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**Child Abductors Who Have Killed Their Victims:
A Theoretical Approach to Spatial Analysis**

by

Tonya M. DeSa

A dissertation submitted to the Graduate Faculty in Criminal Justice in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

The City University of New York

2015

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This manuscript has been read and accepted for the
Graduate Faculty in Criminal Justice in satisfaction of the
dissertation requirement for the degree of Doctor of Philosophy.

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THE CITY UNIVERSITY OF NEW YORK

Abstract

Child Abductors Who Have Killed Their Victims:

A Theoretical Approach to Spatial Analysis

by

TONYA M. DeSA

Advisor: Karen J. Terry, Ph.D.

Despite the intense and prolonged public attention received when a child is abducted and killed, there are major gaps in the academic literature. One of the gaps pertains to the distances traveled by the offender between key crime locations. The overall aim of this study was to provide information concerning typical travel distances of offenders. This project utilized an archival data set compiled by the Federal Bureau of Investigation, National Center for the Analysis of Violent Crime. The database constructed for this project consisted of 72 victims who were abducted and murdered by 68 offenders. The date range for these offenses was 1970 – 2006. The research questions were addressed with t-tests for independent samples and multiple linear regressions. Three primary dependent variables under investigation in this study were (a) the distance between the offender's residence and the abduction site, (b) the distance between the abduction site and the disposal of the victim's remains, (c) the distance between the location of the body disposal site and the offender's residence. Additionally, a multitude of bivariate analyses were examined. The variables examined in various combinations using bivariate analyses were offender characteristics, victim characteristics, distance variables, and crime event variables.

Although findings were primarily insignificant, they contribute to the general literature regarding child abduction homicide offenses. While a number of studies have related child

abduction/homicide to specific contexts, little research has been done relating child abduction to theoretical frameworks. This study explored routine activities theory, rational choice theory, and crime pattern theory as they relate to the geographical behavior of child abductors/murderers.

Dedication

To my beautiful and incredibly talented daughter Katie:

Set a goal and keep working, no matter how hard or how long the journey.

You are a source of unending joy and happiness.

You are my inspiration.

Acknowledgements

There are several people I would like to recognize and thank for your help and support during this very long journey to receiving my Ph.D. First is my mother. You instilled in me a “never give up” attitude. Thanks to you, I had the commitment and courage to finish what I had started. Despite the length of this journey, you never lost faith in me. I can never repay all that you’ve done for me over the years. I can only hope that I can “pay it forward” and emulate all you’ve taught me with my own daughter.

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Chapter 1. Introduction and Literature Review

Introduction

Most individuals are frightened when they hear the words “missing child.” It causes parents to question the safety of their children. Does the chosen caregiver or religious leader, or perhaps the bus driver or a sports coach compromise their child’s safety? Mass media plays a significant role in the creation, maintenance, and orientation of social problems, including missing children. The media frenzy surrounded by cases such as Samantha Runnion or Elizabeth Smart or the more historic cases of Adam Walsh or Polly Klass has caused many individuals to believe that an epidemic of crimes against children is occurring. Misleading and often conflicting figures on the number and types of missing children have been widely publicized (Muschert, Young-Spillers, & Carr, 2006). A debate exists as to how frequently crimes against children, and more specifically kidnapping of children, actually occurs. Reliable statistics do not exist (Finkelhor & Ormrod, 2000). However, the lack of research in the area of child abduction/homicide is alarming because of the overwhelming impact such an event can have on our society. These horror stories are perceived as typical and are influential in framing the missing children problem. Aside from the violence and tragedy inherent in a child abduction/homicide, the publicity surrounding such an event invokes high levels of fear and tension in the community. Efforts to find missing children represent an important societal concern. The increased public anxiety generates heavy pressures on police and demands significant resources from them. Police, who may have never had any previous experience investigating a child abduction/homicide, may suffer from information overload and have difficulty sifting out the important from the more peripheral. It is important that efforts to locate missing children be informed by sound scientific research so as to maximize recovery efforts.

This present research will begin to fill the void regarding reliable information on child abduction/homicide. This study will also go beyond the scant literature available by tying child abduction/murder to a theoretical framework. A general theoretical framework for binding together distances traveled by an offender and important crime features is needed. Santtila, Hakkanen, Canter & Elfgrén (2003) produced a model of crime scene features in homicide cases using psychological theories to formulate hypotheses regarding such a relationship. This study attempts to do the same for child abduction/homicide cases. This study is exploratory in nature and was designed with investigative considerations in mind. It is hoped that the applied benefit of academic research will be realized by law enforcement organizations in order to maximize police effectiveness.

The literature review will begin with an examination of the prevalence of child homicide and child abduction and then review various definitions of abduction. Next, characteristics of abductions and abductors will be analyzed, followed by a review of abduction sites and body disposal sites. The literature review will then explore the concepts of environment criminology and criminal spatial behavior. The literature review will conclude with a synopsis of the routine activities theory, the rational choice theory, and crime pattern theory and their application to child abduction/homicide.

This study will compare travel distances of two types of child abductors who murder their victim – one group will be offenders who have abducted their victim from the victim's residence and the other group will be offenders who have abducted their victim from all other locations, i.e. public playgrounds, movie theaters, shopping malls, etc. Routine activities theory, rational choice theory, and crime pattern theory will be applied. The ability of specific crime features to predict distances traveled will also be explored.

The rationale for this study is to understand criminal mobility patterns for effective police operations. In 76% of missing children cases, the victim was found dead within 3 hours of the reported abduction, and in 89% of these cases, the victim was found deceased within 24 hours (Douglas, 2012). These dramatic statistics demonstrate the importance of executing the most effective recovery strategies immediately after a child goes missing. Time is of the essence in missing children cases. It is hoped that the present study will be used to improve the efficiency and effectiveness of law enforcement professionals confronted with an abducted child investigation. Because of the rarity of child abduction/homicides, the majority of seasoned investigators have not worked a child abduction/homicide case. It is anticipated that the results of this study will shed some light on the mobility patterns of child abductors so that the child can be rescued. However, in the event that the child is murdered, understanding mobility patterns can still assist in the investigation by helping to locate the remains of the child and/or locate the offender responsible for this heinous crime. Only through scientifically sound research will advances be made in the knowledge base surrounding child abductions resulting in homicide. These informational advances will assist law enforcement professionals at all stages of the investigation, thereby calming public fears when a child is abducted and murdered.

Literature Review

Prevalence of child homicide and child abduction. According to the National Vital Statistics Reports (Murphy, Xu, & Kochanek, 2012) published by the Centers for Disease Control and Prevention, children of all ages are far more likely to die due to accidents than to be the victim of a homicide. For instance, the death rate for 5-14 year olds due to accidents is 4.0 per 100,000, and is the leading cause of death for that age group. Homicide is the fifth leading cause of death for that same age group with a death rate of only 0.6 per 100,000.

When child homicide does occur, it is a highly emotional event, often attracting widespread societal and media attention. By far, the most publicized and emotionally charged type of child homicide is the “stranger abduction,” a kidnap-murder scenario wherein a child is abducted and killed by a stranger. However, the parental fear, community hysteria, and intense local, national, and perhaps international media coverage dedicated to abductions by strangers is disproportionate to the actual incidence rate of this type of crime (Spilman, 2006; Zgoba, 2004).

Childhood is a period characterized by dramatic developmental changes. Crimes need to be analyzed as to how they are distributed across the various stages of childhood, an exercise called “developmental victimology” (Finkelhor & Ormrod, 2000). Research has shown the importance of assessing the victimization of children from a developmental perspective (Boudreaux & Lord, 2005; Boudreaux, Lord & Dutra, 1999; Brown, Keppel, Weis & Skeen, 2006; Crittenden & Craig, 1990). The methodological practice of examining childhood crime patterns from a pediatric, age-based perspective has afforded researchers, health care professionals, law enforcement, and social service practitioners the capacity to more successfully identify, investigate, and resolve serious child victimization cases (Boudreaux & Lord, 2005).

The dynamics of child abduction patterns can best be understood from a developmental perspective. During their lives, children face different abduction scenarios and risks. By breaking down child victim samples into specific age and gender groups, different victimization patterns are revealed (Boudreaux et al., 1999). Additionally, victim age and gender are among the few variables consistently known by authorities at the inception of an investigation.

Child age may affect the risk for death by homicide for developmental reasons. Age may determine the range of physical threats to which the child is most vulnerable as well as influence the source of the attack (Crittenden & Craig, 1990). Younger, more constantly monitored

children (birth to 5 years) generally have a greater risk of abduction by parents or other trusted caregivers who have access to the child's protected boundaries (Lord, Boudreaux & Lanning, 2001). The motive for familial abduction often involves divorce or custody disputes (Miller, Kurlycheck, Hansen & Wilson, 2008). Familial kidnapping peaks at about age 2 and then declines thereafter (Finkelhor & Ormrod, 2000). Homicide risk for young children is largely centered in intrafamilial violence or inadequate parenting or care giving, such as neglect and maltreatment or domestic dispute (Boudreaux & Lord, 2005).

As children age, they become more independent, self-sufficient, and mobile. They become less burdensome to parents and primary caregivers. However, school-aged children are not yet physically or cognitively prepared to adequately protect themselves and may experience increasing lapses in vigilant guardianship (Boudreaux & Lord, 2005). More independent school-age children who experience lapses in supervision by caretakers are more accessible and more often abducted by acquaintances or strangers, as opposed to parents/caregivers (Lord et al., 2001). The risk of kidnapping by a stranger rises throughout a child's elementary school years, however, by the time a child reaches his/her teenage years, acquaintance kidnapping is the predominant abduction threat (Finkelhor & Ormrod, 2000). Unlike family abductions, nonfamily abductions (both stranger and acquaintance) are likely to have a criminal motive, such as robbery or, more often, sexual assault (Miller et al., 2008). Vulnerability, accessibility, and social naiveté render school-aged children at increased risk of assault, abduction, and homicide by sexually motivated acquaintances and strangers (Boudreaux & Lord, 2005).

As children enter adolescence, homicide victimization patterns begin to resemble typical young adult homicide victimization patterns. Homicide patterns in older teens, particularly teenage boys, are commonly rooted in peer-based aggression (Lord, Boudreaux, Jarvis,

Waldvogel, & Weeks, 2002). Homicide patterns in adolescent girls are also generally representative of patterns found in the adult female population. Teenage girls are often assaulted and killed by boyfriends or former boyfriends in domestic-type disputes (Boudreaux et al., 1999). They are also at risk for sexually motivated offenses committed by acquaintances and strangers (Boudreaux et al., 1999).

Individual jurisdictions often do not compile their own statistics regarding child abduction. Additionally, the Federal Bureau of Investigation does not collect this information in the National Incident-Based Reporting System or the broader Uniform Crime Report. Therefore, it has been difficult to achieve a reliable national assessment of the extent of child abduction.

In an effort to provide a solution, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) completed a report – National Incidence Studies of Missing, Abducted, Runaway and Thrownaway Children (NISMART-2) (Sedlak, Finkelhor, Hammer & Schultz, 2002). The unified estimates of the number of missing children were derived from data collected by four complementary NISMART-2 studies. These studies were designed to provide a comprehensive picture of the number of missing children, including the number of abducted children. According to these studies, the total number of children who were missing from their caretakers in 1999 (the 12-month period reflected by these studies) was estimated to be over 1.3 million (Sedlak et al., 2002). Of these 1.3 million children, a nonfamily perpetrator abducted an estimated 58,200 in the study year (Finkelhor, Hammer & Sedlak, 2002). However, of the estimated 58,200 children abducted by a nonfamily perpetrator, only an estimated 115 children were victims of a stereotypical kidnapping by a stranger (Finkelhor et al., 2002). This definition of abduction, perpetrated by a stranger, includes any of the following: (1) the child is held overnight, (2) is transported a distance of 50 miles or more from the point of abduction, (3) is

killed, (4) is ransomed, or (5) the perpetrator shows an intent to keep the child permanently (Finkelhor, Hotaling, & Sedlak, 1992)

This estimate of stereotypical kidnapping victims (115 children) is consistent with reports to the National Center for Missing and Exploited Children (NCMEC), a national clearinghouse for information on missing children since 1984. Typically, NCMEC receives fewer than 200 stranger-abduction reports annually (Allender, 2007).

Stereotypical stranger abductions resulting in homicide are even rarer (Shutt, Miller, Schreck & Brown, 2004). According to the NISMART-2 studies, only approximately 50 children each year are the victims of a stranger abduction homicide (Finkelhor et al., 2002). Even though research has shown that a child's risk of victimization is more likely to be caused by family members or acquaintances than by strangers, the media leads the public to believe otherwise (Boudreaux et al., 1999; Boudreaux, Lord & Jarvis, 2001). Although child abduction/homicides are rare, methods for carrying out such a crime are restricted and therefore amenable to analysis. There are always patterns to be recognized and compared to other cases (Jackson & Bekerian, 1997). Given the nature of public perception concerning child homicide risks, it is clear that more definitive information addressing the dynamics of child homicide is needed.

Only through more extensive scientifically sound research will advances be made in the information surrounding child homicides. One study in the United Kingdom (UK) specifically examined the approach of law enforcement to sexually oriented child homicide, a rare crime in the UK. A study by Adhami & Browne (1996) examined the effectiveness and transferability of detectives' general expertise to the low incident serious crime of sexually oriented child homicide. Although detectives had significant expertise in managing investigations in general

and had the ability to draw inferences to prioritize investigative lines of inquiry, the inferential expertise of detectives was deficient when dealing with rare crimes, such as sexually oriented child homicide. The ability of the detectives to deal with specific types of low incidence serious crime was hindered by their limited experience with such crimes.

Informational advances that will assist law enforcement officials at the outset of a rare crime, such as a stranger abduction/homicide, are greatly needed. These advances can aid in evidence collection and analysis and the overall effectiveness of case investigations, thereby calming public fears when the rare stranger child abduction/homicide does occur.

Abduction defined. In addition to the misinformation regarding the numbers of actual abductions that occur each year, debate also exists regarding the definition of abduction. The term abduction has not been consistently defined in the literature. The legal definition of abduction varies from state to state. Abduction may be defined as the coercive movement of a person a short distance (one California court has set that distance at 22 feet) as well as the unlawful confinement of an individual for a period of time of only one half hour (Finkelhor, et al., 1992). The Supreme Court has stated that it is “not a matter of how much distance, it is the fact of the movement” (Forst & Blomquist, 1991, p. 135). The popular stereotype of kidnapping, however, requires the removal of a child from his or her home and/or parents for an extended period of time primarily for purposes of ransom, sexual assault, or murder. Boudreaux et al. (1999) defined abduction as the “coerced, unauthorized or illegal movement of a child for the purpose of a criminal act” (p. 540). In reviewing various definitions, the core concept of abduction appears to involve the unauthorized movement of the victim, regardless of distance or length of confinement.

Characteristics of abductions and abductors. Two large, multiyear, multistate samples of abductions of juveniles have allowed researchers to sketch the characteristics of offenders in such cases. Boudreaux et al. (1999) examined 550 cases of alleged child abduction obtained from Federal Bureau of Investigation files for the period 1985 through 1995. Boudreaux et al. (1999) also conducted interviews with the lead investigators for each case. Brown et al. (2006) examined over 700 child abduction murder cases for the period 1968 through 2002. Brown et al. (2006) obtained case information directly from the investigating police agency as well as through interviews with detectives.

Both of these studies included abductions committed by family members, acquaintances, and strangers. However, an analysis of victim-offender relationship in the Boudreaux et al. (1999) study indicated that in 40% of the cases studied, victims were abducted by strangers. Similar results were found in the Brown et al. (2006) study with 44% of the cases having a victim-offender relationship of stranger. This seemingly high rate of stranger abduction appears to be a disparate finding from that of Finkelhor et al. (2002) in the NISMART-2 studies. However, this apparent disparity may be the result of a definitional difference. The definitions utilized by Boudreaux et al. (1999) and Brown et al. (2006) were considerably broader than the definition used by Finkelhor et al. (2002).

Research findings indicate that the overwhelming majority of child abduction offenders are male (Boudreaux et al., 1999; Brown et al. 2006; Finkelhor & Ormrod, 2000) and white (Boudreaux et al., 1999; Brown et al., 2006). The average age of male child abduction offenders was 28 years old (Boudreaux et al., 1999; Brown et al., 2006).

Brown et al. (2006) found that the child abduction murderers in their study had an uneven employment history, with approximately half of the child abduction murderers being

unemployed at the time of the murder. If the child abduction murderers were employed, they worked in unskilled or semi-skilled labor occupations. Brown et al. (2006) also found that nearly half of the child abduction murderers had a history of prior crimes against children.

A study conducted by Beyer and Beasley (2003) in which data was obtained through interviews of 25 incarcerated child abduction-murder offenders and a review of case documents appears consistent with the existing literature on most points. All 25 offenders were male. The mean age of offenders was 27, with 72% of offenders younger than 30. The majority of the offenders were white. Employment of the offenders appears to differ somewhat from the findings of Brown et al. (2006). Unlike Brown et al. (2006), only 4% of the offenders in the Beyer and Beasley (2003) study reported being unemployed at the time of the child abduction murder. However, similar to Brown et al. (2006), of those child abduction murderers employed, Beyer and Beasley (2003) found that most were employed at unskilled or semi-skilled jobs.

