

Thesis of;
An Examination of the Effectiveness of Crime Prevention through
Environmental Design Mechanisms on the Convenience Store Industry in the
Youngstown area

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Thesis Proposal of;
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Abstract

Crime prevention practices, which use the physical environment to deter crime, are known as crime prevention through environmental design (or CPTED) (Jeffery, 1971). The effectiveness of CPTED strategies used by convenience stores on reported criminal offenses, and the relationship such strategies have with the crimes that occur are the primary elements examined by this thesis. These CPTED strategies include natural access control, natural surveillance, and territorial reinforcement. The fourth element studied is the location of the retail establishment itself (Crowe 1991).

Natural access control allows occupants to the ability to regulate who can gain access. Natural surveillance allows occupants of a place an adequate view of the place and surrounding areas. Territorial reinforcement shows the need of a place to gain the support of the surrounding community (Crowe 1991).

The primary instrument consisted of a security survey, done on scene, by the author of this thesis. The survey results were compared to local reported crimes, in an attempt to clarify the effects of CPTED on crime in the sampled convenience stores.

In conclusion, many factors have an impact on crime in convenience stores, but feasibility of CPTED principles, as well reported crime being a poor indicator of actual crime may limit the testability of crime prevention practices.

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Chapter 1: Introduction

Crime Prevention, as a discipline, is relatively new, and as yet, there is no one framework of prevention methodology. Some of the more common crime prevention methods used today include, neighborhood watches, education programs, community policing programs, actual physical deterrents, and environmental designs. Many of the methods of crime prevention are as old as crime itself, and most modern innovations have their roots in the past (Crowe, 1991; Newman, 1972)

This thesis is examines the effectiveness of modern crime prevention practices, which use the physical environment to deter crime. This is known as crime prevention through environmental design (or CPTED) (Jeffery, 1977). It is my intention to examine the effectiveness of CPTED strategies used by convenience stores and food oriented gas stations, in the greater Youngstown area. The relationship such strategies have with the crimes that occur at the studied locations is the primary focus of the study.

The National Crime Prevention Institutes' definition of CPTED, is "the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life" (as cited in Crowe 1991, pxi). In Timothy Crowe's Book Crime Prevention Through Environmental Design (1991) Increased profit, improved quality of life, and protected property values are also named as byproducts of effective crime prevention.

Crime prevention through environmental design is also defined as the “altering of the physical environment to enhance safety” (Miller and Hess, 1994, p.359). CPTED strategies are not designed to function alone, and require continuous interaction with numerous physical and social conditions. These strategies are, however, an effective part of the total social changes required to reduce crime (Miller and Hess, 1994).

CPTED and the Convenience Store Industry

A convenience store is a retail outlet, typically 1000-5000 square feet in size that sells a limited variety of grocery items, cigarettes, publications, and non-consumable products, and may or may not operate gasoline pumps. It is generally in an easily accessible, convenient location, and is open 7 days per week for longer than conventional supermarkets. (Calder and Bauer, 1992; Schreiber, 1992; Amandus 1993; Malcan, 1993 as cited in Bellamy, 1996)

In this thesis, convenience stores that sell gas, and those that do not will be examined and discussed. For purposes of this thesis, the term convenience store will be used to describe those stores which meet the above definition, but which do not sell gasoline. A retail gasoline establishment, that also contains a complete convenience store, will be referred to as a food oriented gas station. This distinction is being made because crime trends tend to be different for convenience stores and gas stations (Bellamy, 1996). The distinction between crime in convenience stores and food oriented gas stations has not been established clearly (Bellamy, 1996).

Purpose of the Study

This thesis examines the effects of CPTED mechanisms in convenience stores, in the Greater Youngstown area, on reported crime. Four general mechanisms of CPTED are examined within these settings. Three of these; natural access control, natural surveillance, and territorial reinforcement, are defined in crime prevention literature (Crowe, 1991). The fourth element studied is the location of the retail establishment itself. Also examined, as individual elements, were the differences in reported crimes between stores that sell alcohol, sell state lottery, and have an Automated teller machine, versus those that do not.

The primary instrument of the study consisted of a security survey of thirty convenience stores and food oriented gas stations, done on scene by the author. The results of the survey were then compared to local reported crimes, which occurred at the stores location, in an attempt to clarify the effects of CPTED on crime in the sampled convenience stores.

This study is a relatively comprehensive look at a broad range of prevention tactics as they apply to a specific type of setting. CPTED's mechanisms are viewed, in this thesis, as broad overlapping prevention practices. In doing so, individual smaller methods of prevention are included as part of a greater whole. This thesis is an attempt to determine the overall effectiveness of CPTED on the types of stores examined. That is not to say that I did not look at smaller methods, as they are examined in conjunction with the

larger mechanism, or the mechanisms they support. The type of lighting, for example, has a direct impact on natural visibility, and on territorial reinforcement.

By taking a holistic approach, it is the purpose of this thesis to shed some light on whether or not CPTED mechanisms work, not for example, whether or not one type of alarm or camera is better than another type.

Overview of the Study

The first chapter shows the need for the study, and provides a general overview of Crime prevention through environmental design, and crime in the convenience store industry. The central idea is that the physical environment has an effect on crime in the convenience store industry, of the greater Youngstown area, and so can be altered to reduce the total amount and effects of crime in the industry.

The second chapter consists of a literature review, which examines various CPTED principles. Related crime prevention writings, and convenience store crime are also examined. Finally the opposing beliefs that crime prevention actually reduces the total amount of crime, versus the belief that crime prevention only changes the nature of crime, and not the total amount, are discussed.

The third chapter of the thesis describes the methods research. This included on scene field research of thirty convenience stores and food oriented gas stations, and an examination of one year reported crimes that occurred at the stores. Attempts were made to examine a wide variety of stores, and to gather data on the stores related to the principles of CPTED.

The fourth chapter contains an analysis of data gathered in chapter three. Attention was focused on the CPTED principles of natural surveillance, natural access and territorial reinforcement, as well as numerous variables related to the stores location, and some other miscellaneous variables that could have an impact on criminal activity. This was accomplished through the use of various statistical testing procedures. Descriptive statistics illustrated the results of the study.

The fifth chapter consists of a summary of the thesis. Included in chapter five are the author's conclusions of the findings.

Chapter 2: Literature Review

CPTED, as a discipline, is still in its infantile stages and like other similar prevention practices, requires a great deal of research, and practical application, before it can be understood and properly critiqued. Technological advances, continuing changes in the criminal justice system, as well as advances in the social sciences, have influenced and will certainly continue to test and shape the premises of CPTED. Only through continuing trial and error will the advocates of CPTED be able to adequately test what they preach.

Traditional Crime Prevention

Crime prevention is broad in scope, and includes “any action taken before a crime is committed that will reduce or eliminate the occurrence of crime”(Jeffery 1977, p.43). One of the advantages of crime prevention is that the rights and well being of a community will be better protected under a model of prevention than a model of reacting to crimes, which have already occurred (Jeffery, 1977). The term crime deterrence can be considered different from crime prevention, however, for purposes of this paper, crime deterrence and crime prevention will be considered to have the same meaning.

Traditional crime prevention practices focus primarily on the central assumptions that “efforts to understand and control crime must begin with the offender...[and that]... the focus of crime prevention is on crime and people” (Weisburd, 1997, p1). Because of this, traditional approaches lack a holistic and

integrated viewpoint, which can lead to a greater understanding of crime and an increased knowledge of how to prevent crime from occurring. (Eck, 1997; Weisburd, 1997)

Situational Crime Prevention; an Alternative Approach

A relatively new approach to crime prevention, called situational crime prevention, began in the early 1970's. This approach seeks to change the focus of crime prevention research and practices, from the traditional offender based view, to the context in which crime is committed. The primary question asked in situational crime prevention is that of "why crime occurs in specific settings? " Situational crime prevention looks at the immediate opportunities of the crime situation. This approach seeks to reduce crime by reducing these specific opportunities. Situational crime prevention, like all crime prevention methodologies, requires more research to determine if it is the best method possible. (Weisburd, 1997).

Opportunity Blocking

The act of making crime more difficult, less rewarding, or otherwise undesirable is known as opportunity blocking. Some examples of crime prevention techniques advocated by the proponents of this technique include photographs on credit cards, or car alarms. (Clarke 1992, and 1995a, 1995b) Opportunity blocking, which is concentrated on locations, is a form of situational crime prevention, and the two disciplines use much of the same methodology for

preventing crime (Eck, 1997 p.2) Target hardening is another crime prevention term, that can be used interchangeably with opportunity blocking.

Preventing Crime at Places

A "Place" is "a very small area reserved for a narrow range of functions, often controlled by a single owner, and separated from the surrounding area" (Eck, 1997 p.1). Examples of places include stores, homes, apartment building hallways, street corners, airport lounges, and mobile places such as buses. "Most places have no crime, and most crime is highly concentrated in and around a relatively small number of places" (Eck, 1997 p.1). "If we can prevent crime at these high crime places, then we might be able to reduce total crime" (Eck, 1997).

Places have recently become favored by criminologists as a factor of crime to study (Eck and Weisburd, 1995a, 1995b). Eck (1997) believes that crime prevention tactics, which are based on place, attempt to influence offenders when they are considering whether or not to commit a given crime. Offender based prevention strategies are intended to affect criminal behavior weeks, months, or even years before hand.

Timothy Crowe and CPTED

Published in 1991, the book Crime Prevention through Environmental Design, by Timothy Crowe, continues the works of earlier crime prevention authors. Crowe's book uses architectural design and space management as key

factors in preventing crime. (Crowe, 1991). Defensible Space (Newman, 1972) is a term used synonymous with CPTED throughout the literature.

Crowe advocates three strategies of CPTED, which will form much of the basis of this paper. These three mechanisms include natural access control, natural surveillance, and territorial reinforcement. Location, which is also considered prominent by Crowe, will also be examined as an important factor in crime prevention. Natural access control is the structuring of a place in such a way as to allow occupants to have the ability to regulate who can and cannot gain access into the place. Natural access control involves making it clear to people where they belong, and where they do not. Methodologies of natural access control include (but are not limited to) locks, guards, and bars on windows, and works best when security is incorporated into the building layout. (Crowe, 1991).

Natural surveillance allows occupants of a place to have an adequate view of the place and surrounding areas. Natural Surveillance allows for better observation, and utilizes such methods as patrols, lighting, and placement of windows. Natural Surveillance is more than just good lighting. Placement of windows and position of employees can also help to create a natural environment of high visibility (Crowe, 1991, p.45).

