

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN AND BURGLARY
PREVENTION: A SYSTEMATIC SOCIAL OBSERVATION APPROACH

by

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A Thesis

Submitted in Partial Fulfillment of the Requirements for the
Master of Science Degree

Department of Criminology and Criminal Justice
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THESIS APPROVAL

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Crime prevention through environmental design (CPTED) is a set of six techniques that utilize environmental factors in an area to reduce the chance of a crime occurring. Previous research has found these to generally be effective, with recent research finding that some of these techniques being more effective than others. In a similar vein, this study used systematic social observation on a sample of burglarized and comparison residences in Paducah, Kentucky. Analysis of this data shows the potential preventative effects offered by CPTED with four of the six components found to be significantly different between groups. In particular, higher levels of territoriality, surveillance, image maintenance, and target hardening were found to be associated with the non-burglarized group. Overall, CPTED would appear to offer a promising set of burglary prevention tools, and an area of crime prevention warranting further evaluation in other settings.

TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
ABSTRACT.....	i
LIST OF TABLES	iii
LIST OF FIGURES	iv
CHAPTERS	
CHAPTER 1 – Introduction.....	1
CHAPTER 2 – Literature Review	5
CHAPTER 3 – Methodology.....	22
CHAPTER 4 – Findings	33
CHAPTER 5 – Conclusion	44
REFERENCES	53
APPENDICES	
APPENDIX A – SSO Instrument	56
VITA	60

LIST OF TABLES

<u>TABLE</u>	<u>PAGE</u>
Table 1 – Burglaries by month.....	34
Table 2 – Burglaries by time of day.....	34
Table 3 – Territoriality.....	35
Table 4 – Surveillance	36
Table 5 – Access Control.....	37
Table 6 – Activity Support.....	38
Table 7 – Image Maintenance.....	39
Table 8 – Target Hardening	40
Table 9 – Independent Samples T-Test results	41

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Figure 1 – CPTED Concepts.....	29

CHAPTER 1

INTRODUCTION

There is a high chance that a person living in the United States has either been a victim of a property crime or knows someone who has. According to the FBI's Uniform Crime Report for 2016 about 1/5 of the nearly 8 million property crimes committed in the United States were burglaries. This translated to roughly 1.5 million total burglaries being reported to police in 2016, with UCR estimates putting the total cost of these property losses around \$3.5 billion dollars. Further, these 1.5 million total burglaries translated to a rate of about 470 burglaries per 100,000 residents. National Crime Victimization Survey data estimates that over 3.2 million burglaries occurred in 2016, more than double the amount reported by the UCR (Bureau of Justice Statistics, 2016). With this kind of estimated occurrence, it is not surprising that there has been a number of prevention strategies put forward to reduce property crimes like burglary.

Crime prevention through environmental design (CPTED) is one type of prevention that utilizes certain environmental factors to reduce the chances of a crime occurring (Crowe, 2000). While prior research would appear to suggest that CPTED generally functions as intended for preventing burglaries (Montoya et al., 2016), recent qualitative research interviewing burglars finds that some components of CPTED may actually not be as effective in practice (Armitage & Mochuk, 2017). Specifically interviews with burglars that focused on topics such as target site selection have revealed that target hardening CPTED strategies like burglar alarms and dogs may not be as much of an effective deterrent to burglars as was previously theorized (Armitage, 2017). Additionally, other core CPTED strategies involving the upkeep and proper maintenance of the external portion of the home may also work to entice burglary, rather than prevent it. This project attempts to examine these discrepancies further by using systematic social observation to

observe and compare differences in the presence or absence of CPTED components associated with burglaries committed in Paducah, Kentucky.

CPTED asserts that “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” (Crowe, 2000, p. 46). To do this, CPTED utilizes six different approaches: target hardening, territoriality, access control, surveillance, activity support, and image maintenance (Cozens et al., 2005). The first element of these elements, territoriality, deals with environmental characteristics of a space that create a sense of ownership. Next, target Hardening involves environmental characteristics that cause an offender to need to make an increase in the effort needed to commit a crime. Access control uses environmental characteristics that reduce crime opportunities by denying the offender access to a potential target. Surveillance stresses proper environmental characteristics that increase the residents’ ability to see what is going on in an area. Activity Support asserts that a space is being used for its intended/legitimate purpose. Finally, image maintenance deals with the overall proper upkeep and maintenance of an area.

Recent qualitative research involving interviews of burglars has found that while some components of CPTED seem to be functioning as theoretically intended, others may not actually work as intended. For example, Armitage (2017) interviewed a sample of 22 incarcerated burglars in England, who were asked to describe their response to 16 images of residential housing. The results confirm that the design of residential housing does influence burglar decision making, but that the principles of CPTED should be re-examined. Components like surveillance and access control proved a clear deterrent, yet image management, maintenance, and target hardening were not considered as important in offender decision making.

Similarly, Armitage and Mochuk (2017) found discrepancies again with their interviews of 10 incarcerated, adult, male burglars and 10 Designing Out Crime Officers in England and Wales. The results of these interviews find similar support for the significance of features such as surveillance. However, other features of design traditionally considered as critical to burglary risk are afforded less importance. In particular the image management and maintenance component was found to directly contradict what CPTED asserts. The general consensus amongst the interviewed burglars was that poorly maintained properties are unattractive targets because an unkempt external space equates to a lack of money, and therefore it is not worth breaking into. Instead, offenders specifically stated that they would be attracted to tidy, well-maintained properties. This would suggest then that perhaps specific CPTED components may carry more weight than others in regards to the prevention of certain crimes, in this case burglary.

The basic premise of this thesis project involves further examination of the relationship between CPTED and residential burglary occurrences. In particular, this has been done by using observations of residences where a burglary had been reported, and then comparing them to observations of residences selected from the same street, but where a burglary had not been reported. The information for these burglaries was obtained from the Paducah, Kentucky Police Department, and lists the addresses of burglaries occurring from the time period of November 1, 2017 through April 30, 2018. This information was then used to perform systematic social observation of CPTED features. The main question being addressed here then is, are there statistically significant differences between the presence of CPTED components at burglary sites, compared to residences on the same street where no burglary has been reported? By answering

this question, this project attempts to further examine our understanding of the relationship between traditionally effective CPTED techniques, and the occurrence of burglary.

CHAPTER 2

LITERATURE REVIEW

Before beginning this examination on the prevalence of CPTED components, it is first important to establish the key concept of offender choice. This section begins with a brief overview of this concept before moving into a discussion of opportunity theories like routine activity theory and rational choice theory. From there, the focus is then shifted to prevention strategies that are compatible with these opportunity theories like defensible space and CPTED. Finally, this section concludes with an overview of the existing quantitative and qualitative research involving CPTED and burglary.

Offender Choice

Offender choice refers to “the conscious thought processes that give purpose to and justify conduct, and the underlying cognitive mechanisms by which information about the world is selected, attended to, and processed” (Cornish & Clarke, 1985, p. 147). More simply, this essentially just means that offenders make a careful choice of their target when considering whether to commit a criminal act or not. This choice is often influenced by factors like the fear of being caught and punished for these law violations, the difficulty of actually committing the criminal act, and the potential reward resulting from the commission of the crime (Seipel & Eifler, 2010). Opportunity theories like rational choice and routine activity theory rely on the assumption that offenders are trying not to be caught when discussing means of control and prevention (Siegel, 2000). Prevention strategies that would follow this choice perspective then would function by making would-be offenders think that the risks of committing a criminal act would exceed the benefits from that act. The sections on defensible space and CPTED will expand on these ideas in more detail, but some examples of strategies for increasing the risk and

difficulty for the offender include things like the installation of security cameras and alarms, placing locks on doors, and ensuring that there is proper lighting on a property.

Rational Choice

Rational choice theory offers a general explanation for crime, and it began to rise in popularity in criminology in the 1980's (Akers et al., 2016). It incorporates ideas from economic theory, particularly the work of Gary Becker, such as the expected utility principal, and attempts to apply them to criminal decision making. In particular, this utility principal asserts that individuals are rational and that decision making is a process of analyzing the potential benefits one can expect versus the potential cost/anticipated losses of the action (Becker, 1968). Similar to deterrence theory, rational choice theory also functions on the basis that humans are self-interested and will make rational choices that benefit their self-interest (Cornish & Clarke, 1987). As such, according to the rational choice perspective, crime and delinquency are something an individual willingly takes part in. It is no different than any other nondelinquent behavior they may engage in as they are not forced to commit crime, rather the individual chooses to commit a crime because they are interested in the potential rewards it offers when compared to the risk they take in its commission. This point is important as it signifies that unlike other theories in criminology, those who commit crime are not socialized to commit crime, nor are they turning to commit crime as a coping mechanism to escape the stress of their environment. Crime is simply the result of self-interested individuals making a rational decision of the risks and rewards involved with committing crime.

In regard to offender choice, the “rational choice theory assumes that offenders respond selectively to characteristics of particular offenses [...] to their opportunities, costs, and benefits in deciding whether or not to displace their attentions elsewhere” (Cornish & Clark, 1987, p.

934). This is important because it forms the basis for how the rational choice perspective would treat and prevent crime. Offenders choose to offend because of a combination of characteristics relating to the offender and the offense itself. It would follow then that different types of crimes have different factors and skills associated with them. The factors and characteristics that are associated with an offense that make it an attractive choice for certain types of offenders are called choice-structuring properties (Cornish & Clark, 1987). For burglars this means that they might look for specific environmental cues of a residence that entail a relatively low level of risk and an expected reward that would outweigh these risks (Bohm & Pfister, 2000). These cues could be something as simple as a car in the driveway or a dog in the front yard. When an offender sees something that they believe will increase their chances of getting caught, they will make the choice to not commit the offense on that target.

