be moved)	100

2. The presence of metal trash cans

<input type="checkbox"/> No	100
<input type="checkbox"/> Yes	0

3. The food court is located in the corner of building or end of corridor

<input type="checkbox"/> No	0
<input type="checkbox"/> Yes	100

4. The volume of the foot traffic and/or activities nearby the food court

<input type="checkbox"/> Very heavy	0
<input type="checkbox"/> Heavy	25
<input type="checkbox"/> Moderate	50
<input type="checkbox"/> Low	75
<input type="checkbox"/> Very low	100

5. There are sight barriers on the second floor above the food court

<input type="checkbox"/> No	0
<input type="checkbox"/> Yes	100

6. Overall cleanliness of the food court

<input type="checkbox"/> Very dirty	0
<input type="checkbox"/> Dirty	25
<input type="checkbox"/> Clean	50
<input type="checkbox"/> Very clean	100

7.	The presence of cleaning crews in the food court	
___	None	0
___	Yes very rare	25
___	Yes sometime	50
___	Yes often	75
___	Yes all the time	100

Night time

1. Overall cleanliness of the food court

___	Very dirty	0
___	Dirty	25
___	Clean	50
___	Very clean	100

2. The presence of cleaning crews in the food court

___	None	0
___	Yes very rare	25
___	Yes sometime	50
___	Yes often	75
___	Yes all the time	100

3. The volume of the foot traffic and/or activities nearby the food court

___	Very heavy	0
___	Heavy	25
___	Moderate	50
___	Low	75
___	Very low	100

CPTED for ATM

All time

1. The ATM is located in the corner of building or end of corridor

___	No	100
___	Yes	0

2. The volume of the presence of attendants nearby the ATM (e.g. retail stores, information desks, customer services, cashier registers)

___	None	0
___	Low	25
___	Moderate	50
___	Heavy	75
___	Very heavy	100

3. The volume of the foot traffic and/or activities nearby the ATM

___	Very low	0
___	Low	25
___	Moderate	50
___	Heavy	75
___	Very heavy	100

4. The level of service of illuminance with the area of 5 feet around ATM

___	No lighting installed/out of service	0
___	Below 10 foot candles	25
___	10 foot candles	50
___	Above 10 foot candles	100

5. The level of service of illuminance with the area of 50 feet around ATM

___	No lighting installed/out of service	0
___	Below 2 foot candles	25
___	2 foot candles	50
___	Above 2 foot candles	100

6. The volume/dense of vegetations (e.g. trees, plants and bushes) nearby ATM

___	Very thick and reduced visibility	0
___	Thick but maintained	25
___	Moderate volume	50
___	Thin and maintained	75
___	No presence of landscaping	100

7. The presence of benches nearby ATM

___	Benches, obscuring visibility	0
___	Benches, no obscuring visibility	50
___	No bench	100

8. The presence of nooks, walls or other obscures nearby ATM

___	No	100
___	Yes	0

9. Installation of rearview mirrors on ATM

___	No	0
___	Yes	100

Night time

1. The volume of the foot traffic and/or activities nearby the ATM

___	Very low	0
___	Low	25
___	Moderate	50
___	Heavy	75
___	Very heavy	100

2. The level of service of illuminance with the area of 5 feet around ATM

___	No lighting installed/out of service	0
___	Below 10 foot candles	25
___	10 foot candles	50
___	Above 10 foot candles	100

3. The level of service of illuminance with the area of 50 feet around ATM

___	No lighting installed/out of service	0
___	Below 2 foot candles	25
___	2 foot candles	50
___	Above 2 foot candles	100

APPENDIX B
SOCIAL ATTITUDE SURVEY

Social Attitude Survey

The level of safety feeling of customers in Shopping malls environment

Please select the items that apply to you

Section I: The attitudes toward physical environment in shopping malls

Opinions toward parking facility in shopping centers	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I feel safe while walking from the mall's exit to my car	0	1	2	3	4
I think it is possible that someone might hurt/attack me while I am walking to my car or to the mall entrance	0	1	2	3	4
This parking is well-lit	0	1	2	3	4
I feel safe using the stairs in this parking lot	0	1	2	3	4
I feel that I may be accidentally hit by a car while walking in this parking lot	0	1	2	3	4
I feel that my car may be broken-in while parked in this parking lot	0	1	2	3	4
I feel that my car may be stolen while parked in this parking lot	0	1	2	3	4
I always park in the same parking area	0	1	2	3	4
I feel safe to park in this parking lot	0	1	2	3	4
My car has been broken-in before	No				Yes
My car has been stolen before	No				Yes