Although Boudreaux et al. (1999), Brown et al. (2006), and Beyer & Beasley (2003) provided useful information regarding offender characteristics, these studies did not have a theoretical link. The present study will attempt to tie child abduction/murder to theoretical frameworks. Routine activities theory and rational choice theory will be used as bases for explaining abduction sites, body disposal sites, and their relationship to the residence of the offender.

Location of abductions and disposal sites. Brown et al. (2006) found that 26% of child abduction murderers came into contact with the victim because the killer lived in close proximity to the victim. Similarly, Boudreaux et al. (1999) found that 45% of the child abductors in their study lived less than 1 mile from the abduction site with 31% of the male abductors committing

the abduction from inside the victim's home and an additional 23% of the male abductors committing the abduction from the public streets within the victim's neighborhood.

When disposing of victim remains, Boudreaux et al. (1999) found that male offenders often left the victim at the abduction site (32%) with transportation of victim remains less than 1 mile in 17% of the cases examined. Brown et al. (2006) found similar results. The victim's body was recovered within 199 feet of where the victim was last seen in 15.8% of the cases. Victim remains were recovered from 200 feet to 1 1/2 miles of the where the victim was last seen in 30.2% of the cases. Overall, victim remains were recovered at the location of where the victim was last seen or within 1 1/2 miles of that location in 46% of the cases.

While Brown et al. (2006) and Boudreaux et al. (1999) recognized the importance of distance between abduction sites and body disposal sites, these studies did not attempt to determine the role, if any, that opportunity or situational factors may have played in the selection of either the abduction site or the body disposal site. The present study will go beyond the work of previous studies in applying routine activities theory and rational choice theory to child abduction/homicide cases.

Environmental criminology. Environmental criminology sees crime as a product of the interaction between potential offender and the environment. The environmental structuring of routine behaviors is central to understanding crimes (Eck & Clarke, 2003). According to situational crime prevention, an offender's behavior interacts with circumstances in the environment to produce criminal acts (Simon & Zgoba, 2006). All behavior, both criminal and non-criminal, is influenced by the many routines and regularities of daily life. People follow routines out of habit, necessity or convenience. Offenders often follow standardized routines and also use routine travel routes going to and from everyday destinations (Eck & Clarke, 2003).

The requirements of daily life occupy so much of everyone's time that much of the activity of any offender is generally indistinguishable from that of law-abiding people. Crime can be understood as a by-product of normal, non-criminal activity patterns (Brantingham & Brantingham, 2000). However, for crime to occur, the behaviors of non-offenders must interact with the behaviors of offenders (Eck & Clarke, 2003).

In the distance-decay pattern of human spatial behavior, people interact more with people and things that are close to their home location than with people or things that are far away. Crime trips also follow a distance-decay pattern with the number of crime occurrences decreasing with distance from the offender's residence (Beauregard et al., 2005). An empirical regularity that has emerged from journey-to-crime research is that offenders select targets/victims that are located near their residence (Canter & Larkin, 1993; Capone & Nichols, 1975; LeBeau, 1987). This finding has been shown to be consistent across different types of crimes and across different countries (Sarangi & Youngs, 2006; Snook, Cullen, Mokros & Harbort, 2005; Snook, Wright, House & Alison, 2006). Such consistent patterns have the potential to be applied in police settings. The regularities in offender spatial behavior can be used to predict offender home locations.

Criminal profiling is the practice of predicting a criminal's personality, behavioral, and demographic characteristics based on crime scene evidence (Douglas, Ressler, Burgess, & Hartman, 1986). The purpose of profiling is to develop a behavioral composite, combining sociological and psychological assessments of the offender (Egger, 1999). Profiling does not provide the specific identity of the offender; rather, it indicates the kind of person most likely to have committed the crime by focusing on certain behavioral and personality characteristics (Douglas et al., 1986). Snook, Cullen, Bennell, Taylor and Gendreau (2008) broadly classified

criminal profiling as clinically oriented or statistically oriented. Clinically oriented profilers draw on their training, knowledge, experience, and/or instinct or intuition to make their predictions of the likely offender (Alison, Goodwill, Almond, van den Heuvel, & Winter, 2010; Holmes & Holmes, 1996; Turvey, 1999). Statistically oriented predictions are derived from an analysis of offenders who have previously committed crimes that are judged as similar to those being investigated (Santilla et al., 2003). In Aitken, Connolly, Gammerman, Zhang, Gordon and Oldfield (1996), logistic regression was one of two statistical methods found promising in providing a probabilistic prediction of the characteristics of an offender from the known victim characteristics and from the crime scene of individual cases of child murders with a sexual connotation. The statistical approach is predominantly based on the multivariate analysis of behavioral information and other information found at the crime scene to infer an offender's characteristics and psychological processes (Alison et al., 2010).

The first recorded use of a psychological profile occurred during World War II when Dr. W. C. Langer, a psychiatrist, was commissioned by the Office of Strategic Services to provide a profile of Adolph Hitler (Egger, 1999). Dr. Langer offered a psychodynamic personality profile of Hitler, focusing on decisions that Hitler might make given certain scenarios. Langer's profile proved to be very accurate, including Hitler's suicide when the Allies took Berlin.

An important development in the history of offender profiling occurred in 1985 when David Canter, a psychologist at the University of Surrey in England, was approached by the head of the Surrey Police Criminal Investigation Division. Canter's assistance was requested with an investigation of 2 murders and at least 30 rapes by several cooperating police agencies (Egger, 1999). Canter agreed to assist and developed a profile of the unidentified murderer-rapist

dubbed the Railway Rapist. Canter's profile was extraordinarily accurate and proved to be very useful in the apprehension of the murderer-rapist John Duffy.

Following the profile of the Railway Rapist, Canter spent the next 9 years conducting research and developing empirical data from which to generalize. Canter developed the circle theory, which proposes the existence of a fixed base from which the offender travels in order to offend in a defined area (Canter & Larkin, 1993). The circle theory proposes that criminal spatial behavior may simply be conceptualized as circular and requires that only a radius need be determined to learn the criminal range of the offender (Canter & Larkin, 1993; Meaney, 2004). Canter & Larkin (1993) also proposed the marauder and commuter offense styles, two competing models of criminal spatial behavior. Marauders are said to operate in an area close to their residence while commuters are deemed to commit crimes in locations perceived as being distant from the offender's residence.

Another important development in the history of offender profiling was the research and dissertation of D. Kim Rossmo in 1995. Rossmo developed a tool known as geographic profiling, an investigative methodology to determine the most probable area of an offender's residence (Rossmo, 2000).

Spatial analysis. Crime mapping is a term used in law enforcement to refer to the process of conducting spatial analysis within crime analysis (Boba, 2005). Although researchers had expressed interest in the relationship between crime and place for decades, it wasn't until the technological advances of the late 1990s, specifically the proliferation of computerized police information systems and the advent of affordable desktop computer mapping applications and accompanying geographic information systems, that this literature began to significantly influence law enforcement (Anselin, Griffiths & Tita, 2011).

A geographic information system (GIS) is a powerful software tool that allows the user to create, modify, visualize, query, and analyze any kind of geographic and tabular data (Boba, 2005). Geocoding, the process of linking an address with its map coordinates so that it can be displayed on a map and the GIS can recognize that address in the future, can assist in determining whether any identifiable travel patterns exist (Boba, 2005). Improvements in geocoding mean that many crime sites can be mapped, visualized and analyzed with a considerable degree of precision. This enables the location of one crime site to be scrutinized in relation to the relative position of other crime sites (Ratcliffe, 2002).

Spatial analysis looks for statistically significant patterns in observed events that occur at specified locations. Criminal events can be studied using spatial analysis. Xue & Brown (2006) used two separate models to show that criminal incidents are the product of spatial choice processes of criminals and how the preferences of criminals can be modeled to better understand the spatial patterns of crime. Criminal opportunities therefore have a spatial element.

The study of criminal spatial behavior has created the foundation and groundwork of geographic offender profiling (Ebberline, 2008). In the broadest sense, geographic profiling may be thought of as a strategic information management system that can assist police with the large volume of information that arises during the course of an investigation (Rossmo & Rombouts, 2011). Geographic offender profiling should be thought of as a support tool for investigators (Rossmo, 2000). A geographic profile can indicate an optimal search process that can be used for investigative purposes (Canter, 2003).

Basically, geographical profiling involves three tenets: (1) understanding the geographical search pattern of criminals in relation to the spatial distribution of potential offenders and potential targets; (2) the awareness space of potential offenders including the

labeling of “good” targets and crime areas; and (3) the interchange of information between potential offenders who may modify their awareness space (Brantingham & Brantingham, 1981; Levine, 2009; Rossmo, 1997, 2000).

One of the fundamental assumptions of geographical profiling is that the location of the offender’s anchor point influences the choice of an offender’s target location. Essential to this assumption is the requirement that the offender has a single, stable anchor point (O’Leary, 2009).

Recent studies show that the general pattern of relationships between where offenders are based and where they commit their crimes is consistent enough across offenders to be used to predict the spatial pattern of any one offender (Canter, 2009). Geographical profiling can be applicable when only one crime is being investigated (Canter & Hammond, 2007). The best predictor for spatial behavior of a crime type is data particular to that crime type (Santtila, Laukkanen & Zappala, 2007). Although driven by an intrinsic motive understood only by child abductors/murderers, the extreme nature of the motivation of the child abductor/murderer will not necessarily be reflected in his spatial behavior. The child abductor/murderer is still subject to the external influences of his environment and his internal conceptions of the same. By analyzing the travel patterns of child abductors who have killed their victims, it is hoped that the spatial pattern of future offenders can be predicted to assist law enforcement in child abduction investigations. Santtila, Laukkanen, Zappala & Bosco (2008) found that certain crime features in difficult-to-solve homicide cases, such as the body being found outside, were correlated to distances traveled. However, a general theoretical framework for binding together journey-to-crime distances and important crime features is needed.

Goodwill and Allison (2007) argued that the reliability of correctly profiling certain demographic characteristics is dependent on many discrete aspects of behavior during the

offense. The challenge is to recognize, preferably based on some clear theoretical basis, what these behaviors are.

Underlying theories of child abduction and spatial analysis. In addition to the practical utility of prioritizing the search area for an offender, geographic profiling also has a theoretical appeal (Block & Bernasco, 2009). Geographic profiling linked major theoretical perspectives on crime such as routine activities (Felson, 2011), rational choice (Cornish & Clarke, 1986) and crime pattern theory (Brantingham and Brantingham, 1993) to real-life situations.

While a number of studies have related child abduction to specific contexts, little research has been done relating child abduction to theoretical frameworks. Applicable theoretical approaches regarding geographical behavior of criminals are routine activities theory, rational choice theory, and crime pattern theory.

Routine activity theory. The first theoretical approach to the geographic behavior of criminals is routine activity theory, which places emphasis on the daily activities of offenders and potential victims (Beauregard et al., 2005; Cohen & Felson, 1979). The original routine activity theory applied to direct-contact predatory offenses. Over time, routine activity theory fused with geography of crime, environmental criminology, situational prevention and models of offender choices and was broadened to help understand non-routine crimes such as serial murder and sexual abuse (Felson, 2011). However, before the more contemporary routine activity theory is explored, Oscar Newman's more classic defensible space theory must first be discussed.

Newman's defensible space concept refers to the systematic way in which the physical design of urban residential environments can be designed in order to create places that are less

vulnerable to crime by providing residents with more opportunities to control their space and defend it if necessary. Newman's theoretical framework implies that defensible space is activated through three critical components: territoriality, natural surveillance, and image/milieu. Territoriality, or the capacity of the physical environment to create perceived zones of territorial influence, is the cornerstone of Newman's theory. Natural surveillance refers to the capacity of the physical design to provide surveillance opportunities for the residents and their agents. Image and milieu, as originally used by Newman, suggests that the appearance of residential space creates an image of the area that symbolizes the lifestyle of its inhabitants (Newman, 1972).

In its original formulation, routine activity theory explains that a criminal event occurs when a motivated offender and a suitable target converge in time and space in the absence of a capable guardian (Cohen & Felson, 1979). Routine activities often bring potential victims and offenders together. A proportion of offending is driven by the availability of opportunities presented in the routine activities of offenders' lives (Ratcliffe, 2006). Routine activities are defined by Cohen and Felson (1979) as any recurrent and prevalent activities which provide for basic population and individual needs. Crimes may occur during routine activities at home, in jobs away from home, or in other activities away from home.

Criminal acts require convergence in time and space of likely offenders, suitable targets, and the absence of capable guardians against crime. Each successfully completed criminal act requires an offender with both criminal inclinations and the ability to carry out the inclinations, a person or object providing a suitable target for the offender, and an absence of guardians capable of preventing the criminal act. The lack of any one of these basic elements normally is sufficient to prevent the criminal act (Cohen & Felson, 1979).

Places, just like people, have routine activities that also determine their risk of becoming crime targets. Both defensible space theory and the more contemporary routine activities theory are united in the shared principle that opportunities for crime are dependent as much on the type of activities that occur in an area as on the environmental characteristics of a place. The types of activities and the physical and social characteristics of a place not only influence the types of crime opportunities that are available there, but also influence the probability of detection, intervention and/or apprehension. The blending of the defensible space theory with the routine activity perspective reveals that the physical design and layout of an area, along with its accessibility and the extent of the local social ties all have an effect on the nature and type of routine activities that occur. The nature of the routine activities determines the type of image they generate, affecting resident's attitudes toward their territory and their territorial behavior in the form of guardianship. Residents' ability to create defensible space by acting as capable guardians who discourage crime is, therefore, directly influenced by these routine activities (Reynald and Elffers, 2009).

Guardianship is a central element in routine activities theory. As explained by Felson (2011), a guardian, as it was intended in his seminal piece with Cohen in 1979, is anybody whose presence or proximity discourages crime. However, the concept of guardianship has been interpreted and expanded upon in many ways over the last few decades. Hollis, Felson and Welsh (2013) examined the evolution of research on the guardianship element of routine activities theory and refined a definition of guardianship for purposes of empirical research, consistent with its original conceptualization. "Guardianship can be defined as the presence of a human element which acts – whether intentionally or not – to deter the would-be offender from committing a crime against an available target" (Hollis et al., 2013, p. 76). It is hoped that

researchers studying child abduction/homicide can explore the concept of guardianship, as it pertains to routine activities, at key crime sites such as the abduction site and the murder site. Having a definition of guardianship suitable for empirical research can help to refine the concept consistently, further enhancing the usefulness of the research.

People generally move about in a purposeful manner. The modes of transportation, the rhythms of movement, the volumes of movement and the ease of flow along different transportation paths all create concentrations of offenders and targets at predictable times and places (Brantingham & Brantingham, 1999). If a specific object is being searched for and there are two available objects, all things being equal, the closer of the two available objects will be chosen. From a criminological perspective, if a subject is searching for a target and several potential targets exist, the closer target will be chosen provided all things are equal. When offenders commit offenses away from home, these offenses distribute in the direction of some additional important life node, i.e. work, school, recreation etc. (Brantingham & Brantingham, 1999). All things are never equal, however, but it is argued on the whole that a strong spatial bias exists which results in more short trips than long trips within any particular category of crime. Within any category of crime, occurrences should decline with distance. This well-documented phenomenon of decline of the number of trips with distance is known as distance decay (Brantingham & Brantingham, 1984).

The significance of the crime location may signify particular spatial constraints on the offender (Brantingham & Brantingham, 1981). Child abduction/homicide offenders may commit criminal acts by choosing victims from more familiar areas, such as near their residence, where the offender feels safe and where offender efforts are minimized. The routine activities of the

offender and the victim are paramount in determining their movements in space and the eventual crime locations.

All individuals develop personal places (activity nodes) where they spend the majority of their time and personal paths between their personal activity nodes (Ratcliffe, 2006). Law enforcement officials investigating child abduction murders need to examine the potential importance of the abduction site and the body disposal site and examine the “fit” of these locations into the routine activities of any suspects.

Canter (2003) illustrated how early offenses in a serial offender’s career provided a reasonably accurate indication of the likely location of their residential base. Such crimes were likely to involve less planning, and thus likely to occur in areas familiar to the perpetrator and so in turn are more likely to be located shorter distances from the offender’s home. This simple premise is interesting in that if a single, initial crime of a series of crimes can be used to help locate an offender, perhaps the same concept could be of investigative value in single offenses.

The offender’s residence is likely to be a central point in his routine activities. Research on distances traveled from home to offense confirms the existence of distance decay (Brantingham & Brantingham, 1984; Rengert, 1996; Warren, Reboussin, Hazelwood, Cummings, Gibbs, and Trumbetta, 1998). Capone and Nichols (1975) have suggested that distances from home to offense location may vary as a function of offense type. For example, there are suggestions that offenders generally tend to travel greater distances in order to commit a property crime compared to the distance traveled to commit a violent crime (LeBeau, 1987; Rossmo, 2000). Therefore, a distance-decay function describing the relationship of the residence to the offense is likely to be found (Santilla, Zappala, Laukkanen, Picozzi, 2003).