Routine Activity Theory

Another of the opportunity theories, routine activity theory, also offers an explanation for offender choice. The routine activity theory was first conceptualized by Lawrence E. Cohen and Marcus Felson (1979) as a theory of crime, rather than criminality. Instead of attempting to explain the biological, psychological, or social factors behind the criminal committing the act, they instead provide theory to explain the event itself. This involves offender decision making being a combination of time, space, and other situational factors associated with the potential commission of a crime. The occurrence of a crime can then be explained by three key elements: A motivated and capable offender, a suitable target or victim, and the absence of capable guardians to protect these targets (Cohen & Felson, 1979). When these three elements converge in space and time during the course of daily life and activities, crime occurs.

Cohen and Felson (1979) theorized that the first element, the motivated offender, could be any person with a motivation to commit crime and possessing the ability to do so, although they pointed out that these offenders will typically be young men who lack a stable income and have a history of previous criminal offenses. In Felson's later work on the routine activity theory, he began de-emphasizing the motivated portion of the offender (Miro, 2014). This was done in order to emphasize the fact that the motivation is not as particularly relevant in the routine activity theory as it is more a theory of crime, not criminality. In sum then, the element of the offender is simply that there must be an individual physically capable of and disposed to committing a crime.

The second element, the suitable target, is any kind of property or person that can be targeted by an offender (Cohen & Felson, 1979). For this theory, Cohen and Felson tended to use the term target rather than victim as a way of showing that most crimes are committed in order to obtain some type of good, and so there may not necessarily always be a victim present when a crime is being committed. As for determining whether a target is suitable or not, Cohen and Felson theorized that offenders viewed suitability through four differing attributes: value, inertia, visibility, and access (VIVA). Value is rather straightforward, and simply refers to how much importance the offender places on the target. Inertia refers to physical aspects of the target, which could be a person or object, like size or shape, which could serve as obstacles to the offender in committing the crime. Visibility refers to how well the offender is able to view their target, or conversely, the chances they have of being caught while in the process of committing a crime. The final attribute of suitability, access, refers to the layout or design of the area where the crime is to be committed. Depending on the location of the target, it could increase the difficulty in the commission of crime.

The final element presented in routine activity theory is the absence of a capable guardian (Cohen & Felson, 1979). A capable guardian simply refers to any individual whose presence could potentially stop a crime from being committed and whose absence makes the crime more probable. A guardian then could include any person who is simply in the area at that time. Additionally, this guardian does not necessarily have to be a person who has a specific duty to be guarding or protecting the area. However, in order to be a capable guardian, there also needs to be a willingness to intervene into the situation (Reynald, 2009). The key then is that Cohen and Felson's definition of capable guardians would include the obvious answers like police officers and security guards, but would also importantly include people like the occupants of a dwelling, or a concerned passerby.

As mentioned previously, the convergence of these three elements in space and time during the course of daily activities and routines can explain crime. Crime prevention under this routine activity approach then would focus on making changes to target suitability and/or ensuring there is capable guardianship to deter the offender. Making changes to target suitability could take the form of a number of activities like putting up fences, putting locks on doors, or installing alarm systems. These types of target hardening changes are discussed in more detail in the following sections on defensible space and crime prevention through environmental design.

Defensible Space

Similar to these opportunity theories, the defensible space concept also recognizes the importance of offender choice in crime opportunities and prevention by offering suggestions for specific environmental changes. Defensible space arose in the United States in the early 1970's from Oscar Newman's work on public housing. Defensible space refers to an environment where the physical attributes, including the design and layout of the building itself, can function

as a means of security for residents (Newman, 1972). Newman believed that public housing was designed in such a way that it allowed for crime by enabling residents to not have to take responsibility for the shared areas in this type of housing. Additionally, he found that the sheer size of the building used in public housing created a situation where a resident would never be able to recognize another resident from a stranger. Further, the size of these buildings also created a number of access points that could be utilized by criminals. These allowed for those committing crime easy access into the housing itself, in addition to an easy escape route after committing the crime.

Recognizing these problems, Newman applied defensible space as a way to not only address these problems in public housing, but also serve as a possible application to all types of residential areas and neighborhoods. The defensible space concept consists of four features that work together in an attempt to reduce the opportunities for the commission of crimes; these features being territoriality, surveillance, image, and milieu (Newman, 1972). First, Newman asserted the importance of the concept of territoriality. He proposed that there was an importance for residents to have a clear definition of what space belongs to them. This could be done through the use of physical barriers like gates or fences, in addition to symbolic markers like signs. When residents signal that an area is not made for public use it not only made clear that the area was off limits, but it was also believed that residents would be forced to take more responsibility/guard that area.

Next, Newman (1972) stressed the importance of natural surveillance. This refers to the ability of residents to be able to regularly view the surrounding physical areas. Additionally, in conjunction with the territoriality aspect, residents cannot attempt to stop a crime from happening in their area if they cannot actually see it happening. Newman (1972) also argued that

crime could be reduced if residents could create the sense that an area was always being watched, so this could translate into an increase in the number and position of windows in housing for example.

Additionally, Newman (1972) also emphasized the image and milieu components. Image refers to an overall safe appearance of the residential structure and community, whereas milieu refers to location and proximity to other high crime areas. Newman proposed that when the appearance of a residential area was perceived as neglected or isolated, it would begin to negatively differentiate itself from surrounding areas and would thus become vulnerable to crime. Alternatively, when a residential area shows signs of being well maintained, it can serve as a deterrent to would be offenders. This can also work together with the other aspects of defensible space. When the area is perceived positively it can create a sense of pride and ownership in residents, and the desire to keep the area well maintained. Furthermore, by keeping these areas well maintained it can also allow for more effective surveillance by ensuring proper care of structures.

In sum then, defensible space has the main goal of designing the physical layout of an area in a way that allows residents to better control their environment. These changes stress the importance of four key areas: natural surveillance, territoriality, image and milieu. By making changes that instill a sense of ownership and better visibility of an area, it creates an environment that reduces the opportunities for the commission of crime. Fitting with the previously mentioned choice theories, if the potential offender thinks that these changes make the risk of committing a crime higher than the potential reward, or if these changes reduce the suitability of the target site by increasing guardianship, then the residents will have effectively reduced their chances of being targeted.

Crime Prevention Through Environmental Design

CPTED emerged as an expansion of Oscar Newman's "Defensible Space" concepts. It sought to expand environmental prevention techniques to the school, industrial, and residential contexts. At the most fundamental level CPTED is designed around "the proper design and effective use of the built environment [which] can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life" (Crowe, 2000, p. 46). In the first generation of CPTED, this is done through 6 concepts including: territoriality, target hardening, access control, surveillance, activity support, and image maintenance.

Territoriality is the foundation of first-generation CPTED, and is the concept that has helped to inform the other five (Cozens et al., 2005). It is primarily concerned with helping to instill a sense of ownership of a space by making changes to the environment that reinforce ownership and thereby reduce and discourage opportunities for crime. This can be done through the use of both real and symbolic barriers, and will typically be done in conjunction with other CPTED concepts like increased surveillance and access control (Crowe, 2000). At its most basic level then, territoriality is focused on defining both ownership and acceptable use of a space. When it comes to reducing the opportunity for burglary, the territoriality aspect of CPTED would likely come in the symbolic form of signs indicating the presence of a security alarm being used in the home, or signage indicating the use of some type of neighborhood watch program. In addition, it will also employ the use of physical barriers like fences or landscaping to help emphasize between public and private spaces, and thus reduce the opportunity for burglaries to occur.

Target hardening is the concept that focuses on making changes to the environment that will cause an offender to need to make an increase in the effort needed to commit a crime and represents one of the oldest and most straight-forward approaches in crime prevention (Cozens et

al., 2005). In order to limit the access to an environment, target hardening typically involves using physical objects like locks or security alarms. However, this use of physical deterrents can also snowball and create what is known as a “fortress mentality” (Grabosky, 1996). As residents of an area begin to employ more and more physical barriers, it actually works against other CPTED concepts that focus on surveillance and the overall image of an area. In regard to burglary, target hardening strategies to reduce burglaries would likely include the installation of security measures like the addition of security alarms, deadbolt locks on doors, or adding locks to windows (Cozens et al., 2005).

The concept of access control attempts to reduce crime opportunities by denying the offender access to a potential target and thereby create a perception that there is a higher likelihood of being caught (Cozens et al., 2005). At the individual level, access control will incorporate ideas from other CPTED concepts like placing locks on doors or using landscaping, but here it is employed as a means of keeping individuals and would be offenders out of an area they are not authorized to use. By keeping individuals out of areas they are not supposed to be in, it is hoped that there will be less of an opportunity to commit crime. At the neighborhood level access control can reduce opportunities for crime by making use of neighborhood-based parking restrictions, as well as limiting what type of traffic is allowed in an area.

The surveillance concept of CPTED involves both natural surveillance opportunities, as well as formal surveillance (Cozens et al., 2005). The natural surveillance component involves the use of physical objects like the placement of windows, lighting, or landscaping that increase the resident’s ability to see what is going on in an area. By instilling in offenders the simple perception that they may be constantly under observation, it is hoped that it will lead to a reduction in offending. Formal surveillance refers to actions taken by organized groups of

individuals like criminal justice actors (Crowe, 2000). This typically comes in the form of police patrols but can also include elements in the retail sector like security guards. Like natural surveillance methods, these methods are again used to create a sense of being constantly observed in would be offenders.

