5-2022

A Spatial Analysis of the Relationship Between Places of Worship and Criminal Activity in Little Rock, Arkansas

Joseph Charles Williams III
University of Arkansas, Fayetteville

A Spatial Analysis of the Relationship Between Places of Worship and Criminal Activity in Little Rock, Arkansas

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Sociology, with a concentration in Criminology

by

Joseph Williams III
University of Arkansas
Bachelor of Arts in Sociology, Criminology, and Psychology, 2020

May 2022
University of Arkansas

This thesis is approved for recommendation to the Graduate Council.

_____
Grant Drawve, Ph.D.
Thesis Director

_____
Casey Harris, Ph.D.
Committee Member

_____
Kayla Allison, Ph.D.
Committee Member

Abstract

Research Topic and Gap(s): Previous studies often show negative relationships between religiosity and participation in criminal acts. However, much of the literature revolving around this topic employs a micro-level approach that looks at the religiosity of individuals instead of a macro-level approach that looks at the religiosity of communities. Because this relationship has often been studied from a micro-level perspective, a gap in the literature surrounding macro-level relationships has formed. More specifically, the potential for places of worship to act as buffers against crime has been relatively understudied which furthers the importance of filling this gap in the literature to understand the spatial relationship between the presence of a place of worship and the potential protective effect it may have against crime.

Theoretical Orientation: The current study employs a theoretical foundation rooted in the Routine Activities Theory and Place Management.

Research Approach: This study employs both a spatial and quantitative research design to understand the relationships between places of worship and crime occurrence. Data for the current study were collected from both the City of Little Rock and the HIFLD Database, "All Places of Worship". Our sample size for the analysis included 33,368 crimes in the City of Little Rock as recorded by the police department and 186 places of worship as recorded by the HIFLD All Places of Worship Database. Microsoft Excel and ArcGIS Pro were used to clean, code, and analyze the data allowing for spatial analytical tools to be employed to investigate the relationship between physical places of worship and crime occurrence.

Research Implications: This study results in implications that further the knowledge on how places of worship fall in the environmental criminology literature. Additionally, the study adds to a small literature base involving macro-level relationships between places of worship and crime.

Table of Contents

Introduction

Since the late 1960s, religiosity has often been investigated as a potential mitigating factor for criminality (Hirschi and Stark, 1969; Burkett and White, 1974; Higgins and Albrecht, 1977; Olson, 1990; Baier and Wright, 2001; Heaton, 2006). Much of the prior research centered on the impact of religiosity on criminality tends to approach research involving this relationship from either a micro-level perspective of how an individual's religiosity impacts their criminality (Salas-Wright et al., 2014; Johnson et al., 2001; Brauer et al., 2013) or a macro-level perspective of how county level adherence rates impact crime rates (Heaton, 2006; Lee, 2006; Olson, 1990; Johnson & Jang, 2010). Both micro-level, individual, and macro-level, community studies have yielded similar results revealing that generally, as religiosity increases, the likelihood for criminal activity decreases. Despite this, literature also demonstrates an aggravating, rather than protective, effect where religiosity, measured by adherence rate, increases the likelihood for criminal activity to occur in an area (Brettfeld & Wetzels, 2006; Heaton, 2006; Baier, 2014; Shariff & Rhemtulla, 2012). These mixed findings create a gap in the literature surrounding how micro-level places of worship rather than individuals influence the likelihood for criminal activity to occur. This gap necessitates that the relationship between crime and religion be studied more extensively to better understand the relationship.

When looking at religiosity and criminal behavior, the focus is often on how a person's level of religiosity or a communities adherence rates relate to criminal activity. Contrary to this, the spatial relationship between the presence of places of worship and crime primarily investigates how the presence of the actual building, regardless of adherence rates, relates to criminal activity in the area immediately surrounding it. Macro-level community studies (Heaton, 2006; Lee, 2006; Olson, 1990; Johnson & Jang, 2010) have focused on county or

census tract level religious data without investigating the relationship between places of worship and criminal behavior at smaller units of analysis such as street segments. With large spatial units of analysis (e.g. counties), there is the potential to miss out on smaller variations in the crime and religion relationship. In short, there could be variation within a county or tract level approach, masking divergent relationships based on the spatial unit of analysis.

The limited studies that have examined the spatial relationship between places of worship and crime at smaller spatial units of analysis have utilized either county or census tract level adherence rate data as well as place of worship location data when conducting their analyses. These studies have found mixed results with some studies finding that the presence of places of worship acts as an aggravator for criminal activity and others finding that the presence of places of worship acts as a protector against criminal activity (Corcoran, Scheitle, and Hudnall, 2020; Lee, 2006; Lee, 2008; Lee and Thomas, 2010; Stef, 2017). These mixed results are often a byproduct of regional location, crime type, or religious denomination. As a result, little is known regarding the spatial relationship between how the actual location of a place of worship could influence the level of crime surrounding their location (i.e., crime on those streets).

More specifically, regarding the spatial relationship between places of worship and crime, what macro-level theorists have often overlooked is how Routine Activities Theory (Cohen & Felson, 1979) intersects with Brantingham and Brantingham's (1981) work on crime attractors and crime generators. The intersection of these two theoretical ideas stands to offer an explanation as to how physical places of worship might influence criminal behavior at smaller spatial units of analysis through their classification as informal spatial guardians. Furthermore, previous studies (Lee, 2006; Lee, 2008; Lee and Thomas, 2010; Stef, 2017) have not focused on how the presence of places of worship on a street might offer either an aggravating effect on

crime or a protective effect against crime. An argument could be made for both circumstances with one side postulating that the prosocial beliefs associated with the actual buildings may act as a deterrent for criminal activity on the streets in the immediate area surrounding the place of worship with the other side postulating that the routine activities and increased foot traffic at places of worship make them increasingly vulnerable to criminal activity.

The current study focuses on addressing this gap in literature surrounding the spatial relationship between places of worship and crime at the street level. With this focus in mind, spatial analyses are used to investigate and analyze the potential spatial relationship between places of worship and criminal activity. Employing a theoretical approach rooted in the environmental criminology, the current study seeks to investigate the relationship between the presence of places of worship and crime in Little Rock, Arkansas.

Theory and Literature

In this section the current paper will discuss the methods and results of previous studies conducted on the spatial relationship between places of worship and crime and how these studies formed the framework and current research questions and hypotheses. While the current study is focusing on a place-based approach to understanding places of worship and crime, extant literature at larger spatial units have utilized a number of different theoretical frameworks. For instance, extant literature often uses the Hellfire Hypothesis and Social Disorganization as theoretical foundations.

The Hellfire Hypothesis (Hirschi & Starke, 1969) argues that religiosity acts as a deterrent for criminality through the threat of supernatural sanctions and encourages the following of norms through the promise of supernatural reward (Baier & Wright, 2001; Hirschi

& Stark, 1969). Previous studies on this theory have revealed evidence for the idea that higher levels of religiosity have resulted in lower levels of criminal activity (Baier & Wright, 2001; Jang, 2019; Salas-Wright et al., 2014). These studies have primarily focused on measuring adherence rates and their relationship to criminal activity and have shown support for a negative relationship between religiosity and crime. However, this theory would similarly add support for the idea that places of worship should be negatively correlated with criminal activity due to the idea that the religious adherents discussed in the hellfire hypothesis would be gathering at these physical buildings. As a result, the argument could be made that the prosocial norms and beliefs may bleed out from the building into the streets immediately surrounding it.

Additionally, researchers have used social disorganization theory (Shaw & McKay, 1969) and the concepts of informal social controls and social ties as a possible explanation for the relationship between places of worship and criminal activity (Warner & Konkel, 2019). These studies often argue that places of worship are organizations in a community that act as an informal social control through the promotion of social cohesion and social ties amongst community members (Warner & Konkel, 2019; Lee, 2006; Brunson et al., 2015). Building off of this idea of social disorganization theory, Lee (2006) also uses the moral communities thesis as a framework for work on places of worship and crime. The moral communities thesis, popularized by Stark (1996), argues that religion ought to be thought of as a group phenomenon more than an individual one. This thesis simultaneously suggests that living with or near a significant number of religious people will affect how any given religious person act (Regnerus, 2003). Studies that have used these theories have made large advances in the field of research revolving around the relationship between places of worship and criminal activity.

While it is recognized that other studies have utilized The Hellfire Hypothesis (Hirschi & Starke, 1969) and Social Disorganization (Shaw & McKay, 1969), the current study focuses on routine activities theory (Cohen and Felson, 1979) as a theoretical foundation for understanding the relationship between the presence of religious organizations and crime occurrence. This is then connected to broader environmental criminology arguments related to risky places and crime generators and attractors. This builds to a discussion of extant literature examining religion and crime at multiple spatial units of analysis to identify gaps in what is currently known and where the current study positions itself to address.

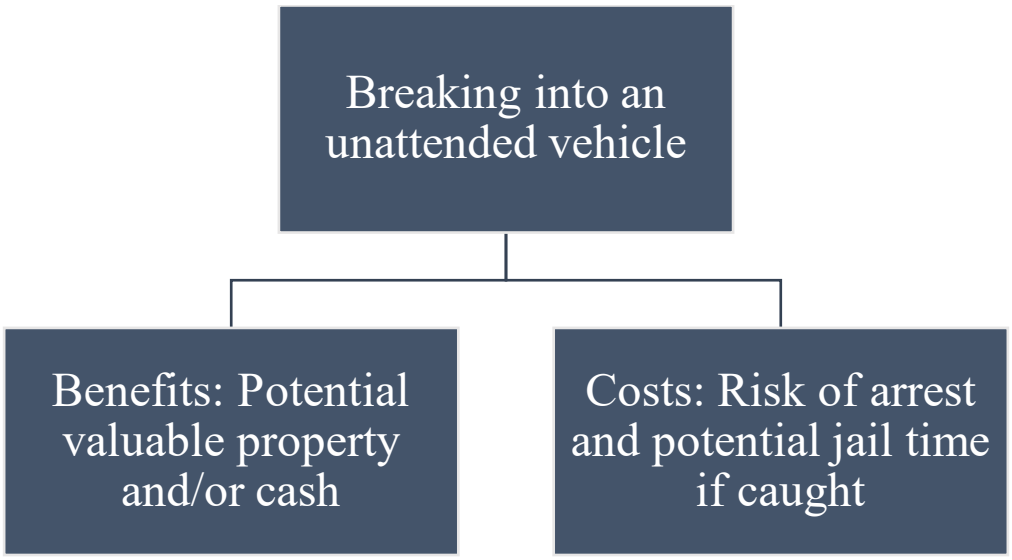
Routine Activities and Criminal Opportunities

Routine Activities Theory (Cohen & Felson, 1979) argues that criminal opportunities exist when there is a convergence of three elements in time and place: motivated offenders, suitable targets, and the absence of capable guardians in time and space. According to Cohen and Felson (1979), motivated offenders would be people that are willing to participate in criminal activity and go out looking for an opportunity to victimize specific people or places. It is essential to this theory that the criminal opportunity presents itself within the bounds of the daily routine of the motivated offender. Although being motivated to offend is key, it is equally as important that the criminal opportunities presented to these offenders occur within their daily routines because that is when they are most comfortable and familiar with their environment. While Cohen and Felson (1979) do not specifically address why or how motivation is formed, Cornish and Clarke (1986) use Rational Choice Theory to argue that motivation occurs because of the offender's analysis of the environment they are in and the suitability of the target.

Building off this idea of motivation, Cornish and Clarke's (1986) Rational Choice Theory argues that offenders make rational calculations of the costs and benefits of engaging in an

offense through choice structuring before ultimately deciding whether following through with it would be in their best interest. Within this concept of choice structuring is the idea that offenders have a potential criminal act at the top of a pyramid and then two or more possible scenarios stemming from this act (See **Figure 1**) that show the potential outcomes of engaging in this behavior.

Figure 1 – Example Choice Structuring (based on Cornish and Clarke's Rational Choice Theory)



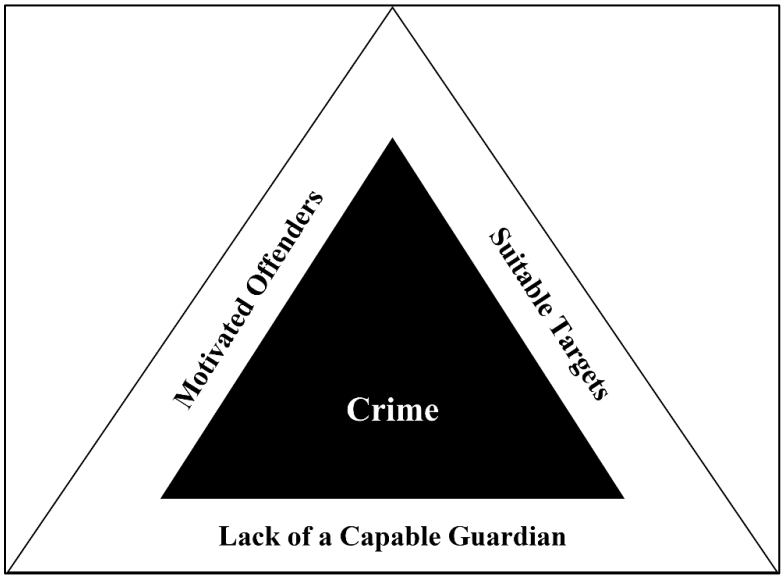
Studies have indicated that offenders who decide participating in criminal activity stands to benefit them more than cost them are more likely to engage in it (Freeman, 1999; Brown, 2001; Steele, 2016). This provides support for offenders developing motivation for criminal activity based on a rational calculation of the costs and benefits of engaging in crime. One important aspect of the cost – benefit analysis that influences a person's likelihood to offend is whether the potential target is suitable for victimization. This choice structuring ties back into Cohen and Felson's routine activities theory because the presence of a suitable target is the second major component of their theory.

Suitable targets are people, objects, or places that are vulnerable to victimization in the eyes of the motivated offender and require little effort to complete the victimization. Throughout the routine activities and suitable target literature it has been found that time and place matter significantly when it comes to a motivated offender deciding whether a target is suitable for victimization (Brantingham & Brantingham, 2016; Eck & Weisburd, 2015). These studies indicate offenders are more likely to see certain people and places as more suitable depending on the time of day (Felson & Poulsen, 2003), the type of business (Farrell, 2015; Eck et al., 2007), the social/physical environment surrounding the target (Taylor & Harrell, 1996; Hipp et al., 2019), and individual demographics such as age and sex (Bachman, 1994; Pimlott-Kubiak & Cortina, 2003; Stafford & Galle, 1984). Despite the suitability of a target, be it a place or a person, the presence of a guardian can stand to influence whether a crime is more likely to occur.

The final component of routine activities theory is the lack of a capable guardian, which Cohen and Felson (1979) define as supervision of people or property that may deter criminal action. Cohen and Felson (1979) argue capable guardians can be formal or informal. Often times, people think of police as formal guardianship, but formal guardianship extends beyond law enforcement to include, security guards, urban citizen patrols, and CCTV cameras (Piza & Sytsma, 2016; Piza, Caplan, & Kennedy, 2014; Hollis-Peel et al., 2011). Whereas informal guardians might include neighbors who keep an eye out for anything outside of the ordinary in the environment (Hollis-Peel et al., 2011; Reynald, 2016). Another important factor that influences capable guardianship is the idea that the guardian must be willing to act. If there is a guardian present in an area, but they are not willing to act to prevent an offense from occurring, they would not be considered a capable guardian. Empirical studies have shown that guardianship can influence the likelihood that crime occurs in a location (Madensen & Eck,

2008, Reynald, 2011). Adding the lack of a capable guardian is the final piece of what Cohen and Felson refer to as the crime triangle (See **Figure** 2) that often results in criminal activity.