Since illegal activities overlap with other activities, the spatial and temporal structure of routine legal activities should play an important role in determining the location, type and quantity of illegal acts occurring in a given community (Cohen & Felson, 1979). Routine legitimate activities often provide the opportunities to commit offenses and may also provide offenders with suitable targets. Daily activities may affect the location of targets in visible and accessible places at particular times (Cohen & Felson, 1979). Variables, such as gender, age, and reason for the journey, affect the types of routines in which individuals participate and have an impact on the mobility patterns of suspects (Pizarro, Corsaro & Yu, 2007). In other words, the routine activities of child abduction/homicide offenders, such as trips between residence, workplace, leisure activities, shopping centers, grocery store, etc., may often put the offender in close proximity to a potential victim. The routine activities of suspects in child abduction/homicide cases should be looked at in an attempt to determine how the offender and victim came into contact with each other.

Pedneault and Beauregard (2013) studied the routine activities of 147 sexual offenders incarcerated in a Canadian province. The researchers collected and analyzed data on the sexual offenders' use of time in a variety of activities in the weeks preceding the offense for which they were incarcerated. On average, each offender had 3.6 different sexual victims. With regard to the age of the sexual victims, 57.9% of the offenders selected child victims, 29.0% selected adult victims, and 13.1% selected both child and adult victims. The sexual offenders studied generally spent many hours each week engaging in noncriminal activities. This supports the notion that offenders act on opportunities to offend available to them during their noncriminal activities. Offenders may look for vulnerability and accessibility of a victim during the course of the

offender's routine activities, both criminal and noncriminal, and law enforcement must consider all activities of a suspect in a child abduction/homicide investigation.

Clearly, establishing a connection between a victim and an offender who is not known to the victim prior to the offense (a "stranger") can be particularly challenging for law enforcement. Establishing such links, however, can prove essential to solving these crimes. Few child homicide studies examine victim remains disposal methodologies and patterns. As just discussed, the routine activities of offenders may often provide the opportunity for the offender to make contact with the victim. Just as routine activities may provide the opportunity to select a victim and commit the crime, the routine activities of the offender are also likely important in the location chosen by the offender to dispose of the remains. Analyses of how and where offenders dispose of their victims' remains could provide law enforcement professionals with a more scientifically sound method of directing search efforts. It could also lessen investigative burdens, such as the financial burden and personnel burden of such cases, while increasing the probability of preserving physical evidence, improving case resolution, resource management, and prosecution success. Few researchers have looked at the characteristics of the disposal sites to see if opportunity played a role in choice of site, and whether victim and/or offender characteristics have an effect on the site chosen.

However, a study by Boudreaux et al. (1999) did provide information on victim and offender residences in relation to disposal sites without tying it to any theoretical framework or applying a spatial analysis to the study. Boudreaux et al. (1999) found that 78% of victims studied were abducted and victimized within 1 mile of their residence and offenders generally resided near the initial abduction site (60% lived within 2 miles). Disposal of the victim's remains typically occurred within 5 miles of the abduction site (66%) (Boudreaux et al., 1999).

Additionally, Boudreaux et al. (1999) found that body disposal patterns differed with victim age. Movement of the victim remains was generally farther in cases involving older victims. Older victims are generally larger and more difficult to conceal than younger victims and may also require more physical strength and effort to conceal, causing the offender to travel farther in search of an adequate disposal location. In addition, disposal of larger victims would more likely require the use of a vehicle, which would reduce distance limitations for the offender.

Rational choice theory. The second theoretical approach to the geographic behavior of criminals is the rational choice approach, which places emphasis on the adaptive nature of human behavior. It is a “voluntaristic, utilitarian action theory in which crime and criminal behavior are viewed as the outcomes of choices. These, in turn, are influenced by a rational consideration of the efforts, rewards, and costs involved in alternative courses of action” (Cornish, 1993, p. 362). A basic tenet of this theory is that there is a decision to be made in every step of the crime process (Clarke & Cornish, 1985).

The core concepts of the rational choice perspective are:

- Criminal behavior is purposive
- Criminal behavior is rational
- Criminal decision-making is crime-specific
- Criminal choices fall into two broad groups: involvement and event
- Involvement decisions have three stages
- Event decisions unfold in a sequence of stages and decisions

(Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Purposive nature of crime. Criminal acts are never senseless, but purposive (Cornish & Clarke, 1986). Offenders are seen as rational individuals who commit crimes in an attempt to satisfy their need for rewards such as money, sexual satisfaction, elevated status, and excitement. A study by Leclerc, Proulx & Beauregard (2009) examined the modus operandi of sexual offenders against children while applying the rational choice theory. Modus operandi can be defined as the actions taken by an offender to successfully carry out the offense (Douglas, Burgess, Burgess & Ressler, 1997). Leclerc et al. (2009) found that the modus operandi had a purpose and that most offenders would seek to employ those strategies that they found to be successful in past sexual episodes.

Rational choice theory assumes “that offenders seek to benefit themselves by their criminal behavior; that this involves the making of decisions and of choices, however rudimentary on occasion these processes might be; and that these processes exhibit a measure of rationality, albeit constrained by limits of time and ability and the availability of relevant information” (Cornish & Clarke, 1986, p.1). Criminals will decide whether or not to commit a crime by weighing the efforts, rewards, and costs involved in alternative courses of action (Beauregard, Rossmo & Proulx, 2007). It is important to note that the rational choice theory suggests that individuals will decide *not* to commit crimes when the risks are too high or the rewards are not adequate.

Rational nature of crime. The most important aspect in the rational choice perspective is the presumption of rationality of human action, criminal or not (Cornish, 1993). Presuming rationality is not the same, however, as presuming perfect rationality. A criminal’s decisions are limited or “bounded” by time, effort, and available information. Real world action is often taken on the basis of decisions made under less than perfect circumstances. Decisions are likely to

produce “satisficing” outcomes – satisfactory and sufficient outcomes – rather than optimal outcomes most of the time. Offenders are seldom in possession of all the necessary facts about the risks, efforts, and rewards of the crime. Criminal choices usually have to be made quickly and are often hastily revised. Criminals may rely on a general approach that has previously worked and improvise when they meet unforeseen circumstances. Criminals also tend to focus on the rewards of the crime rather than its risks. Like non-offenders, offenders often act rashly and fail to consider the long-term consequences of their actions. However, offenders are generally making the best decisions they can within the limits of time, resources, and available information (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Experience changes an individual’s information processing, and a criminal may improve his or her decision making over time. Learning is an integral part of rational choice theory that sees behavior as interactional and adaptive (Cornish, 1993). However, rational does not equal intelligent or sophisticated.

Even violent criminals will exhibit a substantial degree of rationality, as they see it at the time. (Rossmo, 2000). Two studies that applied a rational choice theory to the seemingly irrational behavior of violent offenders were Beauregard et al. (2007) and Lundrigan & Canter (2001). Beauregard et al. (2007) studied the hunting process from the offenders’ perspective of 69 serial sex offenders incarcerated in a Canadian institution. The results of that study showed that sex offenders acted in a rational, although sometimes bounded, way during the commission of their crimes. Lundrigan & Canter (2001) examined the body disposal sites of 126 serial killers from the United States and 29 serial killers from the United Kingdom. The results of that study concluded that the locations at which serial killers disposed of their victims’ bodies reflected the logic of the choices that underlie their predatory activities.

A recent extension of the rationality perspective of the rational choice theory is a hot/cool perspective: “hot” affect, i.e. feelings that influence criminal choice; “cool” cognition (Van Gelder, 2013). This hot/cool perspective does not argue against the concept of rationality, but offers a more complete explanation of criminal behavior and decision making by considering the influence of affect, or feelings, alongside rational considerations. A study by Van Gelder and De Vries (2014) showed, via vignettes, that there are two different modes, a “hot” affective mode and a “cool” cognitive mode, in which criminal prospects are processed. It seems likely that there would be variation among different types of crime with respect to the extent to which affect, or feelings, would play a role.

Importance of crime specificity. Specific offenses bring particular benefits to offenders and are committed with specific motives in mind. Because crimes differ from one another, the factors weighed by offenders and the variables influencing their decision-making will differ with the nature of the offense (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Yang, Wu & Huang (2007) studied Taiwanese kidnapers and found that most of the offenders included in the study did not make their decisions strictly on a cost-benefit calculation. Instead, various noneconomic factors were better suited to explain the process of kidnapping.

Temptations may override long-term decisions (Trasler, 1993). An offender may succumb to the emotional temptation to abduct and murder a child over the long-term consequence of detection and punishment. According to Cornish (1993), in such a perspective, it becomes important to study situational variables such as crime scene and victim characteristics, and their choice structuring properties, in order to emphasize the distinctive nature of different person-situation criminal interactions.

Criminal choice cannot be studied in the abstract. Descriptions of criminal choice must be developed for specific categories of crime. The need to be crime-specific does not, however, ignore the fact that many offenders are generalists, committing a wide range of crimes over the course of their careers. But each crime has its own purpose and its own method of commission with its own choices and decisions to be made (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Distinction between events and involvement. Event decisions relate to the commission of a particular offense. They are crime specific and concern choices and decisions made when preparing for, carrying out, and concluding the commission of a particular crime. They concern such matters as the choice of a particular target and ways to reduce the risks of apprehension (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Involvement decisions are more complex and are made at three separate stages of a criminal's career. Offenders must decide whether they are ready to begin committing crime to obtain what they want (initiation), having started, whether to continue offending (habituation), and whether, at some point, they should stop (desistance). Involvement decisions, like event decisions, are crime specific and must be studied separately for different crimes (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Separate stages of involvement. Decisions at each stage of criminal involvement (initiation, habituation, and desistance) are influenced by different sets of variables. Background factors, such as personality and upbringing, have their greatest influence at the initiation stage. Current life circumstances, routines, and lifestyles, which reflect the ongoing rewards of crime, are of principal importance at the habituation stage. At the desistance stage, background factors have ceased to play any significant role in decision making. Current life circumstances, along

with the accumulating costs of crime, weigh heavy in decisions at the desistance stage. During all stages, it is the immediate impact of situational variables, such as needs, motives, opportunities, and inducements, which trigger the actual decision about whether or not to commit a particular crime (Cornish & Clarke, 2005; Cornish & Clarke, 2011).

Sequence of event decisions. Crime scripts are step-by-step accounts of the procedures used by offenders to commit particular crimes. These crime scripts can assist in the analysis of event decisions. Crime scripts are designed to help identify every stage of the crime-commission process, the decisions and actions that must be taken at each stage, and the resources, such as criminal cast, props, and suitable locations, required for effective action at each step. The scripts build on offenders' accounts of their criminal activities and treat crimes as stories. By providing a template that outlines the necessary steps involved in any kind of successful offending, crime scripts can expose the rationality in even ostensibly senseless crimes, such as child abduction/homicide (Cornish & Clarke, 2005; Cornish & Clarke, 2011). Findings of a 2012 study by Beauregard, Leclerc and Lussier whose sample consisted of rapists, child molesters and victim-crossover sex-offenders showed that, similar to any other criminal, sex offenders are rational decision makers who plan their crime on varying levels.

Scripts can be used to deconstruct a wide range of crimes and can be built using different types of data, including material routinely collected by the police. A benefit of scripts is that they can be created from partial or incomplete data and later amended as more information becomes available (Brayley, Cockbain and Laycock, 2011).

Usually, scripts comprise related tracks. Tracks are considered variants of a more generic script and enable the individual to deal with differences in procedures in specific circumstances

(Cornish, 1994). Tracks follow an action sequence from start to finish for a particular version of the crime (Brayley et al., 2011).

A study by Beauregard, Proulx, Rossmo, Leclerc and Allaire (2007) identified hunting process scripts of serial sex offenders. Three hunting process scripts that take into account both behavioral and geographic aspects of crime were identified. These three scripts included different tracks of the hunting process. Results of the study indicated that environmental variables, such as familiarity with the offense location, were important to the sample of serial sex offenders' hunting processes.

In a logical way, the rational choice theory shows how decisions/choices are made throughout the entire criminal process, from the choice of crime location, to body disposal site, to how to remain undetected. These actions require planning and there are several rational choices/decisions to be made by the offender, even though they might not seem rational to a noncriminal (Canter & Youngs, 2008).

The rational choice explanation of spatial behavior involves the making of decisions and choices which exhibit a trade-off between increased opportunity and greater reward the further an offender travels from home, as well as the costs of time, effort, and risk (Cornish & Clarke, 1986). The benefits of a criminal action are the net rewards of crime, to include any material gains, but also intangible benefits such as emotional or sexual satisfaction. The risks or costs of crime are formal punishment should the offender be apprehended.

Crime pattern theory. Crime pattern theory is derived from a multidisciplinary approach to understanding crime and criminality and explores patterns of crime and criminal behavior. While crime pattern theory is general, it was specifically developed to make it easier to understand patterns of crime and the diversity in such patterns (Brantingham & Brantingham,

1993). A pattern can be defined as a recognizable interconnectedness of objects, processes, or ideas (Andresen, 2014). Crime pattern theory maintains that criminal events occur in persistent, identifiable patterns in time and space (Brantingham, Brantingham, Vajihollahi & Wuschke, 2009). Particularly for human activities, patterns matter because we are creatures of habit. There are patterns to our daily lives in the ways, times, and how we move through the landscape (Andresen, 2014).

Most people spend their days in very routine ways: time is spent at home, in travel to work or school; at work or school; in travel to visit friends, do some shopping or other errands, or visit entertainment sites; and in travel back home. The area in which this routine takes place may be large or small, depending on the social context, network of friends, work and home locations, the design of the city, the means of transit, and the reasons for moving around. The routes taken between end points, or nodes, form an activity space, which becomes stable for long periods of time (Andresen, 2014).

The geography of the crime has been identified as a very important aspect of the investigation and the solvability of child abduction/homicide (Brown & Keppel, 2007). All humans have spatial behavior, which is a mental representation of their surroundings (Brantingham & Brantingham, 1981). Brantingham and Brantingham (1981) studied the spatial movements of offenders and suggested that offenders form a cognitive map of their environment. Offenders develop an activity space, which is central to crime pattern theory, based on both criminal and non-criminal activities. The actions of the offenders help form an awareness space, or parts of their surroundings, about which they have knowledge.

Activity spaces are restricted as well as what is remembered within an activity space. The awareness space of an individual (which is larger than the individual's activity space) is

limited and is potentially predictable. After an original learning period in a new location, activity spaces and awareness spaces become somewhat established. Criminals, as well as non-criminals, function within spatially restricted awareness spaces. Potential offenders learn about criminal opportunities from their peers, the media and their own observation (Clarke, 1997). Target selection is dependent upon the physical environment (Beauregard, Rebocho & Rossmo, 2010; Canter & Larkin, 1993). A criminal's search for a suitable target falls within their awareness space and decreases in intensity as distance increases away from their normal activity areas (Brantingham & Brantingham, 1984). A possible reason why offenders do not search for opportunities far from their normal activity path is because the offender may move into areas in which they are unfamiliar and may be uncomfortable (Ratcliffe, 2006).

The type of awareness space and activity space that an offender develops is likely to be slightly different in general characteristics from the awareness space and activity space of most other area residents. Awareness space and activity space of offenders likely vary with age, gender, race, and socioeconomic status (Beauregard, Proulx, & Rossmo, 2005). Since regular or routine activities and movements between these activities dominate awareness spaces, it seems reasonable to assume that the form of movement between activities will influence the level of awareness (Brantingham & Brantingham, 1981).

Environment is the totality of people, places, and things that an individual comes in contact with and the relationships that influence the individual's behavior. To understand environment and consequently behavior, space must be categorized in a manageable and understandable way. Spatial information is information that has locational coordinates attached to it and can be interrelated based on position. For example, crime occurrence data, such as abduction site and body disposal site, can be translated into positions on a map (often longitude

and latitude). Because of the reference system on a map, these points may be interrelated (Brantingham & Brantingham, 1984).

People act and react within a world they know, not the world that exists in any objective sense. Places are never without significance (Canter, 2003). Offenders choose their targets in a deliberate rather than random fashion (House, 1997). Target suitability depends not only on the target itself, but the surroundings of that target: the environmental backcloth. The environmental backcloth consists of the economic, socio-cultural, legal, and physical surroundings that also include the routine activities of the population, thereby creating a pattern (Andresen, 2014). Offender perceptions and judgments about risk, effort, and rewards play an important part in their determination of where to commit a crime (Clarke, 1997). The crime template is developed from cues emitted from the environment that allow a potential offender to identify a good target (Andresen, 2014). Templates vary by specific crimes, offenders, and the general context for the crime. However, there is enough similarity in how people engage in crime and how they form a cognitive image of an environment that general templates can be constructed to help explain specific crime patterns (Brantingham & Brantingham, 1993). Although crime templates vary between crime types, once established, they are relatively fixed. However, crime templates can change and adapt if the environmental cue pattern changes.

Environmental criminology focuses on understanding the criminal event and how it relates to individual motivation, to victims and targets, and to the legal, social, psychological, and physical backcloth against which crime occurs. Offenders do not choose locations and environments in which to offend at random. Instead, offenders are influenced by their knowledge, experience, and target needs. However, for an offense to occur, the experience, knowledge, and needs of the offender have to be translated in a complex, dynamic environment

(Lundrigan, Czarnomski & Wilson, 2010). Understanding crime requires understanding how people, places, spaces, routine activities, and general settings all influence why, where, and when crimes occur (Brantingham & Brantingham, 1998). According to Brantingham and Brantingham (1981), crime occurs when four things are in concurrence: a law, an offender, a target, and a place. Environmental criminology studies the fourth dimension, place: a discrete location in time and space at which the other three dimensions intersect and a criminal act occurs. Situational crime prevention shifts the focus from the offender to aspects of the immediate environment that encourage or permit crimes to occur (Wortley & Smallbone, 2006). The emphasis in situational crime prevention is on modifying environmental factors that provoke offenders' attitudes and motives as well as create opportunities for the commission of crimes (Kaufman, Mosher, Carter, & Estes, 2006).