Both natural access control, and natural surveillance, influence the mental state of those who inhabit an area which utilizes CPTED. Territorial reinforcement shows the need of a place to gain the support of the surrounding community. Territorial reinforcement requires that the basic need in people for

their own space be understood, and supported. Appearance, cleanliness, and attentiveness of personnel all effect territorial reinforcement (Crowe 1991).

Territorial reinforcement, is a relatively new concept that is intended to create a sense of belonging, and allows for the inhabitants of a given place to police themselves, and feel protective of their location, and community (Crowe, 1991).

Displacement and Diffusion

When the effectiveness of crime prevention is examined, the question of displacement is sure to come up. Displacement is the change of crime in terms of either space, time, or type of offending, from the original targets of crime prevention interventions (Repetto, 1976, as cited in Weisburd, 1997).

Displacement is, for example, if a person intends to rob a given store using a gun, but at the last minute realizes that the clerk is working behind bullet resistant glass, and so either steals merchandise, or robs the store two blocks away. A crime has still occurred despite a prevention practice working.

Displacement can be positive as well as negative (Weisburd, 1997). Improvements are noted in areas, which are related to, but not exactly, those criminal activities targeted by crime prevention methodologies. This phenomenon is called diffusion (Weisburg, 1997). Diffusion is, for example, if a person intends to rob a given store using a gun, but at the last minute realizes that the clerk is working behind bullet resistant glass, and so gives up the attempt, and finds

something else to do. In this situation a crime prevention practice worked, and no other crime occurred.

Opponents of situational crime prevention believe that context specific methods of prevention (such as CPTED) will lead to displacement of criminal activities. There is a great deal of debate as to the totality and consequences of displacement, but most experts agree that if displacement occurs, it is certainly not a 100% occurrence of crime in a different form. If the situation that leads to an opportunity to commit a specific crime can be prevented, then perhaps the lack of opportunity can lead to a different crime being committed, or no crime at all occurring (Weisburd, 1996).

Crime in Convenience Stores and Food Oriented Gas Stations

One frequently asked question, regarding convenience stores, is why are some convenience stores robbed repeatedly, while others are never victimized? The answer seems to be that stores that are robbed the most tend to have features, that are attractive to robbers (Bellamy, 1996).

Convenient to shop at also seems to mean convenient to victimize. Late hours, small staff, drive up accessibility, and cash on hand are all inviting to potential robbers (Smith 1987, as cited in Bellamy, 1996). This propensity to be robbed has given convenience stores and food oriented gas stations the names "poor mans ATM" (Malcan, 1993, as cited in Bellamy, 1996 p.1), and "stop and robs" (Amandus, 1993, as cited in Bellamy, 1996 p.1).

Chapter 3: Methods

Store Selection

The sample for this thesis consisted of 30 convenience stores and food orientated gas stations in the greater Youngstown area. The author, through referral, and word of mouth, contacted numerous stores, until such time as 30 stores were found whose management consented to allow their store to be surveyed. Attempts were made to include in the study, numerous different stores, with different security features. The final sample of stores was drawn from the greater Youngstown area.

Past research has noted the possibility of differences in those crimes committed at convenience stores, and those crimes committed at food oriented gas stations (Bellamy, 1996). Because of this, attempts were made, when selecting stores to obtain as close to an even number of each type of store as is possible. The final sample contained 14 food oriented gas stations and 16 convenience stores.

Another contrast that has yet to be explored clearly is the possibility of differences in crimes between privately owned and named stores and those that are part of a larger chain. Attempts were also be made, when selecting stores to obtain as close to an even number of each type of store as is possible. The final sample contained 14 privately owned, and 16 chain stores.

The hours of operation of convenience stores, and food oriented gas stations may vary enough to lead to a difference in crimes committed at both

types of locations. Attempts were also made to examine the relationship between hours of operation, and crimes committed. The final sample contained 9 stores open 24 hours daily, and 21 stores that were not open 24 hours.

Stores that sell alcohol, those that sell state lottery tickets, and those with automated teller machines may also have a different environment or clientele. These factors will also be examined; however, there were some limitations within the sample. Among the stores surveyed only three stores were found that did not sell alcohol, only four stores were found that did not sell lottery tickets, and only three stores studied had an ATM machine.

Human Subjects, and Confidentiality of Data

The vast majority of information was compiled by the author, on scene, from personal observation. Human subjects were questioned only in so far as to identify the store, request permission to study a given store, and to inquire about official store policy. All variables inquired about are included in appendix A.

A form explaining the nature of the study and requesting consent was given out to all participants in the study. Permission from the stores (see appendix G), as well as approval of the human subjects review board at YSU was obtained before data was gathered. The letter of approval from the YSU Human Subjects Research Committee is attached as Appendix H.

The police departments edited all police reports containing confidential information prior to allowing the author access to them. All attempts were made

to ensure that the data remained accurate, while not infringing on individual rights.

Personal information, including names, on police reports was not used in this study. All raw data was destroyed to protect confidentiality to further ensure confidentiality of stores and individuals.

Instrument

The primary instrument (attached as appendix A) consisted of a security survey, done on scene. In order to examine all of the variables effectively, each store surveyed was examined in daylight hours, as well as darkness. The variables compiled fell under one of five categories, which include, Store Information, Store Type, Location Information, Natural Access Control, Natural Surveillance, and Territorial Reinforcement.

The section labeled "Store Information" was used to identify the store surveyed, and when the surveys were compiled. The identity of the stores was kept confidential in all submitted work. The Store information was used for identity and verification purposes only, and was not used in any of the statistical computations. All data was reported in aggregated fashion.

The store type section also included some miscellaneous variables that could affect crime, but which are not CPTED principles. These include whether or not the store sells alcohol, or lottery tickets, and if the store has an ATM machine.

Two city blocks was chosen as the cutoff point for studying the store's surrounding area, as a delimitation of the study. This is because a larger area would almost certainly contain a multiple of most of the variables tested.

A copy of the survey form has been provided in appendix A, as well as brief explanations of many of the variables. More information on some of the variables, and CPTED mechanisms, has been provided in Appendix B.

Reported Crime

For purposes of this thesis reported crime is defined as crime that occurs on store property, and was reported to a police department of appropriate venue.

Every Local municipal police report, written in the 1999 calendar year, which refers to a crime that occurred on store property, was obtained. These reports were used to compile data on reported crimes which occurred in the stores. All reports were obtained from police departments in the greater Youngstown area with appropriate jurisdiction in the areas of the stores surveyed. Only reported crimes were analyzed in the study.

Survey Results

The survey looked at such crimes as robbery of the given store, robbery of a person or persons, shoplifting, after hours burglaries, homicides, assaults (sexual or other), vandalism, or offenses unrelated to the store. The nature and definitions of offenses was determined by the Ohio Revised Code (Ohio, 1999) in

effect when the crime was committed, as indicated on the police report by the reporting police officer.

The reported crimes were recorded by type of crime. These types include Robbery of the Store, Robbery of a person, Shoplifting offenses, driveoffs¹, burglaries, homicides, assaults, vandalism offenses, and offenses unrelated to the store. In the sample, no homicides occurred, and so no statistical data on homicides was analyzed.

Offenses unrelated to the store included any criminal offense where offenders are by chance apprehended in the area of the store property, or crimes committed on store property, that are the result of chance and not deliberate decision. These unrelated offenses will include for example; a DUI pulled over in the lot of a store that would otherwise not have had any contact with store property, or an assault that began in another location, and spilled over on to store property. Unrelated offenses were recorded, but not compiled as part of the data analysis.

All the recorded types of crimes were analyzed individually. Also the total number of reported crimes at each store was looked at, as were the total number of reported property crimes, and the total number of reported crimes against persons. A final distinction was made for those reported crimes committed by employees, and those committed by the public.

CPTED Principles

The survey (see appendix A) was divided up into sections, which were made to reflect Crowe's CPTED principles (Crowe 1991) of natural access control, natural surveillance, and territorial reinforcement. Data on Location, which is also considered prominent by Crowe, was also compiled for analysis. Some miscellaneous variables were also added, for analysis, which did not conform completely to any one CPTED principle, but which were considered relevant never the less.

Construction of the Natural Access Control Score

Natural access control was assigned a score of zero through two, for each store. This was based on the variables: number of entrances, number of vehicle entrances, drive through, bullet resistant barriers, physical barriers, and spatial definition.

The number of entrances resulted in two through negative two points being added (two points for only one entrance, one point for two entrances, minus one point for three entrances, and minus two points for three or more entrances). The number of vehicle entrances resulted in two through negative two points being added (two points for only one entrance, one point for two entrances, minus one point for three entrances, and minus two points for three or more entrances).

The drive through variable resulted in zero through two points being added (stores with a drive through received no points, stores without a drive through received two points).

The bullet resistant barrier enclosure variable resulted in zero through two points being added (stores without a bullet proof enclosure received no points, stores with such an enclosure received two points). The variable access prohibitive physical barriers resulted in zero through two points being added (stores without access prohibitive barriers received no points, stores with such barriers received two points).

The spatial definition variable resulted in zero through two points being added (stores without clearly defined interior space received no points, stores with clearly defined interior space received two points).

The final points (which totaled negative four through fourteen) were then divided by seven (the total number of variables) to result a possible natural access control score of zero to two (with negative numbers rounded to zero). Scores in the sample ranged from .71 to 1.57.

Construction of the Natural Surveillance Score

Natural surveillance was assigned a score of zero through two, for each store. This was based on the variables: visibility of parking area, visibility of entrances, internal visibility, Internal lighting, external lighting, hiding spots, and presence of cameras.

The visibility of parking area variable resulted in zero through two points being added (two points for the entire area being visible, zero points for obstructions). The visibility of entrances variable resulted in zero through two points being added (two points for all entrances being visible from any point inside, zero points for obstructed entrances).

The internal visibility variable resulted in zero through two points being added (two points for the whole interior being visible from any point inside, one point for stores with minor obstructions, zero points for major obstructions). The external visibility variable resulted in zero through two points being added (two points for the whole exterior immediately around the store being visible from inside, zero points for obstructions).

The interior lighting variable resulted in zero through two points being added (two points for the whole interior being well lit, one point for stores adequate but not exceptional lighting, zero points for inadequate interior lighting). The external Lighting variable resulted in zero through two points being added (two points for the whole surrounding area being well lit, one point for adequate but not exceptional lighting, zero points for inadequate exterior lighting).

The hiding spots variable resulted in zero through two points being added (two points for nowhere to hide in close proximity to the store, zero points for any hiding spots). The presence of cameras variable resulted in zero through two points being added (two points for a functional camera, zero points no camera, or a non functional camera).