Figure 2 – Crime Triangle adapted from Cohen and Felson (1979)



Although each one of these factors on their own could play a significant role in contributing to criminal opportunities, they are most impactful when intersecting with each other and the lack of one of these factors could be enough to prevent a normal situation from becoming a criminal opportunity occurring. Furthermore, it is essential to this theory that all three of these components converge in time and place for a criminal opportunity to exist.

Previous research on routine activities theory has indicated that it is important to consider the temporal relationship between the convergence of motivated offenders, suitable victims, and the lack of a capable guardian. These studies find that the likelihood for criminal activity to occur varies across time with some hours of the day or some days of the week demonstrating a higher likelihood of criminal activity (Malleson & Andresen, 2015; Almanie et al., 2015; Conrow et al., 2015; Towers et al.,2018). This reveals that there are temporal patterns for

criminal activity. Often these temporal patterns can be traced back to routine activities theory as well. These temporal patterns are likely to appear during times where foot traffic is highest (Malleson & Andresen, 2015; 2016). One example of this can be seen in Malleson and Andresen's (2015) findings that crime is more likely to occur on Saturday during the day at an area known for its retail shopping and on Saturday evening around a college campus when students are more likely to be out participating in activities. This idea that crime clusters temporally ties back into how routine activities theory argues that when suitable targets, in this case shoppers or distracted students, interact with motivated offenders at a time of the day when foot traffic is high in a place where a capable guardian is not present, crime is more likely to occur.

Although it could be argued that the presence of a significant amount of people would deter criminal activity, most of these people would not be considered capable guardians because they are not willing to act to stop victimization from occurring. The willingness of a guardian to act is essential in deciding whether they can be considered capable guardians. Another concept that influences guardianship is the idea of anonymity in numbers. It could be argued that a large crowd of people in an area would deter someone from offending because of all the potential "guardians" that might step in to prevent them, however studies have revealed that when there are larger amounts of people, criminal activity is more likely to occur because offenders feel as if they are less likely to be noticed in a large group of people and feel as if they are not as responsible to their neighbor (Braithwaite, 1975; Dukova, 2016). Additionally, it is important to note that space plays a significant role in this relationship given the space-time convergence.

Similar to the role that time plays in the routine activities theory, research has shown that space plays an important role, and often is the primary focus (Spelman, 1995; Block & Block,

1995; Eck & Weisburd, 2015). Empirical research has shown that the likelihood for crime to occur not only varies across time, but across place as well with some locations being more likely to experience crime than others (Sherman et al., 1989; Steinman et al., 2021; Weisburd, 2015; Groff, Weisburd, & Yang, 2010). Examples of these locations are bars (Block & Block, 1995; Bernasco & Block, 2011), transportation hubs (Loukaitou-Sideris, 1999; Block & Block, 2000; McCord & Ratcliffe, 2009; Murray et al., 2001), and shopping centers (LaGrange, 1999; Brantingham et al., 1990; Weisburd et al., 2009). Again, evidence for the spatial clustering of crime adds support to the argument of a time and space convergence of suitable targets, motivated offenders, and the lack of a capable guardian. This points to the argument that crime is not random in space, and these concentrations in place are often referred to as hot spots (Weisburd et al., 1992; Sherman, 1995; Eck et al., 2005; Brantingham et al., 2020). Brantingham and colleagues (2020) discuss how the fact of hotspots, spatial and temporal clusters of crime, has become one of the most important contributions to environmental criminology.

From Daily Routines to Crime Generators and Attractors

Building from prior research in environmental criminology on spatial clustering and suitable targets, Brantingham and Brantingham (1995) extensively discuss how the built - physical environment could be seen as suitable targets through their classification as crime generators or crime attractors. Brantingham and Brantingham (1995) illustrate in their definitions of crime generators and crime attractors that buildings identified as generators and attractors may be more vulnerable to victimization because of their design and the way they are managed which as a result might increase their vulnerability to victimization. Crime generators are places where large numbers of people gather for reasons unrelated to any criminal motivation that they might end up committing while there. Some examples of crime generators include bus stations,

shopping centers, and sport stadiums. All three of these places are highly traveled and bring a lot of people into contact with each other. Brantingham and Brantingham then argue that among the large amount of people that are gathered, there are likely to be a few potentially motivated offenders that are likely to exploit any opportunity to participate in criminal behaviors if the right opportunity arises. All in all, these potentially motivated offenders do not go to these crime generators looking to commit crime, but if the opportunity to do so presents itself, and the rewards appear to outweigh the risks, the likelihood that they engage in criminal behavior increases exponentially.

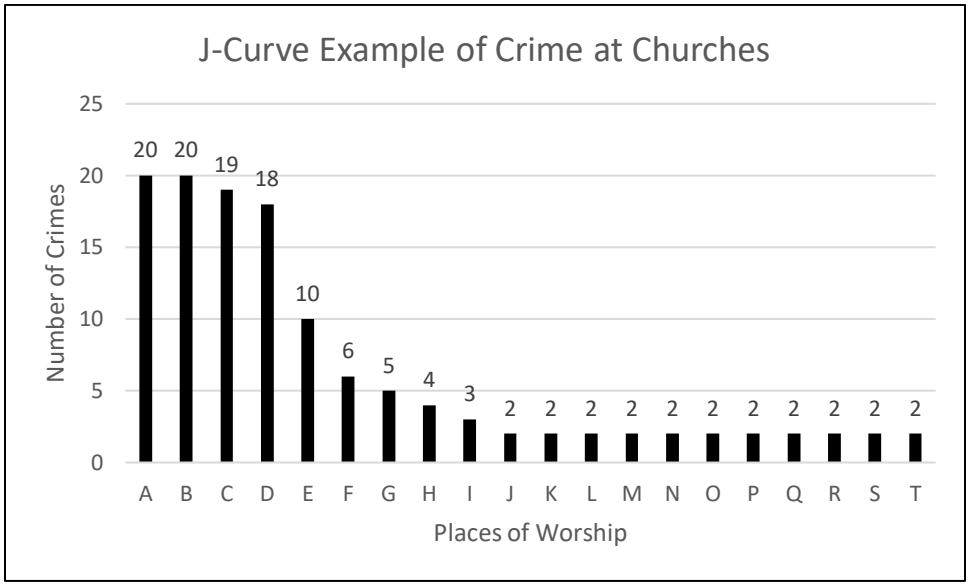
On the other hand, crime attractors are specific places or neighborhoods where widely known criminal opportunities that draw strongly motivated criminal offenders to them often occur. Some examples as outlined by Brantingham and Brantingham (1995) include bar districts, large, insecure parking lots, and drug markets. In this case, the strongly motivated offenders are attracted to these locations with the intention of participating in criminal behaviors such as assault, theft, and vandalism. Subsequent studies on shopping centers (Engstad, 1973; Eck & Weisburd, 2015; Ceccato et al., 2021), bus stops (Loukaitou-Sideris, 1999; Block & Block, 2000; McCord & Ratcliffe, 2009; Murray et al., 2001), and sporting events (Ristea et al., 2020; Ge et al., 2021; Barker, 2004) have since affirmed what Brantingham and Brantingham had postulated about crime attractors and crime generators (Young, 1997; McCord et al., 2007; Kiney et al., 2008; Bernasco and Block, 2011; Soto and Summers, 2020). These studies all find and emphasize that time, place, and environment play an overwhelmingly important role in determining why some places are considered riskier than others when it comes to the likelihood for criminal activity to occur.

To summarize, routine activities theory (Cohen & Felson, 1979) postulates that the convergence of a motivate offender, a suitable target, and the lack of a capable guardian in time and space results in an increased likelihood for criminal activity to occur. Building off this idea of suitable targets, Brantingham and Brantingham (1995) explain how places, such as bars and bus stops, can be seen as suitable targets based on their classification as crime generators and attractors. These places classified as crime generators and attractors often experience criminal activity at a higher rate than places that do not fall in either category.

Risky Facilities & Place Management

Eck and colleagues (2007) extend the application of crime generators and attractors in identifying truly "risky facilities". Specifically, for any group of facilities (e.g., bars or bus stops), many of which are crime generators and attractors, a small portion of the whole accounts for most of the crime experienced by the whole. In other words, a few of the facilities account for most criminal offenses experienced by the whole group. An example using concepts from the current study would argue that data on crime for a group of twenty places of worship would form a J-curve on a graph. This J-curve would be visible through a few of the places of worship on the left side accounting for most of the crime before seeing a steep drop off that eventually flattens (See **Figure 3** for a visualization).

Figure 3 – Fictitious J-Curve Example of Crime at Churches (based on Eck et al., 2007)

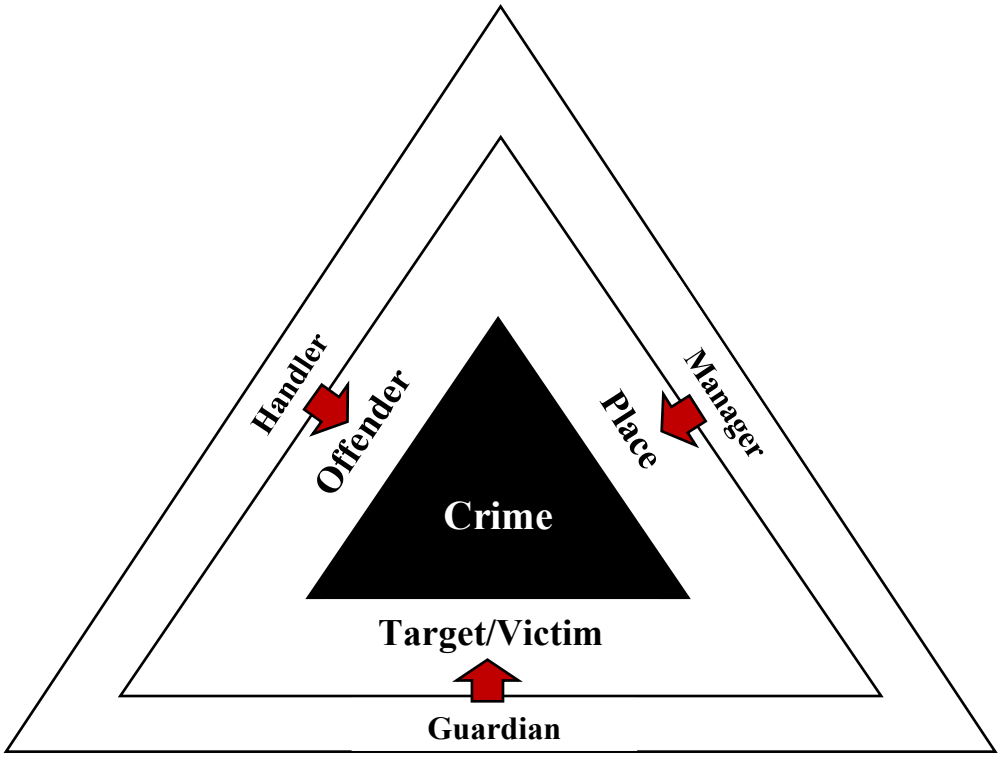


This phenomenon is also referred to the 80-20 rule (see Clarke & Eck, 2007) which in terms of crime would postulate that 20% of all bars are responsible for 80% of all crimes experienced by bars. Subsequent studies on the risky facilities phenomena reveal overwhelming support for this 80-20 idea at bars/pubs, convenience stores, shopping centers, and motels/hotels (Eck, Clarke, & Guerette, 2007; Blair, Wilcox, & Eck, 2017; Bowers, 2014; Townsley et al., 2014). One possible explanation as to why some of these facilities do not experience the same level of victimization as others can be tied back to Eck's idea of place managers (Eck, 2015; 2019).

As can be seen in Eck's adaptation of the crime triangle (**Figure 4)**, it is postulated that each component of the routine activities theory that contributes to the likelihood for a criminal activity to occur has a component that can function as a mitigator against the negative effects one would expect to occur. One factor specifically that is discussed (Eck, 2015; 2019) extensively in relation to how place and crime intersect is the idea of place managers and the role they play in creating or combating risky facilities. To provide clarity, place managers are the people /

management responsible for making decisions regarding culture, atmosphere, and physical design of a place.

Figure 4 – Crime Triangle (Based on Eck, 2003)



From this extension, it is argued that a possible explanation for a small number of places being responsible for a large amount of crime is place managers and the way they take care of the buildings they are responsible for (Eck, 2019; 2003). Eck (2019) goes on to explain that the four primary functions of these place managers are the organization of space, regulation of conduct, control of access, and the acquisition of resources. These functions can be tied back to Jane Jacob's idea of defensible spaces and how the design of a space could reduce crime and promote a better sense of security (Jacobs, 1993 [1961]). Eck (2019) continues to build from this and argues that if done correctly and to a high degree, the likelihood for criminal activity to occur in these places can be significantly decreased by place managers. Researchers have often

investigated this idea of how the presence of a place manager could influence levels of crime and disorder experienced at these locations by using data from places such as bars and apartment complexes as well as crime data from the place itself or the area immediately surrounding it (Madensen, 2007; Madensen & Eck, 2008; Eck & Guerette, 2012; Eck, 2015; Gilchrist et al, 2019; Douglas & Welsh, 2020). The results of these studies indicate that place managers stand to have a significant influence on the security of the facilities they manage through the way in which places are designed and social cohesion is promoted (Eck, Clarke, & Guerette, 2007; Douglas & Welsh, 2020; Welsh, Mudge, & Farrington, 2010).

To this accord, Taylor (1997) extensively discusses the idea of how micro-level social disorganization varies from street to street based on the informal social controls present on these streets. Taylor argues that street blocks are behavior settings where people who frequent them begin to familiarize themselves with the routines of others. As a result, people build relationships with others, develop uniform norms, and delegate informal role obligations. One role obligation specifically discussed is that of the "block organizer" who plays a central role in the development and enforcement of social cohesion, which refers to the strength of the relationships and overall feeling of solidarity amongst members of a specific community, on theses streets. Much like what Taylor describes as block organizers, place managers may play a similar role in their street communities as cultivators of social cohesion (Eck, 2018; Manning et al., 2016). Social cohesion has been shown to result in lower levels of crime (Hirschfield & Bowers, 1997; Hardyns & Pauwels, 2009; Uchida et al., 2013). In other words, if place managers promote social cohesion, the likelihood for crime to occur at or around the facilities that they manage decreases greatly.

Place Managers, Spatial Approaches, and Religious Organizations

One social institution specifically that place managers stand to have a strong impact at are places of worship. It has been found that places of worship and the people who attend them promote social cohesion through the creation of social bonds and moral teachings (Warner & Konkel, 2019; Lee, 2006). Furthermore, in relation to places of worship this idea of place managers ties into how Willits and colleagues (2011) argue that places of worship might not experience high levels of victimization in or around the building because places of worship often do not bring motivated offenders in because of their moral nature and because the level of informal social control created by the bond of the moral adherents might act as a guardian in and of itself.

