DISPLACEMENT AND DIFFUSION:

RURAL HOTSPOT POLICING AND DRUG ARRESTS IN SOUTHWEST VIRGINIA

by

Melissa C. Minton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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ABSTRACT

Drug production, distribution, and trafficking is a growing problem in Southwest Virginia. Routine activity theory and situational crime prevention theory focus on the specific characteristics and have led to many policing initiatives such as hotspot policing. Many policing approaches, including hotspot policing, have positively impacted the production, distribution, and trafficking of methamphetamine, cocaine, heroin, and fentanyl in rural Virginia. However, there is little known about the impact these approaches have had on the displacement and diffusion of these drugs in the areas where the biggest law enforcement operations have taken place. Displacement and diffusion are common consequences of any drug initiatives. It cannot be assumed that rural hotspots follow the same patterns as urban hotspots. It also cannot be assumed that situational changes will affect crime patterns. Studying a rural area rather than an urban location gives greater insight into the effectiveness of hotspot policing in rural areas. This study aimed to show if major drug operations, considered hotspot policing for the purpose of this study, have an impact on the arrest rates of methamphetamine, cocaine, heroin, and fentanyl. Data were analyzed through a paired *t*-test and an ANOVA to determine the impact each operation (Operation Trap Door, Operation Pandemic, and Operation Appalachian Action) had on the county in which the operation occurred and the surrounding counties. Operations Trap Door, Pandemic, and Appalachian Action did not initiate statistically significant displacement or diffusion of benefits.

Keywords: displacement, diffusion, hotspot policing, methamphetamine, balloon-effect

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Dedication

"A man's heart deviseth his way: but the Lord directeth his steps," (Proverbs 16:9, KJV). I would like to thank my Lord and Savior Jesus Christ, who has given me this opportunity to pursue this dream and the strength to persevere.

I would like to dedicate this dissertation to my amazing family. To my loving husband, Aaron, you have supported me throughout this journey and are truly my best friend. Thank you for believing in me and always encouraging me to chase my dreams. To my parents, you have always been my rock and foundation from which I have been able to achieve anything that I set my mind to. I love and appreciate you more than you will ever know. To my three beautiful daughters: Kielyn, Kherington, and Nilah. You are my world and I grow more proud of you every day. In the words of Misty Copeland, I hope you "start unknown, finish unforgettable." I cannot wait to see you grow in Christ and accomplish all your dreams.

Acknowledgements

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High-Intensity Drug Trafficking Areas (HIDTA)

National Institute on Drug Abuse (NIDA)

Weighted Displacement Quotient (WDQ)

CHAPTER ONE: INTRODUCTION

Overview

Southwest Virginia is a small portion of the state nestled between Tennessee, Kentucky, West Virginia, and North Carolina. Many farms, agricultural opportunities, and forestry businesses reside in Southwest Virginia (Sorrell, 2019). This rural area consists of small towns, unincorporated communities, and smaller cities. Unfortunately, in the heart of Southwest Virginia lies a major drug trafficking route. Interstate-81 is a major highway that runs down the center of Southwest Virginia. According to the U.S. Department of Justice, Interstate-81 falls within Drug Trafficking Corridor A, which runs west to east, beginning in California and ending in New York (National Drug Intelligence Center, 2006). Over the last decade, methamphetamine has posed the greatest threat to this region (Brown, 2019). In 2019, the High-Intensity Drug Trafficking Areas (HIDTA) published a study that included portions of Southwest Virginia. They reported methamphetamine seizures have increased to 81% while cocaine, heroin, and fentanyl seizures have grown just 10% over reported seizures in 2017 (Brown, 2019). There have been many successful local, regional, and federal joint task force operations to combat the production, use, and trafficking of methamphetamine, cocaine, heroin, and fentanyl. However, little research has been done in the area to study the effects of displacement and diffusion after joint task force operations in rural areas.

Background

Methamphetamine was first synthesized in 1893 by a Japanese pharmacologist; however, it was not widely used until World War II. Japan, Germany, and the United States prescribed the drug to military personnel to increase endurance and performance (Anglin et al., 2000). During this time, methamphetamine was sold over the counter in Japan to fight sleepiness and enhance

vitality both in Japan and the United States. During the 1960s, amphetamine was written as a prescription to treat depression and obesity. It was also gaining popularity as a treatment for heroin addiction but quickly became the new drug of choice for users and drug abusers (Anglin et al., 2000). Illegal laboratories emerged in San Francisco and methamphetamine dominated the "speed" market. By the 1970s, many states had restrictions on the allowable amount of manufactured amphetamine, which led to an increase in black-market methamphetamine produced primarily by motorcycle gangs (Lukas, 1997). At the same time, the target user groups changed from white- and blue-collar workers to college students, minorities, and women (Potter & Kolbye, 1996).

In the 1980s, law enforcement intensified their efforts to reduce the production of methamphetamine in the United States, which led to greater involvement of Mexican traffickers (Morgan & Beck, 1997). Large quantities of methamphetamine, now known as "crystal meth," along with the necessary chemicals to continue the manufacturing, were smuggled from Mexico into California (Anglin et al., 2000). Another surge of methamphetamine, in the form of "ice," occurred in the 1980s in Hawaii with Mexico- and California-based trafficking organizations dominating the market. These transnational organized crime groups played a major role in increasing methamphetamine use and clandestine lab growth (Anglin et al., 2000).

In 1996, seizures of clandestine methamphetamine labs increased by 169% in 1995 throughout the western and midwestern states (Anglin et al., 2000). In response, Congress passed the Comprehensive Methamphetamine Control Act of 1996. Since 1996, methamphetamine use has surged within the United States, and the user population has broadened (Anglin et al., 2000). In 1998, the estimated number of people who had tried methamphetamine was approximately 21% of the population. The distribution of methamphetamine is increasing, encompassing many

regions of the United States. Use and distribution patterns and trends in one region often predict trends in other regions, providing an early warning of what the future may bring (Anglin et al., 2000).

Despite the many attempts to control methamphetamine, it continues to be widely available in the United States. In recent years, prices have declined while purity levels have increased. This factor is significant because the increase of availability in domestic and imported methamphetamine has increased the demand for the drug. According to Pennell et al. (1999), aspects of the manufacturing, trafficking, and use of methamphetamine have consequences that are very different from all other drugs. The fact that it can be locally manufactured and easily trafficked across the United States creates several unique problems, specifically in rural areas (Hunt, 2006; Weisheit, 2008; Weisheit & Wells, 2009).

Cocaine is a naturally occurring substance found in the leaves of the coca plant, which is indigenous to South America, Mexico, Indonesia, and the West Indies. Ancient civilizations used cocaine for religious and ceremonial activities (Goldstein et al., 2009). When Europeans came to South America in 1492, native workers used cocaine, by chewing the leaves, to increase their physical stamina when working in the silver mines. It was not until the mid-1800s, through the isolation of the cocaine alkaloid, that it was used as an anesthetic (Goldstein et al., 2009). By 1897, cocaine was used to treat morphine addiction. In the United States, cocaine was sold over the counter until 1916 (Goldstein et al., 2009).

Cocaine's addictive properties became well known, and in 1914, The Harrison Narcotics Tax Act was passed. It did not prohibit the use of cocaine; however, it appeared to be a law for the "orderly marketing of opium, morphine, heroin, and other drugs to include cocaine, in small quantities over the counter, and in larger quantities by prescription" (Goldstein et al., 2009, p. 8).

The National Institute on Drug Abuse found that in 2006, six million Americans, ages 12 and older, had abused cocaine in some form (Goldstein et al., 2009). A 2007 study conducted by the National Institute on Drug Abuse found that 2% of eighth graders, 3.4% of 10th graders, and 5.2% of 12th graders had abused cocaine at some point during the previous year. Cocaine is the most frequent drug-related cause of emergency room visits in the United States (Goldstein et al., 2009).

Heroin had a unique beginning and was once hailed as a wonder drug. Heroin smoking originated in Shanghai in the 1920s spreading across Eastern Asia and to the United States over the next decade. Heroin's original intention was to be an alternative to morphine (United Nations, 1953). Heroin was also prescribed for various illnesses and had also been found to curb addiction to codeine or morphine. However, later studies found that the addiction-forming properties of heroin are more pronounced than morphine. The same studies found that heroin addiction is difficult to cure and usually involves severe withdrawal symptoms such as cramps, convulsions, and even death from respiratory failure (United Nations, 1953).

In 1931, a limitation conference proposed the total abolition of heroin to include medical practices. The objections failed, in part, because traffickers would not have any difficulty manufacturing heroin because of the import certificates (United Nations, 1953). The United States discontinued dispensing heroin around 1916, which led to a demand on the black market. In the 1930s, there was a sharp drop in trafficking due to the growing international restrictions. In many parts of the world, heroin traffic has increased since World War II, but the drug's purity changed dramatically. By 1941, less the 1% of heroin was pure (United Nations, 1953). The issues with purity have not lessened the impact and growth of heroin overdoses. In a 2016 report by the DEA, death by heroin overdose rose 19% over 2015 statistics (Drug Enforcement

Administration [DEA], 2018). Heroin is readily available and comes in various forms. The southwestern border in California remains the primary entry point for heroin into the United States. The DEA predicts that heroin flow into the United States will increase to meet the demands of abusers (DEA, 2018).

Fentanyl is a Schedule II synthetic opioid approved for a pain killer and anesthetic. The strong opioid properties make it an attractive drug of choice for both heroin and opioid users. Fentanyl is typically trafficked into the United States from Mexico and China. The United States produces very little homemade fentanyl, and most are smuggled in powder or counterfeit pill form (DEA, 2018). The use of fentanyl for pain therapy began in Belgium in the 1950s. By the mid-1980s, fentanyl was widely available in many forms, including a patch, lollipop, nasal spray, lozenges, and dissolvable oral tablets (T. Stanley, 2005). Fentanyl is available in the United States under the same or similar names as heroin, confusing customers, leading to accidental overdoses (DEA, 2018).

Fentanyl's high potency leads to a continued rise in overdoses leading to a 103% increase in synthetic opioid deaths in 2016 when compared to 2015 deaths. Virginia is one of the top 10 states for fentanyl and heroin overdose reports by the National Forensic Laboratory Information System (DEA, 2018). The presence of fentanyl-laced counterfeit pills is one area associated with spikes in overdose deaths. In September 2017, 40 states had encountered fentanyl-laced counterfeit pills. Fentanyl production requires no plant material, and there are only two ways to synthesize it. Fentanyl will continue to be a problem if drug traffickers in Mexico, China, and the United States continue to be drawn to high profits (DEA, 2018).

Demographics of Drug Use in Virginia

The use and abuse of illegal drugs in Virginia are lower, on average, than in many other states (Virginia Department of Behavioral Health and Developmental Services, 2009). However, rural areas within the state report higher than average drug abuse and use. Specifically, Southwest Virginia—which includes the counties of Bland, Bristol City, Buchanan, Carroll, Dickenson, Floyd, Galax City, Grayson, Lee, Norton City, Russell, Scott, Smyth, Tazewell, Washington, Wythe, and Wise—tend to experience higher rates of drug use and abuse (Virginia Department of Behavioral Health and Developmental Services, 2009). According to the Virginia Drug Control Update published by the Executive Office of the President of the United States (2011), the amount of methamphetamine lab seizures increased 958% between 2008 and 2011. Southwest Virginia has a higher drug arrest rate, reporting an increased 63.8% from 2002 to 2006, more than the rest of the state (Council on Virginia's Future, 2010). The 2011 Virginia Drug Control Update found that although the rate of drug-induced deaths in Virginia is lower than the national average, Dickenson County had the fourth-highest rate of illegal drug poisoning deaths in the state between 2004 to 2008 (Executive Office of the President, 2011). In a survey in 2011, 7.53% of Virginians reported using illegal drugs during the past month, where the national average was 8.82%. Additionally, 3.54% of Virginians reported using an illegal drug other than marijuana in the past month (Executive Office of the President, 2011). While these numbers also included marijuana use and other illegal drugs, it is apparent that Virginia has a drug problem.

In October 2018, the DEA and the U.S. Department of Justice published a report on the national drug threat assessment that indicated an increase in heroin-related deaths. Virginia also ranked ninth for heroin- and fentanyl-involved incidents in a DEA report gathered in 2016 by the National Forensic Laboratory Information System (DEA, 2018). In 2016, Virginia reported 54%

of all fatal cocaine overdoses also involved lethal doses of fentanyl. Statewide, fentanyl overdose deaths rose 67.8% from 2015 to 2016 (DEA, 2018). In January 2018, the DEA reported fentanyl mixed with cocaine led to an estimated 19 overdoses and 11 deaths in Southwest Virginia (DEA, 2018). The Office of the Chief Medical Examiner reported that fatal drug overdose has been the leading method of unnatural death in Virginia since 2013 (Virginia Department of Health, 2017). Opioids have been the driving force behind the largest increases in fatal overdoses statewide (Virginia Department of Health, 2017). In 2017, the report estimated that nearly 96% of fentanyl overdoses came from drugs produced in clandestine labs. In 2017, heroin overdoses increased by 24.6% over 2016 numbers. Methamphetamine overdoses increased by 69.2% in 2017 compared to 2016 (Virginia Department of Health, 2017). A higher amount of drug abuse and overdoses means there are more and better-quality drugs making their way through Corridor A and the center of Southwest Virginia.

Problem Statement

Displacement and diffusion are problems that are often overlooked or dismissed as unintended consequences in the struggle to suppress drug production and trafficking. This study provides a greater understanding of how displacement and diffusion influence the overall drug arrest rates of methamphetamine, cocaine, heroin, and fentanyl after a major drug seizure in a rural area. Studying the after-effects can provide law enforcement with additional information to assist in the development of a multi-prong anti-drug program to target multiple areas at once. There is a small amount of current recent research on displacement and diffusion and its impacts on the drug arrest rates in rural areas. Identifying if there is an increased pattern of methamphetamine, cocaine, heroin, and fentanyl arrests may help identify and allow law enforcement to focus on additional problem areas after a significant drug seizure. If the opposite

is true and drug statistics suggest diffusion, it can be vital in the conceptual development of drug prevention and detection techniques in the future. The reality is that drug trafficking, production, and use are significant issues in Southwest Virginia. Unfortunately, law enforcement typically faces a lack of credible intelligence and financial resources to make multiple, consistent attacks on these drugs in Southwest Virginia. In this study, the dependent variables (displacement and diffusion) are analyzed in relationship to the number of arrests of methamphetamine, cocaine, heroin, and fentanyl after a major drug seizure (independent variable). The desired outcome of this study is a developed and identifiable pattern, either of displacement or diffusion, that can better assist law enforcement in their anti-drug task force operations in the future. The problem is the lack of information on displacement and diffusion after a major drug seizure in Southwest Virginia.

Purpose Statement

The purpose of this study was to discover if there is a significant rise, no change, or drop in methamphetamine, cocaine, heroin, and fentanyl arrests after a significant drug seizure in Southwest Virginia. Displacement is defined as reducing the methamphetamine, cocaine, heroin, and fentanyl arrests in one location of Southwest Virginia, leading to a possible rise in methamphetamine, cocaine, heroin, and fentanyl arrests in other areas. Diffusion is defined as reducing the methamphetamine, cocaine, heroin, and fentanyl arrest rates in one location in Southwest Virginia, leading to a decrease in methamphetamine, cocaine, heroin, and fentanyl arrests in other locations.

Significance of the Study

The significance of the study allows for law enforcement to make location and drug-specific anti-drug policies and initiatives that account for the rise or stability of drug arrests after

a significant drug seizure. Understanding the rise or stability in the arrests of other drugs after a seizure provides an opportunity for law enforcement to remove more drugs from the area using a variety of other enforcement patterns or anti-drug initiatives. Once a pattern has developed, officers can target specific drugs to remove more drugs from the area and further disable the trafficking route. I-81 runs through the center of Southwest Virginia, and officers have an opportunity to disrupt a major supply route for multiple drugs (Brown, 2019; National Drug Intelligence Center, 2006). This study can be used in other jurisdictions to help combat the production, use, and trafficking of the top four drug threats in the region. This study may benefit not only Southwest Virginia but also the neighboring regions of Virginia, Tennessee, North Carolina, West Virginia, and Kentucky.

