AN ANALYSIS OF INTERNATIONALLY EXPORTED VEHICLE THEFTS IN TWO HIGH-RISK CITIES

by

STEVEN BLOCK

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ABSTRACT OF THE DISSERTATION

An Analysis of Internationally Exported Vehicle Thefts in Two High-Risk Cities

By STEVEN BLOCK

Dissertation Director: Ronald V. Clarke

Motor vehicle theft costs the United States billions of dollars each year in direct and indirect losses. More specifically, vehicle theft in areas near borders and ports has been cited as a significant growing problem in both academic studies and media reports. Although no reliable measure of international vehicle theft exists, the National Insurance Crime Bureau and other agencies acknowledge that a disproportionate number of vehicles are stolen in cities and towns near borders and ports. Yet, with few exceptions, research studies have not focused on vehicle theft in these high-risk areas. This dissertation utilizes incident-level data from a U.S.-Mexico border area city (Chula Vista, California) and a U.S. port area city (Newark, New Jersey) to investigate vehicle theft patterns related to exporting in the two locations.

Two separate analyses were conducted using recovery status and recovery country as dependent variables in logistic regression models. Predictor variables were constructed based on previous research findings and expectations from a rational choice framework. In the multivariate comparison between unrecovered vehicles and recovered vehicles in both sites, few significant predictors emerged. Overall, there were more statistically significant predictors in Chula Vista than in Newark. Specifically, in Chula Vista,

unrecovered vehicle thefts are more likely to be larger vehicle types. In a second analysis, vehicles stolen in Chula Vista and recovered in Mexico were compared to a random sample of vehicles stolen in Chula Vista and recovered domestically. Vehicles stolen in Chula Vista and recovered in Mexico are significantly younger and more expensive than vehicles recovered in the U.S. Additionally, sports utility vehicles and pick-up trucks are more likely to be taken to Mexico, while 2-door cars are more likely to be recovered domestically.

The current study provides partial support for a link between rational choice perspective's focus on increasing rewards and professional vehicle theft in Mexico. It appears that less consideration is given to reducing effort and risk by professional thieves in these areas in comparison to amateur thieves. From a policy standpoint, this study indicates that prevention efforts should target certain vehicles in border cities and focus less on space and time.

Preface

I am thankful for the professional and personal support that I have received since entering the graduate program in the School of Criminal Justice at Rutgers in 2005. This dissertation is, of course, only the culmination of the doctoral program and I have received assistance at every step in the process. From the first week on campus, Dr. Ronald Clarke (my advisor) and Dr. Michael Maxfield (my eventual outside reader) have been outstanding mentors. Inside the classroom, during research projects, and in their advising roles, they have been integral in my development through graduate school. Certainly, there have been dozens of students in the past and dozens more in the future who will discuss them in this same section of their dissertations. I am also indebted to Dr. James Finckenauer and Dr. Joel Miller who both agreed to participate on my dissertation committee and provided excellent feedback without much familiarity with my plans and interests beforehand.

Other professional relationships that have been extremely important through my graduate career include Dr. Deborah Ward who provided me with research work throughout most of the years of my doctoral program. Departmental chairs at both campuses of Fordham University and Kean University have supported my progress through consistent part-time employment as an adjunct professor. I hope I have added to their departments over the years. Phyllis Schultze conducted an amazing search for vehicle theft literature for a previous project which made the literature review for my dissertation so much easier. I also must acknowledge the first person to ever suggest pursuing a doctoral degree, Dr. Shaohua Hu of Wagner College. Although he probably

did not realize it, the day he approached me on campus and touted my potential for this type of career path was the first time I ever seriously considered the option. Access to data supplied by personnel in the Newark and Chula Vista Police Departments was vital. Last, I am grateful to the Rutgers-Newark Graduate School for their support.

On the personal side, I would never have been able to survive the length of a doctoral program without the support of my parents and grandparents. Their hard work and sound decisions over the years is the reason that I was able to finish this program without worrying about the "real life" issues that often cause people to stall or quit. I think there are plenty of people who would like to pursue advanced degrees who never get the opportunity because of other issues and responsibilities. Both my parents have ensured that I never had to be concerned with such things to the point where it would threaten my participation in the program.

Although it may sound silly, I would be remiss to not mention the one who was always more-than-willing to provide breaks from dissertation work during the last six months with propositions of Frisbee in the backyard or a tug game at 1:30am – my dog, Shortie.

Since the first day of my Ph.D. program in September of 2007, my girlfriend, Lauren, has been the single constant in my life. Through moves, changes in peers and jobs, and academic setbacks, there has been, and always will be, Lauren. All graduate students would be lucky to have such a relationship.

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Chapter I – Introduction

Problem Statement

This study investigates patterns of vehicle theft in areas near international borders and ports. Clarke and Brown (2003) cite two main reasons why studying international vehicle trafficking is necessary. First, reliable data sources exist from law enforcement agencies, insurance agencies, and victim surveys. Each form of data has been utilized in research studies to better understand vehicle theft patterns and trends. Second, increased knowledge of the prevalence and nature of vehicle theft directly impacts prevention measures. Vehicle theft prevention mechanisms are found in many forms (Clarke & Harris, 1992a; Field, Clarke, & Harris., 1991; Linden & Chaturvedi, 2005), yet the application of such measures may be misallocated without a proper understanding of each of the specific types of vehicle theft.

In addition to the reasons discussed by Clarke and Brown (2003), all forms of permanent vehicle thefts are particularly damaging to both direct and indirect victims. Clarke and Harris (1992a) provide numerous examples of the effect of permanent vehicle theft on direct victims including missing work and the inconvenience of securing temporary transportation until replacement of the vehicle. Aldridge (2007) acknowledges the potential economic harm posed by temporarily reducing transportation to and from places of work, as well. Stolen vehicles also affect the larger society through the facilitation of the commission of other crimes (Adger, 2007; Aldridge, 2007; McCord, 2010). Additionally, the manner in which the vehicles are stolen and driven may contribute to a decline in public safety (McCord, 2010; Ziersch & Ransom, 2008). Less directly, it is well established that unrecovered vehicle thefts affect all vehicle owners

through higher insurance premiums (Clarke & Harris, 1992a) and criminal justice processing costs (Krimmel & Mele, 1998).

In spite of the aforementioned harms associated with permanent vehicle theft, little is known about the different forms of vehicle theft. This dearth of research can be partially explained by inadequate measures for each form of vehicle theft, including international trafficking of vehicles. There are no reliable estimates of the scope of the problem, nor any trustworthy breakdown of how many vehicles are stolen for border and port-related theft. Additionally, more consistent databases of vehicle theft are kept in other countries such as Germany and Australia. Within vehicle trafficking literature, several issues require further research including a better understanding of (1) which vehicles are most commonly targeted for certain forms of permanent theft (e.g. theft for export), (2) variables that facilitate the crime, (3) and the differences between vehicle theft for export and vehicle theft for other purposes. Without an improved understanding of each form of vehicle theft, crime prevention responses are likely to be costly and ineffective rather than targeted and focused. The current study examines patterns of vehicle theft in two high-risk areas. Vehicle-related, spatial, and temporal variables are applied to understand vehicle theft patterns in a U.S.-Mexico border city (Chula Vista, California) and a seaport city (Newark, New Jersey).

Outline of Chapters

This dissertation includes ten chapters. The first chapter has provided a brief statement of the academic problem to be studied in this analysis. The second chapter provides a broad introduction to motor vehicle theft in the United States by presenting definitions used by each of the major data sources, categories of vehicle-related crimes, prevalence and trend data for vehicle theft, and the different purposes for which vehicles are stolen. The beginning of Chapter II provides an explanation of the role of vehicle theft in criminal activity so that each form of vehicle theft can be understood in proper context. Chapter III reviews the history of international vehicle trafficking from the U.S. The existing body of literature associated with international vehicle trafficking from the U.S. is also reviewed. The history and academic writings on vehicle theft for export are divided into several categories: estimates of prevalence; organization; operations; vehicle target choice; and prevention measures. Chapter IV builds upon the previous chapter by describing the "crime scripts" of vehicle trafficking through borders and across seaports. This chapter utilizes the academic literature, personal communication, and media reports to create a comprehensive qualitative description of what is known about how this process operates.

Chapter V provides an overview of environmental criminology and the rational choice perspective that guides the present quantitative study. The second portion of this chapter relates rational choice perspective to motor vehicle theft, specifically. The goal of this chapter is to explain and link criminological theory to the present analysis of vehicle trafficking in Chula Vista and Newark. Chapter VI introduces the methodology associated with this research study including the research questions, site description, data

sources, variables, research hypotheses, and analytical strategy. This chapter contains the analytical strategy for both of the quantitative analyses found in the following two chapters.

Chapter VII presents the results associated with the study comparing patterns of theft for export in two high-risk cities (Chula Vista, California and Newark, New Jersey). In this section, logistic regression analyses comparing models of spatial, temporal, and vehicle-related patterns are conducted. Descriptive, bivariate, and multivariate results are presented. Chapter VIII reveals results from a secondary quantitative study only in Chula Vista. In this chapter all vehicles stolen in Chula Vista and recovered in Mexico or at the U.S.-Mexican border are compared to a random sample of vehicle thefts in Chula Vista that were recovered the U.S. While this analysis can only be conducted with the Chula Vista, many of the limitations of the first study are addressed using this alternative methodology. Chapter IX contains a summary of results and discussion of the findings from the two quantitative analyses. This section revisits the hypotheses associated with the study and links these findings to prior work. Chapter X concludes the dissertation by providing an elaborate discussion of limitations, theoretical and practical implications, and directions for future research in the area.

Chapter II - Motor Vehicle Theft in the United States

The specific subject of this study, the theft of vehicles for purposes of exportation, is only one of many forms of vehicle theft. This chapter introduces the broader crime of vehicle theft. The chapter first presents definitions from several sources on what constitutes a vehicle theft and how the crime differs from other similar crimes. Next, this chapter will analyze recent trends in vehicle theft according to major sources of crime data such as the Uniform Crime Reports, the National Incident-Based Reporting System, and the National Crime Victimization Survey. Last, the chapter provides an overview of research on variables that impact vehicle theft from the academic literature.

Motor Vehicle Theft Definition and Prevalence

Motor vehicle theft is typically categorized as a separate crime from other property offenses in major indexes of criminal acts such as the Uniform Crime Reports (UCR), the National Incident-Based Reporting System (NIBRS), and the National Crime Victimization Survey (NCVS). The UCR defines motor vehicle theft as "the theft or attempted theft of a motor vehicle. A motor vehicle is self-propelled and runs on the surface and not on rails. Motorboats, construction equipment, airplanes, and farming equipment are specifically excluded from this category" (Federal Bureau of Investigation, 2011). NIBRS defines motor vehicle theft as "the theft of a motor vehicle. A motor vehicle is defined for UCR purposes as a self-propelled vehicle that runs on land surface and not on rails and which fits one of the following property descriptions: automobiles, buses, recreational vehicles, trucks, or other motor vehicles" (Federal Bureau of

Investigation, 2000). The NCVS defines motor vehicle theft as "stealing or unauthorized taking of a motor vehicle, including attempted thefts. A motor vehicle is defined as an automobile, truck, motorcycle, or any other motorized vehicle legally allowed on public roads or highways" (Bureau of Justice Statistics, 2010). These definitions generally aim to (1) differentiate between motor vehicles and non-motor vehicles and (2) determine whether a successful, completed attempt is necessary for the event to be considered a vehicle theft. However, there is relative consistency through each of the sources in the intent to differentiate vehicles from other targets of property theft.

Motor vehicle theft is also classified separately from other crimes involving motor vehicles. A distinction is commonly made between "thefts of vehicles" and "theft from vehicles" (Clarke & Harris, 1992a). Both of the two major national-level data sources in the United States, the UCR and the NCVS, provide separate categories for incidents where items such as "cameras, suitcases, wearing apparels, cellular phones, MP3 packages, and packages" (UCRH, 2004, p.33), were taken from a vehicle and incidents where the actual vehicle was stolen. Clarke and Harris (1992a) estimate that 85 percent of vehicle-related offenses are actually thefts of components opposed to temporary or permanent thefts of entire vehicles.

When separated from the "theft from vehicles" category, motor vehicle theft still accounts for a substantial portion of all documented criminal activity in the United States. According to Uniform Crime Report (UCR) data, there were 737,142 motor vehicle thefts in the U.S. in 2010. The nearly one million reported vehicle thefts represent about 7 percent of the 10,329,135 estimated Part 1 offenses in 2010 (Federal Bureau of Investigation, 2011). Vehicle theft has declined considerably in recent years according to

UCR data. The total number of vehicle thefts that occurred in 2008 marked a 23 percent decline from ten years prior when UCR data from 1998 totaled 1,240,754 vehicle thefts. In terms of overall losses, the UCR estimates that over 6 billion dollars of value were lost due to vehicle theft (Federal Bureau of Investigation, 2011). Historical trends of motor vehicle theft in the UCR have generally followed overall crime patterns: a steep rise in the 1980s followed by a sharp decline in the 1990s and a period of no significant changes in the early 2000s. The recent drop in vehicle theft since 2005 has been far more rapid that the decline in overall index offenses, however.

The National Crime Victimization Survey (NCVS) portrays similar patterns and trends for vehicle theft. The NCVS estimated that there were 606,990 vehicle theft incidents in 2010 (Truman, 2011). This total marks a 17 percent estimated decline from the previous year when the number of vehicle thefts summed to 735,700. According to the NCVS, motor vehicle thefts account for only 3.2 percent of the 18,725,710 estimated number of criminal offenses in 2010 (Truman, 2011). Differences between the results from the two major sources of data can be attributed to reporting and classification distinctions (Maxfield, 2004). However, both sources of data portray similar patterns and trends for vehicle theft.

When analyzing the major data sources on vehicle theft including police data and victim surveys, it is clear that vehicle theft significantly contributes to the overall property crime situation in the U.S. The declines in vehicle theft that have occurred over the last two decades are relatively similar to overall crime trends, according to UCR and NCVS data. Additionally, many commentators have argued that declines in vehicle theft are primarily concentrated in temporary thefts (Tremblay, Clermont, & Cusson, 1994)

rather than permanent thefts and that the nature of vehicle theft is changing (McDonold, 2011). Data from Europe indicates that the continent has experienced a much bigger drop in temporary thefts than professional, as well (Gounev & Bezlov, 2009). Therefore, the drop in vehicle theft may signify a drop in joyriding rather than declines in more harmful forms of professional vehicle theft.

Forms of Vehicle Theft

Within the "theft of vehicles" category, vehicle thefts are often grouped into "temporary" and "permanent" thefts for more in-depth analysis (Maxfield, 2004; Tremblay et al., 1994). Within these two broad categories of "thefts of vehicles", vehicles are stolen for many different reasons. Purposes that generally lead to a successful recovery include "amateur" thefts for joyriding, temporary transportation, and the commission of a crime. Permanent forms of vehicle theft, in which the vehicle is not recovered or located with major parts missing, include thefts for parts dismantling, domestic resale, and export (ACJC, 2004; Aldridge, 2007; Clarke & Harris, 1992a; Longman, 2006; NHTSA, 1998).

Joyriding is the short-term theft of a vehicle for personal enjoyment. Often, joyriding is associated with urban juveniles and multiple U.S. and international studies have documented the existence of a culture around joyriding stolen vehicles (Dawes, 2002; Kellett and Gross, 2006). The theft of a vehicle for temporary transportation takes place when an offender steals a vehicle in absence of other forms of transportation from one point to another. A third purpose that generally leads to successful recovery is the

commission of some additional crime. Although some of these vehicles may never be recovered, the theft of a vehicle for use in crimes such as burglaries, robberies, or drive-by shootings is considered to be temporary and nonprofessional.

Permanent thefts also are comprised of several subgroups. Because of difficulties associated with driving a stolen vehicle for extended periods of time within the United States, it is assumed that most stolen vehicles are either chopped or stripped for parts, retagged for domestic use, or transported in parts or in whole across international boundaries. In cases which vehicles are broken down for the value of their parts by the offender or in "chop shops", there is variation in their level of organization. Furthermore, vehicles for export are typically driven over land borders or shipped from seaports to international destinations. In addition to this dichotomous classification scheme, some reported vehicle thefts may actually be instances of insurance fraud in which the owner reports a theft to police and insurance agencies without a theft occurring.

Despite the acknowledgement of these different forms of vehicle theft, there is no unanimous consensus about what percentage of all vehicle thefts each form actually accounts for. In surveys conducted in 1989, the National Highway Traffic Safety Administration (NHTSA) estimated that chop shops contributed between 10 to 16 percent of all vehicle thefts; domestic retags accounted for approximately 15 percent; insurance fraud amounted to 9 to 23 percent; crime commission summed to 13 percent; and joyriding or transportation was responsible for between 25 and 68 percent. In a 1998 report, the National Highway Traffic Safety Administration estimated that professional thefts accounted for approximately 23 percent of all thefts (NHTSA, 1998). In addition, Maxfield (2004) reports that about 20 percent of all reported vehicle thefts in New Jersey

are actually cases of vehicle fraud, although this estimate does not rely on systematic assessments, but rather professional opinions. Miller (1987) estimated that 10 to 25 percent of vehicle thefts from the U.S. to Mexico were "owner-perpetuated insurance fraud." (p. 18). Internationally, about 75 percent of vehicle thefts are labeled as opportunistic joyriders or transportation, while 25 percent is classified as professional theft in Australia (Carroll, 2004; Gant & Grabosky, 2001). Overall, the lack of research on specific types of vehicle theft (Clarke & Harris, 1992a) and concrete estimates (Gerber & Killias, 2003) based on systematic assessments has been noted as a cause for concern by researchers. However, there is near unanimous agreement that each of these major purposes for vehicle theft discussed above accounts for a meaningful portion of the total sum of attempted or completed vehicle thefts.

Variables Influencing Motor Vehicle Theft

There is an established body of research identifying predictors of increased risk for motor vehicle theft. These studies have explained why variation in vehicle theft exists at macro-, meso-, and micro- levels. Researchers have relied upon incident- and summary-based data to determine why distinct vehicle theft patterns exist. In particular, these factors include variables relating to opportunity and the environment. This section will provide an overview of the predictor categories used in the current study that have been applied in previous research to explain variation in vehicle theft.

Spatial Predictors

Several studies have shown that vehicle theft, like most crimes, does not distribute evenly across space. At a macro-level, Clarke and Harris (1992a) and NHTSA (2007) note that there is a considerable difference between the rates of vehicle theft in urban and rural areas. Specifically, urban areas have higher levels of vehicle theft than rural areas. This disparity is greater for vehicle theft than most other index crimes. Across states, counties, and cities, there are also significant differences in levels of vehicle theft according to UCR data (Clarke & Harris, 1992a; Krimmel & Mele, 1998). The Arizona Automotive Theft Authority (2009) presents a table that shows state theft rates in 2008 ranging from 611.6 per 100,000 residents in Nevada to 94.2 per 100,000 residents in Vermont.

At a neighborhood level, studies also show spatial variation. In his recent study of vehicle theft incidents at the census block level (n=1816) in Philadelphia, McCord (2010) found that land use played a significant role in influencing levels of vehicle theft. Places that were found to increase vehicle theft within the neighborhood include commercial parking lots, shopping centers, and bars, while areas with higher counts of single family homes had fewer incidents of vehicle theft. However, McCord (2010) also found that the inclusion of variables such as age of population, socioeconomic status, and heterogeneity reduced the strength of the relationship between vehicle theft and land use.

Other studies have also found variables related to opportunity to be significant predictors of higher levels of vehicle theft. Rice and Smith (2002) studied face blocks in one city and discovered that several routine activity variables including number of parking lots, hotels, commercial places, stores, multifamily units, restaurants, gas

stations, and bars were associated with an increased prevalence of vehicle theft. Levy (2006) found that locations in Lexington, Kentucky with increasing levels of vehicle theft included apartments, bars, and auto repair and parts shops. However, Levy also found there to be locations that did not meet research expectations as facilitators of vehicle theft such as parking structures, schools, and hotels.

Offender travel patterns also appear to play a large role in vehicle theft crimes. In a study of Newark incidents in 2000, Potchak, McGloin, and Zgoba (2002) found that offenders travel short distances from their residences to commit vehicle theft crimes (mean=1.68 miles). However, this research did not investigate where stolen vehicles traveled after the vehicle theft incident. An early study had found much longer distances of (3.42 miles) for vehicle theft than for other crimes such as homicide, assaults, and burglaries (Gabor & Gottheil, 1984). In an analysis of 852 resolved cases of vehicle theft, Westerberg, Grant, and Bond (2007) identified differences in traveling distance in the crime mobility triangle for younger offenders and offenders involved in drug use with such offenders traveling shorter distances. Despite the longer journey to crime compared with many other criminal acts, Tonkin, Woodhams, and Bond (2009) state that most vehicle theft offenders travel less than two miles to commit their crime. Other studies (Lu, 2003) support the notion that vehicle recovery locations are spatially nonrandom.

Recent academic interest in the “near repeat” spatial phenomenon has also included vehicle theft. A study by Youstin, Nobles, Ward, & Cook (2011) found there to be near repeat patterns for vehicle thefts in Jacksonville, Florida, that encompassed a larger area than the patterns for other crimes (e.g. homicides). Most recently, Lockwood (2012) studied the near repeat patterns of vehicle thefts in Lincoln, Nebraska. This study

found there to be a clear pattern of spatio-temporal near repeat incidents within two weeks of an initiator event.

Victim surveys show that vehicles are commonly stolen on streets near houses or in parking lots or decks. However, vehicles are far more likely to be stolen from lots than decks before considering levels of guardianship and location. When vehicles are parked in commercial or private garages, vehicle theft is a relatively rare occurrence (Clarke and Harris, 1992a).

Most relevant to the current work, several researchers have established that distance to international borders is a predictor of higher levels of overall vehicle theft. Gallahan (1997) analyzed recovery rates in Texas and confirmed Miller's (1987) expectation of lower recovery rates in border cities. Roberts' (in press) study of U.S. cities found that agencies reporting to NIBRS have higher vehicle theft rates when closer to international borders.

In total, these studies indicate that vehicle theft is affected by land use and other spatial considerations. Vehicle theft is not dispersed evenly across places. The studies that have been conducted in this area generally support environmental theories which argue that offenders consider location when determining where to commit a vehicle-related crime.

Temporal Predictors

Like most crimes, data also demonstrate that vehicle theft is not evenly dispersed across time. Rice and Smith (2002) point out that vehicle theft is most commonly committed at night when detection is more difficult. The British Crime Survey shows that

approximately 60 percent of vehicle thefts occur during nighttime hours between 6 p.m. and 6 a.m. in England (Clarke and Harris, 1992a; Krimmel & Mele, 1998).

However, studies of temporal variation are limited by difficulties of determining when the incident actually took place. Often victims, whether reporting to police or in victim surveys, are unaware of the exact time of the incident. Therefore, police are forced to create "start" and "end" dates to identify a range of time when the vehicle could have been stolen. As a result, researchers have constructed measures to weigh the likelihood that vehicles were stolen at specific times based on that range (Ratcliffe, 2004). Time of day appears to affect vehicle theft incidents but these restrictions in measurement limit previous research on the temporal characteristics of vehicle theft.

Vehicle-Related Predictors

Several commentators have noted that thieves consider properties of items of value when committing thefts, leading to Felson's VIVA and Clarke's CRAVED models (Clarke, 1998). Likewise, offenders are likely to select vehicles in a nonrandom manner. One might suspect that certain manufacturers and/or models are selected based on the vehicle's characteristics. Vehicle thief decisions appear to be based on a variety of factors including desirability, security, and opportunity. Several sources provide data on variation across vehicle types and models in levels of overall theft.