Despite this increased interest in the spatial relationship between places of worship and crime, the full nature of the relationship is not fully developed. Using a larger spatial unit of analysis, specifically county level data on adherence rates and number of places of worship present, prior studies have found evidence that places of worship may have a protective effect against criminal activity, specifically violent crime (Lee, 2006; Lee, 2008; Lee and Thomas, 2010; Stef, 2017; Babin, 2020). Lee (2008; 2010) generally argues that rural communities with a strong non-economic institutional presence and a civically, morally engaged population will experience lower levels of violent crime. Lee (2006) argues that one sign of a strong non-economic institutional base is the number of places of worship present in a community. Furthermore, Lee (2006) argues that these places of worship could have a protective effect against violent crime due to their ability to create social networks of moral people that build strong ties to the communities in which they are located. This moral belief system that is possessed by the adherents who attend this place of worship might then be associated with or

embodied by the actual physical building itself which ultimately might influence people in the community, regardless of religious belief, to adhere to the norms associated with the place itself (Lee, 2006). As a result, places of worship may act as a mitigator that decreases one's likelihood to participate in criminal behavior. While it is important to discuss the significance of findings for a protective effect, it is equally as important to note that the studies that have found these effects have specifically looked at violent crime in rural communities and communities outside of the United States.

Moving to a smaller spatial unit of analysis, such as streets or actual buildings, places of worship have been relatively understudied in the environmental criminology literature. Despite limited research having explored how this theory can be applied to places of worship (Corcoran, Scheitle, and Hudnall, 2020; Willits, Gonzales, and Denman, 2011), the results are mixed with a variety of different potential explanations offered as to how routine activities theory might cause crime to converge or desist at these places of worship.

Contrary to this, Willits and colleagues (2011) contend that places of worship could not experience high levels of victimization in or around the building because places of worship often do not bring motivated offenders in due to their moral nature and because the level of informal social control created by the bond of the moral adherents might act as a guardian in and of itself. Willits and colleagues (2011) investigated how three different establishments, churches, schools, and bars, were related to the likelihood of criminal activity, both property and violent, to occur at the block group level of analysis in Albuquerque, New Mexico. Using poisson and negative binomial regression models to analyze results, Willits and colleagues (2011) find that for both violent crime and property crime there is no significant relationship between the presence of a church and a criminal activity at the block group level. Furthermore, it is discussed that one

possible explanation for the lack of a statistically significant relationship could be that it was not possible to distinguish between the different denominations of places of worship in the samples. In other words, there is the potential for greater guardianship and place management based on religious denomination.

On the other hand, Corcoran and colleagues (Corcoran, Scheitle, and Hudnall, 2020) argue that places of worship could bring in an influx of potentially motivated offenders into an environment where the opportunity for victimization is easy. The study found a positive relationship between places of worship and certain types of criminal activity such as theft and vandalism. Corcoran and colleagues (2020) specifically discuss that places of worship that have something like a soup kitchen / food pantry or places of worship that hold community festivals are at the highest risk of victimization. Corcoran et al. (2020) argued that the routine activities for these places of worship engaged in for hosting events/gatherings made them an easy and suitable target for criminal activity because they were open to anyone in the community which increased their likelihood of exposure to potential offenders. Additionally, Corcoran and colleagues discussed that places of worship located in areas with a higher population density were at a higher risk of victimization due to their exposure to larger amounts of people, some of which may be potential offenders. In conclusion, as the number of routine activities that a congregation holds increases, their likelihood of experiencing property crime victimization increases as well. This is significant because it reveals how places of worship might be seen as crime attractors because of the foot traffic they experience because of the routine activities that are often located at these places. Although the findings here are significant, it is important to consider the different ways that places of worship may act as a mitigator or aggravator to criminal activity.

Current Study Research Questions and Hypotheses

With a theoretical foundation based on the Routine Activities Theory (Cohen & Felson, 1979) and Eck's (2003; 2019) expansion on how place managers can combat the negative effects of risky facilities, the current study seeks to answer questions surrounding the nature of the spatial relationship between physical places of worship and criminal activity at a street level. The goal of this study is to determine the relationship between places of worship in Little Rock, Arkansas, and crime occurrence. With this goal in mind, the research questions are as follows:

1. What is the spatial relationship between places of worship and crime occurrence in Little Rock, Arkansas at a street level?
2. How does this relationship vary spatially across locations of places of worship? Are there other businesses/buildings on those streets that might explain any variation?

Corcoran and colleagues (2020) discuss extensively the idea that places of worship might be considered crime attractors due to the large number of people, some of which might be criminally motivated, they bring in for religious services and other community programs such as food pantries. Rooted in Corcoran's (2020) findings of a positive relationship between certain criminal activities and the presence of places of worship as well as Brantingham and Brantingham's (1995) definitions of crime generators and attractors the current study hypothesizes:

1. Places of worship in Little Rock, Arkansas have an aggravating effect on criminal activity.

2. Some places of worship will experience a higher likelihood of criminal activity occurring around them than others. Other businesses and buildings will explain the variation in criminal activity from place to place.

Data and Methodology

Little Rock, the capital city of Arkansas, is in Pulaski County in central Arkansas and has an estimated population of over 200,000 people making it the largest city in the state of Arkansas (City of Little Rock, 2021). In addition, Little Rock is home to a variety of different institutions such as the Clinton Presidential Library, University of Arkansas for Medical Sciences, and Dillard's Headquarters. Of the over 200,000 residents, about 52% are female, 50% are White, and about 24% of the population is between 18 and 34 years old. Furthermore, the median household income is $51,485 and about 11.97% of the families are living below the poverty line (ACS 5-year estimates, 2019).

Moving from socio-demographics to crime, as discussed in news media Little Rock is consistently rated as one of the top ten most dangerous cities in the United States (Fieldstadt, 2020; Moniuszko, 2019). The property crime rate per 100,000 people in Little Rock was 6,957.87 in 2017 and 4,892.56 in 2020, whereas the violent crime rate per 100,000 was 1,633.60 in 2017 and 1,849.88 in 2020 (UCR Program Data, 2020). For a clearer vision of how property and violent crime rates changed throughout the time that data were collected for this study, refer to **Table 1** below. This table reveals that during the time that the data for this study was collected, property crime decreased whereas violent crime fluctuated. With this in mind, it is important to take into consideration that crime rates in 2020 may have been heavily influenced by the Covid-19 pandemic

Table 1 – Comparison of Crime Rates per 100,000 Between U.S. and Little Rock, AR (UCR Program Data, 2020)

	2017	2018	2019
United States			
Total Crime Rate	2,757.80	2,593.20	2,511.40
Property Crime Rate	2,362.90	2,209.80	2,130.60
Violent Crime Rate	394.90	383.40	380.80
Little Rock			
Total Crime Rate	8,591.47	8,053.17	7,661.48
Property Crime Rate	6,957.87	6,604.01	6,144.71
Violent Crime Rate	1,633.60	1,449.16	1,516.77

Crime Data

The crime data necessary for this study were obtained from the City of Little Rock's open data portal and consisted of a list of all reported crimes in Little Rock from 2017 to December 31, 2019, as reported to the FBI for the UCR. The original dataset included 48,240 different cases of crimes that occurred in between January 1, 2017, and December 31, 2019, in Little Rock, Arkansas. The original dataset was subsequently filtered down to six different crime types of interest: aggravated assault & murder, burglary/breaking & entering, motor vehicle theft, robbery, theft from building, and theft from motor vehicle. Descriptive statistics of the filtered sample show that 31.80% of the crimes reported within that time frame were classified as Aggravated Assaults or Murders. Rounding out the top three, the other two most frequently committed offenses were Theft from Motor Vehicle, 19.26% of all crimes and Burglary/B&E, 18.68% of all crimes. The other 30.26% of crimes were accounted for by the other three offenses of interest. A visual breakdown of the offense count can be found in **Table 2** below.

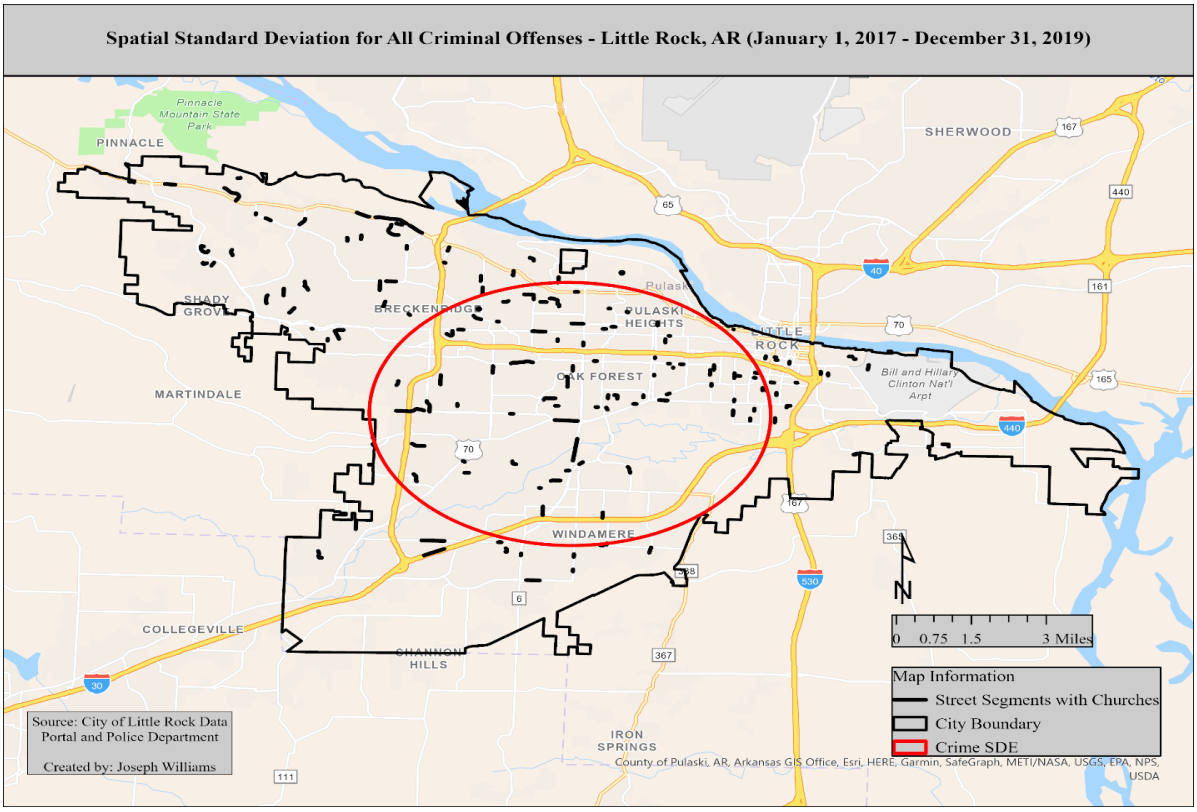
Table 2 – Count by Offense Type

Offense Type	Offense Count	Percentage of Total	Cumulative Percent Total
Aggravated Assault & Murder	10,725	31.80%	
Burglary/B&E	6,300	18.68%	50.48%
Motor Vehicle Theft	3,505	10.39%	60.87%
Robbery	1,457	4.32%	65.19%
Theft from Building	5,245	15.55%	80.74%
Theft from Motor Vehicle	6,492	19.26%	100%
Grand Total	**33,724**	**100.00%**	

Of the original 33,724 reported incidents, 33,368 were made available with the latitude and longitude. This means that 356 crimes were removed due to a lack of geospatial data. Ultimately this equates to a 99% match rate for incidents of crime in Little Rock between January of 2017 and the 31st of December 2019. All 356 incidents that were unable to be mapped were excluded from the final analysis done in the current study.

As provided in **Figure 5**, general spatial descriptives are provided to assist in describing the spatial distribution of all criminal offense occurrences in ArcGIS Pro. A one standard deviation ellipse and a mean point were created based on the crime data. The standard deviation ellipse tells us that about 68% of the selected crimes for this study during this time period occurred within the 43.96 square mile ellipse, which covers about 36% of the total area of Little Rock in square miles. This is a general spatial descriptive for *all* crime and is a meso-level description of where crime is likely to occur in Little Rock. Joining the spatial descriptives were street segments with places of worship present demarcated by bolded lines, to allow for easier identification of the different parts of Little Rock that are included within this ellipse.

Figure 5 – Spatial Descriptive Statistics of Crime in Little Rock



Places of Worship Data

Church data for the current study came from the Homeland Infrastructure Foundation-Level Data (HIFLD) All Places of Worship database that is publicly available through the Department of Homeland Security (DHS). The original HIFLD database included 254,406 places of worship but for the current study the data were subsequently filtered down to 252 places of worship in Little Rock. From this list of places of worship in Little Rock, the data were filtered down even further by removing places of worship that report a PO box as the address of the place of worship in an effort to remove "Postal" addresses and only capture "Street Addresses" and "Postal Addresses" of actual buildings where worship services may occur. With that, sixty-eight of the places of worship were removed from the final sample because the address listed was

a PO box and not that of an actual place of worship. Ultimately, this data cleaning resulted in a final sample of 185 places of worship, 73.41% of all listed places of worship, located across 149 different street segments in Little Rock, Arkansas. To ensure the accuracy of this data, the HIFLD dataset was compared against a Little Rock Places of Worship dataset that was compiled by Predict Align Prevent, a non-profit organization dedicated to stopping child maltreatment (see Technical Report: Drawve, Thomas, & Datta, 2020). The HIFLD list was completely corroborated by the list created by Predict Align Prevent, which ensures the reliability of the dataset used in the current study.

Analytical Framework

After receiving the datasets, both were cleaned of any unnecessary data in Excel before being added into ArcGIS Pro for analysis. After displaying all 33,724 criminal incidents and all 185 places of worship, there were 356 offenses and no churches that were removed from the final analysis due to an inability to accurately map the data. With the cleaned, working datasets of 33,368 crimes and 185 places of worship, the information was transferred from Microsoft Excel to ArcGIS Pro to assist in spatially representing the criminal offenses and places of worship for Little Rock. ArcGIS has a variety of different functions that allow users to spatially represent datasets. A function that allows for displaying of data based on latitude and longitude was used to spatially represent the data at hand by using the latitudinal and longitudinal data that was included in the already cleaned datasets for the criminal offenses and places of worship. After mapping the data initially, a few different functions were used to create "spatial descriptive statistics" to initially make sense of the data before running any real analyses.

After running initial spatial descriptive statistics, a spatial join was used to join all 33,368 criminal offenses to the street segments in Little Rock. Subsequent spatial joins were employed

for each specific crime type of interest in the current study as well as for the places of worship. These spatial joins create a count of the number of crimes and places of worship there are on each street segment in Little Rock. Using the count of places of worship on street segments and the "Select by Feature" tool in ArcGIS, only street segments containing places of worship were selected. Finally, descriptive statistics were run for all crimes as well as each individual crime type. These descriptive statistics revealed information such as mean, standard deviation, and sample size for all street segments as well as only street segments that have a place of worship present on them. In the current study one sample z-tests will be utilized to investigate whether there are differences between the mean number of crimes that occurred on street segments with places of worship present as compared to the mean number of crimes that occurred on all street segments in Little Rock. One sample z-tests are seen as an appropriate statistical test that previously have been used in empirical research in the criminological literature (Bromley, 1992; Slater, Long, & Ford, 2006; Hickman and Rice, 2010).