Research Questions

RQ1. Has Operation Trap Door initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

RQ2. Has Operation Trap Door initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

RQ3. Has Operation Pandemic initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

RQ4. Has Operation Pandemic initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

RQ5. Has Operation Appalachian Action initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

RQ6. Has Operation Appalachian Action initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

Definitions

1. *Addiction* – According to the National Institute on Drug Abuse (NIDA, 2018b), addiction

   is a chronic disease often characterized by drug seeking and use that is compulsive and

   difficult to control despite the consequences. Because methamphetamine, cocaine, heroin,

   and fentanyl cause significant changes to the brain, many users will seek out other drugs

   if their drug of choice is no longer available (U.S. Department of Health and Human

   Services, 2018). Alternate choices play a significant role in displacement and diffusion

   because once a major methamphetamine seizure has occurred and less methamphetamine

   is available, traffickers and users may begin to move to an alternative product to meet the

   demand and satisfy the addiction needs of their buyers.

2. *Cocaine* – Cocaine is a highly addictive stimulant made from the leaves of the coca plant

   in South America (NIDA, 2016). According to the NIDA (2016), it is a white,

   crystallized powder that is often mixed with household items to increase profit. Cocaine

   is snorted through the nose or rubbed directly on the gums. It can also be used by

   dissolving and injecting directly into the bloodstream or smoked in the form of rock

   cocaine (NIDA, 2016). Cocaine increases dopamine in the brain; however, the more a

   drug abuser uses cocaine, the greater the amount needed to achieve the same high. Short

   term effects of cocaine include hypersensitivity, irritability, and paranoia. Cocaine's

   effects appear almost immediately. However, these effects are short term and usually last

   no longer than an hour. Cocaine is a Schedule II drug. According to the National Survey

   on Drug Use and Health, cocaine use has remained relatively stable since 2009 (NIDA,

   2016).

3. *Diffusion* – Crime diffusion is the opposite of displacement. Diffusion occurs when reductions are attained in other areas by crime-prevention interventions but not specifically targeted in the initial operations (Clarke & Weisburd, 1994; Guerette & Bowers, 2009). Other terms to describe diffusion are *bonus effect*, *halo effect*, and *multiplier effect*. The benefits of diffusion intensify because without using resources from the targeted area, success is achieved (Guerette & Bowers, 2009). Ratcliffe and Makkai (2004) identified two types of diffusion crime control benefits: *deterrence* and *discouragement*. Deterrence relates to an increase in the potential offender's perceived risk of apprehension, and discouragement relates to an increase in the perceived effort required to complete the criminal act (Ratcliffe & Makkai, 2004).

4. *Displacement* – Displacement is a reaction to a crime prevention intervention. When referring to law enforcement, it is known as the *balloon effect*. According to Windle and Farrell (2012), this term seems to imply that law enforcement efforts move the drug trade around with no net impact; however, this is incorrect. In the metaphor, the size of the balloon is the size of the methamphetamine issue in rural Southwest Virginia. The amount of air inside the balloon represents the volume of methamphetamine production, and the pressure on the balloon represents law enforcement. When squeezed, the balloon expands elsewhere to an equal extent. There is no reduction in total air inside the balloon but instead a displacement of air to another location (Windle & Farrell, 2012). The squeeze on the methamphetamine trafficking in Southwest Virginia may have an impact on the amount of cocaine, heroin, and fentanyl produced, sold, used, or trafficked in other areas.

Critics of U.S. drug policy often refer to the balloon effect, stating that most policies squeeze one area only to inflate an increase in another area (Centre for International Policy, 2005; Windle & Farrell, 2012). According to Guerette and Bowers (2009), there are typically six types of displacement; however, Windle and Farrell (2012) cited 10 types of displacement. *Temporal displacement* is where offenders change the time at which they commit a crime. *Spatial displacement* occurs when offenders switch from targets in one location to targets in another location. *Target displacement* occurs when offenders change from one type of target to another target type (Guerette & Bowers, 2009). *Tactical displacement* occurs when offenders alter the methods used to carry out crimes. *Offense displacement* is known as the change from one crime to another crime. *Offender displacement* is where new offenders replace old offenders who have been removed from crime by arrest, death, or other means (Guerette & Bowers, 2009). *Anticipatory displacement* is the shifting of crime location or type in advance of law enforcement. According to Windle and Farrell (2012), *residual displacement* is where trafficking and using resume at higher levels after enforcement. *Market price displacement* refers to the reduced supply, which causes more players to enter the market and the price to rise significantly. Last, the *domino effect displacement* occurs when other law enforcement agencies see efforts by other departments as fruitless and reduce their efforts (Windle & Farrell, 2012).

5. *Fentanyl* – Fentanyl is a synthetic opioid that is like morphine but is 50 to 100 times more potent (NIDA, 2019a). Although fentanyl remains a prescribed medication, it is typically created in clandestine labs. Synthetic opioids, including fentanyl, are now the most common drugs involved in drug overdose deaths in the United States (NIH, 2019).

According to the NIDA (2019a), fentanyl is sold illegally as a powder, as drops on blotter paper, put in eye droppers and nasal sprays, or made into pills. Often combined with other drugs, such as heroin, cocaine, and methamphetamine, fentanyl is not typically used alone (NIDA, 2019a). Fentanyl typically makes people feel extreme happiness and confusion. It may also cause breathing problems or lead to unconsciousness (NIDA, 2019a). The NIDA (2019a) reported that it takes very little to produce a high with fentanyl, making it a cheaper option. Many people taking drugs do not realize the drugs may contain fentanyl (NIDA, 2019a).

6. *Heroin* – Heroin is a highly addictive opioid drug processed from morphine. Morphine is a naturally occurring substance extracted from the seed pod of certain poppy plants. It is a white or brownish powder and mixed with household items for profit. Heroin is snorted, smoked, or injected (NIDA, 2018a). Studies have shown that continued heroin use can affect decision-making capabilities, the ability to regulate behavior, and unpredictable responses in stressful situations (NIDA, 2018a). According to the NIDA (2018a), heroin use has been on the rise since 2007. With access to methamphetamine on the decline due to federal regulations and seizures, cocaine, heroin, and fentanyl are becoming more common in rural areas (NIDA, 2018a).

7. *Hotspot policing* – Crime is a widespread issue within all modern cities, but crime does not impact all neighborhoods equally. Serious crimes are typically patterned in time and space, forming crime hotspots (Short et al., 2010). Hotspot policing is the location-specific use of police resources at high crime locations and places where criminal activities are most concentrated. Research focusing on crime hotspots, specifically through the seminal criminological research, has found that a small percentage of

offenders are responsible for most crime (Groff et al., 2015; Wolfgang, 1972). Removing those offenders and focusing on that specific hotspot should reduce the amount of crime in that area. One criticism of focusing policing efforts on high crime locations is that it can produce a diffusion of crime prevention benefits into adjacent areas rather than causing crime displacement (Braga et al., 2019). Research has shown that focused police interventions, such as directed patrols, proactive arrests, and problem-oriented policing, can significantly reduce crime at hotspots (Braga & Bond, 2008; Eck, 1997; Weisburd & Eck, 2004). Brantingham and Brantingham (1993) defined two types of hotspots: *attractors* and *generators*. Attractor hotspots attract offenders to an area because it has favorable crime conditions. Generator hotspots attract offenders to an area because of the number of people representing potential future victims who frequent the area.

8. *Methamphetamine* – Methamphetamine is a potent, extremely addictive stimulant that affects the central nervous system. According to the NIDA (2019b), methamphetamine derives from amphetamine, a common ingredient in nasal decongestants and bronchial inhalers (Anglin et al., 2000). Methamphetamine, as classified by the DEA, is a Schedule II stimulant. Methamphetamine comes in several forms and can be smoked, snorted, injected, and orally ingested and requires greater amounts over some time to achieve the same level of high (NIDA, 2019b; Anglin et al., 2000). Most methamphetamine, found in the United States, is produced by transnational criminal organizations (cartels) in Mexico. The drug, made in small clandestine labs, utilizes a common ingredient in many cold medications: pseudoephedrine. These clandestine labs do not require a significant amount of equipment, so they are easy to conceal (NIDA, 2019b). According to the NIDA (2019b), restrictions placed on pseudoephedrine have caused manufacturers to develop a

new way to make methamphetamine without it, called *smurfing*. The change in the drug

manufacturing process stemmed directly from public policy, both in the United States

and Mexico, restricting the limits on purchases of common medications containing

pseudoephedrine (NIDA, 2019b). The use of methamphetamine is steadily increasing,

encompassing many regions of the United States; use patterns in one region often

foreshadow future trends in neighboring areas (Anglin et al., 2000).

9. *The Combat Methamphetamine Epidemic Act (CMEA) of 2005* – The CMEA of 2005

became law on March 9, 2006. Included in Title VII of the USA Patriot Improvement and

Reauthorization Act of 2005, it made definitional changes concerning the sale of non-

prescription products containing the chemicals necessary to produce methamphetamine

(CMEA, 2005). Simply put, it attempted to regulate the bulk retail purchase of certain

over-the-counter drugs due to their use in the manufacturing of illegal drugs. The purpose

of this act was to limit the purchase of methamphetamine-making materials (CMEA,

2005). The intention was to make those materials more difficult to obtain to reduce the

amount of methamphetamine made in the United States. However, this act did not

address the amount of methamphetamine smuggled into the United States from Mexico.

While this act cut down the domestic production of methamphetamine and reduced the

amount of small clandestine labs, the methamphetamine supply increased from elsewhere

to meet the demand (CMEA, 2005). Mexican super-labs have replaced the small

domestic labs in the production and trafficking of methamphetamine, cocaine, heroin, and

fentanyl. There has been an increase in imported methamphetamine from Mexico,

trafficked along the drug corridors to meet the demand (CMEA, 2005).

10. *The Comprehensive Methamphetamine Control Act (CMCA) of 1996* – The CMCA of 1996 is an amendment to the regulations originally incorporated in the Controlled Substances Act. It directed the Attorney General to coordinate international drug enforcement efforts to decrease the movement of methamphetamine and methamphetamine precursors into the United States (CMCA, 1996). The CMCA of 1996 also amended the Controlled Substances Import and Export Act to add prohibitions for the possession, manufacture, and distribution of a controlled substance to a listed chemical and sets the penalty for any violations. It directed the Commission to review and increase penalties for trafficking in methamphetamine. Finally, it established a Methamphetamine Interagency Task Force (CMCA, 1996).

Major Drug Operations in Southwest Virginia

Operation Trap Door

Two regional task forces achieved the successful seizure of methamphetamine, cocaine, fentanyl, illegal prescription drugs, and illegal firearms in August and September of 2019. The complete investigation seized over 39.9 pounds of methamphetamine and 6.7 pounds of cocaine, worth over $2.1 million. Operation Trap Door began in 2017 during a narcotics investigation that was initiated in Carroll County and spread into Southwest Virginia. The arrests were a result of 2 years of police work pursuing a complex drug network (Virginia State Police, 2019).

Operation Pandemic

Operation Pandemic resulted in dozens of individuals arrested on drug-related charges in Southwest Virginia according to Sheriff Blake Andis in Washington County. Arrest warrants were issued for over 48 individuals charged with conspiring to distribute methamphetamine in Southwest Virginia. This operation seized methamphetamine, heroin, fentanyl, prescription

drugs, and marijuana, the majority of which were smuggled into the United States from Mexico and other countries (Greiss, 2020).

Operation Appalachian Action

Operation Appalachian Action concluded in November 2018 in Wise County. The investigation stemmed from a 15-month investigation that resulted in the arrests of more than 30 people. Most of the individuals arrested were involved in methamphetamine production and trafficking. Tests concluded that the methamphetamine confiscated from the individuals arrested in this operation was cartel grade rather than the typical "shake and bake" (Igo, 2020).

These operations are only a snapshot of the number of drug arrests over the past 10 years. The illegal manufacture, sale, and distribution of narcotics is a problem across Southwest Virginia (Slemp, 2016). Methamphetamine trafficking and its effects have taken a toll on Southwest Virginia (Cullen, 2019). Not only is it important to dismantle the drug-trafficking organizations responsible for moving drugs through the area, but it is also important to study the after-effects to ensure another drug is not temporarily taking its place or moving to another location. The displacement and diffusion of drugs arrests of methamphetamine to cocaine, heroin, and fentanyl is a substantial concern in fighting the war on drugs.

CHAPTER TWO: LITERATURE REVIEW

Overview

Methamphetamine use and its associated crime have been on the rise since the mid-1990s. According to Dobkin and Nicosia (2009), in 1995 the United States successfully reduced the supply of methamphetamine by targeting specific entry points, which caused arrests to drop 50%, the price to triple, and the purity to go from 90% to 20%. However, the impact was temporary, the price returned within 4 months, and the purity returned within 18 months (Dobkin & Nicosia, 2009). This impact on methamphetamine in the United States suggests that police can be effective in addressing crime by using focused geographical efforts. Reducing the use and distribution of methamphetamine is an important policy goal both in the United States and Southwest Virginia and requires targeted efforts by both police and administrators. According to Shukla et al. (2012), research has shown that hotspot policing has had a significant impact on the trafficking and distribution of methamphetamine. However, there are potential side effects such as displacement and diffusion, not only of methamphetamine, but other same-high substitutions such as cocaine, heroin, and fentanyl.

Theoretical Framework

Three crime opportunity theories that influence hotspot policing are rational choice, routine activities, and environmental criminology (Braga & Clarke, 2014; Braga et al., 2019; Eck & Weisburd, 1995). Rational choice theory presumes that offenders seek out personal benefit through their choice of criminal behavior. Rational choice theory is often combined with routine activity theory and is used to explain criminal behavior during the crime event (Cornish & Clarke, 1987). Routine activity theory suggests that a criminal act occurs when a target crosses

paths with an offender in a specific time and space that is optimal for criminal activity (L. Cohen & Felson, 1979).

Rational offenders stumble across criminal opportunities throughout their daily activities, and then they must decide to offend or not. The assumption is an increased police presence in a hotspot can reduce the number of opportunities that criminals encounter to commit a crime during their daily routines (Braga et al., 2019). Environmental criminology studies the distribution and interactions of targets, offenders, and opportunities throughout the optimal time and space intersect (Brantingham & Brantingham, 1991). Weisburd et al. (1992) implied that the best way to prevent crime is to analyze and prevent it at the location rather than with the person. The attributes of a place are just as important in explaining hotspots. Green (1996) stated that the focus should be on the features of locations that criminals use to disrupt criminal activity.

Rational choice has a relationship with criminal behavior and is, to an extent, predictable (Clarke, 1980). Glaser (1977) described free will and determinism to be socially derived representations of reality. Choice plays a substantial part in displacement and diffusion. Those who choose to use, produce, and traffic illegal drugs can make other choices when a task force operation or arrest prohibits their activity (Glaser, 1977). Such choices include the use, production, and trafficking of methamphetamine at other locations; the use, produce, and trafficking of other drugs at both the same and other locations; or to cease drug use, production, and trafficking for any length of time. Offenders make a series of choices when preparing and committing a crime (Johnson et al., 2014). These choices include the location, time, tools, specific target, and the desired outcome.

In some cases, the offender will still choose to commit the crime even if the conditions are difficult or risky. Ultimately, the offender will decide if the risk is worth taking to obtain the

reward. Although the decision-making process is empirical by nature, offenders will use past experiences and previous outcomes to influence their decision. These principles are the foundation of rational choice perspective (Cornish & Clarke, 1987). By hardening targets, reducing the rewards, and discouraging unlawful behavior, crime may be prevented through situational crime prevention (Johnson et al., 2014).