Vehicles are often categorized into groups such as cars, sport utility vehicles, minivans, and trucks. In a study from Canada, Wallace (2004) notes that although cars are stolen more than other types of vehicles in Canada, the rate of vehicle theft for trucks is increasing while the comparable rate for cars is decreasing. In the United States, the Federal Register publishes yearly vehicle theft rates on certain vehicle lines for first-year

vehicles. In a recent year, rates of vehicle lines that experienced a theft per 1,000 produced vehicles ranged from 12.26 thefts to 0.10 thefts (U.S. Department of Transportation, 2010). Also, the National Insurance Crime Bureau publishes an annual list of the most commonly stolen vehicles in the United States. The latter two sources demonstrate that there are substantial differences in vehicle theft prevalence across both models and vehicle type. However, these statistics do not provide any insight into the interaction between vehicle targets and types of vehicle theft.

In sum, several research studies have already identified influential variables in explaining variation in vehicle theft across vehicle-specific variables, time, and space. These studies, however, generally examine vehicle theft as a whole, without taking the purpose of the theft into consideration. Some scholars have categorized vehicle theft into meaningful groupings (Challinger, 1987; Clarke & Harris, 1992). Consistent with the crime-specific focus of environmental criminology, other scholarly work has investigated research questions relating to vehicle theft while focusing on these specific forms of the crime.

Variables Influencing Specific Forms of Vehicle Theft

Thieves steal vehicles for different reasons including, but not limited to, joyriding, temporary transportation, the commission of a crime, stripping or chopping for parts, or exporting the vehicle as a whole. Put simply, vehicles are generally stolen for temporary or permanent purposes although there can be situations where the dichotomy is blended together. Research analyzing these specific forms of vehicle theft is especially useful for

crime analysts and those responsible for crime prevention, however little is known about the factors that influence each form. A major reason for this dearth of research is the difficulty associated with determining the motivation for any particular incident.

Spatial Predictors

Few studies have considered the role of space in comparing professional and amateur thefts. One notable exception is Wallace's (2004) analysis of data in Canada to determine that vehicles stolen from streets (90%) or parking lots (85%) were more likely to be recovered than vehicles stolen from private residences (66%) and auto dealerships (59%). These results led the author to state that "organized groups are very selective in the vehicles they target" (Wallace, 2004, p. 5). Wallace concludes that the western provinces of Canada experience more of a joyriding, amateur problem, while cities in the East such as Halifax have higher levels of organized theft. Adding to the small body of literature on the effect of borders and ports, Roberts and Block's (unpublished) analysis of UCR city data found there to be a significant relationship between distance to borders and professional theft rates, while no such relationship was found for distance to seaports.

Temporal Predictors

For the most part, research has not investigated when specific forms of vehicle theft occur. There are a couple of noteworthy exceptions found within the international trafficking literature. Resendiz's (1998) qualitative work found that vehicle thieves at the border in Texas preferred to steal vehicles at night while border traffic was modest. In addition, prevention programs, such as Citizens Against Auto Theft (CAAT) in McAllen, Texas, operate on assumptions that vehicles are stolen and moved across the border in overnight hours. On the other hand, many commentators (Clarke & Brown, 2003; Miller,

1987) have argued that vehicle traffic is an important element for concealing the vehicles in heavy traffic. Therefore, these scholars might suggest that vehicle thefts destined for Mexico would occur during the day when thieves could disguise the vehicle within the volume of legitimate, commuting traffic. However, these studies focus exclusively on international-bound thefts rather than other forms of vehicle theft.

Vehicle-Related Predictors

A few studies have attempted to identify patterns in vehicle demand for specific types of vehicle theft. Clarke and Harris (1992) constructed vehicle theft rates using three different indexes measuring temporary use, stripping, and permanent retention based on recovery values. When the vehicles were ranked, the authors noted important trends in the differences that emerged across the three indexes. Most notably, "powerful American cars" (Clarke & Harris, 1992, p. 37) were stolen most for temporary use while valuable, luxury cars were stolen permanently, such as Porsches and Mercedes. Although there was a relatively high positive correlation between the temporary and permanent indexes, there were still substantial, noteworthy differences across the three measures.

Another study by Field, Clarke, and Harris (1991) looked specifically at vehicles targeted for export. Based on Miller's (1987) assertion that vehicles are stolen and transported to Mexico at greater levels when they are also produced and sold in Mexico, Field et al. (1991) analyzed recovery rates of specific models using data from the Highway Loss Data Institute. The results showed that Mexican-sold vehicles had lower recovery rates than expected, indicated a greater prevalence of theft for export targeting those vehicles which included several models of Chevrolets, Fords, Mercurys, Renaults, and Volkswagens.

Tremblay, Talon, and Hurley (2001) used a different methodology to understand vehicle choice. These researchers examined investigated co-offender professional theft rings in Canada. Between 1989 and 1994, the authors compared vehicle-related characteristics of three different types of theft. In terms of vehicle value, they found that export resale networks targeted more expensive vehicles ($26,432 per vehicle) than local resale ($14,625) and local parts networks ($14,024). Tremblay et al. (2001) hypothesized that the higher costs associated with exporting vehicles using vehicles, trains, and the sea demanded a higher profit. Interestingly, all three of these forms of theft targeted vehicles on average that were higher than the median market value of $12,000 per vehicle. In relation to vehicle age, the authors found that export resale networks targeted newer vehicles more than other forms of professional theft in Canada. The mean age of vehicles in the export networks was only 1.63 years compared to 3.48 for local resale networks and 3.83 for local parts networks. In total, the analysis reviewed 210 professional incidents over the five year span.

Wallace's (2004) analysis of data throughout Canada supports earlier arguments that organized, professional vehicle thieves target trucks more often than cars. Recovery rates in 2002 for cars were 86 percent while trucks were only recovered in 81 percent of the cases. As a whole, there have been very few studies that consider vehicle, spatial, and temporal characteristics that differentiate between the many forms of vehicle theft. Rather, most studies have treated vehicle theft as a single crime.

Variables Influencing Vehicle Recovery

Very few studies have investigated the variables that influence whether vehicles are recovered. However, there are two notable exceptions. Gallahan (1997) utilized city-level data to test whether city size, police behavior, and distance to the border crossing affected recovery rates in Texas cities. The study found only distance to the border to be a significant predictor of recovery rates. Contrary to research expectations, at a city-level there was no relationship between jurisdiction size or cross-border relationships between law enforcement in the United States and authorities in Mexico.

Most recently, Roberts (in press) used National Incident-Based Reporting System (NIBRS) data to identify variables associated with higher likelihood of recovery. Roberts searched for predictors of successful recovery cases using a total of 56,924 motor vehicle theft incidents in 22 states. In the logistic regression analysis, the variable measuring distance to the border was found to be the strongest predictor of successful recovery while variables relating to social disorganization theory and police behavior had little or no impact. The only other community-level predictors besides distance to international outlets to significantly predict recovery at the 95 percent confidence level were whether the incident's city used a stolen vehicle tracking device and the size of the jurisdiction divided by sworn officers.

Taken together, these two studies support the argument that police behavior and other socioeconomic variables have little or no influence on vehicle recovery. Further, Rice and Smith (2002) cite an unpublished report that found that only 3 percent of stolen vehicles were recovered due to proactive policing in one Canadian city. Because only 3

percent of the stolen vehicles were recovered due to proactive policing, it can be inferred that most of the recovered vehicles were recovered due to offender actions, such as leaving the vehicle in a residential area after joyriding. Therefore, these studies support the notion that vehicle recovery can be used as a proxy measure for the type of theft. In other words, the successful recovery of a vehicle is more likely to be related to the nature and intentions of the vehicle thief rather than any other action or reaction on the part of law enforcement, the victim, or the community.

Chapter Summary

This chapter has provided an overview of motor vehicle theft in the United States by introducing definitions, examining data from multiple sources, and discussing the academic literature on variation in vehicle theft. Both the UCR and NCVS have experienced declines in vehicle theft counts, although the crime still accounts for a substantial portion of all serious offenses. The review of predictors of vehicle theft in total, specific forms of vehicle theft, and vehicle recovery found that there is ample evidence that vehicle theft is not distributed evenly across potential targets, space, and time. Furthermore, offenders tend to have vehicle-related preferences in the decision-making process. However, fewer studies have examined differences between specific forms of vehicle theft as described in this chapter. The next chapter provides a detailed account of the history and academic research associated with one of the forms of vehicle theft, international vehicle trafficking.

Chapter III - Motor Vehicle Theft for Export in the United States

"Vehicle theft for export" is one of many purposes for which a vehicle may be stolen. Over the past 30 years, the trafficking of vehicles across international borders has received both media attention (Dauler, 1994; Jensen, 1995; Tomb, 1985) and academic discussion (Clarke & Brown, 2003; Field et al., 1991; Miller, 1987; Tremblay et al., 1994). In this dissertation, "vehicle theft for export" or "international vehicle trafficking" are used interchangeably to describe the theft of a motor vehicle in one country for the purpose of taking that vehicle across international boundaries. The underlying purpose of the criminal event may be temporary transportation, the commission of a crime, or professional profit. Vehicle theft for export in the United States takes one of a multitude of forms. Vehicles are either (1) driven across a land border crossing, (2) shipped, in whole or in parts, on containers from seaports, or (3) flown on aircraft out of the country. It is generally assumed that the majority of vehicle theft for export incidents fall into one of the first two categories due to the complications and expenses involved with using forms of aircraft to transport vehicles. Clarke and Brown (2003) categorize methods of international vehicle trafficking somewhat differently into three categories, stating that "these forms are driving stolen cars across national borders or transporting them in ferries, shipping them overseas in sealed containers, and disassembling them and shipping them overseas for sale as spare parts." (p.206).

The History of Vehicle Theft for Export

Vehicle trafficking has been acknowledged as a criminal justice problem for nearly 100 years. Early in the 20th century, the process of exporting a vehicle was typically an interstate issue rather than an international concern. In the first years of mass vehicle production, the Dyer Act of 1919 was passed to increase punishments against those who illegally transported vehicles across state lines or for purposes of foreign commerce (Richburg, 1984). This landmark piece of legislation was generally aimed at criminals who were taking advantage of laws that restricted arrests and prosecutions once a vehicle had left its jurisdiction of theft. Although this legislation appeared to acknowledge professional vehicle theft as a criminal justice problem, complex organizations in international trafficking did not appear to develop early in the 20th century. In fact, discussion of international vehicle theft was not commonly found in the media or academic publications until the 1980s. By the early 1980s, there were indications that professional vehicle theft was becoming more common. In 1981 one major news source cited a vehicle theft for export problem occurring at ports like "Newark, Baltimore, Philadelphia, and Washington" according to a Customs officer (White, 1981). The perceived rise in professional vehicle theft, including theft for export, was featured in major newspaper articles throughout the 1980s, including the Sacramento Bee (Cage, 1984), the Miami Herald (Tomb, 1985), and the Washington Post (White, 1981) among others.

In response to the fear of an emerging form of organized crime, the Motor Vehicle Theft Law Enforcement Act (MVTLEA) of 1984 was passed to target "chop shops" where vehicles were stolen and dismantled for profit. While the MVTLEA

focused more on domestic “chop shops” than vehicles stolen for export, the vehicle identification number parts-marking requirement placed on vehicles with high theft rates marked an important concern about professional vehicle theft in general. The Act was said to be the most influential piece of legislation relating to vehicle theft since the Dyer Act of 1919 (Richburg, 1984).

Through the 1980s and early 1990s, professional vehicle theft and, more specifically, vehicle theft for export, appeared to rise in the U.S. It is not completely clear why this increase took place or the scope of the increase but one possible hypothesis is the loosening of international borders (Longman, 2006). In response, many agencies attempted to thwart the problem. In Florida, a Division of Motor Vehicles office was opened at the Port of Miami where an apparent “cars-for-cocaine” trafficking problem had emerged (Leen, 1985). Another program in Florida, the Certificate of Right of Possession (CRP) program, mandated that exporters provide documentation to prove ownership before shipping vehicles overseas in Florida (King Jr., 1991). Efforts to reduce vehicle theft for export in Florida eventually led to the Stolen Auto Recovery System (STARS) at the Port of Miami in 2000 (Stauffer & Bonafanti, 2006). In the Northeast, New Jersey formed a Vehicle Enforcement Team in 1992 to solely dedicate attention to vehicles stolen with the intent of overseas shipping (Dauler, 1994). Increased monetary appropriations toward vehicle theft for export to hire more personnel and purchase technology also targeted Northeast port areas (Schwab, 1991). On the west coast, Operation SEAT enhanced data collection on vehicle manufacturing and importing through partnerships (Gregory, 1993). No empirical studies were conducted to assess the

perceived increase in theft for export, but the issue was acknowledged by law enforcement and border patrols across the country resulting in these initiatives.

The Anti-Car Theft Act of 1992 was the third major piece of legislation passed by the U.S. Congress targeting professional vehicle theft. The Act enhanced federal penalties for offenders convicted of some vehicle theft crimes. The program also initiated the National Motor Vehicle Title Information System to enhance vehicle identification and tracking. Specific to international thefts, the Act allowed for random customs inspections. Both the 1984 and 1992 Acts showed that professional vehicle theft was a major concern at the federal level. The Acts also required that future evaluation reports be conducted to demonstrate the extent of professional vehicle theft and the successes of prevention and recovery measures (Longman, 2006; NHTSA, 1998).

As a response to the perceived continued increase in international vehicle thefts, international organizations have recently focused on a new set of responses including cross-boundary data gathering, information sharing, and prevention alliances. Clarke and Brown (2003) note that international organizations such as INTERPOL and the United Nations have assumed large roles in enhancing international cooperation. INTERPOL has created comprehensive stolen vehicle databases, while the United Nations has arranged multinational meetings focused on the trafficking of stolen motor vehicles (Clarke & Brown, 2003). Aldridge (2007) reports that more than 100 countries share stolen vehicle data through Interpol's database. The recognition that successfully limiting international crime requires bilateral partnerships has allowed for the agreements of numerous treaties between the United States and other destination countries (Aldridge, 2007; Clarke & Brown, 2003; Miller, 1987). In addition, the North American Export Committee was

formed to bring together members of various agencies with the mutual interest of reducing theft of vehicles for export (http://www.naec.ws).

Within the U.S., many states located near international borders have established specialized prevention authorities to focus exclusively on the vehicle theft problem including Arizona, Texas, Colorado, and Michigan. Along the U.S.-Mexico border, specific departments responsible for recovering vehicles have also been established such as the Border Auto Theft Information Center in the Department of Public Safety in Texas (Adger, 2007). In some cases, financial support has been geared towards prevention efforts. For example, in California, a statute was passed to fund initiatives targeting the exportation of stolen vehicles via the California Highway Patrol (California Highway Patrol Website). The current status of vehicle theft for export is one in which partner agencies are working together to improve data collection and intelligence while operating with limited resources.

Evidence of Vehicle Theft for Export

Preliminary evidence of international vehicle trafficking appears in many different forms including UCR data, Highway Loss Data Institute (HLDI) reports, and National Insurance Crime Bureau (NICB) data. While academic research is limited, these initial findings are presented here to justify further research into the subject matter. In total, the geographic patterns of vehicle theft in the United States appear to demonstrate a pattern between access to borders and port and elevated levels of vehicle theft.

Motor vehicle rates derived from UCR data indicate that vehicle theft rates near international boundaries are substantially higher than the rest of the country. Aldridge (2007) notes that the southern portion of San Diego County has a vehicle theft rate in the UCR that is four times the national average, while the entire state of California has a vehicle theft rate that is more than double the national rate. Vehicle theft rates in other regions in the Mexican border area are higher than national averages. Approximately one of every three recorded vehicle thefts in the UCR occurs in the four states bordering Mexico (California, Arizona, New Mexico, and Texas) (Aldridge, 2007). Other cities with high vehicle theft rates in the UCR include port cities such as Newark, New Jersey and Detroit, Michigan. However, UCR data are limited due to a lack of information about vehicle availability and security.

Other evidence of international vehicle trafficking includes the NICB's annual list of metropolitan statistical areas (MSAs) with the highest vehicle theft rates. The NICB compiles this published list by dividing the number of vehicle thefts from the National Crime Information Center (NCIC) database by population estimates from the U.S. Census. Generally, MSAs ranking in the top ten have been located in states along the west coast or the Mexican border. Both the NICB and secondary media outlets have pointed to the proximity to international boundaries as an explanation for the presence of said locations on the list. The NICB's top ten metropolitan areas for vehicle theft rates in 2009 feature nine areas in Mexico border region states, including six in California (Hot Spots).

Data from HLDI suggest that a substantial theft for export issue exists, as well. The HLDI is a non-profit research organization, funded by the Insurance Institute for

Highway Safety, which computes statistics on insurance losses (HLDI, 2008). A 2008 report produced by the HLDI indicates that county-based (1) theft losses in the Mexican border area have increased greatly over the previous 8 years; that (2) theft losses are generally concentrated in southern portions of Texas and Arizona; and that (3) theft losses are more skewed toward border areas in comparison with overall vehicle units stolen, indicating a prevalence of unrecovered thefts. In fact, in 2006-07, the seven counties with the highest overall theft losses per insured vehicle years were located along the U.S.-Mexico border. According to the 2008 report, from 1999 to 2007 "theft overall losses increased in the southwest and along the Mexican border" (p. 1). The HLDI report also contains multiple maps in the report demonstrating the patterns and trends in vehicle theft towards borders and ports.

Other commentators have pointed to falling recovery rates in the U.S. or other industrialized countries to explain an increase in exported vehicles (Aldridge, 2007; IBC, 2004). Aldridge writes that, "vehicles are considered 'recovered' when they are found and their owners and insurance carriers have been notified" (Aldridge, 2007, p. 23). Decreasing trends in rates of successful recovery in the U.S. are found in major data sources like the UCR and NCVS and in reporting data from insurance companies (KLD, 2007). As an example of limited reliability of data on recoveries, a report filed by KLD Associates (2007) used data from insurance companies to show that reported recovery rates had dropped from about 67 percent in 1989 to 12 percent in 2000 (NHTSA, 2007). Other data sources such as the NCVS show more modest changes. Alternative explanations have been offered in regard to the decline of recovery rates on an international level including factors affecting temporary thefts such as changes in

population, vehicle ownership, vehicle security, and perceived likelihood of arrest as well as factors affecting professional thefts like cost of new vehicles, percentage of vehicles in accidents, clearance charges for adults, and insurance appraisal changes (Tremblay et al., 1994). However, the overall evidence base from these data sources suggests that there is a substantial vehicle theft for export problem, although these data sources and related publications do not directly provide adequate conclusions about the issue.

Research on Vehicle Theft for Export

Because the majority of the focus of this study relates to vehicle theft for export patterns, it is necessary to provide an overview of the academic research that has been conducted on the subject. The research literature on vehicle theft for export consists of many different subjects. However, many of these research directions have not yet been fully explored. This section will review the vehicle theft for export literature in five categories: (1) estimates at the scope of the problem in the U.S.; (2) the organization of vehicle theft operations that move vehicles across international borders; (3) the modes of operation by opportunist or professional thieves; (4) the manufacturers, make, model or other qualities of vehicles of choice in cases of international trafficking; and (5) prevention efforts to reduce vehicle theft for export.

Estimates of Prevalence

In order to inform research and policy decisions relating to issues like criminological explanations and criminal justice interventions for vehicle trafficking, there have been preliminary efforts to estimate the number of vehicles stolen for export in

the U.S. The most commonly cited statistic has been an estimate from the National Insurance Crime Bureau of 200,000 vehicles per year (Clarke & Brown, 2003; U.S. General Accounting Office, 1999). This estimate was based upon an approximation that about 30% of all unrecovered vehicles in the U.S. were sent abroad. This estimate, often cited publicly (Howard, 1998; King, 1996; Sherman, 1998), is subject to many criticisms. First, the figure does not differentiate between manufacturers, models, and specific makes of vehicles despite the aforementioned research that notes important differences across these variables. Second, no distinction is made based on geographical location within the U.S. Third, the cited estimate has not changed over the time since it was first proposed in the 1980s. It is unlikely that a phenomenon dependent on both offender and reactive justice system approaches would not change over the course of two decades. A more modest number was estimated by Lojack's vice president of law enforcement when he stated that reports indicated approximately 20,000 stolen vehicles are driven across the U.S.-Mexico border each year. In addition, he stated that possibly 12,500 of those vehicles traveled from Arizona to Mexico (Aldridge, 2007). In a 1991 report, the NHTSA released results from surveys conducted two years earlier that estimated that thefts for export accounted for between 4 and 17 percent of all thefts (NHTSA, 1998). A 1998 NHTSA report applied the results of the survey conducted in 1989 to theft numbers in 1995 and estimated that between 30,000 and 123,000 vehicles are stolen for export. These estimations would yield between $221 and $905 million dollars in estimated lost value. The Customs Service provided a larger estimate of 375,000 stolen vehicles for export in 1995, although this number has been disputed (NHTSA, 1998). The wide margin across estimates illustrates the difficulties associated with approximating how

much this form of vehicle theft contributes to the overall theft problem. No clear indications were provided in the reports regarding the data that these survey estimates relied upon.

In addition to estimates cited above, two identified research studies have estimated the number of vehicles stolen for export purposes. The first academic study to estimate the sum of stolen vehicles for export was conducted by Clarke and Brown (2003) in England. Clarke and Brown (2003) identified high-risk models through interviews with 17 experts and compared the recovery rates of these models with recovery rates of market segment averages. The recovery "ratio" that was calculated by the researchers showed that an estimated 140 vehicles were stolen for export from England. Clarke and Brown (2003) also described methodologies that could be implemented in the U.S. to conduct a study on the scale of the problem:

> First, U.S.-wide records of the numbers of cars registered for use in year 1 could be compared with numbers registered for years 2, 3, and 4 for high-risk models and for all other models. Allowance should be made for cars legally exported and ones written-off in accidents. The difference in yearly attrition rates between the two groups could provide a measure of cars stolen for export. Second, statistically valid counts could be attempted of high-risk models using border crossings between the United States and Mexico. Comparisons of the numbers observed and numbers expected could provide estimates of the trade in stolen vehicles using this route. Third, representative samples of cars using border crossings and containers awaiting shipment at U.S. ports could be examined to determine numbers of vehicles. (Clarke and Brown, 2003, p. 218-219)

The authors add that future research on the subject will be aided by partnerships with organizations maintaining critical data such as "the National Insurance Crime Bureau, the Highway Loss Data Institute, and R.L. Polk" (Clarke and Brown, 2003, p.219). Brown and Clarke (2004) suggest many possible data sources for future analyses on the scope of vehicle theft for export in any particular jurisdiction including an analysis

of "vehicles recovered from a systematic search of containers; vehicles identified from random checks on cars at border points or international ferries; vehicles recovered at ports; vehicles identified or recovered in the course of police operations that are destined for other countries; recoveries reported by Interpol to the National Criminal Intelligence Services (NCIS); and recoveries by insurance companies" (Brown & Clarke, 2004, p. 179).

Block, Clarke, Maxfield, and Petrossian (2011) estimated the number of vehicles stolen for export in the United States by using crime location quotients based on uniform crime report data. The authors created an "overage" figure to identify areas in the United States with a higher-than-expected level of vehicle theft in comparison to overall crime levels. This study established that Mexican border region states (Arizona, California, Nevada, New Mexico, and Texas) accounted for approximately 100,000 more vehicle thefts than would be expected in proportion to overall crime levels in these 5 states. While falling short of establishing a specific estimate of overall theft for export in the U.S., this study did establish that areas close to the Mexico border have a "specificity" for vehicle theft in comparison to other crimes. A county-level analysis also demonstrated that some port areas such as Essex County, New Jersey and Miami-Dade County, Florida had elevated levels of vehicle theft while controlling for overall crime patterns.