Activity support is the component that focuses on making efforts to ensure that a space is being used for an intended and safe purpose (Cozens et al., 2005). When an area is being used by residents/other legitimate users and has a clearly defined purpose, it is less likely to attract non-legitimate users (Crowe, 2000). This can be done through a number of different strategies. One way could be with the use of proper signage to communicate what the area is intended to be used for such as a park or playground. Additionally, this can be reinforced in conjunction with the natural surveillance component of CPTED. By implementing features near these areas like sidewalks, it can increase the number of people that use an area, and subsequently the number of people that are observing the area and ensuring that it is being used as intended.

The final component of CPTED, image management, involves keeping up the appearance of an area (Cozens et al., 2005). It is hoped that by maintaining the appearance that an area is being properly kept up and cared for it will cause would be offenders to reconsider the risk involved with committing a crime in that area. Similarly, by maintaining the environment of an area, it can help ensure that other components of CPTED are also functioning properly. For example, keeping the landscaping around a home from overgrowing can allow for better surveillance opportunities.

To review, CPTED emerged as an expansion of defensible space. It is designed to reduce crime through a number of prevention techniques that ensure the environment is being utilized properly. To do this, CPTED utilizes six concepts: territoriality, target hardening, access control,

surveillance, activity support, and image maintenance. When these components are used properly, it is believed that the chances of being targeted for crime will be lowered.

Empirical Evidence for CPTED and Burglary

As discussed in the previous section, CPTED is a crime prevention strategy that is designed around using specific environmental cues to lead to a reduction in the incidence of crime. Now with a solid foundation for what CPTED is, this section focuses on empirical evaluations of the components of CPTED. These evaluations range from looking at CPTED's overall ability to reduce crime in general, to looking at its ability to reduce individual crimes like robbery.

Additionally, specific attention is paid to empirical evaluations of the effect of CPTED on burglary prevention. After reviewing this existing evidence, the focus will then shift to recent qualitative findings. While overall there does appear to be consensus within these evaluations, recent qualitative research raises some questions about the need to further examine the effectiveness of certain CPTED components as they relate to burglary.

In general, previous research has indicated that CPTED appears to offer an effective strategy for reducing crime. For example, Poyner (1993) reviewed over 120 different crime prevention programs in both the United States and the United Kingdom utilizing various CPTED strategies. After analyzing and evaluating these programs, he found general success in all 6 areas of CPTED with the greatest success in reducing crime coming from strategies utilizing target hardening. Looking at more specific crimes, the implementation of CPTED strategies was also found to be associated with a decrease in the occurrence of robberies. Casteel and Peek-Asa (2000) conducted a systematic review of 16 studies evaluating the implementation of CPTED strategies in various retail and convenience stores. Their analysis of these studies found that the implementation of these strategies were associated with a decrease in the number of robberies

ranging from 30 to 84 percent. While CPTED did appear to be associated with a general decrease in robberies, the large variety of ways it was implemented in each study made it difficult for them to draw conclusions on what specific strategies were most effective. Overall then, the above evidence does suggest that CPTED is an effective means of crime prevention.

The limited existing research on CPTED and burglary also seems to show support for CPTED's effectiveness. A study conducted by Brown and Altmann (1983) for example, examined the characteristics of over 300 houses, paying particular attention to the differences between the homes that were burglarized and homes that were not burglarized. Their analysis revealed that there were significant differences when comparing the two. Burglarized houses typically showed a distinct lack of territoriality. The homes that were burglarized typically showed signs of poor maintenance or an unoccupied appearance. Houses that were not burglarized were found to make better utilization of surveillance. These non-burglarized homes were those that offered better sight-lines, and also had a closer proximity to neighbors. Overall then, these would fit in line with what CPTED asserts.

Similarly, research conducted by Montoya and colleagues (2016) on burglarized homes in the Netherlands also offers similar support for CPTED components. Their study looked at a sample of over 800 homes, and utilized a sample of burglarized residences in addition to a random selection of non-burglarized houses. Their analysis of the characteristics of these homes once again found significant differences between those that were burglarized and those that were not. Overall support was found for the ability of the proper use of CPTED concepts to reduce the chance of burglary. Surveillance and image maintenance were found to be the strongest deterrents against burglary, with homes that offered higher visibility and signs of being properly cared for being less likely to be victims of burglary.

While early qualitative research conducted with burglars was not focused on CPTED per se, many of the features described in their target selection process can be applied and labeled with the components of CPTED. For example, Wright and Bennett (1984) conducted interviews with over 300 convicted burglars in England. These interviews revealed that burglars utilize environmental cues when choosing a target to burglarize. The majority of burglars indicated that they would not burglarize a target that appeared to be occupied. Additionally, the presence of certain measures like burglar alarms or dogs were actually not a deterrent to most burglars. Interviews conducted by Cromwell and colleagues (1991) of active burglars in Texas also indicated that burglars utilized environmental cues in target selection. The burglars in these interviews however, stressed the importance of surveillability as the primary factor in determining a target. These offenders discussed the importance of remaining unseen when committing the burglary and specified factors like the location of the home on the street, the proximity of neighbors, and level of traffic as crucial deterrents.

One of the more important contributions to the qualitative literature involving burglary, is Richard Wright and Scott Decker's (1994) ground breaking book, *Burglars on the Job*. Their research involved in-depth, semi-structured interviews with a sample of over 100 active burglars in Saint Louis, Missouri. These interviews covered a number of topics including motivation, the commission of the burglary itself, and what items they typically take. Of particular relevance to the current study is their discussion of target selection. Like the previously mentioned studies, while not explicitly discussing CPTED components much of their discussion relates to the prevention strategies involved with CPTED.

For example, the burglars they interviewed overwhelmingly discussed the importance of potential rewards. In order to construct a potential reward from the burglary, burglars would

utilize specific wealth cues. These would include a number of factors including larger sized homes, well-maintained landscaping, and any cars/vehicle parked at the home. Essentially, the nicer the home, the greater the potential reward. Burglars also stressed the importance of not being seen or heard as they commit their crime. In order to minimize their risk, burglars would often target homes with an abundance of landscaping as the trees/bushes offered places of concealment, and/or homes that were not in close proximity to other residences. Additionally, for a portion of the burglars they interviewed this also meant that they would altogether avoid committing burglaries in apartment complexes or public housing. Ease of access also factored into their target selection process. Interestingly, burglars seemed to not factor the presence of measures like locks on windows/doors into their target selection process. Burglars viewed locks as something to be easily overcome, and seemed to only be dissuaded by measures like security bars on windows, as they were viewed to take too much time to remove. Overall then, their research would suggest the importance of potential rewards, visibility, and ease of access in the target selection process.

More recently, Rachel Armitage's work with burglars in England offers specific insight into how burglars view each of the components of CPTED. Armitage and Mochuk's (2017) sample involved interviews of 10 incarcerated, adult, male burglars and 10 Designing Out Crime Officers in England and Wales. They used a combination of semi-structured interviewing and photographs of mock burglary targets to gain a better understanding of how burglars choose their targets. The results of these interviews found strong support for CPTED components like surveillance and access control. Offenders reported that they were unlikely to burglarize a target where there was a high chance of being seen. This translated to offenders being more likely to avoid homes that showed signs of being occupied, homes where there were large front windows,

and homes with a close proximity to neighbors. Offenders regard for access control meant that they typically only chose targets where they knew they could escape easily and unseen. This typically meant they avoided homes on cul-de-sacs.

Less support was shown for certain aspects of target hardening. Offenders indicated that most types of locks on doors or gates would not serve to deter them from a target, or even bars on windows. Security alarms also did not appear to offer much of a deterrent, as offenders indicated that even when they go off, neighbors often ignore them. Some offenders even indicated that the use of excessive types of these target hardening measures served to strengthen the idea that they had something worth taking inside. Offender assessment of the image component of CPTED actually proved contrary to what was theorized. To offenders, properties that showed poor signs of maintenance and upkeep actually made targets unattractive because they indicated that there was little reward/money to be taken. Rather, offenders were attracted to properties that were well maintained as they offered valuable wealth cues for potential rewards.

Additional work by Armitage (2017) also further supports the idea that while some CPTED concepts are working as intended, others seem to not be as effective. In a study of 22 incarcerated prolific burglars in England, she asked them to rate the attractiveness of 16 images of residential housing. Again, burglar responses supported the surveillance component of CPTED. Burglars consistently stated they would avoid places where they could be easily viewed by others, or properties that allowed them to be easily seen. Conversely, they would be attracted to targets that possessed features that obscured sight lines such as large shrubbery or fencing. Similar to the previous study, again certain target hardening measures like locks and burglar alarms were not viewed as particular deterrents. Burglars would regularly respond with methods on how to pick locks or disable alarms. Additionally, like the previous study, burglars once

again confirmed that they were more likely to target well maintained properties as opposed to those that appear rundown and neglected.

What this body of qualitative evidence has shown is that when burglars are asked about their target selection process, certain components of CPTED seem to be consistently working as intended. However, this research has highlighted aspects that may need to be re-examined. Even early work with burglars seems to show the importance of surveillance and access control. The ability of a burglar to remain unseen seems to be perhaps the most important factor in determining the suitability of a target. Additionally, the layout of the home and surrounding area are also important factors. When neighbors are close by, or escape points are limited, offenders will likely not select that area. Multiple studies have also shown that certain factors associated with target hardening may also not be working as intended (Armitage, 2017; Armitage & Mochuk 2017). Burglar alarms and locks in particular seem to consistently be shown to not serve as an effective deterrent to burglars, and in some cases, an overabundance of these measures may even serve to attract burglars. Similarly, counter to what CPTED would assert about image, a well-maintained property may also serve as an attractive cue for burglars. These would all fit within the notion that offender choice and target selection involves an evaluation of the risk of being caught and risk versus reward.