The theories of routine activity provide further explanation as to why offenders cease from crime rather than displace their activity (L. Cohen & Felson, 1979). According to Brantingham and Brantingham (1981), offenders will study and analyze their environment the same way that law-abiding citizens do. Criminals will evaluate the areas around their workplace, home, and other places they frequently visit. They will become familiar with their places along their routes of travel and develop an acute awareness of the area to include possible crime opportunities to analyze the associated risk and rewards within them (Brantingham & Brantingham, 1981). Eck (1993) proposed in the familiarity decay hypothesis that the likelihood an offender will pursue an opportunity is associated with the distance they must travel from their routine activity area. According to this theory, if an offender cannot capitalize on their original target and there are no alternative targets within their comfort area, displacement is less likely to occur (Johnson et al., 2014).

Clarke (1980) noted that conventional wisdom falls under the principle that the elements of prevention go hand in hand with the causes of crime. However, many criminological theories exclude the causes of situational crime (Clarke, 1980). Theories such as self-control (Gottfredson & Hirschi, 1990), social bonds (Hirschi, 1969), strain (Agnew, 1992; Merton, 1938), institutional anomie (Messner & Rosenfeld, 1994), and deterrence (Becker, 1963) focus on the criminal and the perceived biological, psychological, or sociological disposition to illegal activities. Routine

activity theory and situational crime prevention theory focus on the specific characteristics and processes of a criminal situation rather than the offender. Benson et al. (2009) suggested that focusing on how likely a criminal act is to occur is more productive than focusing on why. In the 1970s, researchers began to realize that studying locations, specifically micro-locations, are equally as important as studying offenders. This practice led to the emergence of environmental criminology.

Environmental criminology explores criminal events by considering the offenders, victims, times, and places (Brantingham & Brantingham, 1991). This perspective concludes that all behavior is the result of a person plus an interaction with their environment. More recent definitions include the spatial concentration of time (Telep & Weisburd, 2018), which modifies the definition. Spatial concentration of time is the study of how and why the concentration of crime, victims, and offenders in one micro-geographic area evolve. Evolution is a consequence of the physical and social characteristics of the space and time intersection. This focus on micro-geography, or hotspots, is also known as the criminology of place (Sherman et al., 1989; Weisburd, 2015; Weisburd et al., 2012). The how and why characteristics of hotspots influence the offender's decision-making process regarding the choice to commit a crime.

The sociological model of crime proposes three features of crime prevention—first, the explanation centers around the criminal event and how it can be prevented. Second, there is a need to develop explanations for crime to separate each category of crime. Each criminal has a specific motivation for a criminal act. Third, the individual's circumstances are more significant than in other theories (I. Taylor et al., 1973). Situational crime prevention theory is important to displacement and diffusion because it measures crime activity in two distinctive measures: opportunities for offending and the chances of being caught (Clarke, 1980). The question is,

according to Clarke (1980), if they are stopped from committing a particular crime, do people turn to another type of crime or look for another criminal opportunity elsewhere versus looking for a legal way to achieve the same result. If the offender's motivation is unaffected by situational crime prevention, it can be reasonable to assume, being denied one opportunity, a motivated offender will continue to search until another target opportunity presents itself.

New opportunities may present themselves in other geographical locations (spatial displacement), at another time (temporal displacement), or at alternative targets (target displacement). Barr and Pease (1990) noted that arresting an offender may not lead to crime reduction if the opportunities for crime remain unaffected. The offenders that are not arrested may take advantage of opportunities now vacated by their incarcerated criminal counterparts. For example, a drug dealer could be arrested; however, the market for illegal drugs and the opportunities to sell and use them would remain unaffected. Another dealer would move in and take over the territory (Johnson et al., 2014). Many theories of criminality predict that displacement is an inevitable outcome of crime prevention (Yochelson & Samenow, 1976).

The hydraulic view of crime suggests there will always be a certain amount of crime; however, the level will be determined by factors that influence offender motivation and the immediate situation (Johnson et al., 2014; Sherman et al., 2014). The hydraulic view of crime also suggests that offenders will continue to offend because the root of the issue has not been addressed. Bennett and Wright (1984) suggested that many offenders are not affected by the successful prevention of crime; therefore, there will be some displacement. Guerette and Bowers (2009) further concluded that some displacement is better than total displacement, and there will always be a benefit to intervention attempts. Barr and Pease (1990) separated this partial displacement into two categories: malign and benign displacement. Malign displacement is a

situation where the intervention led to a worse crime than originally intended. If the committed crime is less serious than the intended one, it is called benign displacement. Weisburd and Telep (2013) argued that crime is location specific and should not displace. If a crime is prevented at a certain site, there is no reason to believe an offender will move to another location unless the new location has the same characteristics as the original site. Brantingham and Brantingham (1993) described this as a crime hotspot.

<div align="center">**Related Literature**</div>

Hotspot Policing

Over the past 30 years, research has pointed to the potential benefits of focusing on specific crime prevention efforts on locations rather than specific crimes or criminals. Hotspot policing treats the location as the unit of analysis. Hotspot crime perspective suggests that crime does not occur evenly across geography but is concentrated in relatively small places that generate more than half of all criminal events (Pierce et al., 1988; Sherman et al., 1989; Weisburd et al., 1992). Sherman (1995) claimed that places, like offenders, have criminal careers. In 2017, Weisburd and Eck built upon their 2004 study of the standard model of policing and examined the social and physical dynamics of hotspots. They found the standard model of policing focuses less on reducing crime and more on police procedure (Weisburd & Eck, 2017). By preventing victims and offenders from meeting in time and space, police can reduce crime (Braga, 2001). Several researchers have claimed that many crime problems can be eliminated with hotspot policing efforts; however, there is little research if hotspot policing causes displacement or diffusion in rural areas. Police officers have a great understanding of how location plays a role in both crime and prevention. The traditional response to hotspots is strength in numbers: the more police officers that are present, the fewer opportunities criminals

get to commit crimes. Unfortunately, due to the size of the typical rural departments and the amount of geography patrolled, crime reducing efforts may need collaboration between multiple departments for crime specific operations.

Two concepts support hotspot policing: deterrence and crime opportunity reduction (Ariel et al., 2016; Weisburd et al., 2017). Deterrence theory indicates that crime can be prevented when the offender realizes that the costs of committing the crime outweigh the benefits (Gibbs, 1975; Zimring & Hawkins, 1973). Deterrence focuses on the certainty and severity of punishment associated with committing criminal acts (Braga et al., 2019). Nagin et al. (2015) argued that increasing police activity in known hotspots will deter crime by making offenders believe their risk of arrest is higher than in other locations. Sherman and Weisburd (1995), during a Minneapolis hotspot policing experiment, found place-specific "micro-deterrence" associated with an increased police presence in hotspot areas. Hotspot policing initiates crime control benefits that diffuse into the areas immediately surrounding the targeted locations rather than displacing crime to other locations (Braga et al., 2019).

The concentration of crime at a place also suggests the possibility of using crime prevention strategies such as hotspot policing. Hotspot policing focuses resources tightly at places with a large amount of criminal activity (Weisburd et al., 2006). There is evidence that police can impact crime in the areas they are targeting; however, this approach risks shifting crime to locations where police efforts are not focused. This is described as spatial displacement and has been the major skepticism of place-based prevention efforts (Weisburd et al., 2006). Clarke and Weisburd (1994) pointed to evidence that situational prevention strategies often lead to a diffusion of crime control benefits to areas other than the target of hotspot policing instead of spatial displacement. Spatial diffusion of crime control benefits has been the focal point in

many studies (Braga et al., 1999; Caeti, 1999; Hope, 1994; Sherman & Rogan, 1995; Weisburd & Green, 1995).

From a theoretical perspective, a hotspot is a cluster of crime where less than 5% of the land produces at least 50% of the crime (Ariel et al., 2016). Different methods of defining hotspots can effectively guide police action if it is guided by crime theories (Weisburd, 2015; Weisburd et al., 2012). The practical implications for strategically defining hotspots impact how the police can monitor and patrol the area. Urban areas provide easier ways to implement and monitor hotspot policing; however, rural areas have more difficulty (Ariel et al., 2016). Studies have shown strong support for hotspot policing as an effective measure for crime prevention. There has also been evidence in these studies that spatial displacement is not a major issue in hotspot strategies (Weisburd & Telep, 2014). Braga et al. (2012) found that displacement to nearby areas is unlikely in hotspot policing intervention strategies. Instead, diffusion of benefits is a more likely and positive outcome in the areas surrounding the targeted hotspot (Clarke & Weisburd, 1994; Weisburd et al., 2006).

Agent-based modeling (ABM) develops a more accurate representation of the impact of hotspot policing (Eck & Liu, 2008; Groff et al., 2019). ABM allows researchers to examine the same crimes under different conditions. ABM can represent a bottom-up approach that closely mimics crime patterns and interactions between criminal and victim. ABMs are a valuable tool in methodological studies and are a potentially powerful tool in evaluating crime-reduction programs (Groff & Birks, 2008; Groff & Mazerolle, 2008; Johnson, 2009; Verma et al., 2013). However, there are limitations to ABMs. ABMs are a simulation of human behavior, and the accuracy of the results depends on what is included and excluded from the model (Weisburd et al., 2017).

Rural Policing

Studies of rural policing are rare (Mawby, 2004; Yarwood, 2008; Yarwood & Gardner, 2005). Nearly all experimental studies of hotspot policing have been conducted in large cities (Braga et al., 1999; Sherman & Weisburd, 1995; B. Taylor et al., 2011). Rural areas, for the most part, have been excluded, which leaves questions on how effective hotspot tactics are in these areas. Lum and Koper (2013) found that only one out of every 120 crime control intervention studies took place in small towns or rural jurisdictions. This exclusion is a major concern since most police jurisdictions in the United States are small- to medium-sized agencies (Weisburd & Telep, 2014). One of the key assumptions of hotspots is that crime is highly concentrated in small geographic urban areas (Sherman et al., 1989; Weisburd et al., 2004, 2012). There is little research that provides evidence of the same clustering in rural areas (Weisburd & Telep, 2014).

There is significant disagreement amongst researchers on the amount of crime in the hotspots found in rural areas. However, Hinkle et al. (2013) argued that hotspots in rural areas are much smaller than hotspots located in large cities. Hotspot policing research has also only looked at short-term benefits and has excluded any long-term impacts on the areas. Problem-oriented hotspot approaches, by design, have longer-term impacts on the clusters. Problem-oriented policing was developed by Goldstein (1979) to address the underlying issues that led to the crime. When applied to hotspot policing, problem-oriented policing solves problems before they happen and prevents crime in the long run (B. Taylor et al., 2011). Weisburd et al. (2012) saw hotspots as micro-communities and offered that social change is relevant to crime prevention.

Chainey et al. (2018) defined hotspot analysis as the ability to determine where crime may happen next based on past data. One method to aid in this determination is the application of

boost account, optimal foraging theory, and flag account. According to Chainey et al., the boost account refers to an offender who decides to return to the same area to commit a crime due to the successful completion of a crime in the same area. Optimal foraging theory says that offenders take advantage of good opportunities to commit crimes before moving on to another location. The flag account suggests there is something about the target or target location that draws the offender's attention and the attention of other criminals (Chainey et al., 2018). This flag is important to rural drug hotspot research because the cluster may not be a specific small area but may be a roadway, a known drug route that connects two larger areas or joins to the interstate.

Rural areas tend to have higher rates of unemployment, illiteracy, and poverty, which may lead to increased criminal behavior and an increase in rural drug use (Leukefeld et al., 2002). Criminologists have often tried to explain why low socioeconomic status, lack of economic opportunity, and broken families impact crime levels in rural areas (Agnew, 1992; Cloward & Ohlin, 1960; Merton, 1938; Wolfgang & Ferracuti, 1967). Methamphetamine is cited by one third of law enforcement agencies as the drug that contributes most to crime (National Drug Intelligence Center, 2006). Policing in rural areas requires closer types and more citizen interactions. Difficulties arise when researchers generalize their findings across all types of areas, including rural and urban (Pelfrey, 2006; Rukus et al., 2018). Community-oriented policing is designed to give residents empowerment by allowing them to participate in discussions on policing and work more closely with officers (Rukus et al., 2018). Pelfrey (2006) found that researchers who focused on community policing in rural areas found conflicting results: either rural areas are adaptable to community policing, or they have a traditional style of policing.

It cannot be assumed that rural crime follows the same patterns as larger urban cities (Gill et al., 2017). The layouts of rural areas are not always laid out in grid patterns. Microgeographic

places are the typical key unit of analysis in hotspot research (Barker, 1968; Wicker, 1987). Patterns are developed due to the shared spaces and patterns of behavior, activities, and socialization (Felson & Boba, 2010). The structures that shape and facilitate crime in urban areas also are vastly different than those in rural areas. The limited amount of research on crime at micro-geographies in rural locations may alter the crime concentrations due to the environmental differences (Gill et al., 2017). Because most evidence-based policing research has been conducted in larger areas, smaller rural agencies may believe that place-based policing may not work in their jurisdictions (Gill et al., 2017). Gill et al. (2017) suggested that there is a need to think beyond the street segments while still maintaining the integrity of the micro-geographic focus that allows police to focus resources more efficiently. However, the practical implications for rural police departments are substantially different due to the hundreds of square miles that a limited number of officers must cover.

According to Gill et al. (2017), it is important for police to know where to focus their efforts to have the maximum effect on crime. Hotspot policing is one of the most influential policy innovations (Hinkle et al., 2013); however, most studies have been conducted in major cities. Hotspot policing is one of the most promising police tactics against crime when combined with problem-oriented policing or situational crime prevention (Braga & Bond, 2008; Braga et al., 2012). It aims to address the root causes in the micro-clusters of crime, and future research is needed to measure the depth of hotspot policing effectiveness in rural areas (Hinkle et al., 2013).

Weisburd and Telep (2014) identified several areas that can expand the knowledge of hotspot policing. Some of these areas include the effects on police legitimacy, non-spatial displacement, successful strategies on most effectively addressing hotspots, the long-term effects of hotspot policing, the effects on smaller and rural areas, and if hotspot policing will reduce

crime overall. Legitimacy is linked to the ability of police to prevent crime. If the public no longer trusts the police, any hotspot efforts will be futile (Braga, 2001). Regardless if the hotspot is in a rural or urban area, if police-community relations are characterized by distrust and suspicion, situational crime prevention, including hotspot policing, will be unsuccessful.

Drug Hotspots

Jacobson (1999) identified four key steps relating to the situational policing of drug hotspots. First, it is necessary to identify and analyze the suspected drug hotspots. This information is dependent on the knowledge of geography, social and environmental features, and the specific drug market being targeted. Second, previous enforcement strategies need to be examined to determine if they have had an impact on the drug market. Third, a plan needs to be constructed to ensure that the hotspots can be fully policed. Finally, contingency plans for displacement must be in place (Jacobson, 1999). Situational crime prevention involves both the identification and modification of physical and social features that attract crime. Eck and Weisburd (1995) posited that these features vary but most likely include poor management, easy access, no surveillance, and poorly secured valuable items. Crimes are committed by offenders who have easy targets in settings that make committing the crime easy, safe, and profitable (Brantingham & Brantingham, 1995).