While Block et al.'s (2011) analysis of Uniform Crime Report data did identify some useful patterns in vehicle theft, there were several limitations noted in the research. First, the analysis assessed all vehicle thefts, including temporary, locally recovered thefts that are not related to theft for export. Therefore, recovery status was not considered in the analysis which limited any interpretations in relation to thefts for

export. Second, the "overage" figure created by the formula in the article yielded the possibility of negative export totals when jurisdictions totaled fewer vehicle thefts than expected based on national averages. Third, the analysis used UCR data which are subject to specific weaknesses relating to measuring vehicle theft including proper reporting and recording practices on the part of vehicle owners and law enforcement agencies.

The limited number of studies that have applied a standardized methodology to estimating vehicle thefts for export from specific areas is particularly troubling, considering the cost and presumed prevalence of the problem. While several commentators have acknowledged that the U.S. and worldwide total of internationally trafficked vehicles is large, estimates continue to guide policy. Table 1 summarizes estimates that have been constructed to approximate how many "vehicle theft for export" incidents occur in specific locations.

Table 1 - Estimates of Stolen Vehicles for Export in Specific Regions

Source	Yearly Estimate/Location	Year	Details/Methods
Washington Post (White, 1981)	10,000 to 20,000 vehicles stolen and driven to Mexico	1981	No cited methodology
The Miami Herald (Leen, 1985)	Over 11,000 vehicles exported from South Florida	1985	No cited methodology
Journal of American Insurance (1982) as cited in Miller (1987)	20,000 vehicles stolen and driven to Mexico	1980	No cited methodology
Levine (1989) as cited in Field et al	40,000 vehicles stolen in Texas and exported	1988	No cited methodology

(1991)	to Mexico		
National Insurance Crime Bureau (1990s and 2000s)	200,000 vehicles stolen from U.S. for export	1990s/2000s	Approximately 30% of all unrecovered vehicles nationwide
Clarke and Brown (2003)	Only 140 stolen exported vehicles from U.K.	2000?	Recovery Ratios between high-risk models and sector averages
Clarke and Brown (2003)	500,000 vehicles stolen and exported worldwide	2000?	Estimates based on region estimates
Block et al. (2011)	About 100,000 vehicles stolen in U.S.-Mexico region	2008	Crime Location Quotients using Uniform Crime Report Data

Organization

Some researchers have observed that vehicle theft for export can take multiple forms. In some cases, vehicles are stolen opportunistically by amateur thieves. Conversely, organized theft rings involving multiple actors are necessary to reap the benefits of stealing a vehicle and distributing it in another country. The process of successfully operating an illegal enterprise transporting vehicles across international boundaries requires some type of organization. In the case of international thefts into Russia, Gerber and Killias (2003) argue that it is unlikely that many individuals have the "necessary expertise to steal cars, the skills to falsify documents, the connections to smuggle them across borders, falsify documents in Russia that allows registration of these cars, and also find buyers for them" (p.220). Further, they make an argument that groups involved in transnational crimes are loosely put together, unlike stereotypical

views of organized mafias. The process of stealing a vehicle from the U.S. and selling it abroad likely requires many of these same steps. Resendiz (1998, 2001) has conducted the most extensive field research to understand how this process works along the U.S.-Mexico border. Resendiz (1998, 2001) interviewed 10 persons involved in vehicle theft across the Mexican border and identified three separate roles: the "chauffer" who shopped for vehicles and drove specialists around; the "specialist" who broken into vehicles; and "mounters" responsible for crossing into the United States. Overall, these informal agreements are flexible and not organized in a traditional hierarchy. Further, females played an important role as "chauffeurs" or "mounters" (Resendiz, 2001). Richardson and Resendiz (2006) stress the role of juveniles in border area property crimes near Mexico. Juveniles are often returned back to the families with little or no punishment when they commit crimes across the border in the U.S. They state that "some criminal elements, for example, have discovered that they can bring Mexican juveniles over to Valley cities to engage in shoplifting or auto theft" (Richardson & Resendiz, 2006, p. 193). Resendiz (1998) argued that these relationships are so informal that they are not consistent with most definitions of organized crime.

In order to better understand the processes at work in organized trafficking cases, multiple researchers have applied Cornish's (1994) script analysis. In a study of professional thefts in Canada, Tremblay et al. (2001) applied script analysis to explain the organized vehicle theft increase that occurred through the 1970s and 1980s. As part of this analysis of professional thefts, investigative files were analyzed from several export-resale subset groups. Tremblay et al. (2001) found that some of the networks were family-based while others involved elaborate operations across several countries with

many different actors. In one complex case, Tremblay et al. (2001) report vehicles driven from Montreal to Toronto, taken by train to Halifax and then New York, and finally shipped to the Middle East. Morselli and Roy (2008) applied Cornish's script analysis to two vehicle ringing operations sending vehicles to countries in Europe and Africa. They found that brokers fulfilled crucial roles in the network that facilitates successful international theft operations. Morselli and Roy (2008) also argued that the groups were relatively "centralized and resilient" (p.91).

Richardson and Resendiz (2006) believe that to understand international vehicle trafficking one must consider the role of both untrained and highly trained vehicle thieves that operate along the U.S.-Mexico border. Some thieves view vehicle theft as a way to supplement short-term income for spending while others see the crime as a way of making a living. Professional vehicle theft operations are described as more organized with a facility designed for altering and prepping the vehicle for resale or stripping. Vehicles that go through this process are often custom ordered by businessmen in Mexico.

Despite this initial qualitative research from the U.S.-Mexico border, Canada, and Eastern Europe, the current state of knowledge is limited by the ethnographic results with limited generalizability. Studies have analyzed only isolated cases that may not be representative of the organization of most international vehicle theft operations. Further, none of these studies have compared and contrasted border theft and port theft. Rather, studies have examined organization of theft rings in border or port areas without consideration of the differences. The current body of research does, however, provide us

with an understanding of how some international vehicle trafficking groups are organized.

Operations

Closely related to organization, discussion of the operations of the vehicle theft for export process is rarely found in the literature and typically involves either interviews with active and former offenders or with experienced practitioners. On an international level, Gerber and Killias (2003) interviewed law enforcement officials and criminologists who were familiar with international stolen merchandise in Europe. Through these contacts, the researchers established that international vehicle thefts relied upon several factors, often including insurance fraud, contracted thefts targeting specific models, and facilitating travel through corrupt officials. In the U.S., the General Accounting Office (1999) reviewed commonly used tactics based on discussions with customs officials at six separate port facilities. The GAO identified methods including the production of counterfeit vehicle identification numbers (VINs), switching vehicles after initial inspections, and not reporting concealed vehicles.

The specific characteristics associated with crossing illegal vehicles over borders are still unclear. For instance, many researchers (Miller, 1987; Clarke & Brown, 2003) have argued that vehicle volume is a major element facilitating illegal border crossings, however Resendiz (1998) found that thieves preferred to cross the border during times with less vehicle traffic from midnight to 5am. In contrast, Miller's (1987) research found that commuter traffic was a major factor in facilitating illegal crossings. Furthermore, it has been often argued that corruption within Mexican enforcement agencies is

responsible for the ease with which vehicles move into Mexico (Gallahan, 1997; Miller, 1987). In contrast, Resendiz's (1998) research subjects explained that it was more common to outrun Mexican authorities rather than bribe them. Many of the challenges associated with researching the organization of vehicle theft rings are also present with studying the preferred methods used.

The profit margins of illegal traffickers are largely affected by the destination country and the type of vehicle. Research along the U.S.-Mexico border indicates that vehicles are typically sold for less than their market value in the U.S. The motivation for stealing the vehicle and transporting it across the international boundary is more related to opportunity and ease than excessive profits, according to Miller (1987). On the other hand, newspaper sources have noted that destinations with lucrative value placed on American vehicles tend to be motivated more by extreme profit margins rather than the number of units transported to these locations. For instance, it has been stated that stolen American vehicles can fetch four times their value in South America (Tomb, 1985) or two to three times the sticker price in Europe or Russia (Richey, 1996). Detailed analyses of two ringing operations in Canada found vehicles being shipped to Russia, Egypt, Iraq, Italy, Ghana, Switzerland, and France (Morselli & Roy, 2008). Therefore, research on the methods used to facilitate international vehicle crimes and the financial motivation associated with these acts has produced inconsistent findings.

Vehicle Target Type

Another important research direction in understanding the nature of vehicle theft for export is the study of which vehicles are targeted most often. The earliest discussion

in the literature of vehicle target choice is found in Miller's (1987) overview of vehicle theft along the U.S.-Mexico border. Field et al. (1991) conducted a study to test Miller's (1987) hypothesis that vehicles stolen for export in the United States were models also produced and owned in Mexico. The authors argued that this conclusion would be logical because these stolen vehicles would not garner the attention of Mexican authorities when observed. Field et al. (1991) used National Highway Traffic Safety Administration (NHTSA) data to determine whether 18 models sold in Mexico were stolen at higher levels than 155 models not sold in Mexico. The authors analyzed recovery rates of the models and found that vehicle theft for export to Mexico was focused on Mexican-sold models in Texas and other nearby states. Resendiz's (1998) qualitative work supports Miller (1987) and Field et al.'s (1991) findings. Resendiz (1998) found that newer models from General Motors, Ford and Chrysler were targeted by vehicle thieves along the Texas-Mexico border. Plouffe and Sampson (2004) added to the body of knowledge about desired vehicles through an analysis of vehicle recovery in Chula Vista, California. This research found that certain vehicle types such as Toyota Camrys (13%) and Toyota trucks (9%) had extremely low recovery rates, representing professional thefts.

Non-academic references from practitioners have also identified lines of vehicles that are targeted most by thieves. In Florida, Mercedes and sporty vehicles like Camaros and Mustangs were labeled as the most common targets of vehicle theft (Leen, 1985). Experts in New Jersey cite Jeep Grand Cherokees, Ford Expeditions, and Toyota Land Cruisers as vehicles in high demand (Sherman, 1998). Another report stated that luxury models were in demand due to their high value such as the Porsche 911, Toyota Supra, and Cadillac Seville while other more common vehicles like the Mitsubishi Mirage and

Ford Mustang were demanded for their parts (Haas, 1994). Clarke and Brown (2003) provide an elaborate list of vehicles linked to specific international destinations in media and practitioners reports.

Some research has also examined the effect of vehicle value on demand in vehicle theft for export operations. A study in Canada found that, in comparison to local resale and local parts networks, export resale networks tended to focus on more expensive vehicles (Tremblay et al., 2001). More research is necessary to fully understand the role of vehicle type, value, and age in international vehicle trafficking.

Prevention Measures

Since the perceived increase of illegally exported stolen vehicles in the 1980s and 1990s, efforts have been made to limit the number of vehicles that are stolen and illegally exported from the U.S. Prevention efforts aimed toward limiting vehicle theft for export are divided into three stages: (1) interventions that attempt to reduce the number of vehicles initially stolen; (2) interventions at the point of exit at border or port facilities; and (3) interventions after they have left the U.S. (Field et al., 1991). Although many interventions take place during the initial stage, some studies have specifically focused on mechanisms for reducing theft in high-risk vehicle theft for export locations. For example, Aldridge (2007) discusses the potential effectiveness of using "bait vehicles" in borderland areas in the southwestern U.S. Bait vehicle programs have been initiated in each of the four states bordering Mexico (Aldridge, 2007). However, no strong empirical study supports the effectiveness of "bait vehicles" along the border. Most evidence on the success of bait vehicles is measured in arrests directly related to the intervention and

correlations with vehicle theft rates, and no evaluation considering displacement or other variables has been performed. Ethridge and Sorensen (1993) evaluated a Citizens Against Auto Theft (CAAT) program in which residents placed decals on their vehicles that signified that the vehicle could only be driven in the U.S. during specific hours of the day. The evaluation found that the program had lower vehicle theft rates than would be expected based on several risk factors. The program in Arizona expanded from 4,131 enrollments in 1999 to 89,552 enrollments in 2008 (AATA, 2009), yet its effectiveness has not been shown through analytical statistics or in other settings. In Chula Vista, California, Plouffe and Sampson (2004) examined recovery rates in San Diego County and proposed that interventions on limiting vehicle theft for export should target high-risk parking lots rather than border crossings. Plouffe and Sampson (2004) viewed interventions at the initial stage to be more practical and cost effective than efforts at the border or in Mexico. In one case, a mall parking lot extremely close to the Mexican border in Chula Vista, California was able to minimize vehicle crimes through electronic ticketing-triggered gate arms, staffed exits, extensive patrols, and security patrols. In contrast to the arguments of Plouffe and Sampson (2004), Miller (1987) claimed that law enforcement efforts at the point of theft tend to be "tedious, time consuming, and generally yields few arrests" (p. 23). In general, interventions that attempt to reduce vehicle theft by making vehicles more difficult to steal are subject to concerns of general ineffectiveness, cost, and displacement across vehicle models and geographic jurisdictions.

In the second of Field et al.'s (1991) three categories, many possible interventions address the problem at the point of departure from the country. As Miller (1987)

discusses, interventions at border crossings aimed at limiting illegal vehicle theft benefit from the limited number of monitored, passable crossings. Unlike human, drug, or gun trafficking, vehicle trafficking across the Mexican border is generally limited to a few dozen crossings. Vehicle theft detection mechanisms include electronic databases, portable computer scanners, and gamma-ray detection scanners. License plate readers, another form of border technology, that records date and time information of border crossings (Kaza, Wang, & Chen, 2007) have been questioned in regard to their effectiveness and consistency (Plouffe and Sampson, 2004). Plouffe and Sampson (2004) claim that such plate readers from the U.S. to Mexico tend to be inaccurate or broken. They also question the effectiveness of any border measures considering that vehicles have often crossed the border by the time the vehicle is reported as stolen. Qualitative research with border officers have described failed programs at international bridges using extra officers in lanes due to the excessive costs and low budget (Miller, 1987; Richardson & Resendiz, 2006). Any such interventions that might carry side-effects of limiting legitimate commerce are likely to meet local resistance. Most recently, research on the identification of criminal vehicles has focused on mutual information analysis of "partner vehicles" that operate in groups (Kaza et al., 2007). Kaza et al. (2007) argue that analyzing patterns of criminal vehicles holds potential for addressing this issue at the border. Unfortunately, access to criminal record information is not necessarily accessible for border agents (Kaza et al., 2007). Most prevention efforts at border crossings appear to rely upon the experience of border officers to spot vehicle thieves based on appearance, behavior, and responses of border crossers (Richardson & Resendiz, 2006). Additionally, Gerber and Killias (2003) found that experts on international vehicle theft

in Europe unanimously agreed that prevention efforts require addressing the corruption of enforcement before addressing illegal vehicle markets. In Russia, the corruption problem was linked to low salaries and a lack of professionalism, and it can be argued that similar issues arise at the U.S.-Mexico border. The main challenges associated with interventions at the border point include cost, competing concerns, and the sheer volume of vehicle and pedestrian crossings at border checkpoints.

Although no identified studies have evaluated the success of recovery procedures in destination countries, the process has been documented. For instance, Gallahan (1997) studied the relationship between Texas law enforcement agencies and Mexican governmental authorities to establish whether a relationship existed between consistent inter-country contact and increased recovery rates. However, this study found no significant relationship between cross-border relations and recovery. Interventions that aim to reduce vehicle theft for export after the vehicle has left the country rely heavily upon international cooperation and effort from the receiving country which may be unrealistic, considering infrastructure and priorities of destination countries.

Any prevention measures that are put in place to thwart the theft of vehicles for exportation face many challenges. Brown and Clarke (2004) found that few upper-level personnel in local police departments received substantial intelligence information. In England, cuts in staffing took place in stolen vehicle units, and many U.S. newspaper reports have identified auto theft units as the first areas of focus when budgetary cuts are made. Although more studies have been conducted on prevention of international vehicle theft than other aspects of the phenomenon, there have not been enough comprehensive evaluations to substantiate the success of any particular measure or technique.

Chapter Summary

This chapter has explored what is known about international vehicle trafficking in the United States. The problem appeared to emerge in the early 1980s based on a series of reports in newspapers across the countries. The government quickly responded with several pieces of federal legislation partially aimed at the growing phenomenon. Today, it appears that international trafficking remains a serious problem in areas near borders and ports, but no rigorous methods have been applied to produce a reliable estimate of the total scope. Only a few academic articles have been published about this problem. Methodologies applied to address the subject have included qualitative and quantitative designs. Table 2 presents a brief description of research findings from all identified studies conducted on the subject of vehicle trafficking from the U.S. The table demonstrates that little work has been carried out on the subject in the last 25 years. The next chapter will describe the process of vehicle exporting across international borders and ports in greater detail.

Table 2 - Research Studies on Vehicle Theft for Export at the US-Mexico Border

Author and Year	Methodology	Research Goals	Main Conclusions/ Findings
Miller (1987)	Police records, field observations, interviews with informants	Exploratory research to identify directions for future studies	There is a significant theft for export issue for cars/trucks and few parties are directly harmed as to respond
Field, Clarke & Harris (1991)	Regression Analysis of Insurance Data	Determine whether vehicles stolen to Mexico are also	Vehicle types stolen to Mexico are commonly also

		produced there	manufactured there for concealability purposes
Ethridge & Sorensen (1993)	Comparison of vehicles that were part of program and comparison vehicles	Assess effectiveness of a "Citizens Against Auto Theft" Program	Found program to be effective but several limitations discussed
Gallahan (1997)	Correlation analysis comparing 26 Texas cities	Determine whether distance to border, jurisdiction size, and crossborder relationships affect vehicle recovery	Distance to the border was the only significant predictor of city-level variation in recovery
Resendiz (1998, 2001)	Participant observation research, interviews, gathering of unobtrusive data	Explore qualitative questions relating to structure and methods vehicle theft across the U.S.-Mexico border	There are multiple specific roles within the vehicle theft process and gender plays an influential part in the process
Plouffe & Sampson (2004)	Mapping hot-spot analysis, environmental surveys, and police calls-for-service	Analyze vehicle theft patterns in San Diego County and develop situational prevention measures	Recovery rates are lowest in areas closest to the Mexican border and situational crime prevention measures appear successful
Kaza, Wang & Chen (2007)	Association Analysis of border crossing vehicles in Tucson metropolitan area	Determine effectiveness of using mutual vehicle border crossing technology	Mutual information may be able to identify pairs of vehicles involved in criminal activity across the border
Block et al., 2011	Crime location quotients (LQCs) created at state, county, and city levels from Uniform Crime Report data	Estimate number of vehicle thefts attributable to U.S.-Mexico border region	At a state-level, border states account for an "overage" of approximately 100,000 vehicles

Chapter IV – The Process of Exporting Stolen Vehicles

Before proceeding to the methodology and findings associated with the quantitative study, this chapter will present a detailed, comprehensive qualitative description of vehicle theft for export in the U.S. through borders and ports. The discussion within this section is limited due to the lack of research in the area. Subsequently, this chapter is informed by (1) the previous studies on the topic that have been published, (2) newspaper accounts of vehicle theft for export, and (3) other informal conversations with vehicle theft experts within the law enforcement field. This chapter will present what is known about different forms of vehicle trafficking across borders and through seaports by explaining each major stage of the process

First promoted by Cornish (1994), script analysis allows for a better understanding of the specific mechanisms of a specific form of crime. Moving away from traditionally criminological study that focuses on criminals rather than crimes, script analysis aids opportunity theorists by developing detailed accounts of the stages of a particular form of crime. Script analysis has been performed on a variety of crime types including drug manufacturing (Chiu, Leclerc, & Townsley, 2011), sex offending (Deslauriers-Varin & Beauregard, 2010; Leclerc, Wortley, & Smallbone, 2011), carjacking (Copes, Hochstetler, & Cherbonneau, in press) and vehicle theft for export (Morselli & Roy, 2008; Tremblay et al., 2001).

An important component of script analysis is the practical relationship with understanding crime prevention. Within the scope of vehicle theft, Morselli and Roy (2008) utilized script analysis to highlight the importance of "broker" personnel. Other

applications of script analysis have also stressed the relation with policy. This chapter will build upon previous studies on vehicle theft to explain the different stages and possible adaptations within vehicle theft for export across borders and through ports.

In his initial work proposing the use of script analysis to the study of crime, Cornish (1994) identified at least 5 separate stages in vehicle "ringing" operations: theft, concealing, disguising, marketing, and disposal. These stages are described in-depth below. Much of the information used for this section is based on accounts from completed investigations or working personnel due to the lack of academic research.

Cornish (1994) identifies several levels within script analysis ranging from the broader "protoscript" term that represents a general act such as "robbery" or "sexual assault" to more specific terms such as "script" and "track". Cornish used vehicle theft for export rings as an example in explaining script analysis in one of the earlier publications on the method. However, this script did not differentiate between these two forms. The current explanation divides vehicle theft for export into these two categories and discusses each stage in more depth. Within the current study, two separate "tracks" are identified.

The Crime Script at Borders

Protoscript: Vehicle Theft

Script: Permanent Vehicle Theft

Track: Vehicle Theft for Export through Borders

Theft: The first stage of the vehicle exporting process across international borders is the point of initial theft. According to accounts, there are a variety of ways that vehicles are stolen for this purpose. They likely depend on whether the crime is committed by what Miller (1987) termed to be large "frontera" rings targeting very specific vehicles or smaller less sophisticated groups. The earlier accounts of vehicle thefts near the U.S.-Mexican border references thefts where thieves would break and enter a vehicle from streets, parking lots, and shopping malls (AP, 1989; Miller, 1987). Later, Plouffe and Sampson (2004) noted that border vehicle thieves in southern portions of California targeted shopping mall parking lots adjacent to a major border crossing. Such thefts are similar to assumed general patterns of theft where thieves use knowledge and expertise to break into vehicles without the presence of the vehicle owner or other potential guardians. Resendiz (1998) found that border vehicle thefts are often the result of a successful "shop" or "cruise" where potential offenders search for desirable vehicles using co-offenders in the role of the chauffer or with the help of a taxicab. According to Resendiz (1998), some groups have a specialist who "opens and ignites the vehicle" (p.28) without resorting to hotwiring. Different methods are utilized depending on the vehicle manufacturer including breaking off ignition caskets, using vise grips to break open doors, and applying masterkeys. A large percentage of these types of thefts have historically been assumed to be committed by juveniles who face minimal punishment if apprehended (Miller, 1987).

Another form of theft is for border vehicle thieves to rent vehicles from rental companies in border regions. Soon after renting the vehicle, the thieves legally cross the border and leave the car that they rented from the U.S. in Mexico. The Arizona Criminal

Justice Commission (2004) reports that this is specifically a problem in Tucson, Arizona, where an airport with rental agencies is located within driving distance of an international border crossing. After the vehicle has crossed the international border, a vehicle theft is reported to the rental agency and appropriate insurance agencies (Bauder, 1997).

A third, reportedly common, method of theft is in the form of insurance fraud (Davis, 2008; Williams, 1990). In these instances, owners are motivated by a variety of circumstances including being behind on payments, needing quick cash, or regretting a previous purchase. Davis (2008) reports that some owners simply leave their vehicle near the U.S.-Mexico border, while other vehicle owners formally arrange for the vehicle to be taken to Mexico before filing a theft claim with their insurance agency. In each of these forms of fraud, the original owner recoups a large percentage of the vehicle's value based on their vehicle insurance coverage. Meanwhile, the arrangement is clearly advantageous to those who profit off of the false insurance report in Mexico.

It is important to note that the ultimate purpose of the border theft is tied closely to the method of theft. If the vehicle is to be sold or utilized in its entirety in Mexico, it is integral for there to be little or no damage incurred during the theft process. In such cases, insurance fraud and rental theft are extremely attractive, because it is not necessary to do any damage to the vehicle. When the vehicle is stolen with the purpose of using or distributing its parts, it may be less important that the vehicle avoid any damages, especially if the damages are not related to the targeted parts.