The final points (which totaled zero through fourteen) were then divided by seven (the total number of variables) to result a possible Natural Access Control Score of zero to two. Scores in the sample ranged from .57 to 1.86.

Construction of the Territorial Reinforcement Score

Territorial reinforcement was assigned a score of zero through two, for each store. This was based on the variables: visibility of boundaries, interior cleanliness, exterior cleanliness, visible vandalism or graffiti, employee presence, spatial designation, employee only areas, no parking areas, and original purpose of the building.

The visibility of boundaries variable resulted in zero through two points being added (two points for the entire area being clearly marked, one point for reasonably clear boundaries, zero points for the boundaries being unclear).

The interior cleanliness variable resulted in zero through two points being added (two points for clean, zero points for dirty). The external cleanliness variable resulted in zero through two points being added (two points for clean, zero points for dirty).

The visible vandalism and graffiti variable resulted in zero through two points being added (zero points for visible damage or graffiti, two points for no such damage).

The employee presence variable resulted in zero through two points being added (two points active and attentive employees, zero melancholy employees).

The designated space variable resulted in zero through two points being added (two points very clear designation with signs, one clear designation, but without signs, zero points for inadequate designation).

The employee presence variable resulted in zero through two points being added (two points for employee areas clearly marked, or secured, zero points no clearly marked employee areas). The no parking areas variable resulted in zero through two points being added (two points clearly marked zones, zero points for no clearly marked zones).

The stores original purpose variable resulted in zero through two points being added (two points for stores built as storefronts, zero points for stores built with another original purpose).

The final points (which totaled zero through eighteen) were then divided by nine (the total number of variables) to result in a possible natural access control score of zero to two. Scores in the sample ranged from .67 to 1.89.

Construction of the CPTED Total Score

The stores were also given a CPTED score, which was compiled by adding together the scores for natural access control, natural visibility, and territorial reinforcement, and dividing by three. This resulted in a possible CPTED score from 0 to 2. Stores in the sample ranged from .65 to 1.72

Location Variables

Location variables were tested individually, because they do not reflect actual CPTED mechanisms. The location variables (see appendix A) include neighborhood type, nearby housing, neighborhood businesses, neighborhood institutions, bordering streets, neighborhood upkeep, and socioeconomic aspects of the neighborhood. The major emphasis of the analysis of location variables was intended to look at 2 major factors, how busy is the surrounding area, and how well is the surrounding area maintained.

Miscellaneous Variables

Variables that could not be easily lumped into location, or CPTED mechanisms, but which could nevertheless have an impact on store security were analyzed individually. These include (see appendix A); store type (convenience store, or food oriented gas station), store owner (chain, or private), store hours (Is the store open 24 hours a day, 7 days a week?) alcohol sales, lottery sales, and ATM machine. cash control policies, drop safes, multiple clerks, security on duty, and policies to encourage police to be patrons were added to the miscellaneous section, because they did not exactly fit into the CPTED mechanisms as defined in the literature review.

Statistical Analysis

All data was analyzed using the computer program "Statistical Procedures for the Social Sciences" or SPSS. The results of the surveys were compared with

the gathered crime information. A multi dimensional approach, using the three major CPTED Principles, was used to compare the crimes reported at the stores, across the CPTED principles.

The data was analyzed (Bohrnstedt ,1988, Babbie 1983, Allen, Rubin and Babbie, 1989) using the ANOVA, T test, Correlation (Pearson's r), and Regression. Correlations were decomposed between the CPTED mechanisms and total reported crime (Bornhorst and Knoke, 1988, and Bailey, 1978).

Chapter 4: Analysis and Findings

This thesis examines the effects, on reported crime, of CPTED mechanisms in convenience stores, in the Greater Youngstown area. The mechanisms of natural access control, natural surveillance, and territorial reinforcement, as well as the location of the retail establishment itself were the primary elements focused on. Also examined, as individual elements, were the differences in reported crimes between stores that sell alcohol, sell state lottery, and have an Automated teller machine, versus those that do not.

The primary instrument (attached as appendix A) consisted of a security survey, done on scene by the author. The survey results were compared to such crimes as robbery of the store, robbery of a person, shoplifting offenses, driveoffs², burglaries, homicides, assaults, vandalism offenses, and offenses unrelated to the store. In the sample, no homicides occurred, and so no statistical data on homicides was analyzed.

This study is a relatively comprehensive look at a broad range of prevention tactics as they apply to a convenience store setting. CPTED's mechanisms are viewed, in this thesis, as broad overlapping prevention practices. This thesis is an attempt to determine the overall effectiveness of CPTED on the types of stores examined.

CPTED Score

The analysis of the CPTED scores for the stores studied, when compared to the reported crimes, yielded the following moderate positive significant relationships (as illustrated in table 1). The data revealed a positive relationship ($r=.4996$, $p=.005$) between the total reported crime and CPTED. This means that the better the stores CPTED score, the more crime that was reported. There was also found a positive relationship ($r=.4957$, $p=.005$) between the total reported property crime and CPTED, this means that the better the stores CPTED score, the more property crime that was reported.

A positive relationship was discovered ($r=.5058$, $p=.004$) between the total reported driveoffs and CPTED. Also found was a positive relationship ($r=.5151$, $p=.004$) between the total reported shoplifting offenses and CPTED, this means that the better the stores CPTED score, the more shoplifting offenses, and driveoffs (see endnote 2) that were reported.

Table 1 Correlations between CPTED Scores and Reported Crimes

<u>Crime Type</u>	<u>Pearson's r</u>	<u>Significance</u>
Total Reported Crime	0.4996	0.005
Reported Property Crime	0.4957	0.005
Reported Driveoffs	0.5058	0.004
Reported Shoplifting Offenses	0.5151	0.004

Natural Access Control Score

The analysis of the natural access scores for the stores studied, when compared to the reported crimes, yielded the following moderate positive significant relationships (as illustrated in table 2). The data analysis revealed a positive relationship ($r=.4553$, $p=.011$) between the total reported crime and natural access. This means that the better the stores natural access score, the more crime that was reported. There was also found a moderate relationship ($r=.4510$, $p=.012$) between the total reported property crime and natural access. This means that the better the stores natural access score, the more property crime that was reported.

The study showed a positive relationship ($r=.4339$, $p=.017$) between the total reported driveoffs and natural access. The analysis also revealed a positive relationship ($r=.4660$, $p=.009$) between the total reported shoplifting offenses and natural access. This means that the better the stores natural access score, the more driveoffs (see endnote 2) and shoplifting offenses that were reported.

Table 2 Correlations between Natural Access Scores and Reported Crimes

<u>Crime Type</u>	<u>Pearson's r</u>	<u>Significance</u>
Total Reported Crime	0.4553	0.011
Reported Property Crime	0.4510	0.012
Reported Driveoffs	0.4339	0.017
Reported Shoplifting Offenses	0.4664	0.009

Territorial Reinforcement Score

The analysis of the territorial reinforcement scores for the stores studied, when compared to the reported crimes, yielded the following moderate positive significant relationships (as illustrated in table 3). The study revealed a positive relationship ($r=.4879$, $p=.006$) between the total reported crime and territorial reinforcement. This means that the better the stores territorial reinforcement score, the more crime that was reported. There was also found a moderate positive relationship ($r=.4743$, $p=.008$) between the total reported property crime and territorial reinforcement. This means that the better the stores Territorial Reinforcement score, the more property crime that was reported.

The findings indicated a moderate positive relationship ($r=.4670$, $p=.009$) between the total reported driveoffs and territorial reinforcement. The data also supported a moderate positive relationship ($r=.4926$, $p=.006$) between the total reported shoplifting offenses and territorial reinforcement. This means that the better the stores territorial reinforcement score, the more driveoffs (see endnote 2) and shoplifting offenses that were reported.

Table 3 Correlations between Territorial Reinforcement Scores and Reported Crimes

<u>Crime Type</u>	<u>Pearson's r</u>	<u>Significance</u>
Total Reported Crime	0.4879	0.006
Reported Property Crime	0.4743	0.008
Reported Driveoffs	0.4670	0.009
Reported Shoplifting Offenses	0.4926	0.006

Natural Surveillance Score

The analysis of the natural surveillance scores for the stores studied, when compared to the reported crimes, yielded the following moderate positive significant relationships (as illustrated in table 4). The data also supported a moderate positive relationship ($r=.4957$, $p=.005$) between the total reported property crime and natural surveillance. This means that the better the stores natural surveillance score, the more property crime that was reported.

The study revealed a moderate positive relationship ($r=.4002$, $p=.028$) between the total reported driveoffs and natural surveillance. There was also found a moderate positive relationship ($r=.3779$, $p=.040$) between the total reported shoplifting offenses and natural surveillance. This means that the better the stores natural surveillance score, the more driveoffs (see endnote 2) and shoplifting offenses that were reported.

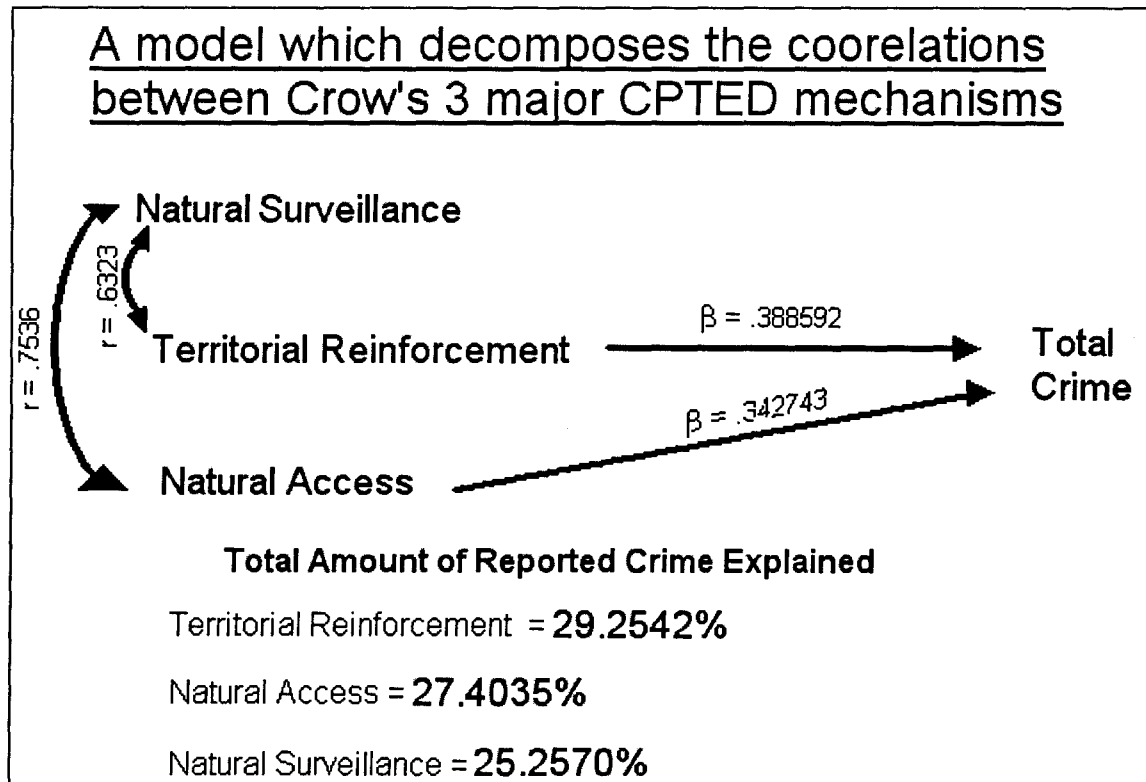
Table 4 Correlations between Natural Surveillance Scores and Reported Crimes