Most situational drug crime prevention strategies are applied to geographically fixed markets, for example, a street corner or a specific building in a neighborhood. It should be noted that some stationary tactics can be applied to mobile markets, specifically targeting the use of mobile phones (Jacobson, 1999). An additional question to be considered in the analysis of a particular drug market is whether it takes place over an extended area and, if so, should it be treated as one large market or several smaller ones (Weisburd & Green, 1994). Green (1996)

cautioned that many routine activities in the drug market can be legal, with only a small portion of activity being illegal. It is also important to note that illegal drugs may not be the primary illegal activity at a known drug location (Jacobson, 1999). Crackdowns aimed at drug markets should include methods such as covert surveillance and a series of purchase-no-arrest operations that will lead to a significant bust. Levels of drug-related illegal activity may drop rapidly after a crackdown; however, these operations are resource-intensive and cannot be sustained over a long period (Jacobson, 1999).

Displacement

Weisburd et al. (2006) noted that much attention is on displacement, but the methodological problems of measuring it remain unfocused. The failure of researchers, to this point in history, to examine displacement and diffusion effects is reasonable because most departments and agencies focus on crime prevention strategies for individuals instead of places and situations (Weisburd & Braga, 2006). Barr and Pease (1990) conveyed that crime patterns are a combination of circumstances: offender motivation, the absence of legitimate routes to personal satisfaction, the availability of susceptible targets, the amount of preparation and effort to commit different crimes, and the alleged value of the crime. Displacement is the unintended effect of crime-control programs where one type of crime prevention leads offenders to the same type of crime, just at a different time or place (Barr & Pease, 1990). Many researchers believe that displacement cancels out the progress made by crime-reduction efforts.

Displacement can, however, be used as a predictability tool and used to combat crime. The choice of displacement, on the part of the criminal, is either crime abatement or crime displacement (Barr & Pease, 1990). Displacement can occur in many ways, which can cause issues for researchers. A crime prevention method, such as a task force operation, can be

successful, but any displacement after the fact can also create setbacks. Heal and Laycock (1986) lectured that there is little point in investing time and resources if situational crime prevention tactics cause displacement of crime to another location but never reduce it. Trasler (1986) noted that researchers are a long way from understanding crime patterns to prevent displacement.

A crime displaced is a crime prevented (Barr & Pease, 1990). The chosen target, even a target as generalized as the public, is protected through displacement. According to Barr and Pease (1990), a benign displacement is a tool that works toward distributive justice instead of an obstacle to crime prevention. As noted in Barr and Pease (1990), displacement through deliberate intervention is always a possibility; however, it has no value unless it displaces more serious crimes with less serious crimes. Malign displacement occurs when crime changes in ways that are undesirable (Barr & Pease, 1990), for example, when a crime of the same seriousness replaces another crime. An example of malign displacement is the prevention of a major drug sale that leads to a gang war with multiple casualties. Caulkins (1992) claimed that one of the most important topics in drug policy is displacement. Local police officers have many advantages over interdiction, but the enormous size of local drug markets limits the possibilities of complete containment. While the typical definition of displacement is physical relocation, changes in the mode of operation are just as important (Caulkins, 1992).

Sutherland (1947) acknowledged the importance of factoring opportunity into the crime equation but did not see the benefits of adding crime places as a relevant focus. Weisburd and Braga (2006) elaborated on this thought and claimed that crime opportunities provided by place were assumed to be so numerous and would make crime prevention tactics difficult. Reppetto (1976) noted that the police could not be everywhere at the same time. He defined displacement as the shift of crime in terms of space, time, or type of offending. However, Barr and Pease

(1990) disclaimed that while most displacement may be unfavorable, some displacement from more violent crimes to lesser crimes is desirable. Because the bulk of resources centers on targeting the supply of drugs, many scholars believe that displacement is less of a problem than originally thought. However, this is only true if the basic assumptions about opportunity and crime are abandoned. It also requires the distribution of criminal opportunities towards both benefits and effortlessness (Dobkin & Nicosia, 2009; Weisburd & Braga, 2006).

When displacement and diffusion occur in a study, the outcome supports both rational choice theory and routine activity theory (Guerette & Bowers, 2009). According to Guerette and Bowers (2009), one of the only studies to evaluate displacement and diffusion was after a focused policing operation study; however, it was unintentional and not the primary focus. The findings supported the view that displacement and diffusion are the exceptions rather than the rule (Guerette & Bowers, 2009). But this observation provided contributions beyond any other study. First, the study was conducted in various settings across a variety of times and evaluated many different situations. Second, it expanded on many studies on displacement and was the first to examine the diffusion of benefits. Last, it applied statistical procedures that studied situational treatment effects on displacement and diffusion (Guerette & Bowers, 2009).

Jacobson (1999) mentioned four key points when comparing the finding of displacement studies with related literature. First, the risks of displacement will rarely invalidate entire crime-reduction initiatives at drug-dealing locations. Displacement may occur to a limited extent. When it does occur, there will be some diffusion of benefits that will impact the amount of displacement. Second, the most likely displacement is the transformation of open markets into closed ones (Jacobson, 1999). Open-air markets are drug transactions where there are few barriers, and anyone can purchase drugs. Closed markets are drug transactions that take place

between a buyer and seller who know one another or who have been validated by another trusted individual (Harocopos & Hough, 2005). Third, Jacobson (1999) found that displacement may have certain benign effects, such as difficulty for new dealers to enter the market. Finally, there is a need for further research into rural policing and rural drug displacement (Jacobson, 1999). According to Caulkins (1992), law enforcement has many obstacles due to the size of local drug markets. Typically, in police operations, there are three outcomes:

1. Drug dealers stopped the production, use, and trafficking of drugs in the hotspot neighborhood resulting in total diffusion of benefits.

2. The dealers took operations elsewhere and created a new market generating total displacement.

3. The amount of drug crime did not change in the targeted hotspot; however, it became more covert, causing a closed market to occur (Caulkins, 1992).

Spatial Displacement

Spatial displacement has received the most attention in both literature and previous displacement studies. The typical approach is to observe changes over time in an area, the surrounding area, and the control area (Johnson et al., 2014). Crime may be displaced or benefits diffused within areas with increased police presence, but overall, the rate of crime may not decrease. Bowers and Johnson (2003) found that the likelihood of crime displacement is impacted by offender mobility and decision making. Additional research found that offenders like to commit crimes closer to their homes or within their routine activity area (Bernasco & Block, 2009; Bernasco & Nieuwbeerta, 2005; Johnson et al., 2014; Johnson & Summers, 2015).

Few studies have explored patterns regarding the spatial distribution of the same type of crime; in addition, few have examined changes in the distribution of other types of crimes. Crime

switch displacement occurs when reductions in one type of crime occur in sync with increases in another (Johnson et al., 2014). Tactical switch displacement ensues when offenders use different methods to commit the same types of crimes (Johnson et al., 2014). A tactical switch may be subtle or may have very different methods. Analysis of crime switch displacement and tactical switch are rare and generally inadequately designed to allow a reliable conclusion (Johnson et al., 2014). Johnson et al. (2014) suggested that a different approach may be necessary and may include a study on how long the effects of hotspot policing last.

Researching, investigating, and evaluating crime prevention initiatives have shown potential for crime displacement (Mayhew et al., 1976). However, when evidence is found for crime displacement, the amount is less than the initial crime amount, so it nets an overall reduction in crime in the total area (Barr & Pease, 1990; Eck, 1993; Hesseling, 1994). In 2009, Guerette and Bowers conducted a study to measure displacement and diffusion effects. They found multiple forms of displacement, including spatial displacement, offense displacement, and diffusion of benefits. They noted that many of the studies they examined were not designed to measure displacement or diffusion directly. Johnson et al. (2014) noted that crime displacement is not unavoidable. If crime prevention removes easy targets, offenders with low acceptance of risk will move on to another target or will choose not to commit a crime. Barr and Pease (1990) found that patterns of crime are responsible for the distribution of criminal opportunities. Any changes in opportunity can directly impact the patterns of crime (Barr & Pease, 1990).

Johnson et al. (2014) suggested there is a lack of qualitative data used to contextualize findings. There have also been issues determining the size of the displacement area to determine whether displacement or diffusion has occurred. If other crime prevention techniques have been applied to the targeted area, they may have a significant impact on the displacement or diffusion

data. As noted in Johnson et al. (2014), displacement studies typically measure displacement or diffusion over short periods (Hodgkinson et al., 2020). Hipp (2016) suggested that using mental maps of neighborhoods to identify social networks and daily activity patterns can point to potential crime hotspots.

Balloon Effect

Friesendorf (2005) argues that the term "balloon effect" given to displacement is often misleading. Critics of U.S. foreign policy use the balloon metaphor to emphasize that coercive strategies against drugs often lead to displacement (Madsen et al., 2007). Scholars agree that drug problems have become worse over the past few decades (Friesendorf, 2005). More people have begun to use illegal drugs or have switched to will-breaking drugs and more dangerous consumption methods. The illegal drug industry has had horrendous consequences for both individuals and states. The increase in drug demand and supply has created an increase in violence, corruption, environmental issues, and a rise in disease. According to Friesendorf (2005), on a macro level, drug prohibition created a thriving illegal market. On a micro level, prohibition through strong-arm methods has serious side effects such as displacement and diffusion. Numerous factors contribute to the issues with drug policy, including the poverty of rural areas, the profitability of illegal drugs, the lack of relationship between communities and the police, and weak anti-drug attitudes in general (Friesendorf, 2005).

Squeezing the balloon is a significant concept found in many counterdrug operations today (Windle & Farrell, 2012). It suggests that stronger law enforcement actions in one location, or centered on one specific drug, will result in a displacement or diffusion of drug activities to another location or another type of drug (Friesendorf, 2005; Kleiman & Hawdon, 2011; Reuter, 2014). There is another negative version of the balloon effect hypothesis where the

balloon gets bigger; however, instead of displacement, it leads to bigger and better methods of trafficking. In this version, Windle and Farrell (2012) explained that the strong survive, their networks get better, and their profits get bigger. This example of displacement is threefold: there will be those who cannot adapt and will cease, there will temporarily be lower levels of activity, and there will be additional costs.

Windle and Farrell (2012) stated that the opposite of displacement is diffusion. An example of diffusion is an interrupted trafficking route that may cause a temporary hold on other trafficking routes due to the perceived threat of risk and uncertainty. The impact of displacement and diffusion can vary greatly. It is more complicated than displacement, being a negative outcome, since diffusion has a positive outcome (Windle & Farrell, 2012). The outcomes depend on many other circumstances and whether it is easier to quit offending and do something else. Windle and Farrell (2012) concluded that the balloon effect is a misleading and misunderstood term. The term narrowed the understanding of displacement and diffusion (Windle & Farrell, 2012). Traditionally, the United States has focused on supply rather than demand as a solution to the illegal drug issue. Madsen et al. (2007) found that the U.S. borders are not completely effective in keeping out illegal drugs because the focus is on the source, not the demand. Many times, the solution is to shift the supply and demand activity to another area. When the balloon is squeezed in one place, it develops enough pressure to bulge out somewhere with increased force (Madsen et al., 2007; Windle & Farrell, 2012). Friesendorf (2005) and Windle and Farrell (2012) argued that external factors cause displacement in addition to law enforcement efforts.

Diffusion

Crime displacement is often seen as a negative consequence of hotspot policing. If displacement were significant, hotspot policing would produce little crime reduction (Hall & Liu,

2009; Sherman & Weisburd, 1995). According to Guerette and Bowers (2009), displacement is not common and very rarely overwhelms crime reduction efforts by police. Braga (2001) reviewed several policing studies and found that none reported significant displacement. According to studies conducted by Hall and Liu (2009) and Weisburd and Green (1995), they found an improvement in crime control in neighboring areas close to the hotspot areas. Clarke and Weisburd (1994) defined this as diffusion of crime control benefits. The diffusion of crime control benefits is either the deterrence or the discouragement of an offender to commit a crime (Clarke & Weisburd, 1994).

The main theoretical criticism of situational prevention is that offenders will change their method or location, commit their crimes at another time, or turn to another type of crime. Many early studies found evidence of displacement (Gabor, 1990). However, more recent studies have found less displacement evidence after crime reduction strategies and found more diffusion evidence. Because of this dilemma, a theoretical reexamination of displacement through routine activity theory and rational choice theory has led to the assumption that situational changes may affect the pattern of crime but not the amount of crime (Clarke & Weisburd, 1994). Diffusion, in this sense, refers to the intervention that shifts crime away from the original targets and ignites a process to spread crime reduction benefits beyond the original situation.

According to Clarke and Weisburd (1994), there are two types of diffusion: deterrence and discouragement. Deterrence is consistent with the definition provided by Scherdin (1986), which was labeled the halo effect. Deterrence is where offenders believe they are under a heightened threat of discovery and, under rational choice theory, decline to participate in crime in fear of being caught. Discouragement comes by increasing the amount of fear for an arrest while reducing the reward (Clarke & Weisburd, 1994). Understanding the differences between

diffusion of benefits and the problem with displacement allows law enforcement and policy-makers to recognize the possibility of spreading crime beyond the original target, but also crime prevention beyond those targets as well (Clarke & Weisburd, 1994).

Over the last decade, a significant number of studies have focused on hotspot policing (Weisburd & Braga, 2006; Weisburd et al., 2006). These studies have found that hotspot policing has an impact on crime in the targeted spots (Weisburd & Eck, 2004; Weisburd et al., 2006). When spatial displacement has been examined, the findings support that displacement is small, and the diffusion of benefits is more likely (Weisburd et al., 2006). The primary issue in measuring diffusion involves identifying likely displacement areas (Bowers & Johnson, 2003). According to Guerette and Bowers (2009), three aspects must be considered: (a) the location of the displacement or diffusion area with the targeted drug area, (b) the size of the location of the anticipated displacement or diffusion area, and (c) any overlap between displacement and diffusion (Guerette & Bowers, 2009).

In a 2009 study conducted by Guerette and Bowers, a systematic review of situationally focused crime-prevention projects was conducted for evidence of displacement and diffusion. Because both were observed somewhat equally, the findings supported the central issue in the rational choice theory. The findings also provided the break-in crime opportunities explained by routine activity theory. Guerette and Bowers (2009) found that although displacement and diffusion were present, the results were not entirely negative. They found that crime displacement was an exception rather than the rule, and it is more likely that diffusion of benefits will occur. The findings also implied that when displacement does occur, the gains achieved are less due to the situational intervention by police (Guerette & Bowers, 2009).

Situational Crime Prevention

Crime reduction strategies such as situational crime prevention (Clarke, 1995) are often criticized by scholars and researchers alike. Despite the possibility that when a crime is reduced in one area, it will displace to another, the majority of crime prevention literature has repeatedly refuted this finding that it does not always displace (Hodgkinson et al., 2020). Reviews have shown that diffusion of benefits is a more likely outcome in the areas surrounding the targeted location (Barr & Pease, 1990; Eck, 1993; Hesseling, 1994). Weisburd et al. (2006) found a diffusion of benefits after addressing methodological issues. A primary limitation of most studies is that displacement is only investigated in the immediate areas surrounding the target. If a crime is displaced further away, it would not be included in the research (Hodgkinson et al., 2020). In a 2017 study, Weisburd et al. found that crime displaced further away in cases involving robbery.

Conventional crime prevention holds that it needs to be based on a thorough understanding of the causes of crime. Preventative physical measures can reduce opportunities that are thought to be of limited value (Clarke, 1980). Preventative measures are thought to suppress the impulse to offend, which will manifest itself at another time and place. With some exceptions, most criminological theories have not been concerned with the situational determinants of crime. Situational research, within crime prevention, has been separated into measures which (a) reduce opportunities to offend, and (b) increase the chances of being caught (Clarke, 1980). Offenders who have the intention of committing a crime and who seek out the opportunity pose the greatest theoretical dilemmas. There must be geographical limits to displacement so that a town or city can protect itself from some crime without displacing it elsewhere (Clarke, 1980).