Conceal: Following the theft, vehicles can be concealed in a variety of ways. One method for concealing vehicles is to drive a truck across the border containing vehicles or

major vehicle parts. In such instances it would be unnecessary for thieves to put much effort into the "disguising" process, because the plan is that Customs and other officials will not come into contact with the vehicle. However, a seemingly large number of cases are not concealed because license plate readers at the border crossings either do not work or are not taken seriously by U.S. Customs. The necessity to conceal the stolen vehicle is particularly diminished in areas such as San Diego County and the I-5 crossing at San Ysidro where tens of thousands of legitimate vehicles move through on a daily basis. Therefore, with little chance of an official check, some offenders and theft rings likely spend little time concealing the vehicle's identity. In the United States, a vehicle that is not immediately being taken across the border might be stored in a garage or warehouse. Even after the vehicle has crossed into Mexico, Resendiz (1998) notes that garages are commonly used to store vehicles until an appropriate buyer is found. In instances where the registered owner drives the vehicle into Mexico as part of an owner give-up or insurance fraud, many of the concealment steps are unnecessary. Additionally, if the vehicle is stolen near a border crossing and taken across the border quickly, there is little need to conceal the vehicle since the crime probably has not yet been reported to authorities. If the vehicle was stolen further from the border or remained in the U.S. for an extended period of time, not concealing the vehicle would potentially risk triggering alert systems with U.S. Customs.

Disguising: A related, but separate, concept to concealing the stolen vehicle is disguising its identity. Vehicles can be identified in several ways including license plates, identification numbers, ownership papers, and even characteristics such as color. According to some media reports, there is lacking cooperation at border crossings

between U.S. and Mexico officials. Abrams (1988) reports about concerns that Mexican officials will waive active vehicle thieves through their checkpoints on international bridge border crossings. In such instances, vehicle thieves can "outrun" U.S. authorities with a nearby safe haven (Resendiz, 1998). In many other cases, the thieves will not need to "outrun" authorities because the vehicle will not yet be reported and there will be little suspicion about the original vehicle. The process of adequately disguising the vehicle appears to be a much bigger part of the exportation process out of seaports than across borders.

Marketing: The role of marketing in vehicle theft across borders depends greatly upon the structure of the entire arrangement. In some instances, the vehicles are stolen on order. In other words, very specific vehicles (e.g. a Black 2007 Toyota Tundra) are stolen with a recipient waiting for the vehicle. In these circumstances, it is not necessary for the vehicles to be marketed after the theft. In other cases, vehicles might be stolen if they fit set criteria such as being manufactured in Mexico (Bauder, 1997; Field et al., 1991; Miller, 1987) or a certain vehicle type. In these cases, vehicles known to be desirable and popular in Mexico are stolen with the belief that there will be a strong market for the vehicle once it exits the United States.

Disposing: When vehicles are illegally transported across international borders, disposal outlets include prearranged clients in destination countries, buyers on an open market, and officials within the destination country. LePage and Romero (1990) discuss how Mexican officials are often the beneficiaries of stolen vehicles from the United States. In these cases, Mexican police receive stolen vehicles and use them for personal

and official purposes. In other situations, the buyer may be a private citizen who has purchased the vehicle or traded some other commodity in a barter-type system.

The Crime Script at Ports

Protoscript: Vehicle Theft

Script: Permanent Vehicle Theft

Track: Vehicle Theft for Export through Ports

Theft: Reports in the media of individual cases resulting in illegally exported vehicles through seaports are common. Besides the traditional methods of stealing vehicles parked on streets (Glionna, 1995) or parking lots, there are also accounts of carjackings targeting selected vehicles (Beekman & Daly, 1990). In another case involving direct contact with victims, multiple sources indicate that some exports through ports are the result of accident schemes (Beekman & Daly, 1990; King, 1991). In these scenarios, a rear-end collision is purposefully caused leading to both parties exiting their vehicles to assess the damage. While the occupant gets out of the front vehicle, a passenger or other person quickly enters the front vehicle and drives away. Less obtrusive methods include efforts to obtain the key through nonviolent means. In some situations, this involves targeting tourists as in the case of southern Florida (Robles, 1996). In other settings, keys are obtained by stealing valet keys with or without cooperation from valet workers (Beekman & Daly, 1990; St. Petersburg Times, 1997).

As is the case with border area theft, rental agencies play a major role in vehicle theft through ports. In Baton Rouge, Louisiana, an organized group created a scheme to send vehicles that were rented and reported stolen to Kuwait (The Advocate, 1988). Vehicles were not reported as stolen until the car was already in the destination country. At that point, the subjects who rented the cars notify the police of the theft. Some of these arrangements included vehicles rented in locations distant from the exporting port. (e.g. rented in Boston, exported in Miami).

Other forms of vehicle theft are also associated with seaport trafficking of vehicles. Through inside connections with workers, thieves are able to obtain brand-new vehicles without any tampering that could decrease the value of the vehicle (Rondeaux, 2007; Wallace, 2000). This method is particularly suitable for international trafficking organizations, because it is often assumed that vehicles sent abroad are expected to be in good condition. A recent case in Virginia illuminated how a particular method can be modified. Expensive vehicles were smuggled out of the country after "straw purchases" were made by immigrants who had good credit, a clean background, and had no long-term plans in the U.S. The straw purchasers were paid low sums to buy several vehicles over a short period of time (Frost, 2011). The purchasers left the country well before authorities were aware of the complex scheme.

Insurance fraud, as discussed earlier in Chapter 2, is a common method used for trafficking vehicles. Insurance fraud schemes are undoubtedly used in many forms of professional theft, however there are several published accounts of insurance fraud linked to trafficking across seaports (Dauler, 1994; Gonzales, 2000; Wallace, 2000; Williams, 1990). The insurance fraud schemes operate similar to other fraudulent methods such as

the “straw purchases” as no report is filed until the vehicle reaches the international destinations. Once the person who filed the report is told that the vehicle is out of the country, the insurance report is then made.

Concealing: International vehicle thefts through seaports appear qualitatively different from theft for exports across borders in several reports, partially due to the need to conceal the vehicle until it is exported. As many vehicles are moved across the country, King (1991) reported the use of refrigerated produce trucks to conceal a stolen vehicle. Near seaports, storage areas are needed to house vehicles for periods of time before they are ready to be sent across the border. Warehouses or garages within close proximity to the port are sometimes used for these purposes (Glionna, 1995; King, 1996).

Disguising: Methods for disguising vehicles through seaports generally follow two paths: disguising the stolen vehicle as other goods or disguising the vehicle as another vehicle. When vehicles are shipped to other countries, exporters either ship vehicles in 40-foot shipping containers or loose on roll-on, roll-off containers. Vehicles that are stocked on standard 40-foot containers are disguised through other materials (Beekman & Daly, 1990; MacLeod, 1995; Noble, 1988; Schwab, 1991; White, 1981) such as beach balls, bags of rice, mattresses (King, 1991), fiberglass wall (Jensen, 1995), old refrigerators, clothes, chairs, TVs (King, 1996), cardboard, scrap, bubble wrap (Matza, 1997), appliances, textiles, and motor oil (Howard, 1998). The goods that are used to disguise stolen vehicles contain several qualities. First, illegal exporters do not want to attract attention from officials, so the goods should be those which are typically sent to that destination. For instance, if food products were used to block a stolen vehicle going to South America, this would likely attract unwanted attention because food is

rarely exported from the U.S. to the southern portions of the Western Hemisphere. A second important quality of these goods is to create difficulties for searching. If the goods are easily removed, Customs officials would be more likely to look through the container. Heavier items that are most difficult to move are expected to deter searches that could discover the vehicle. When vehicles are successfully disguised using these methods, it is not necessary to provide documentation or change identification numbers because it is expected that officials will never come in contact or be aware of the vehicle. Some such searches consist of multi-person searches over hours to conduct. In other instances, a legitimate vehicle takes the place of the goods in the front of the container so a legitimate export blocks the stolen vehicle in the back of the container (Sherman, 1998).

If stolen vehicles are not blocked by other goods, the vehicle is normally disguised. Illegal exporters use a variety of methods to disguise stolen vehicles. One common method is to purchase wrecked vehicles at salvage yards or auctions, steal an identical vehicle in ordinary condition, and then such the identity through the vehicle identification numbers (VINs) (Lloyd, 1995; Scharnhorst, 1998). One trafficking organization stole a vehicle in Europe, exported the vehicle to the U.S., legally registered the car in the U.S., and exported many of the identical vehicles (Scharnhorst, 1998). Another method is to provide false documentation for a vehicle after removing forms of identification, including the VINs (Glionna, 1995; Lloyd, 1995; MacLeod, 1995; Polich, 1990; Schwab, 1991).

Marketing: Arrangements for marketing stolen vehicles are dependent upon whether the organization already has a planned buyer. In such instances, it is unnecessary for the vehicles to be marketed. Virtually no information is available about how stolen

vehicles are marketing when there is no buyer for vehicles shipped out of U.S. ports. This may indicate that when the operation moves vehicles long distances out of seaports, buyers are already prearranged.

Disposal: The disposal of internationally trafficked vehicles across ports includes pre-ordered vehicles from international buyers, waiting lists from the general population, corrupt officials, and exchanges for drugs. If there are predetermined arrangements, there may be a specific buyer who has a particular demand relating to vehicle manufacturer, model, make, color, and year. Similarly, in some countries there are waiting lists for certain highly desired vehicles (Beekman & Daly, 1990). Corrupt officials can be outlets for stolen vehicles, as well. The international trade in vehicles also overlaps with drug markets. Reports of vehicles sent to the Caribbean from the Port of Miami were traded in exchange for cocaine (Leen, 1985), while other arrangements include exchanges of stolen vehicles for drug debts (Dauler, 1994).

Chapter Summary

This chapter briefly documented how the process of exporting stolen vehicles works according to accounts from practitioners, media reports, and academic research. Fundamentally, the process appears to be quite different depending on whether the vehicle crosses a land border or exits the country through a seaport. Although many of the same methods (insurance fraud, rental car fraud, obtaining keys) are used in both forms of trafficking, the latter stages of concealing, disguising, marketing, and disposing are all related to the highly contextual nature of vehicle theft trafficking. Other common

themes that emerge include challenges with legitimate commerce, the role of corruption in destination countries, and suggested links with other forms of crime. The next chapter will discuss the theoretical framework associated with the current quantitative study.

Chapter V - Theoretical Framework

The previous chapters have established that relatively few studies have investigated the similarities and differences across forms of vehicle theft. This chapter will propose a theoretical background for the current research study described in Chapter VI. First, this section will introduce the broader group of theories that make up environmental criminology. Afterward, this section will summarize the rational choice perspective and explain its application toward theft for export and the current research.

Environmental Criminology

Environmental theories of crime depart from most theories of criminality that explain criminal behavior through social, psychological, and biological variation. Such theories often portray criminals and non-criminals in two separate, distinct groups. Instead, theories such as the rational choice perspective, routine activity theory, and crime pattern theory view crime as a phenomenon that is greatly influenced by criminal opportunities and the offender's mindset. These theories promote the study of crime rather than the study of criminals. Supporters of these opportunity-based theories argue that most people have the potential to become an offender under a certain set of circumstances; therefore, explaining criminality should be viewed as a secondary concern. At a fundamental level, these theories stress that crime cannot occur without criminal opportunities. Furthermore, there are many complicating factors that influence opportunity and the perception of opportunity to the offender.

Environmental criminology theorists do not argue that root causes of crime are meaningless or non-existent. Rather, environmental criminology assumes a practical approach that views some sizable amount of crime as inevitable in any society. In other words, it is suggested that both root causes and everyday circumstances should be studied. Environmental criminology has also gained support because of its separation from political and social views that often guide theory development and support. Most traditional theories rely upon underlying views about society that are inextricably linked to one's political position and personal feelings about society and the role of law and policy (Lilly et al., 2007).

In some respects, many of the leading environmental theories relate back to earlier ideas from other perspectives. For example, elements from the early classical school of criminology and early-mid 20th century ecological-based theories are found within the environmental school of criminology. In the 1980s and 1990s, each of the major theories falling under the umbrella of environmental criminology was developed and quickly gained popularity and support partially due to their relative simplicity and practical implications. Various theories under the environmental criminology umbrella are used to explain many different forms of crime with particular attention toward property crimes such as motor vehicle theft. The rest of this chapter will apply the rational choice perspective to vehicle theft for export and the current study.

Rational Choice Perspective

The preliminary framework of the contemporary rational choice perspective can be found in the early utilitarian arguments of Jeremy Bentham and Cesare Beccaria in the 18th century. This classic view of criminality argued that criminal behavior was a result of a form of "hedonistic calculus" in that potential offenders weighed that pains and pleasures associated with possible criminal behavior. The policy implications from the classic school were relatively clear, and a focus on increasing pains through punishment to outweigh the perceived benefits of criminal activity grew in popularity. In the 1960s, an economist's version of rational choice theory emerged. This form of rational choice theory views human beings as actors who make purely mathematical decisions based on a defined set of facts. The contemporary rational choice perspective described in this section considers flaws in these models such as an overreliance on material items, the challenge of punishment, and the lack of concern for the complexities of social decisions (Clarke & Felson, 1993). Therefore, the rational choice perspective recognizes that offenders may be "bounded" in their decision-making process by a variety of factors including time, ability, and a lack of necessary information (Clarke & Felson, 1993).

The rational choice perspective (Cornish & Clarke, 1986) is comprised of two phases that clarify the decision-making process of potential criminal offenders. First, a potential offender makes a decision to commit a criminal offense. This criminal involvement decision may be related to traditional root causes of crime, such as poverty

or social bonds, and a complex consideration of short- and long-term benefits and consequences. This process is generally the focus of most traditional criminological inquiry. Second, and most relevant to the current context of this study, potential offenders make a criminal event decision that includes a consideration of highly specific situational factors (Cornish & Clarke, 1986). "Choice structuring properties" under the rational choice framework relate to complex decisions that offenders may account for when considering specific criminal opportunities such as rewards, enjoyment, and obstructions.

The rational choice perspective relies upon the perceptions of potential offenders. Offenders are not always calculating and may not take all rewards and risks into account. This is an important critique of the rational choice perspective. Any particular criminal act involves an array of possible rewards (monetary, respect, convenience, etc.) and risk (criminal justice processing, stigma, shame, etc.). Therefore, there are likely several short- and long-term factors that potential offenders do not consider. Additionally, an offender's ability to be "rational" may be restricted by various forces which cause some theorists to see offender actions as "bounded rationality". The inability for most offenders to consider various rewards and risks is one possible criticism of rational choice.

One of the fundamental aspects of the rational choice perspective is the focus on models of criminal activity that are crime-specific. Proponents of this perspective criticize other theories for lumping several forms of crime into broad categories such as "crime", "violent crime" or even burglary. Clarke and Cornish (1985) argue that it is "necessary to differentiate at least between commercial and residential burglary….and perhaps even between different kinds of residential and commercial burglaries. For example, burglary in public housing projects will be a quite different problem from

burglary in affluent commuter areas, or from burglary in multioccupancy inner-city dwellings" (p.165). Clarke and Cornish apply this logic to several crimes including vandalism, robbery, rape, and fraud. Through a consideration of the factors that contribute to different forms of each legal category, it is then argued that crime prevention mechanisms can be put into place.

Apart from stressing a crime-specific approach, the rational choice perspective also introduces several assumptions about the nature of criminal offenders. These presumptions are directly linked to subsequent responses found in the 25 techniques for crime prevention. Rational choice theory supposes that potential criminal offenders will aim to reduce the effort of criminal offending, reduce risks, and increase the rewards.

First, the rational choice perspective posits that offenders will seek to reduce the efforts related to criminal activity. Therefore, offenders may change their methods, type of crime, or decision to participate in crime based on the amount and nature of effort exerted to successfully commit the crime. If greater effort is necessary to complete a crime, potential offenders may decide to avoid criminal activity altogether. Second, the rational choice perspective argues that offenders will attempt to reduce risks associated with potential crime. Risks can include, but are not limited to, physical harm such as injury or victim retaliation, criminal justice detection, embarrassment, and shaming. It is assumed that all criminal activity involves certain risks that the offender must include in his own calculations. Third, the rational choice perspective views the increase of rewards as a factor in criminal involvement. The term "rewards" may refer to any positive outcome from criminal activity including monetary gain, immediate gratification, enhancement of social standing, etc. Again, the potential rewards that one may

accumulate through crime are considered in the mind of the offender before the decision to commit any particular crime is made.

Each of these three components to the rational choice perspective has also been linked to situational crime prevention. By increasing offender effort or perceived risks or through decreasing rewards, crime is said to be less enticing for potential offenders. However, offenders are not necessarily equally influenced by effort, risk, and rewards. Offender behavior will largely depend upon their reasons for considering criminal activity and their ultimate short- and long-term objectives. The current study will investigate the interaction between these three aspects of the rational choice perspective and motor vehicle theft.

Rational Choice and Motor Vehicle Theft

As a framework for studying the crime, an environmental criminology approach is well suited to vehicle theft as many situational crime prevention and crime analysis examples use vehicle theft to demonstrate patterns and the specific vehicle theft purposes. Several studies have applied environmental theories of crime to motor vehicle theft (Barthe, 2004; Levy, 2006; McCord, 2010; Plouffe & Sampson, 2004). High reporting rates and available data have allowed for studies connecting these theories and the relationship between land use and MVT (McCord, 2010), publicity programs (Barthe, 2004), situational crime prevention (Plouffe & Sampson, 2004), and characteristics of the environment (Levy, 2006). Specific to this study, there is reason to believe that the rational choice perspective can be applied to the study of motor vehicle theft.

The rational choice perspective assumes that offenders weigh perceived benefits and costs. Several accounts from law enforcement authorities have acknowledged that there are ample opportunities to steal vehicles, punishments are not certain, and said punishments often lack severity. The lack of certainty associated with vehicle theft is found in exceptionally low clearance rates. One newspaper article identifies a vehicle thief who was convicted 19 times without being incarcerated. Beekman and Daly (1990) cite familiarity with a vehicle thief in New York City who was arrested five times and only paid fines totaling to approximately 500 dollars. Another article pointed out that state guidelines applied the possibility of a prison sentence only after three convictions for the crime (Robles, 1996). Other sources argue that vehicle theft is given very low priority in law enforcement agencies and prosecutor's offices (Haas, 1994). Perceived benefits of engaging in amateur or professional forms of vehicle theft for export are appealing to potential offenders when considering the minimal costs (Bruinsma & Bernasco, 2004). Some law enforcement authorities have argued that participation in vehicle trafficking is a wise choice compared to the criminal justice and safety dangers associated with drug or human trafficking (King, 1996).

The focus on the offender within the rational choice framework is also important. Offenders make several nonrandom decisions when determining targets choices for vehicle theft. These choices include vehicle properties, vehicle location, and temporal influences. Because there are many different reasons for which an offender steals a vehicle (Clarke & Harris, 1992a), these offender decisions may differ depending on the purpose of the vehicle theft. Therefore, the rational choice perspective helps us understand the framework for these criminal decisions.

The current research study searches for distinctions between forms of vehicle theft for export. The effort to look beyond general crime classifications is a major part of environmental criminology and the rational choice perspective. Because offenders (and victims) are viewed as calculating individuals who make decisions and movements across space and over time, it is essential to consider the possibility that there are separate motivations and purposes found across criminal incidents involving vehicles.

As Cornish (1993) describes, most research using the rational choice perspective either (1) explores the usefulness of the theory's components toward preventing crime or (2) investigates particular crimes. This study pursues the latter direction through a comparison of offense differences in border area and port area vehicle thefts. Further, the study links the concepts of reducing effort, reducing risk, and increasing rewards to decision-making differences across specific forms of vehicle theft to determine whether certain offenders focus more on reducing effort and risk opposed to increasing rewards.

Chapter Summary

This chapter provided a brief description of environmental criminology and the rational choice perspective and linked the theory to motor vehicle theft. Generally, theories within environmental criminology consider crimes more than criminals. Specifically, vehicle theft appears to be well-suited for study under such theories. The current study applies the rational choice perspective by examining three of the core tenets of rational choice perspective: increasing rewards, reducing risk, and reducing effort. It is hypothesized that certain types of vehicle thieves will be captured by certain parts of this

rational choice framework more than other parts. The next chapter will present the methodology associated with the current research.

Chapter VI - Methodology and Research Design

This research aims to build upon the previous studies described in Chapter III on vehicle theft for export in the United States. Two separate quantitative analyses are conducted in this study. The first part compares vehicle, spatial, and temporal patterns of recovered and unrecovered thefts in two cities that represent different forms of theft for export. The second analysis matches all vehicles stolen in a border city and recovered in Mexico to a random sample of vehicles stolen in the border city and recovered in the United States.

The main research questions that are posed in this study are introduced below. Following the research questions, the study's design will be presented by describing the quantitative methods (site description, data sources, variables, research hypotheses, analytical strategy) as well as study limitations. A brief summary will conclude the methodology section.

Research Questions

Research Question #1:

Are there vehicle, spatial, and temporal differences between unrecovered (professional) and recovered (temporary) vehicle thefts in a high-risk border (Chula Vista) and high-risk port (Newark) city?

Research Question #2:

Are there vehicle, spatial, and temporal differences between vehicles stolen in Chula Vista, Caifornia, and exported to Mexico and vehicles stolen in Chula Vista, California, and recovered domestically?

Research Question #3:

Do rational choice principles (increasing rewards, decreasing effort, and decreasing risks) assist in differentiating between forms of vehicle theft?

Site Descriptions

Two cities were chosen to be the subject of this incident-level study of vehicle theft. Chula Vista, California, was selected as a city that represents vehicle theft for export across land borders. Chula Vista is the closest of the largest 100 U.S. cities to the busiest border crossing to Mexico (San Ysidro). In Block et al.'s (2011) location quotient analysis of vehicle thefts in U.S. cities, Chula Vista ranked 5th of 247 cities. Newark, New Jersey was selected as a site to represent vehicle thefts from ports because Port Newark is the largest vehicle exporting port in the United States, according to data from the Port Import Export Reporting Service (PIERS). In the Block et al. (2011) study, Newark had the second highest rank out of the 247 cities. Both cities have been the site of previous research (Plouffe & Sampson, 2004; Potchak, McGloin, & Zgoba, 2002) due to relatively high levels of vehicle theft and well organized, detailed databases.

Chula Vista is a city of approximately 240,000 residents, located in the southwest portion of San Diego County in California. According to the most recent U.S. Census, the median family income in Chula Vista is slightly over $50,000 a year. Approximately 55 percent of Chula Vista residents are White, while 50 percent of the population classifies themselves as Hispanic or Latino. Geographically, Chula Vista is located only miles away from one of the busiest international land border crossings in the world into Tijuana, Mexico. The San Ysidro border crossing is the most heavily trafficked road border linking the U.S. and Mexico. A total of 6 lanes are available for vehicles crossing into Mexico. The city is also located very close to a second border crossing, Otay Mesa. Importantly, within Chula Vista's city boundaries, there are two major interstate highways, Interstate 5 and Interstate 805, and a third toll highway that travels north-south. The two interstate highways come together to form the San Ysidro border crossing while the third highway connects to the Otay Mesa border crossing. Therefore, each of the major three highways in Chula Vista lead directly to an international crossing into Mexico.