The environmental perspective contrasts sharply with traditional criminological theories. Traditional theories are concerned with criminality, focusing on the historical perspective of how an offender acquired deviance. The environmental perspective takes a different view, focusing instead on crime, whereas the offender is just one element of a criminal event (Wortley & Mazerolle, 2011).

Environmental criminology urges researchers to explore how and why certain crime patterns emerge (Brantingham & Brantingham, 2004). Pattern is a term used to describe recognizable inter-connectiveness, or linking, of objects, rules, and processes (Brantingham & Brantingham, 2011). The situational perspective recognizes and explores the fact that crime is not randomly distributed in time and space, but follows patterns (Wortley & Smallbone, 2006). Crimes, decisions to commit crimes, and the process of committing a crime are patterned (Brantingham & Brantingham, 2011). Distances traveled can be seen as a pattern.

Environmental criminology also explores the crime patterns of groups of offenders (Brantingham & Brantingham, 2000).

Crime pattern theory combines routine activity theory, rational choice, and environmental principles to explain the distribution of crime (Rossmo, 2000). The pattern theory of crime expands upon the flexibility of routine activities theory, while the rational choice theory is operating in the background at all times (Andresen, 2014).

The present study will apply principles of environmental criminology to a particular group of offenders – child abductors who have killed their victims – and will focus on the distances traveled by these offenders.

Although it may seem that one theory might have superior explanatory potential over the others, one theory does not have to exclude the others. Perhaps a combination of the theories might provide a strong basis for the understanding of criminal spatial behavior.

While routine activities theory focuses on the surroundings such as where a “good” crime site would be (Beauregard et al., 2005), rational choice theory focuses more on the underlying cognitive processes of the offender. Crime pattern theory is consistent with the routine activity approach with its emphasis on the relevance of regular and routine behaviors (Rossmo, 2000). An example of how these theories can be combined is a 2010 study by Deslauriers-Varin and Beauregard. This study examined serial sex offenders of stranger victims and identified scripts that demonstrate that the target selection stage is highly influenced by the victim’s routine activities and the physical environment in which the crime takes place.

Specific conditions and processes generate patterns that are identified, and theories can be employed to help us understand them. When examining crime patterns from a theoretical perspective, one should ask: how important is geography in explaining this pattern? This study

will provide insight on the importance of locations involved with child abduction/homicide offenders, such as residence, and how the distances between key crime points (abduction site and disposal site) may form identifiable patterns to assist law enforcement in the identification of the suspect in future cases of child abduction/homicide.

Chapter 2. Methodology, Data, Analysis, and Hypotheses

Aim of Present Study

The overall aim of this study is to identify travel patterns of child abductors who have killed their victims to aid law enforcement officers in identifying a subject or locating victim remains in new unsolved cases. While this study is exploratory in nature, by providing information concerning typical travel distances of offenders, law enforcement officers in new unsolved cases can identify an area in which an offender is likely to live or limit the area to be searched in looking for victim remains.

Abduction site will be used as a distinguisher in one set of research questions. The rationale for utilizing abduction site as a distinguisher is that this location may be the most telling of all sites associated with the crime being studied. The offender may have more choice over the abduction location than the murder site, disposal site, etc. Exploring the possibility of associations between traveling behavior and abduction site is important as such links would make it possible to make separate calculations for subgroups according to the abduction site. If a specific type of abduction site, i.e. victim residence, can be associated with differences in distances traveled, estimating statistical models for these subgroups might yield more accurate calculations, and thus be of more use to the police trying to locate remains and/or catch the perpetrator. Therefore, for the current study, one goal is to test whether or not the abduction location (i.e. victim residence vs. all other locations), and as a rule, available to the police in the beginning of the investigation, would be associated with traveling distances of the offenders in line with the expectations outlined.

A second goal of the study is to examine the ability of specific victim characteristics (i.e. age, gender, etc.) and crime scene locations (i.e. abduction site and body disposal site) to predict

distances traveled. Since one of the goals of this study is to provide information which may be useful to law enforcement officers at the outset of a new child abduction case, the predictor variables chosen were variables which are likely to be known or easily obtained within the first few minutes of the investigation.

The unit of analysis is the victim. There are three primary dependent variables under investigation in this study including (a) the distance between the offender's residence and the abduction site, (b) the distance between the abduction site and the disposal of the victim's remains, (c) the distance between the body disposal site and the offender's residence.

Data

This project utilized an archival data set compiled by the Federal Bureau of Investigation (FBI), National Center for the Analysis of Violent Crime (NCAVC). The database consisted of 72 child victims who were abducted and murdered by 68 offenders. The date range for these offenses was 1970 – 2006.

Participants in the archival data set were initially identified through FBI case files and the Violent Criminal Apprehension Program. The FBI's Violent Criminal Apprehension Program (ViCAP) is a nationwide data information center designed to collect, collate, and analyze crimes of violence, specifically murder. Anecdotal reports from law enforcement officers regarding child abduction homicide cases that would potentially meet study criteria were also used to identify victims. Additionally, FBI researchers reviewed federal and state prison records to identify participants who met the research criteria. The inclusion criteria for the data set were:

1. Victim was less than 18 years of age
2. Victim was abducted by the offender
3. Offender was convicted of the murder

For purposes of this archival data set, abduction was defined as “the coerced, unauthorized or illegal movement of a child for the purpose of a criminal act” (Boudreaux et al., 1999, p. 540). Exclusion criteria were parental abductions (i.e. involving custodial disputes/conflicts) and cases wherein the offender was processed through the juvenile system. Offenders meeting either of the exclusion criteria were eliminated from the potential subject pool.

The archival data set is a non-random sample of the population of child abductors who have killed their victim(s). The population of such offenders is unknown. It is likely some child abductors/killers have not been caught. It is also possible that the FBI was not able to secure sufficient information regarding some of the offenses to allow for inclusion in the dataset.

Data Collection Method

To identify appropriate study participants, presentence investigative reports, psychological reports, offense records, autopsy reports, confessions, and/or any other relevant documents were requested by the FBI’s NCAVC. Requested information was given an archival case number and the present researcher completed a research protocol for each subject meeting the inclusion criteria. The FBI’s NCAVC developed an extensive protocol of 177 questions titled “Child Abduction Protocol Archival Research Project”. The current research project used 132 of the original 177 questions. Additionally, this researcher added five (5) questions to capture population density of key locations to the protocol for a total of 137 questions, many with sub-questions, used to capture information regarding each child abduction homicide offense.¹

¹ The FBI prohibits inclusion of the protocol due to the sensitive law enforcement nature of the document.

Basic demographic data regarding each offender was captured, such as gender, age at the time of the offense, date of birth, and race. Marital status at the time of the offense as well as marital history was also captured. Information regarding the existence of children of the offender (biological, adopted/foster, step-children), age, and with whom the children lived was also recorded in the protocol. IQ level, educational history of the offender, and the employment history of the offender, at the time of the offense as well as in the five (5) years prior to the offense, were captured. Sexual, physical, and emotional abuse, as well as neglect, of the offender and who committed the abuse or neglect of the offender was recorded.

Also captured was the criminal history of the offender, both as a juvenile and as an adult. In addition to the existence of a criminal history, the specific offenses, according to the National Incident-Based Reporting System (NIBRS), to include the number of each type of offense, was recorded. The protocol captured the number of times each specific offense was committed, even though an arrest did not occur, as well as the number of arrests and convictions for each offense. Information regarding prior abduction attempts, prior sexual offense attempts, and prior homicide attempts was also recorded.

Stressors present for the offender at the time of the current abduction/homicide offense, such as financial strain, marital problems, conflict with significant other, being fired/released from a job, or recent excessive drug or alcohol use were captured. With whom the offender was living at the time of the offense, as well as whether the offender used a computer in connection with the offense, or whether the offender maintained or viewed pornography was also recorded.

Basic demographic data regarding each victim such as gender, age at the time of the offense, date of birth, and race were captured. The relationship between the victim and the offender was also recorded. The relationship was categorized as a “friend” if the offender had

intimate knowledge of the victim and there was not a gap greater than five (5) years between the offender and the victim. An “acquaintance” was defined as an offender having awareness of the victim. The relationship was coded as a “stranger” if there was no indication that the offender and the victim had knowledge of each other.

Where the victim was intending to sleep on the day of the abduction was also recorded, to include the occupants (primary residence, friend’s house, etc.) as well as the type of dwelling (single family residence, apartment building, hotel/motel). Recent changes in the location of the victim’s residence (i.e. family moved from New Jersey to California) as well as any recent changes in the make-up of the victim’s household (i.e. victim’s mother’s boyfriend moved into the house, older sibling moved out of the house) were captured. “Recent” was defined as having occurred within the six (6) months prior to the abduction.

Robust abduction information was recorded, to include the city, county, and state of the abduction, the date of the abduction, the day of the week on which the abduction occurred, the best estimate of the time at which the abduction occurred, and the location of the abduction, including whether the abduction occurred indoors or outdoors. If the abduction occurred indoors, the means of entry into the building was also captured.

The offender’s familiarity with the abduction site was also recorded. The offender was considered familiar with the abduction site if the offender had been to the location at least once prior to the abduction.

The presence of others at the time of the abduction and the relationship of that person to the victim (i.e. victim’s parent(s), victim’s sibling(s), male/female friend of the victim) was recorded. An individual was considered “present” at the time of the abduction if they were in an area that would have enabled them to see/hear the abduction. An individual was considered

“aware” if they were aware that the abduction had occurred. An individual was considered “challenged” if he/she challenged the offender at the time of the abduction.

The approach of the offender to the victim was also captured. A “con/ruse” was defined as a continuum of behavior ranging from simple verbal deception to complicated and orchestrated maneuvers implemented by an offender to deceive, gain the confidence of, and/or mislead the victim about the threat posed by the offender. A “physical” approach was defined as a continuum of behavior ranging from touching to physical assault to blitz, in which the offender applied immediate and overwhelming injurious physical force to incapacitate and control the victim. A “threat” was defined as either verbal or physical threat of injury, with or without the use of a weapon. A “surprise” approach was defined as the unexpected and sudden confrontation of the victim by the offender with the purpose of frightening, gaining compliance of, and/or controlling the victim.

The type of weapon used by the offender, if any, at the abduction site, as well as whether the victim resisted the offender at the abduction site was also recorded. The offender’s means of transportation to the abduction site as well as away from the abduction site, and the ownership of the vehicle used, if applicable, were also included in the dataset. The primary motive for the abduction was also captured. Sexual motive was coded if there was evidence of genital trauma, the victim was recovered nude or partially nude, or if the victim’s clothing was in sufficient disarray as to indicate sexual assault.

As for information regarding the murder of the victim, the city, county, and state of the murder, the date of the murder, the day of the week on which the murder occurred, the best estimate of the time at which the murder occurred, and the location of the murder was recorded.

The estimated amount of time between the abduction and the murder of the victim was also captured.

The offender's familiarity with the murder site was also recorded. As with familiarity with the abduction site, the offender was considered familiar with the murder site if the offender had been to the location at least once prior to the murder.

Again, as with the abduction, the presence of others at the time of the murder and the relationship of that person to the victim (i.e. victim's parent(s), victim's sibling(s), male/female friend of the victim) was recorded. The same definitions of "present", "aware," and "challenged" were used in regard to others at the murder scene as were used with others present at the abduction.

The offender's means of transportation to the murder site, from the murder site to the body disposal site, as well as away from the body disposal site, and the ownership of the vehicle used, if applicable, were also included in the dataset. Whether the offender returned to the initial body disposal site and moved the body to another location was also recorded.

Also included in the dataset was information regarding the use of restraints by the offender. The type of restraint, as well as specific information regarding the restraint, such as whether the restraint was brought to the scene by the offender, obtained at the scene, left on the victim, etc., was captured.

Information regarding sexual activity between the offender and the victim was also recorded, to include whether the sexual activity occurred before or after the victim's death and whether the offender performed the sexual activity on the victim or the offender forced the victim to perform the sexual acts on the offender. The specific type of sexual activity (i.e. oral

sex, vaginal intercourse, anal sex, foreign object insertion, digital penetration, fondling) was captured.

The cause of the victim's death and the amount of time between the murder of the victim and the final disposal of the body was also recorded.

As for information regarding the victim's body, the date of recovery, the type of location in which the body was recovered, and the method of body disposal was included in the dataset. The visibility of the body at the final body location, as well as the apparent intention of the offender in disposal of the body, was also captured. The offender was determined to have "concealed" the body if an apparent effort to delay or prevent discovery of the body was made. "Displayed" was defined as the intentional placement and/or positioning of the body in a location where it was certain to be found, and/or in a manner intended to either degrade or humiliate the victim, and/or shock or offend the person finding the body. "Dumped" was defined as no apparent effort by the offender to conceal the body. The condition of the body (i.e. fresh remains, early decomposition, partial or full skeletonization, or burned remains) was also recorded.

The offender's familiarity with the disposal site was also recorded. As with familiarity with the abduction site and the murder site, the offender was considered familiar with the disposal site if the offender had been to the location at least once prior to the disposal of the victim's body.

The primary motive for the murder was also captured. The murder was defined as a "sexual" murder if it was determined that the offender derived sexual pleasure from the act of murder. The murder was an "emotion-based" murder if anger or rage was the motive. A "cover-

up” murder was defined as a murder in which the offender murdered the victim for the sole purpose of avoiding detection in the abduction.

Distance between key crime locations, such as the offender’s residence, the victim’s residence, the abduction scene, the murder scene, and the body disposal scene were recorded. Distances were calculated “as the crow flies” over a spherical earth. Crow’s-flight distances were used as it makes no assumptions about the route taken from one point to another. Crow’s-flight distance also allows for comparison with other similar research as this measure is one of the most common measures used (Canter, Hammond, Youngs & Juszcak, 2013; Lundrigan & Czarnomski, 2006; Wheeler, 2012). Addresses for relevant sites (as found in the case file for each offender) were converted to latitude/longitude (decimal format) via a publicly available website. Once the latitude/longitude was determined for each relevant site, the distance between the latitude/longitude for each relevant site was computed via the same website. The actual distance was captured in the protocol, as well as the categorical distance, using the following measurement levels:

0, same location

less than 0.5 mile

0.5 mile to 1 mile

over 1 mile to 5 miles

over 5 miles to 10 miles

over 10 miles to 25 miles

over 25 miles

unknown

does not apply

The last category of information included in the dataset was the population density of key locations, such as the offender's residence, the victim's residence, the abduction location, the murder location, and the body disposal location. Definitions of urban, suburban, and rural were derived from the United States Census Bureau. An urban area was defined as an area with a population of 50,000 people or more. A suburban area was defined as an area with a population of at least 2,500 people and less than 50,000 people. A rural area was defined an area not encompassed by either urban or suburban. The population density of a particular city or town was determined by utilizing the United States Census Bureau's categorization as of the 2010 census.

All coded items from the 137 protocol questions were entered into the Statistical Package for the Social Sciences (SPSS) for database maintenance and analysis. This process resulted in a de-identified data set of 72 victims, each with 422 variables, who meet the criteria for this project. Inter-rater reliability was not a factor as a single coder completed each of the 72 protocols and entered all information into the SPSS database.

Data Analysis Plan

The data were examined for outliers, skewedness and kurtosis. Because the distance variables were highly skewed, and to increase the power of the analysis, bootstrapping procedures were conducted. A bootstrap sample of 1,000 and bias-corrected confidence intervals of 95% were requested.

Descriptive statistics, including means, standard deviations, frequencies and percentages (where appropriate) were calculated. The research questions were addressed with t-tests for independent samples and multiple linear regressions.

The unit of analysis was the victim. Three primary dependent variables under investigation in this study were (a) the distance between the offender's residence and the abduction site, (b) the distance between the abduction site and the disposal of the victim's remains, (c) the distance between the body disposal site and the offender's residence. Each of these dependent variables were calculated before analysis.

Additionally, a multitude of bivariate analyses were run using Pearson correlation, Chi-Square test of association, t-test for independent sample, or ANOVA, depending on the variable. The variables examined in various combinations using bivariate analyses were offender characteristics (age, race, marital status, education level, employment status, history of sexual, physical, or emotional abuse, criminal history, living arrangement, familiarity with abduction location, and familiarity with disposal site), victim characteristics (gender, age, race, relationship to the offender, intended sleep location on day of abduction, and with whom the victim lived), distance variables (the distance between the offender's residence and the abduction site, the distance between the abduction site and the disposal site, and the distance between the body disposal site and the offender's residence), and crime event variables (time of the abduction, amount of time between the abduction and murder, month of the abduction, year of the abduction, day of week of the abduction, the abduction location, the visibility of the body at the disposal site, and whether the disposal site was also the murder site).

Research Questions

Distance as a function of abduction site. The first set of research questions examined differences in the dependent variable by abduction site (independent variable). T-tests for independent samples were utilized as the purpose of the statistical analysis was to compare the mean distance traveled (dependent variable) between two groups of offenders (independent

variable). Was there a significant difference in distance as a function of abduction site (victim residence vs. all other locations)?