Most crime prevention strategies are rooted in rational choice. Offenders act with some degree of logic when choosing easy targets first, then offend when opportunities present themselves and prevention is absent (Clarke & Cornish, 1985). If easy targets are eliminated, some offenders may be deterred, where others may seek out opportunities elsewhere (Johnson et al., 2014). Prevention strategies such as Situational Crime Prevention and Crime Prevention through Environmental Design (Clarke, 1980; Saville & Cleveland, 2013) aim to remove crime opportunities. Because motivation varies, an offender's willingness to seek out other targets results in three outcomes: crime may decline, crime continues uninterrupted, or crime is either partially or entirely displaced (Hodgkinson et al., 2020).

Choice structuring properties identified by Cornish and Clarke (1987) revolve around the characteristics of the offense and target that the offender sees as more important. Offenders, in this case, with a variety of motivations, chose a target because they saw an unobstructed opportunity to benefit from a criminal act (Hodgkinson et al., 2020). If prevention strategies fall short of the offender's decision threshold, the decision to alter their choice will rely on the response and potential intervention by the police. When offenders fail to displace following police intervention attempts, bounded rationality suggests there is more to the decision-making process other than opportunity. Bounded rationality includes the constraints on offender decision-making to include emotion, developmental factors, information processing, and opportunity (Pratt & Cullen, 2005). Preventing crime through the manipulation of environmental factors has been troubled with the issue of displacement (Barr & Pease, 1990). The study of displacement into the effectiveness of current crime prevention methods to design prevention methods for the future would include situational crime prevention (Bowers & Johnson, 2003).

Weighted Displacement Quotient

A crime that moves in response to targeted law enforcement efforts has been a subject discussed by researchers and scholars for decades (Barr & Pease, 1990; Hakim & Rengert, 1981; Ratcliffe & Breen, 2011; Reppetto, 1974). The introduction of the weighted displacement quotient (WDQ) by Bowers and Johnson (2003) attempted to address the diffusion effects of hotspot policing over displacement. The WDQ, if applied towards understanding the effects of hotspot policing, can become an invaluable tool (Ratcliffe & Breen, 2011). The determination of the WDQ requires the researcher to look at three operational areas: (a) the identification of the target area where the crime reduction initiative started, (b) an area where the crime is most likely to be displaced, (c) a control area that is consistent with general crime trends. The buffer area is any area that would be considered a feature on a map. This buffer zone is an area where offenders are less likely to commit crimes or a gateway between two high crime areas. It is important to consider that offenders may travel through the buffer zone to another hotspot (Ratcliffe & Breen, 2011). Bowers and Johnson (2003) claimed that the WDQ is valuable in crimes other than burglary. Choosing a buffer zone may require geographical analysis and may change, through displacement, based on offender behavior. The WDQ can be a method to allow departments and agencies to predict where the displacement and diffusion may occur based on the buffer zone and the next favorable target area (Ratcliffe & Breen, 2011).

There are several reasons noted by Bowers and Johnson (2003) for the use of the WDQ. First, it integrates the degree to which the measurement of displacement has been successful. Second, it makes no assumptions about the number of crimes, either displaced or diffused (Bowers & Johnson, 2003). Third, because it examines changes in crime rates rather than the actual volume of crime, the data are standardized, which allows for broader comparisons. Fourth,

it is a fully integrated measure that accounts for area trends. Last, it uses control buffer areas that protect the validity of the analysis. The crime rate of two areas that follow different patterns over time is due to the criminogenics of the areas being different rather than displacement (Bowers & Johnson, 2003). The WDQ is a tool flexible enough to allow an assessment to be done using either aggregate or disaggregate information at almost any unit of analysis (Bowers & Johnson, 2003). The WDQ provides a systematic way of measuring the geographical displacement of crime as it relates to a buffer zone (Bowers & Johnson, 2003).

Policies on Methamphetamine

Methamphetamine is described as the most poorly understood drug that can be abused (Hunt et al., 2005). It has become one of the most serious illegal drug problems in the United States (DEA, 2009, 2011) and internationally (United Nations, 2011). Experts agree that certain aspects of the manufacturing, trafficking, and use of methamphetamine have consequences that are very different from other addictive drugs (Pennell et al., 1999). Amphetamines were available without a prescription until early in the 1950s (Maxwell & Brecht, 2011; Miller, 1997). Methamphetamine is a synthetic derivative of amphetamine (Zorick et al., 2008). In the 1980s, methamphetamine use gained public attention due to the dangerous side effects (Ling et al., 2006; Weisheit & White, 2009). Home-based laboratories that exploded were making headlines across the United States (Chitwood et al., 2009). Photos that revealed the physical ramification of methamphetamine use were being circulated (Linnemann & Wall, 2013; Murakawa, 2011; Stern, 2006). These images portrayed the destructive effects it can also have on neighborhoods and law-abiding neighbors.

Methamphetamine production in the United States, in the 1980s and 1990s, was dominated by small domestic laboratories. In 1980, the U.S. government reported 95% of

methamphetamine sold in the United States was made domestically, with the remaining 5% imported (National Narcotics Intelligence Consumers Committee, 1987). Since then, those ratios have been reversed (Coleman, 2016). During the mid-1990s, these labs were partially displaced by Mexican drug trafficking organizations that operated super-labs. Each super-lab could produce 10 pounds of methamphetamine in less than 24 hours (Dobkin & Nicosia, 2009). In 2010, the United States Government estimated that 80% of meth consumed in the United States was imported from Mexico, with the other 20% being produced domestically (Drug Enforcement Administration, 2011). The most recent information concerning the transnational growth of the methamphetamine supply in the United States is primarily based on law enforcement drug reports, congressional hearings, and reports given to the U.S. Congress.

Like the 1986 Anti-Crime Act, the Comprehensive Methamphetamine Control Act (CMCA) of 1996 was passed when methamphetamine use was fluctuating rather than steadily increasing. The CMCA focused on limiting illegal methamphetamine production rather than the pharmaceutical restrictions of other drug policies (Hendrix & Dollar, 2018). From 1997 to 2004, methamphetamine use tripled in comparison to other drugs (Mumola & Karberg, 2006). By 2004, methamphetamine was the most widely used and clandestinely produced drug in the United States (Office of National Drug Control Policy, 2004). Clandestine laboratories, which were once contained in certain regions within the United States, were now being found nationwide. Efforts to stop clandestine production over the past decades have included various federal laws aimed at placing controls on the ingredients needed to make methamphetamine. In every decade since passing the 1970 Controlled Substances Act, the United States has passed legislation to attempt to curb the amount of methamphetamine within its borders. Acts that targeted methamphetamine included the Chemical Diversion and Trafficking Act of 1987, the

Domestic Chemical Diversion Control Act of 1993, the Comprehensive Methamphetamine

Control Act of 1996, and the Combat Methamphetamine Act of 2005.

Critics of drug control argue that supply-oriented policy interventions are not only

ineffective but also produce unintended consequences, such as displacement (Greenfield & Paoli,

2012). Paoli et al. (2009) found that the illegal drug industry is like a balloon: when squeezed in

one direction, it tends to bulge in another. Illegal drugs travel across multiple borders before

reaching consumer markets (Caulkins, 2017). Drug traffickers have an endless number of

trafficking routes; however, researchers have found that the concentration of routes falls on well-

established trends of other criminal behavior (Giommoni et al., 2016). The disruption of drug

trafficking is a key priority of most drug policies and intervention plans. One setback is the

ability of traffickers to adapt or shift to alternate routes. According to Giommoni et al. (2016),

current knowledge of the various factors that lay the foundation for how and why certain routes

are involved in drug trafficking, both theoretically and empirically, are limited. Reuter (2014)

noted three models that attempt to examine how traffickers choose their routes. First,

confiscation of assets, incarceration, and loss of the product caused by law enforcement are

principal costs for drug traffickers. Second, long distances increase transportation costs as well

as the risk of seizure. Third, social ties around the country may shape drug trafficking routes

(Reuter, 2014). The risk and price model (Reuter & Kleiman, 1986) claims that traffickers are

business-minded individuals who want to lower costs and raise profits. Risks and profits may

drive many drug trafficking routes and play a role in displacement and diffusion decisions by

traffickers (Giommoni et al., 2016).

Coleman (2016) laid the foundation that in 1980, the U.S. government reported that 95%

of methamphetamine sold originated from within the United States. Since then, the ratios have

switched. There is significant criticism for the Combat Methamphetamine Epidemic Act of 2005 because it focused only on methamphetamine. Many feel it drives users to other drugs if the materials to make methamphetamine are not readily available (P. Stanley, 2007). It does not consider the impact of the increased amounts of other drugs, specifically cocaine, heroin, and fentanyl, as a direct repercussion to this displacement. CMEA's before-and-after statistics in reducing methamphetamine labs are impressive; however, the gains did not last long (Coleman, 2016). While super labs in Mexico and along the U.S. southern border continue to provide the bulk of methamphetamine sold in the United States, the one-pot, or smurfing, method of domestic production is growing (Coleman, 2016). Smurfing, a post-CMEA of 2005 term, is defined as acquiring ingredients, just under the legal limit, to convert into methamphetamine. Acquiring under the legal limits from multiple retailers allows small batches to be cooked without the scrutiny and attention that bulk-purchases ones created (Coleman, 2016).

As noted by P. Stanley (2007), the CMEA of 2005 outlines the following regulations:

- certifying and training retailers on the sale of methamphetamine making materials,

- limiting daily purchases,

- limiting monthly purchases,

- prohibiting direct access to these products on the shelf,

- the requirement to show identification during purchase,

- selling products in blister packages,

- restricting internet sales,

- imposing strict penalties,

- enhancing criminal penalties for distribution of methamphetamine,

- holding legal importers and exporters responsible,

- increase government oversight,

- supporting Mexico and their anti-methamphetamine policies,

- improving environmental regulations,

- implementing new child-protection measures, and

- granting money for various programs.

Lawmakers hoped to achieve national uniformity since criminals are attracted to areas where laws are more relaxed. However, it was not achieved with the initial passage of the act because it did not override state policies. As defined by P. Stanley (2007), the act's primary purpose was to make the materials to make methamphetamine difficult to obtain, causing displacement. However, economic theory depends on assumptions that are not always true. According to P. Stanley (2007), the theory assumes that producers and traffickers will pick up and move to another jurisdiction or location but, financially, this is not always true. Critics of the CMEA of 2005 assert that Mexican meth can always replenish any displacement, the CMEA is ineffective against clandestine trafficking, it is harmful to consumers, and it infringes on privacy rights. The act, while the intentions were noble, does not diffuse methamphetamine production or trafficking (P. Stanley, 2007).

Summary

Scholars agree that the United States has dominated international drug control efforts (Friesendorf, 2005). Policy-makers rely on coercion against traffickers, producers, and the governments of drug-producing and transit countries such as Mexico to reduce the drug problem in the United States (Friesendorf, 2005). Drug problems in the United States, specifically with methamphetamine, have steadily become worse over the past decades. The illegal drug industry has had devastating consequences for individuals and states. The increase in drug demand and

trafficking has been supplemented with conflict, corruption, and environmental degradation (Friesendorf, 2005).

Law enforcement has made valiant efforts to combat the illicit drug trade in both urban and rural areas and increased policing efforts to prevent displacement. Displacement and diffusion of benefits are popular research themes in both U.S. foreign and domestic drug policy; however, many scholars refer to displacement without studying it in depth. When displacement is the focal point of research, rural displacement is not considered. Many studies on displacement are geared towards proving policy and policing ineffectiveness rather than explaining the factors leading to displacement (Friesendorf, 2005; Windle & Farrell, 2012). Traffickers and drug producers are flexible and adapt to law enforcement efforts that can alter the structure of the illegal drug industry. The illegal drug industry can influence how law enforcement plans its anti-drug operations. Analyzing displacement means understanding that the illegal drug industry and law enforcement tactics are fluid by nature.

Effects can become causes (Friesendorf, 2005). According to Friesendorf (2005), understanding and explaining displacement means that unpredictable, unique, and contingent conditions must be studied. Hotspot policing is considered a strategic, successful innovation for the reduction of crime in multiple situations and environments (Braga, 2007). Hotspot policing techniques are often met with concern because they focus on larger urban areas and do not consider the potential impact on rural areas. Most of the concern stems from traditional police responses such as crackdowns and side effects such as spatial displacement (Rosenbaum, 2006). Hotspot policing relies solely on deterrence and produces results that are typically short term. Future research is needed to evaluate if hotspot policing, when combined with problem-oriented

policing, community policing, and intelligence-led policing, is as successful and effective in rural areas (Sorg et al., 2013).

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative study was to determine the relationship between major drug operations and arrest rates in Southwest Virginia during Operation Trapdoor from August 2019 to December 2019; Operation Appalachian Action from November 2018 to February 2019; and Operation Pandemic from May 2020 to August 2020. The discussion in this chapter includes research methodology and design, instrumentation, along with an explanation of the appropriateness of the design to the topic and purpose. Examining the relationship between drug arrest rates and major drug seizure operations can allow law enforcement to develop and implement location specific anti-drug policies and initiatives after a major drug operation has concluded. Previous studies on hotspot policing have not included smaller cities, towns, and rural areas. Studies of the impacts of hotspot policing demands new and innovative thinking that goes beyond present methods (Weisburd & Telep, 2014).

Rationale

A growing body of research suggests that place-based police interventions, such as hotspot policing, will generate significant crime control gains (Braga et al., 2012). This research, often referred to as practice-based research, is complementary to evidence-based policing and plays a vital role in determining which crime reduction strategies are realistic and sustainable (Boba, 2010). U.S. police departments have increasingly focused their crime controls strategies on very small places that generate most of the crime and disorder problems within that area (Braga & Weisburd, 2010). Phase 1 of hotspot policing was the development and implementation of computerized crime mapping (Weisburd & Lum, 2005), the use of technology for crime analysis (Boba-Santos, 2013), and national efforts to promote crime mapping software

and training that helped to drive hotspot policing forward (Wellford & Lum, 2014). Phase 2 focused on better identification of hotspots, replication of research, addressing displacement, and testing the best hotspot policing methods to reduce crime in the area (Wellford & Lum, 2014).

Weisburd et al. (2012) found that hotspot policing strategies worked; however, there was a lack of explanation for why the clusters occurred. Policing interventions, such as hotspot policing, may be more effective when they are not only proactive but also more focused (Lum et al., 2011; Weisburd & Eck, 2004; Weisburd et al., 2010). Collective efficacy is a social condition that occurs in communities and neighborhoods when the members share a sense of community, ownership, and trust in one another (Rinehart Kochel & Weisburd, 2019). Collective efficacy is the bond between community members based on shared values and goals, common social situations, and common adversaries (Bellair, 1997; Coleman, 1988; Sampson, 2008; Sampson et al., 1997). Past research on collective efficacy and hotspot policing has shown that it must be a conscious effort by both police and the community to identify and address a geographical area of concern (Weisburd & Telep, 2014). Problem-oriented interventions, such as hotspot policing tactics, are part of a larger and increasingly expanding movement in social policy to guide program development and application (Ariel et al., 2016; Chainey et al., 2018; Sherman, 1998).

Research Design

The researcher conducted a non-experimental quantitative study employing both causal-comparative and correlational methods to determine the impact of a major drug operation on arrest statistics in Southwest Virginia. Data were analyzed using causal-comparative and correlational research methods. Causal-comparative and correlational research designs are two types of quantitative descriptive methods that aim to define the existence and characteristics, such as associations and relationships, between and among variables (Umstead & Mayton,

2018). Causal-comparative designs aim to determine whether an independent variable causes a difference in the dependent variable (Umstead & Mayton, 2018). Correlational designs do not set out to prove the reason for a relationship between variables but are used to determine if a relationship or association is present (Umstead & Mayton, 2018).