Several factors make Chula Vista an attractive and practical location for a detailed study of border vehicle theft patterns. First, its relative proximity to a major metropolitan area in Mexico makes Chula Vista one of only a few locations with a substantial population within miles of a major Mexican city. Second, Chula Vista features major interstate highways with many entrance and exit ramps to test hypotheses about highways and proximity to border crossings. Third, Chula Vista maintains detailed, updated information about vehicle theft and recovery locations. Previous research (Plouffe &

Sampson, 2004) has utilized this, or similar, comprehensive datasets. Many other potential research locations lack accessible databases for such analyses.

Newark is a city with a population of approximately 280,000 residents located in Essex County, New Jersey. Newark is part of the New York City metropolitan statistical area. About 53 percent of the Newark population is Black/African-American, while approximately 30 percent of residents label themselves as Latino. The city has been characterized as a high-crime area despite recent declines in violent and property crimes. Newark features many highways including Interstate 78, Interstate 280, the New Jersey Turnpike, and the Garden State Parkway. Interstate 78 runs east-west toward the Port of Newark. The Port of Newark-Elizabeth Marine Terminal is the largest vehicle exporting port in the United States.

Newark is an ideal location to study vehicle theft for export from ports for multiple reasons. First, as discussed above, Port Newark is the largest port for vehicle exports in the U.S. Second, similar to Chula Vista, Newark collects detailed data on vehicle theft incidents that includes information about the vehicle, location, and recovery (Maxfield, 2004). Third, the city has been identified as having a vehicle theft issue disproportionate to other crimes (Block et al., 2011), prompting the establishment of auto theft tasks forces for Newark and other New Jersey cities (Krimmel & Mele, 1998).

Data Sources

Chula Vista Police Department Crime Data

The Chula Vista Police Department (CVPD) maintains detailed records of vehicle theft incidents since 2002. The CVPD database contains a total of approximately 20,000 vehicle theft incidents. The database maintains information about the date and time of the vehicle theft, location of vehicle theft, make, model, and year of vehicle, license plate, vehicle identification number, recovery status, recovery date, and recovery location. Although a county database for the entirety of San Diego County possesses detailed information on all vehicle thefts in the county, unreliable recovery information makes the Chula Vista database a more appropriate source for a study on vehicle theft for export.

Newark Police Department Crime Data

The Newark Police Department (NPD) maintains detailed records of vehicle theft incidents since 2005. In total, the NPD database contains a total of approximately 15,000 vehicle theft incidents from 2005 to 2007. The database maintains information about date, time, and location of vehicle theft, make, model, and year of production. The database also contains details about recovery status, condition, and location. In addition, the NPD reports detailed information regarding vehicles that were stripped or had parts taken.

Vehicle Identification Number Websites

The websites, www.autocheck.com and www.decodethis.com allow users to enter vehicle identification numbers (VINs) to identify detailed information about the vehicle. For the purpose of this study, information derived from these websites is limited to the vehicle manufacturer and make as well as the year of production. Although the Chula Vista Police Department and Newark Police Department datasets contain detailed vehicle codes, these websites permit the researcher to double-check information on vehicle production year, manufacturer, and make. In some instances, ambiguous codes are found in the databases such as a Ford vehicle with the letters "exp" which could represent both Ford Explorers and Expeditions. In such cases, VINs are typed into the website to determine which of the models is associated with that VIN combination. In cases where no additional information on vehicle manufacturer, model, or year was needed, the vehicle identification number websites were not consulted.

TravelGIS.com

The TravelGIS.com website is used to calculate distances from exact points of theft to both highway entrances and border crossings. As described previously, the Travel GIS website uses natural area codes (NACs) which pinpoint precise locations anywhere in the world based on the 10-digit letter and number codes. This resource permits the researcher to assess the exact driving distance to create the most precise distance-based independent variables.

Variables

Dependent Variable

In the first analysis that includes data from both Chula Vista and Newark, recovery status is used to differentiate professional and amateur vehicle thefts. Furthermore, it is assumed that a large portion of unrecovered vehicle thefts in these two locations are related to vehicle theft for export. Therefore, vehicles that are stolen and recovered by the end of the data period are coded as 0, representing temporary vehicle thefts. These thefts include purposes such as joyriding, short-term transportation, or the commission of a crime that are stolen and unrecovered by the end of the study period are coded as 1, representing permanent vehicle theft relating to stripping, domestic resale, and vehicle theft for export. The only exception for this coding scheme is for vehicles that are recovered at border/port crossings or outside the country; these cases are included in the latter category. As shown in Tables 3 and 4, there are important limitations to using this proxy measure. The potential exists for both false positives and false negatives by using recovery status to identify professional vehicle theft. However, recovery status has been used to assess forms of vehicle theft in many previous studies (Clarke & Brown, 2003; Field et al., 1991, Gallahan, 1997; Tremblay et al., 1994).

The use of recovery status as the dependent variable for measuring professional theft requires considerable discussion. Studies that analyze specific forms of vehicle theft generally take one of two forms. Researchers either (1) rely on small samples of documented cases or (2) large samples using proxy measures for the type of theft. Each of these techniques for identifying purposes of vehicle theft is subject to limitations which exemplify the difficulty in studying the topic.

Studies using qualitative methods (Resendiz, 1998; 2001) or cleared investigations or arrests (Morselli & Roy, 2008; Tremblay et al., 2001) allow researchers to confidently identify the motivation for the incident. However, vehicle theft is a crime with very low clearance rates. Therefore, these studies are generally unable to attain large samples. For example, Morselli and Roy (2008) analyzed two organized international vehicle rings while a study conducted by Tremblay et al. (2001) in Canada included 210 vehicles. The major advantage of using this methodology is that the purpose of vehicle theft is usually very clear. The main limitation is the limited scope of the study. Therefore, this method is typically strongest for research studies that intend to analyze individual cases in-depth. Studies that aim to learn about large-scale patterns have limited use for this type of data selection.

A second option for studying vehicle theft is to use recovery status as a proxy measure. Several published studies have utilized this proxy measure to identify vehicle theft purposes (Clarke & Brown, 2003; Clarke & Harris, 1992b; Field et al., 1991; Tremblay et al., 1994). Data on recovery is generally available in local police databases as well as victim surveys and in insurance agency datasets. Therefore, researchers are able to analyze a larger number of incidents working under the assumption that unrecovered vehicles represent professional thefts while recovered vehicles represent amateur thefts. The obvious disadvantage to using this proxy measure is the possibility of misdiagnosing vehicle theft incidents through false positives (the vehicle is identified as a professional theft due to lack of recovery when the theft was actually an amateur effort) and false negatives (the vehicle is identified as an amateur theft due to recovery while the theft was actually a professional act).

Several commentators have initiated this discussion about using recovery as a proxy measure. Wallace (2004) provides a comprehensive discussion using examples of instances where vehicles might be reasonably misclassified. For instance, if a vehicle is stolen for a short joyride and left on private property or in submerged water, the vehicle might never be recovered despite the amateur, non-professional nature of the crime. Conversely, vehicles may be recovered in various conditions that may represent professional theft of major parts of the vehicle without eliminating the chances of recovery of some parts of the vehicle. Gant and Grabosky (2001) argue that professional thefts are underestimated because many vehicles that are found stripped and/or burned are labeled as recovered thefts that mark non-professional amateur theft. However, these thefts are often the work of professional thieves who stole the profitable portions of the vehicle before dumping it. Tables 3 and 4 provide 2x2 matrixes that summarize the possible outcomes of using recovery as a proxy measure to identify professional thefts or, more specifically, vehicle thefts for export.

Table 3 - Proxy Measures in Study 1 to Identify Professional Vehicle Theft Incidents

	Professional Theft	**Amateur Theft**
Unrecovered (Used as Proxy)	True Positive – The stolen vehicle is correctly identified as an unrecovered, professional theft.	False Positive – The stolen vehicle is incorrectly identified as a professional theft due to unrecovered status when, in reality, the incident was an amateur theft.
Recovered (Used as Proxy)	False Negative – The stolen vehicle is incorrectly identified as an amateur theft due to recovery status when, in reality, the incident was a professional theft.	True Negative – The stolen vehicle is correctly identified as a recovered, amateur theft.

Table 4 - Proxy Measures in Study 1 to Identify Vehicle Thefts for Export Incidents

	Actual Theft for Export	**Actual Theft for Other Purpose**
Unrecovered (Used as Proxy)	True Positive – The stolen vehicle is correctly identified as an unrecovered theft for export.	False Positive – The stolen vehicle is incorrectly identified as a theft for export when, in reality, it was taken for another purposes such as stripping or domestic resale. The scope of this category is unknown.
Recovered (Used as Proxy)	False Negative – The stolen vehicle is incorrectly identified as a non-export theft when, in reality, it was a theft for export. The scope of this category is known through tabulations of international recoveries.	True Negative - The vehicle is correctly identified as a recovered non-export theft.

In the study presented in Chapter VIII, vehicle exportation is measured in a different manner. In this second analysis, vehicles recovered in Mexico are coded as "1" while a random sample of vehicles recovered in the United States are coded as "0". This alternative measure for internationally trafficked vehicles eliminates the concern of "false positives" because all vehicles coded as "1" actually left the country. Unfortunately, this form of coding eliminates all unrecovered vehicle cases. Some of the unrecovered thefts may actually have remained in the country, while others likely were exported to Mexico or other destinations.

Independent Variables

Vehicle Manufacturer

Some discussion on vehicle exporting has included vehicle manufacturer information (Clarke & Brown, 2003; Plouffe & Sampson, 2004). In other cases, studies have been more interested in the exact model of vehicles (Field et al., 1991). In this study, vehicles are coded for their manufacturer. A total of 40 vehicle manufacturers are included in the total coding scheme. However, for the regression analyses in this dissertation, seven groupings are created. Based on the descriptive counts of stolen vehicles, the six most commonly stolen manufacturers are included (Chevrolet, Ford, Dodge, Honda, Nissan, and Toyota). An "other" category that includes vehicles from all other manufacturers is also used. Hondas are used as the reference category, because Hondas account for the most stolen vehicles in both Study 1 and Study 2 samples.

H1: *There will be significant differences between manufacturers of vehicles that are recovered domestically and those representing international trafficking in the two research locations.*

Vehicle Type

Previous studies have incorporated the role of vehicle type into analyses (Plouffe & Sampson, 2004). Media reports have suggested that thefts along the Mexican border, for instance, target vans above other vehicle types (Green, 1988). According to assumptions under choice structuring, there will be considerable variation in recovery

rates across different types of vehicles, because some vehicles are targeted more often than others for professional vehicle theft. However, statistics from insurance data in a KLD Associates (2002) report shows that recovery rates at a national level are relatively consistent across types of vehicles (passenger cars, light trucks, heavy trucks, and multi-purpose vehicles). This analysis will include a categorical variable that groups vehicle thefts into six categories: 2-door cars, 4-door cars, vans, utility vehicles, trucks, and others. Four-door vehicles are used in all analyses as the reference group. It is expected that there will be significant differences that exist between vehicles stolen for export and those stolen for other purposes.

H2: *There will be significant differences between the types of vehicles that are recovered domestically and those representing international trafficking in the two research locations.*

Vehicle Value

Within crime-specific decisions, offenders not only consider spatial variation, but also variation within target qualities. Publications under the broader scope of environmental criminology have discussed in-depth some of the target-related decisions of property offenders resulting in Felson's VIVA model and Clarke's CRAVED model (Clarke, 1998). Relating to vehicle thefts, there are several qualities that might influence a potential offender in their target decisions. As Clarke's CRAVED model supposes, the perceived value of any potential target should be considered in analyses of vehicle theft decisions. The theft of vehicles with greater value is an example of offenders attempting

to increase rewards associated with their criminal activity. However, vehicle value will not necessarily be a driving force for all types of vehicle thieves. As discussed earlier in Chapter II, some research studies have examined the role of vehicle value in different types of vehicle theft, including theft for export (Tremblay et al., 2001) and Roberts (in press) notes that previous research has shown professional forms of theft to target more expensive vehicles. This study includes an independent variable that estimates vehicle value based on the Kelley Blue Book estimates at the time of theft based on year of production, manufacturer, and model. The dollar figure for trade-in value at good condition is used. This method is selected above other ways of calculating vehicle value, because some data sources rely upon vehicle estimates of the vehicle owner which tend to be overinflated (M. Culuko, personal communication, May 27, 2010). Based on previous literature and theoretical logic, predictions are made for both study sites. The first hypothesis for this variable states that internationally trafficked vehicles will be more expensive in both cities in the study when compared to non-trafficked vehicles. The second expectation is that the difference will be greatest in Newark due to higher costs associated with shipping a vehicle out of a port.

H3: *Vehicles stolen for export will be more valuable than vehicles stolen for other purposes at both locations.*

H4: *Vehicles stolen for export in Newark will be more valuable than those in Chula Vista when compared to vehicles stolen for other purposes.*

Vehicle Age

Similar to vehicle value, vehicle age is another vehicle-specific factor that may relate to the purpose of vehicle theft. While it is not entirely clear whether old vehicles are selected by thieves due to reduced levels of security, opportunity, or disposability, there may be a relationship between the type of theft and the age of the vehicle. In other words, professional thieves may focus on newer or older vehicles opposed to temporary thieves. According to the rational choice perspective, offenders looking to increase rewards would steal newer vehicles that would be more desirable and disposable in secondary markets. As discussed in earlier chapters, there is anecdotal evidence that suggests that demand in international locations is for newer vehicles that are unavailable in those locations. Vehicle age is measured in this study as a continuous variable from the year of production to the year of theft. In comparing border and port thefts, reports from newspaper articles and academic journals (Tremblay et al., 2001) indicate that thefts through ports are generally newer vehicles. It is hypothesized that vehicles stolen in both locations for export will be younger than those stolen for other purposes. It is also expected that the differences will be greater in Newark than in Chula Vista due to international demand.

H5: *Vehicles stolen for export will be newer than vehicles stolen for other purposes at both research locations.*

H6: *The difference in age between vehicles stolen for export and those stolen for other purposes will be greater in Newark than in Chula Vista.*

Vehicle Owner Residence

Both the Newark and Chula Vista databases contain information about where the vehicle is registered. In accordance with the idea of increasing rewards in the rational choice perspective, vehicle thieves seeking an increase in rewards associated with vehicle theft will target vehicles from outside the local jurisdiction. Previous studies in the area have not included such a variable. First, it is hypothesized that vehicles stolen for export will be from out-of-city more than vehicles stolen for other purposes. Second, it is expected that this difference will be stronger in Newark than Chula Vista due to target selection associated with port-related thefts.

H7: *Vehicles stolen for export will target out-of-city vehicles more than vehicles stolen for other purposes in both sites.*

H8: The difference in targeting out-of-city vehicles between vehicles stolen for export and for other purposes will be greater in Newark than in Chula Vista.

Distance to the Boundary

The distance from the point of vehicle theft to the nearest international point of departure in road miles is included as a variable in this analysis. Distances are measured using Natural Area Codes for the address of theft and the nearest border or port location according to the TravelGIS website. Logic from the rational choice perspective would suggest that distance to the border will be influential in making a distinction between specific forms of vehicle theft because of the offender thought-process that includes concerns about the aftermath to the criminal event. By stealing vehicles closer to

international boundaries, vehicle thieves reduce both the effort needed to dispose of the vehicle and the risks associated with detection inside the United States. Several studies have found distance to international outlets to be a significant predictor of successful recovery (Gallahan, 1997; Plouffe & Sampson, 2004; Roberts, in press), however many of these studies have not considered other variables included in this present analysis. Furthermore, the previous studies were conducted at national, state, and county levels. None of these studies has examined the "distance" variable within a city near the border. Previous studies have found no link between distance to ports and recovery status (Roberts & Block, unpublished). Interestingly, some researchers (Gant & Grabosky, 2001) argue that professional thieves do not consider spatial issues as much as vehicle-related factors. Nevertheless, it is hypothesized that distance to the border will be a statistically significant predictor of recovery in Chula Vista because opportunistic border thieves will seek to reduce risks of offending. Furthermore, a secondary hypothesis states that vehicles in Chula Vista will be less likely to be recovered when they are stolen near international departure points.

H9: *Vehicles stolen for export in Chula Vista will be influenced by short distances to international crossings in comparison to other vehicle thefts.*

Distance to Highway Entrance

Another independent variable included in this study is the distance to the highway entrance that would provide quickest access to the nearest international crossing. Distance to highway entrances are measured using Natural Area Codes by calculating the

distance from the point of vehicle theft to the highway entrance. Much of the literature and theoretical discussion on stolen goods within environmental criminology argues that concealability is an important factor in facilitating the transfer of stolen property (Cherbonneau & Copes, 2006). In fact, Maxfield (2004) argues that concealability is one of the main factors encouraging vehicle theft. Highways act as facilitators for quick travel to borders as well as concealing forces due to the amount of vehicle traffic. According to the rational choice perspective, stealing vehicles destined for other countries closer to highway entrances would facilitate a reduction of risks such as police detection. In Chula Vista, there are 3 major highways (Interstate 5, Interstate 805, and Route 125) leading toward the U.S.-Mexico border. On these three highways there are 19 different entrance ramps to highways leading south. Previous studies on theft for export have not included variables considering the role of highways. It is hypothesized that distance to highway entrances will be more influential in Chula Vista because offenders will seek to reduce effort and risks associated with their criminal activity.

H10: *Vehicles stolen for export in Chula Vista will be influenced by short distances to highway entrances in comparison to other forms of other vehicle thefts.*

Time of Day

Along with space and target-related issues, temporal variation is another fundamental aspect of understanding the criminal event within environmental criminology. Specifically, there is a substantial amount of research into the daily patterns of criminal activity, including vehicle theft. Ratcliffe (2004) argues that temporal patterns

of crime are diffused, focused, or acute. A diffused pattern is relatively constant across time. A focused pattern shows important variation throughout a 24-hour period. An acute pattern features drastic temporal differences with a majority of the incidents occurring during a small percentage of daily hours. Previous discussions of temporal variation in vehicle theft for export have found mixed results. Resendiz's (1998) qualitative studies found that vehicle thieves at the border in Texas preferred to steal vehicles at night while border traffic was modest. Kaza's (2007) empirical study of border crossings found that vehicles with police contacts were more likely to cross during nighttime hours than other vehicles. Some prevention programs, such as Citizens Against Auto Theft (CAAT) in McAllen, Texas, operate on assumptions that vehicles are stolen and moved across the border during overnight hours. On the other hand, many commentators (Clarke & Brown, 2003; Miller, 1987) have argued that vehicle traffic is an important element for concealing the vehicles in heavy traffic at land borders. This study creates three categories for the "time of day" variable to assess whether the vehicle was stolen during the day (8am-8pm) or during the night (8pm-8am). Previous studies on vehicle theft have dichotomized day and night crimes using the same time periods (Shaw, Smith, & Bond, 2010). The third category represents "unknown" time when the start and end date of the theft range includes both day and nighttime hours. Due to the conflicting research that has been published on thefts across borders, there is no specific direction for the expected research findings.

H11: *There will be significant differences between the time of day when vehicles stolen for export and those stolen for other purposes are taken in both research locations.*

Day of Week

According to crime pattern theory, temporal patterns are likely to affect levels of specific crime and choice structuring properties. Many crimes tend to have higher rates on weekends than on weekdays (e.g. assaults in bars, homicides) while other crimes might be more highly concentrated on weekdays (thefts from residences) as potential guardians are away. However, little is known about how different forms of vehicle theft vary in terms of weekly temporal patterns. Additionally, weekly temporal patterns have not been connected to different forms of theft for export. One might argue that joyriders are more likely to commit vehicle thefts on weekends while professional thieves would commit acts throughout the week. This study constructs a variable for weekday thefts (Monday through Thursday) and weekend thefts (Friday through Sunday). A third category includes cases where the start and end date include both weekday and weekend times. It is expected that, in both research locations, vehicles stolen on weekdays will represent a larger portion of thefts for export while other purposes will be more highly concentrated on weekends in both Newark and Chula Vista.

H12: *Vehicles stolen for export will be concentrated more on weekdays than weekends in comparison to vehicles stolen for other purposes in both research locations.*

Recovery Status Study Analytical Strategy

A logistic regression analysis is performed at the incident-level for the study of vehicle theft in Chula Vista, California and Newark, New Jersey. The nature of this data allowed the researcher to determine whether specific incidents concluded in successful recovery. Individual incidents were used as the unit of analysis with a dichotomous dependent variable measuring whether the vehicle was recovered. A series of predictor variables, as discussed above, were developed to test whether vehicle-specific, spatial, and temporal factors affect vehicle theft patterns in these two high-risk locations. Separate models are run for each of the two research sites and significant predictors will be compared to test the research hypotheses which contrast Chula Vista and Newark.

Although there are more than 2,000 vehicle theft incidents in each city for each year used in this analysis, a randomly selected sample of 500 cases are randomly selected at each of the two sites for analysis for each of the 3 years in the database. All incidents in the database were not included because of the considerable time required to calculate each variable. In particular, the variables measuring distances to borders and highways are especially time-consuming to construct. Using this form of sampling, the entire analysis consists of 1,500 cases at each site for a total of 3,000 vehicle theft cases before cases with inadequate data were dropped. Following previous studies on vehicle theft

(Tonkin, Grant, & Bond, 2008), cases were dropped if incidents involved motorcycles or other non-traditional vehicles such as golf carts in both analyses.

Recovery Country Study Analytical Strategy

As discussed earlier in this chapter and in the final chapter of this dissertation, there are several limitations associated with the study using recovery status as a dependent variable. Most importantly, the study is limited by the potential for a large number of "false positive" cases which identify exported thefts due to unrecovered status when the vehicles were actually stolen for other purposes. In order to address this misclassification problem, in Chula Vista only, vehicles that were recovered in Mexico from the years 2005 to 2007 were compared with a random sample of recovered vehicles in the U.S. By only including cases involving vehicle recovery, this method allows the researcher to correctly identify whether every case in the sample was exported or not. Logistic regression models were formed dividing the vehicles recovered in Mexico and the U.S. into two separate groups as the dependent variable. Because of the nature of the dataset and lack of data on vehicles recovered at ports, a similar analysis was not possible in Newark. Separate limitations associated with this second study are discussed in Chapter X.

Chapter Summary

This chapter presented the methodology associated with the two studies applying the rational choice perspective to international vehicle trafficking. The main three research questions are examined by performing logistic regression analyses using two different dependent variables that serve as proxy measures for international thefts in Chula Vista, California and Newark, New Jersey. Nine independent variables are included in the study and a total of twelve research hypotheses were formulated based on predictions from previous research and theory. The next two chapters present the results from the two statistical analyses.

Chapter VII – Recovery Status Study Results

This chapter presents results from logistic regression analyses in both Chula Vista, California and Newark, New Jersey. Regression models are constructed in both locations using recovery status as a dependent variable and proxy measure for internationally exported vehicles. The results for Chula Vista are presented first including descriptive statistics, bivariate correlations, bivariate regression results, and multivariate regression results. The results for Newark are presented next in the chapter in the same format. Table 5 shows definitions and coding for variables in the study.