Specifically:

- a. Was there a significant difference in distance between the offender's residence and the abduction site (dependent variable), based upon an abduction site of victim residence vs. abduction site of all other locations (independent variable)?
- b. Was there a significant difference in distance between the abduction site and the body disposal site (dependent variable), based upon an abduction site of victim residence vs. abduction site of all other locations (independent variable)?
- c. Was there a significant difference in distance between the body disposal site and the offender residence (dependent variable), based upon an abduction site of victim residence vs. abduction site of all other locations (independent variable)?

Hypothesis 1: Distance traveled between the offender's residence and the abduction site will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

Hypothesis 2: Distance traveled between the abduction site and the body disposal site will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

Hypothesis 3: Distance traveled between the body disposal site and the offender's residence will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

It was hypothesized that the distances traveled by the offender in situations where the abduction site is the victim's residence will be shorter than in situations where the abduction site

is all other locations. Applying a theoretical framework to the hypothesized travel distances, it was anticipated that the routine activities theory would be more applicable to travel distances of offenders who abduct their victim from the victim's residence and the rational choice theory would be more applicable to travel distances of offenders who abduct their victims from all other locations.

If a victim was abducted from his/her residence, then the routine activities of the offender were likely to be spatially restricted. This group of offenders would likely commit their offense in a marauder-type fashion, operating in an area close to their residence. Offenders often follow standardized routines and use regular travel routes going to and from everyday destinations. A smaller activity space, for instance 2 miles from the offender's home, in which most of his activities take place, may lead to less opportunities for the offender and victim to come into contact than if the offender has a larger activity space, for instance 15 miles from his residence. The smaller activity space may lead to less potential victims than a larger activity space; therefore, the offender may have to abduct the victim from his/her residence, which is far riskier than abducting a victim from a public playground, movie theatre, shopping mall, etc.

Body disposal options would also be more restricted if an offender is operating within a smaller activity space as opposed to a larger activity space, i.e. 2 miles from the offender's residence vs. 15 miles from the offender's residence. Therefore, the offender would dispose of the body of a child abduction/homicide victim close to the abduction site, which would also be closer to his residence, if his routine activities form a small activity space.

If the victim was abducted from a location other than the victim's residence (public playground, movie theater, shopping mall, etc.), it was hypothesized that the travel distances would be greater than in cases where the victim was abducted from his/her residence. This

group of offenders would likely commit their offense in a commuter-type fashion, operating in areas perceived to be distant from their residence. Applying the rational choice theory to this set of offenders, in searching for a victim to abduct, the offender must make decisions which exhibit a trade-off between increased opportunity and greater reward the further an offender travels from home, as well as the cost of time, effort, and risk. For example, an offender looking for a child to abduct and murder would have a larger number of potential victims from which to select the further he travels from his residence. The offender would also have the opportunity to make the abduction with less risk of initial apprehension as an abduction from a public playground, movie theatre, shopping mall, etc. is safer for the offender than an abduction from the victim's residence.

The offender would also have a larger number of locations from which to choose to dispose of the body the further he travels from his residence. The offender weighs these perceived benefits against the cost of increased risk of apprehension the further he travels and makes a rational choice that the benefits outweigh the costs. It must be remembered however that these choices may not seem rational to the noncriminal.

Predictors of distance. The next set of research questions examined the ability of specific victim characteristics and crime scene locations - independent variables - (often the only information known at the outset of an investigation) to predict distance (dependent variable). Multiple linear regression analysis was used as the purpose of the statistical analysis was to predict distance traveled between key crime locations, using independent variables usually known to law enforcement at the outset of an abduction/homicide investigation. The independent variables utilized in this project were the age, gender, and race of the victim, the intending sleeping location of the victim (victim's residence vs. all other locations), the living

arrangements of the victim (biological parents vs. biological mother only and biological parents vs. all other arrangements), the abduction site (victim's residence vs. all other locations) and the recovery site (death scene vs. all other locations) Specifically:

- d. Which victim characteristics and crime scene locations (independent variables) predict the distance between the offender's residence and the abduction site (dependent variable)?
- e. Which victim characteristics and crime scene locations (independent variables) predict the distance between the abduction site and the disposal of the victim's remains (dependent variable)?
- f. Which victim characteristics and crime scene locations (independent variables) predict the distance between the body disposal site and the offender's residence (dependent variable)?

Hypothesis 4: Distance traveled by offenders between all crime locations will increase as the age of the victim increases.

It was anticipated that younger victims would be abducted from their home and that older victims would be abducted from locations other than their residence. Young children often have restricted activity space and are more closely supervised than older children. Using the same line of reasoning as with the first set of research questions, a routine activities approach to the abduction of younger children would imply that the routine activities of the offender are spatially restricted, meaning the offender travels shorter distances between crime locations when abducting younger children.

Hypothesis 5: Distance traveled by offenders between all crime locations will be greater for offenders who abduct female victims than for offenders who abduct male victims.

The primary motivation for abduction and murder of a child is usually a sexual motive. It was anticipated that the majority of offenders would be heterosexual in their sexual orientation and would be seeking a female victim. As society generally has a more protective posture towards females than males, females are more likely to have close supervision and therefore make them less attractive targets to offenders, utilizing the rational choice theory. An offender seeking a female victim to abduct may have to travel further from his residence to find a victim than an offender seeking a male victim, also giving him more options far from his home in selecting a disposal site.

Hypothesis 6: Distance traveled by offenders between all crime locations will be greater for Caucasian offenders than for offenders of all other races.

In looking at the population density of the United States, ethnic groups tend to be centered in urban locations. A widely known fact in criminal justice is that offenders typically choose victims within their own race. Therefore, offenders within a minority race, i.e. Black, will likely chose a Black victim. As Blacks tend to be in urban locations, a Black offender seeking a Black victim to abduct would not have to travel far to find a victim, due to the dense population of urban locations. Applying a routine activities approach to this hypothesis, the activity space of a Black offender would likely be more restricted than the activity space of a Caucasian offender.

Hypothesis 7: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim was intending to sleep at their own residence on the day of the abduction than for offenders whose victim was intending to sleep somewhere else on the day of the abduction.

Victims intending to sleep at his or her own residence on the day of the abduction indicate a greater likelihood of capable guardianship than a victim who was intending to sleep elsewhere, i.e. a friend's house. Applying a rational choice perspective, an offender may have to travel further in order to find a victim with lax guardianship, therefore making the victim more attractive to the offender.

Hypothesis 8: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim lived with both biological parents than for offenders whose victim lived with only their biological mother.

One-parent households typically have less supervision of the children than two-parent households, simply by having one less person to share the burden of capable guardianship. A victim living with only a biological mother will likely have greater freedoms and will have more opportunity for his/her routine activities to intersect with the routine activities of a motivated offender than a victim living with both biological parents. Therefore, the distances traveled by the offender abducting a victim who is living with only his/her biological mother will be farther than the distances traveled by an offender abducting a victim living with both biological parents.

Hypothesis 9: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim lived with both biological parents than for offenders whose victim lived with someone other than their biological parents.

A victim living with both biological parents will likely have closer supervision than a victim living with someone other than a biological parent, i.e. an aunt. Applying the same reasoning as above, a victim living with someone other than a biological parent will likely have greater freedoms and will have more opportunity for his/her routine activities to intersect with the routine activities of a motivated offender than a victim living with both biological parents.

Therefore, the distances traveled by the offender abducting a victim who is living with someone other than a biological parent will be farther than the distances traveled by an offender abducting a victim living with both biological parents.

Hypothesis 10: Distance traveled by offenders between all crime locations will be shorter for offenders who abduct their victim from the victim's residence than for offenders who abduct their victim from some other location.

Applying the same theoretical framework as was applied to the first set of research questions, if a victim was abducted from his/her residence, the routine activities of the offender are likely to be spatially restricted. This group of offenders would likely commit their offense in an area close to their residence and would have a more restricted area within which to commit the abduction and dispose of the body than offenders who abduct their victim from a location other than the victim's residence.

Hypothesis 11: Distance traveled by offenders between all crime locations will be shorter for offenders who leave the victim's body at the death scene than for offenders who leave the victim's body at a site other than the death scene.

Applying a routine activities approach, the offender who leaves the victim's body at the death scene may have a more restricted activity space within which to operate than an offender who moves the body from the death scene to another location for disposal.

If it is possible to identify crime features, such as victim characteristics (i.e. age, gender, etc.) and crime scene locations (i.e. abduction site and body disposal site) that are statistically significantly correlated with the journey-to-crime distance traveled by offenders, this will have practical implications for investigators as the crime features explored in the present study are, as a rule, often known by the police prior to an offender having been identified.

The rationale for this study was to add to the general knowledge base regarding child abduction homicides and to attempt to understand criminal mobility patterns for effective police operations. It was hoped that the present research would be used to improve the efficiency and effectiveness of homicide detectives confronted with an unsolved murder case involving child abduction. Additionally, it was anticipated that results from this study would help police investigators to efficiently identify strategies and implement tactics which will lead to the capture of child abduction killers and the solution of cases by providing guidelines for search parameters when attempting to identify the residence of a child abduction killer or the location of the victim's remains.

Chapter 3. Results

Descriptive Statistics

In line with other research on child abduction/child homicide, the demographics of offenders and victims were identified, including gender, race and age. The distance between key crime locations was also generally examined by looking at the range of miles between key points as well as the mean distances traveled between these points.

In all child abduction cases, law enforcement's first priority is to locate and recover the child alive, bringing him/her back to the family. As this study was designed to assist law enforcement, the amount of time between the victim's abduction and murder was examined.

The time between the victim's abduction and victim's murder was generally very short. As shown in Table 1, a time lapse of less than .5 hour occurred in 22.4% of the cases. In 46.3% of the cases, the time span was between .5 to 1 hour. Therefore, in the vast majority of cases, law enforcement officials have very limited time in which to recover the victim alive. If abduction location (usually known at the outset of an investigation) can be used by law enforcement to determine an area in which to focus their search efforts, perhaps more abduction victims can be recovered before the offender continues to climb on the crime continuum to commit murder.

The time span between abduction and murder was looked at more closely to determine whether there was a correlation between the amount of time that lapsed between the abduction and murder and the victim's age. This was assessed using a Pearson correlation. The analysis indicated the correlation between time between abduction and murder and the victim's age was not statistically significant ($r = -.005, p = .96$), as indicated in Table 2.

The time span between abduction and murder and the victim's gender was also examined with a *t*-test for independent samples, as indicated in Table 3. Males had an average time between abduction and murder of 2.17 (*SD* = 0.71), which corresponds to a time of 0.5 to 1 hour. Female victims had an average time between abduction and murder of 2.20 (*SD* = 1.07), which also corresponds to a time of 0.5 to 1 hour. The difference between male and female victims' time between abduction and murder was not statistically significant ($t(65) = -0.103, p > .05$).

Table 1

*Frequencies and Percentages for the Amount of Time between Victim's Abduction and Murder
(N = 67)*

Variable	Frequency	Percentage
Amount of time between victim's abduction and murder		
less than 0.5 hour	15	22.4
0.5 to 1 hour	31	46.3
over 1 hour to 8 hours	18	26.9
over 8 hours to 1 day	1	1.5
over 1 day to 3 days	1	1.5
over 7 days to 14 days	1	1.5

Table 2

*Correlation between Amount of Time between Victim's Abduction and Murder and Victim's Age
(N = 67)*

<i>r</i>	<i>p</i>
-.005	.96

Table 3

T-test for Independent Samples Comparing Amount of Time between Victim's Abduction and Murder by Gender (N = 67)

	sex of victim	N	Mean	SD	Std. Error Mean	t	df	p
amount of time between victim's abduction and murder	male	12	2.17	0.71	.207	-0.10	65	.91
	female	55	2.20	1.07	.145			

As shown in Table 4, all the sex offenders were male. A majority was White (73.6%). There were also Black (12.5%) and Hispanic (9.7%) sex offenders. The majority of the victims were female (83.3%) and White (76.4%). There were also Hispanic (13.0%) and Black (8.3%) victims.

Table 5 shows the age of the offenders as well as the victims. At the time the offense was committed, the male offenders were between 13 and 57 years old; the mean age was 27.60 ($SD = 9.62$). At the time of abduction, victims were between three and 17 years old; the mean age was 10.90 ($SD = 3.66$).

Also shown in Table 5 is the distance between key points. The distance (in miles) between the abduction scene and the offender's residence ranged from zero to 88; the mean distance was 9.15 ($SD = 20.90$). The distance (in miles) between the abduction scene and the body disposal scene ranged from zero to 195.23; the mean distance was 15.62 ($SD = 35.22$). The distance (in miles) between the offender's residence and the body disposal scene ranged from zero to 185.63; the mean distance was 16.57 ($SD = 35.39$).

Table 4*Frequencies and Percentages for the Variables Describing the Offender and the Victim (N = 72)*

Variable	Frequency	Percentage
Gender of offender		
Male	72	100.0
Female	0	.0
Race of offender		
Black/African American	9	12.5
Hispanic/Latino/Mexican American	7	9.7
Native American/American Indian	1	1.4
White/Caucasian/European American	53	73.6
Other	2	2.8
Gender of victim		
Male	12	16.7
Female	60	83.3
Race of victim		
Black/African American	6	8.3
Hispanic/Latino/Mexican American	10	13.9
Native American/American Indian	1	1.4
White/Caucasian/European American	55	76.4
Other	0	.0

Table 5*Descriptive Statistics for Age and Distance Variables (N = 72)*

Variable	Range	<i>M</i>	<i>SD</i>	Skew	Kurtosis
Sex offender's age	13 to 57	27.60	9.62	.94	.20
Victim's age	3 to 17	10.90	3.66	-.22	-.70
Distance in miles between:					
Abduction scene and					
offender's residence	0 to 88	9.15	20.90	3.12	8.93
Abduction scene and					
body disposal scene	0 to 195	15.62	35.22	3.39	12.32
Offender's residence and					
body disposal scene	0 to 185	16.57	35.39	3.10	10.07

Note. *SE* for skewness statistic = .28. *SE* for kurtosis statistic = .56.

As shown in Table 6, the primary motive for the abduction was a sexual motive (80.6%). Sexual activity between the offender and the victim was present in 72.2% of the cases, while it was unclear whether sexual activity took place in 8.3% of the cases. However, case file information led the researcher to believe that the motive for the abduction was sexual in 80.6% of the cases, as previously stated.

Table 6 also shows the employment status of offenders. Offenders were employed at the time of the offense in 55.9% of the cases. All offenders were employed in blue-collar type positions. Examples of positions in which offenders were employed at the time of the offense are dishwasher, laborer, farm worker, construction worker, painter, mechanic, store clerk, and security guard.

Table 6 provides information regarding the relationship between the abductor and the victim. The abductor and the victim were strangers in 56.9% of the cases and were acquaintances in 41.7% of the cases. As previously stated, 80.6% of the abductions were motivated by a sexual desire of the offender. This may appear to be a disparate finding to general information regarding sexual abuse of children that shows that the vast majority of child sex abuse victims know their offender (Bolen, 2003). In fact, the United States Department of Justice National Sex Offender Public Website states that only about 10% of the perpetrators of child sexual abuse are strangers to the child (2014). However, it is important to note that the difference may lie in the abduction itself. Most sexual abusers of children do not abduct the victim to commit the sexual offense.

Table 6

Frequencies and Percentages for the Motive for Abductions, Sexual Activity Prior to Death, Employment of Offenders, and Relationship between Abductor and Victim

Variable	Frequency	Percentage
Primary motive for the abduction		
sexual motive	58	80.6
emotion-based motive	6	8.3
profit	2	2.8
other	3	4.2
unknown	3	4.2
Sexual activity prior to death		
yes	52	72.2
no	14	19.4
unknown	6	8.3
Offenders employed		
yes	38	55.9
no	30	44.1
relationship between abductor and victim		
stranger	41	56.9
acquaintance	30	41.7
friend	1	1.4

Table 7 shows the living arrangements of the offender. The majority of the offenders lived with one or both parents (32.8%). In 16.4% of the cases, the offender lived with his spouse. The offender lived with a significant other in 11.9% of the cases and lived alone in 11.9% of the cases. The population density of the offender's residence was predominately urban (56.9%). The offender lived in a suburban location in 38.9% of the cases and a rural location in 2.8% of the cases.

As shown in Table 8, many of the victims lived primarily with their biological parents (40.3%) or their biological mother (23.6%). The majority of the victims intended to sleep at their primary residence the night they were abducted (87.5%). The population density of the victim's residence was predominately urban (55.6%). The victim lived in a suburban location in 36.1% of the cases and a rural location in 5.6% of the cases.