Causal-comparative studies center around two or more groups that already differ and are compared to one or more variables. Causal-comparative research, specifically ex post facto research, attempts to define the cause and effect, seeing that the cause and effect have previously occurred and are being studied after the fact (Gay, Mills & Airasian, 2006). Recent methodological developments have shown that ex post facto evaluation designs can be applied to hotspot policing tactics and intervention research. Causal-comparative methods are used when the independent variables cannot be manipulated by the researcher because the events have already occurred, (Edmonds & Kennedy, 2017) and there is no manipulation of the variables on the part of the researcher other than what is required to collect the data (Wallen & Fraenkel, 2000). The purpose of causal-comparative studies is to determine the cause or consequences of differences that already exist among a group of individuals. For example, the researcher may observe that two similar groups differ on some variable and attempt to determine the reason for the difference. Causal-comparative research focuses on causation rather than prediction (Wallen & Fraenkel, 2000).

Correlational research examines relationships between two or more independent and dependent variables for a single group to determine how these variables are related without influencing them (Curtis et al., 2016; Wallen & Fraenkel, 2000) According to Leedy and Ormrod (2013), the purpose of correlational research is to investigate the extent that one variable impacts another variable. Woodworth (1938) established two major distinctions in quantitative research

methods: the differences between dependent and independent variables and the differences between experimental and correlational methods. Correlational design measures two or more variables and then measures the differences between them (Curtis et al., 2016). Correlational designs determine whether two variables are connected in such a way that as one increases, the other decreases, or whether there is no change or impact (Umstead & Mayton, 2018). Although correlational studies cannot determine the cause of the developed relationships, they often suggest paths for future research opportunities. Correlational research is conducted for two main reasons: to explain human behavior and to predict likely outcomes (Wallen & Fraenkel, 2000). Correlational research aims to address three questions regarding two variables or sets of data. First, is there a relationship between the two variables? Second, if so, what is the direction of the relationship? Third, what is the magnitude of the relationship? (L. Cohen et al., 2003).

Internal Validity and Reliability

Quantitative research achieves rigor, the extent to which researchers work to enhance the quality of their study, through internal validity and reliability. Internal validity is the extent to which a research question is accurately measured (Heale & Twycross, 2015). There are three major types of validity: content validity, construct validity, and criterion validity. Content validity determines if the research method covers all the content with respect to the variables. Construct validity is defined as the ability to draw inferences related to the topic being studied (Heale & Twycross, 2015). Criterion validity is the validity determined by multiple research methods used on the same variable. According to Heale and Twycross (2015), reliability is the extent to which the research, when performed multiple times, consistently has the same results. Stability is the consistency of the results with repeated testing. For stability to be accomplished in research, there should be significant correlation between results each time the research is

conducted (Heale & Twycross, 2015). Determining how reliability and validity have been addressed in a study is equally as important in the critique of the research as well as the decision to implement the findings into developing and implementing future hotspot policing policies.

Ex post facto research is one of the most common forms of correlational research to suggest causation (Giuffre, 1997). The major weakness of ex post facto research is its internal validity. Of the most frequent threats to internal validity (history, selection, maturation, testing, and mortality), history and selection are the most common threats (Allen, 2017; Campbell & Stanley, 1963; Giuffre, 1997; Lee, 1985; Mitchell, 2015). Hotspot policing methods, due to differing laws between counties and unavailable resources in some counties but not others, may have an impact on the history of an ex post facto design; however, for the purposes of this study, each major drug operation was treated as a separate and independent group. The second major weakness in ex post facto research is selection (Giuffre, 1997). The pre-existing groups, in the form of drug operation location, were determined prior to the study, and it may not be evident to the reader as to why one location was chosen over another county or area. Selection problems can be managed if the limits of the design are continually assessed, and it is a common understanding that each drug operation is independent of all others and each location is unique.

Participants and Setting

For the purposes of this study, each major drug operation in Southwest Virginia was treated as an individual hotspot policing initiative. To determine if there was any displacement or diffusion, the researcher examined the following variables: displacement or diffusion (dependent variables); a major drug operation and seizure in Southwest Virginia (independent variable). Drug arrests statistics were gathered from the Virginia State Police in Southwest Virginia and from the Virginia State Police during Operation Trapdoor from August 2019 to December 2019;

Operation Appalachian Action from November 2018 to February 2019; and Operation Pandemic from May 2020 to August 2020. The counties and cities located in Southwest Virginia and included in this study are as follows: Bland County, Bristol City, Buchanan County, Carroll County, Dickenson County, Floyd County, Galax City, Grayson County, Lee County, Norton City, Russell County, Scott County, Smyth County, Tazewell County, Washington County, Wise County, and Wythe County. The target population was limited to all arrests for methamphetamine, heroin, cocaine, and fentanyl in these counties and cities in Southwest Virginia. Demographic information was of little significance in this study as the major component of the study consisted of the arrest reports rather than personal information about the offender.

Hypotheses

All the hypotheses listed below are proposed at a 95% confidence interval with a p value of ≤ 0.05. In the case that the p value is < 0.05, the null hypothesis will be rejected.

RQ1. Has Operation Trap Door initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

H$_o$1. Operation Trap Door had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H$_a$1. Operation Trap Door has initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

RQ2. Has Operation Trap Door initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

H$_o$2. Operation Trap Door had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a2. Operation Trap Door has initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

RQ3. Has Operation Pandemic initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

H_o3. Operation Pandemic had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a3. Operation Pandemic has initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

RQ4. Has Operation Pandemic initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

H_o4. Operation Pandemic had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a4. Operation Pandemic has initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

RQ5. Has Operation Appalachian Action initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

H_o5. Operation Appalachian Action had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a5. Operation Appalachian Action has initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

RQ6. Has Operation Appalachian Action initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

H₀6. Operation Appalachian Action had no statistically significant impact on the area in which the operation took place and the surrounding areas.

Hₐ6. Operation Appalachian Action has initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

Instrumentation

To collect data for each variable, the researcher used arrest statistics obtained from the Virginia State Police website (https://va.beyond2020.com). The Virginia State Police offer access to this website to view and analyze crime data in the state. This website is open to the public. Crime data found on this website is continuously collected from all law enforcement agencies in the state. Data, prior to entry, are validated and made available daily. For this study, the research utilized the public option of data collection on the website. The researcher collected and recorded monthly statistics during Operation Trapdoor from August 2019 to December 2019; Operation Appalachian Action from November 2018 to February 2019; and Operation Pandemic from May 2020 to August 2020 from the website. The complied data were organized for entry into a computerized statistical analysis program (SPSS) to generate appropriate charts and graphs.

Procedure and Ethics

Drug arrest statistics were obtained through the public crime data website of the Virginia State Police. All communication with police departments and sheriff's offices located in Southwest Virginia were compliant with the United States Department of Health and Human Services Code of Federal Regulations. This study was of minimal risk to participants. The probability and magnitude of harm or discomfort anticipated in the research was not any greater

than that encountered in normal day-to-day activities. Personal identifiable information about offenders was not gathered or included in the study.

To initiate the process for the request of data, the researcher submitted the required official request form with an explanation of the purpose of the research and research question. The researcher completed and submitted the appropriate Internal Review Board (IRB) request to Liberty University for permission to proceed with the research process. The collection of data was initiated after receiving approval from Liberty Online IRB. Collection of data included records that addressed each variable in the study such as month/year of offense, type of drug, specific charges such as distribution/trafficking, county of arrest, and type of drug. To maintain confidentiality, offender demographics were not gathered. The analyzed data were included in the final research for each variable. Information was gathered from the public Virginia State Police website. Freedom of information action does not apply to this publicly available information. Information was stored on a locked computer in a locked office to which only this researcher had access.

Data Analysis

J. Cohen (1968) indicated that quantitative studies produce casual-comparative and correlational evidence through tests such as a paired t-test and analysis of variance (ANOVA). A paired t-test is used to compare the means of at least two groups and is often used to determine if a process or treatment influences the population of interest. An ANOVA test determines if the dependent variable changes according to the level of influence of the independent variable. These two tests explore the relationships between variables (J. Cohen, 1968). A paired t-tests was used to determine if there is any statistical significance between the county or counties in which the major drug operation occurred and the drug arrest rates in the same location in the 3

months following the operation. The purpose of using a paired t-test is to establish a drug arrest baseline in the affected county and to determine if there are any patterns of displacement or diffusion following a major drug operation in the same location. An ANOVA was used to determine if there is any statistical significance between the county or counties in which the major drug operation occurred and the drug arrest rates in the 3 months following the operation in the remaining counties in Southwest Virginia. The purpose of using an ANOVA was to establish a baseline of drug arrests and to determine if there are any patterns of displacement or diffusion in the affected county and all other counties and cities in Southwest Virginia.

Summary

Presented in this chapter is an explanation of the methods and procedures that were used in this study. In this study, the researcher attempted to determine any displacement or diffusion effect that a major drug operation, treated as a hotspot policing initiative, had on Southwest Virginia in the area in which the operation took place in addition to other areas in Southwest Virginia. The researcher attempted to identify the relationship between the major drug operation and the impact on drug arrests throughout Southwest Virginia. Gall et al. (2003) noted that quantitative research, both casual-comparative and correlational, has been effective to determine the relationship between groups or variables.

CHAPTER FOUR: RESULTS

Results

The data were analyzed in SPSS and the hypotheses were tested using paired t-tests and analysis of variance (ANOVA). Paired t-tests were used to determine if drug arrest rates increased or decreased after a particular operation within target counties. ANOVAs were used to determine if there were statistically significant differences in the drug arrest rates among counties during the 3 months after the specific operation.

Test of the Hypotheses

Research Question 1

Research Question 1 examined two impacts: first, the impact of Operation Trap Door on Carroll County before and after the operation; and second, the impact of Operation Trap Door on surrounding counties in comparison to Carroll County. Research Question 1 asked, "Has Operation Trap Door initiated statistically significant displacement in the county in which the operation took place and surrounding counties?" The corresponding hypotheses were as follows:

H_o1. Operation Trap Door had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a1. Operation Trap Door initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

Operation Trap Door included Carroll County, Galax City, Grayson County, and Wythe County. To test the hypotheses, the researcher first conducted a paired t-test to determine if there was a statistically significant change in the average drug arrest rate 3 months before and 3 months after Operation Trap Door in *Carroll County* (the county where the operation took place). In addition, ANOVA was used to determine if there were statistically significant

differences in the average drug arrest rates across counties after the implementation of Operation Trap Door.

Descriptive Statistics

The aggregate descriptive statistics for Operation Trap Door appear in Table 1.

Table 1

Descriptive Statistics for Operation Trap Door Drug Arrests for Carroll County

Drug Arrests	Min	Max	*M*	*SD*
Number of Drug Arrests Before the Operation	0.00	62.00	11.25	19.14
Number of Drug Arrests During the Operation	0.00	26.00	5.06	8.47
Number of Arrests After the Operation	0.00	37.00	6.38	11.09

The Impact of Operation Trap Door on Carroll County

The first paired samples *t*-test was used to examine the difference between the average numbers of arrests in Carroll County before and after Operation Trap Door. As seen in Table 2, the average number of drug arrests in Carroll County in the 3-month period before the operation was 16.25 ($SD = 30.53$) and the average number of drug arrests in the 3-month period after the operation was 10.00 ($SD = 18.02$) indicating a mean difference of 6.25 arrests in the period before and after the operation. The average number of drug arrests was lower after the implementation of Operation Trap Door in Carroll County (see Figure 1). However, the difference between the number of drug arrests in Carroll County before and after Operation Trap Door was not statistically significant ($t (3) = 1.00$, $p > .05$).

Table 2

Paired Samples t-Test Comparing the Average Number of Drug Arrests in Carroll County

Before and After the Implementation of Operation Trap Door

Pair	*M*	*SD*	*SE* Mean	Lower	Upper	*t*	*df*	*p*
Drug Arrests Before the Operation	16.25	30.53	15.27	–13.68	26.18	1.00	3	.39
Drug Arrests After the Operation	10.00	18.02	9.01					

Figure 1

Plotted Means for Average Number of Drug Arrests in Carroll County Before and After the

Implementation of Operation Trap Door
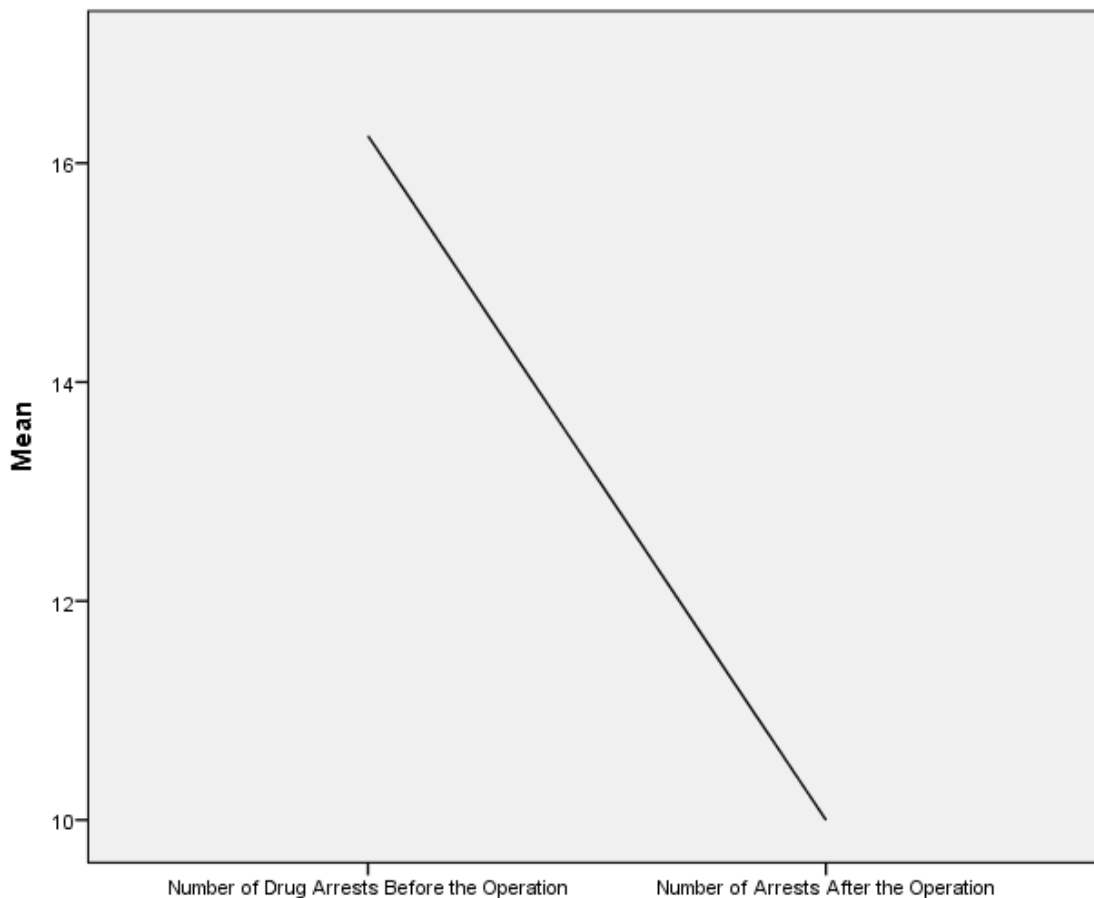
The Impact of Operation Trap Door on Carroll County in Comparison to Surrounding

Counties

An ANOVA was used to determine if there were statistically significant differences in drug arrest rates across counties after the implementation of Operation Trap Door. Table 3 shows the descriptive statistics for average drug arrest rates across counties after the implementation of Operation Trap Door. The average number of drug arrests in Carroll County 3 months after the operation was 10.00, which was higher than the surrounding areas: Galax City ($M = 4.50$), Grayson County ($M = 3.75$), and Wythe County ($M = 7.25$). The mean drug arrests for each county are plotted in Figure 2. Due to the small sample size, as seen in Table 4, there was no statistically significant difference in average drug arrest rates across counties after the implementation of Operation Trap Door ($F[3,15] = 0.22$, $p = .88$).