Table 5 - Definitions and Coding Scheme for Variables

Variable	Definition and Coding
Recovery Status (Dependent)	Vehicle recovered in United States = 0, Vehicle recovered outside of United States or unrecovered = 1 (Dichotomous)
Vehicle Manufacturer	Manufacturer of vehicle classified into one of seven groups: Chevrolet, Dodge, Ford, Honda, Nissan, Toyota, or Other (Categorical)
Vehicle Type	Type of vehicle classified into one of six groups: 2-door, 4-door, Van, SUV, Truck or Other (Categorical)
Vehicle Value	Dollar value (in thousands) of vehicle at time of theft based on Kelley Blue Book's "good" trade-in value (Continuous)
Vehicle Owner Residence	Vehicle registered within city of theft or outside of city of theft (0 – Out of Jurisdiction, 1 – In Jurisdiction) (Dichotomous)

Vehicle Age	Number of years since manufacture at time of theft (Continuous)
Distance to Border Crossing	Shortest distance in road miles to the nearest of two border crossings into Mexico (Continuous)
Distance to Highway Entrance	Distance to the highway entrance that facilitates the shortest trip to the border (Continuous)
Time of Day	Daytime thefts = 8am to 8pm, Nighttime thefts = 8pm to 8am, Unknown = Overlapping both time periods (Categorical)
Day of Week	Weekday thefts = Monday through Thursday, Weekend thefts = Friday through Sunday, Unknown = Overlapping both time periods (Categorical)

Chula Vista Results

Descriptive Statistics

Univariate statistics are presented in Tables 6 and 7 for the Chula Vista model. In Table 6 means and standard deviations are shown for the continuous variables in the study including vehicle value, vehicle owner residence, vehicle age, distance to nearest border crossing, and distance to the nearest highway entrance. The average Kelley Blue Book dollar value for unrecovered vehicles in Chula Vista is 5.65 (SD=5.62). The average value for the unrecovered vehicles is slightly over one thousand dollars more than recovered vehicles at 4.52 (SD=4.74). The standard deviations for the two populations are quite similar. The mean for vehicle owner residence of .6544 (SD=.4761)

indicates that approximately 66 percent of the unrecovered vehicles are owned by residents of Chula Vista. The value of .6917 (SD=.4622) for recovered vehicles shows that about 70 percent of recovered vehicles are owned by Chula Vista citizens. The mean for age at time of theft is 8.64 years (SD=4.428) for recovered vehicles and 7.67 (SD=4.316) for unrecovered vehicles in Chula Vista. For distance to the nearest Mexican border crossing, the average distance to the border is 7.74 road miles (SD=1.454) for unrecovered vehicles and 7.88 road miles (SD=1.543) for recovered vehicles. The average distances to nearest highway entrances are very similar. For unrecovered vehicles, the mean distance is 1.17 (SD=.7033), while recovered vehicles mean distance to border is 1.23 (SD=.7248).

Table 6 - Descriptive Statistics for Unrecovered and Recovered Vehicles in Chula Vista, 2005-07

	Unrecovered (N=463)	**Recovered (N=639)**
Vehicle Value (in thousands)	5.65 (5.62)	4.52 (4.74)
Vehicle Owner Residence (1= In City)	.6544 (.4761)	.6917 (.4622)
Age of Vehicle in Years	7.67 (4.316)	8.64 (4.428)
Distance to Border in Road Miles	7.736 (1.454)	7.879 (1.543)
Distance to Highway in Road Miles	1.171 (.7033)	1.227 (.7248)

Frequency percentages and raw totals are reported for the variables with nominal data. Data are presented for vehicle manufacturers in Chula Vista. Few notable

differences are found between the recovered and unrecovered samples except for Hondas accounting for a larger percentage of recovered vehicles than unrecovered. Vehicle type is categorized into six groups: 2-door cars, 4-door cars, vans, sports-utility vehicles, trucks, and other vehicles. The most common category for each of the two populations is 4-door cars. Slightly less than 46 percent of unrecovered vehicles in Chula Vista are 4-door cars, while 51.8 percent of recovered vehicles are 4-door cars. Two-door cars are also represented more often in the recovered category with 24.1 percent of recovered cars falling into this category, opposed to 20.7 for unrecovered vehicles. Both SUVs (12.5%) and trucks (15.1%) accounted for a larger proportion of unrecovered vehicles than recovered vehicles (7.5 and 10.6, respectively). When "time of day" is split into three categories (day, night, and unknown) the largest proportion for both unrecovered vehicles in Chula Vista is unknown (45.1%). In the group of recovered vehicles, nights accounted for the highest total at 36.3 percent. Notably, when the vehicle time of theft is known, for both groups, vehicles are more commonly stolen at night than during day time hours. For the "day of week" variable, the weekday category accounts for 47.9 percent of unrecovered vehicles and 46.5 percent of recovered vehicles. A higher percentage of Chula Vista recoveries (39.0%) are during the day than unrecovered cases (33.3%).

Table 7 - Frequency Statistics for Unrecovered and Recovered Vehicles in Chula Vista, 2005-07

	Unrecovered% (#)(N=463)	**Recovered % (#) (N=639)**
Vehicle Manufacturer		
Chevrolet	8.0 (50)	6.3 (55)
Dodge	3.3 (21)	4.6 (40)
Ford	13.2 (83)	11.8 (103)

Honda	17.0 (107)	23.7 (207)
Nissan	18.3 (115)	16.3 (142)
Toyota	10.2 (64)	8.8 (77)
Other	29.9 (188)	28.4 (248)
Vehicle Type		
2-Door	20.7 (96)	24.1 (154)
4-Door	45.6 (211)	51.8 (331)
Van	3.9 (18)	3.9 (25)
SUV	12.5 (58)	7.5 (48)
Truck	15.1 (70)	10.6 (68)
Other	2.2 (10)	2.0 (13)
Time of Day		
Day	26.2 (121)	30.8 (197)
Night	28.6 (132)	36.3 (232)
Unknown	45.2 (209)	32.7 (209)
Day of Week		
Weekday	47.9 (222)	46.5 (297)
Weekend	33.3 (154)	39.0 (249)
Unknown	18.8 (87)	14.6 (93)

Bivariate Statistics

Table 8 presents a bivariate correlation matrix for the independent variables in this analysis. While several relationships are statistically significant at the .01 level, there are a few relationships with high correlations. The relationship between vehicle value and vehicle age is negatively correlated (r=-.663). This result is expected as vehicle value

predictably drops when the vehicle becomes older in its market value. Separate regression models are run without each of these variables and with both variables included. A second relatively large correlation (r=-.707) occurs between weekday and weekend thefts. This negative correlation exists because most cases fall into one of the two groups with only some cases being "unknown".

Table 8 - Bivariate Correlation Coefficients for Independent Variables in Chula Vista, 2005-07

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
Rec	-.04	-.02	.06*	.06*	.07*	.11**	-.04	-.07**	-.06*	-.04	.03	-.05*	-.04	-.07**	.032	-.031	.021	.027	.023	.016
X1	1	-.11**	-.17**	-.22**	-.11**	-.14**	.05*	.19**	-.02	.02	-.02	.-.03	.03	-.02	-.07**	-.08**	-.11**	-.05	-.08**	.02
X2		1	-.07**	-.09**	-.05	-.05	-.01	-.-00	-.01	.01	.00	.00	-.02	-.00	.04	.27**	.04	-.07**	-.02	-.01
X3			1	-.14**	-.09	.26**	-.01	-.19**	-.02	-.01	-.01	-.01	-.-04	.03	.13**	-.,02	.09**	-.06	-.04	.09**
X4				1	-.09**	.10**	-.02	-.03	.01	-.05	-.03	-.03	.00	-.01	.11**	.04	.30	-.03	.11**	-.15**
X5					1	-.01	.03	-.05	-.04	.07**	-.00	-.00	-.01	-.00	-.03	-.01	-.07**	-.07**	-.01	.16**
X6						1	-.02	-.66**	.04	.00	.01	.01	-.04	.03	.17**	-.04	.04	-.-20**	.03	.20**
X7							1	.04	-.05	.04	-.06*	.05*	-.03	-.01	-.02	.02	-.00	.01	-.03	-.01
X8								1	-.04	-.02	-.02	.-.03	.04	-.07**	-.09	-.08	-.19	.10	.23**	-.16**
X9									1	.25**	.02	.04	.02	-.01	.01	-.00	-.02	.02	-.05*	-.02
X10										1	.00	.01	.00	-.03	-.01	-.02	-.04	.02	.01	.02
X11											1	-.45**	.03	.02	.04	-.01	-.05	.02	-.01	-.01
X12												1	.03	-.03	.00	.05*	.02	-.04	.01	-.00
X13													1	-.71**	-.00	-.01	-.02	.01	.01	.00
X14														1	.01	.01	.01	-.01	.02	-.03
X15															1	-.06*	-.10	-.13**	-.09**	-.18**
X16																1	-.08**	-.09**	-.07*	-.13**
X17																	1	-.17**	-.12**	-.24*
X18																		1	-.15**	-.29**
X19																			1	-.21**
X20																				1

p<.05 *, p<.01 **

Key: X1=2-Door, X2=Vans, X3=SUV, X4=Pick-ups, X5=Other Vehicles, X6=Value, X7=Owner Residence, X8=Age, X9=Border Distance, X10=Highway Distance, X11=Day, X12= Night, X13=Weekday, X14=Weekend, X15=Chevrolet, X16=Dodge, X17=Ford, X18=Nissan, X19=Toyota, X20=Other Manufacturer

Table 9 presents bivariate regression coefficients, standard errors, odds ratios, and p-values for each of the 14 bivariate regressions run. There were no statistically significant relationships for vehicle manufacturer coefficients. For the "vehicle type" variables, there are statistically significant relationships for SUVs (OR = 1.53, p. =.015), trucks (OR = 1.426, p= .015), and other vehicles (OR=1.903, p=.013) in comparison to the 4-door car reference group. Vehicle value (OR=1.044, p=.000) significant predicts recovery status in Chula Vista, as well, at the 99.9 percent confidence level. Age, another vehicle-related characteristic, negatively predicts recovery (OR= .976, p=.008). For spatial variables, vehicles that are stolen closer to the border are less likely to be recovered (OR=.925, p=.029). When compared to vehicles that were stolen on an unknown day, weekend thefts (OR=.741, p=.008) are more likely to be recovered. All other variables produced insignificant findings at the 95 percent confidence level.

Table 9 - Bivariate Regression for Recovery Status in Chula Vista, 2005-07 (N=1102)

	B(SE)	Odds Ratio	Sig.
Vehicle Manufacturer			
Chevrolet	.251 (.203)	1.285	.216
Dodge	-.329 (.275)	.720	.231
Ford	.128 (.158)	1.137	.416
Nissan	.142 (.138)	1.152	.304
Toyota	.158 (.178)	1.172	.373
Other	.072 (.115)	1.075	.529
Vehicle Type			
Two-Door	-.197 (.129)	.821	.126

Vans	-.216 (.263)	.805	.410
SUVs	.426 (.176)	1.530	.015
Trucks	.355 (.146)	1.426	.015
Other Vehicles	.644 (.260)	1.903	.013
Value	.043 (.012)	1.044	.000
Owner Residence	-.178 (.112)	.837	.111
Vehicle Age	-.024 (.009)	.976	.008
Border Distance	-.078 (.036)	.925	.029
Highway Distance	-.118 (.075)	.889	.118
Time of Day			
Night	-.299 (.113)	.741	.008
Unknown Time	.423 (.108)	1.526	.000
Day of Week			
Weekend	-.211 (.110)	.809	.054
Unknown Day	.148 (.139)	1.160	.285

Multivariate Statistics

Predictor variables were entered in a multivariate regression model to determine which predictors, if any, significantly predicted recovery in Chula Vista in Table 10. The only significant relationship for vehicle manufacturers are Nissans (OR=1.566, p=.026), which are significantly more likely to be unrecovered than Hondas. For vehicle type, SUVs still predicts recovery status at the 95 percent confidence level (OR=1.643, p=.035). SUVs are 64.3 percent more likely to be unrecovered than 4-door cars. Additionally, trucks are also 58.2 percent more likely to be unrecovered than 4-doors (OR=1.582, p=.042). The “other vehicles” category is not significant in the multivariate

model, although it had been significant in the bivariate regression. “unknown time” category. When compared to thefts during the day, thefts at unknown times are 67 percent more likely to be unrecovered (p=.001).

Table 10 - Binary Logistic Regression for Recovery Status in Chula Vista, 2005-07 (N=1102)

	B(SE)	Odds Ratio	Sig
Vehicle Manufacturer (Ref=Honda)			
Chevrolet	.258 (.300)	1.294	.390
Dodge	-.369 (.369)	.691	.317
Ford	-.036 (.261)	.964	.889
Nissan	.448 (.201)	1.566	.026
Toyota	.101 (.309)	1.107	.743
Other	.169 (.192)	1.184	.379
Vehicle Type (Ref = Four-Door)			
Two-Door	.074 (.167)	1.077	.657
Vans	.312 (.344)	1.367	.364
SUVs	.496 (.235)	1.643	.035
Trucks	.459 (.225)	1.582	.042
Other Vehicles	.246 (.447)	1.279	.582
Value	.017 (.017)	1.017	.322
Owner Residence	-.148 (.136)	.863	.275
Vehicle Age	-.036 (.021)	.964	.079
Border Distance	-.045 (.044)	.956	.303
Highway Distance	-.063 (.092)	.938	.492

Time of Day (Ref = Day)			
Night	-.065 (.163)	.937	.689
Unknown Time	.515 (.156)	1.674	.001
Day of Week (Ref = Weekday)			
Weekend	-.272 (.140)	.762	.052
Unknown Day	.178 (.180)	1.195	.321
Chi-Square = 61.764, (p=.000)			
Cox R2 = .055			

Newark Results

Descriptive Statistics

Tables 11 and 12 present univariate statistics (descriptives and frequencies) for independent variables used in the model for predicting Newark vehicle recovery. The average unrecovered vehicle stolen in Newark is valued at 5.01 or slightly over five thousand dollars (SD=5.29), while the average recovered vehicle is assessed at 4.70 or slightly less than five thousand dollars (SD=5.14). In contrast to Chula Vista, approximately half of both unrecovered vehicles (Mean=.5067, SD=.5016) and recovered vehicles (Mean=.5437, SD=.4983) are stolen from Newark registered owners. The percentages of cases where the vehicle owner lived within the city for both unrecovered and recovered vehicles in Chula Vista are higher. Surprisingly, unrecovered vehicles

stolen (8.21 years, SD=4.259) in Newark are on average only .05 years newer than recovered vehicles (8.26 years, SD=4.089).

Table 11 - Descriptive Statistics for Unrecovered and Recovered Vehicles in Newark, 2005-07

	Unrecovered (N=151)	**Recovered (N=977)**
Vehicle Value (in thousands)	5.01 (5.29)	4.70 (5.14)
Vehicle Owner Residence (1= In City)	.5067 (.5016)	.5437 (.4983)
Age of Vehicle in Years	8.21 (4.259)	8.26 (4.089)

In Table 12, frequency data for the Newark sample is presented for vehicle manufacturer, vehicle type, time of day, and day of week. Although there are few substantial differences in comparing percentages for unrecovered and recovered vehicles for each vehicle manufacturer category, it is noteworthy that a much higher percentage of vehicles are classified in the "other" categories in Newark (about 47.5) than in Chula Vista (less than 30). Over half (57.4%) of the recovered vehicles in the Newark sample are 4-door cars, while 56.3 percent of unrecovered vehicles are 4-doors. The next highest category for both unrecovered vehicles (17.9%) and recovered vehicles (15.6%) are vans. SUVs and trucks have a similar proportion of the overall sum in both the unrecovered and recovered vehicle sample.

The variable measuring "time of day" shows a relatively even distribution across the three response categories. While the "unknown" category accounts for the highest percentage of responses in both unrecovered (38.4%) and recovered (36.4%) categories, unrecovered vehicles were more often during the day (33.1%) and recovered vehicles

were more often stolen at night (33.6%). For "day of week", the proportion of vehicle thefts occurring during the day is nearly identical at 47.0 for unrecovered and 46.8 for recovered vehicles. A slightly higher percentage of known recoveries occurred during the weekend for recovered vehicles (43.4%) than for unrecovered vehicles (39.1%).

Table 12 - Frequency Statistics for Unrecovered and Recovered Vehicles in Newark, 2005-07

	Unrecovered% (#)(N=151)	**Recovered % (#) (N=977)**
Vehicle Manufacturer		
Chevrolet	8.1 (18)	4.4 (55)
Dodge	10.9 (24)	17.7 (221)
Ford	10.4 (23)	7.3 (91)
Honda	8.6 (19)	9.2 (115)
Nissan	8.6 (19)	7.7 (97)
Toyota	5.9 (13)	6.2 (77)
Other	47.5 (105)	47.6 (596)
Vehicle Type		
2-Door	11.3 (17)	9.5 (93)
4-Door	56.3 (85)	57.4 (561)
Van	17.9 (27)	15.6 (152)
SUVs	13.2 (20)	13.9 (136)
Truck	1.3 (2)	2.4 (23)
Other	0.0 (0)	1.2 (12)
Time of Day		
Day	33.1 (50)	30.0 (293)
Night	28.5 (43)	33.6 (328)

Unknown	38.4 (58)	36.4 (356)
Day of Week		
Weekday	47.0 (71)	46.8 (457)
Weekend	39.1 (59)	43.4 (424)
Unknown	13.9 (21)	9.8 (96)

Bivariate Results

Table 13 presents a bivariate correlation matrix between independent variables in the study. Notably, there is a high correlation between vehicle value and vehicle age (r=-.723). This relationship indicates that as vehicles become older, they lose value, as one would expect. Strong negative correlations between “day” and night” (r=-454) variables and “weekday” and “weekend” variables (r=-.786) were also expected and similar to the results in Chula Vis

Table 13 - Bivariate Correlation Coefficients for Independent Variables in Newark, 2005-07

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18
Rec	.05*	-.00	-.01	.00	.07**	.02	-.02	.07*	-.00	-.03	.02	-.04*	.06*	-.07*	.04	.01	-.00	-.00
X1	1	-.15**	-.13**	-.07**	-.05	-.06*	.00	.19**	-.04	.05*	.02	-.01	.05`	-.12**	-.01	-.05	-.05	-.04
X2		1	-.17**	-.09**	-.06*	-.14**	.08**	.02	.02	.00	.06*	-.06*	.04	.22**	.06*	-.10**	-.06*	-.06*
X3			1	-.08**	-.05*	.16**	-.06*	-.12**	.03	.00	-.05*	-.06*	.01	-.11**	.03	-.04	-.02	.15**
X4				1	-.03	.05	-.09**	-.06*	.04	-.04	.05	-.09*	.01	.12**	.15**	-.05	-.04	-.09**
X5					1	.00	-.05	-.03	-.05	.04	.02	-.02	-.01	.01	.02	-.04	-.04	.04
X6						1	-.14**	-.72**	.01	.00	-.00	.01	-.01	-.10**	-.05	.01	-.01	.15**
X7							1	..14**	-.03	.06*	.04	-.05	.00	-.02	-.01	-.02	.03*	-.01
X8								1	.00	-.00	.01	-.04	.08**	-.18**	.00	.01	-.20**	-.04
X9									1	-.45**	.04	-.01	.01	.00	.08**	.04	.03	-.06*
X10										1	.00	-.01	.01	.02	-.02	-.01	.01	-.04
X11											1	-.79**	.06*	.03	.04	-.01	.06*	-.06*
X12												1	-.04	-.03	-.04	-.02	-.04	.06
X13													1	-.10	-.07*	-.07*	-.06*	-.22**
X14														1	-.13**	-.13**	-.11**	-.43**
X15															1	-.08**	-.07*	-.28**
X16																1	-.07	-.28
X17																	1	-.25
X18																		1

p<.05 *, p<.01 **

Key: X1=2-Door, X2=Vans, X3=SUV, X4=Pick-ups, X5=Other Vehicles, X6=Value, X7=Owner Residence, X8=Age, X9=Day, X10= Night, X11=Weekday, X12=Weekend, X13=Chevrolet, X14=Dodge, X15=Ford, X16=Nissan, X17=Toyota, X18=Other Manufacturer

Bivariate regression models were run for the Newark sample with recovery status as the dependent variable. Chevrolets (OR=1.930, p=.020) are significantly more likely to be unrecovered than Hondas, while Hondas are significantly more likely to be unrecovered than Dodges (OR=.568, p=.013). For vehicle type, with four-door cars labeled as the reference group, 2-door vehicles are significantly more likely to be unrecovered (OR=1.554, p= .039). Vehicles in the "other" category are also statistically significant (OR=2.010, p=.01). Contrary to research expectations, age of vehicle is a significant predictor of recovery with each year of age decreasing the chance of recovery

by 3.5 percent (OR=1.035, p=.013). None of the temporal variables were statistically significant at the .05 level.

Table 14 - Bivariate Regression for Recovery Status in Newark, 2005-07 (N=1128)

	B(SE)	Odds Ratio	Sig.
Vehicle Manufacturer			
Chevrolet	.657 (.282)	1.930	.020
Dodge	-.565 (.229)	.568	.013
Ford	.393 (.246)	1.482	.109
Nissan	.113 (.262)	1.120	.666
Toyota	-.047 (.309)	.954	.878
Other	-.004 (.146)	.996	.980
Vehicle Type			
Two-Door	.441 (.213)	1.554	.039
Vans	-.033 (.202)	.968	.871
SUVs	-.059 (.222)	.943	.792
Trucks	.050 (.352)	1.051	.887
Other Vehicles	1.068 (.415)	2.910	.010
Value	.011 (.016)	1.011	.481
Owner Residence	-.105 (.146)	.901	.475
Vehicle Age	.034 (.014)	1.035	.013
Time of Day			
Night	-.265 (.161)	.767	.100
Unknown Time	.127 (.149)	1.135	.396
Day of Week			

Weekend	-.163 (.151)	.850	.280
Unknown Day	.368 (.207)	1.444	.076

Multivariate Results

The multivariate regression in Table 15 for the city of Newark produced no statistically significant results at the 95 percent confidence level. Each of the results that were significant in the bivariate models became insignificant predictors at .05. Additionally, the Cox & Snell R-Squared was extremely low (.022) indicating a model that does little to help understand recovery in the city. The discussion section of the dissertation explores possible explanations for the lack of significant findings in Newark.

Table 15 - Binary Logistic Regression for Recovery Status in Newark, 2005-07 (N=1128)

	B(SE)	Odds Ratio	Sig
Vehicle Manufacturer (Ref=Honda)			
Chevrolet	.664 (.453)	1.943	.142
Dodge	-.727 (.409)	.483	.076
Ford	.042 (.448)	1.043	.925
Nissan	.213 (.391)	1.237	.586
Toyota	.287 (.475)	1.332	.546
Other	-.235 (.318)	.791	.460
Vehicle Type (Ref = Four-Door)			
Two-Door	.168 (.312)	1.183	.591
Vans	.370 (.257)	1.448	.150
SUVs	-.128 (.281)	.880	.649

Trucks	-.595 (.794)	.551	.454
Other Vehicles	-19.128 (11502)	.000	.999
Value	.012 (.025)	1.012	.620
Owner Residence	-.152 (.181)	.859	.400
Vehicle Age	-.007 (.033)	.993	.828
Time of Day (Ref = Day)			
Night	-.244 (.229)	.784	.287
Unknown Time	.004 (.214)	1.004	.985
Day of Week (Ref = Weekday)			
Weekend	-.069 (.193)	.934	.722
Unknown Day	.458 (.280)	1.580	.103
Chi-Square = 25.038,			
Cox R2 = .022			

Chapter Summary

This chapter presented the univariate, bivariate, and multivariate results for the first study comparing Chula Vista and Newark. As a whole, more significant predictors were found in both bivariate and multivariate regression models in Chula Vista than in Newark. In Chula Vista bivariate regression tests found that SUVs, trucks, and other vehicle types are more likely to be exported than the reference group of 4-door cars. Exports from Chula Vista also are more expensive, older, and stolen closer to the border in bivariate tests. In the multivariate regression, both day and night categories are less likely to be recovered than the other category. For the “day of week variable”, weekend

thefts are linked to non-exported cases. Also, in the multivariate regression in Chula Vista SUVs are more commonly unrecovered.