<u>Crime Type</u>	<u>Pearson's r</u>	<u>Significance</u>
Reported Property Crime	0.4957	0.005
Reported Driveoffs	0.5058	0.004
Reported Shoplifting Offenses	0.5151	0.004

Decomposing the Relationship Between the three CPTED Mechanisms

A model, which decomposes the relationship between the three major mechanisms of CPTED (Bornhorst and Knoke, 1988, and Bailey, 1978), indicates that territorial reinforcement and natural access have a direct effect on the total reported crime, whereas natural surveillance has only a coorelated effect (as illustrated in Figure 1). By using the relationship as a PRE (Proportional Reduction in Error) measure we can see that Territorial Reinforcement explains the most reported crime (29.2542%) followed closely by Natural Access, which explains (27.4035%). Natural Surveillance has almost as much effect (25.2570%), but only indirectly.

Figure 1



Food Oriented Gas Stations vs. Convenience Stores

When the reported crimes in convenience stores and food oriented gas stations were analyzed the following significant relationships were discovered (as illustrated in table 5). In the study food oriented gas stations were found to have significantly more total crimes reported ($\bar{X}=10.8571$) than convenience stores ($\bar{X}=3.6250$) ($t= 2.68$, $df=17.04$, $p=.016$). When the number of gas driveoffs (see endnotes 1 and 2) was removed from the compiled total number of crimes, the amount of total reported crimes at food oriented gas stores was still significantly higher ($\bar{X}=8.0000$) than at convenience stores ($\bar{X}=3.1875$) ($t= 2.56$, $df=28$, $p=.016$).

The findings indicated that food oriented gas stations were also have significantly more property crimes reported ($\bar{X}=6.7857$) than convenience stores ($\bar{X}=1.6250$) ($t= 2.57$, $df=28$, $p=.016$). The amount of total reported property crimes at food oriented gas stations remained significantly higher ($\bar{X}=3.9286$) than at convenience stores ($\bar{X}=1.1875$) ($t= 2.20$, $df=28$, $p=.036$) when the number of gas driveoffs was removed (see endnotes 1 and 2). Food oriented gas stations were also found to have significantly more shoplifting offenses ($\bar{X}=3.1429$) reported than convenience stores ($\bar{X}=0.6250$) ($t= 2.35$, $df=16.84$, $p=.031$).

Table 5 Reported Crimes; Food Oriented Gas Stations vs.
Convenience Stores

Total Reported Crime

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Food Oriented Gas Stations	10.8571	2.68	17.04	0.016
Convenience Stores	3.6250			
Food Oriented (Excluding Driveoffs)	8.0000	2.56	28.00	0.016
Convenience (Excluding Driveoffs)	3.1875			

Reported Property Crime

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Food Oriented Gas Stations	6.7857	2.57	28.00	0.016
Convenience Stores	1.6250			
Food Oriented (Excluding Driveoffs)	3.9286	2.20	28.00	0.036
Convenience (Excluding Driveoffs)	1.1875			

Reported Shoplifting Offenses

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Food Oriented Gas Stations	3.1429	2.35	16.84	0.031
Convenience Stores	0.625			

Privately Owned vs. Chain Stores

When the reported crimes in Privately Owned, and Chain, Stores were analyzed the following significant relationships were discovered (as illustrated in table 6). Privately owned stores were found to have significantly less total crimes reported ($\bar{X}=2.7857$) than chain stores ($\bar{X}=10.6875$) ($t=-3.33$, $df=19.42$, $p= .003$). Privately owned stores also had significantly less property crime reported ($\bar{X}=1.0000$) than chain stores ($\bar{X}=6.6875$) ($t=-3.09$, $df=17.17$, $p= .007$).

The study revealed that privately owned stores also had significantly less driveoffs (see endnote 2) reported ($\bar{X}=0.5000$) than chain stores ($\bar{X}=2.5000$) ($t=-2.37$, $df=20.64$, $p= .027$), and significantly less shoplifting offenses reported ($\bar{X}=0.2143$) than chain stores ($\bar{X}=3.1875$) ($t=-3.267$, $df=15.47$, $p= .005$).

Table 6 Reported Crimes; Privately Owned Stores vs. Chain Stores

<u>Total Reported Crime</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Privately Owned Stores	2.7857	-3.33	19.42	0.003
Chain Stores	10.6875			
<u>Total Property Crimes</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Privately Owned Stores	1.0000	-3.09	17.17	0.007
Chain Stores	6.6875			
<u>Total Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Privately Owned Stores	0.5000	-2.37	20.64	0.27
Chain Stores	2.5000			
<u>Total Shoplifting Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Privately Owned Stores	0.2143	-3.26	15.47	0.005
Chain Stores	3.1875			

Store Hours

When the reported crimes in stores open 24 hours, and stores not open 24 hours, were analyzed the following significant relationships were discovered (as illustrated in table 7). The findings indicated that stores not open 24 hours were found to have significantly less total crimes reported ($\bar{X}=4.2381$) than stores open 24 hours ($\bar{X}=13.4444$) ($t=8.90$, $df=0.035$, $p=3.709$). When the number of after hours burglaries was removed from the compiled total number of crimes, the amount of total reported crimes at stores not open 24 hours was still significantly lower ($\bar{X}=4.1905$) than at stores open 24 hours ($\bar{X}=13.4444$) ($t= -2.50$, $df=8.89$, $p=.034$).

Stores not open 24 hours were found to have significantly less property crimes reported ($\bar{X}=1.7143$) than stores open 24 hours ($\bar{X}=9.4444$) ($t=-2.73$, $df=8.52$, $p= 0.024$). When the number of after hours burglaries was removed from the compiled total number of property crimes, the amount of total reported property crimes at stores not open 24 hours was still significantly lower ($\bar{X}=1.6667$) than at stores open 24 hours ($\bar{X}=9.4444$) ($t= -2.75$, $df=8.51$, $p=0.024$).

The study showed that stores not open 24 hours had significantly less driveoffs reported ($\bar{X}=0.6667$) than stores open 24 hours ($\bar{X}=3.6667$) ($t=-2.55$, $df=9.36$, $p=.030$). Stores not open 24 hours were also found to have significantly less reported shoplifting offenses ($\bar{X}=0.5714$) than stores open 24 hours ($\bar{X}=4.6667$) ($t=-2.87$, $df=8.29$, $p=0.020$).

Table 7 Reported Crimes; Stores Open 24 Hours vs. Stores Not
Open 24 Hours

Total Reported Crime

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Open 24 Hours	4.2381	8.90	0.035	3.709
Stores Open 24 Hours	13.4444			
Stores Not Open 24 Hours (After Hours Burglaries removed)	4.1905	-2.5	8.890	0.034
Stores Open 24 Hours (After Hours Burglaries removed)	13.4444			

Total Property Offenses

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Open 24 Hours	1.7143	-2.73	8.52	0.024
Stores Open 24 Hours	9.4444			
Stores Not Open 24 Hours (After Hours Burglaries Removed)	1.6667	-2.75	8.51	0.024
Stores Open 24 Hours (After Hours Burglaries Removed)	9.4444			

Total Driveoff Offenses

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Open 24 Hours	0.6667	-2.55	9.36	0.03
Stores Open 24 Hours	3.6667			

Total Shoplifting Offenses

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Open 24 Hours	0.5714	-2.87	8.29	0.02
Stores Open 24 Hours	4.6667			

Alcohol Sales

When the reported crimes in Stores that sell alcohol, and stores that do not sell alcohol, were analyzed the following significant relationships were discovered (as illustrated in table 8). The data indicated that stores that do not sell alcohol (n = 3) were found to have significantly less reported crimes against persons ($\bar{X}=0.00$) than stores that sell alcohol (n = 27) ($\bar{X}=1.4074$) (t=-4.38, df=26, p= <0.001). It was also discovered that stores that do not sell alcohol had significantly less driveoffs reported (see endnote 2) ($\bar{X}=0.00$) than stores that sell alcohol ($\bar{X}=1.7407$) (t=-3.39, df=26, p=0.002). Stores that do not sell alcohol were also found to have significantly less robberies reported ($\bar{X}=0.00$) than stores that sell alcohol ($\bar{X}=0.2222$) (t=-2.73, df=26.00, p=0.011).

Table 8 Reported Crimes; Stores Selling Alcohol vs. Stores Not Selling Alcohol

<u>Reported Crimes Against Persons</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Selling Alcohol	0.0000	-4.38	26	<0.001
Stores Selling Alcohol	1.4074			
<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Selling Alcohol	0.0000	-3.39	26	0.002
Stores Selling Alcohol	1.7407			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Selling Alcohol	0.0000	-2.73	26	0.011
Stores Selling Alcohol	0.2222			

Lottery Sales

When the reported crimes in Privately Owned, and Chain, Stores were analyzed the following significant relationships were discovered (as illustrated in table 9). The study revealed that stores that do not sell State Lottery tickets had significantly less crimes against persons reported ($\bar{X}=0.00$) than stores that sell State Lottery tickets ($\bar{X}=1.4615$) ($t=-4.44$, $df=25.00$, $p= <.001$). Stores that do not sell State Lottery tickets also were found to have significantly less reported robberies ($\bar{X}=0.00$) than stores that sell State Lottery tickets ($\bar{X}=.2308$) ($t=-2.74$, $df=25.00$, $p= .011$).