This chapter began with an explanation of the importance of offender choice. The subsequent discussion of opportunity theories like rational choice and routine activity theory elaborated further on the idea that offenders take into account certain environmental and risk cues when deciding to commit a crime. Prevention strategies like Newman's defensible space also took into account the importance of offender choice when discussing prevention strategies, and CPTED expanded even further on these ideas put forth by Newman. Subsequent empirical evaluations of

CPTED found support for its ability to reduce burglary occurrences (Brown & Altman, 1983; Montoya et al., 2016). However, recent qualitative studies have shown that certain CPTED components may actually be enticing burglars, rather than repelling them. In the following chapter a proposed methodology for examining this discrepancy, as well as for examining the overall relationship between burglary occurrence and CPTED, will be discussed in detail.

CHAPTER 3

METHODOLOGY

The current research project uses systematic social observation to evaluate the relationship between the six components of CPTED and the occurrence of residential burglaries. Chapter 2 identified these six components as target hardening, formal and informal surveillance, access control, image maintenance, territoriality, and activity support. Of these six concepts, recent qualitative research conducted by Rachel Armitage (2017) has found that target hardening and image maintenance may actually be functioning contrary to what CPTED asserts for burglaries. In order to further investigate this inconsistency, this chapter focuses then on detailing the process that will be used to further assess the relationship between the presence of the six CPTED elements and the occurrence of residential burglary.

The main research question that will be answered in this process is whether there are statistically significant differences in the presence/absence of CPTED elements between residences where a burglary has been reported to occur, compared to those where one has not. As mentioned in chapter 2, CPTED functions as a set of environmental prevention techniques that work together to lower the chances of victimization for crimes like burglary. Previous research, both quantitative and qualitative, has shown general support for effectiveness of these techniques. With this in mind, hypotheses related to the components of CPTED have been formulated to test this research question and are listed below.

Hypothesis 1: There will be statistically significant differences in the presence or use of Territoriality techniques at residences where a burglary has been reported compared to residences where no burglary has been reported.

Hypothesis 2: There will be statistically significant differences in the presence or use of surveillance techniques at residences where a burglary has been reported, compared to residences where no burglary has been reported.

Hypothesis 3: There will be statistically significant differences in the presence or use of access control techniques at residences where a burglary has been reported, compared to residences where no burglary has been reported.

Hypothesis 4: There will be statistically significant differences in the presence or use of activity support techniques at residences where a burglary has been reported, compared to residences where no burglary has been reported.

Hypothesis 5: There will be statistically significant differences in the presence or use of image maintenance techniques at residences where a burglary has been reported, compared to residences where no burglary has been reported.

Hypothesis 6: There will be statistically significant differences in the presence or use of target hardening techniques at residences where a burglary has been reported, compared to residences where no burglary has been reported.

These hypotheses aim to test the central idea that there is a relationship between the presence of CPTED components and burglary occurrence. Essentially, this means that homes where a burglary has been reported will be expected to have a lower presence of the six components of CPTED. The way the presence of these components will be constructed and analyzed, as well as the location of these burglaries are discussed in the sections below.

Study Site

This study examines indicators of CPTED techniques at burglary locations in Paducah, Kentucky from the period of November 2017 through April 2018. Paducah is located in the

western part of the state and is the most populous city located within McCracken County. Census estimates from 2016 put Paducah's population at just over 25,000 residents. This number has been relatively stable from the previous census conducted in 2010 (U.S. Census Bureau, 2016). Within this population the majority of citizens were white, representing about 70% of all residents. African Americans made up the largest minority group at about 25%, and both Asian and Hispanic comprised of about 5% of the population of Paducah respectively.

Census Bureau estimates put the median household income for Paducah at about \$32,000, which is nearly \$10,000 below the median income for the state, and over \$20,000 below the median income nationally (U.S. Census Bureau, 2016). Additionally, nearly 25% of Paducah residents live below the poverty line. These same Census estimates put the median home in Paducah valued at just about \$110,000. Furthermore, a slight majority of residents in Paducah appear to be homeowners, with an owner-occupied housing rate of 52%.

Uniform Crime Report data from 2015 shows the city has an average property crime rate at about 5,700 per 100,000 which is more than double the Kentucky state average of 2,200 per 100,000 (Federal Bureau of Investigation, 2015). Additionally, Paducah also had double the rate of property crime compared to the rest of the United States with UCR estimates of 2,500 per 100,000. Within this high property crime rate in Paducah, burglary made up nearly 10% of the total property crimes. Despite its high crime rate, property crimes including burglary have generally been declining in Paducah since 2010 at about 1-2 percent per year.

Study Data

There are three primary sources of data for this research project. The first source of data is the police reports filed by the Paducah Police Department. The police report data that was used in this project was obtained through a freedom of information act request and, provided by the

Paducah Police Department. These data include all burglaries reported to police during the 6-month period of November 1, 2017 through April 30, 2018. In total there were 62 burglaries. These reports also list the addresses where the burglaries occurred, as well as the days and times when the incidents occurred. From the total burglaries, seven were excluded because they were of businesses. An additional seven were excluded because they involved apartments. These were excluded from the observations because they represent a small portion of the total burglaries, in addition to the instrument used here not being aimed at capturing information about these types of dwellings. One home was also excluded from the observations due to extensive fire damage, rendering it uninhabitable. In total, 47 burglarized residences were used for observation.

Second, parcel data from McCracken County (2018) were used to identify comparable residences without a reported burglary in the past 6 months. These residences without a burglary were chosen at random from the same street segment where a burglary had already been reported. The rationale behind choosing residences on the same segment is that they will likely be similar in terms of property value and demographics but have some other features that may make them less susceptible targets of burglaries. The McCracken county website offers a mapping feature, allowing a user to see the address data for streets in Paducah (McCracken County, 2018). This information was used to gather the addresses on streets where a residence had been burglarized. From this list, Microsoft Excel was used to randomly select a corresponding non-burglary address for each of the burglary targets. An additional address was also recorded as an alternative, in the case that the original address selected in excel was an apartment or otherwise unusable. Furthermore, on street segments with more than one burglarized home, all burglarized addresses were removed and excluded from selection for

comparison.¹ As mentioned in the previous paragraph, the number of burglarized addresses was 47, so this added an additional 47 addresses to be observed, bringing to total sample size to 94.

Third, the current research project uses systematic social observation of residences where burglaries have been reported and compares them to observations of nearby residences where burglaries were not reported during the 6 month time period. Systematic social observation research was introduced to criminology through the work of Robert Weiss (1971). His conception of systematic social observation expands on the idea of simple observation by using a series of protocols and rules to structure and standardize what is being observed. By using a structured set of rules, a researcher will be able to predetermine relevant concepts, as well as how these concepts will be coded in later analysis. Essentially then, systematic social observation is a powerful tool that allows for the observation of human behavior and environmental settings.

One of the earliest examples of systematic social observation being used to code environmental characteristics is the work of Ralph Taylor and colleagues (1985) in Baltimore. Systematic social observation was used in part to test a link between higher levels of disorder and deterioration in a neighborhood leading to a higher fear of crime. The observations in their study were focused on street blocks and looked for physical features that would indicate disorder like graffiti, litter, and vacant lots. The gathered observations were used in combination with resident surveys, and analysis revealed a more complex relationship than previously thought. While the link between disorder and fear of crime was an important part of their study, their work also helped solidify systematic social observation as a tool for environmental indicators. They were able to show that this type of observation could be done reliably and consistently.

¹ A street segment refers to the length of street spanning from one intersection to another.

One of the more notable examples of systematic social observation being used to code environmental factors is the work of Sampson and Raudenbush (1999) on public disorder and crime in Chicago neighborhoods. Their study made use of video recordings to observe and analyze over 20,000 street segments in Chicago. In these recordings they were looking for specific measures of public disorder such as environmental and behavioral indicators in order to help construct an idea of the overall collective efficacy of an area. The systematic social observation data was then used in conjunction with police records, surveys, and census data to get a clearer picture of collective efficacy and show that the direct relationship between disorder and crime was basically nonexistent, contrary to prior theory.

For the systematic social observation in this project a coding instrument was created to capture CPTED strategies and definitions found in previous literature such as Cozens et al. (2005), Montoya et al. (2016), and Crowe (2000). This instrument (see Appendix A) uses the presence/absence of certain observed phenomena such as the presence of a fence, the location of the home on the street, and the condition of landscaping to construct the presence (or lack) of each of the six CPTED components. In total, the instrument uses 52 questions to measure the components of CPTED found or absent from the addresses that were observed.

The observation of both the burglarized and comparison homes was done in person, and on the same day for each group. These observations were conducted on the public sidewalk/street in front of the home in order to respect the homeowner's privacy. Additionally, observations were done in a similar time frame as to what appears on the police report. For example, if a burglary was reported to occur at 11:30 pm, the observation was conducted after sunset. The comparison sites were also observed during the same time as the burglarized residence. Reports where the time of occurrence could cross between day/night were defaulted to daylight hours as

to allow for the best conditions for observation. A subsample of 10 addresses were also double coded by another rater, to ensure reliability of what is being observed. This subsample consisted of 5 homes from the burglarized group and 5 from the non-burglary group. The percentage of agreement between the two raters for these observations was 92 percent. After completing the observations of these residences, a database was created in SPSS for analysis.

Study Variables

The sole dependent variable that will be examined is the presence of burglary. For this analysis, burglary is a dichotomous variable. Addresses that did not have a burglary recorded in the previous six months were indicated by a 0, and those where a burglary had been reported were given a 1.