Table 7

Frequencies and Percentages for the Living Arrangements of Offender and Population Density of Where Offender Lived

Variable	Frequency	Percentage
Living arrangements of the offender		
no one	8	11.9
spouse	11	16.4
live-in significant other	8	11.9
parents	22	32.8
grandparents	1	1.5
siblings	2	3.0
other relative(s)	3	4.5
friend(s)	6	9.0
homeless or transient	2	3.0
other	4	6.0
Population density of where offender lived		
urban	41	56.9
suburban	28	38.9
rural	2	2.8
unknown	1	1.4

Table 8

Frequencies and Percentages for the Variable Describing the Residence of the Victim, Where the Victim Intended to Sleep, and the Population Density of Where Victim Lived

Variable	Frequency	Percentage
Victim resided with		
Biological parents	29	40.3
Biological mother	17	23.6
Biological father	3	4.2
Mother and step-father or boyfriend	8	11.1
Father and step-mother or girlfriend	3	4.2
Grandparents	3	4.2
Other or unknown	9	12.5
Where victim intended to sleep during the night of abduction		
Primary residence	63	87.5
Not primary residence	6	8.3
Unknown	3	4.2
Population density of where victim lived		
urban	40	55.6
suburban	26	36.1
rural	4	5.6
unknown	2	2.8

As shown in Table 9, the majority of the victims were abducted in a location other than their home (72.2%). Only 27.8% were abducted in or near their residence. Of the “other” abduction locations, 26.4% of the victims were abducted from a sidewalk, while 6.9% were abducted from a road and 6.9% were abducted from a parking lot. The population density of the abduction locations were predominately urban (56.9%). The abduction location was a suburban setting in 36.1% of the cases and a rural setting in 5.6% of the cases. The offender was familiar with the abduction site in 66.7% of the cases.

Table 9

Frequencies and Percentages for Location of Abduction, "Other" Victim Abduction Locations, Population Density of Abduction Locations, and Offender's Familiarity with Abduction Site

Variable	Frequency	Percentage
Location of abduction		
residence/near residence	20	27.8
other location	52	72.2
"Other" victim abduction locations		
school	2	2.8
park	4	5.6
sidewalk	19	26.4
convenience store	1	1.4
road	5	6.9
fast food restaurant	1	1.4
single family dwelling-not victim's	4	5.6
parking lot	5	6.9
orchard/vineyard/field	4	5.6
yard	2	2.8
shopping mall	1	1.4
beach	1	1.4
drug store	1	1.4
church	1	1.4
unknown	1	1.4
does not apply	20	27.8

Variable	Frequency	Percentage
<hr/>		
Population density of abduction locations		
urban	41	56.9
suburban	26	36.1
rural	4	5.6
unknown	1	1.4
Familiarity with abduction site		
yes	48	66.7
no	5	6.9
unknown	19	26.4

As shown in Table 10, half of the victims' bodies were recovered at the scene of death; 43.1% of the victims' bodies were recovered at a location other than the death scene. The population density of the disposal location was predominately urban (48.6%). The disposal location was suburban in 37.5% of the cases and was rural in 11.1% of the cases. The offender was familiar with the disposal site in 43.1% of the cases.

Table 10

Frequencies and Percentages for the Location of the Body, Population Density of Disposal Site, and Offender's Familiarity with Disposal Site

Variable	Frequency	Percentage
Location of body		
death scene	36	50.0
location other than death scene	31	43.1
unknown	2	2.8
body not recovered	3	4.2
Population density of disposal site		
urban	35	48.6
suburban	27	37.5
rural	8	11.1
unknown	1	1.4
does not apply	1	1.4
Offenders' familiarity with the disposal site		
yes	31	43.1
no	5	6.9
unknown	35	48.6
does not apply	1	1.4

As shown in Table 11, the distance between the abduction site and the offender's residence was over 1 mile to 5 miles in 30.6% of the cases and was less than .5 mile in 23.6% of the cases. The distance between the abduction site and the disposal site was less than .5 mile in 25.0% of the cases and over 1 mile to 5 miles in 23.6% of the cases. The most common distance categories between the disposal site and the offender's residence were again the same, with the distance traveled between the disposal site and the offender's residence being over 1 mile to 5 miles in 34.7% of the cases and less than .5 mile in 16.7% of the cases.

Table 11

Frequencies and Percentages for the Categories of Distance between Abduction Site and Offender's Residence, Categories of Distance between Abduction Site and Disposal Site, Categories of Distance between Disposal Site and Offender's Residence

Variable	Frequency	Percentage
Distance between abduction site and offender's residence		
0, same distance	7	9.7
less than 0.5 mile	17	23.6
0.5 mile to 1 mile	6	8.3
over 1 mile to 5 miles	22	30.6
over 5 miles to 10 miles	7	9.7
over 10 miles to 25 miles	7	9.7
over 25 miles	3	4.2
unknown	3	4.2
Distance between abduction site and disposal site		
0, same distance	3	4.2
less than 0.5 mile	18	25.0
0.5 mile to 1 mile	7	9.7
over 1 mile to 5 miles	17	23.6
over 5 miles to 10 miles	10	13.9
over 10 miles to 25 miles	6	8.3
over 25 miles	8	11.1
unknown	2	2.8
does not apply	1	1.4

Variable	Frequency	Percentage
<hr/>		
Distance between disposal site and offender's home		
0, same distance	4	5.6
less than 0.5 mile	12	16.7
0.5 mile to 1 mile	5	6.9
over 1 mile to 5 miles	25	34.7
over 5 miles to 10 miles	9	12.5
over 10 miles to 25 miles	6	8.3
over 25 miles	9	12.5
unknown	1	1.4
does not apply	1	1.4

Distance as a Function of Abduction Site

(First Set of Research Questions)

Procedure. Independent t test procedures were conducted to answer the first set of research questions. Because the distance variables were highly skewed, bootstrapping procedures were conducted. A bootstrap sample of 1,000 and bias-corrected confidence intervals of 95% were requested.

Distance between offender's home and abduction site. The first sub-question sought to determine whether the distance between the offender's home and the abduction site would differ as a function of abduction site. The findings in Table 12 reveal that distance between the offender's home and the abduction site did not differ across abduction sites, $t(70) = -.41, p = .636$.

Distance between abduction site and body disposal site. The second sub-question sought to determine whether the distance between the abduction site and body disposal site would differ as a function of abduction site. As shown in Table 12, distance between the abduction site and body disposal site did not differ across abduction sites, $t(70) = .51, p = .664$.

Distance between body disposal site and offender's home. The third sub-question sought to determine whether the distance between the body disposal site and the offender's home would differ as a function of abduction site. The findings in Table 12 show that the distance between the body disposal site and the offender's home did not differ across abduction sites, $t(70) = .94, p = .440$.

Table 12

Descriptive Statistics and Independent T Test Results for Distance as a Function of Abduction Site (N = 72)

Abduction Site	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	Diff.	<i>SE</i>	Sig.	Bias Corrected 95% CI	
								Lower	Upper
Home and abduction site									
Residence/near residence	7.51	14.64	-.41	70	-2.27	4.47	.636	-10.47	6.14
Other locations	9.78	22.95							
Abduction and body site									
Residence/near residence	19.07	39.04	.51	70	4.78	9.98	.664	-11.50	26.45
Other locations	14.29	33.96							
Body disposal site and home									
Residence/near residence	22.92	42.33	.94	70	8.79	10.56	.440	-8.47	31.18
Other locations	14.13	32.46							

Note. CI = confidence interval. Bootstrap standard errors are presented above.

In general, it was hypothesized that the distances traveled by the offender in situations where the abduction site is the victim's residence will be shorter than in situations where the abduction site is all other locations. Although the mean distance traveled between the offender's home and the abduction site was shorter for offenders who abducted their victims from the victim's residence than for offenders who abducted their victims from other locations, the difference was not significant. Therefore, the null hypothesis for Hypotheses 1 could not be rejected.

However, the findings for distance traveled between abduction site and body disposal site and between body disposal site and offender's home were not as anticipated. Not only were the differences not significant, the differences were not in the direction anticipated. The mean distance traveled between the abduction site and the body disposal site and between the body disposal site and the offender's home was greater for offenders who abducted their victims from the victim's residence than for offenders who abducted their victims from all other locations. Therefore, the null hypotheses for Hypothesis 2 and Hypothesis 3 cannot be rejected.

Predictors of Distance

(Second Set of Research Questions)

Procedure. Multiple linear regression procedures were conducted to determine which variables significantly predicted the distance variables. Because the distance variables were highly skewed, bootstrapping procedures were conducted. A bootstrap sample of 1,000 and bias-corrected confidence intervals of 95% were requested.

Distance between offender's home and abduction site. The first sub-question sought to determine which victim characteristics and crime scene locations would predict distance between the offender's home and the abduction site. The findings in Table 13 reveal that none of

the variables significantly predicted the distance between the offender's home and the abduction site ($F(8,63) = 1.11, p = .36$). The model as a whole only accounted for 12% of the variance ($R^2 = .12$) in the distance between the offender's home and the abduction site. One of the family indicator variables, however, marginally predicted distance between the offender's home and the abduction site, $B = 12.50, p = .095$. The distance between the offender's home and the abduction site was marginally farther when the victim lived only with the biological mother ($M = 14.14, SD = 29.25$) than when the victim lived with both biological parents ($M = 2.76, SD = 2.94$).

Table 13

Multiple Linear Regression Results for the Distance between Offender's Home and Abduction Site Model (N = 72)

Variable	<i>B</i>	<i>SE</i>	Sig.	Bias Corrected 95% CI	
				Lower	Upper
Victim's age at time of offense	1.02	1.12	.365	-1.46	2.95
Victim's gender (male vs. female)	3.61	4.38	.411	-5.27	12.05
Victim's race (other vs. Caucasian)	-2.98	7.84	.710	-18.72	12.83
Sleep location (other vs. residence)	-.66	11.91	.958	-26.74	19.44
Living arrangements					
Biological parents vs.					
biological mother	12.50	6.69	.095	-1.55	26.24
Biological parents vs.					
other arrangement	7.93	5.08	.155	-2.10	18.26
Abduction site (residence vs. other)	2.21	5.07	.670	-8.35	11.84
Recovery site (other vs. death scene)	5.29	5.06	.314	-4.42	15.62

Note. CI = confidence interval. Bootstrap standard errors are presented above.

Distance between abduction site and body disposal site. The second sub-question sought to determine which victim characteristics and crime scene locations would predict distance between the abduction site and the body disposal site. The findings in Table 14 indicate that none of the variables significantly predicted the distance between the abduction site and the body disposal site ($F(8,63) = 0.65, p = .73$). The model as a whole only accounted for 7% of the variance ($R^2 = .07$) in the distance between the abduction site and the body disposal site.

Table 14

Multiple Linear Regression Results for the Distance between Abduction and Body Disposal Sites Model (N = 72)

Variable	<i>B</i>	<i>SE</i>	Sig.	Bias Corrected 95% CI	
				Lower	Upper
Victim's age at time of offense	1.39	.99	.186	-.48	3.36
Victim's gender (male vs. female)	9.70	6.37	.143	-2.87	23.02
Victim's race (other vs. Caucasian)	-.74	9.30	.941	-20.13	17.99
Sleep location (other vs. residence)	-6.15	22.59	.781	-60.26	24.25
Living arrangements					
Biological parents vs.					
biological mother	3.57	9.44	.701	-15.81	22.18
Biological parents vs. other					
arrangement	5.13	9.50	.628	-14.33	23.63
Abduction site (residence vs. other)	-5.89	10.49	.586	-28.68	12.96
Recovery site (other vs. death scene)	-11.15	9.46	.275	-30.26	6.53

Note. CI = confidence interval. Bootstrap standard errors are presented above.

Distance between body disposal site and offender's home. The third sub-question sought to determine which victim characteristics and crime scene locations would predict distance between the body disposal site and the offender's home. As shown in Table 15, none of the variables significantly predicted the distance between the body disposal site and the offender's home ($F(8,63) = 0.75, p = .64$). The model as a whole only accounted for 8% of the variance ($R^2 = .08$) in the distance between the body disposal site and the offender's home.

Table 15

Multiple Linear Regression Results for the Distance between Body Disposal Site and Offender's Home Model (N = 72)

Variable	<i>B</i>	<i>SE</i>	Sig.	Bias Corrected 95% CI	
				Lower	Upper
Victim's age at time of offense	.83	1.09	.441	-1.15	3.27
Victim's gender (male vs. female)	8.57	6.60	.187	-4.10	20.98
Victim's race (other vs. Caucasian)	.85	9.22	.933	-17.74	17.91
Sleep location (other vs. residence)	-19.28	21.63	.382	-67.31	15.52
Living arrangements					
Biological parents vs.					
biological mother	9.37	10.23	.378	-12.45	28.68
Biological parents vs.					
other arrangement	3.95	9.43	.672	-16.81	20.87
Abduction site (residence vs. other)	-9.57	10.78	.405	-32.58	9.17
Recovery site (other vs. death scene)	-4.59	9.48	.672	-24.29	12.73

Note. CI = confidence interval. Bootstrap standard errors are presented above.

Bivariate analyses

Many combinations of bivariate analyses were run comparing offender characteristics, victim characteristics, crime event variables, and distance variables. The variables examined in various combinations using bivariate analyses were offender characteristics (age, race, marital status, education level, employment status, history of sexual, physical, or emotional abuse, criminal history, living arrangement, familiarity with abduction location, and familiarity with disposal site), victim characteristics (gender, age, race, relationship to the offender, intended sleep location on day of abduction, and with whom the victim lived), distance variables (the distance between the offender's residence and the abduction site, the distance between the abduction site and the disposal site, and the distance between the body disposal site and the offender's residence), and crime event variables (time of the abduction, amount of time between the abduction and murder, month of the abduction, year of the abduction, day of week of the abduction, the abduction location, the visibility of the body at the disposal site, and whether the disposal site was also the murder site).

Variables measured using a scale level of measurement were age, education level, month of abduction, year of abduction, day of abduction, hour of abduction, time between the abduction and murder, and the distance variables. All other variables used a nominal level of measurement. Only the statistically significant results will be reported.

As seen in Table 16, the results of the Pearson correlation indicate there was a positive statistically significant relationship between actual distance in miles between abduction scene and offender's residence and month of abduction ($r = .245, p < .05$), actual distance in miles between abduction scene and body disposal scene ($r = .284, p < .05$), and actual distance in miles between offender's residence and body disposal scene ($r = .316, p < .01$). As the actual distance

in miles between abduction scene and offender's residence increased, month of abduction, actual distance in miles between abduction scene and body disposal scene, and actual distance in miles between offender's residence and body disposal scene also increased. There was a negative statistically significant relationship between actual distance in miles between abduction scene and offender's residence and time at beginning of interval (military time) during which abduction occurred ($r = -.311, p < .05$). As the actual distance in miles between abduction scene and offender's residence increased, time at beginning of interval (military time) during which abduction occurred decreased.

Table 16

Statistically Significant Correlations between Actual Distance in Miles Between Abduction Scene and Offender's Residence and Other Variables (N = 72)

Variable	<i>r</i>	<i>p</i>
month of abduction	.245	.038
actual distance in miles between abduction scene and body disposal scene	.284	.016
actual distance in miles between offender's residence and body disposal scene	.316	.007
time at beginning of interval (military time) during which abduction occurred	-.311	.011

As seen in Table 17, there was a positive statistically significant relationship between actual distance in miles between offender's residence and body disposal scene and the offender's age at time of offense ($r = .354, p < .01$) and distance in miles between abduction scene and body disposal scene ($r = .810, p < .01$). As the actual distance in miles between offender's residence and body disposal scene increased, the offender's age at time of offense and the actual distance in miles between abduction scene and body disposal scene also increased.

Table 17

Statistically Significant Correlations between Actual Distance in Miles Between Offender's Residence and Body Disposal Scene and Other Key Variables (N = 72)

Variable	<i>r</i>	<i>p</i>
offender's age at time of offense	.354	.002
actual distance in miles between abduction scene and body disposal scene	.810	.001

As seen in Table 18, there was a positive statistically significant relationship between actual distance in miles between abduction scene and amount of time between victim's abduction and murder ($r = .376, p < .01$). As the actual distance in miles between abduction scene and body disposal scene increased, the amount of time between the victim's abduction and murder also increased.

Table 18

Statistically Significant Correlations between Actual Distance in Miles Between Abduction Scene and Body Disposal Scene and Other Key Variables (N = 72)

Variable	<i>r</i>	<i>p</i>
amount of time between victim's abduction and murder	.376	.002

Summary

In summary, all offenders in the study were male. The majority was White with an average age of 27.6 years old. The majority of the victims were female with an average age of 10.9 years old. The majority of the victims were White. The time between the victim's abduction and victim's murder was generally very short.

The majority of the offenders were employed at the time of the offense. The motive for abduction was primarily a sexual motive and sexual activity occurred prior to death in the majority of the cases. In the vast majority of cases, the relationship between the offender and the victim was that of a stranger or acquaintance.

The most common living arrangement of the offender was an offender living with his parents. The majority of the offenders lived in an urban area.

The most common living arrangement of the victim was living with both biological parents. As with the offenders, the majority of the victims lived in an urban area also.

In terms of abduction location, the abduction location was somewhere other than the victim's residence in the majority of the cases. The victim was most often walking on a sidewalk when the abduction took place. The most common abduction location was in an urban area and the offender was familiar with the abduction location in the majority of the cases.

In terms of body disposal locations, the victim was left at the site of death in half of the cases. The most common disposal site was in an urban area and the offender was often familiar with the disposal site.

Following is a review of the research hypotheses and the outcomes:

Hypothesis 1: Distance traveled between the offender's residence and the abduction site will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

Outcome: Fail to reject the null hypothesis.

Hypothesis 2: Distance traveled between the abduction site and the body disposal site will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

Outcome: Fail to reject the null hypothesis.