Table 9 Reported Crimes; Stores Selling Lottery vs. Stores Not Selling Lottery

<u>Reported Crimes Against Persons</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Selling Lottery	0.0000	4.44	25	<0.001
Stores Selling Lottery	1.4615			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Not Selling Lottery	0.0000	2.74	25	0.011
Stores Selling Lottery	0.2308			

ATM machines

When the reported crimes in stores with ATM machines, and stores without ATM machines, were analyzed the following significant relationships were discovered (as illustrated in table 10). The findings showed that stores that do not have an ATM machine had significantly less reported driveoffs ($\bar{X}=1.2593$) than stores that have an ATM machine ($\bar{X}=4.3333$) ($t=-2.06$, $df=28$, $p= .048$). Stores that do not have an ATM machine were also found to have significantly more reported robberies ($\bar{X}=.2222$) than stores with an ATM machine ($\bar{X}=0.00$) ($t=2.37$, $df=26$, $p= 0.011$). The study also showed that stores that do not have an ATM machine had significantly less reported shoplifting offenses ($\bar{X}=1.3704$) than stores that have an ATM machine ($\bar{X}=5.6667$) ($t=-2.55$, $df=28$, $p= .017$).

Table 10 Reported Crime; Stores With ATM Machines vs. Stores Without ATM Machines

<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Without an ATM	1.2593	-2.06	28	0.048
Stores With an ATM	4.3333			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Without ATM	0.2222	2.37	26	0.011
Stores With ATM	0.0000			
<u>Reported Shoplifting Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Without ATM	1.3704	-2.55	28	0.017
Stores With ATM	5.6667			

Neighborhood Upkeep

When the reported crimes in stores located in clean neighborhoods, and stores located in unclean neighborhoods, were analyzed the following significant relationships were discovered (as illustrated in table 11). Stores located in a clean neighborhood had significantly more reported robberies ($\bar{X} = .2857$) than stores located in unclean neighborhoods ($\bar{X} = 0.00$) ($t=2.83$, $df= 20$, $p=.010$). However stores located in a clean neighborhood had significantly less reported assaults ($\bar{X}=.4286$) than stores located in unclean neighborhoods ($\bar{X}=1.8889$) ($t=-2.69$, $df= 28$, $p=.012$).

Stores located in a clean neighborhood were found to have significantly more reported property crimes ($\bar{X}=5.3810$) than stores located in unclean neighborhoods ($\bar{X}=.8889$) ($t=2.90$, $df= 24.31$, $p=.008$). Stores located in a clean neighborhood also had significantly more reported driveoffs ($\bar{X}=2.1905$) than stores located in unclean neighborhoods ($\bar{X}=.1111$) ($t=3.26$, $df= 21.22$, $p=.004$). Stores located in a clean neighborhood also had significantly more reported shoplifting offenses ($\bar{X}=2.3810$) than stores located in unclean neighborhoods ($\bar{X}=.4444$) ($t=2.37$, $df= 26.30$, $p=.026$).

Table 11 Reported Crimes; Stores In Clean Neighborhoods vs. Stores In
Unclean Neighborhoods

<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores In Clean Neighborhoods	0.2857	2.83	20	0.01
Stores In Unclean Neighborhoods	0.0000			
<u>Reported Assaults</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores In Clean Neighborhoods	0.4286	-2.69	28	0.012
Stores In Unclean Neighborhoods	1.8889			
<u>Reported Property Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores In Clean Neighborhoods	5.3810	2.90	24.31	0.008
Stores In Unclean Neighborhoods	0.8889			
<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores In Clean Neighborhoods	2.1905	3.26	21.22	0.004
Stores In Unclean Neighborhoods	0.1111			
<u>Reported Shoplifting Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores In Clean Neighborhoods	2.3810	2.37	26.30	0.026
Stores In Unclean Neighborhoods	0.4444			

Surrounding Buildings

When the reported crimes in stores located in neighborhoods with abandoned or neglected buildings, and stores located in neighborhoods without abandoned or neglected buildings, were analyzed the following significant relationships were discovered (as illustrated in table 12). Stores located in a neighborhood with abandoned or neglected buildings had significantly less reported property crimes ($\bar{X}= .8889$) than stores located in neighborhoods without abandoned or neglected buildings ($\bar{X}= 5.3810$) ($t=-2.90$, $df= 24.31$, $p=.008$). The study also revealed that stores located in a neighborhood with abandoned or neglected buildings had significantly less reported driveoffs (see endnote 2) ($\bar{X}=.1111$) than stores located in neighborhoods without abandoned or neglected buildings ($\bar{X}=2.1905$) ($t=-3.26$, $df= 21.22$, $p=.004$). Stores located in a neighborhood with abandoned or neglected buildings had significantly less reported robberies ($\bar{X}= 0.00$) than stores located in neighborhoods without abandoned or neglected buildings ($\bar{X}= .2857$) ($t=-2.83$, $df= 20$, $p=.010$).

The findings also indicated that stores located in a neighborhood with abandoned or neglected buildings had significantly more reported assaults ($\bar{X}=1.8889$) than stores located in neighborhoods without abandoned or neglected buildings ($\bar{X}=.4286$) ($t=2.69$, $df= 28$, $p=.012$). Stores located in a neighborhood with abandoned or neglected buildings also were found to have significantly less reported shoplifting offenses ($\bar{X}= .4444$) than stores located in neighborhoods without abandoned or neglected buildings ($\bar{X}= 2.3810$) ($t=-2.37$, $df= 26.30$, $p=.026$).

Table 12 Reported Crimes; Stores Located Near Abandoned or Neglected Buildings vs. Stores Not Near Abandoned or Neglected Buildings

<u>Reported Property Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located Near Abandoned or Neglected Buildings	0.8889	-2.90	24.31	0.008
Stores Not Near Abandoned or Neglected Buildings	5.3810			
<u>Reported Assaults</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located Near Abandoned or Neglected Buildings	1.8889	2.69	28.00	0.012
Stores Not Near Abandoned or Neglected Buildings	0.4286			
<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located Near Abandoned or Neglected Buildings	0.1111	-3.26	21.22	0.004
Stores Not Near Abandoned or Neglected Buildings	2.1905			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located Near Abandoned or Neglected Buildings	0.0000	-2.83	20.00	0.01
Stores Not Near Abandoned or Neglected Buildings	0.2857			
<u>Reported Shoplifting Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located Near Abandoned or Neglected Buildings	0.4444	-2.37	26.30	0.026
Stores Not Near Abandoned or Neglected Buildings	2.3810			

Neighborhood Socioeconomic aspects

When the reported crimes in stores located in middleclass neighborhoods, and stores not located in middleclass neighborhoods, were analyzed the following significant relationships were discovered (as illustrated in table 13). The study revealed that stores located in middle class neighborhoods had significantly more reported property crimes ($\bar{X}= 5.3810$) than stores located in poor neighborhoods ($\bar{X}= 0.8889$) ($t=2.90$, $df=24.31$, $p=.008$). It was also found that stores located in middle class neighborhoods had significantly more reported driveoffs ($\bar{X}= 2.1905$) than stores located in poor neighborhoods ($\bar{X}= 0.1111$). ($t=3.26$, $df=21.22$, $p=.004$).

The study showed that stores located in middle class neighborhoods had significantly more reported robberies ($\bar{X}= 0.2857$) than stores located in poor neighborhoods ($\bar{X}= 0.00$) ($t=2.83$, $df=20.00$, $p=.010$). Stores located in middle class neighborhoods also had significantly more reported shoplifting offenses ($\bar{X}= 2.3810$) than stores located in poor neighborhoods ($\bar{X}= 0.4444$) ($t=2.37$, $df=26.30$, $p=.026$). However, stores located in middle class neighborhoods had significantly less reported assaults ($\bar{X}= 0.4286$) than stores located in poor neighborhoods ($\bar{X}= 1.8889$) ($t=-2.69$, $df=28$, $p=.012$).

Table 13 Reported Crimes: Stores Located in Middle Class Neighborhoods
vs. Stores Not in Middle Class Neighborhoods

<u>Reported Property Crimes</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	5.3810	2.90	24.31	0.008
Stores Located In Poor Neighborhoods	0.8889			
<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	2.1905	3.26	21.22	0.004
Stores Located In Poor Neighborhoods	0.1111			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	0.2857	2.38	20.00	0.010
Stores Located In Poor Neighborhoods	0.0000			
<u>Reported Shoplifting Offenses</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	2.3810	2.37	26.30	0.026
Stores Located In Poor Neighborhoods	0.4444			
<u>Reported Assaults</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	0.4286	-2.69	28.00	0.012
Stores Located In Poor Neighborhoods	1.8889			

Neighborhood Dwellings

When the reported crimes in stores located near multiple family dwellings, and stores not located near multiple family dwellings, were analyzed the following significant relationships were discovered (as illustrated in table 14). The findings indicated that stores located near multiple family dwellings had significantly less reported shoplifting offenses ($\bar{X} = .5833$) than stores located near single family dwellings only ($\bar{X} = 2.6111$) ($t = -2.18$, $df = 24.23$, $p = .039$)

Table 14 Reported Shoplifting Offenses: Stores Located Near Multiple Family Dwellings vs. Stores Not Located Near Multiple Family Dwellings

<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located In Middle Class Neighborhoods	0.5833	-2.18	24.23	0.039
Stores Located In Poor Neighborhoods	2.6111			

Bordering streets

When the reported crimes in stores located on streets with two or more lanes, and stores not located on streets with two or more lanes, were analyzed the following significant relationships were discovered (as illustrated in table 15). The study revealed that stores located on roads with more than two lanes had significantly more reported driveoffs (see endnote 2) (\bar{X} = 1.8800) than stores located on two lane roads (\bar{X} = 0.00) ($t=3.45$, $df=24.00$, $p=.002$).

Stores located on roads with more than 2 lanes also had significantly more reported robberies (\bar{X} = .2400) than stores located on 2 lane roads (\bar{X} = 0.00) ($t=2.75$, $df=24.00$, $p=.011$)

Table 15 Reported Crimes: Stores Located on Roads with Two or More Lanes vs. Stores Not Located on Roads with Two or More Lanes

<u>Reported Driveoffs</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located on Roads with two or More Lanes	1.8800	3.45	24.00	0.002
Stores Located on Roads with two or More Lanes	0.0000			
<u>Reported Robberies</u>				
<u>Store Type</u>	<u>Mean</u>	<u>t</u>	<u>df</u>	<u>p</u>
Stores Located on Roads with two or More Lanes	0.24	2.75	24.00	0.011
Stores Located on Roads with two or More Lanes	0.0000			

The relationship between Crime Type, Store Type, Store Owner.