After conducting z-tests, the data table containing crime count per street with places of worship present was exported from ArcGIS into Microsoft Excel for an initial investigation into whether an 80-20 effect was present on streets with places of worship. Once the data were transferred to Excel, the percent of total for each street was calculated by dividing crime count per street for all crime types of interest by the total count of criminal incidents on streets with places of worship. Once this was completed, the streets were sorted from largest to smallest based on crime count. Next, another column calculating cumulative percentage was subsequently created. This cumulative percentage column made it possible to identify which streets were risky by looking at which streets add up to account for 80% of all crime experienced. These steps were then repeated for each specific crime type of interest in an effort to see if there is overlap of risky

streets for each crime type. Risky streets were coded "1", while non-risky streets were coded as "0". Coding of streets based on their risk of criminal activity set up the dataset for one last analysis.

With the identification of which streets with places of worship were risky, the focus of the current study was the shifted towards identifying whether other known crime generators and attractors are present on these risky streets with places of worship. To further investigate this relationship, a conjunctive analysis was used in the current study. In short, the original street segments were chosen based on the presence of a church alone, so there could be additional criminogenic establishments on that same street (i.e. Church is not alone). The first step was retrieving business license data from the City of Little Rock open data portal to identify crime generators and crime attractors. Based on previous literature (Eck, Clarke, & Guerette, 2007; Blair, Wilcox, & Eck, 2017; Bowers, 2014; Townsley et al., 2014), eight different establishments were selected for this portion of the analysis: liquor stores, schools, retail stores, grocery stores, supermarkets, hotels/motels, convenience stores, and establishments that sold beer or liquor (Drawve & Barnum, 2018; Chillar & Drawve, 2020). The data retrieved from the Little Rock open data portal included latitudinal and longitudinal data which allowed for the businesses to be easily mapped in ArcGIS Pro. After the establishments were mapped, spatial joins were run to join the establishments to a street file containing the data on places of worship and criminal activity. At the conclusion of the joins, one complete street file was obtained with data on the number of places of worship present on each street segment, the number of crimes present on each street segment broken down by crime type, and the number of each type of risky place present on the street segments. This final attribute tale was exported to Microsoft Excel for recoding prior to the final conjunctive analysis.

Once in Excel, the dataset was recoded to variables that simply measure whether a facility was present. If an establishment were present on a street segment, the new variable would be coded as "1" and if there was no establishment present then it would be coded as "0". This task was repeated for all eight of the risky facilities investigated. Once all the recoding was completed, the dataset was ready to be inputted into SPSS for analysis. Once in SPSS, a syntax designed to run conjunctive analysis (See Miethe, Hart, & Regoeczi, 2008) was used. Analyses were run on streets with places of worship present for all crime as well as each individual crime type of interest. Each analysis exported a truth table that was created using the outcome variable, in this case risk classification, and the predictor variables, the risky facilities. Each row in the truth tables displayed a unique combination of risky facilities that was present in the dataset. In order to interpret the results from these truth tables, a dominant case configuration was decided upon based on a previous article written by Hart (2014). According to Hart (2014), in a dataset with a sample size of less than 1000, it is common for five or more of the same profiles to be considered a dominant case configuration.

With a sample size of only 149 in the current study, five or more of the same profiles was used when identifying dominant cases configurations of risky facilities on streets with places of worship present. To further investigate the significance of these results, binomial logistic regressions were run starting with all crimes of interest. Subsequent binomial logistic regressions were run for each individual crime type when possible. It is common to find binomial logistic regression being run after conjunctive analysis (Mieczkowski & Beauregard, 2010; Miethe et al., 2008). SPSS was utilized and risk level was used as the dependent variable with risky being coded as "1" and not risky being coded as "0". The presence of a supermarket, retail store, liquor store, motel or hotel, grocery store, convenience store, establishment where liquor or beer is sold,

and school were all used as explanatory variables in the regression with the presence of being coded as "1" and the lack of a presence of being coded as "0". Binomial logistic regressions were only able to be run for all crime and four of the individual crime types. Two of the crime types, motor vehicle theft and robbery, were unable to be run due to only a small number of risky streets being available in the analysis.

Results

One Sample Z-Tests

Using ArcGIS Pro all criminal incidents were combined with street segments in Little Rock. This allowed for the calculation of several descriptive statistics of criminal incidents on both all street segments and just those street segments that contained a place of worship. **Table 3** below outlines the different descriptive statistics found in the dataset.

Table 3 – Descriptive Statistics

	Sample Size (N)	Mean	Standard Deviation	Min	Max	Sum
All Street Segments	**17,824**	**1.87**	**7.00**	**0**	**306**	**33,368**
Theft from Building	17,824	0.29	1.75	0	67	5,190
Robbery	17,824	0.08	0.51	0	22	1,447
Theft from MV	17,824	0.36	1.55	0	93	6,377
MV Theft	17,824	0.20	1.27	0	127	3,470
Burglary and B&E	17,824	0.35	1.47	0	74	6,241
Murder and Agg. Assault	17,824	0.60	2.80	0	107	10,643
Street Segments with Places of Worship	**149**	**6.80**	**27.10**	**0**	**306**	**1,014**
Theft from Building	149	1.35	5.20	0	51	201
Robbery	149	0.28	1.88	0	22	41
Theft from MV	149	1.05	3.00	0	31	157
MV Theft	149	0.68	3.23	0	35	101
Burglary and B&E	149	1.33	6.20	0	73	198
Murder and Agg. Assault	149	2.10	9.30	0	94	316

Using the descriptive statistics collected from the street segments, one sample z-tests were conducted to identify whether there were differences between the mean number of crimes that occurred on street segments with places of worship as compared to all street segments in Little Rock. The results from the one sample z-tests can be found in **Table 4** below

Table 4 – One Sample Z-Test Results

	Z Obtained
All Crime	8.597**
Theft from Building	7.394**
Robbery	4.643**
Theft from MV	5.434**
MV Theft	4.662**
Burglary and B&E	8.138**
Murder and Agg. Assault	6.539**

** $p < .01$

As can be seen in **Table 4,** all the z-tests, regardless of crime type, returned statistically significant obtained values. This reveals that the mean number of crimes that occurred on street segments with places of worship was significantly greater than the mean number of crimes that occurred on all street segments in Little Rock.

80-20 Distribution

Using Microsoft Excel all criminal incidents on streets with places of worship were analyzed to identify whether there was an 80-20 distribution. Microsoft Excel allowed for the calculation of several necessary elements, such as total percentages and cumulative percentages, of criminal incidents on just those street segments that contained a place of worship. Using the crime counts and cumulative percentages from the dataset, 80-20 tests were conducted to identify whether a small portion of streets with places of worship were responsible for most of the crime

experienced by the whole of streets with places of worship in Little Rock. The results from each one of the one 80-20 tests can be found in **Figures 6 - 12** below.

Figure 6 – Graph of All Crime per Street with Cumulative Percentage of Total

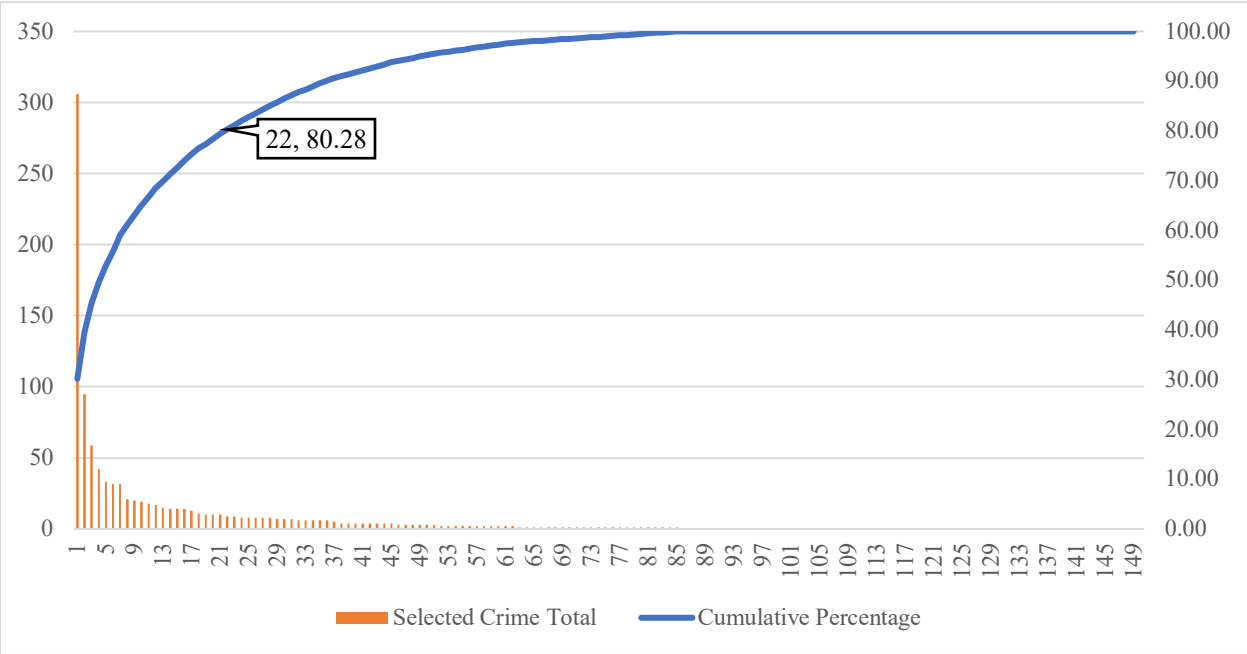


Figure 7 – Graph of Aggravated Assault & Murder per Street with Cumulative Percentage of Total

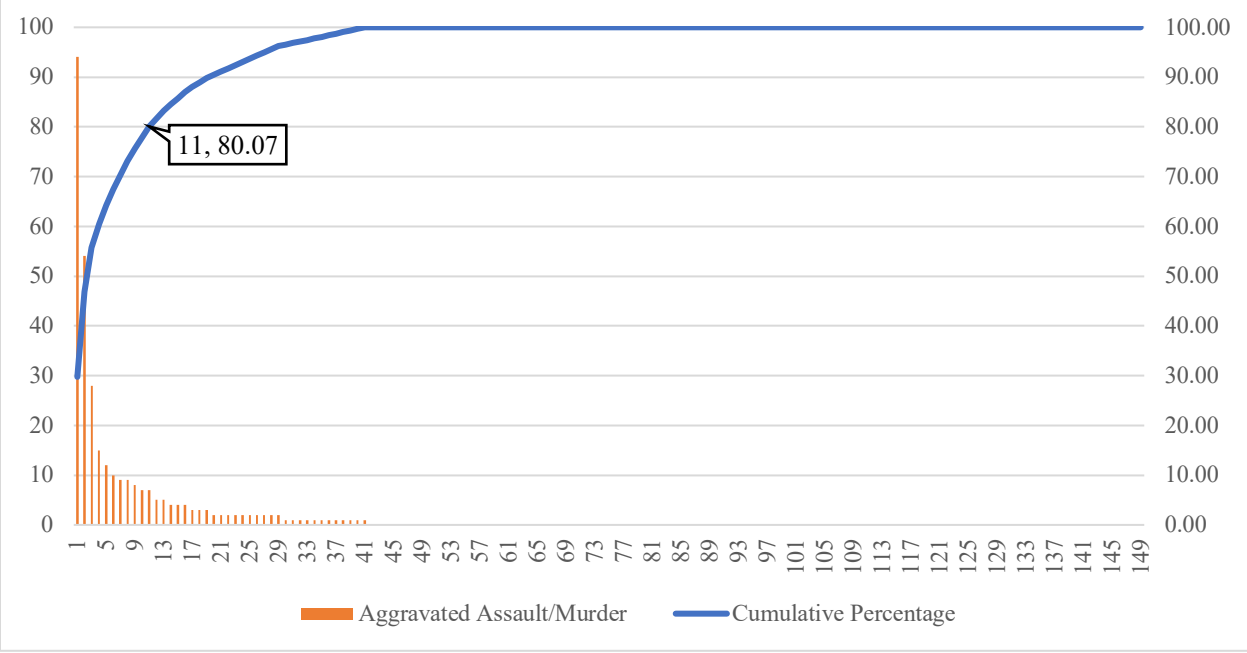


Figure 8 – Graph of Breaking & Entering per Street with Cumulative Percentage of Total

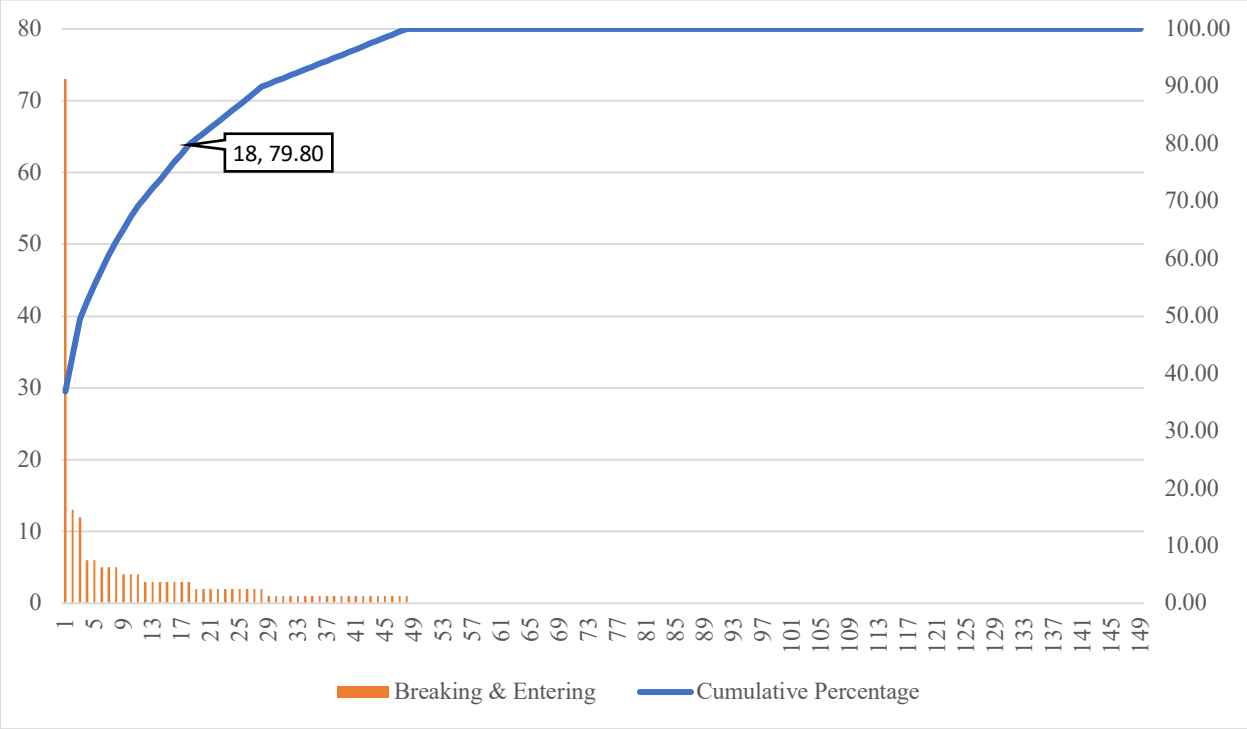


Figure 9 – Graph of Motor Vehicle Theft per Street with Cumulative Percentage of Total