Hypothesis 3: Distance traveled between the body disposal site and the offender's residence will be shorter for offenders who abduct their victims from the victim's residence than for offenders who abduct their victims from other locations.

Outcome: Fail to reject the null hypothesis.

Hypothesis 4: Distance traveled by offenders between all crime locations will increase as the age of the victim increases.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 5: Distance traveled by offenders between all crime locations will be greater for offenders who abduct female victims than for offenders who abduct male victims.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 6: Distance traveled by offenders between all crime locations will be greater for Caucasian offenders than for offenders of all other races.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 7: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim was intending to sleep at their own residence on the day of the abduction than for offenders whose victim was intending to sleep somewhere else on the day of the abduction.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 8: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim lived with both biological parents than for offenders whose victim lived with only their biological mother.

Outcome: The research hypothesis was accepted for the distance traveled between the offender's home and the abduction location. The distance traveled by the offender between his home and the abduction location was marginally farther when the victim lived with the biological mother than when the victim lived with both biological parents.

For the two other dependent variables (distance between abduction location and disposal site, and the distance between body disposal site and offender's home), this study failed to reject the null hypotheses.

Hypothesis 9: Distance traveled by offenders between all crime locations will be shorter for offenders whose victim lived with both biological parents than for offenders whose victim lived with someone other than their biological parents.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 10: Distance traveled by offenders between all crime locations will be shorter for offenders who abduct their victim from the victim's residence than for offenders who abduct their victim from some other location.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

Hypothesis 11: Distance traveled by offenders between all crime locations will be shorter for offenders who leave the victim's body at the death scene than for offenders who leave the victim's body at a site other than the death scene.

Outcome: Fail to reject the null hypothesis for all three dependent variables (distance between offender's home and abduction location, distance between abduction location and disposal site, distance between body disposal site and offender's home).

As for the statistically significant bivariate analyses, as the distance in miles between the offender's home and the abduction scene increased, so did the distance between the abduction scene and body disposal scene, and the distance between the disposal scene and the offender's residence. Additionally, the month of the abduction increased as the distance between the offender's home and the abduction scene increased. As the distance between the offender's

home and the abduction scene increased, the time at the beginning of the interval (military time) during which the abduction occurred decreased.

When looking at the distance between the offender's residence and the body disposal site, as that distance increased, so did the distance between the abduction scene and the body disposal scene, as well as the offender's age. Also, as the distance between the abduction scene and the body disposal scene increased, so did the amount of time between the victim's abduction and murder.

Chapter 4. Discussion

Brief Summary of Key Findings

This study sought to fill the void regarding reliable information on child abduction/homicide offenders and to identify travel distances by child abduction/homicide offenders that could be useful to law enforcement officers at the outset of an investigation.

One of the most troubling findings of this study was the incredibly short amount of time between the abduction and murder of the victim in the majority of the cases. It was hoped that identifiable travel patterns would be discovered to assist in the search for the victim in future child abduction cases. Unfortunately, that did not occur. Law enforcement officials must continue to rely on traditional investigative methods at the outset of a child abduction case, such as witness interviews, neighborhood canvas, grid search, etc. However, this research did show that the offender often lives in close proximity to the abduction location, regardless of whether the abduction location is the victim's residence or some other location. Therefore, at the outset of an investigation, when trying to identify a suspect, law enforcement officials should focus on the area near the abduction site and work outward.

This study confirmed several other previous studies as to the demographics of the offenders and victims and the motivation for the abduction. The "typical" offender is a white male, approximately 27-28 years old. The "typical" victim is female, approximately 11 years old. Overwhelmingly, the motive for the abduction is sexual.

Perhaps the most important finding of this research was the greater than expected travel distances of offenders between key locations, such as offender's residence, abduction site, and body disposal site. This finding implies that the activity nodes of the offenders encompass a larger geographic area than anticipated. The activity space and the awareness space of the

offenders was greater than expected, thereby increasing the difficulty of the investigation by giving officers more ground to cover when trying to determine the offender's movements in space and the crime locations.

Key Contributions

This study was designed to be exploratory in nature and with investigative considerations at the forefront. Although significant statistical findings regarding travel distances were not found in this study, this study did contribute to the general knowledge base regarding child abductions leading to murder.

Time is of the essence when a child abduction occurs. As noted in Douglas (2012), in 76% of missing children cases, the victim was found dead within 3 hours of the reported abduction, and in 89% of these cases, the victim was found dead within 24 hours. The current study showed similar anguishing results. In 22.4% of the cases, the victim was killed within the first 30 minutes following the abduction and in 46.3% of the cases, the victim was killed within the 30 minute to 1 hour time frame. Combining the two time frames shows that 68.7% of the victims were killed within the first hour after the abduction.

Law enforcement officers often have little to no experience with child abduction investigations and the volume of information to be sifted through can be overwhelming. This study hoped to discover travel patterns of child abduction homicide offenders that could be used by law enforcement officers at the outset of an investigation to limit search areas, first, for the missing child, and, secondly, for the offender. Generally, it was hypothesized that distances traveled by offenders abducting child victims from the victims home or immediate surrounding area would differ from distances traveled by offenders abducting children from all other locations, such as parks, schools, shopping centers, etc. Specifically, it was hypothesized that

offenders abducting their child victims from the victim's home and immediate surrounding area would travel shorter distances from their own home to the abduction site, from the abduction site to the body disposal site and ultimately back to their own homes than the offenders who abducted their child victims from all other locations. It was hoped to be able to tie the distances traveled by offenders to a theoretical basis. For the most part, distances traveled by offenders in this study did not comply with expectations.

A few previous studies have also focused on the dynamics of child abduction and/or child abduction leading to murder. However, the current study differs from the Boudreaux et al. (1999) study and the Brown et al. (2006) study in a couple of facets. The Boudreaux et al. (1999) study examined cases of alleged child abduction, whether or not the victim was murdered. This is broader than the current study, in that the current study only examined child abductions that resulted in murder. Both the Boudreaux et al. (1999) and the Brown et al. (2006) studies also included cases of abduction by family members, which the current study specifically excluded. A third study, much smaller in scale than the Boudreaux et al. (1999) and the Brown et al. (2006) studies, also examined child abduction murder cases. Beyer and Beasley (2003) interviewed 25 incarcerated child abduction homicide offenders and reviewed relevant case documents. It is important to note the similarities and differences between the current study and previous research in order to add to the cumulative knowledge regarding child abduction and child abduction resulting in murder.

The characteristics of the offenders in the current study are consistent demographically with studies by Bourdreaux et al., (1999), Brown et al. (2006) and Beyer and Beasley (2003). All offenders in the current study were male and the majority of the offenders were white (73.6%). Additionally, the average age of the offender in the current study was consistent with

the average age of the offender in the previously mentioned studies. While the age of the offenders in the current study ranged from 13 years old to 57 years old, the mean age of the offender in the current study was 27.6 years old. The average age of male offenders in the Bourdreaux et al., (1999) and Brown et al. (2006) studies was 28 years old and the mean age of offenders in the Beyer and Beasley (2003) study was 27 years old.

Since routine activities and developmental victimology play a role in the risk of abduction for victims, it is important to look at the victims. In the current study, 83.3% of the victims were female and 16.7% of the victims were male. In the Brown et al. (2006) study, 74.0% of the child abduction murder victims were female, with 26.0% of the child abduction murder victims being male. In Bourdreaux et al. (1999), 70% of the child abduction victims were female with 30% of the child abduction victims being male. Overwhelmingly, the majority of child abduction victims are female.

Age of the victim provides an indication of the type of risk the victim may be exposed to, with younger victims more likely to be kidnapped by family members and older victims exhibiting risk patterns similar to that in the adult population (girls likely to be the victim of a sexual assault and boys likely to be the victim of peer aggression). The age of the victims in the current study ranged from 3 years old to 17 years old, with the mean age of the victim being 10.90 years old, again consistent with the previously mentioned studies. The average age of the victim in Brown et al. (2006) was approximately 11 years old and the average age of female victims in Bourdreaux et al., (1999) was approximately 10 ½ years old. Generally, at approximately 11 years old (usually 6th grade), children are becoming more independent and may experience lapses in supervision by caretakers as the caretakers, most often parents, allow their children to attend activities away from home with their friends, i.e. go to movies, walk to

and from a friend's house, etc. Although becoming more self-sufficient and mobile, children are not prepared to protect themselves, either physically or cognitively, therefore making them attractive targets for offenders seeking to abduct, and perhaps kill, a child. By educating parents and guardians as to the potential risks associated with routine activities of children at this stage of development, perhaps some child abductions could be prevented. One way to increase the risk to the offender is by extending guardianship, whether is it guardianship provided by a group of friends, guardianship provided by security guards, or guardianship provided by technology. One simple way to lessen the likelihood of abduction would be to teach children of this age, especially females, to stay with groups as opposed to walking alone. Technology may be able to provide guardianship as well, in the form of formal surveillance using cameras at places where young people congregate (i.e. malls, movie theaters) or in the "guardianship" provided by one's cell phone which provides quick and easy access to emergency services using 9-1-1.

The majority of the victims (72.2%) in the current study were abducted at locations other than their residence, indicating a greater likelihood of lack of capable guardianship than if the victim has been abducted from their residence. Again, by educating parents and guardians as to the benefits of children staying with groups and avoiding areas where there are few people present, children may become less desirable and less attractive targets for potential abductors.

The primary motive for the abduction in the current study was a sexual motive (80.6%). Again, this is consistent with the primary motive of offenders in the Boudreaux et al. (1999) and the Brown et al. (2006) studies. Offenders in the Boudreaux et al. (1999) study abducted children for sex 60% of the time and the Brown et al. (2006) study revealed that nearly 70% of the child abduction murders involved a sexual motive. Although the current study showed a higher percentage of offenders abducting children for sexual reasons than either the Boudreaux

et al. (1999) or the Brown et al. (2006) studies, all three studies have sexual motivation as the highest motive of the offenders.

As for employment of the offenders in the current study (which may play a role in the routine activities of the offender), slightly more than half (55.9%) of the offenders were employed at the time of the abduction. Brown et al. (2006) found similar results, with approximately half of the child abduction murderers in that study being employed. Beyer and Beasley (2003) found a higher rate of employment among offenders studied, with 80% being employed. However, the small sample size of the Beyer and Beasley (2003) study may have played a role in this finding, in that only 25 offenders were included. The rate of employment of child abduction murderers may be more accurately reflected as the sample size increases. The current study had a sample size of 68 offenders committing 72 offenses and the Brown et al. (2006) sample was much larger with over 700 cases being included in that study.

In the Boudreaux et al. (1999) study, 40% of the abductors were strangers to the child victim and 41% of the abductors were acquaintances of the child victim. In the Brown et al. (2006) study, the relationship between the child abduction murderer and the victim was that of a stranger in 44.4% of the cases and that of acquaintance in 41.9% of the cases. The current study found that in 56.9% of the cases, the victim was abducted and murdered by a stranger and in 41.7% of the cases, the victim was abducted and murdered by an acquaintance. The slightly higher percentage of victims abducted and murdered by strangers in the current study is likely due to operational differences in the selection of the sample cases. Both the Boudreaux et al. (1999) and the Brown et al. (2006) studies included family abductions whereas the current study did not. The current study only had possible victim-abductor relationships of stranger, acquaintance, or friend.

Contrary to popular perceptions that individuals who abduct and kill children are loners, Brown et al. (2006) found that only 17.1% of the offenders lived alone while 74.8% lived with someone. The most common living arrangement found by Brown et al. (2006) was an offender living with his parents. This arrangement occurred in 33.2% of the cases studied. The current study found similar results. Only 11.9% of the offenders in the current study lived alone while 79.1% lived with someone. The most common living arrangement was again found to be the offender living with his parents. This occurred in 32.8% of the cases examined in the current study. The routine activities of child abductors who live with someone (as opposed to loners) are likely to resemble the routine activities of most noncriminals, in that many routine legitimate activities, such as trips between home, work, recreational spots, shopping centers, and grocery stores, are likely. It is likely that child abductors, especially those that live with someone, generally spend many hours each week engaging in noncriminal activities, just like noncriminals. In terms of risk to children, it is good that most offenders are not loners, as it is often perceived. Loners are more likely to “fly under the radar,” making it more difficult to identify a loner as a suspect once an abduction occurs. Changes in mood and behavior or a change in patterns, such as going to work, may be identified by others with whom the suspect normally interacts and may be reported to police.

Population density of certain key crime locations was also examined. In terms of population density of a city or town, definitions used by the Census Bureau were applied to aid in the classification for the current study. In order to be classified as urban, the city or town had to have a population of 50,000 or more people. Suburban locations were locations with at least 2,500 and less than 50,000 people, otherwise known as urban clusters by the Census Bureau. And rural locations encompassed all locations not otherwise classified as urban or suburban. In

the current study, 56.9% of offenders lived in an urban area, 39.8% of offenders lived in a suburban area, and 2.8% of offenders lived in a rural area.

Population density of the victim's residence was also examined in the current study. Aligning very closely to the classification of the offenders, 55.6% of the victims lived in an urban area, 36.1% of the victims lived in a suburban area, and 5.6% of the victims lived in a rural area.

The current study also looked at the living arrangements of the victim. The living arrangements of the victim may be indicative as to the level of supervision (or guardianship according to the routine activities theory) present in the life of the victim. The victim resided with the biological parents in 40.3% of the cases and with only the biological mother in 23.6% of the cases.

Another item to be considered in looking at the victims of the current study is where the victim intended to spend the night on the day of the abduction. This aspect of the life of the victim provides information as to the risk level of the victim, i.e. a high-risk victim such as a runaway or a low-risk victim with a stable home life. In 87.5% of the cases included in the current study, the victim intended to sleep at his/her primary residence, indicating that the vast majority of the victims in the current study would be considered a low-risk victim. This finding is consistent with Brown et al. (2006). In Brown et al. (2006), most of the victims (67.5%) were described by those who knew them as "normal kids," again indicating that they were low-risk victims.

One of the key locations looked at in the current study was the abduction location. The location of the abduction (victim's home vs. all other locations) was used to divide the sample into two groups for comparison. This study had a restrictive definition for "victim home" when

coding the data for the location of the abduction. Abduction location was coded as the victim's home when the victim was abducted from within the home, the yard immediately surrounding the home, or the sidewalk in the immediate vicinity of the home. Although children may have a feeling of safety and security, such as is usually experienced at home, in a neighbor's yard or in the general neighborhood, such instances were not coded as an abduction from the victim's home. The current study had victims being abducted from their home in 27.8% of the cases. This finding is consistent with Boudreaux et al. (1999) and Brown et al. (2006). In Boudreaux et al. (1999), 31% of the male abductors abducted the victim from within the victim's home and in Brown et al. (2006), 35% of the victims lived less than 199 feet from the initial contact site between the victim and the offender, indicating the offender made contact with the victim at the victim's home or in the immediate surrounding area.

Conversely, the victims were abducted from locations other than the victims' residence in 72.2% of the cases. Looking more closely at the exact locations for abductions when the abduction took place at a location other than the victim's home shows that the most common abduction site (26.4% of cases) was when the victim was on a sidewalk, i.e. walking to/from various locations. The next most common abduction sites within the "all other" category were a road (6.9%) and a parking lot (6.9%).

Examining the population density of the abduction location, 56.9% of all abduction locations were classified as urban, 36.1% were suburban, and 5.6% were rural.

As for familiarity of the offender with the abduction site, the offender was familiar with the abduction site in 66.7% of the cases, regardless of whether the abduction site was the victim's residence or another location. This implies that the routine activities of the offender often bring the offender to the abduction site, or in close proximity, at some point prior to the

abduction. The abduction site is either within the activity space and/or the awareness space of the offender. Or in other words, the individual nodes and pathways that the offenders use to move between these nodes expose the offender to the abduction site, prior to the commission of the crime.

In terms of body disposal sites, the current study showed that in 50.0% of the cases, the offender left the body at the murder site. The population density of the body disposal sites for the current study showed that in 48.6% of the cases, the body was left in an urban area. In 37.5% of the cases, the body was left in a suburban area and in 11.1% of the cases, the body was left in a rural location. These findings are a sharp contrast to the findings in Brown et al. (2006). In Brown et al. (2006), the body of a child abduction murder victim was left in an urban location 27% of the time, a suburban location 20.5% of the time, and a rural location 52.6% of the time. However, it should be noted that definitions used in Brown et al., (2006) for urban, suburban, and rural were not identified, therefore making it difficult to accurately compare the two studies on this feature.

As for familiarity of the offender with the body disposal site, the offenders in the current study were familiar with the body disposal site in only 43.1% of the cases, regardless of whether the abduction site was the victim's residence or another location. This indicates that in more than half of the cases, the offender disposed of the body in an area of convenience, rather than an area he had previously scouted out and planned to use.

Generally speaking, the distance traveled by offenders in the current study was rather large. Distance was measured in miles and distance between locations was based on "how the crow flies" as opposed to distance obtained from actual roads. "How the crow flies" is a commonly used method to measure distance between two points and eliminates the need to guess

which route(s) an offender may have taken. However, the environmental backcloth of available roads, buildings, and other infrastructure between points of interest such as the offender's residence, victim's residence, abduction location, and the body disposal site should be examined in an attempt to learn how the offender and victim converged in time and space.