In the Newark regression, bivariate tests show other vehicles more likely to be unrecovered than the reference group, 4-door cars. Additionally, newer vehicles are also more likely to be unrecovered. In the multivariate regression, no significant predictors were identified and the model proved to provide little assistance to understanding recovery status. Chapter IX, containing discussion of the study's findings, will elaborate further on understanding and interpreting the results of this section in relation to previous studies. Next, Chapter VIII will present the results from the second study in this dissertation, an analysis of vehicles recovered in Mexico and in the U.S. from the Chula Vista database.

Chapter VIII – Recovery Country Study Results

This chapter presents the results from a logistic regression analysis comparing vehicles recovered in the U.S. and Mexico from the border city of Chula Vista, California. This chapter presents the results in three sections. First, descriptive statistics, such as mean, standard deviation, and frequencies, are presented for each of the eight independent variables in the study. Next, the results are shown for bivariate correlations and bivariate regression models for each independent variable. Last, the results are presented for the multivariate analysis which includes all 4 vehicle-related predictors, 2 spatial predictors, and 2 temporal predictors. Table 16 features each of the variables with the associated definition and coding labels for interpretation in this section.

Table 16 - Definitions and Coding Scheme for Variables

Independent Variable	Definition and Coding
Recovery Location (Dependent)	Recovered in United States = 0, Recovered in Mexico = 1 (Dichotomous)
Vehicle Manufacturer	Manufacturer of vehicle classified into one of seven groups: Chevrolet, Dodge, Ford, Honda, Nissan, Toyota, or Other (Categorical)
Vehicle Type	Type of vehicle classified into one of six groups: 2-door, 4-door, Van, SUV, Truck or Other (Categorical)
Vehicle Value	Dollar value of vehicle at time of theft based on Kelley Blue Book's "good" trade-in value (Continuous)

Vehicle Owner Residence	Vehicle registered within city of theft or outside of city of theft (0 – Out of Jurisdiction, 1 – In Jurisdiction) (Dichotomous)
Vehicle Age	Number of Years since Manufacture at time of theft (Continuous)
Distance to Border Crossing	Shortest distance in road miles to the nearest of two border crossings into Mexico (Continuous)
Distance to Highway Entrance	Distance to the highway entrance that facilitates the shortest trip to the border (Continuous)
Time of Day	Daytime thefts = 8am to 8pm, Nighttime thefts = 8pm to 8am, Unknown = Overlapping both time periods (Categorical)
Day of Week	Weekday thefts = Monday through Thursday, Weekend thefts = Friday through Sunday, Unknown = Overlapping both time periods (Categorical)

Recovery Country Results

Descriptive Statistics

A total of 728 cases are compared from two populations: vehicles stolen in Chula Vista and recovered in the U.S and vehicles stolen in Chula Vista and recovered in the Mexico. Three hundred and sixty four cases are selected from each of the two populations. This group included all the vehicles stolen in Chula Vista and recovered at the border or in Mexico from 2005 to 2007 and a random sample of cases recovered in the U.S. Table 16 presents the definitions and coding schemes for the independent

variables. Table 17 shows the descriptive statistics (total # of cases, mean, standard deviation) for the continuous and dichotomous independent variables in the analysis. Most of the variables contained few cases with missing data. The variable with the most missing cases is vehicle value. In some instances, vehicle value could not be established due to ambiguous coding in the database or unusual vehicles not found in Kelley Blue Book.

As shown in Table 17, the mean vehicle value for vehicles recovered in Mexico (Mean=8.66, SD=6.40) is substantially higher than vehicles recovered in the U.S. (Mean=4.39, SD=4.79). For vehicle owner residence, the means are relatively close. The mean value of .663 (SD=.473) indicates that approximately 67 percent of vehicles recovered in Mexico are registered within the city of Chula Vista. Additionally, 71 percent of the vehicles recovered domestically are registered within the city (Mean=.708, SD=.455). For the variable of "age", the means show that vehicles recovered in Mexico are only 5.3 years old on average (Mean=5.30, SD=4.28), while vehicles recovered in the U.S. average 9.81 years of age (SD=5.61) since manufacture. For spatial variables, vehicles stolen in Chula Vista and recovered in the U.S. occur at a slightly further distance from the two border crossings (mean = 8.07 road miles, SD=1.71) than vehicles recovered in Mexico (mean = 7.85 road miles, SD=1.78). However, the mean distances toward the nearest highway entrance are relatively similar between vehicles recovered in Mexico (1.34 road miles, SD=..868) and those recovered in the U.S. (1.31 road miles, SD=.880).

Table 18 presents frequency data on independent nominal variables included in the study. The vehicle manufacturer variable shows that both Chevrolets and Fords are

overrepresented in the Mexico recovery category when compared to the U.S. group. The table shows the frequency and percentages for vehicle types in both the U.S. and Mexican recovery groups. In both groups, the majority of recovered vehicles are 4-door cars. In the Mexican recovery group, 4-door cars account for 41 percent versus 48 percent for the U.S. recoveries. The main apparent differences in frequency counts are found when comparing 2-door recoveries and SUVs and pickup trucks. Two-door vehicles account for 24 percent of U.S. recoveries, but only 9 percent of Mexican recoveries. On the other hand, SUVs and pick-up trucks account for a higher proportion of Mexican recoveries (21 and 24 percent, respectively) compared to only 7.2 and 12.7 percent for SUVs and pick-up trucks in U.S. recoveries.

The next variable in Table 18 shows frequency data for the three categories within the "time of day" variable. Of the cases recovered in the U.S., 39 percent of cases cannot not be classified as day or night because their start and end dates include both day and night times. When comparing day and night thefts that can be classified, 35 percent of U.S. recoveries are during night time hours while 26 percent are during the day. In the Mexican recovery category, a larger percentage of cases are unable to be classified as day or night (45 percent). Interestingly, of the cases that can be classified, a higher percentage took place during the day (29 percent) than during night time hours of 8pm to 8am (26 percent).

The other temporal variable included in this study measures whether vehicles were stolen during a weekday or weekend. In comparing the two groups, a similar percentage of vehicles are stolen on weekdays for Mexican recoveries (51.3 percent) contrasted with U.S. recoveries (49.7 percent). In both samples there are a substantial

number of cases that are unknown because their beginning and end dates of theft include both weekend and weekday times. However, there are fewer unknown cases in the "day of week" variable than for the "time of day" variable.

Table 17 - Descriptive Statistics for Chula Vista Vehicle Thefts Recovered in U.S. and Mexico, 2005-07

	U.S. Recoveries (N=332)	**Mexican Recoveries (N=347)**
Vehicle Value (in thousands)	4.39 (4.79)	8.66 (6.40)
Vehicle Owner Residence (1= In City)	.708 (.455)	.663 (.473)
Age of Vehicle in Years	9.81 (5.61)	5.30 (4.28)
Distance to Border in Miles	8.07 (1.71)	7.85 (1.78)
Distance to Highway in Miles	1.31 (.880)	1.34 (.868)

Table 18 - Frequency Data for Chula Vista Vehicle Thefts for U.S. and Mexico Recoveries, 2005-07

	U.S. Recoveries % (#) (N=332)	**Mexican Recoveries % (#) (N=347)**
Vehicle Manufacturer		
Chevrolet	8.0 (29)	15.7 (57)
Dodge	2.5 (9)	4.7 (17)
Ford	14.6 (53)	20.9 (76)
Honda	23.9 (87)	11.8 (43)
Nissan	14.0 (51)	8.0 (29)
Toyota	10.4 (38)	6.9 (25)

Other	26.6 (97)	32.1 (117)
Vehicle Type		
2-Door	24.1 (80)	9.2 (32)
4-Door	47.9 (159)	41.2 (143)
Van	5.4 (18)	4.6 (16)
SUVs	7.2 (24)	21.0 (73)
Truck	12.7 (42)	23.6 (82)
Other	2.7 (9)	0.3 (1)
Time of Day		
Day	26.2 (87)	29.1 (101)
Night	34.9 (116)	25.6 (89)
Unknown	38.9 (129)	45.2 (157)
Day of Week		
Weekday	49.7 (165)	51.3 (178)
Weekend	39.5 (131)	35.4 (123)
Unknown	10.8 (36)	13.3 (46)

Bivariate Results

Table 19 presents a correlation matrix between the 14 independent variables used in the model. As expected, there is a strong negative correlation between vehicle value and vehicle age (-.704). As vehicles become older, their value decreases. The multivariate analysis will determine which of these predictor variables play a larger role in thefts found in Mexico. Other strong relationships within the independent variable group include SUVs and vehicle value (r=.357), showing that SUVs have the highest value of the vehicle types in the study. Also, as expected, day and night thefts have a negative

correlational relationship (r=-.409) as well as weekday and weeknight thefts (r=-.784). The majority of the correlational relationships are non-significant.

Table 19 - Bivariate Correlation Coefficients for Independent Variables in Chula Vista, 2005-07

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
Dep	-.19**	-.03	.21**	.11**	-.09*	.36**	-.04	-.41**	-.07	.00	.02	-.09*	.03	-.05	.12**	.06	.08	-.10**	-.06	.06
X1	1	-.10**	-.18**	-.21**	-.07*	-.17**	.06	.20**	.08*	-.00	-.09*	.03	.05	-.06	-.09*	-.08*	-.10**	-.02	-.11**	-.02
X2		1	-.09*	-.11**	-.04	-.09*	-.02	.06	-.00	-.04	.02	.03	-.04	.06	-.05	.12**	.04	-.04	.02	.04
X3			1	-.20	-.07	.36**	-.04	-.22**	-.04	.01	.14**	-.06	.01	.01	.26**	-.08	.06	-.11**	-.01	.03
X4				1	-.08*	.04	.00	-.12**	.06	.06	-.04	-.04	-.00	-.02	.01	.15**	.31**	-.00	.11**	-.20**
X5					1	-.05	.03	.03	.05	-.00	.11**	-.02	.02	.00	-.04	.01	-.08*	-.03	.01	.09**
X6						1	-.04	-.70**	.03	.06	.12**	-.06	.02	.01	.20**	-.07	.01	-.20**	-.06	.28**
X7							1	.08*	-.04	.05	-.17**	.12**	.01	-.05	.02	-.03	-.02	.08*	.01	-.07*
X8								1	.01	-.07	-.08*	.08*	-.03	.02	-.17**	-.02	-.12**	.18**	.15**	-.18**
X9									1	.31**	.05	-.08	-.02	-.01	.00	-.03	-.06	-.01	.01	.07
X10										1	.03	-.06	.01	-.01	.04	-.02	-.02	.00	.02	.02
X11											1	-.41**	.12**	-.02	.04	-.01	-.02	-.02	-.09*	.10**
X12												1	.03	.02	-.04	.04	.00	.03	.04	-.10**
X13													1	-.78**	-.04	.06	.01	.07	-.10**	.01
X14														1	.04	-.04	.03	-.05	.07	-.03
X15															1	-.07	-.17**	-.13**	-.11**	-.24**
X16																1	-.09*	-.07	-.06	-.12**
X17																	1	-.16**	-.14**	-.30**
X18																		1	-.11**	-.23**
X19																			1	-.20**
X20																				1

p<.05 *, p<.01 **

Key: X1=2-Door, X2=Vans, X3=SUV, X4=Pick-ups, X5=Other Vehicles, X6=Value, X7=Owner Residence, X8=Age, X9=Border Distance, X10=Highway Distance, X11=Day, X12= Night, X13=Weekday, X14=Weekend, X15=Chevrolet, X16=Dodge, X17=Ford, X18=Nissan, X19=Toyota, X20=Other Manufacturer

Bivariate logistic regressions were run for all independent variables included in this analysis. Table 20 presents the coefficients, standard errors, odds ratios, and significance levels for each of the 14 independent variables in the study for both of the groups. In the bivariate regression models, several significant relationships were identified. For vehicle manufacturer, Chevrolets (OR=2.145, p=.002) and Fords

(OR=1.548, p=.026) are both significantly more likely to be recovered in Mexico when compared to the reference group of Hondas. Conversely, Hondas are significantly more likely to be recovered in Mexico in comparison to Nissans (OR=.531, p=.010)

For vehicle type, four-door vehicles were used as the reference category because they had the highest count of each of the six vehicle type categories in both groups. Two-door vehicles are 67 percent less likely to be recovered in Mexico than in the U.S. when compared to four-door vehicles. This relationship is significant at the 99.9 percent confidence level. While 2-door vehicles are more likely to be recovered in Mexico than in the U.S., the opposite is true for SUVs and pick-up trucks. The strongest bivariate relationship for vehicle type is for SUVs. When compared to 4-Door vehicles, SUVs are 276 percent more likely to be recovered in Mexico (p=.000). Likewise, pick-up trucks are much 72 percent more likely to be recovered in Mexico (OR=1.72, p=.005). Vehicles in the "others" category are 70 percent less likely to be recovered in the Mexico than in the U.S. (OR =.303, p=.021). Vans showed no statistically significant relationships when compared to 4-door cars.

Vehicle value significantly predicts being recovered in Mexico, providing further evidence to the descriptive statistics that vehicles of higher value are more often recovered in Mexico than in the U.S. The coefficient and odds ratio are .157 and 1.17, respectively, showing that an increase of one thousand dollars of value increases the likelihood of recovery in Mexico by 17 percent. The bivariate relationship between vehicle value and recovery country is significant at the 99.9 percent confidence level.

The age of vehicle, as measured by Kelley Blue Book values, was found to be a predictor of recovery location between the two groups. The negative coefficient (-.179) and odds ratio (.836) indicate that vehicles recovered in Mexico are younger than vehicles recovered in the U.S. For each additional year of vehicle age, a vehicle's odds of recovery in the U.S., opposed to Mexico, is reduced by 17 percent. The bivariate relationship for the variable of "age" is statistically significant at the 99.9 percent confidence level.

The variable measuring the distance to the Mexican border crossings did not show a statistically significant relationship at the 0.05 level for predicting recovery country. However, the relationship was statistically significant at 90 percent confidence (p=.06).

Of the temporal variables for "time of day" and "day of week", only one statistically significant relationship appeared. There is no relationship between day thefts and recovery location when compared to thefts without known times. However, thefts are night are 36 percent less likely to be recovered in the Mexico (OR = .664, p=.012) than thefts with unknown times.

Other predictor variables showed no significant relationship with recovery location. There is no statistically significant relationship between vehicle owner registration status and the dependent variable. The "distance to highway" and time variables were not statistically significant in bivariate regression models either. The relationships that became nonsignificant predictors in the multivariate model include "other vehicles" compared to four-door vehicles and vehicle value. In the bivariate regression, other vehicles were more likely to be recovered in the U.S. This relationship

disappeared in the multivariate model. Similarly, vehicle value was a strong predictor of recovery country in the bivariate regression. Yet, when other variables were included in the model, the relationship became insignificant. Based on the high correlation, vehicle age seems to impact the relationship between vehicle value and country of recovery.

Table 20 - Bivariate Logit Regression Results for Recovery Location in Chula Vista, 2005-07 (N=679)

	B(SE)	Odds Ratio	Sig.
Vehicle Manufacturer			
Chevrolet	.763 (.241)	2.145	.002
Dodge	.659 (.419)	1.932	.116
Ford	.437 (.197)	1.548	.026
Nissan	-.632 (.246)	.531	.010
Toyota	-.458 (.269)	.633	.089
Other	.265 (.163)	1.304	.104
Vehicle Type			
Two-Door	-1.104 (.224)	.331	.000
Vans	-.286 (.340)	.751	.400
SUVs	1.324 (.243)	3.759	.000
Trucks	.544 (.193)	1.722	.005
Other Vehicles	-1.194 (.518)	.303	.021
Value	.157 (.018)	1.17	.000
Owner Residence	-.153 (.160)	.858	.338
Vehicle Age	-.179 (.017)	.836	.000
Border Distance	-.082 (.043)	.922	.060

Highway Distance	.011 (.086)	1.011	.899
Time of Day			
Night	-.409 (.163)	.664	.012
Unknown Time	.283 (.151)	1.327	.061
Day of Week			
Weekend	-.210 (.153)	.810	.169
Unknown Day	.236 (.230)	1.266	.305

Multivariate Results

The independent variables were placed into a multivariate logistic regression model. Table 21 shows coefficients, standard errors, odds ratios, and significance levels. For vehicle type, two-door (p=.012) vehicles are 67less likely to be recovered in Mexico, while SUVs (p=.019) and Trucks (p=.034) are 276 and 72 percent more likely to be recovered in Mexico, respectively. Interestingly, vehicle age significantly predicted recovery country with younger vehicles recovered in Mexico. Each additional year of age decreases the likelihood that the vehicle will be recovered in Mexico by 12 percent (OR=.878, p=.000). Although distance to the Mexican border crossings did not significantly predict recovery country at .05, the relationship was significant at 90 percent confidence with shorter distances to the border increasing the likelihood of recovery in Mexico. No significant findings are identified for temporal variables in the multivariate model.

When comparing the bivariate and multivariate results, many of the coefficients that were statistically significant in bivariate regressions held their relationship when the other variables were entered in the same model. However, several relationships that were

established in the bivariate regression table, disappeared for vehicle manufacturer. Vehicle type appears to account for differences in vehicle manufacturers when comparing vehicles recovered in the U.S. and Mexico.

Table 21 - Binary Logistic Regression for Recovery Location in Chula Vista, 2005-07 (N=679)

	B(SE)	Odds Ratio	Sig
Vehicle Manufacturer (Ref=Honda)			
Chevrolet	-.150 (.374)	.861	.689
Dodge	.483 (.526)	1.620	.359
Ford	-.065 (.344)	.937	.850
Nissan	-.087 (.337)	.917	.797
Toyota	-.421 (.400)	.656	.292
Other	.009 (.287)	1.009	.976
Vehicle Type (Ref = Four-Door)			
Two-Door	-.671 (.267)	.511	.012
Vans	.064 (.409)	1.066	.876
SUVs	.720 (.306)	2.054	.019
Trucks	.590 (.278)	1.804	.034
Other Vehicles	-1.770 (1.106)	.170	.109
Value	.037 (.025)	1.038	.138
Owner Residence	-.039 (.193)	.961	.838
Vehicle Age	-.130 (.028)	.878	.000
Border Distance	-.099 (.055)	.906	.072

Highway Distance	.019 (.106)	1.020	.855
Time of Day (Ref = Day)			
Night	-.117 (.240)	.889	.626
Unknown Time	.277 (.226)	1.319	.220
Day of Week (Ref = Weekday)			
Weekend	-.176 (.192)	.839	.360
Unknown Day	.247 (.288)	1.281	.390
Chi-Square = 171.362, (p=.000)			
Cox R2 = .223			

Chapter Summary

The study in this chapter measured international thefts using a different method than the first study by contrasting vehicles recovered in the U.S. and vehicles recovered in Mexico. When using this alternative method for measuring theft for export, more significant relationships are found. The bivariate analysis showed many significant relationships, while fewer are identified in the multivariate model. Bivariate predictors of recovery in Mexico include vehicle types of SUV and trucks, more valuable vehicles, younger vehicles, and nighttime thefts. Two-doors were more likely to be recovered in the U.S. compared to four-door cars. In the multivariate model, SUVs and trucks remained significant predictors, while only younger vehicles were significant predictors of the other vehicle characteristic variables. The next chapter, Chapter IX, will provide a discussion of results.

Chapter IX – Summary of Results and Discussion

This chapter provides a summary of the findings from the previous two chapters and a re-visitation of the study's primary research questions and hypotheses. This breakdown will discuss the three types of independent variables included in the study (vehicle, spatial, and temporal). Table 22 presents whether each of the hypotheses received no support, partial support, or full support.

Revisiting Research Questions

Research Question #1: Are there vehicle, spatial, and temporal differences between unrecovered and recovered vehicle thefts in a high-risk border and high-risk port area?

Yes. This first quantitative study identified several significant relationships as discussed in the individual research hypotheses below. However, most of these relationships were found in Chula Vista, not Newark.

Research Question #2: Are there vehicle, spatial, and temporal differences between vehicles stolen in the U.S. and exported to Mexico and vehicles stolen in the U.S. and recovered domestically?

Yes. The second quantitative study identified many significant relationships as discussed below. Specifically, vehicle exported to Mexico are younger in age and "larger" vehicle types.

Research Question #3: Do rational choice principles apply to vehicle theft decision-making in border and port areas?

The answer to this research question is mixed. While there were some relationships, many of the proposed hypotheses according to the logic proposed in the study were not found in the study results.

Revisiting Research Hypotheses

Vehicle Relationships

H1: *There will be significant differences between manufacturers of vehicles that are recovered domestically and those representing international trafficking in the two research locations.*

This hypothesis received minimal support in these studies. Bivariate regressions revealed several significant relationships between vehicle manufacturer and proxy measures for international vehicle trafficking. However, most of these relationships disappeared when vehicle type was taken into account in the same model. Therefore, it can be concluded that variations in vehicle manufacturer recovery patterns are representative of the types of vehicles (e.g. pick-up trucks, vans, etc.) that are stolen and exported.

H2: *There will be significant differences between the types of vehicles that are recovered domestically and those representing international trafficking in the two research locations.*

This hypothesis was supported by the studies in Chula Vista and was the strongest variable in predicting exports. Exported thefts are more likely to be SUVs and trucks using both forms of measuring exports. In Newark, however, only bivariate analyses revealed any relationship between types of vehicle and the reference category.

H3: V*ehicles stolen for export will be more valuable than vehicles stolen for other purposes at both locations.*

This prediction also achieved partial support from this study. While there were no statistically significant differences in Newark, there were significant differences in vehicle value in the Chula Vista sample in the bivariate regression. In the multivariate regression model, value was a significant predictor of recovery when age was dropped as a variable in both studies in Chula Vista.

H4: *Vehicles stolen for export in Newark will be more valuable than those in Chula Vista when compared to vehicles stolen for other purposes.*

This hypothesis was not supported in this study. While the Newark data did show a difference in means between unrecovered and recovered vehicles, this relationship was not significant in multivariate models. The first study did not show any statistical difference between the values of unrecovered and recovered vehicles. The second analysis in Chula Vista did find stark differences between vehicles recovered in Mexico and the U.S.

H5: *Vehicles stolen for export will be newer than vehicles stolen for other purposes at both research locations."*

This expectation was only supported in studies in Chula Vista, not in Newark. In both studies in Chula Vista, the "age" variable was a significant predictor of recovery status in Study 1 and location in Study 2 bivariate results. In multivariate models, "age" was only significant in the second study. In Newark, there were no significant differences in the multivariate logistic regression models.

H6: *The difference in age between vehicles stolen for export and those stolen for other purposes will be greater in Newark than in Chula Vista."*

This hypothesis was not supported in this study. As stated in the previous hypothesis, the only multivariate significant relationships relating to "age" were found in Chula Vista.

H7: *Vehicles stolen for export will target out-of-city vehicles more than vehicles stolen for other purposes in both sites*.

This hypothesis was not supported in either research location. The variable measuring the residence of the vehicle owner was not significant in any analysis.

H8: *The difference in targeting out-of-city vehicles between vehicles stolen for export and for other purposes will be greater in Newark than in Chula Vista*.

This hypothesis was not supported. Again, the variable measuring residence of the vehicle owner was not significant in any analysis.

Spatial Relationships

H9: *Vehicles stolen for export in Chula Vista will be influenced by short distances to international crossings in comparison to other vehicle thefts.*

This hypothesis was not supported. The only relationship that was significant at the .05 level was the bivariate relationship in the first analysis. In the second study the relationships in the bivariate and multivariate analysis were all significant at .10, but not at .05. Each of the relationships were in the expected direction with vehicles stolen closer to the border linked with professional, exported thefts.

H10: *Vehicles stolen for export in Chula Vista will be influenced by short distances to highway entrances in comparison to other forms of vehicle theft.*

This hypothesis was not supported. None of the analyses showed any significant relationship between highway entrance and dependent variables.