The six independent variables that are used in this analysis represent the level of use of the six components of CPTED. This means that these six elements are hypothesized to significantly differ between the group of burglarized addresses and comparison non-burglarized addresses. These independent variables are constructed as indexes. The indexes themselves are formed as proportions, taking the number of questions indicating the presence of the selected CPTED component, and dividing them by the total number of questions in that section. These questions each represent a way of measuring the dosage, or degree of presence, of the CPTED component. For example, the instrument has 4 questions related to measuring territoriality. If only one of these questions was answered indicating that the home does have a fence, the presence of this component would then be constructed by dividing 1 by 4. The higher this number then, the greater the dosage of the CPTED component. This is important to distinguish as these questions are simply measuring what techniques were being used, and the degree to which they were

present. Figure 1 below shows a visual representation of the questions and concepts corresponding with each of the CPTED elements.

Figure 1 – CPTED Concepts

CPTED Concept	Composition
Territoriality	<ul style="list-style-type: none"> • Presence of Fencing • Presence of Landscaping • Presence of Private Property Signs • Presence of a covered front porch
Target Hardening	<ul style="list-style-type: none"> • Presence of alarm system signage • Presence of dogs/beware of dog signs • Presence of bars on windows • Presence of screens on windows • Presence of curtains/blinds on windows • Presence of solid door with no glass surrounding
Access Control	<ul style="list-style-type: none"> • Presence of a gated entrance to home • Presence of sidewalks in front of home • Parking restrictions in front of home
Surveillance	<ul style="list-style-type: none"> • Has windows facing the street • No obscured windows • Clear sightlines • Not on the corner of street • Neighborhood watch signage present • Has neighbors across the street • Has security cameras or signage • Lights present on the home • Street light present in front of home
Activity Support	<ul style="list-style-type: none"> • Adjacent to Park/Playground • Adjacent to Store/Business • Adjacent to School/Daycare • Adjacent to Community Center/Church
Image Maintenance	<ul style="list-style-type: none"> • Sidewalk condition in front of home • Little/no garbage in yard or street • Properly maintained landscaping • Absence of disabled vehicles • Absence of home damage (fire, broken windows, roof, siding)

The first of the independent variables is territoriality. It is defined as environmental characteristics of a space that create a sense of ownership. As mentioned in the previous paragraph and seen in figure 1, this was measured by an index of 4 questions related to strategies for increasing territoriality. One of the main questions in this section involve identifying if the home has one of the more visible signs of territoriality; a fence or some types of landscaping along the property lines. Additionally, this section also takes into account whether the home has any private property or no soliciting signs posted, as well as if the home has a covered front porch.

The second independent variable is target hardening which is defined as changes made to the environment that will cause an offender to need to make an increase in the effort needed to commit a crime. It was measured by an index of 6 questions related to target hardening strategies. These include the presence of alarm system signs, dogs in the yard or beware of dog signs, bars covering the windows on the home, screens on the windows of the home, the presence of curtains/blinds on the windows, and glass in/around the front door.

Another independent variable, access control, is defined as any attempt made to reduce crime opportunities by denying the offender access to a potential target. Conceptually this element focuses on a number of street level measures like whether the home is on a cul-de-sac or dead end street. As this study involves looking at individual addresses, a number of questions on the instrument were ultimately excluded from analysis due to being at the street level, and thus lacking any variation between groups. Access control then was measured by an index of 3 questions. These include the presence of a sidewalk in front of the home, if the entrance to the home was gated, and any parking restrictions in front of the home.

The next independent variable surveillance is the use of physical objects that increase the residents' ability to see what is going on in an area. This was measured by an index of 9 questions. Some of the questions included the location of the home on/away from the street, positioning of windows on the home, any obstructions to the windows, and the presence of lights on the street/yard in front of the home, or lights on the home itself. Additionally, this variable also examined the sightlines of the home, which here meant that the home was within 50 feet of the street, making it easily visible.

The fifth independent variable is activity support. This variable is defined as a space being used for its intended purpose. Similar to access control, this measure was also difficult to measure looking strictly at the address level. As the addresses observed here were all homes, they by default already possess a level of activity support as they are being used for an intended/legitimate purpose. In order to see if/what variation there was between homes, the areas immediately surrounding each home were examined. Activity support then was measured by an index of 4 questions. These questions examine other spaces surrounding each address beyond merely the residential. Some spaces these questions focus on include if the home is adjacent to places such as businesses, schools, community centers, and parks.

The final independent variable is image maintenance. This is defined as the level of keeping up the overall appearance of an area. This was measured by an index of 12 questions related to assessment of image. The instrument includes the presence of garbage/litter in the yard/street, any damage to the home itself (e.g. peeling paint, missing siding, broken windows), disabled vehicles on the property, and properly maintained landscaping including the front lawn as well as any bushes/trees.

Summary

As laid out in the beginning of this chapter the six hypotheses this analysis will address are whether there are statistically significant differences of CPTED elements present at residences where no burglary has occurred, compared to those where a burglary has occurred. As a result, the unit of analysis that will be used in the testing of these hypotheses is the address. The dependent variable here is a

dichotomous variable, burglary. Furthermore, the independent variables being used in the testing of this hypothesis are the six components of CPTED; target hardening, territoriality, access control, surveillance, activity support, and image maintenance.

Systematic social observation was used to gather data to test this hypothesis. This particular type of research has been used previously in criminology, particularly in cases of examining public disorder. For this project, systematic social observation was conducted at selected addresses in Paducah, a rural town in western Kentucky. The observations were of a sample of addresses in which half are residences that had a burglary reported in the past 6 months, and the other half being residences where no burglary had been reported during that same period. An instrument was constructed for these observations that derives questions from previous CPTED literature. Chapter 4 reports on the data gathered from these observations.

CHAPTER 4

FINDINGS

As discussed in Chapter 3, the data used for the statistical analysis in this section was gathered from the systematic social observation of selected addresses in Paducah, Kentucky. In total, 94 addresses were observed. Of these addresses, 47 where locations where a burglary had been reported previously, and 47 addresses with no burglary were randomly selected from the same streets where these burglaries were reported to occur. This observed address data was then used to create a database in SPSS. SPSS was first used to assess the nature and trends of the data gathered. These statistics give an overall picture of the data that has been collected and include information about the frequencies of each of the comparison groups. The purpose of these statistics is to get a better understanding of what is occurring on both types of addresses in Paducah with regard to CPTED.

After using descriptive statistics to gain a better understanding of how CPTED components are being represented at the sampled addresses, more advanced statistical analysis was conducted. The main inferential statistic that is being used in this research project to test the hypothesis that there are statistically significant differences between the presence of CPTED elements at burglarized homes vs non-burglarized is an independent samples t-test. The independent samples t-test functions as a statistic that can be used to show whether the means of two groups are statistically different from one another. Essentially its goal is to show that the variance within and between two groups are due to more than chance alone. This analysis was also performed through SPSS, and the output will be discussed in the following subsections.

Descriptive Statistics

Table 1 – Burglaries by Month

Month	N(ct)	Percentage%
November	18	43%
December	15	28%
January	4	8%
February	6	13%
March	3	7%
April	1	1%

It is important to first look at how the burglaries were distributed regarding the date and times.

Table 1 above gives a visual representation of the 47 burglaries selected for observation during the 6-month period of November 2017 to April 2018. The highest number of burglaries committed during a single month was 18, or 43 percent, and took place during the month of November. December had the second most burglaries with 15, or 28 percent. February then had the third most burglaries with 6, or 13 percent. January and March had similar burglary counts of four and three, representing eight and seven percent of the total, respectively. The month with the lowest burglary total was April, with only one burglary taking place during that month. As is apparent with the distribution of burglaries in Table 1, over 70 percent of the burglaries took place during the first two months of the time period being examined. Subsequent follow up with the Paducah Police Department revealed that a number of the burglaries in these two months were from a serial offender who was apprehended at the end of December.

Table 2 – Burglaries by time of day

Time of Day	N(ct)	Percentage%
00:00-05:59	8	17%
06:00-11:59	14	30%
12:00-17:59	18	38%
18:00-23:59	7	15%

Table 2 represents the times the burglaries were reported to have occurred at. These were sorted into four different six-hour categories that were as follows: midnight to 5:59 AM, 6:00 AM to 11:59 AM, noon to 5:59 PM, and 6:00 PM to midnight. These categories were created primarily based on the natural light that would be available under normal conditions at that time. For example, the category of midnight to 5:59 AM could be thought of as burglaries that occur in

the early morning hours, before sunrise, where natural lighting would be at a minimum.

Alternatively, burglaries occurring during the afternoon category of Noon to 5:59 PM could be classified as daytime burglaries, where natural lighting would be in abundance. The largest portion of burglaries, 38 percent, actually took place during this afternoon category of Noon to 5:59 PM. Thirty percent took place between 6:00 AM and noon, 17 percent between Midnight and 5:59 AM, and 15 percent took place between 6:00 PM and 11:59 PM. The actual counts for these burglaries was 18 between Noon and 5:59 PM, 14 between 6:00 AM and 11:59 AM, eight between midnight and 5:59 AM, and seven between 6:00 PM and Midnight.