When the relationship between crime type, store type, and store owner was analyzed the following significant relationships were discovered (as illustrated in tables 16 and 17). There was found a strong positive relationship between total reported crime and property crime ($r = 0.9568$ $p = <0.001$). There was also found a positive relationship between total reported crime and crimes against persons ($r = 0.3980$ $p = 0.025$). However there was no relationship between crimes against persons and property crimes. This means that as the total reported crime increased both reported property crimes and reported crimes against persons increased, but property crimes were more strongly influenced. Crimes against persons, and property crimes did not; however, significantly affect each other.

Table 16 Zero Order Table of Reported Property Crimes, Reported Crimes Against Persons, and Total Reported Crime

	<u>Property Crimes</u>	<u>Crimes Against Persons</u>	<u>All Reported Crimes</u>
<u>Property Crimes</u>			
<u>Crimes Against Persons</u>	$r = .2379$ $p = .206$		
<u>All Reported Crimes</u>	$r = .9568$ $p = <.001$	$r = .3980$ $p = .025$	

The moderate positive relationship between total crimes against persons, and total reported crime ($r = .3980$ $p = 0.025$) was explained when store type, and store owner were controlled for. The relationship became no longer significant when store type ($r = 0.3624$ $p = 0.053$), store owner ($r = 0.3091$ $p = 0.103$), or both store type and owner ($r = 0.2841$ $p = 0.143$) was controlled for. This means that type of store (food oriented gas station, or convenience), and the store owner (private or chain) explained the relationship between crimes against persons and total crime.

Table 17 Controlling for Store Type and Store Owner in the relationship between Reported Property Crimes, Reported Crimes Against Persons, and Total Reported Crime

	Controlling For							
	Zero Order		Store Type		Store Owner		Store Type and Owner	
	r	p	r	p	r	p	r	p
<u>Property Crimes and Crimes Against Persons</u>	0.2379	.206	0.1814	.346	0.1229	.346	0.0798	.687
<u>Property Crimes and Total Reported Crimes</u>	0.9856	.000	0.9465	.000	0.9435	.000	0.9329	.000
<u>Crimes Against Persons and Total Reported Crimes</u>	0.3980	.025	0.3624	.053	0.3091	.103	0.2841	.143

Chapter 5: Summary and Conclusions

CPTED Scores Natural Access Score, Territorial Reinforcement Score, and Natural Surveillance Score

As the CPTED score increased for the stores studied, so did the number of reported crimes at the store. This was also true for the natural access scores, territorial reinforcement scores, and natural surveillance scores. On the face of it one could argue that stores should not put any money into CPTED because then it will have more crime. This argument is like a person observing more fire trucks at bigger fires, and concluding that fire trucks cause fires. The biggest problem with the comparisons made CPTED and crime is that the study was limited to reported crime only. If anything the study showed a lack of accuracy, and consistency in reported crime in the sample (see endnote 1).

It could also be argued that stores that have more of an investment in crime prevention are more aware of crime, and thus are more likely to report it. This could be true, and when looking at crimes against persons in the study, one can see that it is distinctly possible.

The CPTED score, as well as the natural access score, territorial reinforcement score, and natural surveillance score had no significant effect on crimes against persons. Property crimes, especially driveoffs³ and shoplifting offenses were the most strongly influenced by CPTED and its mechanisms. A crime committed against a person seems much more likely to be noticed, and reported irregardless of CPTED, due to liability, and the fact that a person exists

who says that a given crime occurred. Property crimes could more easily be unnoticed, and end up as inventory loss, if an inventory is even done.

When looking at the relationship between CPTED and its mechanisms, natural surveillance is dependant on the other two variables, but all three have roughly the same effect on reported crime. Actual physical barriers, limited access, and the perceived environment of the stores have more of an effect and are the most obvious way of preventing crime in convenience stores (Clarke 1992).

Food Oriented Gas Stations vs. Convenience Stores

Food Oriented Gas Stations were found to report significantly more total crimes, and property crimes than Convenience stores, even with the number of driveoffs removed. Food Oriented Gas Stations also reported significantly more shoplifting offenses. This may be a result of gas stations being more accessible to vehicles than other stores by design.

Privately Owned vs. Chain Stores

Privately owned stores were found to report significantly less total crime, property crimes, driveoffs, and shoplifting offenses than chain stores. This may be because people are more likely to steal from what they see as a nameless corporation than a family business. I think it is more likely that, in a chain store, corporate inventory policies may be stricter, and more likely to notice a crime for what it is. Employee theft is probably also a factor. If you own the store you can

take what you want, and it is not a crime. Employees, however, may be more inclined to try to make employee theft appear like a shoplifting offense, or driveoff, if they are likely to be responsible for unexplained lost inventory on their shift.

Store Hours

Stores not open 24 hours were found to report significantly less total crime, and property crimes than stores open 24 hours, even with the number of after hours burglaries removed. Driveoffs and shoplifting offenses were also lower for stores not open 24 hours. This is simply no surprise; greater accessibility leads to more crime. Although academic it seems impractical to tell stores to shorten their hours, as this will also undoubtedly lessen profits.

Alcohol Sales

Stores that do not sell alcohol were found to report significantly less Crimes against persons, driveoffs, and robberies than stores that sell alcohol. The small number of stores that did not sell alcohol (only three) may have affected the results. After beginning this study the author discovered that convenience stores in Pennsylvania do not sell alcohol, further research, perhaps with a sample split between Ohio and Pennsylvania may yield different results.

Lottery Sales

Stores that do not sell State Lottery tickets were found to report significantly less crimes against persons, and robberies, than stores that sell State Lottery tickets. This may also have been in part because of the small number of stores (Four) that do not that sell lottery tickets, and requires more study at this time.

ATM machines

Stores that do not have an ATM machine were found to report significantly less driveoffs, robberies, and shoplifting offenses than stores that have an ATM machine. Only three stores in the study had an ATM machine, all of these were chain stores that sell gas. Further research on the presence of ATM machines is also recommended. This may be increasingly easy, as the number of stores with ATM machines seems to be increasing.

Neighborhood Upkeep

Stores located in a clean neighborhood reported significantly more property crimes, driveoffs, robberies, and shoplifting offenses than stores located in dirty neighborhoods. There were, however, significantly less reported assaults than stores located in clean neighborhoods. The stores in clean neighborhoods may be more likely to report the minor property crimes, due to less apathy. The assaults may be related to the neighborhood also. The higher number robberies at stores in clean neighborhoods could be because these stores somehow

appear more like good targets, being less “tough” because the neighborhood is not as hard.

Surrounding Buildings

Stores located in a neighborhood with abandoned or neglected buildings reported significantly less property crimes, driveoffs, robberies, and shoplifting offenses than stores located in neighborhoods without abandoned or neglected buildings. This also could be because of apathy, or perhaps they appear to have less money, and thus are less desirable victims.

Stores located in a neighborhood with abandoned or neglected buildings reported significantly more assaults than stores located in neighborhoods without abandoned or neglected buildings. This appears to be more likely related to the neighborhood itself.

Neighborhood Socioeconomic aspects

Stores located in middle class neighborhoods reported significantly more property crimes, driveoffs, robberies, and shoplifting offenses, than stores located in poor neighborhoods. Once again perhaps they appear to be better victims, and have more money, or perhaps the people who inhabit middleclass neighborhoods are more likely to call the police for lesser crimes than people who inhabit poor neighborhoods. The higher assaults may, however, be related to the neighborhood.

Neighborhood Dwellings

Stores located near multiple family dwellings reported significantly less shoplifting offenses than stores located near single-family dwellings only. This could again be explained by apathy, or may be indicative to other factors of the neighborhood.

Bordering Streets

Stores located on roads with more than 2 lanes reported significantly more driveoffs, and more robberies than stores located on 2 lane roads. Past research has been divided on this issue (Hunter and Jeffery, 1992, Swanson, 1986), but more traffic seems to lead to more crime.

Conclusion

The study showed several significant findings. Some findings were easily predictable, such as the busier the street the store is on the more reported crime. Other findings were a surprise, such as the better a store's CPTED score the more reported crime. A closer look at the variables, and the study itself may help to answer some of the questions raised.

The analysis of the effectiveness of the CPTED principles indicated that natural surveillance is dependant on the other two variables, but all three have roughly the same effect on reported crime. Actual physical barriers, limited access, and the perceived environment of the stores have more of a direct effect on crime.

The neighborhoods themselves influenced crime in a number of ways. Being in a less affluent, or poorly maintained area was not always an indicator of more reported crime. Higher random assaults seemed to be connected with less desirable areas. Apathy and the appearance of some stores having more money or being easier targets due to the surrounding area also seem to play a factor on reported crime.

Food Oriented Gas Stations were found to report significantly more total crimes, and property crimes than Convenience stores, this may be a result of gas stations being more accessible to vehicles than other stores by design.

Privately owned stores were found to report significantly less total crime, property crimes, driveoffs, and shoplifting offenses than chain stores. This may be because people are more likely to steal from what they see as a nameless corporation than a family business, also, in a chain store, corporate inventory policies may be stricter, and more likely to notice a crime for what it is.

In conclusion, many factors have an impact on crimes committed against Convenience stores. CPTED methodologies, as well as similar concepts such as target hardening, and situational crime prevention, and opportunity blocking, are not intended to be quick fixes. If any security policy is to remain effective it should be continually monitored and modified. Businesses must learn from their mistakes if they hope to survive, especially where security and liability are concerned.

It should also be noted that crime prevention principles are not useful if they are bad for business. Shortening store hours, moving off busy streets, and

doing away with lottery, and alcohol sales may reduce crime, but are sure to also reduce business. Making the store more convenient by having longer hours, better vehicle accessibility, and more entrances may increase profit, but also increase crime. It seems that Practicality, and cost effectiveness of CPTED variables inventory loss, and employee theft, would all be good topics for future study.

End Notes

¹ Two of the convenience stores had “gas” driveoffs reported, when they do not in fact sell gas. They were actually shop lifting offenses of non gas items from the parking lot of the establishments, but were reported as driveoffs. The total number of times this occurred in reporting is not clear, because some of the original police reports were vague as to the exact nature of the crime which was being reported. It should also be noted both of the stores where this error was discovered were located in the jurisdictional area of the same police department. This could be an indicator of disparity in reporting methods of individual officers, shifts, or departments.

² Part of the reason for the effect of the variables studied on driveoffs may be linked to policies of paying first before pumping gas, which would make a driveoff much more difficult. This was not examined in the study, and certainly would be a good candidate for further research.