Table 3

Descriptive Statistics for Average Drug Arrests Across Counties After the Implementation of

Operation Trap Door

County	N	M	SD	SE	95% CI Lower	95% CI Upper	Min	Max
Carroll County	4	10.00	18.02	9.01	−18.67	38.67	0.00	37.00
Galax City	4	4.50	8.35	4.17	−8.78	17.78	0.00	17.00
Grayson County	4	3.75	6.85	3.43	−7.15	14.65	0.00	14.00
Wythe County	4	7.25	11.90	−11.68	0.31	26.18	0.00	25.00
Total	16	6.38	11.10	0.46	2.88	12.29	0.00	37.00

Table 4

Results of the ANOVA for Average Drug Arrests Across Counties After the Implementation of

Operation Trap Door

	Sum of Squares	df	Mean Square	F	p
Between Groups	97.25	3	32.42	0.22	.88
Within Groups	1748.50	12	145.71		
Total	1845.75	15			

Figure 2

Plotted Means for Average Drug Arrests Across Counties After the Implementation of Operation
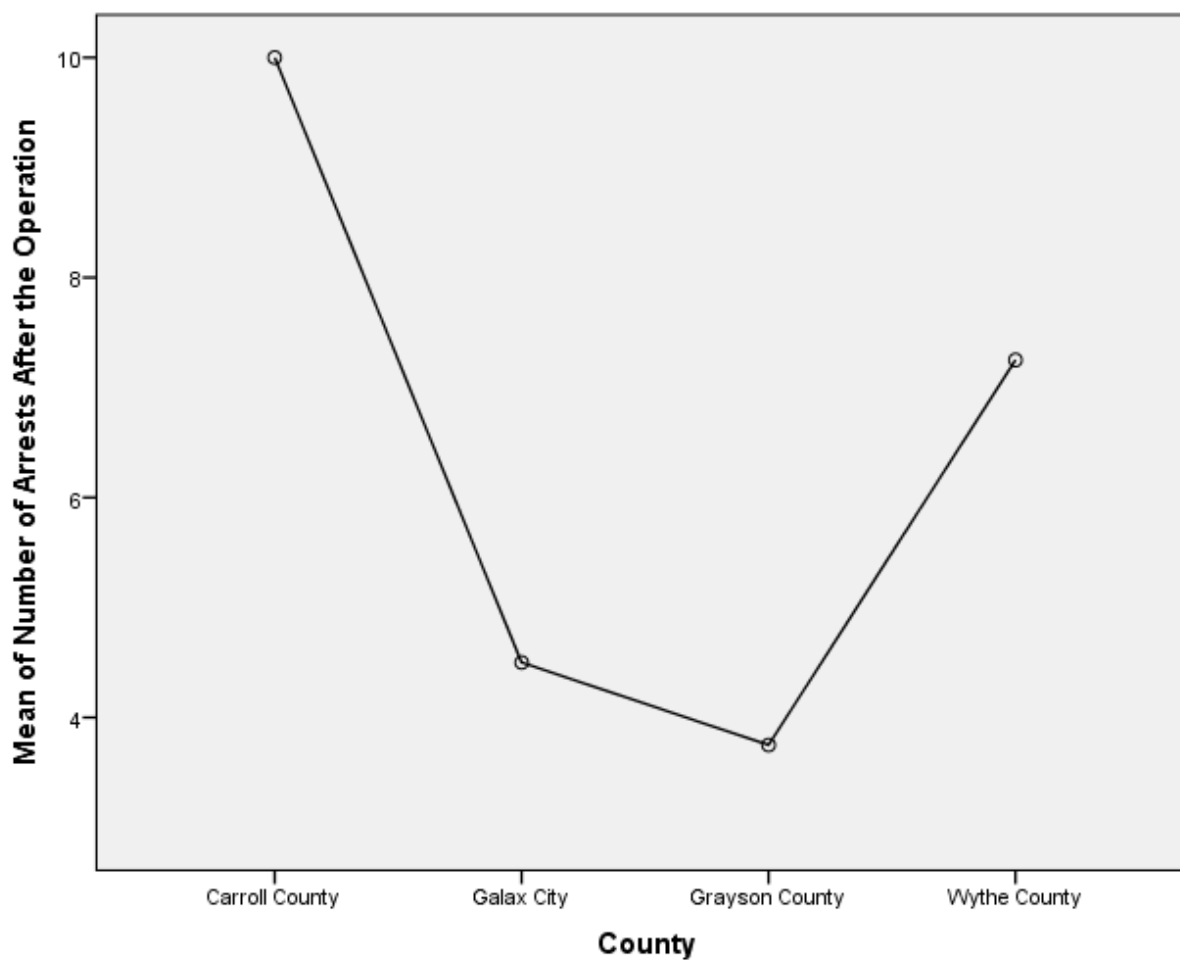
Trap Door

Given the findings, there is not sufficient evidence to conclude that Operation Trap Door initiated statically significant displacement in the county in which the operation took place and in the surrounding counties.

Research Question 2

Research Question 2 asked, "Has Operation Trap Door initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties? The corresponding hypotheses were as follows:

> **H₀2**. Operation Trap Door had no statistically significant impact on the area in which the operation took place and the surrounding areas.

> **Hₐ2**. Operation Trap Door initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

To determine if diffusion occurred, the researcher assessed changes in the counties' average arrest rates from pre- to post-Operation Trap Door. ANOVA was used and the dependent variable was *change* in the average number of arrests from pre- to post-operation. Table 5 shows the descriptive statistics for change in the average number of arrests from pre- to post-Operation Trap Door across counties. As seen in Table 6, there was no statistically significant difference for change in the average number of arrests from pre- to post-Operation Trap Door across counties ($F[3,12] = 0.64$, $p = .60$). The mean change in number of arrests from pre- to post-Operation Trap Door is plotted in Figure 3. All counties, apart from Grayson County, experienced a decrease in arrests from pre- to post-Operation Trap Door.

Table 5

Descriptive Statistics for Change in the Average Number of Arrests from Pre- to Post-Operation

Trap Door by County

County	N	M	SD	SE	95% CI Lower	95% CI Upper	Min	Max
Carroll County	4	–6.25	12.53	6.26	–26.18	13.68	–25.00	1.00
Galax City	4	–4.50	7.77	3.88	–16.86	7.86	–16.00	1.00
Grayson County	4	1.75	3.59	1.80	–3.97	7.47	–1.00	7.00
Wythe County	4	–10.50	20.42	10.21	–42.99	21.99	–41.00	1.00
Total	16	–4.88	12.25	3.06	–11.40	1.65	–41.00	7.00

Table 6

Results of the ANOVA for Change in the Average Number of Arrests from Pre- to Post-

Operation Trap Door by County

	Sum of Squares	df	Mean Square	F	p
Between Groups	310.25	3	103.42	0.64	.60
Within Groups	1941.50	12	161.79		
Total	2251.75	15			

Figure 3

Plotted Means for Change in the Average Number of Arrests from Pre- to Post-Operation Trap Door by County
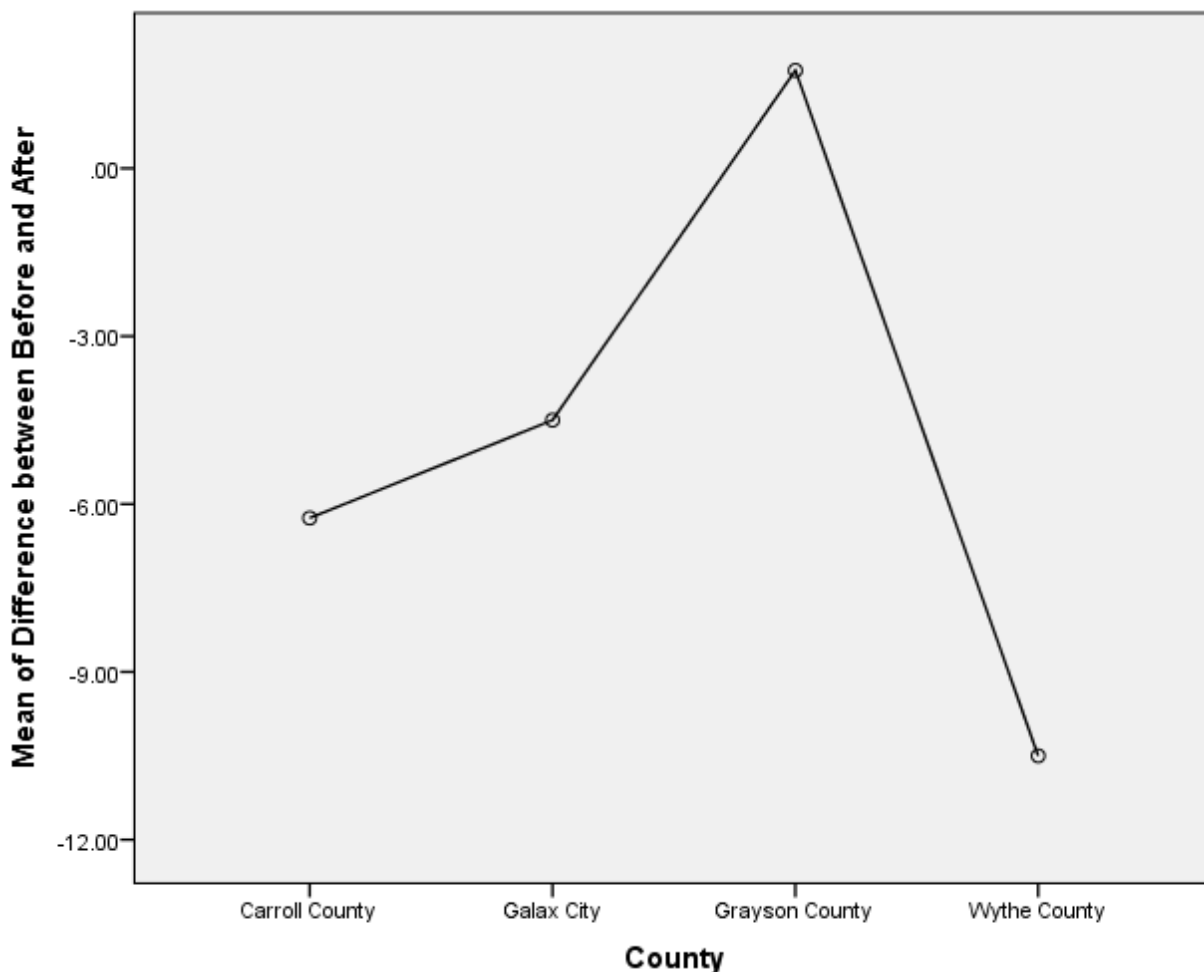
Given these findings, there is not sufficient evidence to conclude that Operation Trap Door initiated statistically significant displacement in the area in which the operation took place and the surrounding areas.

Research Question 3

Research Question 3 examined two impacts: first, the impact of Operation Pandemic on Washington County before and after the operation; and second, the impact of Operation Pandemic on surrounding counties in comparison to Washington County. Research Question 3

asked, "Has Operation Pandemic initiated statistically significant displacement in the county in which the operation took place and surrounding counties?" The corresponding hypotheses were as follows:

H_o3. Operation Pandemic had no statistically significant impact on the area in which the operation took place and the surrounding areas.

H_a3. Operation Pandemic has initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

Operation Pandemic included Washington County, Bristol City, Grayson County, Russell County, Scott County, and Smyth County. To test the hypotheses, the researcher first conducted a paired *t*-test to determine if there was a statistically significant change in the average drug arrest rate 3 months before and 3 months after Operation Pandemic in *Washington County* (the county where the operation took place). In addition, ANOVA was used to determine if there were statistically significant differences in the average drug arrest rates across counties after the implementation of Operation Pandemic.

Descriptive Statistics

The aggregate descriptive statistics for Operation Pandemic appear in Table 7.

Table 7

Descriptive Statistics for Operation Pandemic Drug Arrests in Washington County

Drug Arrests	Min	Max	*M*	*SD*
Number of Arrests Before the Operation	0.00	76.00	8.54	17.77
Number of During the Operation	0.00	72.00	5.79	15.21
Number of Arrests After the Operation	0 .00	74.00	9.83	19.62

The Impact of Operation Pandemic on Washington County

The first paired samples *t*-test was used to examine the difference between the average numbers of arrests in Washington County before and after Operation Pandemic. As seen in Table 8, the average number of drug arrests in Washington County 3 months before the operation was 19.75 (*SD* = 37.51) and the average number of drug arrests in the 3-month period after the operation was 23.50 (*SD* = 33.97), indicating a mean difference of 3.75 arrests. The average number of drug arrests was higher after the implementation of Operation Pandemic in Washington County (see Figure 4). However, the difference between the number of drug arrests in Washington County before and after Operation Pandemic was not statistically significant ($t[3] = -1.20$, $p = .32$).

Table 8

Paired Samples t-Test Comparing the Average Number of Drug Arrests in Washington County Before and After the Implementation of Operation Pandemic

Pair	*M*	*SD*	*SE* Mean	95% CI of the Difference		*t*	*df*	*p*
				Lower	Upper			
Drug Arrests Before the Operation	19.75	37.51	18.75	−13.67	6.18	−1.20	3	.32
Drug Arrests After the Operation	23.50	33.97	16.98					

Figure 4

Plotted Means for Average Number of Drug Arrests in Washington County Before and After the

Implementation of Operation Pandemic
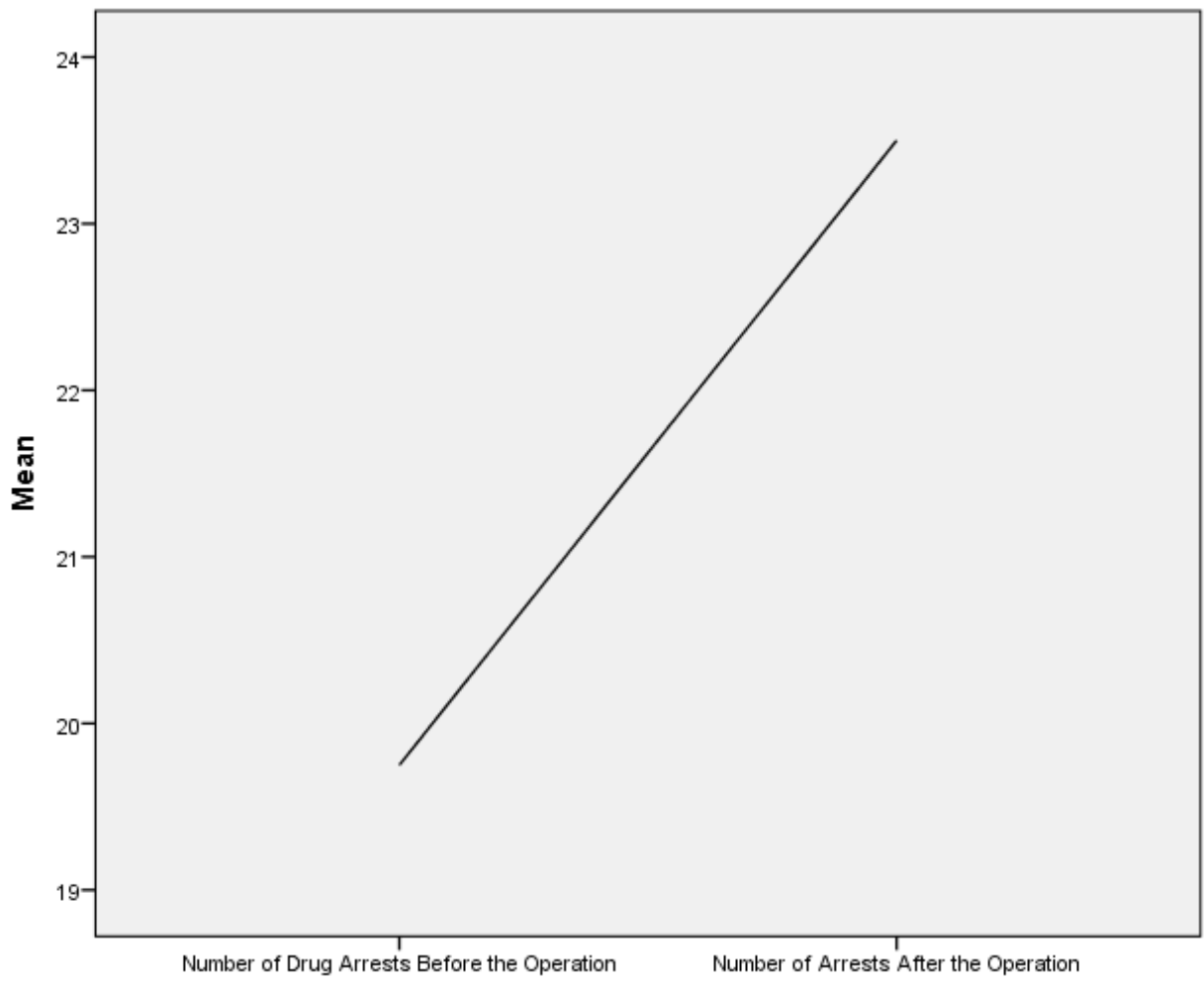
The Impact of Operation Pandemic on Washington County in Comparison to Surrounding

Counties

An ANOVA was used to determine if there were statistically significant differences in

drug arrest rates across counties after the implementation of Operation Pandemic. Table 9 shows

the descriptive statistics for average drug arrest rates across counties after the implementation of

Operation Pandemic. As seen in Table 10, there was not a statistically significant difference in

average drug arrest rates across counties after the implementation of Operation Pandemic ($F[5,18] = .71$, $p = .62$). The mean drug arrests for each county are plotted in Figure 5. Washington County had a higher average drug arrest rate ($M = 23.50$, $SD = 16.98$) than all other counties.