Temporal Relationships

H11: *There will be significant differences between the time of day when vehicles stolen for export and those stolen for other purposes are taken in both research locations.*

This finding received little support. The only significant findings in any of the studies for the time of day of the theft was unknown times being more likely unrecovered than vehicles stolen during the day.

H12: *Vehicles stolen for export will be concentrated more on weekdays than weekends in comparisons to vehicles stolen for other purposes in both research locations.*

This finding received no support. When compared to weekday thefts, significant relationships were not found in Chula Vista or Newark in multivariate models for weekend thefts or unknown thefts.

Table 22 – Level of Support for Proposed Research Hypotheses in Current Study

	Strong	Partial	No Support
#1 – Significant Differences in Manufacturers Within Sites		X	
#2 - Significant Differences in Vehicle Type Within Sites		X	
#3 - Significant Differences in Vehicle Value Within Sites		X	
#4 - Significant Differences in Vehicle Value Across Sites			X
#5 - Significant Difference in Vehicle Age Within Sites		X	
#6 - Significant Differences in Vehicle Age Across Sites			X
#7 - Significant Differences in Owner Residence Within			X
#8 - Significant Differences in Owner Residence Across			X
#9 - Significant Differences in Border Distance in CV			X
#10 - Significant Differences in Highway Distances in CV			X
#11 - Significant Differences in Time of Day Within Sites			X
#12 – Significant Differences in Day of Week Within Sites			X

Discussion

Previous research had established expectations for many of the vehicle-related variables. In relation to vehicle type, Chula Vista studies found there to be many

differences relating to border theft. These findings generally match reports in the media and prior studies. There are at least three possible interpretations for why SUVs and trucks are targeted for exported thefts, while 2-door cars are linked to domestic thefts. First, although the data is not available for this analysis, it is possible that SUVs and trucks are most common in Mexico and will blend in with the vehicle fleet. This explanation is similar to the logic of Miller (1987) and Field et al. (1991) that vehicle models manufactured and found in Mexico would be stolen for export in the U.S. more often. A second explanation is that SUVs and pick-up trucks are better suited for the rough terrain in Mexico. Miller (1987) suggests that many vehicles are used to transport drugs deeper into Mexico. In particular, across the border from Chula Vista, areas deeper in Mexico past Tijuana are especially difficult to drive. Third, as vehicle trafficking can be related to other forms of cross-border trafficking, such as the movement of people (Miller, 1987), drugs (Miller, 1987), or firearms. SUVs and trucks would be more useful in moving larger amounts and more concealable people and contraband back across the border.

For vehicle value, this study used estimates from Kelley Blue Book values. Obviously, there are some weaknesses with this measure as the vehicle theft databases in both cities do not contain information about vehicle condition, mileage, or any modifications that might change the estimated value of the vehicle. Additionally, vehicles might be more or less valuable in certain markets. Despite these limits, the variable does appear to be important in differentiating between local, recovered thefts in Chula Vista and Mexico-bound thefts. This finding indicates that many of the vehicles are likely being used for profit-oriented purposes. The result also adds to the current literature that

focuses more on vehicle type than value. In addition to the findings of Miller (1987), Field et al. (1991), and Resendiz (1998) in relation to vehicle preferences, the sheer monetary value of vehicles should be considered. If vehicles were only stolen for trafficking purposes, the vehicle type would be more important than value. The lack of significant findings for value in Newark is somewhat surprising. Although the mean difference was over $1,000 different between unrecovered and domestically recovered vehicles, the variable was not a significant predictor in the regression models. Considering past discussion of vehicle value in newspaper reports and in studies like Tremblay et al. (2001) on exports, this finding may indicate that very few of the unrecovered thefts in Newark are actually being shipped out of the country.

In Chula Vista, there is a strong effect of age on type of vehicle theft. The second analysis, in particular, identified age as a predictor of recovery in Mexico. This finding indicates that thieves involved in exporting are particularly interested in stealing younger vehicles. The fact that amateur thieves are stealing older cars may also reflect the role of immobilizers that are more commonly found on newer vehicles. Professional thieves who bring vehicles across the U.S.-Mexico border do not appear to be deterred by the forms of security found on many of the vehicles built after the year 2000. However, amateur thieves seem to target older vehicles that are likely not equipped with immobilizers or which have very early versions of immobilizing technology. The results in Newark provide more evidence that vehicles might not be going overseas. Perhaps, the similar ages of vehicles stolen between the unrecovered and recovered domestically categories is due to older vehicles being professionally stripped or chopped rather than exported.

The examination of vehicle manufacturers provides new insight to previous research by Miller (1987), Field et al. (1991), Resendiz (1998), and Plouffe and Sampson (2004). Specifically, both studies in this dissertation included dummy variables for the most commonly stolen manufacturers. In the Mexico border region, Miller (1987) stated that in the 1980s, Chevrolets and Fords were desirable in Mexico. Regression results indicate that Chevrolets remain popular in cross-border thefts to Mexico. The differences found across vehicle manufacturer, though, appear to represent an artifact of vehicle type (i.e. 2-door, 4-door, sports-utility vehicles, vans, trucks). When vehicle type is added into the multivariate model, there are few significant influences of vehicle manufacturer.

Previous to this study, few researchers have examined the relationship between space and international vehicle trafficking. The four main studies considering space (Gallahan, 1997; Plouffe & Sampson, 2004; Roberts, in press; Roberts & Block, unpublished) all found significant relationships between distance to the Mexico border and either recovery rates or professional theft rates. The one study to consider distance to ports found no significant relationship (Roberts & Block, unpublished). Additionally, there was no relationship between distance to the U.S.-Canada border and professional theft rates. The current study extended the research literature by examining distance to border effects within a city. Research has already established that when comparing city-level data across the country (Roberts, in press; Roberts & Block, unpublished), state (Gallahan, 1997), and county (Plouffe and Sampson, 2004), there are substantial effects. However, none of these studies had investigated patterns within a city near the border.

Although the mean distance in Chula Vista revealed an average shorter distance for unrecovered vehicles in Study 1 and vehicles recovered in Mexico in Study 2, there

were no significant findings at .05 in either bivariate or multivariate regressions. This study may identify a "cut off" point in the importance of "distance to the border" considerations. Plouffe and Sampson's (2004) previous analysis of San Diego County data showed that areas approximately 30 or 40 miles from the border in northern San Diego County had higher recovery rates than areas closer to the border. In that research study, distance appeared to play a significant role in the decision-making process of thieves in the area. Thieves were not largely willing to steal vehicles and drive over 30 miles consistently to cross the border at the same rates that they would within miles of the border. In Chula Vista, the closest distance to the border is approximately 4 miles away, while the furthest distance from the closest border crossing is about 14 miles. Therefore, the lack of significant findings in this study shows that thieves do not appear to mind driving from northern parts of Chula Vista with stolen vehicles to the border. However, they are less likely to be willing to drive from the cities further north in San Diego County across the Mexican border.

It was also posited that "distance to the nearest highway" entrance would be taken into consideration by potential thieves in Chula Vista. Every theft crossing the border would be required to enter one of the three highways filtering toward the Mexican border at some point. The highway provides quick access away from the point of theft which might reduce the risk of detection. The lack of significant findings in either analysis may either indicate that this factor does not influence exported theft patterns or that amateur thefts also consider proximity to highway entrances for access to joyriding areas or quick getaways.

Academic interest in the relationship between time and crime has increased in recent years. Within the modest literature base on vehicle trafficking across borders and ports, there has been some discussion about when the theft occurs. Specifically, this discussion has been related to whether vehicle thieves moving vehicles across the Mexican border prefer to steal and move cars during day or nighttime hours. There is logical support for both ideas. If vehicles are stolen during the night, they can be moved quickly to and across the border without much interference. However, when vehicles are stolen during the day, the thieves might be able to blend in with the "crush of commuter traffic" (Miller, 1987, p. 19) of international crossings. In the analyses comparing recovered and unrecovered vehicles in Chula Vista and Newark, the independent variables measuring time of day and day of week did not generally reach statistical significance.

Chapter Summary

This chapter has revisited each of the twelve hypotheses originally presented in Chapter VII. As described in Table 22, none of the hypotheses received consistently strong support, yet four of the hypotheses received some support in the analyses. The discussion subsection of the chapter reviewed how the findings, or lack of findings, can be interpreted in light of previous findings. Particularly, the section revisited the work of Miller (1987), Field et al. (1991), Resendiz (1998), and Plouffe & Sampson, 2004). The next chapter concludes the dissertation by presenting the study's limitations, areas for future research, theoretical and policy implications, and concluding thoughts.

Chapter X – Limitations, Implications, and Conclusion

This concluding chapter introduces the research study's limitations, future research directions, theoretical and policy implications, and conclusions. The limitation section is divided into multiple sections to address issues within the three of the main threats to validity: internal validity, construct validity, and external validity. The section on theoretical implications discusses what the study's findings mean toward applying the rational choice perspective. Policy implications relate to how prevention and reactions to international vehicle trafficking might be altered and improved based on this study. Last, the conclusion section provides the final commentary on the topic.

Limitations

This analysis of individual incidents in Chula Vista and Newark allows for an assessment of detailed relationships between vehicle characteristics, spatial, and temporal factors and stolen vehicles. Yet, important limitations are still related to the study of vehicle theft incidents here. These limitations include restrictions on accurately measuring exports, measuring components of rational choice perspective, variables not included in the analysis, and the generalizability of the findings to other locations.

Measurement of Exports

One of the most important issues within this dissertation is the measurement of exported vehicles. No single study has identified a precise, reliable method for assessing how many or which vehicles are exported from the U.S. to international locations. This issue presents perhaps the biggest challenge to studying crimes such as international vehicle trafficking. In the analysis that used recovery status as a dependent variable, recovery status is used as a proxy measure for specific forms of vehicle theft. There are undoubtedly incidents that are misclassified using this proxy measure, however using recovery status marks one way of measuring vehicle theft for export. The limitations associated with the dependent variables in this dissertation are discussed in-depth in Chapter VI. The main problems relate to whether vehicle trafficking is measured well by available data and the ambiguous nature of the variable of "recovery" (Maxfield, 2004). This concern is addressed by obtaining data from two cities that maintain extremely detailed and updated databases. Although consistent data collection and maintenance of license plate readers at border crossings could potentially facilitate a more rigorous examination of vehicle theft for export, current interagency coordination and technology do not allow these systems to be used for research purposes. Future studies should continue to refine measures of vehicle theft for export focusing on obtaining data on vehicle border crossings. Considering the exceptionally low clearance rates associated with vehicle theft, there are very few other options for comparing types of vehicle theft. The secondary analysis conducted in Chula Vista, comparing recoveries in Mexico with recoveries in the U.S. partially address this concern of recovery status. However, using this method, other concerns are present about whether vehicle recoveries in Mexico represent all theft for exports, many of which are unrecovered. Essentially, the first

method risks overestimating international thefts because all unrecovered thefts are assumed to be destined for other countries. Conversely, the second method risks not capturing all international thefts because only vehicles that were recovered in Mexico are included in the international thefts category.

The problem of inadequately measuring exported thefts is likely a greater threat to the findings in the Newark dataset than in Chula Vista for two main reasons. First, Newark, New Jersey, located in the Northeast, shares borders with 11 different municipalities. There are hundreds of different jurisdictions within reasonable driving distance of Newark including major population centers such as New York City, Jersey City, Elizabeth, and Paterson. Chula Vista shares fewer borders with other jurisdictions than Newark. This is important for two reasons. First, the surrounding area provides more alternative locations for exported thefts through Port Newark than there are in Chula Vista for the two border crossings. Also, the large number of jurisdictions near Newark increases the likelihood that a stolen vehicle might be recovered outside the city and not properly recorded in the police department's database. The challenges in measurement may contribute to the lack of statistically significant findings in Newark. Additionally, Shane (2010) reports that some professional thieves engage in an activity termed "port shopping". In these scenarios, professional rings carefully consider which international port is best suited for exportation even if located hundreds of miles from the point of initial theft.

Measurement of Rational Choice Constructs

Due to the exploratory nature of much of this study, some of the measures could be critiqued in how theoretical constructs of rational choice perspective are measured. In the study, links are made between elements of the rational choice perspective (increasing rewards, decreasing effort, decreasing risks) and patterns of vehicle theft incidents. For instance, vehicle characteristics such as vehicle value and type relate to the concept of "rewards", while patterns of time and space reflect reducing risk and effort, respectively. Most previous studies of the rational choice perspective have not operationalized several components of the theory simultaneously. Chapter VI contains descriptions of how relationships involving the independent variables are rationalized.

Alternative Influences

In this study, several predictors relating to vehicle qualities, space, and time are proposed in regression models. However, there are other possible variables that could impact the research findings that are not measured due to a lack of data and research design in this study. Specifically, there was no measurement of police behavior in this design. Previous studies (Gallahan, 1997; Rice and Smith, 2002; Roberts, in press) have demonstrated that police effort appears to have little effect on recovery. Because this study examined vehicle theft and recovery patterns within only two cities, there was no reasonable measure of police behavior comparable to previous studies that examined data at a city-level and considered the presence of vehicle theft units (Roberts, in press), use of tracking devices (Roberts, in press), and international relationships (Gallahan, 1997), because there is no data on variation for the variables within cities. In addition to police variables, other forms of security technology are not included in this study. Recent

research on the massive vehicle theft drop in the U.S. and abroad have shown that prevention measures such as immobilizers (Bassmann, 2011; Farrell et al., 2011a; 2011b; Kriven & Ziersch, 2007) influence variation and changes in vehicle theft. More directly, this study does not measure recovery devices, such as Lojack, which might impact vehicles that are recovered (Gonzalez-Navarro, 2007). Also, other spatial influences may be influential that are not measured in the current study. For instance, McCord (2010) included various land uses in his analysis of vehicle theft in Philadelphia. There is also no data in this study on whether the vehicle was stolen from a lot, deck, street, garage, or other setting.

Generalizability of Findings

Generalizability refers to whether the findings in this study are indicative of expectations beyond the reach of the current study. Likely, the most serious threat of generalizability is across geographic units. Vehicle theft across land borders occur along the entire 2,000-mile border between the U.S. and Mexico and, possibly, along the U.S.-Canada border. However, this study only analyzes the phenomenon in Chula Vista. The patterns of vehicle theft in Chula Vista may vary greatly from those in Texas border cities such as Laredo, Brownsville, and El Paso. The results may even differ from findings in other southern California cities such as San Diego. In relation to port selection, it is also possible that results from Newark would be dissimilar to those in other major port cities such as Miami, Florida; Charleston, South Carolina; or Norfolk, Virginia. The sites selected in this study were chosen because of their proximity to the busiest vehicle

exporting points in the country, yet extrapolating these results to other sites should be done with caution.

Future Research

There are several avenues for further research in this area based on limits of the current study. First, great potential lies within the use of border traffic cameras for identifying stolen vehicles that have left the U.S. In many instances, vehicles are stolen, taken to Mexico, and reported to police after the vehicle has already left the country. With access to information about vehicle crossings, researchers would be able to identify unrecovered vehicles that have been taken illegally across the border. In the present study, without this data, the researcher was forced to use two different types of proxy measures: vehicles that were stolen and unrecovered or recovered in Mexico and only vehicles that were stolen and recovered in Mexico. In the current study, the first proxy measure overestimates international exports while the second proxy measure underestimates exports. Although efforts were made to acquire data on border crossings from U.S. Customs through the Chula Vista Police Department, the inquiries were denied by the agencies controlling the data. Therefore, the first step in conducting future research on international vehicle trafficking is to build relationships with agencies controlling such data. On a related note, detailed vehicle theft data might also be derived from insurance company data sets which also rely upon the acquisition of data that is not normally publicly available.

A second area for future research is to compliment quantitative studies with qualitative interviews with vehicle thieves. While there have been several contemporary studies with active or retired vehicle thieves (see Copes & Tewksbury, 2011; Mullins & Cherbonneau, 2011 for recent examples), only one researcher (Resendiz, 1998) has conducted interviews with active vehicle thieves involved in exporting vehicles to other countries. The use of qualitative methods would assist in understanding whether thieves consider vehicle, spatial, and temporal factors when planning and committing these crimes. This type of research would also elaborate on Resendiz's findings in relation to the organization, methods use, and other variables of interest. The lack of qualitative research is caused by the challenges associated with gaining contacts to subjects. In the case of Resendiz's (1998) work, the researcher had previous contacts with some of the participants and was able to gain their trust through the long-standing relationship. Future researchers with such relationships should take advantages of opportunities to learn more about the issue through this form of data collection.

Another note about future studies in international vehicle trafficking is the importance of conducting studies in other locations. As mentioned in the section on limitations, generalizability of the current study is limited without replication. Through partnerships with national agencies or local law enforcement and insurance agencies, data may be accessible for incidents in other parts of the country beyond the two cities chosen for this study. If media reports are correct, issues of vehicle selection and the organization of international vehicle theft rings differ across locations. For instance, specific vehicles have been tied to the Port of Miami in Florida while reports have alleged that much of the illegal vehicle trade in southern Florida is tied into the illegal drug trade (Leen, 1985). In

this study, the results cannot necessarily be generalized beyond the two sites. Results in Chula Vista, California may differ greatly from a similar study in Texas. A similar analysis of vehicle thefts in a port location (e.g. Miami, Florida; Charleston, South Carolina) would help determine whether the lack of findings in Newark are more related to measurement issues or actual patterns of trafficked vehicles in the city of Newark. Ideally, future studies will help us understand similarities and differences in vehicle trafficking in other parts of the country.

Implications

Theoretical Implications

This study has been framed as an application of the rational choice perspective to vehicle theft patterns. It was initially hypothesized that, as according to the rational choice framework, there would be significant differences that emerged between vehicles stolen for export and vehicles that were not stolen for export, and that these differences would reflect variation in offender behavior. Theoretically, it was also expected that patterns for some forms of vehicle theft would relate to specific aspects of rational choice in increasing rewards, reducing risk, and reducing effort.

The two quantitative studies resulted in partially support for this application of rational choice perspective. Altogether, the study, using a sample of vehicle theft cases from 2005 to 2007 in Chula Vista and Newark, showed few significant differences that would support the proposed theoretical logic. The second study, using a methodology that compared only known “theft for export” cases led to more support for the theory.

Although there were a few significant findings within spatial and temporal variables, most of the significant results in both studies were relating to vehicle characteristics, which closely relate to potential rewards emanating from the theft. Therefore, it appears that vehicle thieves operating across the U.S.-Mexico border are more focused on increasing rewards (i.e. vehicle-related characteristics) than reducing risk (i.e. temporal characteristics) or reducing effort (spatial characteristics). The fact that there are differences in the findings at the two sites does provide support for continuing to conduct crime-specific research within general crime categories. In this case, the study of motor vehicle theft or even professional vehicle theft does not appear to be specific enough to understand all the patterns of the crime.

Policy Implications

Policy relating to international vehicle trafficking comes in many forms. As discussed in Chapter III, there are several prevention techniques that have already been put into place and other directions that have not been fully explored. The primary results from this study indicate that some patterns are present for vehicle thefts in these cities. If it is assumed that unrecovered vehicle thefts are more harmful to individuals and communities than recovered thefts, increased surveillance and patrols would be appropriate measures for times and areas with more unrecovered thefts. However, the spatial and temporal patterns found in this study were modest. Also, based on the results from this study, prevention efforts in southern California would benefit from targeting younger, more expensive vehicles. Knowledge of which vehicles are being stolen and sent abroad also relates to vehicle owner decision-making, such as which vehicles to buy, where to park, and what security devices to utilize.

Some manufacturers were subject to more international-bound thefts than others. For instance, when comparing recoveries in U.S. and Mexico, several manufacturers had a higher percentage of their vehicles recovered in Mexico than others. Specifically, Chevrolets, Fords, and GMCs are more strongly represented in the category of international recoveries. It is then essential for vehicle owners of these manufacturers to be aware that their vehicles are at greater risk for professional, international thefts. Barthe's (2004) study is an example of an evaluation of a public awareness program. While the results from this dissertation fall short of providing evidence that this type of program would work, the effort to publicize the models and manufacturers that are stolen and taken across the border most often seems appropriate. Public awareness efforts or a publication of the vehicle models and manufacturers that are stolen most often toward international destinations would provide an outlet for this information. Currently, most discussion of these patterns appears only in rare media coverage on the topic.

Conclusions

Motor vehicle theft is a crime that has been the subject of an increased number of research studies in recent years. Highly-ranked academic journals and peer-reviewed books have examined the problem from a variety of perspectives. Yet, very few of these studies have considered elements of international vehicle trafficking, despite the crime's substantial cost to direct victims, vehicle owners, and the community as a whole. This dissertation analyzed patterns and thefts and recoveries in a border and port location in the United States with the goal of understanding both differences between theft for export

and other thefts, as well as distinctions between vehicle theft across borders and through seaports.

The review of qualitative information on international vehicle thefts from the U.S. identified several "paths" that a specific incident might follow. Based on qualitative studies and media accounts there are several methods applied to steal cars for this purpose and the subsequent stages of the process including disguising, concealing, marketing, and disposing. The process associated with each form of theft of vehicles across borders and through ports appears to be quite different.

The primary purpose of the current research was to conduct a quantitative study of patterns of vehicle theft in high-risk border and port areas to add to the anecdotal knowledge mentioned above. Several important conclusions can be taken from this research, including the direct findings from this study, as well as lessons for future research. The strongest predictors of theft in Chula Vista identified in this study were vehicle type, vehicle age, and to a lesser extent, distance to the border and time of day. The lack of many significant findings in Newark justifies future research using alternative methodologies.

The challenges discussed throughout this dissertation on measurement issues need to be the source of more academic inquiry. Vehicle trafficking is just one of many hidden crimes that is difficult to measure and study. The proxy measure for professional vehicle theft (unrecovered vehicles) is not entirely adequate for the measurement of the more specific crime of international vehicle theft. These challenges are similar to measurement problems associated with other crimes with low clearance and detection rates such as

human and drug trafficking. The study of other forms of vehicle theft, such as insurance fraud, is also rare because of these measurement issues.

Considering the state of the global economy and international trade, the current decline in vehicle theft rates is not necessarily indicative of any long-term trend away from vehicle trafficking. To the contrary, patterns of vehicle theft indicate that since the 1990s the crime has moved toward border and port regions. These changes in domestic vehicle theft patterns and the apparent growth of international markets warrant more attention from both policy-makers and the academic community.

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Curriculum Vita

1984	Born in Summit, New Jersey
2001	High School Diploma from Westfield High School, Westfield, NJ
2005	Bachelor of Arts in Political Science, Wagner College, Staten Island, NY
2007	Master of Arts in Criminal Justice, Rutgers University, Newark, NJ
2007-08	Teaching Assistant, Rutgers University, Newark, NJ, School of Criminal Justice
2008-11	Research Assistant, Rutgers University, New Brunswick, NJ, Economic Development Research Group
2008-11	Part-Time Lecturer, Rutgers University, Newark, NJ, School of Criminal Justice
2008-11	Adjunct Professor, Fordham University, New York, NY, Department of Sociology
2008-11	Adjunct Professor, Kean University, Union, NJ, Department of Criminal Justice
2011	Block, S. & Maxfield, M.G. Model national crime statistics: U.S. Uniform Crime Reports and the National Crime Victimization Survey. In M. Natarajan (Ed.). *Introduction to International Criminal Justice*. (pp. 455-462). New York: McGraw-Hill.
2011	Block, S., Clarke, R.V., Maxfield, M.G., & Petrossian, G. Estimating the number of U.S. vehicles stolen for export using crime location quotients**.** In M.A. Andresen and J.B. Kinney. (Eds.). *Patterns, Prevention, and Geometry of Crime.* New York: Routledge.
2012	Doctor of Philosophy in Criminal Justice, Rutgers University, Newark, NJ