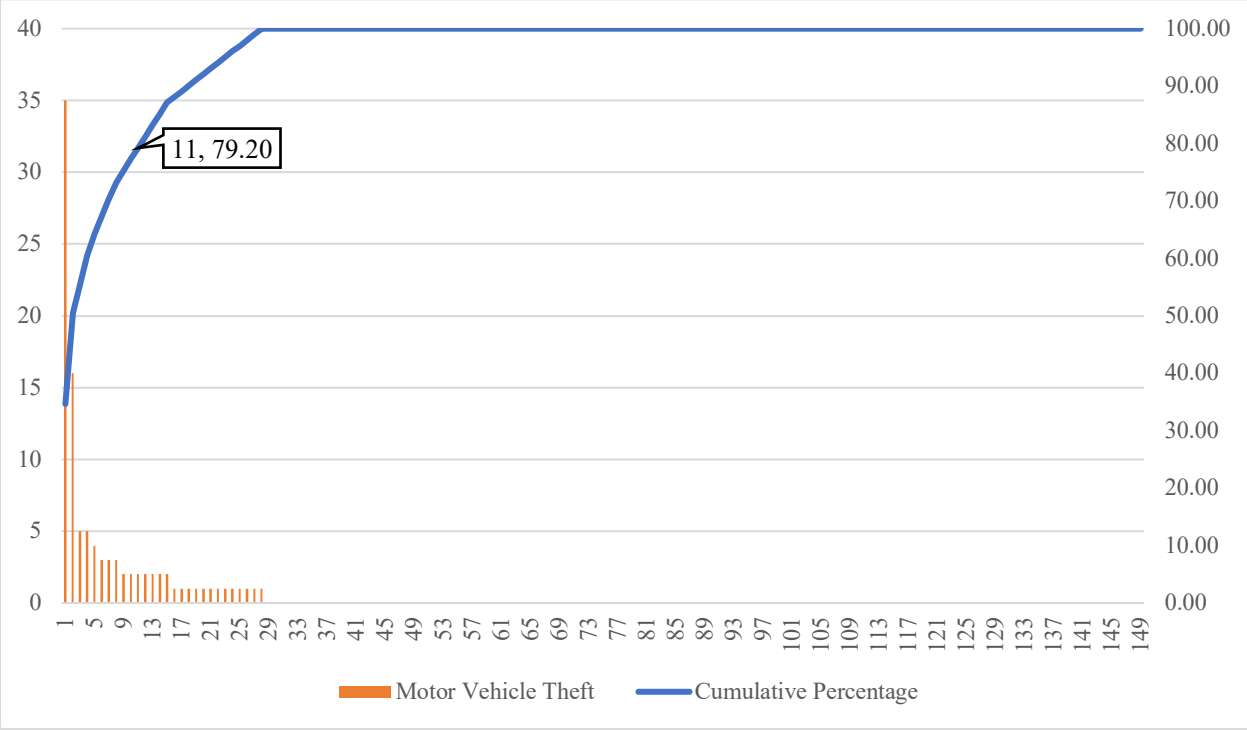


Figure 10 – Graph of Theft from Building per Street with Cumulative Percentage of Total

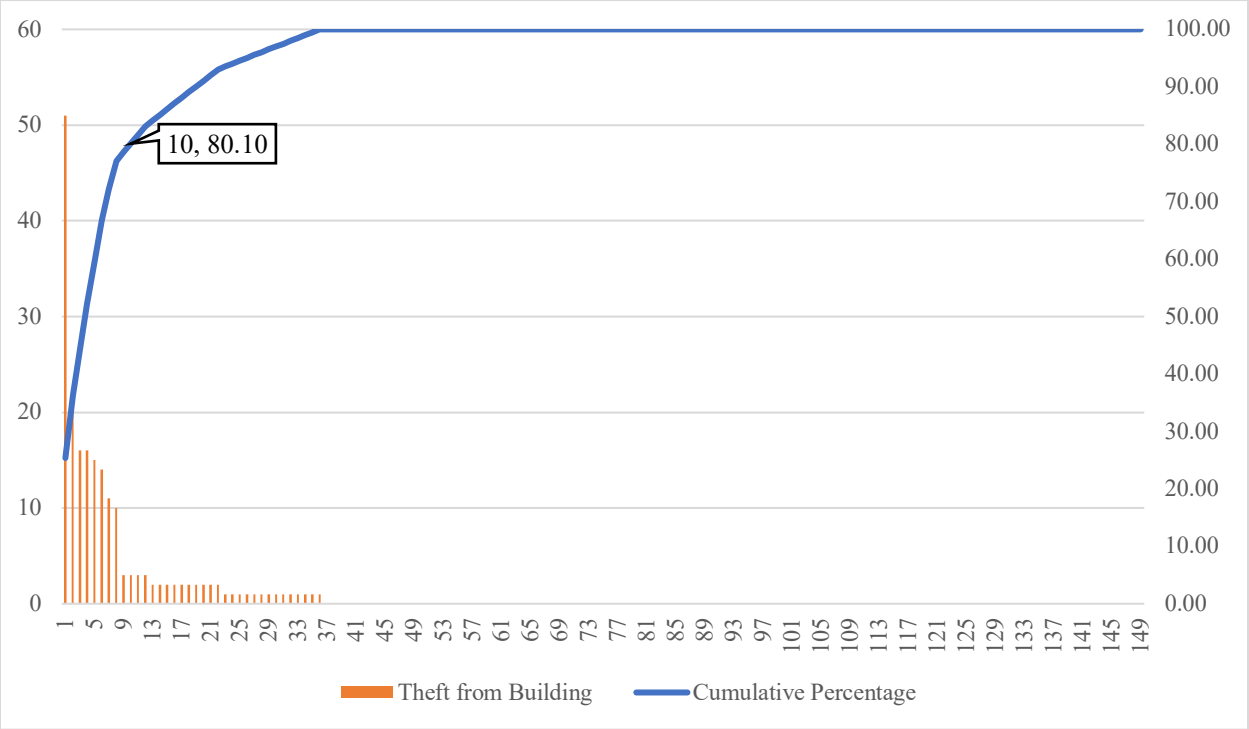


Figure 11 – Graph of Theft from Motor Vehicle per Street with Cumulative Percentage of Total

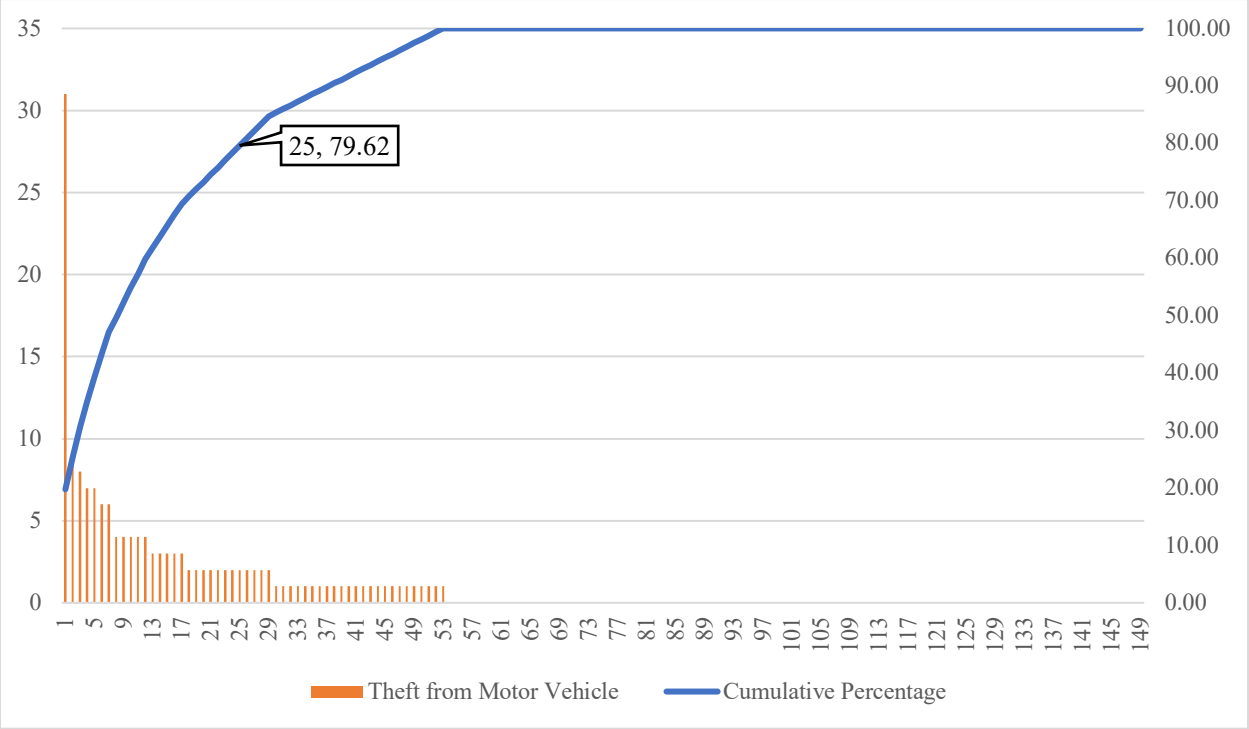
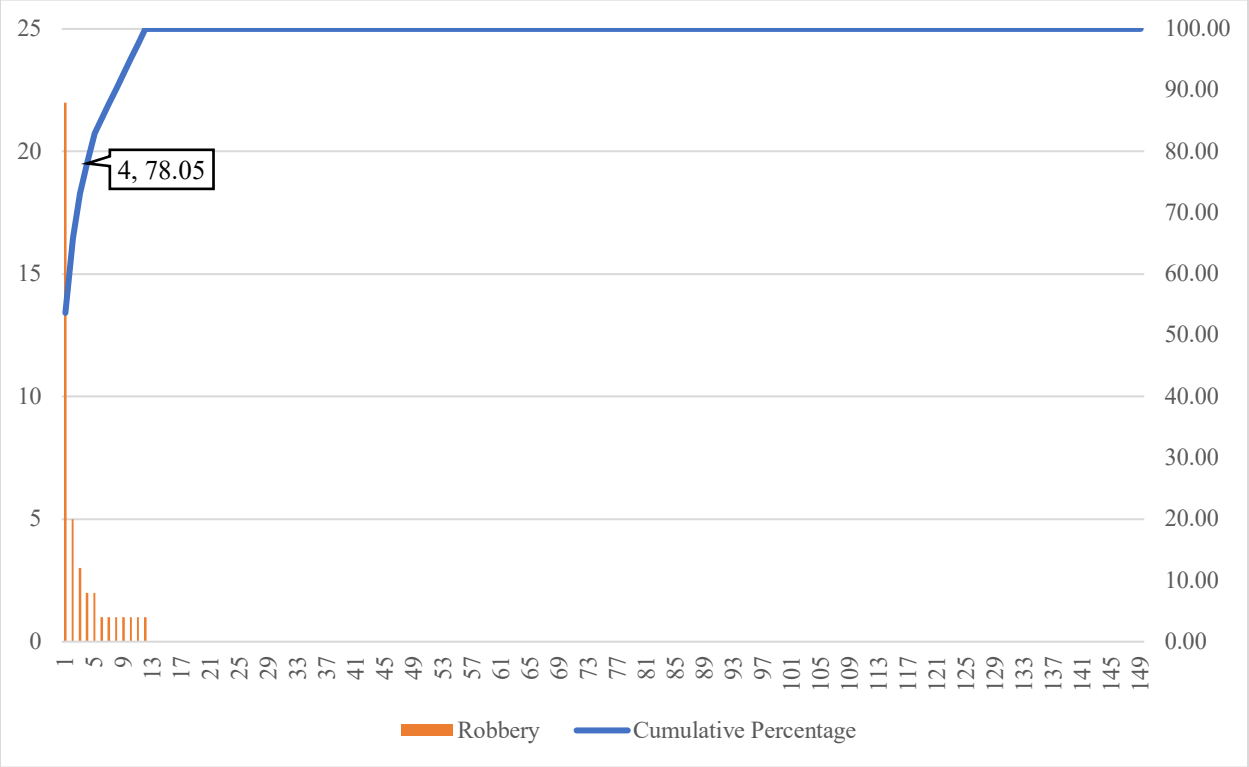
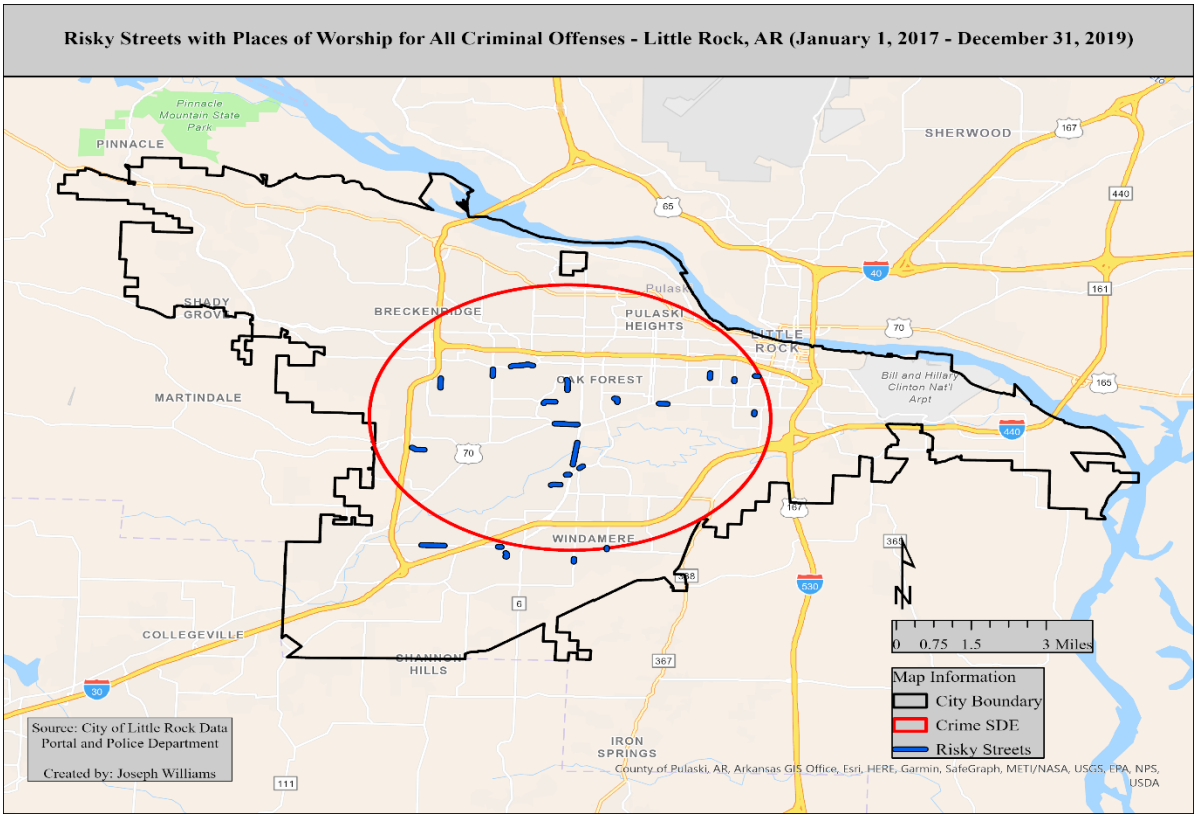


Figure 12 – Graph of Robbery per Street with Cumulative Percentage of Total



The data for All Selected Crime revealed a relationship where 14.77 percent of streets with places of worship account for 80.28 percent of all crime experienced by streets with places of worship present. This finding assists in identifying a small subset of twenty-two streets that may be "riskier" than the other streets with places of worship when it comes to all criminal activity of interest. It is important to make note of the fact that the cut-off in this case is subjective with the difference in crime count between the last risky street and first non-risky street being only one criminal offense. This reveals that it is possible other streets not classified as risky in the current study may be deemed risky in others. See **Figure 13** for a visualization of the location of the twenty-two risky streets with places of worship present based on count of all crime.