 Appendix A; Store Information Survey Sheet
Store Information

- A. Store Name
 B. Store Number (1-30)
 C. Store Address
 D. Surveyed By
 E. Assisted By
 F. Date
 G. Time #1 (Daylight)
 H Time #2 (Darkness)

Thomas F.Gatto

I. Store Type

- | | | |
|--|---|---|
| 1 Convenience Store | Y | N |
| 2 Food Oriented Gas Station | Y | N |
| 3 Chain Store | Y | N |
| 4 Privately owned | Y | N |
| 5 Hours of Operation | | |
| 6 24-7 hours | Y | N |
| 6 Does the store sell Alcoholic Beverages? | Y | N |
| 7 Does the store sell Lottery tickets? | Y | N |
| 8 Does the store have an automated teller machine? | Y | N |

Location Information**A Neighborhood Information****1 Neighborhood Type**

- a Commercial
 b Industrial
 c Residential
 d Other

A B C D

2 Housing

- a Single
 b Multiple
 c High Rise
 d Low Rise
 e Public
 f Other

A B C D E F

3 Neighbor Businesses	A	B	C	D	E	F	
a Fast Food							
b Convenience							
c Shopping Center							
d Services							
e Other							
4 Neighboring Streets	A	B	C	D	E	F	G
a Major arterial(s)							
b Business							
c Residential							
d Mixed							
e 2-Lane							
f 4-Lane							
g Signals							
5 Institutions	A	B	C	D	E	F	
a Church(s)							
b Schools							
c Social Clubs							
d Hospital							
e Recreational							
f Other							
6 Neighborhood upkeep							
a Cleanliness of area		Clean		Dirty			
b Graffiti or vandalism tolerated		Yes		No			
c Abandoned or neglected buildings		Yes		No			
7 Socioeconomic aspects	Thriving		Middle class		Poor		
Natural Access Control							
Number of entrances	1	2	3	4+			
Bullet resistant Barriers		Y		N			
# of vehicle entrances	1	2	3	4+			
Drive up capabilities		Y		N			
Physical Barriers Visibility		Visible complete		Visible Incomplete			
		Not visible					

Physical Barriers	Access Prohibitive	Not Access Prohibitive
Spatial definition	Space Clearly Defined	Not Clearly Defined

Natural Surveillance

Visibility of parking area	Entire Area Clear	Blind Spot/s	
Visibility of entrances	Clear	Obstructed	
Visibility of store interior	Very Clear	Clear	Obstructed
Interior Lighting	Very Good	Adequate	Inadequate
Exterior Lighting	Very Good	Adequate	Inadequate
Hiding Spots	Present	Not present	
Cameras 2variables	A B C	D E F	
type visibility			

a visible
b hidden

c still
d Video

e other
f none

Territorial Reinforcement

visibility of boundaries	Very Clear	Clear	Unclear
cleanliness of store (Interior)	Clean	Dirty	
cleanliness of store (Exterior)	Clean	Dirty	
Does the store tolerate vandalism or graffiti	Yes	No	

presence of employee(s)	Active	Passive	
Designation of Controlled space	Very Clear	Clear	Unclear

a employee only areas	Secure	Not secure
b no parking areas	Clearly marked	Unclear

original purpose of building	Retail	Other
------------------------------	--------	-------

Cash control	Clear Policy	No Clear policy
drop safes	Y	N
multiple clerks	Y	N

Security personnel	Always On Duty	Sometimes on Duty
		Not on Duty
Policies to encourage Police Officers to be patrons	Y N	
Reported Crime history (1 year)	From	To
Source	Y.P.D. Report	
	Other (list)	
Number of Reported crimes		
Types of Crimes	Property Employee	Crimes against persons Public
	Robbery of Store	Robbery of Person
	After hours burglary	Homicide
	other) Vandalism	Assault (sexual or Offense unrelated to Store
		Shoplifting

In the Store Information section of the survey;

A. Store Name	Is self evident
B. Store Number (1-30)	Is the order of the store (1-30) as they are surveyed
C. Store Address	Is self evident
D. Surveyed By	Will remain Thomas F.Gatto for the length of this study
E. Assisted By	Will list any assistants if needed by the author
F. Date	Is self evident (will be noted if different for both times studied)
G. Time #1 (Daylight)	Is self evident
H Time #2 (Darkness)	Is self evident

In the Store Type section of the survey;

1 Convenience Store	Y or N as defined in the introduction
2 Food Oriented Gas Station	Y or N as defined in the introduction
3 Chain Store	Y or N Is part of a uniform corporate group of stores
4 Privately owned	Y or N all surveyed stores that are not chain stores
5 Hours of Operation	Is self evident
6 Does the store sell Alcoholic Beverages?	Y or N is self evident
7 Does the store sell Lottery tickets?	Y or N is self evident
8 Does the store have an automated teller machine?	Y or N is self evident

In the Location Information section of the survey;

A Neighborhood Information

1 Neighborhood Type

- a Commercial
- b Industrial
- c Residential
- d Other

A B C D

- Area is essentially devoted to business and sales
- Area is essentially devoted to production
- Area is essentially devoted to housing, and living areas
- Area fulfills a function not listed above (ex. A university)

2 Housing

- a Single
- b Multiple
- c High Rise
- d Low Rise
- e Public
- f Other

A-F

- Local housing is mostly in single family dwellings
- Housing is in duplex, triplex or similar designs
- Housing in 4 or more story apartment style dwellings
- Housing in 1,2 or 3 floor apartment style dwellings
- Housing in projects, or government subsidized housing
- Housing does not fit above specifications

3 Neighbor Businesses

- a Fast Food
- b Convenience
- c Shopping Center
- d Services
- e Other

A-F (Within 2 blocks)

- Businesses nearby sell fast food
- Local small stores
- Local shopping plaza department store or mall
- Local businesses catering to needs other than sales
- Local business does not fit above specifications

4 Neighboring Streets

- a Major arterial(s)
- b Business
- c Residential
- d Mixed
- e 2-Lane
- f 4-Lane
- g Signals

A-D (within 2 blocks)E-G (store itself)

- Highway, freeway or turnpike
- Business district only
- Housing only
- Contains mix of those above
- Store situated on
- Store situated on
- Traffic control device near store entrance

5 Institutions

- a Church(s)
- b Schools
- c Social Clubs
- d Hospital
- e Recreational
- f other

A-F (Within 2 blocks)

- Self evident
- Self evident
- Self evident
- Self evident
- Self evident
- Local institutions do not fit above specifications

6 Neighborhood upkeep	(Within 2 blocks)
a Cleanliness of area	What is the overall cleanliness of the neighborhood around the store
b Graffiti or vandalism tolerated	Do the buildings in the neighborhood contain noticeable amounts of intentional damage or disfigurement
c Abandoned or neglected buildings	Does the neighborhood contain any noticeably neglected or abandoned buildings.
7 Socioeconomic aspects	Thriving Middle class Poor
	Based on observation from the surveyor

In the Natural Access Control section of the survey;

Number of entrances	1 2 3 4+
	Number of doorways through which the store can be entered from outside
Bullet resistant Barriers	Y N
	Bullet resistant areas that isolate the clerk/s from all customers
# of vehicle entrances	1 2 3 4+
	Ways the parking lot can be accessed from the street or other lots, by motor vehicle
Drive up capabilities	Y N
	Does the facility have a drive through?
Physical Barriers Visibility	Visible, complete, Visible Incomplete, Not visible
	Are barriers clearly visible or not? If they are, Complete or incomplete is dependant on whether or not the barriers cover all necessary locations?
Physical Barriers	Access Prohibitive Not Access Prohibitive
	Do the barriers prohibit entry, or not
Spatial definition	Space Clearly Defined Not Clearly Defined
	Is the store set up with purposes of all internal space clearly defined? Ex. Checkout line area clear, food consumption area (if any) clear?

In the Natural Surveillance section of the survey;

Visibility of parking area	Entire Area Clear Blind Spot/s
	Can the entirety of the parking area be seen from inside the store?
Visibility of entrances	Clear Obstructed
	Can all of the entrances be clearly seen from the area of the primary registers?
Visibility of store interior	Very Clear, Clear, Obstructed
	Can the entire interior of the store be easily seen from the area of the main counter, by line of sight, mirrors, or electronic devices? Very clear requires no mirrors or devices needed for full visibility.
Interior Lighting	Very Good Adequate Inadequate
	Is the entirety of the interior of the store well lit? Very good requires that all lights are in good repair, and the store is kept bright. Adequate allows that the whole interior is visible, without abundantly shadowy areas.
Exterior Lighting	Very Good Adequate Inadequate
	Is the entire exterior store property, including the parking area well lit? Very good requires that all lights are in good repair, and the store is kept bright. Adequate allows that the whole interior is visible, without abundantly shadowy areas.
Hiding Spots	Present Not present
	Is there any place inside or outside that can not be seen from the main counter area, that a person could enter?
Camera Types	
a visible	If both circle both
b hidden	A or B
	Are the stores cameras intentionally concealed?
c still	C or D
d Video	Do the stores cameras record still pictures, or videotapes?
e other	E or F
f none	Other includes non-traditional systems, ex. Digital, or non-recording. None is self-evident.

In the Territorial Reinforcement section of the survey:

visibility of boundaries	Very Clear Clear Unclear Are the stores property lines clearly marked, and visible? Very clear indicates physical barriers, or posted signs are present.
cleanliness of store (Interior)	Clean Dirty Is the interior of the store kept clean?
cleanliness of store (Exterior)	Clean Dirty Is the exterior of the store kept clean?
Does the store tolerate vandalism or graffiti	Yes No Is there any noticeable disfigurement to the store?
presence of employee(s)	Active Passive Are the employees (encountered by the examiner) actively seeking to be noticed and attentive to patrons?
Designation of Controlled space	Very Clear Clear Unclear Are the purposes for areas inside the store clearly enforced? Very clear indicates that signs are in place to inform patrons of store policies.
a employee only areas	Secure Not secure Is the interior of the store set up in such a way that all areas open to patrons are clear, and all areas closed to patrons are clear?
b no parking areas	Clearly marked Unclear Are fire lanes, handicapped parking spaces, employee parking spaces marked clearly on the ground and by sign?
original purpose of building	Retail Other Was the building originally built as a storefront, or has the purpose of the space been modified?
Cash control	Clear Policy No Clear policy Does the store have a clear uniform policy in practice, that assures that only the money needed to run the registers can be accessed by the clerks?
drop safes	Y N Does the store use dropsafes?
multiple clerks	Y N Does the store staff more than one employee at a time (excluding security personnel)?
Security personnel	Always On Duty Sometimes on Duty Not on Duty Does the store employ security personnel, and if so are they employed during all business hours?

