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Risky places: An analysis of carjackings in Detroit☆

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ABSTRACT

The purpose of this research is to apply Risk Terrain Modeling (RTM) to identify spatial indicators that may place citizens at higher risk for carjackings in the City of Detroit, Michigan, USA. While a number of risk factors were tested, the RTM Diagnostic utility identified six that were influential in the best fitting model: proximity to service stations; convenience/grocery/liquor stores; bus stops; residential and commercial demolitions; and areas with high concentrations of drug arrests and restaurants. These factors resulted in relative risk scores that ranged from 1 for the lowest risk areas to 278 for the highest risk areas. This implied that certain locations had an expected rate of carjacking that was 278 times higher than other locations.

You can have the right car and the right driver, but if you ain't in the right place, you ain't doing no carjacking.
(cited from Topalli, Jacques, & Wright, 2014:22)

The notion of an offender as a rational actor moving through time and space has experienced a resurgence in popularity since the 1970s. Proponents of rational choice, routine activities, crime pattern theory, and more recently situational action theory emphasize the importance of a motivated offender coming in to contact with a suitable target in the "best" location. Decision making is behind every aspect of the commission of a crime: targets are carefully selected based on their value, ease of transport, or perceived weaknesses. Environmental cues are evaluated. Is there a suitable escape route? Is it relatively easy to blend in to the background? Even the involvement in a specific type of crime, such as carjacking, involves a rational assessment of one's own personality, temperament, and intelligence (for a more detailed discussion of choice based theories, please see Clarke, 2008; Cornish & Clarke, 1986; Felson & Boba, 2010; Hart & Lersch, 2015; Wortley & Mazerolle, 2008). Crime is not a spatially random occurrence. Aspects of the environment can increase or decrease the likelihood of a criminal event.

This paper will focus on the effect of cues related to the spatial environment for the occurrence of a particular type of violent crime: carjackings. Methodologically, Risk Terrain Modeling (RTM) will be used to determine the characteristics of places at high risk for carjackings within the City of Detroit, where the rate of this crime has been among the highest in the U.S. (Baldas, 2014).

1. Literature review

1.1. Carjacking

Relatively little is known about carjacking when compared to other predatory violent crimes such as murder, robbery, rape, or assault. One of the problems is the lack of readily available data on carjacking, which involves elements of both auto theft and robbery. The lack of valid, consistent data on the occurrence of carjackings is somewhat surprising given the severity of the crime. After a series of highly publicized events in the early 1990s, the Anti-Car Theft Act of 1992 was passed which made carjacking a federal offense punishable by 15 years to life in prison. In 1994, convicted offenders could face the death penalty in cases resulting in the death of the victim(s) (Cherbonneau, 2008).

To illustrate, carjacking is not included as a unique offense in data collected by the Federal Bureau of Investigation (FBI) Uniform Crime Reports. Because the commission of a carjacking involves the taking of a motor vehicle by threat or force (Fisher, 1995), carjackings are included in (but not separated from) robbery tallies when reported by the FBI. Furthermore, data on carjackings are not collected on an annual basis by the National Crime Victimization Survey (NCVS) due to the low frequency of this type of crime. According to the NCVS, based on data collected from 1993 to 2002 there were approximately 38,000 carjackings each year, which equates to a rate of about 1.7 victimizations per 10,000 individuals each year. Some of the key findings from the NCVS survey indicated that victimization rates were the highest in urban areas; a weapon was used in nearly three-quarters of the incidents; and most (68%) occurred between the hours of 6 p.m. and

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6 a.m. With respect to location, most carjackings occurred in an open area (such as on the street), near public transportation (i.e., bus stops), parking lots or garages, as well as commercial establishments such as gas stations, restaurants/bars, stores, or other places of business (Klaus, 2004). It should be noted that the population estimates were based on a total of 130 incidents that occurred over the 10 year data collection period.

Much of what we do know about carjackings involves qualitative interviews with offenders (see, for example, Copes, Hochstetler, & Cherbonneau, 2012; Jacobs, 2010, 2012, 2013; Jacobs et al., 2003; Topalli et al., 2014), media reports (Cherbonneau & Copes, 2003), or surveys of victims (Cherbonneau, 2008). In an analysis of the procedural and perceptual skills used by active carjackers, Topalli et al. (2014) found that targets were selected based on a number of factors including the value and disposability of the vehicle as well as demographics of the driver, including gender, race, or physical size. Similarly, Jacobs (2013) noted that would-be carjackers selected victims that were perceived as "scary" (vulnerable) and "soft." While previous research has recognized the importance of the environment, spatial cues have not been extensively examined. Jacobs (2010), for example, presents evidence of motivated offenders moving through target-rich environments as they seek out vulnerable targets, such as areas known for high levels of drug-related activities. The present research will contribute to the literature by explicitly focusing on the effect of the environment on the selection of targets using Risk Terrain Modeling. Specifically, are there locations that pose greater risk for carjacking than others?