Figure 13 – Risky Streets with Places of Worship for All Crime



A more in-depth analysis of a possible 80-20 effect for each individual criminal offense of interest revealed a variety of results that can be found in **Table 5** below.

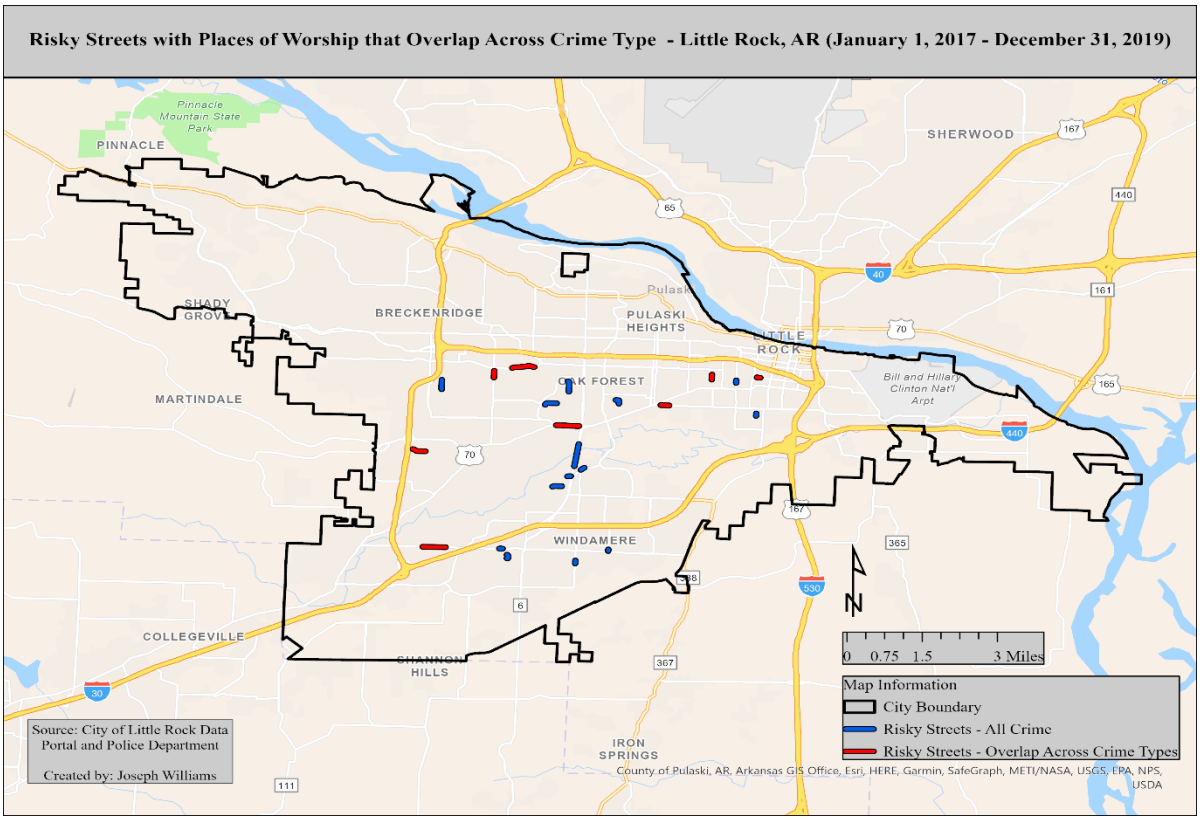
Table 5 – Number and Percentage of Streets Responsible for 80% of Crime by Crime Type

Crime Type	Number of Risky Streets	Percentage of 149 Streets	Percentage of Total Crime
Aggravated Assault & Murder	11	7.38%	80.07%
Burglary/Breaking & Entering	18	12.08%	79.80%
Motor Vehicle Theft	11	7.38%	79.20%
Theft from Building	10	6.71%	80.10%
Theft from Motor Vehicle	25	16.78%	79.62%
Robbery	4	2.68%	78.05%

This table reveals that when looking at individual crime types, for aggravated assault and murder 7.38% of streets account for 80% of aggravated assaults and murders, for breaking and entering

12.08% of streets account for 80% of breaking and entering offenses, for motor vehicle theft 7.38% of streets account for 80% of all motor vehicle thefts, for theft from building 6.71% of streets account for 80% of thefts from a building, for theft from motor vehicle 16.78% of streets account for 80% of all thefts from a motor vehicle, and for robbery 2.68% of streets account for 80% of all robberies. These numbers reveal that although there does not appear to be an exact 80-20 distribution, for each type of criminal offense a small percentage of the streets with places of worship are responsible for a large percentage of the number of crimes experienced by all streets with places of worship. Another important aspect is that there is an overlap of about eight streets deemed risky from offense to offense. For example, the number one riskiest street in terms of all crime is simultaneously the riskiest street for each individual crime type as well. **Figure 14** represents a visualization of the eight risky streets that often overlap across offenses.

Figure 14 – Overlapping Risky Streets with Places of Worship from Offense to Offense



Conjunctive Analysis

Using SPSS all streets with places of worship were analyzed to identify what kind of risky facilities might be present that influence the likelihood for criminal activity to occur. SPSS allowed for the calculation of several different conjunctive analyses that investigated the different combinations of risky facilities that were present on streets with places of worship. Using a syntax designed to run conjunctive analyses (See Miethe, Hart, & Regoeczi, 2008), the presence of a supermarket, retail store, liquor store, motel/hotel, grocery store, convenience store, establishment that sells beer/liquor, and school were all inputted as independent variables. Whether or not the street with the place of worship was risky or not was used as the dependent variable in the current analysis. After inputting the variables into the syntax, it was run. The results for all streets with places of worship can be seen in **Table 6** below.

Table 6 - Conjunctive Analysis for All Streets with Places of Worship

Supermarket	Retail Store	Liquor Store	Motel or Hotel	Grocery Store	Convenience Store	Beer/Liquor on Premises	School	Percent Risky	Number of Streets
Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	0.13	138
Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Present	1	1
Not Present	Not Present	Not Present	Not Present	Not Present	Present	Not Present	Not Present	0	1
Not Present	Not Present	Not Present	Not Present	Not Present	Present	Present	Not Present	1	1
Not Present	Not Present	Not Present	Not Present	Present	Not Present	Present	Not Present	0	1
Not Present	Not Present	Not Present	Present	Not Present	Not Present	Not Present	Not Present	0.5	2
Not Present	Not Present	Present	Not Present	Not Present	Not Present	Present	Present	0	1
Not Present	Not Present	Present	Not Present	Present	Present	Not Present	Not Present	0	1
Not Present	Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	0	1
Not Present	Present	Not Present	Not Present	Present	Present	Present	Not Present	0	1
Present	Present	Present	Not Present	Not Present	Present	Present	Not Present	1	1

This truth table reveals the different case configurations of risky facilities present and the number of streets with places of worship that are associated with each case configuration. The “percent

risky" column displays the percentage of the number of streets with that combination that were deemed to be risky in the 80-20 analysis. For example, in the first row, the 0.13 would show that eighteen of the 138 streets with no other risky facility present were deemed to be risky based on the 80-20 analysis run. Additionally, any row with a one under the percent risky column would reveal that one hundred percent of streets with that combination of risky facilities would be risky. Given the criteria used in the current study, there is only one dominant case configuration in this truth table. The dominant case configuration is that eighteen of the twenty-two risky streets with places of worship for all crimes of interest have no other risky facility present. This would be considered a dominant case configuration given that it occurs more than five times. All other case configurations in this truth table would be deemed to be non-dominant since they occur at a frequency of less than five. Subsequent conjunctive analyses were run for each individual crime type of interest with the most notable findings being displayed in **Table 7** below.

Table 7 – Notable Findings from Conjunctive Analyses Based on Crime Type

Crime Type	Supermarket	Retail Store	Liquor Store	Motel or Hotel	Grocery Store	Convenience Store	Beer/Liquor on Premises	School	Number of Risky Streets
Aggravated Assault and Murder									
	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	8
Burglary and Breaking & Entering									
	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	15
Motor Vehicle Theft									
	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	8
Theft From Building									
	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	8
Theft From Motor Vehicle									
	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	22

This table reveals the different dominant case configurations of risky facilities for each crime type. Because robbery possesses such a small sample size of risky streets, it was impossible to identify a dominant case configuration. Despite the inability to identify a dominant case configuration it is still worth noting that robbery produces an N of two risky streets that have no other risky facilities present. This could still be significant given the small sample size of four risky streets total for that crime type specifically. Additionally, results show that there is only one configuration of risky facilities that is overwhelmingly present on risky streets with places of worship regardless of crime type. The combination is that there are no risky facilities present besides the place of worship. While there are other case configurations of risky facilities that are present across some of these risky streets with places of worship, this one combination is overwhelmingly present and is the most notable due to the number of dominant case configurations present on several risky streets across various crime types.

Due to the subjective nature of the cutoff for the 80-20 rule that resulted in the classification of a street as either risky or non-risky, a subsequent conjunctive analysis was conducted where a street with any number of crimes present was coded as "1" and streets with no crime present were coded as "0". The purpose of this was to investigate whether there were any other dominant case configurations when considering the presence of crime in general regardless of risk classification. The results from this conjunctive analysis (output available upon request) revealed similar results as the original conjunctive analyses with the only difference being that the dominant case configuration occurred 76 times in this analysis versus eighteen in the original analysis. This further illustrates the idea that streets with places of worship on them do not appear to be at a greater risk of experiencing crime because of the presence of other types of risky facilities.

Binary Logistic Regression

The conjunctive analyses offer an illustration of the different combinations of risky facilities present on streets with places of worship. However, this form of analysis does not possess a significance test that reveals whether the relationship between different types of facilities and the risk classification of streets with a place of worship is significant. In an effort to better understand the significance of this relationship, a series of binary logistic regressions were run. The results from the binary logistic regression (outputs available upon request) reveal that not a single type of risky facility used in this study is significantly related to the risk classification of a street with a place of worship present on it. However, these results should be interpreted with caution because of the small sample size of risky streets with places of worship in Little Rock. Essentially, variation in the risky streets and the number of risky establishments used in the current study subsequently may impact the results. To see if the lack of a relationship with all of the predictor variables was a result of the subjective nature of the risky street classification, a follow up binomial logistic regression was run with any street that had crime coded as "1" and any street without crime coded as "0". Even with this change being made, the results from the original regression were affirmed. Still there was no relationship between any of the predictor variables and criminal activity on streets with places of worship present.

Discussion

After conducting analyses, results from the analyses provide support for the hypotheses of the current study. The subsequent paragraphs will discuss how support for these findings can be found in previous studies on routine activities, the 80-20 rule, as well as crime generators and attractors. These previous studies aid in offering possible explanations as to the nature of the spatial relationship between places of worship and criminal activity in Little Rock. Furthermore,

limitations of the current study will be discussed extensively before finishing with suggestions on how future studies could develop a better understanding of this relationship through the implementation of different practices.

The current study finds that street segments with a place of worship present experience a statistically higher mean number of criminal incidents as compared to all street segments in Little Rock. This trend can first be observed in **Table 3**, where the mean crime numbers for all street segments are significantly smaller than the mean crime numbers for street segments with churches on them. Furthermore, this trend is visible in the calculations of the z-scores shown in **Table 4** where the z-obtained values are statistically significant at the 0.01 level for all types of crime tested. These results show support for the first hypothesis of the current study which stated that places of worship in Little Rock, Arkansas would have an aggravating effect on criminal activity. This lack of a protective affect as found in the current study was found previously by both Willits (2011) and Babin (2020) and adds to the overall small base of literature on this topic more generally.

One possible explanation for this trend can be found in Brantingham and Brantingham's (1991; 1995) work on the concepts of nodes, paths, and edges. All three of these concepts add to the overall awareness space for criminal opportunities. Specifically, research shows that people are most likely to be either perpetrators of crime or victims of crime at places central to their lives, which Brantingham and Brantingham (1991) refer to as nodes. For some people, places of worship might be considered a node as it is a place that some frequent at least twice a week for religious services. Additionally, as pointed out by Corcoran and colleagues (2020), many churches do their best to promote community engagement through activities such as community festivals, weekly meals, and food pantries which in hand might bring people to these locations

even more frequently. If people are more likely to be victimized in places that are central to their lives, and places of worship are that type of place for some people, the connection could be made as to why crime is more likely to occur closer to the place of worship than further away. When considering this possibility, it is important to tie it back to guardianship as well. As Cohen and Felson (1979) discuss, the lack of a capable guardian plays a significant role in whether a crime occurs or not. At places of worship, vehicles are often left unattended for extended periods of time during services or events. Additionally, people tend to let their guard down in places familiar to them. This lack of guardianship in some cases may further point to why places of worship, if central to the lives of people, see an uptick in criminal activity.

Another possible explanation for these results can be found in the idea that places of worship might be crime generators. Corcoran and colleagues (2020) discuss that it is within the nature of places of worship to possess a variety of different opportunities that promote social interaction and congregation engagement. Furthermore, it is argued that through inviting large amounts of people to these events, places of worship increase their exposure and proximity to potentially motivated offenders. As a result, places of worship may be considered crime generators because large numbers of people gather at them for reasons unrelated to any criminal motivation. It is these same people that might potentially end up engaging in criminal behavior while there given the right criminalistic opportunity. This potential explanation could point to a why the current study found that offending was more likely to occur on streets containing places of worship.

After determining that crime was more likely to occur on streets with places of worships, the focus shifted towards whether or not there was variation in the likelihood of crime to occur on some streets with places of worship as compared to others. More specifically, the 80-20 rule

was investigated to see if a small portion of streets were responsible for a majority of the crimes experienced. Results demonstrated that an almost perfect 80-20 relationship was present when looking at all crimes of interest combined, meaning that 20% of streets with places of worship were responsible for about 80% of criminal activity experienced by all streets with places of worship. When looking at specific crime types the relationship varied, but the general idea of a small number of streets being responsible for a large percentage of crime remained constant. Previous literature has demonstrated that this 80-20 rule is present when looking at a variety of different establishments (Eck, Clarke, & Guerette, 2007; Blair, Wilcox, & Eck, 2017; Bowers, 2014; Townsley et al., 2014). The results from the current study show possible support for the idea that places of worship can be included in that list of establishments that demonstrate an 80-20 relationship. However, it is important to note that the analysis in the current study looked at this relationship at the street level and not the address level specifically. As a result, this 80-20 relationship found in the current study can only be discussed in terms of risky streets and not risky establishments specifically. Additionally, it is worth noting that one street has the most criminal incidents across crime all crime types. Beyond the fact that this one street is the number one riskiest street for each crime type, it is common throughout this dataset for risky streets in one category to be risky in multiple others as well. This further supports the idea that a small subset of places are responsible for a majority of the crime experienced by the whole.