Table 3 - Territoriality

Measure	Burglary – No N(%)	Burglary – Yes N(%)	Total N(%)
Fence - yes	30 (64%)	18 (38%)	48 (51%)
Landscaping - yes	17 (36%)	6 (13%)	23 (24%)
Private property sign - yes	2 (4%)	8 (17%)	10 (11%)
Covered porch - yes	39 (83%)	23 (49%)	62 (66%)

Note: Each burglary column represents the non-burglary and burglary groups. The total column is the number with measure based on the total sample of 94

After establishing when these burglaries were occurring, it is now time to look at how specific CPTED elements were being employed at the homes being observed. The first CPTED element that will be examined is Territoriality. This element refers to environmental characteristics of a space that create a sense of ownership. One of the more common ways this can be done is by having a fence around the yard of a home. Of the addresses observed in this sample, it was roughly split even if the residence had a fence or not. 51 percent of homes did have a fence, while 49 percent did not. Another way that homes could enforce territoriality is through the use of landscaping along property lines. This could include landscaping such as lines of bushes, shrubs, or trees along property lines that create a similar affect to a fence by clearly dividing off the area as private. This method of territoriality was much less common than fencing however, with only 24 percent of homes making use of landscaping along property lines. Besides physical

barriers such as fencing or landscaping, a simpler means of communicating an area is private property is through signage such as private property, no trespassing, or keep out signs. However, this method did not appear to be very popular, with only about 11 percent of homes displaying some kind of private property signage. The final question regarding territoriality used here was whether the home had a covered front porch. 66 percent of homes had a covered front porch, while 34 percent did not.

Table 4 – Target Hardening

Measure	Burglary – No (%)	Burglary – Yes (%)	Total (%)
Burglar Alarm Sign - Yes	4 (9%)	7 (15%)	11 (12%)
Dog and/or Sign - Yes	3 (6%)	0	3 (3%)
Bars on Windows - Yes	4 (9%)	0	4 (4%)
Screens on Windows - Yes	15 (32%)	21 (45%)	36 (38%)
Curtains/blinds - Yes	42 (90%)	37 (79%)	79 (84%)
No Glass in/around Front Door - Yes	23 (49%)	20 (43%)	43 (46%)

The second CPTED element that was observed was Target Hardening. This element refers to changes made to the environment that will cause an offender to need to make an increase in the effort needed to commit a crime. One way this can be accomplished is through the use of burglar alarms. Only 12 percent of homes observed had a sign about a burglar alarm however. Another type of signage that could deter crimes is beware of dog signs, but only 3 percent of homes made use of this type of target hardening. One of the more extreme ways to use target hardening is to install bar grates over windows, however only 4 percent of homes used this method. A more common way to use target hardening with windows was the use of blinds or curtains as they can hide items within a home that could be taken in a burglary, and in fact 84 percent of homes did use this method. One final area involves the type of front door on the home, particularly those with glass. The more glass on or around the front door, the easier of a

target it is for breaking into, and less than half, 46 percent, of homes did have not have glass in or around their front door.

Table 5 – Access Control

Measure	Burglary – No (%)	Burglary – Yes (%)	Total (%)
Gated Entrance - Yes	10 (21%)	5 (11%)	15 (16%)
Sidewalk in front of Home - Yes	38 (81%)	37 (79%)	75 (80%)
No Parking in front - Yes	2 (4%)	4 (9%)	6 (6%)

The third CPTED element examined was Access Control. Access Control is any attempt made to reduce crime opportunities by denying the offender access to a potential target. One of the more common ways that access control can be increased to a home is via a sidewalk in front of the home as it controls the flow of traffic and creates a defined path for users to follow. Unsurprisingly, 80 percent of homes in the sample had a sidewalk in front of them. Looking more towards the homes themselves, another way to utilize access control is by gating off the entrance to the home. This gating is typically done by running a chain-link or wrought iron fence along the front yard of the home. In the sample, 16 percent of homes did have a fence with a gate leading to the entrance to the home. One final area of access control collected in the sample dealt with no parking restrictions. This can be used as a means of access control by denying would be offenders the ability to park a car in an area for any extended period of time. However, this method saw little use with only 6 percent of homes having some kind of parking restriction in front of them.

Table 6 – Surveillance

Measure	Burglary – No N(%)	Burglary – Yes N(%)	Total N(%)
Windows Facing Street - Yes	47 (100%)	45 (96%)	92 (98%)
Obscured Windows - Yes	7 (15%)	18 (38%)	25 (27%)
Clear Sightline - Yes	47 (100%)	18 (38%)	65 (69%)
Neighbor across street - Yes	34 (72%)	26 (55%)	60 (64%)
On Corner of Street - Yes	13 (27%)	19 (40%)	32 (34%)
Lights in Yard/on home - Yes	33 (70%)	18 (38%)	51 (54%)
Street Light in front of home - Yes	24 (51%)	6 (13%)	30 (32%)

The next CPTED element observed at residences was surveillance. This refers to the use of physical objects that increase the residents' ability to see what is going on in an area. One of the most common ways to increase the surveillance ability of a home is with windows that face the street. Unsurprisingly, nearly all homes, 98 percent, had windows facing the street. However, the surveillance ability offered by these windows can be hampered when they are obscured by things such as overgrown shrubbery. In this case, 27 percent of homes observed did have at least half of the length of the windows obscured by shrubbery/landscaping. The location of the home on the street can also factor that can impact surveillance ability. In particular homes on the corner of the street offered more alluring targets to burglars, as they lacked adjacent neighbors that could potentially see a burglary taking place. It is worth noting that 64 percent of homes in the sample were in the middle of the street, meaning they had a neighbor on either side, while 36 percent were on the end/corner of a street. Lighting can also play a crucial role in increasing visibility, particularly during hours where there is little to no natural light. The majority, 54 percent, of homes did possess at least one light source either in their yard or on the home itself while 46 percent possessed no type of lighting. As for street lights provided by the city, nearly 70 percent of homes did not have a street lamp in front of or adjacent to their home.

One final area that can also serve as an increased means of surveillance is a neighborhood watch program, however none of the addresses in the sample appeared to be on a street with any indication or sign of having a neighborhood watch program.

Table 7 – Activity Support

Measure	Burglary – No (%)	Burglary – Yes (%)	Total (%)
Park/Playground Adjacent - Yes	0	3 (6%)	3 (3%)
Retail/Store Adjacent - Yes	8 (17%)	7 (15%)	15 (16%)
School/Daycare Adjacent - Yes	1 (2%)	0	1 (1%)
Church/ Community Center Adjacent - Yes	2 (4%)	2 (4%)	4 (4%)

Another element of CPTED is activity support. This refers to measures taken to help define and ensure a space is being used for its intended and legitimate purpose. This is most commonly done by placing things like parks or community centers in areas in order to create more legitimate spaces for public use and subsequently draw more legitimate users to that area (Cozens et al., 2005). In the sample here, retail stores/business were the most common types of activity support. This meant that 16 percent of homes examined here were adjacent to a retail space/store. Churches/community centers were the next most common type of activity support with 4 percent of homes being adjacent to one. Parks/playgrounds and schools/daycares were the least common types of activity support with each only being adjacent to 3 percent and 1 percent of homes respectively.

Table 8 – Image Maintenance

Measure	Burglary – No (%)	Burglary – Yes (%)	Total (%)
Poor Sidewalk Condition - Yes	16 (34%)	24 (51%)	40 (43%)
Moderate – Heavy Garbage in Yard - Yes	1 (2%)	13 (28%)	14 (15%)
Properly Maintained Landscaping - Yes	36 (77%)	21 (45%)	57 (61%)
Disabled Vehicles on Property - Yes	2 (4%)	11 (23%)	13 (14%)
Roof Damage - Yes	6 (13%)	10 (21%)	16 (17%)
Peeling Paint - Yes	4 (9%)	19 (40%)	23 (24%)
Missing Siding - Yes	3 (6%)	13 (28%)	16 (17%)
Broken Windows - Yes	2 (4%)	5 (11%)	7 (7%)

Another of the core elements of CPTED is image maintenance. As its name would imply, image maintenance involves the overall upkeep of an area, and ensuring that it does not fall into disrepair. One of the more straightforward ways of measuring this element would be to look at the condition of the houses themselves. Of the total observations, 24 percent of homes had peeling paint, 17 percent had shingles missing from their roof, 17 percent had missing or damaged siding, and seven percent had at least one broken window on the home. Moving to the yards around the home, one way to measure image maintenance is by looking at the amount of garbage present. As can be seen on the instrument (Appendix A) the question regarding the amount of garbage was broken down into four different levels: none, light, moderate, and heavy. In order to make the measure dichotomous the none and light groups were coded as a one and the moderate and heavy groups were coded as a zero. Fifteen percent of residences observed had moderate to heavy levels of garbage present in their yard. For this study moderate was classified as six to ten pieces of trash present in the yard, and heavy was anything more than 10 pieces of trash. A final area worth noting regarding the appearance of the home itself was how well the landscaping was maintained. Similar to image maintenance this question was also coded into a

dichotomous variable. Poor landscaping was classified as a zero, while the moderate and excellent landscaping were grouped together and coded with a one. This meant that properly maintained landscaping was considered little to no weeds in the yard, grass was not over 5 inches in length, and any trees or landscaping was not overgrowing any fencing or the home itself. The majority, 61 percent, of homes had appropriately trimmed front lawns, bushes, and trees.

Independent Samples T-Test

The previous section detailed the descriptive statistics of the sample of observed residences as a whole. This section then focuses on how/if the group of burglarized homes differs from the group of non-burglarized homes. As mentioned in the methodology section, the main inferential statistic that is being used in this research project to test the hypothesis that there are statistically significant differences between the presence of CPTED elements at burglarized homes vs non-burglarized is an independent samples t-test. The independent samples t-test functions as a statistic that can be used to show whether the means of two independent groups are statistically different from one another. Essentially its goal is to show that the variance within and between two groups are due to more than chance alone. SPSS was used to conduct the independent samples t-test for this research project and the results are shown in Figure 10 below.