Opinions toward bus stop in shopping centers	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I feel safe while waiting a bus at this bus stop	0	1	2	3	4
I think it is possible that someone might hurt/attack me while I am waiting for my bus at this bus stop	0	1	2	3	4
I think it is possible that someone might hide in the bush around this bus stop	0	1	2	3	4
I think that my purse might be snatched or my wallet might be picked while waiting for my bus at this bus stop	0	1	2	3	4
I think I might be mugged by panhandlers or homeless people	0	1	2	3	4
I think this bus stop is clean	0	1	2	3	4
Opinions toward restroom in shopping centers	<input type="checkbox"/> I don't use restroom here				
I feel safe while using this restroom	0	1	2	3	4
I think this restroom is clean	0	1	2	3	4
I think this restroom is well-lit	0	1	2	3	4
I think it is possible that someone might hurt me while using this restroom	0	1	2	3	4
I think it is possible that someone might rob me while using this restroom	0	1	2	3	4
I think it is possible that someone might sexually harass me while using this restroom	0	1	2	3	4
I think it is possible that someone might use illegal drugs in this restroom	0	1	2	3	4
I think it is possible that someone might do illicit sexual acts in this restroom	0	1	2	3	4

Opinions toward food court in shopping centers	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I think this food court is always clean	0	1	2	3	4
I think this food court is crowded	0	1	2	3	4
I think this food court is too noisy	0	1	2	3	4
I feel safe while buying food/beverage or eating in this food court	0	1	2	3	4
I think that my wallet might be stolen in this food court	0	1	2	3	4
Opinions toward ATM in shopping centers	<input type="checkbox"/> I don't use ATM here				
I feel safe while using ATM in this mall	0	1	2	3	4
I think it is possible that someone might hurt me while I am at ATM in this mall	0	1	2	3	4
I think it is possible that someone might mugged at ATM in this mall	0	1	2	3	4
I think it is possible that someone might robbed at ATM in this mall	0	1	2	3	4
I feel the area around ATM is well-lit	0	1	2	3	4
This area provides good visibility that I can see what is going on around the ATM	0	1	2	3	4

Section II: Spatial Pattern Information of Shopping

1. How often do you come to this shopping mall?

- more than once a week once a week
 once a month less than once a month

2. What time do you usually come to this mall?

(Check all that apply)

- morning afternoon evening

3. What time do you usually leave this mall?

(Check all that apply)

- morning afternoon evening

4. What day do you usually come to this mall?

(Check all that apply)

- Monday Tuesday Wednesday
 Thursday Friday Saturday
 Sunday

5. What day do you avoid coming to this mall?

(Check all that apply)

- Monday Tuesday Wednesday
 Thursday Friday Saturday
 Sunday None

6. Why do you avoid coming on that day?

(Check all that apply)

N/A

traffic

crowded

work/school

no special discount

other: _____

7. How far do you commute from your home to this shopping
mall? _____ minutes _____ miles

Section III: Demographic Information

1. Gender: Male Female

2. What year were you born? _____

3. Race: African American Asian

Hispanic

White

other

4. Marital status: single married widowed

divorced separated

5. Level of education: below high school

some high school

high school diploma

some college

college degree

above college degree

6. Are you currently employed? Yes No
7. What is your occupation? _____
8. Have you or any member of your family been a victim of
crime in the past year? Yes No
9. How often do you read the news in the local newspaper?
- Everyday Several days a week
- Once or twice a week Almost never Not at all
10. How often do you watch the news on TV?
- Everyday Several days a week
- Once or twice a week Almost never Not at all
11. Have you been assaulted before? Yes No
12. Have you been robbed before? Yes No
13. Have you been mugged before? Yes No
14. Have you been pick-pocketed before? Yes No

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