When discussing this 80-20 relationship in terms of the current study, it is important to note that this study identifies "risky" streets and not risky facilities specifically. As a result, it is more than possible for other risky facilities to be present on the streets with places of worship. Having other risky facilities precent on the same street as places of worship could stand to influence the amount of criminal activity experienced by a street. After conducting a conjunctive

analysis to investigate whether other known risky facilities influence criminal activity, results from the current study reveal that there are several combinations of risky facilities present on streets that appear to influence the likelihood of a street to be considered risky. As discussed previously, the most notable finding is that often there are no other risky facilities present on the risky streets with places of worship. Given the subjective nature of the cutoff for risky streets, the analyses were run again with any crime presence coded as "1". Even after making this change, results remained the same with it being revealed that the dominant case configuration remined that there was no presence of any other risky facilities on the streets with places of worship. Previous literature on supermarkets (Steenbeek et al., 2012), grocery stores (Kajalo & Lindblom, 2011; Bamfield, 2012), convenience stores (Demeau & Parent, 2018; Askey et al., 2018; White & Katz, 2013), and establishments that sell beer and liquor (Brantingham & Brantingham, 1982; Bernasco & Block, 2011) would point to the idea that these establishments would be expected to influence the likelihood for crime to occur on a street, so the fact that this study finds an opposite effect is noteworthy in and of itself.

With the current study finding that there is a lack of other risky facilities present on streets with places of worship it shows support for Corcoran's (2020) idea that the routine activities of places of worship could influence their likelihood to be classified as crime attractors. The lack of other risky facilities on any of these risky streets with places of worship would point to the idea that maybe the places of worship themselves are the facilities influencing criminal activity on the streets they are on. As Corcoran and colleagues (2020) argue, places of worship bring in an influx of people, some of which who may be criminally motivated, through holding events such as community food pantries. This is significant because it points to a possible

explanation as to how the routine activities of places of worship could impact why streets with places of worship might be more likely to experience criminal activity in Little Rock.

Limitations and Future Directions

The findings in this study should be interpreted with caution as there were limitations to the design of the current study. The first major limitation is that this analysis does not distinguish between denomination or other religion in its analysis. Willits (2011) and Babin (2020) discuss extensively that it could be expected that places of worship for different Christian denominations and different religions may have different effects on the likelihood of criminal behavior to occur around them. Because the current study only analyzes the spatial relationship between places of worship in general, results can only be interpreted in that context. Future studies should seek to investigate whether this relationship between places of worship and criminal activity holds up for places of worship across different denominations of Christianity and different religions more generally. The current study only investigated for a relationship between places of worship in general and criminal activity, which necessitates further research into whether this relationship still remains when looking specifically at places such as Methodist churches, Catholic churches, and Synagogues. This area of research would allow for a better understanding of how the relationship between places of worship and criminal behavior varies across different religions.

Another limitation associated with the current study is that the scope is small. This analysis looked at places of worship in the city of Little Rock, which is located in the "bible belt" of the United States. Regions in the United States such as the South and Mid-West are often associated with demonstrating higher levels of religiosity. Furthermore, as Lee (2006; 2008. 2010) and Stef (2017) point out, many of the studies that have found a relationship between religiosity and criminality have shown a regional effect to be present. Because this analysis only

looked at places of worship in a metropolitan city located in the Southern United States, results may not be generalizable to places of worship in other regions of the United States where religion is viewed more or less favorable such as the Northeast or the West. Future research on how the spatial relationship between criminal activity and places of worship may vary across regions will allow for a better understanding of whether the relationship between places of worship and criminal activity remains intact in regions where religious adherence is not as popular.

The next limitation is that it measures only the presence of a place of worship on a street, not adherence rate or who attends these places of worship. In previous studies, researchers have often used a combination of county level adherence rates and a county level count of places of worship when investigating the spatial relationship between places of worship and criminal activity (Lee, 2006; 2008). As a result, the current study is able to only go only as far as the actual buildings when measuring the spatial relationship between places of worship and criminal activity. Through measuring adherence rates, the current study would have been able to create a more complete understanding of how adherence rates at specific places of worship might influence the way in which criminal activity occurs around them. Future studies should seek to measure adherence rates alongside the actual places of worship. County level adherence rates would be appropriate but recording adherence rates for each specific place of worship could be greatly beneficial in developing a clearer understanding of the true nature of the spatial relationship between places of worship and criminal activity. An essential tenet of the moral communities hypothesis is that living with or near a significant number of religious people will affect how any given religious person acts (Regnerus, 2003). By measuring adherence rates as well as the presence of a place of worship, researchers stand to have a better understanding of

how the level of adherence at a place of worship might subsequently influence the protective or aggravating effects of the buildings themselves.

Furthermore, another notable limitation from the current study is that the list of risky facilities used in the analysis is not exhaustive and it does not measure whether the likelihood for an increase in criminal activity on streets with places of worship is directly related to the places of worship alone. The conjunctive analysis conducted used a variety of different risky facilities but fails to be exhaustive through its failure to include places such as bus stops, rental units, and apartment complexes. All these places have been found to be either crime generators or attractors in previous literature (McCord et al., 2007; Kiney et al., 2008; Bernasco and Block, 2011; Soto and Summers, 2020; Eck & Weisburd, 2015; Ceccato et al., 2021). Their exclusion from the analysis means that the results should be interpreted with caution. Future studies should seek to include a more exhaustive list of possible explanatory variables when investigating this relationship. Doing so would provide a clearer picture of how different risky facilities interact to create different case configurations. This would allow for a better understanding of whether other dominant case configurations exist when looking at crime on streets with places of worship.

By focusing only on street segments with places of worship, the study fails to consider the neighborhood or community these places of worship are located. That is, the findings of the current study could be influenced by the neighborhood context. In a study done in Little Rock by Thomas and colleagues (Thomas, Harris, & Drawve, 2021), the risk of crime depended on the level of disadvantage of a neighborhood (ANROC; Aggregated Neighborhood Risk of Crime). By accounting for neighborhood context, this would connect the current micro-level approach to the broader communities and crime literature. For instance, research continues to point to the detrimental relationship between levels of community disadvantage and crime (Krivo &

Peterson, 1996; Hipp, 2010; Chamberlain & Hipp, 2015). In the current study, a large majority of the risky streets for different crime types are located between the three major highways in Little Rock, an area known for its higher levels of criminal activity and disadvantage (Semuels, 2016). As a result, the results from this study that show places of worship as possible crime generators, should be interpreted with caution.

Lastly, the final limitation of the current study is that it focuses only on a space component with no consideration of a time component. By focusing on space alone the current study can identify only the location of streets that are riskier than others but cannot identify when these streets might be more likely to experience criminal activity. Adding a temporal component to future studies investigating this relationship would allow for a better understanding how variation in crime may revolve around the time of church operating hours. Additionally, adding a temporal element to a study of this nature would allow for a more well-rounded understanding of the relationship between places of worship and criminal activity.

Conclusion

The current study was unique in that it sought to fill a gap in literature by investigating how places of worship impact the likelihood for criminal activity to occur using a more micro-spatial unit of analysis, street segments. A lack of a protective effect around places of worship has been found before (Babin, 2020; Willits et al., 2011; Corcoran et al., 2020) and the results from the current study support that finding by demonstrating that places of worship appear to have an aggravating effect on criminal activity in Little Rock, Arkansas. This study adds to the already thin literature base that shows support for the idea that places of worship do not have a protective against criminal activity. Furthermore, findings from the current study show support for the inclusion of places of worship as a building that demonstrates an 80-20 effect. Ultimately,

the current study proved to be essential in furthering knowledge on how routine activities theory and a buildings classification as a crime generator may interact with the presence of places of worship to influence the likelihood for criminal behavior to occur on the street segments with places of worship present.

Works Cited

Almanie, T., Mirza, R., & Lor, E. (2015). Crime prediction based on crime types and using spatial and temporal criminal hotspots. *arXiv preprint arXiv:1508.02050*.

Askey, A. P., Taylor, R., Groff, E., & Fingerhut, A. (2018). Fast food restaurants and convenience stores: Using sales volume to explain crime patterns in Seattle. *Crime & Delinquency*, *64*(14), 1836-1857.

Babin, T. D. (2020). *The halo effect? An ecological analysis of the religion-crime nexus* (Doctoral dissertation).

Bachman, R. (1994). *Violence against women: A national crime victimization survey report* (Vol. 106, No. 4). US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.

Baier, D. (2014). The influence of religiosity on violent behavior of adolescents: A comparison of Christian and Muslim religiosity. *Journal of interpersonal violence*, *29*(1), 102-127.

Baier, C. J., & Wright, B. R. (2001). "If you love me, keep my commandments": A meta-analysis of the effect of religion on crime. *Journal of research in crime and delinquency*, *38*(1), 3-21.

Bamfield, J. A. (2012). Shopping and crime. In *Shopping and Crime* (pp. 1-10). Palgrave Macmillan, London.

Barker, M. I. C. H. A. E. L. (2004). Crime and sport events tourism: The 1999-2000 America's Cup. *Sport tourism: Interrelationships, impacts and issues*, *14*, 174.

Bernasco, W., & Block, R. (2011). Robberies in Chicago: A block-level analysis of the influence of crime generators, crime attractors, and offender anchor points. *Journal of Research in Crime and Delinquency*, *48*(1), 33-57.

Blair, L., Wilcox, P., & Eck, J. (2017). Facilities, opportunity, and crime: An exploratory analysis of places in two urban neighborhoods. *Crime prevention and community safety*, *19*(1), 61-81.

Block, R. L., & Block, C. R. (1995). Space, place and crime: Hot spot areas and hot places of liquor-related crime. *Crime and place*, *4*(2), 145-184.

Block, R., & Block, C. R. (2000). The Bronx and Chicago: Street robbery in the environs of rapid transit stations. *Analyzing crime patterns: Frontiers in practice*, 137-52.

Boessen, A., & Hipp, J. R. (2018). Parks as crime inhibitors or generators: Examining parks and the role of their nearby context. *Social science research*, *76*, 186-201.

Bowers, K. (2014). Risky facilities: Crime radiators or crime absorbers? A comparison of internal and external levels of theft. *Journal of Quantitative Criminology*, *30*(3), 389-414.

Braithwaite, J. (1975). Population growth and crime. *Australian & New Zealand Journal of Criminology*, *8*(1), 57-60.

Brantingham, P. L., & Brantingham, P. J. (1982). Mobility, notoriety and crime: A study of crime patterns in urban nodal points. *Journal of Environmental Systems*, *11*(1), 89-99.

Brantingham, P., & Brantingham, P. (1995). Criminality of place. *European journal on criminal policy and research*, *3*(3), 5-26.

Brantingham, P. J., & Brantingham, P. L. (2016). The geometry of crime and crime pattern theory. In *Environmental criminology and crime analysis* (pp. 117-135). Routledge.

Brantingham, P. J., Brantingham, P. L., Song, J., & Spicer, V. (2020). Crime hot spots, crime corridors and the journey to crime: An expanded theoretical model of the generation of crime concentrations. In *Geographies of behavioural health, crime, and disorder* (pp. 61-86). Springer, Cham.

Brantingham, P. L., Brantingham, P. J., & Wong, P. (1990). Malls and crime: a first look. *Security Journal*, *1*(3), 175-181.

Brauer, J. R., Tittle, C. R., & Antonaccio, O. (2013). Does religion suppress, socialize, soothe, or support? Exploring religiosity's influence on crime. *Journal for the Scientific Study of Religion*, *52*(4), 753-774

Brettfeld, K., & Wetzels, P. (2006). Religiosity and Crime: Attitudes Towards Violence and Delinquent Behavior among Young Christians and Muslims in Germany. *Migration, Culture Conflict, Crime and Terrorism. Burlington*, 73-89.

Bromley, M. L. (1992). Campus and community crime rate comparisons: A statewide study. *Journal of Security Administration*, *15*(2), 49-64.

Brown, K. V. (2001). The determinants of crime in South Africa. *South African Journal of Economics*, *69*(2), 269-298.

Brunson, R. K., Braga, A. A., Hureau, D. M., & Pegram, K. (2015). We trust you, but not that much: Examining police–black clergy partnerships to reduce youth violence. *Justice Quarterly*, *32*(6), 1006-1036.

Burkett, S. R., & White, M. (1974). Hellfire and delinquency: Another look. *Journal for the Scientific Study of Religion*, 455-462.

Cahill, M., & Mulligan, G. (2007). Using geographically weighted regression to explore local crime patterns. *Social Science Computer Review*, *25*(2), 174-193.

Ceccato, V., Falk, Ö., Parsanezhad, P., & Tarandi, V. (2021). Are Shopping Centers Risky Places. *Proceedings of the Webinar Series "Risky Places for Crime", Safeplaces Network-Nottingham Trent University*, *2*.

Chamberlain, A. W., & Hipp, J. R. (2015). It's all relative: Concentrated disadvantage within and across neighborhoods and communities, and the consequences for neighborhood crime. *Journal of Criminal Justice*, *43*(6), 431-443.

Chillar, V. F., & Drawve, G. (2020). Unpacking spatio-temporal differences of risk for crime: An analysis in Little Rock, AR. *Policing: A Journal of Policy and Practice*, *14*(1), 258-277.

Clarke, R. V. G., & Eck, J. E. (2007). *Understanding risky facilities*. Washington, DC: US Department of Justice, Office of Community Oriented Policing Services.

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American sociological review*, 588-608.

Conrow, L., Aldstadt, J., & Mendoza, N. S. (2015). A spatio-temporal analysis of on-premises alcohol outlets and violent crime events in Buffalo, NY. *Applied geography*, *58*, 198-205.

Corcoran, K. E., Pettinicchio, D., & Robbins, B. (2012). Religion and the acceptability of white-collar crime: A cross-national analysis. *Journal for the Scientific Study of Religion*, *51*(3), 542-567.

Corcoran, K. E., Scheitle, C. P., & Hudnall, E. B. (2020). Organizational Activities and Property-Crime Victimization. *The Sociological Quarterly*, *61*(1), 164-186.

Cornish, D., and Clarke, R. V. (1986). The Reasoning Criminal: Rational Choice Perspectives on Offending. Hague: Springer- Verlag.

Demeau, E., & Parent, G. (2018). Impacts of crime attractors and generators on criminality in Montreal. *Canadian Journal of Criminology and Criminal Justice*, *60*(3), 387-412.

Douglas, S., & Welsh, B. C. (2020). Place managers for crime prevention: the theoretical and empirical status of a neglected situational crime prevention technique. *Crime prevention and community safety*, 1-11.

Drawve, G., & Barnum, J. D. (2018). Place-based risk factors for aggravated assault across police divisions in Little Rock, Arkansas. *Journal of Crime and Justice*, *41*(2), 173-192.

Drawve, G., Thomas, S. A., & Walker, J. T. (2016). Bringing the physical environment back into neighborhood research: The utility of RTM for developing an aggregate neighborhood risk of crime measure. *Journal of Criminal Justice*, *44*, 21-29.

Dukova, A. (2016). Growth of Anonymity, Urban Crime and Policing. In *A History of the Dublin Metropolitan Police and its Colonial Legacy* (pp. 181-202). Palgrave Macmillan, London.

Eck, J. (2003). Police problems: The complexity of problem theory, research and evaluation. *Crime prevention studies*, *15*, 79-114.