Table 9 – Independent Samples T-Test Results

CPTED Element	F Score	Min.	Max	Burglarized Mean	Non-burglarized Mean	Sig.
Territoriality	2.985	.00	1.00	.413	.523	.015
Target Hardening	3.416	.00	.67	.291	.397	.012
Access Control	1.728	.00	1.00	.489	.524	.192
Surveillance	5.248	.10	.80	.487	.643	.000
Activity Support	.395	.00	.63	.214	.223	.809
Image Maintenance	1.959	.26	.95	.632	.776	.039

Table 9 reports the minimum and maximum index scores for each of the CPTED components. These scores were taken on a scale with .00 representing no techniques on the instrument being employed for that CPTED element, and 1.00 representing every technique being used that was listed on the instrument for that particular CPTED component. As can be seen with the results in the figure above, this range was not always between zero and one for the observations. For example, the range of image maintenance scores spanned from a minimum .26 to a maximum .95. Some elements, such as image maintenance, were also reverse coded from the instrument in order to ensure a higher score corresponded with higher use of CPTED.

Following these range score, the table also includes the means for both the burglarized group and non-burglarized group. Again, these would follow the same scale with .00 representing no utilization of the CPTED element, and 1 being the highest possible used of that particular CPTED element. Taking a look at the range of these means for all elements, they spanned from .214 to .776. The relevance of the particular scores for each of these components is discussed in more detail in the subsequent discussion section.

The final piece of information reported in Table 9 is the significance level for each of the independent samples T-Test scores. This measure is looking at whether the differences between the non-burglary and burglary groups was due to more than mere chance alone. Looking again at the results from the independent samples t-test, it would appear that four of the six CPTED elements have differences that are statistically significant. The first CPTED element, territoriality, was significant at $p < .05$. with a burglarized mean of .413 and non-burglarized mean of .523. These scores mean that the homes that experienced a burglary were less likely to exhibit signs of territoriality. Target hardening was also found to be significant at $p < .05$ with a burglarized mean of .291 and non-burglarized mean of .397. Again, this would indicate for this

element that burglarized homes were less likely to use target hardening. Access control however was not found to be statistically significant with $p > .05$. This means that a conclusion cannot be made about the differences between the means for this element. Surveillance was another element found to be significant at $p < .001$ with a burglarized mean of .487 and non-burglarized mean of .643. Again, these means indicate that burglarized homes were less likely to use surveillance techniques. Activity support was the other element found not to be significant at $p > .05$, again meaning that a conclusion could not be reached about the differences between the two groups. Finally, image maintenance was found to be significant at $p < .05$ with a burglarized mean of .632 and non-burglarized mean of .766 meaning that the non-burglarized homes were more likely to use proper image maintenance.

The hypotheses that this independent samples t-test is being used to aid in answering is there will be statistically significant differences in the presence or use of CPTED at residences where a burglary has been reported to occur in the past 6 months, compared to residences where a burglary has not been reported in the previous six months. As the results of the independent samples t-tests show, the answer to this question cannot be answered with an absolute yes or no, but instead likely depends on the CPTED element in question. Four of the six CPTED elements did appear to be statically significant when comparing how they were used by the group of burglarized homes compared to the group of non-burglarized homes.

CHAPTER 5

CONCLUSION

This study was an attempt to use systematic social observation to measure how CPTED elements were being used by residences in a rural, residential setting. CPTED emerged as an expansion of Oscar Newman's defensible space. Its primary goal is to use six elements that better utilize environmental factors in and around a residence in order to decrease the risk of a crime being committed. Research has generally found this method effective, with some exceptions in recent qualitative work by Rachel Armitage. Taking this into account, systematic social observation was used to examine how CPTED elements were being utilized in a group of burglarized and a comparison non-burglarized group to test the hypothesis that there would be statistically significant difference between the use of the six CPTED elements between these two groups. These observations took place in Paducah, Kentucky and included homes where a burglary had taken place during the six-month period of November 2017 to April 2018, as well as a comparison group. In total 94 residences were observed.

Following the completion of these observations, analysis was conducted on the data. Index scores were created to measure the presence of CPTED factors at each of the residences. The index scores were used to conduct an independent samples t-test to determine whether differences exist between the burglary and non-burglary group. The independent samples t-test revealed that territoriality, surveillance, image maintenance, and target hardening were all found to be statistically significant. Looking at the mean scores for each of these elements, it would appear that the non-burglary group had higher scores for each of these elements, thus lending support for the effectiveness of CPTED.

The first CPTED element to be examined is territoriality. The differences between the two groups regarding how this element was used did appear to be statistically significant. This element refers to environmental characteristics of a space that create a sense of ownership. One of the more common ways this element is used is by putting fencing around a yard. By doing so, it signals that the area is owned and off limits for unauthorized visitors like burglars. Only 38 percent of homes that were burglarized had a fence, where as 64 percent of homes that were not burglarized had a fence. In addition to fencing, homes can also increase territoriality with a simple ‘private property’ or ‘no trespassing sign’. Interestingly, this actually seemed to function opposite of what was expected. 17 percent of homes that were burglarized possessed this type of signage, while only 4 percent of non-burglarized residences did. Looking more broadly at the use of territoriality elements, it would appear that the mean territoriality score for the burglary group of .413 was lower than the mean of the non-burglarized group of .523. While not featured in previous CPTED burglary literature as prominently, it would seem then that here at least, higher use of territoriality measures was associated with homes that were not the target of a burglary.

The second CPTED element examined was target hardening . This element involves changes made to the environment that will cause an offender to need to make an increase in the effort needed to commit a crime, and was also found to be statistically significant. Target hardening was also one of the elements mentioned by both Armitage (2017) and, Wright and Decker (1994) where certain strategies did not seem to be working as effectively. While CPTED would assert that methods like locks on doors and burglar alarms are effective deterrents, the interviews with burglars in both studies seem to indicate that these types of prevention factor little into burglar decision making. Looking at the sample here, 15 percent of homes that were burglarized had

signs indicating burglar alarms, compared to only 9 percent of homes that were not burglarized. While it appears that homes that were burglarized were more likely to have alarms, it should also be noted that these homes were being observed after the burglary had been reported. There is a chance that these signs could have been added by residents after a burglary in the hopes of deterring future ones. Another area of target hardening Wright and Decker (1994) in particular discussed dealt with whether the home had blinds/curtains on its windows. The burglars they interviewed discussed that being able to see what was inside a home, factored into their target selection process. If a home has curtains/blinds blocking the view, it makes this more difficult. Following with this, about 20 percent of homes that were burglarized did not have curtains or blinds on their windows, compared to the 10 percent of non-burglarized homes. One last area to compare the two groups is looking at the Target Hardening scores. Non-burglarized homes seemed to employ more target hardening measures with a score of .397 compared to the burglarized homes mean score of .291. While some previous research with burglars questions the importance of these type of measures, it would appear that for this sample, higher levels of target hardening were found to be associated with homes that were not burglarized.

Access Control was the first of the CPTED elements found not to be significant. This element dealt with any attempt made to reduce crime opportunities by denying the offender access to a potential target such as the presence of sidewalks and gated entrances to a home. As many of the common types of access control are at the street level rather than the address level, a number of questions included on the instrument were excluded from the analysis conducted here. For example, one question asked was whether the home was on a cul-de-sac or not. This was of particular interest as Armitage (2017) found that burglars in her sample reported avoiding burglarizing homes on cul-de-sacs in particular as they believed they increased their chances of

getting caught. Again, as this question was using the street as the unit of analysis it was ultimately dropped from the final analysis. Additionally, the access control element itself was ultimately not found to be statically significant, making it difficult to draw any conclusions.

Surveillance was another of the CPTED elements found to be statically significant. This group was also of particular interest due to its importance being discussed both in the previously mentioned work of Armitage (2017) and Wright and Decker (1994). It involves measures taken to increase the residents' ability to see what is going on in an area. One particular area of importance for burglars in Armitage's sample were homes that had windows obscured by overgrown landscaping/shrubbery, as they were believed to make easier targets for burglaries. In the sample of burglarized homes here, 38 percent had windows that were obscured by overgrown landscaping compared to the 15 percent of non-burglarized. While the majority of burglarized homes did not appear to have obstructed windows, this percentage was more than double the amount of those in non-burglarized homes, and thus is in line with what Armitage found. Wright and Decker's (1994) sample pointed towards the position of the home on the street as an important part of target selection. In particular, they were attracted to homes on the corners of streets, as they were less likely to be seen by adjacent neighbors. Comparing the two groups, 40 percent of burglarized homes were on the corner of the street where as only 27 percent of the randomly selected non-burglarized homes were on street corners. Again, while the number of burglarized homes was not the majority for the burglary group, this percentage was higher than that of the non-burglarized group.

Examining this element more broadly, both of the previously mentioned studies found that burglars would look for targets that allowed them to go about the crime unseen. Essentially, they were looking for a general lack of surveillance on/around the home. One way that this can be

examined here, is with the Surveillance scores for the two groups. These decimal scores were created as indexes with the highest possible score being 1. The mean surveillance score for the group of burglarized homes was .487, while the mean for non-burglarized groups was .643. Since the non-burglarized group was closer to the maximum score of 1, it would indicate that this group was making more use of surveillance techniques. Overall then, this would show that more use of Surveillance techniques was associated with a burglary not being committed at a residence, as previous literature would indicate.

Activity Support was another of the CPTED elements found not to be significant. This element is used as a way to both define and ensure a space is being used for its intended and legitimate purpose. Similar to access control, this element was difficult to measure at the individual address level for the purposes of this study. In an attempt to mitigate these issues, the areas immediately adjacent to each address was then used to measure this concept. This primarily meant looking at what types of buildings besides residential dwellings were adjacent to the address being observed. However, even measuring it in this way there was still little variation between the burglary and non-burglary group. Additionally, as the element itself was found to not be statistically significant here, it makes it difficult to draw any conclusions.