In the current study, the distance between the abduction scene (without controlling for victim residence vs. all other locations) and the offender's residence ranged from 0 miles (abduction occurred at the offender's residence) to 88 miles. The mean distance traveled was 9.15 miles. Although the range of miles traveled and the mean distance traveled appear to be rather large, when looked at more closely, the distance traveled by the offender between the abduction site and his residence shrinks considerably. Distance traveled between the abduction scene and the offender's residence was less than one-half mile in 33.3% of the cases and less than one mile in 41.6% of the cases. This is significant for law enforcement investigations since it shows that the offender often lives in close proximity to the abduction location. It should be suggested to law enforcement officials that at the outset of an abduction investigation, the search for an offender should begin near the abduction site and continue to fan outward, regardless of whether the abduction occurred at the victim's residence or some other location. In terms of theoretical significance, the offender's home is likely his anchor point and as he engages in noncriminal routine activities between home, work, recreation, shopping, etc., the offender likely became aware of the victim during the victim's routine activities.

The distances traveled between the abduction scene and the offender's residence by offenders in this study appears to be generally in line to that which occurred in the Brown et al. (2006) study. Brown et al. (2006) found that in 36.5% of the child abduction murders, the offender lived within one-fourth mile of the initial contact site between the victim and the

offender. It appears that the distance traveled by offenders in the current study from their home to the site in which the victim was abducted was generally somewhat greater than was found in the Brown et al. (2006) study.

The current study also found that offenders traveled a great distance between the abduction scene (without controlling for victim residence vs. all other locations) and the body disposal scene. Offenders in the current study traveled from 0 miles (victim was abducted and disposed of in the same location) to 195 miles between the abduction scene and the body disposal scene. The mean distance traveled by offenders between the abduction scene and the body disposal scene was 15.62 miles. Just as with the distance traveled by the offender between the abduction scene and his residence, the range of miles traveled and the mean distance traveled by the offender between the abduction scene and the body disposal scene appear to be rather large. But again, when looked at more closely, the distance traveled by the offender between the abduction scene and the body disposal scene shrinks considerably. In the current study, offenders traveled less than one-half mile between the abduction scene and the body disposal scene in 29.2% of the cases and less than one mile in 38.9% of the cases. This finding is in line with expectations of offenders having somewhat limited activity space and committing their offenses in a restricted area.

Comparing the current study with the Brown et al. (2006) study, offenders in the Brown et al. (2006) study traveled less than one-fourth mile between the initial contact site and the body disposal site in 34.9% of the cases and less than 1 ½ miles between the initial contact site and the body disposal site in 46.5% of the cases.

When looking at the distance between the body disposal scene and the offender's residence (without controlling for victim residence vs. all other locations), offenders traveled

between 0 miles (victim was disposed of at the offender's residence) and 185 miles, with the mean distance traveled being 16.57 miles. In the current study, offenders traveled less than one-half mile between the body disposal scene and his residence in 22.3% of the cases and less than one mile in 29.2% of the cases. In 5.6% of the cases, the victim was disposed of at the offender's residence.

These findings regarding the seemingly great distances traveled by offenders were surprising based upon the overall population density of key locations. The majority of the offenders lived in an urban setting (56.9%), the majority of the victims lived in an urban setting (55.6%), and the majority of the abduction locations (56.9%) were all urban settings. Even the most common body disposal site (48.6%) was an urban location. One would think that within urban settings, the distances traveled would be shorter, due to the myriad of opportunities available in terms of potential victims, potential abduction locations, and potential body disposal sites.

Distance as a function of abduction site. The first set of research questions were designed to examine distances traveled by offenders as a function of abduction site. Abduction site was chosen as a distinguisher since it is a site that is generally known by law enforcement at the outset of an investigation. Thus, if differences in travel patterns between offenders who abduct their victim from the victim's home and offenders who abduct their victim from other locations could be identified, this could be useful to law enforcement in searching for the victim as well as searching for the offender at the outset of a new child abduction case.

The sample of 72 victims involving 68 offenders was divided into 2 groups, using the abduction location to differentiate the groups. A total of 20 offenders abducted their victim from the victim's home or the immediate surrounding area. A total of 52 offenders abducted their

victim from all other locations. Independent t tests were utilized. Due to the highly skewed data, bootstrapping procedures were used.

The distances examined were the distance between the offender's home and the abduction site, the distance between the abduction site and the body disposal site, and the distance between the body disposal site and the offender's home

It was hypothesized that the offenders who abducted their victim from the victim's home would travel shorter distances than the offenders who abducted their victim from all other locations.

Distance between the offender's home and the abduction site. When looking at the mean distance traveled between the offender's home and the abduction site, the offenders who abducted their victim from the victim's residence did in fact travel, on average, a shorter distance. However, the difference was not significant. The mean distance traveled between the offender's home and the abduction site by the offenders who abducted their victim from the victim's residence was 7.51 miles, while the mean distance traveled between the offender's home and the abduction site by the offenders who abducted their victim from all other locations was 9.78 miles. It was anticipated that the offenders who abducted their victim from the victim's home would have traveled, on average, only a mile or two from their residence to the victim's residence. Travel distances were greater than anticipated, regardless of abduction location, and suggest that offenders have greater activity space than previously thought.

Distance between the abduction site and the body disposal site. Not only were the mean distances traveled not significant between the two groups of offenders for this sub-question, but they were also in the direction opposite of what was hypothesized. The mean distance traveled between the abduction site and the body disposal site by the offenders who

abducted their victim from the victim's residence was 19.07 miles, while the mean distance traveled between the abduction site and the body disposal site by the offenders who abducted their victim from all other locations was 14.29 miles. Just as the travel distances between the abduction site and the offender's residence were greater than anticipated, the travel distances between the abduction site and the body disposal site, regardless of abduction location, were greater than anticipated, again indicating a larger activity space of offender's than previously thought. This finding is significant for law enforcement officials in that the search for the offender and his relevant activity nodes may encompass a large geographic area, thereby increasing the difficulty of the investigation.

Distance between the body disposal site and the offender's home. Just as with the previous sub-question, not only were the mean distances traveled not significant between the two groups of offenders for this research question, but they were also in the direction opposite of what was hypothesized. The mean distance traveled between the body disposal site and the offender's residence by the offenders who abducted their victim from the victim's residence was 22.92 miles, while the mean distance traveled between the body disposal site and the offender's residence by the offenders who abducted their victim from all other locations was 14.13 miles. Consistent with the distances traveled by offenders between the abduction site and offender's residence, and the distances traveled by offenders between the abduction site and body disposal site, the distances traveled by offenders between the body disposal site and the offender's residence, regardless of abduction location, were greater than anticipated, again indicating a larger activity space of offender's than previously thought. As previously stated, this finding is significant for law enforcement officials in that the search for the offender and his relevant

activity nodes may encompass a large geographic area, thereby increasing the difficulty of the investigation.

Predictors of distance. The second set of research questions attempted to predict distances between the offender's home and the abduction site, the abduction site and the body disposal site, and the body disposal site and the offender's home (the dependent variables). The independent variables used were specific victim characteristics and crime scene locations, often the only information known at the outset of an investigation. Unlike many other crimes, such as robbery or even sexual assault, child abductions do not provide a victim for investigators to interview and from which to develop leads to start the investigation. Witnesses, if any, are often unreliable. Therefore, predictor variables were chosen that would likely be known to investigators at the outset of most child abduction investigations, to include the body disposal site, if the victim has been murdered and recovered.

The specific predictor variables used were the victim's age at the time of the abduction, the victim's gender, the victim's race (Caucasian vs. other), the intended sleeping location of the victim on the day of the abduction (residence vs other), the living arrangements of the victim (biological parents vs. biological mother and biological parents vs. other living arrangements), the abduction site (residence vs. other), and the body recovery site (death scene vs. other). The data was analyzed utilizing multiple linear regression. Again, due to the highly skewed distance variables, bootstrapping procedures were used.

Distance between the offender's home and the abduction site. The first sub-question examined with multiple linear regression sought to determine which victim characteristics and crime scene locations would predict distance between the offender's home and the abduction site. None of the independent variables significantly predicted the distance between the

offender's home and the abduction site. However, one of the family variables marginally predicted distance between the offender's home and the abduction site. The distance between the offender's home and the abduction site was marginally farther when the victim lived only with the biological mother than when the victim lived with both biological parents. One possible explanation for this could be that the burden and time-constraints often associated with being a single parent leave children of single parents with less supervision and parental control than children living with two parents. Or stated in routine activity language, children of single parents often experience greater lapses in capable guardianship than do children living with two parents. Children of single parents may have a larger activity space within which they are free to roam and associate with friends at shopping malls, movie theaters, etc. The possibly large activity space of children of single parents provides greater opportunity for there to be an intersection between the activity space of the victim with the activity space of a motivated offender.

Distance between the abduction site and the body disposal site. The second sub-question examined with multiple linear regression sought to determine which victim characteristics and crime scene locations would predict distance between the abduction site and the body disposal site. None of the independent variables significantly predicted the distance between the abduction site and the body disposal site.

Distance between the body disposal site and the offender's home. The third sub-question examined with multiple linear regression sought to determine which victim characteristics and crime scene locations would predict distance between the body disposal site and the offender's home. None of the independent variables significantly predicted the distance between the body disposal site and the offender's home.

Bivariate analyses. One of the statistically significant bivariate analyses involved the actual distance in miles between the offender's residence and the abduction site. This variable was positively correlated with the actual distance between the abduction scene and the body disposal site and also the actual distance between the body disposal scene and the offender's residence, meaning, as the distance between the offender's residence and abduction site increased, so did the other distances. This finding is consistent with crime pattern theory, in that the crime sites examined (abduction location and body disposal location) are related to the offender's residence in terms of distance between the sites. This implies that a pattern, or a recognizable interconnectedness, of distances traveled by the offender exists.

The actual distance in miles between the offender's residence and the abduction site was also positively correlated to the month of the abduction, meaning that in the early part of the calendar year (i.e. January, February), the offender traveled a shorter distance between his residence to abduct a victim than he did in the later part of the year (i.e. November, December).

A negative correlation was found between the actual distance in miles between the offender's residence and the abduction site and the time (measured in military time) at the beginning of the interval at which the abduction occurred, meaning that the offender traveled a longer distance from his residence to abduct a victim in the early hours of the day and traveled a shorter distance from his residence to abduct a victim later in the day. Looking at this finding in theoretical terms, in order for a crime to occur, the offender and the victim must converge in time and space. A motivated offender must travel a greater distance in the early hours because there are fewer available targets/victims since the majority of children are in school or other structured activities. However, as the school day ends and potential victims move about between their activity nodes or spend time at the activity node, there are more potential victims available to a

motivated offender, thereby decreasing the distance an offender must travel to find a suitable victim.

A statistically significant correlation was found between the actual distance between the offender's residence and the body disposal scene and the offender's age at the time of the offense and the actual distance between the abduction scene and body disposal scene, meaning as the distance between the offender's residence and the body disposal scene increased, so did the offender's age and the actual distance between the abduction scene and body disposal scene.

In looking at the relationship between the offender's age at the time of the offense and the actual distance between his residence and the body disposal scene, the positive correlation may be attributed to maturity of the offender or the activities in which the offender participates. As an offender ages, say from 18 years old to 25 years old, the offender likely becomes more self-confident. The offender may also be required to travel further for work as he ages or he may expand his activity nodes to include entertainment venues further from his home. This expansion of his activity space, for whatever reason, provides him with more options further from his home in which to dispose of the body. Additionally, the positive statistically significant correlation between the actual distance between the offender's residence and the body disposal scene and the actual distance between the abduction scene and body disposal scene implies a pattern of distances traveled by the offender.

The last statistically significant correlation found was between the actual distance between the abduction scene and body disposal scene and the amount of time between the victim's abduction and murder. This was a positive correlation, meaning that as the actual distance between the abduction scene and body disposal scene increased, so did the amount of time between the victim's abduction and murder. Since the primary motive for abduction was a

sexual motive and the vast majority of victims in this study were in fact sexually assaulted, the increase in distance between the abduction scene and the body disposal scene allowed a greater amount of time in which the assault(s) could take place. Once the assault took place and the victim was murdered, the offender would likely look to dispose of the body rather quickly as it is difficult to conceal a dead body.

Summary of Implications

Several important implications can be derived from this study. First, from a policy standpoint, as a way of reducing the possibility of abduction for children, parents and caregivers should be informed as to the risks of routine activities of children, especially around the age of 11-12 years old. It is at this age that children start to become more independent and may be permitted to walk to and from a friend's house or walk to and from school without supervision. However, this makes the child an attractive target to one seeking to abduct a child. By educating parents and guardians as to the potential risks associated with routine activities of children at this stage of development, perhaps some child abductions could be prevented. One way to increase the risk to the offender is by extending guardianship, whether is it guardianship provided by a group of friends, guardianship provided by security guards, or guardianship provided by technology. One simple way to lessen the likelihood of abduction would be to teach children of this age, especially females, to stay with groups as opposed to walking alone. Technology may be able to provide guardianship as well, in the form of formal surveillance using cameras at places where young people congregate (i.e. malls, movie theaters) or in the "guardianship" provided by one's cell phone which provides quick and easy access to emergency services using 9-1-1.

From a theoretical standpoint, the routine activities of the offender often bring the offender to/near the abduction site, prior to the abduction. The abduction site is either within the activity space and/or awareness space of the offender. The pathways used by an offender between the routine activity nodes of the offender bring him into contact or make him aware of the location he later chooses as the abduction location. Or in other words, the individual nodes and pathways that the offenders use to move between these nodes expose the offender to the abduction site, prior to the commission of the crime. Additionally, the activity space and awareness space of offenders was larger than anticipated, indicating greater than expected travel distances between routine activity nodes.

From a practical standpoint for law enforcement officers, due to the large activity space and awareness space of offenders, the search for an offender after an abduction and the search for victim remains must cover a large geographic area. Traditional investigative techniques, such as a neighborhood canvass, must continue to be relied on at the outset of an investigation, and should begin at the location of the abduction and fan outward.

Limitations

This study, like many others, has limitations. One such limitation was the sample size of victims. Overall, the sample size of 72 victims was adequate, considering the small population of non-familial offenders who abduct and murder children. However, when the sample of 72 victims was divided into two groups based upon the location of the abduction, this reduced the sample size to 50 for victims who were abducted from locations other than their home, and only 20 for victims who were abducted from their home. This study would have benefitted from a larger sample, especially of victims who were abducted from their home. A larger sample would

have increased the reliability and generalizability of any findings and may have lead to significant findings on some research questions.

The method of data collection was also a limitation of this study. Official documents, such as police reports and autopsy reports, were the primary source of information utilized for completing each research protocol. While this type of information is useful for gaining factual information, such as the address of the offender, the address of the victim, the location of the abduction, etc., official documents often do not provide insight as to why a person was in a particular location at a particular time, or how and why an offender became familiar with the location chosen as the abduction site, for instance. Notwithstanding the limitations inherent with interviews with offenders, such interviews may have provided a more robust and complete picture of the offender's life in the days and weeks leading up to the offense. Information regarding the routine activities of the offender may be gleaned from such interviews, which might prove helpful in educating parents and caregivers in ways to reduce the likelihood of a child being abducted. Interviews with the family members of victims may have also produced information concerning the routine activities of the victim and shed some light on how the paths of the offender and victim came into contact with each other. Additionally, little information concerning the thought processes of an offender, especially important when looking at crimes from a rational choice perspective, is included in official documents. Interviews with offenders may help researchers and law enforcement professionals better understand the choices offenders make leading up to an offense, during the commission of an offense, and following an offense.

Future Research

Future research should strive for larger samples, for generalizability as previously noted, as well as multiple data collection methods. This will allow researchers to gain a more complete

picture of the offender, his thought processes, and his activities, and to better tie the offender to a theoretical construct. “Studies that are able to identify theoretical constructs for understanding the links between crime characteristics and offender characteristics are urgently needed” (Ter Beek, Van Den Eshof & Mali, 2010 p. 44).

One such method for learning more about the routine activities of offenders would be to design a study modeled after the Pedneault and Beauregard (2013) study examining the routine activities and time use of sexual offenders. The same methodology could be used in studying the routine activities and time use of offenders who abduct and murder children. Another key piece of information that could be learned from such a study would be the identification of the anchor point of the offender’s life. Traditionally, it is assumed that the anchor point for a criminal is the criminal’s home. However, should it be learned that the anchor point for child abductors who murder their victims is a location other than their home, this may influence the travel patterns of offenders, which in turn would alter the convergence in time and space of the offender and any potential victims.

An idea for future research to learn more about the rational choices of child abduction murderers would be to design a study similar to the Beauregard et al. (2012) study, however focusing solely on the decision making processes of child abduction murderers. A study of this nature may lend insight to the seemingly irrational decision to abduct and murder a child, thereby providing information useful to parents and guardians to prevent such an event from occurring. A study examining the choices of offenders may also lend insight into the greater than expected travel distances of offenders. Were the greater than expected travel distances due to the lack of targets/victims or were the offenders more discerning in their target selection?

Additionally, studying child abduction offenses that occurred more recently may lend more insight into the current travel patterns of offenders. The time span of offenses in this study was from 1970-2006. The awareness space and activity space of offenders likely is much larger for more recent offenders than for offenders decades ago due to technological advances such as the Internet, GPS devices, and smartphones.

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