Eck, J., Chainey, S., Cameron, J., & Wilson, R. (2005). Mapping crime: Understanding hotspots.

Eck, J. E. (1995). Examining routine activity theory: A review of two books.

Eck, J. E. (2015). Who should prevent crime at places? The advantages of regulating place managers and challenges to police services. *Policing: A Journal of Policy and Practice*, *9*(3), 223-233.

Eck, J. E. (2018). Regulation for high-crime places: Theory, evidence, and principles. *The Annals of the American Academy of Political and Social Science*, *679*(1), 106-120.

Eck, J. E. (2019). Place managers and crime places. *Oxford Research Encyclopedia of Criminology and Criminal Justice*.

Eck, J. E., Clarke, R. V., & Guerette, R. T. (2007). Risky facilities: Crime concentration in homogeneous sets of establishments and facilities. *Crime prevention studies*, *21*, 225.

Eck, J., & Weisburd, D. L. (2015). Crime places in crime theory. *Crime and place: Crime prevention studies*, *4*.

Farrell, G. (2015). Crime concentration theory. *Crime prevention and community Safety*, *17*(4), 233-248.

Felson, M., & Poulsen, E. (2003). Simple indicators of crime by time of day. *International Journal of Forecasting*, *19*(4), 595-601.

Fieldstadt, E. (2020, November 9). *The most dangerous cities in America, ranked*. CBS News. https://www.cbsnews.com/pictures/the-most-dangerous-cities-in-america/

Freeman, R. B. (1999). The economics of crime. *Handbook of labor economics*, *3*, 3529-3571.

Ge, Q., Sarmiento Barbieri, I., & Schneider, R. (2021). Sporting events, emotional cues, and crime: Spatial and temporal evidence from brazilian soccer games. *Economic Inquiry*, *59*(1), 375-395.

Groff, E. R. (2007). Simulation for theory testing and experimentation: An example using routine activity theory and street robbery. *Journal of Quantitative Criminology*, *23*(2), 75-103.

Groff, E., & McCord, E. S. (2012). The role of neighborhood parks as crime generators. *Security journal*, *25*(1), 1-24.

Gruenewald, P. J., Freisthler, B., Remer, L., LaScala, E. A., & Treno, A. (2006). Ecological models of alcohol outlets and violent assaults: crime potentials and geospatial analysis. *Addiction*, *101*(5), 666-677.

Hardyns, W., & Pauwels, L. (2009). The geography of social cohesion and crime at the municipality level. *Governance of security research papers series*, *1*, 157-178.

Hart, Timothy. (2014). Conjunctive analysis of case configurations.

Heaton, P. (2006). Does religion really reduce crime?. *The Journal of Law and Economics*, *49*(1), 147-172.

Hickman, M. J., & Rice, S. K. (2010). Digital analysis of crime statistics: Does crime conform to benford's law?. *Journal of Quantitative Criminology*, *26*(3), 333-349.

Higgins, P. C., & Albrecht, G. L. (1977). Hellfire and delinquency revisited. *Social Forces*, *55*(4), 952-958.

Hipp, J. R. (2010). A dynamic view of neighborhoods: The reciprocal relationship between crime and neighborhood structural characteristics. *Social problems*, *57*(2), 205-230.

Hipp, J. R., Kim, Y. A., & Kane, K. (2019). The effect of the physical environment on crime rates: Capturing housing age and housing type at varying spatial scales. *Crime & Delinquency*, *65*(11), 1570-1595.

Hirschfield, A., & Bowers, K. J. (1997). The effect of social cohesion on levels of recorded crime in disadvantaged areas. *Urban Studies*, *34*(8), 1275-1295.

Hirschi, T., & Stark, R. (1969). Hellfire and delinquency. *Social Problems*, *17*(2), 202-213.

Hollis-Peel, M. E., Reynald, D. M., Van Bavel, M., Elffers, H., & Welsh, B. C. (2011). Guardianship for crime prevention: A critical review of the literature. Crime, law and social change, 56(1), 53-70.

Jacobs, Jane. (2016). The Death and Life of Great American Cities.

Jang, S. J. (2019). Religiosity, crime, and drug use among juvenile offenders: A latent growth modeling approach. Journal of Quantitative Criminology, 35(1), 27-60.

Johnson, B. R., & Jang, S. J. (2011). Crime and religion: Assessing the role of the faith factor. Contemporary issues in criminological theory and research: The role of social institutions, 117-149.

Johnson, B. R., Jang, S. J., Larson, D. B., & De Li, S. (2001). Does adolescent religious commitment matter? A reexamination of the effects of religiosity on delinquency. *Journal of Research in Crime and Delinquency*, *38*(1), 22-44.

Kajalo, S., & Lindblom, A. (2011). Effectiveness of formal and informal surveillance in reducing crime at grocery stores. *Journal of Small Business and Enterprise Development*.

Kaplan, Jacob. Uniform Crime Reporting Program Data: Offenses Known and Clearances by Arrest, 1960-2018. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2020-02-19. https://doi.org/10.3886/E100707V13

Kennedy, L. W., & Forde, D. R. (1990). Routine activities and crime: An analysis of victimization in Canada. *Criminology*, *28*(1), 137-152.

Kinney, J. B., Brantingham, P. L., Wuschke, K., Kirk, M. G., & Brantingham, P. J. (2008). Crime attractors, generators and detractors: Land use and urban crime opportunities. *Built environment*, *34*(1), 62-74.

Krivo, L. J., & Peterson, R. D. (1996). Extremely disadvantaged neighborhoods and urban crime. *Social forces*, *75*(2), 619-648.

LaGrange, T. C. (1999). The impact of neighborhoods, schools, and malls on the spatial distribution of property damage. *Journal of Research in Crime and Delinquency*, *36*(4), 393-422.

Lee, M. R. (2006). The religious institutional base and violent crime in rural areas. *Journal for the scientific study of religion*, *45*(3), 309-324.

Lee, M. R. (2008). Civic community in the hinterland: Toward a theory of rural social structure and violence. *Criminology*, *46*(2), 447-478.

Lee, M. R., & Thomas, S. A. (2010). Civic community, population change, and violent crime in rural communities. *Journal of Research in Crime and Delinquency*, *47*(1), 118-147.

Lee, M. R., & Bartkowski, J. P. (2004). Love thy neighbor? Moral communities, civic engagement, and juvenile homicide in rural areas. *Social Forces*, *82*(3), 1001-1035.

Loukaitou-Sideris, A. (1999). Hot spots of bus stop crime: The importance of environmental attributes. *Journal of the American Planning association*, *65*(4), 395-411.

Malleson, N., & Andresen, M. A. (2015). Spatio-temporal crime hotspots and the ambient population. *Crime science*, *4*(1), 1-8.

Malleson, N., & Andresen, M. A. (2016). Exploring the impact of ambient population measures on London crime hotspots. *Journal of Criminal Justice*, *46*, 52-63.

Manning, M., Mazerolle, L., Mazerolle, P., & Collingwood, P. (2016). Place managers in entertainment districts: The role of third party policing in shaping place manager actions. *Policing and Society*, *26*(8), 889-906.

McCord, E. S., & Ratcliffe, J. H. (2009). Intensity value analysis and the criminogenic effects of land use features on local crime patterns. *Crime Patterns and Analysis*, *2*(1), 17-30.

McCord, E. S., Ratcliffe, J. H., Garcia, R. M., & Taylor, R. B. (2007). Nonresidential crime attractors and generators elevate perceived neighborhood crime and incivilities. *Journal of Research in crime and delinquency*, *44*(3), 295-320.

Miethe, T. D., Hart, T. C., & Regoeczi, W. C. (2008). The conjunctive analysis of case configurations: An exploratory method for discrete multivariate analyses of crime data. *Journal of Quantitative Criminology*, *24*(2), 227-241.

Miller, J. (2013). Individual offending, routine activities, and activity settings: Revisiting the routine activity theory of general deviance. *Journal of Research in Crime and Delinquency*, *50*(3), 390-416.

Moniuszko, S. (2019, August 14). *25 of the most dangerous cities in America*. USA Today. https://www.usatoday.com/picture-gallery/travel/experience/america/2018/10/17/25-most-dangerous-cities-america/1669467002/

Murray, A. T., McGuffog, I., Western, J. S., & Mullins, P. (2001). Exploratory spatial data analysis techniques for examining urban crime: Implications for evaluating treatment. *British Journal of criminology*, *41*(2), 309-329.

Nezami, S., & Khoramshahi, E. (2016, June). Spatial modeling of crime by using of GWR method. In *2016 Baltic geodetic congress (BGC geomatics)* (pp. 222-227). IEEE.

Olson, J. K. (1990). Crime and religion: A denominational and community analysis. *Journal for the Scientific Study of Religion*, 395-403.

Peterson, R. D., Krivo, L. J., & Harris, M. A. (2000). Disadvantage and neighborhood violent crime: Do local institutions matter?. *Journal of research in crime and delinquency*, *37*(1), 31-63.

Pimlott-Kubiak, S., & Cortina, L. M. (2003). Gender, victimization, and outcomes: reconceptualizing risk. *Journal of consulting and clinical psychology*, *71*(3), 528.

Piza, E. L., Caplan, J. M., & Kennedy, L. W. (2014). Analyzing the influence of micro-level factors on CCTV camera effect. *Journal of Quantitative Criminology*, *30*(2), 237-264.

Piza, E. L., & Sytsma, V. A. (2016). Exploring the defensive actions of drug sellers in open-air markets: A systematic social observation. *Journal of Research in Crime and Delinquency*, *53*(1), 36-65.1

Regnerus, Mark D. "Moral communities and adolescent delinquency: Religious contexts and community social control." *Sociological quarterly* 44.4 (2003): 523-554.

Reynald, D. M. (2011). Translating CPTED into crime preventive action: A critical examination of CPTED as a tool for active guardianship. *European Journal on Criminal Policy and Research*, *17*(1), 69-81.

Reynald, D. M. (2016). *Guarding against crime: Measuring guardianship within routine activity theory*. Routledge.

Ristea, A., Al Boni, M., Resch, B., Gerber, M. S., & Leitner, M. (2020). Spatial crime distribution and prediction for sporting events using social media. *International Journal of Geographical Information Science*, *34*(9), 1708-1739.

Roncek, D. W., & Maier, P. A. (1991). Bars, blocks, and crimes revisited: Linking the theory of routine activities to the empiricism of "hot spots". *Criminology*, *29*(4), 725-753.

Salas-Wright, C. P., Vaughn, M. G., & Maynard, B. R. (2014). Buffering effects of religiosity on crime: Testing the invariance hypothesis across gender and developmental period. *Criminal Justice and Behavior*, *41*(6), 673-691.

Schroeder, R. D., Broadus, E. J., & Bradley, C. (2018). Religiosity and crime revisited: Accounting for non-believers. *Deviant Behavior*, *39*(5), 632-647.

Semuels, A. (2016). *How segregation has persisted in Little Rock*. The Atlantic. Retrieved April 27, 2022, from https://www.theatlantic.com/business/archive/2016/04/segregation-persists-little-rock/479538/

Shariff, A. F., & Rhemtulla, M. (2012). Divergent effects of beliefs in heaven and hell on national crime rates. *PloS one*, *7*(6), e39048.

Shaw, C. R., & McKay, H. D. (1969). *Juvenile delinquency and urban areas* (rev. ed.). Chicago: University of Chicago Press.

Sherman, L. W. (1995). Hot spots of crime and criminal careers of places. *Crime and place*, *4*, 35-52.

Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routine activities and the criminology of place. *Criminology*, *27*(1), 27-56.

Slater, M. D., Long, M., & Ford, V. L. (2006). Alcohol, illegal drugs, violent crime, and traffic-related and other unintended injuries in US local and national news. *Journal of studies on alcohol*, *67*(6), 904-910.

Soto, C., & Summers, L. (2020). Macro-brothels as crime attractors: Impact of closure, displacement, and diffusion of benefits. *European Journal of Criminology*, *17*(3), 247-268.

Spelman, W. (1995). Criminal careers of public places. *Crime and place*, *4*, 115-144.

Stafford, M. C., & Galle, O. R. (1984). Victimization rates, exposure to risk, and fear of crime. *Criminology*, *22*(2), 173-185.

Stark, R. (1996). Religion as context: Hellfire and delinquency one more time. *Sociology of religion*, *57*(2), 163-173.

Stef, N. (2017). Crime deterrence role of Romanian churches. *Review of Social Economy*, *75*(4), 454-467.

Steele, R. H. (2016). How offenders make decisions. *British Journal of Community Justice*, *13*(3), 7-20.

Steinman, H., Drawve, G., Datta, J., Harris, C. T., & Thomas, S. A. (2021). Risky business: Examining the 80-20 rule in relation to a RTM framework. *Criminal Justice Review*, *46*(1), 20-39.

Taylor, R. B. (1997). Social order and disorder of street blocks and neighborhoods: Ecology, microecology, and the systemic model of social disorganization. *Journal of research in Crime and Delinquency*, *34*(1), 113-155.

Taylor, R. B., & Harrell, A. (1996). *Physical environment and crime*. US Department of Justice, Office of Justice Programs, National Institute of Justice.

Thomas, S. A., Harris, C. T., & Drawve, G. (2021). Exploring the influence of elements of the social and physical environment on neighborhood gun crime. *American journal of criminal justice*, 1-29.

Townsley, M., Reid, S., Reynald, D., Rynne, J., & Hutchins, B. (2014). Risky facilities: Analysis of crime concentration in high-rise buildings. *Trends and Issues in Crime and Criminal Justice*, (476), 1-7.

Uchida, C. D., Swatt, M. L., Solomon, S. E., & Varano, S. (2013). *Neighborhoods and crime: collective efficacy and social cohesion in Miami-Dade county*. Justice & Security Strategies, Incorporated.

Warner, B. D., & Konkel, R. H. (2019). Neighborhood churches and their relationship to neighborhood processes important for crime prevention. *Journal of Urban Affairs*, *41*(8), 1183-1204.

Weisburd, D. (2015). The law of crime concentration and the criminology of place. *Criminology*, *53*(2), 133-157.

Weisburd, D., Maher, L., Sherman, L., Buerger, M., Cohn, E., & Petrisino, A. (1992). Contrasting crime general and crime specific theory: The case of hot spots of crime. *Advances in criminological theory*, *4*(1), 45-69.

Weisburd, D., Morris, N. A., & Groff, E. R. (2009). Hot spots of juvenile crime: A longitudinal study of arrest incidents at street segments in Seattle, Washington. *Journal of quantitative criminology*, *25*(4), 443-467.

Welsh, B. C., Mudge, M. E., & Farrington, D. P. (2010). Reconceptualizing public area surveillance and crime prevention: Security guards, place managers and defensible space. *Security Journal*, *23*(4), 299-319.

White, M. D., & Katz, C. M. (2013). Policing convenience store crime: Lessons from the Glendale, Arizona smart policing initiative. *Police Quarterly*, *16*(3), 305-322.

Willits, D., Broidy, L., Gonzales, A., & Denman, K. (2011). *Place and neighborhood crime: Examining the relationship between schools, churches, and alcohol related establishments and crime*. University of New Mexico.

Young, T. R. (1997). „The ABC‟ s of Crime: Attractors, Bifurcations, and Chaotic Dynamics‟. *1997) Chaos, Criminology, and Social Justice: the New Orderly (Dis) Order, Westport: Praeger*, 77-96.