The final element, image maintenance, was found to be statistically significant. This involves the overall upkeep of an area's appearance, and a number of different ways to assess upkeep were used here. One way to do this is by looking at how well a home's landscaping is maintained. About 45 percent of homes that were burglarized had a properly maintained front yard, compared to 77 percent of the homes that were not burglarized. Moving to the home itself, 40 percent of burglarized homes had peeling paint and 28 percent had missing siding. This is compared to the 9 percent and 6 percent of non-burglarized homes respectively. Taking a

broader view of image maintenance overall through the index score, the burglarized homes had a mean score of .632 whereas the non-burglarized homes had a mean of .776. Looking at these scores, it would appear then that homes with higher levels of image maintenance were less likely to be associated with being the target of a burglary.

Limitations

It should be noted that there are some limitations to these findings. First, this study looked at burglary targets after the burglary had taken place, in some cases months after the incident. During this time, changes may have been made to the environmental conditions of the address that differentiate it from when the burglary actually occurred. In particular, measures like landscaping maintenance and garbage upkeep would be the most affected by this limitation. The likelihood of this effect would likely increase the further back in time the burglary occurred. Unfortunately, the majority of burglaries used here took place during the months of November and December, the first two months of the time period being examined. As a result the majority of these observations were being done on homes where the burglary had occurred four to five months earlier, increasing the likelihood that some kind of change to the home or its surroundings occurred. These observations were originally planned to occur on a biweekly basis as reports were received of new burglaries from the Paducah Police Department. As was seen with the burglary distribution in the results section, a total of 4 burglaries occurred during the time period of when these real time observations were supposed to occur (the months of March and April). As a result, the mean time for observations was 102 days after the burglary had occurred. The longest time between a burglary and observation was 141 days and the shortest time between the report and observation was 8 days.

One other limitation to note here is that this study cannot account for all of the factors related to target selection. While this research project was solely looking at environmental factors related to target selection, there are likely other variables ultimately factoring into why a home is targeted. Despite these above limitations, it would appear that the findings here generally support what has been previously found on the effectiveness of CPTED. In particular, increased use of four of the six CPTED elements was found to be associated with homes that were not the victim of a burglary.

Future Research

In terms of criminal justice practice, perhaps the most valuable takeaway from the findings here is a reaffirmation of what works regarding crime prevention. In particular, the findings here show that increased use of four of the six CPTED elements was found to be associated with homes that were not the victims of a burglary. Some of the most commonly thought of prevention techniques such as fencing, lighting, and landscaping upkeep were found to be associated with lower rates of burglary. In addition to what works, another takeaway for crime prevention practice is areas that are not working as intended. For example, techniques such as private property signs and burglar alarm signs seemed to not be associated with a lower incidence of burglary, suggesting that these in particular may need to be re-examined. All of this information can be used by both police departments and/or homeowners to create homes that are less attractive targets to burglars. Furthermore, a number of the burglary reducing techniques found here are relatively easy to implement. Techniques like adding a fence around a yard or putting better lightning on a home are something that a homeowner can implement with little difficulty.

In addition to criminal justice practice, there are also a number of different avenues for potential future research. Perhaps the most important of these highlighted by this study is the simple need for more studies explicitly looking at the connection between CPTED and burglary. There is an abundance of previous literature on burglars/burglary, as well as a number of evaluations of CPTED effectiveness on different types of crime. However, research explicitly looking at the relationship between the two is quite limited. Clearly there is potential preventative effects offered by CPTED, and future research would do well to further explore this area. Additionally, further research may want to explore the role education programs can play in burglary prevention. For example, studies looking at the effectiveness of CPTED are not necessarily looking at areas where these techniques are being explicitly taught to residents by local law enforcement or other agencies. Perhaps CPTED could be found to be even more effective if residents were properly educated on the techniques involved with this topic, and future research would be an effective way of evaluating this.

Summary

In sum, CPTED is a set of six techniques that utilize environmental factors in an area to reduce the chance of a crime occurring. Previous research has found these to generally be effective, with recent research finding that some of these techniques being more effective than others. In a similar vein, this study used systematic social observation on a sample of burglarized and comparison residences in Paducah, Kentucky. Analysis of this data also shows the potential preventative effects offered by CPTED with four of the six components found to be significantly different between groups. In particular, higher levels of territoriality, surveillance, image maintenance, and target hardening were found to be associated with the non-burglarized

group. Overall then, CPTED would appear to offer a promising set of burglary prevention tools, and an area certainly warranting further investigation.

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APPENDIX A
SSO INSTRUMENT²

Address: _____

Case #: _____

Date Coded: _____

Time Coded: _____

Burglary committed at address?

No0

Yes.....1

If yes, date of _____

If yes, time of day _____

TERRITORIALITY MEASURES

1. Does the home have a fence along the property lines?
No0
Yes.....1
2. Does the home have landscaping (e.g., tree line, shrubs etc.) along the property lines?
No.....0
Yes.....1
3. Does the home have signage denoting the property is private?
No0
Yes.....1
4. Does the home have a covered front porch?
No0
Yes.....1

TARGET HARDENING

5. Does the home have a sign denoting an alarm system?
No0
Yes.....1
6. Are there any dogs in front of the home or signs denoting them (beware of dog)
No0
Yes.....1
7. Does the home have bars covering its windows?
No0

² Questions with a strikethrough were street level measures collected, but excluded from analysis.

- Yes.....1
8. Do any of the windows on the residence appear to have screens?
 No0
 Yes.....1
9. Does the residences have glass in/surrounding the front door?
 No1
 Yes.....0
10. Do the windows on the home have curtains/blinds?
 No.....0
 Yes.....1

ACCESS CONTROL

- ~~11. Is the home on a one-way street?~~
 No1
 Yes.....0
- ~~12. Is the home on a street with a dead end?~~
 No.....1
 Yes.....0
13. Is the entrance to the home gated?
 No.....0
 Yes.....1
14. Is a sidewalk present directly in front of home?
 No.....0
 Yes.....1
- ~~15. Is the home on a cul de sac?~~
 No0
 Yes.....1
16. Is there a sign denoting no parking along street/in front of home?
 No0
 Yes.....1
- ~~17. Are there any bus stops within a 2 block radius of address?~~
 No1
 Yes.....0

SURVEILLANCE MEASURES

18. Does the home have windows facing the street?
 No0
 Yes.....1
19. Are the windows obscured by shrubbery/landscaping (more than half of length)?
 No1
 Yes.....0
20. Is there a clear sightline of the home, making it easily and mostly visible from the street (< 50 feet)?
 No.....0
 Yes.....1
21. Is the home on a corner of the street?
 No.....1
 Yes.....0
22. Are there any signs indicating a neighborhood watch program?
 No0
 Yes.....1

23. Is there a home directly across street from the residence?
 No.....0
 Yes.....1
24. Does the home have signs announcing and/or visible security cameras?
 No.....0
 Yes.....1
25. Are there lights on the home or in the yard?
 No.....0
 Yes.....1
26. Are there street lights present directly in front of the home?
 No0
 Yes.....1

ACTIVITY SUPPORT

- ~~27. Is the street residential only?~~
 No1
 Yes.....0
28. Are there any parks/playgrounds adjacent to the address?
 No0
 Yes.....1
29. Are there any stores/businesses adjacent to the address?
 No.....0
 Yes.....1
30. Are there any schools/daycares adjacent to the address?
 No.....0
 Yes.....1
31. Are there any community centers adjacent to the of the address?
 No.....0
 Yes.....1
- ~~32. How much Pedestrian traffic is present on the street segment? (5 minutes)~~
 None.....0
 Light(1-10).....1
 Moderate(11-20).....2
 Heavy(21+).....3
- ~~33. How much vehicle traffic is present on the street segment? (5 minutes)~~
 None.....0
 Light(1-10).....1
 Moderate(11-20).....2
 Heavy(21+).....3

IMAGE MAINTENANCE

34. What is the condition of the road directly in front of home?
 Poor(numerous cracks and potholes).....0
 Moderate(few crack, no potholes)1
 Excellent(few cracks, paint easily visible).....2
35. If a sidewalk is present directly in front of home, what is its condition?
 Poor(numerous cracks, pieces missing).....0
 Moderate (few cracks, no pieces missing).....1
 Excellent (recently paved).....2
36. Is there garbage or litter present on the street and/or sidewalk directly in front of home?
 No pieces.....3

	Light(1-5)	2
	Moderate(6-10).....	1
	Heavy(11+).....	0
37. Is there garbage in the yard or driveway of the residence?		
	No pieces	3
	Light (1-5).....	2
	Moderate(6-10).....	1
	Heavy(11+).....	0
38. How is the landscaping on the property maintained?		
	Poor(numerous weeds, lawn 5+ inches).....	0
	Moderate(few weeds, lawn not overgrown)	1
	Excellent(no weeds, lawn freshly cut).....	2
39. Are there any disabled cars parked directly in front of the home, or on the property?		
	No.....	1
	Yes.....	0
40. Are there any boats and/or RVs parked directly in front of home or stored on the property?		
	No.....	1
	Yes.....	0
41. Are there any broken windows visible on the home?		
	No	1
	Yes.....	0
42. Are there any shingles missing on the roof of the home?		
	No.....	1
	Yes.....	0
43. Is there any fire damage on the home?		
	No	1
	Yes	0
44. Is there any peeling paint on the home?		
	No	1
	Yes	0
45. Are there any pieces of siding missing from the home?		
	No	0
	Yes.....	1
	N/A.....	88

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Thesis Paper Title:
CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN AND BURGLARY
PREVENTION: A SYSTEMATIC SOCIAL OBSERVATION APPROACH

Major Professor: Dr. Julie Hibdon