1.2. Risk terrain modeling

Risk Terrain Modeling (RTM) is a relatively new analytical technique that was developed by Joel Caplan and Leslie Kennedy as they studied the locations of shootings in Irvington, New Jersey. Using geographic information systems (GIS) technology, spatial relationships were examined between the locations of shootings and other factors identified as potentially "risky" for the occurrence of shootings: known gang members' addresses; the locations of drug arrests; and high risk infrastructure, which was defined as the locations of liquor stores, bars, strip clubs and fast food restaurants. The authors then employed these risk factors to create maps to assist law enforcement personnel in the prediction of the locations of future shooting incidents, develop plans for intervention, and assess the effectiveness of the response (Caplan & Kennedy, 2010, 2016).

The underlying theoretical basis for RTM is based on the notion that crime is not randomly distributed through time and place: Some locations are "riskier" than others for various forms of victimization. RTM is heavily influenced by environmental criminologists who have focused on the geography of crime, including early Chicago School theorists, routine activities and opportunity theory, and the Brantinghams' notion of environmental backcloth, crime generators, attractors, and protective factors (for a full discussion of the principles of environmental criminology, please see Hart & Lersch, 2015 or Wortley & Mazerolle, 2008).

At the core of environmental criminology is the assumption of a rational offender moving through time and space who makes decisions about whether or not to commit a crime. Based on the early works of Cesare Beccaria, Hobbes, Locke, and Rousseau, proponents of Classical Criminology focus on the notion of rationality: Individuals carefully weigh the pain of punishment versus potential pleasure when making decisions. In order to deter crime, punishments must be certain, swift, and proportionate to the severity of the offense. Clarke and Cornish (1985); Cornish and Clarke (1986) further developed rational choice theory, in which would-be criminals process available information from their physical and social environment. Prior to the commission of a crime, an individual assesses his or her personal needs and wants; evaluates the risk of apprehension, the severity of the expected punishments, and the expected gain; and reacts selectively to the specific situational factors, such as whether or not a target is well guarded. Risk apprehension becomes critically important. Criminals make choices about when and where to commit their crimes, carefully selecting targets that offer the lowest risk for getting caught and facing painful punishments. As discussed by Jacobs and Cherbonneau (2016), "painful punishments" do not always equate to formal criminal sanctions, such as imprisonment. Would-be offenders also carefully evaluate the threat of informal sanctions, such as shame and guilt or more serious consequences, such as violent encounters with victims that can result in injury or death.

It is because of the perception of reduced risk that some geographic areas can become hot spots of criminal activity. As described by Patricia and Paul Brantingham (Brantingham & Brantingham, 1999), places that attract large numbers of both offenders and victims, such as shopping malls, sporting events, bus/subway interchanges may become crime generators due to the large number of people that come and go. These locations have a high number of criminal incidents simply because of the sheer volume of people interacting in one area. Large numbers of potentially unprotected targets mingle with motivated offenders, creating many opportunities for crimes to occur. Similarly, crime attractors are known locations where motivated offenders are drawn for the purpose of committing crimes. Areas with open-market drug sales, bar districts, large unsecured parking areas, or known prostitution areas can be particularly attractive.

Risk terrain modeling was specifically developed to provide a better understanding of risky places. As defined by Caplan and Kennedy (2010:7), "risk values are the measure of a place's potential for a crime event to occur". Using an analogy from weather forecasting, Caplan and Kennedy maintain that individual factors do not automatically result in thunder storms or hurricanes. It takes an interaction of factors in space and time for a storm to be more likely to occur. Turning back to crime risk, some events may require many different factors to interact for an event to occur. In other cases only one factor must be present. RTM allows the user to examine the relative spatial influence of a number of co-located factors that may result in higher levels of crime risk.

On a more mechanical level, the general idea behind RTM is to create a grid of cells (say, 500 by 500 ft) that covers the entire study area. The spatial influence of risk factors are operationalized in two ways: proximity and density. To measure the influence of proximity, for each factor of interest a value of 1 is assigned to cells in which the risk is present (such as the area one block around a bar) while a 0 is assigned to a cell where the risk is not present (i.e., no bar is present).[1] A risk layer can also be created that measures the influence of density, such as an entertainment area with a high concentration of bars and restaurants. An individual risk layer is created for each factor in the analysis. The different risk layers are ultimately combined into a final Risk Terrain Map in which the cell values for each corresponding 500 × 500 area are summed together.

1.3. Carjacking and risk terrain modeling in the city of Detroit

The City of Detroit, Michigan has been particularly hard hit by the crime of carjacking. In 2008, the city had over 1200 carjackings. As a result of the efforts of a multiagency task force, the number of carjackings has declined but still remains among the highest in the United States. As a point of comparison, in 2013 New York City reported a total of approximately 160 carjackings while in calendar year 2015, the Detroit Police Department confirmed 532 carjackings (Baldas, 2014; Williams, 1993). These locations are displayed in Fig. 1.

In order to build a risk terrain map to better understand the location

[1] For this basic illustration of RTM, binary risk present/absent coding was used. More sophisticated analyses may include varying levels of risk. Protective factors, such as proximity to a police substation, may also be included as negative cell values.