Cash control	Clear Policy	No Clear policy
	Does the store have a clear uniform policy in practice, that assures that only the money needed to run the registers can be accessed by the clerks?	
Policies to encourage Police Officers to be patrons	Y	N
	Ex Discounts or free coffee to police officers	

In the Reported Crime History section of the survey;

Reported Crime history (1 year)	From	To	
Source	Will be the same for all stores		
	Y.P.D. Report		
	Other (list)		
Number of Reported crimes			
Types of Crimes	Property	Crimes against persons	
	Employee	Public	
	Robbery of Store	Robbery of Person	Shoplifting
	After hours burglary	Homicide	Assault (sexual or other)
	Vandalism	Offense unrelated to Store	

Appendix B. Review of CPTED Strategies

Numerous CPTED and other practices have been employed to make convenience stores and food oriented gas stations safe. These methods include but are not limited to;

Multiple clerks, which has inconclusive results (Eck, 1997; Hunter, Jeffery, 1992).

Physical barriers, the most obvious way of preventing crime in convenience stores (Clarke 1992).

Drop safes and security enclosures, excellent methods of target hardening (Clark 1992).

Close proximity to a freeway, can be either good or bad (Hunter and Jeffery, 1992).

Placing stores in high traffic areas, a good deterrent (Swanson, 1986).

Locating stores near other businesses, which have extended hours, is perhaps the best way to use location to deter crime (Swanson, 1986, Hunter 1988,1990, Hunter and Jeffery 1992).

Gasoline pumps operable from inside the store, reduces clerks vulnerability (Bellamy 1996).

Cameras (including the 35-mm still camera, and the interactive video, and hidden cameras) seem to have little effect on deterring crime (Bellamy 1996).

Cash control practices, or keeping the lowest possible amount of money in registers (Crow and Bull 1975, National Association of Convenience Stores, 1991, and 1994)

Keeping a store clean and well organized, and encouraging employees to be attentive to customers (Grevenites, 1992)

Multiple entryways (Crow and Bull 1975), and cover a potential robber may hide behind (Hunter and Jeffery 1992), are perhaps the two biggest mistakes in environmental design a store can make.

Obstructed windows and poor visibility in the store, are traits that seem to be desired by robbers (Swanson 1986).

Appendix C. Definitions

Convenience Store: A retail establishment, small enough in size to be staffed by one or two persons (though more may be present), predominantly devoted to the sale of groceries and consumable goods, located in an area easily accessible to residential neighborhoods. Extended hours, or being opened 24 hours a day, are also common to convenience stores.

Crime Prevention: “Any activity taken before a crime is committed that will reduce or eliminate the occurrence of crime” (Jeffery pp. 45-46).

Crime Prevention through Environmental Design (CPTD):1. “Altering of the physical environment to enhance safety” (Miller, Hess pp. 359-361).2. “The proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life.” (National Crime Prevention Institute’s, NCPI’s definition, as cited in Crowe 1991).

Displacement: The effect of crime prevention on criminal behavior, which may cause a criminal to look elsewhere before committing a crime (Ohio Peace Officers Basic Training Curriculum 1995, unit 3, section 7).

Food oriented gas station: A retail gasoline establishment, that also contains a complete convenience store. Often times the only perceivable

difference between a convenience store and food oriented gas station is the presence of a gasoline pump, or pumps.

Place: "A very small area reserved for a narrow range of functions, often controlled by a single owner, and separated from the surrounding area" (a place may be mobile, such as a car or bus, or as is commonly assumed, stationary) (Eck, 1997 p.1).

Appendix D. Jeffery's principles of CPTED.

Crime prevention is broad in scope and includes: any activity taken before a crime is committed that will reduce or eliminate the occurrence of crime.

Crime prevention through environmental design is an environmental approach to behavior, and as such is only half-complete. An interdisciplinary model of crime prevention, which seeks to understand and educate the individual, is equally necessary to a comprehensive and effective crime prevention program. (Jeffery pp. 40-42)

CPTED is based on the principles of:

- 1- A shift from punishment and treatment to a prevention model.
- 2- An interdisciplinary model of human behavior.
- 3- An appreciation for the role environment plays on human behavior, including but not limited to criminal behavior.

The five criteria of a good CPTED program are: (Jeffery p 37)

- 1- Prevention is proactive and never reactive. You can not prevent what has already occurred.
- 2- Prevention focuses on direct controls of behavior, and not indirect controls.

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- 3- The environment in which a crime occurs, and how offenders act within that environment are studied, but not individual offenders.
 - 4- All relative disciplines which study human behavior must be drawn from to build a preventative framework.
 - 5- Prevention is cost effective and more efficient than other methods; thus, it is more just and moral.

Methods advocated by Jeffery include: (pp.45-46)

- 1- The physical and architectural design of commercial, residential, and public property to reduce crime.
- 2- The creating of behavioral change models, which merge the controlling of physical design and human behavior, in order to encourage healthy behavioral development.
- 3- The use of alarms and surveillance systems in conjunction with other CPTED methods.
- 4- Economic controls of drug trafficking, white-collar crime, and other crimes, and finally, decriminalization can be used in certain cases as a means of prevention.

Appendix E. Newman's principles of CPTED.

Perhaps the most notable view in Newman's works is the recognition of the importance of "self help" in preventing crime. We must rely on the natural desires of residents, rather than decide for them how best to help. Formal authority should help to provide a means of self-help, and not create an environment of control, and unwanted order (Newman pp. 10-11).

Some of the major proponents of Newman's work were:

- 1- Defensible space is a physical expression of a social fabric, which defends itself. It builds a sense of ownership and community in a communities' inhabitants.
- 2- The restructuring of residential environments, so they can be controlled, not only by the police, but also by the community of people dwelling in them.
- 3- Real and symbolic barriers allow a community to watch itself.

There are four principle elements of defensible space which Newman claims can individually and collectively contribute to safe environments, these are: (Newman pp.8-11)

- 1- The territorial definition of space within developments. This shows the areas that are under the control of the buildings inhabitants, and is

done by subdividing areas of influence. This allows residents to adopt attitudes of responsibility and control.

- 2- The positioning of apartment windows to allow for maximum viewing of the exterior, and interior, accessible areas of a building.
- 3- The environment in which a crime occurs, and how offenders act within that environment are studied, but not individual offenders.
- 4- The location of the building should be in an area, which in itself does not promote crime.

Appendix F. Crow's principles of CPTED.

There are three interrelated strategies of CPTED, as stated by Crowe, these include (Crow,1991):

- 1- Natural access control. This reduces opportunity to commit crime and can include physical barriers, guards, and spatial definition.
- 2- Natural Surveillance. This allows for better observation and utilizes such things as patrols, lighting, and placement of windows.
- 3- Territorial Reinforcement. This is a relatively new concept, which is intended to create a sense of belonging, and to allow for the inhabitants of a given territory to police themselves, and feel protective of their community.

Crowe advocates a THREE-D approach to human space. The three D's are designation, definition, and design. They are intended to lead crime prevention practitioners to ask questions about space, which will lead to practical and effective answers (Crowe pp. 33-35).

- 1- All human space has a designated purpose.
- 2- All human space has definitions, either social, cultural, legal, or physical, that determine the acceptable behaviors within the given space.
- 3- All human space is designed to support and control desired human behavior.

Crowe advocates five good sources of information to be utilized before a program is implemented (Crowe pp. 35-37).

- 1- A crime analysis of the area should be conducted. This can be either geographic, or by similar offense.
- 2- A demographic study of the neighborhood should be conducted with as much useful data as can be compiled from a variety of sources, such as libraries, planning departments, or the census bureau.
- 3- Land use, including pedestrian and traffic flow should be studied.
- 4- It is absolutely necessary to gain first hand knowledge. Either formally, or informally, a CPTED practitioner must spend time on the site gathering data.
- 5- For two purposes, the inhabitants of the area must be questioned.
 - A- Residents personal knowledge and perceptions will contain knowledge not in any other source.
 - B- This is a good way to get the community involved, and make them feel like the valuable contributors to the program that they are.

Appendix G. Letter to the Stores Requesting Permission
to Conduct a Security Survey

(See following Page)



Youngstown State University / One University Plaza / Youngstown, Ohio 44555-0001

April 18, 2000

Dear Sir or Madam:

As part of the requirements for the degree of Masters of Science in Criminal Justice at Youngstown State University, Mr. Thomas F. Gatto is conducting a research project on the effects that the environmental design of a store has on crime in the convenience store industry. The study will culminate in his Master's Thesis.

The study being done has been approved by the Criminal Justice department, as well as the School of Graduate Studies and the Human Subjects Review Board at Youngstown State University. Part of the study will entail a survey of convenience stores and gas stations done on scene. All data will be done anonymously, and kept confidential.

Please allow Mr. Gatto to conduct research at your store, and to speak with you, or your employees, as needed. Participation in the study is strictly voluntary, but will be greatly appreciated by the Criminal Justice department.

If you have any questions please feel free to contact the criminal justice department at (330) 742-3279 between the hours of 9:00 AM to 5:00 PM Monday through Friday. The members of the department who are overseeing Mr. Gatto's research project are: Dr's Gordon Frissora and C. Allen Pierce, and Attorney Wade Smith and Academy Coordinator Mr. Richard Mahan.

Thank you for your time and attention to this matter.

Sincerely,
Dr. Gordon Frissora

A handwritten signature in black ink, appearing to read 'Gordon Frissora', written over the typed name.

Assistant Professor of Criminal Justice
Youngstown State University

Appendix H. YSU Human Subjects Research Committee Approval Letter

(See following Page)



Youngstown State University / One University Plaza / Youngstown, Ohio 44555-0001

April 11, 2000

Dr. Gordon Frissora, Assistant Professor
Mr. Thomas Gatto, Student
Department of Criminal Justice
UNIVERSITY

RE: HSRC Protocol #96-2000

Dear Dr. Frissora and Mr. Gatto:

The Human Subjects Research Committee of Youngstown State University has reviewed the protocol you submitted, Protocol #96-2000, "An Examination of the Effectiveness of CPTED on the Convenience Store Industry in the Youngstown Area," and determined that it is exempt from full committee review based on a DHHS Category 2 exemption.

Any changes in your research activity should be promptly reported to the Human Subjects Research Committee and may not be initiated without HSRC approval except where necessary to eliminate hazard to human subjects. Any unanticipated problems involving risks to subjects should also be promptly reported to the Human Subjects Research Committee.

Sincerely,

A handwritten signature in cursive script that reads "Eric Lewandowski (cc)".

Eric Lewandowski, Director
Administrative Co-chair
Human Subjects Research Committee

ECL:cc

c: Dr. Tammy King, Chair
Department of Criminal Justice

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