Table 9

Descriptive Statistics for Average Drug Arrests Across Counties After the Implementation of Operation Pandemic

County	N	M	SD	SE	95% CI Lower	95% CI Upper	Min	Max
Washington County	4	23.50	33.97	16.98	–30.55	77.55	1.00	74.00
Bristol City	4	5.50	9.71	4.86	–9.95	20.95	0.00	20.00
Grayson County	4	3.50	6.35	3.18	–6.61	13.61	0.00	13.00
Russell County	4	3.00	5.35	2.68	–5.52	11.52	0.00	11.00
Scott County	4	17.50	32.34	16.17	–33.96	68.96	1.00	66.00
Smyth County	4	6.00	10.03	5.02	–9.97	21.97	0.00	21.00
Total	24	9.83	19.62	4.01	1.55	18.12	0.00	74.00

Table 10

Results of the ANOVA for Average Drug Arrests Across Counties After the Implementation of Operation Pandemic

	Sum of Squares	df	Mean Square	F	p
Between Groups	1463.33	5	292.67	.71	.62
Within Groups	7390.00	18	410.56		
Total	8853.33	23			

Figure 5

Plotted Means for Average Drug Arrests Across Counties After the Implementation of Operation
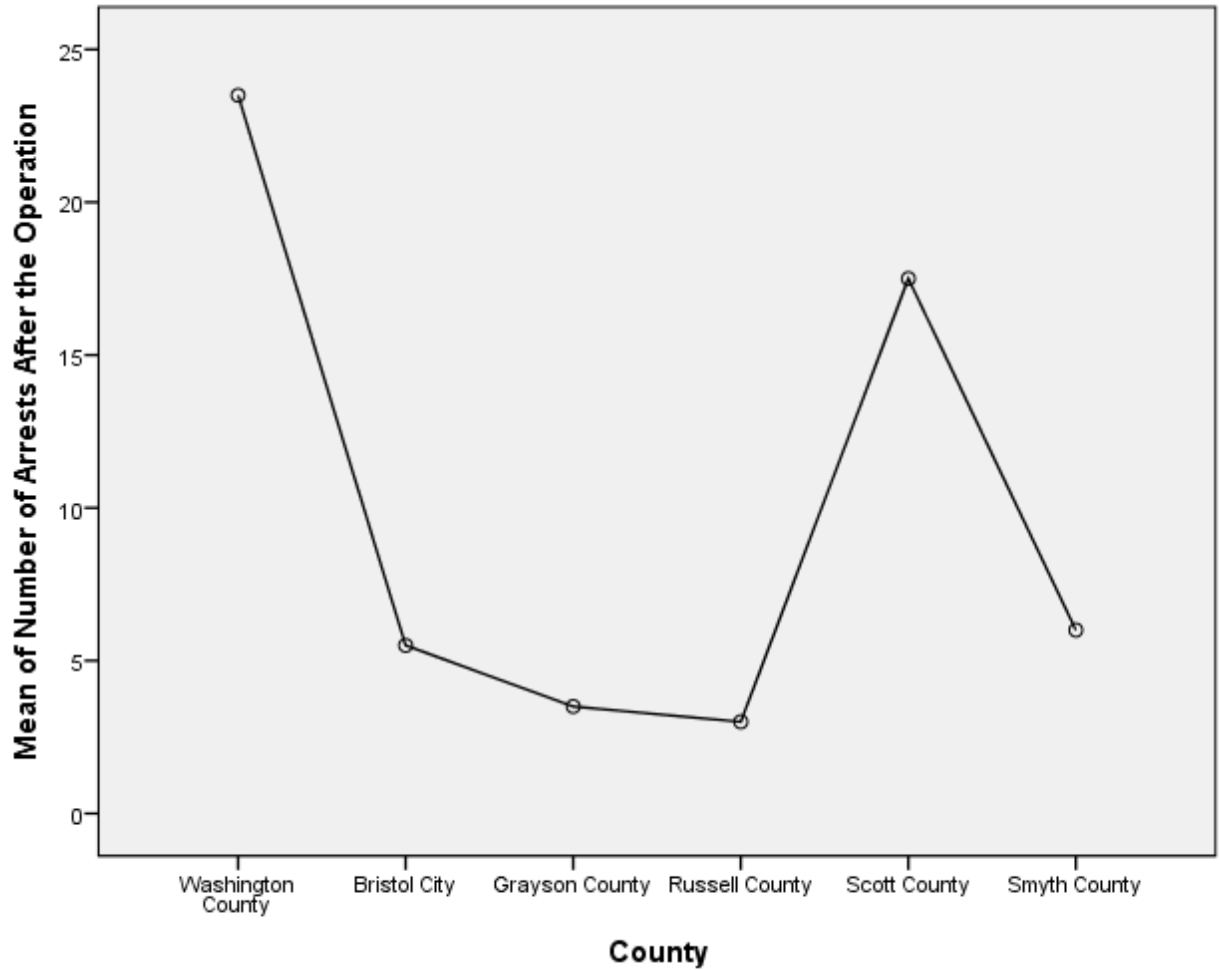
Pandemic

Given the findings, there is not sufficient evidence to claim that Operation Pandemic initiated

statistically significant displacement in the county in which the operation took place, nor that it

initiated statistically significant displacement in the surrounding counties.

Research Question 4

Research Question 4 asked, "Has Operation Pandemic initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?" The corresponding hypotheses were as follows:

H₀4. Operation Pandemic had no statistically significant impact on the area in which the operation took place and the surrounding areas.

Hₐ4. Operation Pandemic has initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

To determine if diffusion occurred, the researcher assessed changes in the counties' average arrest rates from pre- to post-Operation Pandemic. ANOVA was used and the dependent variable was *change* in the average number of arrests from pre- to post-operation. Table 11 shows the descriptive statistics for change in the average number of arrests from pre- to post-Operation Pandemic across counties. As seen in Table 12, there was no statistically significant difference for change in the average number of arrests from pre- to post-Operation Pandemic across counties ($F[5,18] = 0.59$, $p = .71$). The mean change in number of arrests from pre- to post-Operation Pandemic is plotted in Figure 6. Four areas (Washington County, Bristol City, Grayson County, and Scott County) experienced an increase in arrests from pre- to post-Operation Pandemic.

Table 11

Descriptive Statistics for Change in the Average Number of Arrests from Pre- to Post-Operation

Pandemic by County

County	N	M	SD	SE	95% CI Lower	95% CI Upper	Min	Max
Washington County	4	3.75	6.24	3.12	–6.18	13.68	–2.00	12.00
Bristol City	4	0.50	1.29	0.65	–1.55	2.55	–1.00	2.00
Grayson County	4	2.25	4.57	2.29	–5.03	9.53	–1.00	9.00
Russell County	4	–1.75	3.50	1.75	–7.32	3.82	–7.00	0.00
Scott County	4	4.75	14.73	7.36	–18.69	28.19	–8.00	26.00
Smyth County	4	–1.75	4.50	2.25	–8.91	5.41	–8.00	2.00
Total	24	1.29	6.87	1.41	–1.61	4.19	–8.00	26.00

Table 12

Results of the ANOVA for Change in the Average Number of Arrests from Pre- to Post-

Operation Pandemic by County

	Sum of Squares	df	Mean Square	F	p
Between Groups	152.21	5	30.44	.59	.71
Within Groups	932.75	18	51.82		
Total	1084.96	23			

Figure 6

Plotted Means for Change in the Average Number of Arrests from Pre- to Post-Operation Pandemic by County
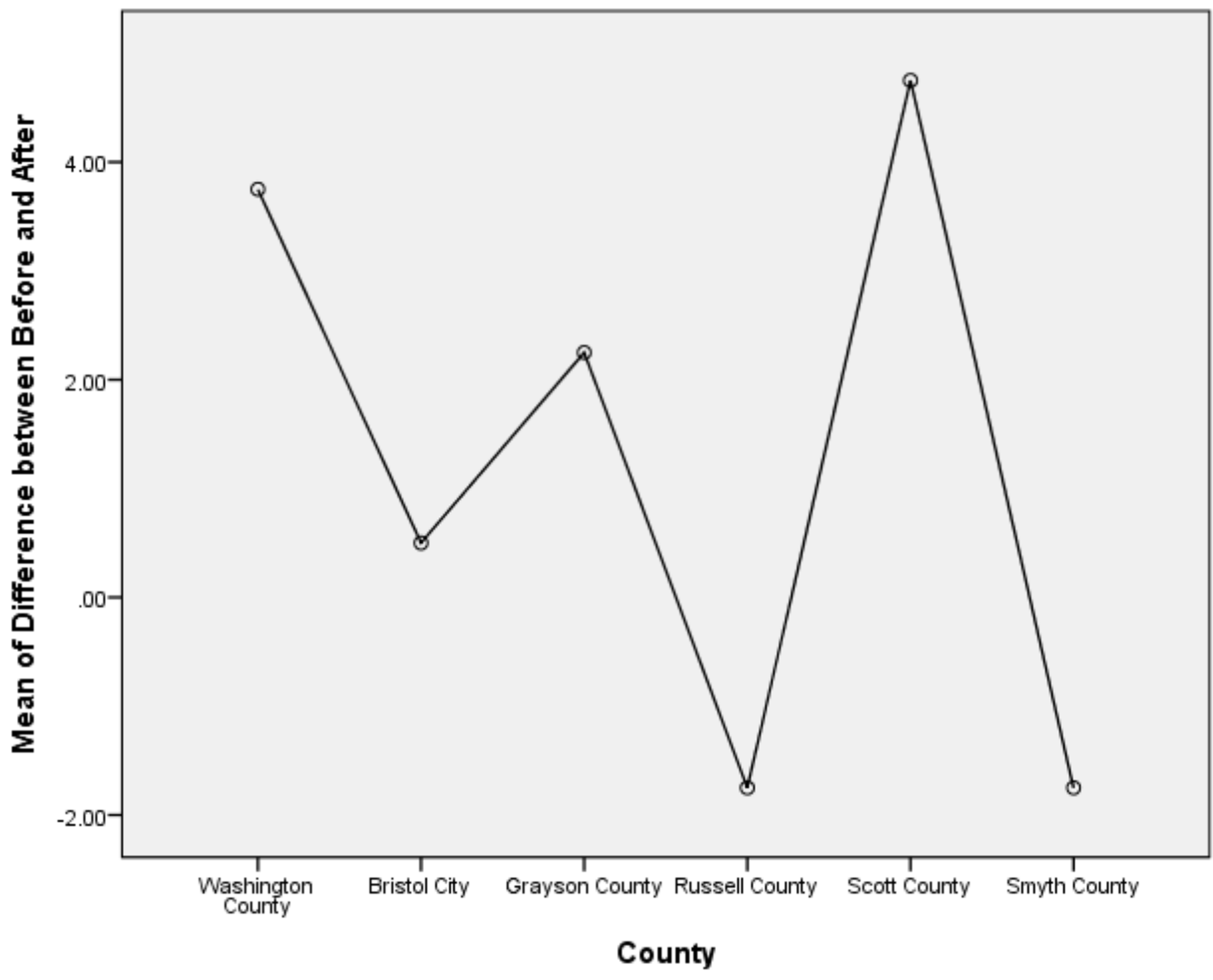
Given the findings, there was not sufficient evidence to claim that Operation Pandemic initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

Research Question 5

Research Question 5 examined two impacts: first, the impact of Operation Appalachian Action on Wise County before and after the operation; and second, the impact of Operation

Appalachian Action on surrounding counties in comparison to Wise County. Research Question 5 asked, "Has Operation Appalachian Action initiated statistically significant displacement in the county in which the operation took place and surrounding counties?" The corresponding hypotheses were as follows:

H₀5. Operation Appalachian Action had no statistically significant impact on the area in which the operation took place and the surrounding areas.

Hₐ5. Operation Appalachian Action has initiated statistically significant displacement on the area in which the operation took place and the surrounding areas.

Operation Appalachian Action included Wise County, Lee County, Norton City, Russell County, and Scott County. To test the hypotheses, the researcher first conducted a paired *t*-test to determine if there was a statistically significant change in the average drug arrest rate 3 months before and 3 months after Operation Appalachian Action in *Wise County* (the county where the operation took place). In addition, ANOVA was used to determine if there were statistically significant differences in the average drug arrest rates across counties after the implementation of Operation Appalachian Action.

Descriptive Statistics

The aggregate descriptive statistics for Operation Appalachian Action appear in Table 13.

Table 13

Descriptive Statistics for Operation Appalachian Action Drug Arrests in Wise County

Drug Arrests	Min	Max	*M*	*SD*
Number of Arrests Before the Operation	.00	41.00	4.85	10.43
Number of During the Operation	.00	13.00	1.55	3.41
Number of Arrests After the Operation	.00	33.00	4.40	8.20

The Impact of Operation Appalachian Action on Wise County

The first paired samples *t*-test was used to examine the difference between the average numbers of arrests in Wise County before and after Operation Appalachian Action. As seen in Table 14, the average number of drug arrests in Wise County 3 months before the operation was 5.50 (SD = 9.71) and the average number of drug arrests in the 3-month period after the operation was 3.25 (SD = 5.85) indicating a mean difference of 2.25 (SD = 3.86) arrests in the period before and after the operation. The average number of drug arrests was lower after the implementation of Operation Appalachian Action in Wise County (see Figure 7). However, the difference between the number of drug arrests in Wise County before and after Operation Appalachian Action was not statistically significant (t[3] = 1.17, p = .33).

Table 14

Paired Samples t-Test Comparing the Average Number of Drug Arrests in Wise County Before and After the Implementation of Operation Appalachian Action

Pair	*M*	*SD*	*SE* Mean	95% CI of the Difference Lower	95% CI of the Difference Upper	*t*	*df*	*p*
Drug Arrests Before the Operation	5.50	9.71	4.86	–3.90	8.40	1.17	3	.33
Drug Arrests After the Operation	3.25	5.85	2.93					

Figure 7

Plotted Means for Average Number of Drug Arrests in Wise County Before and After the

Implementation of Operation Appalachian Action
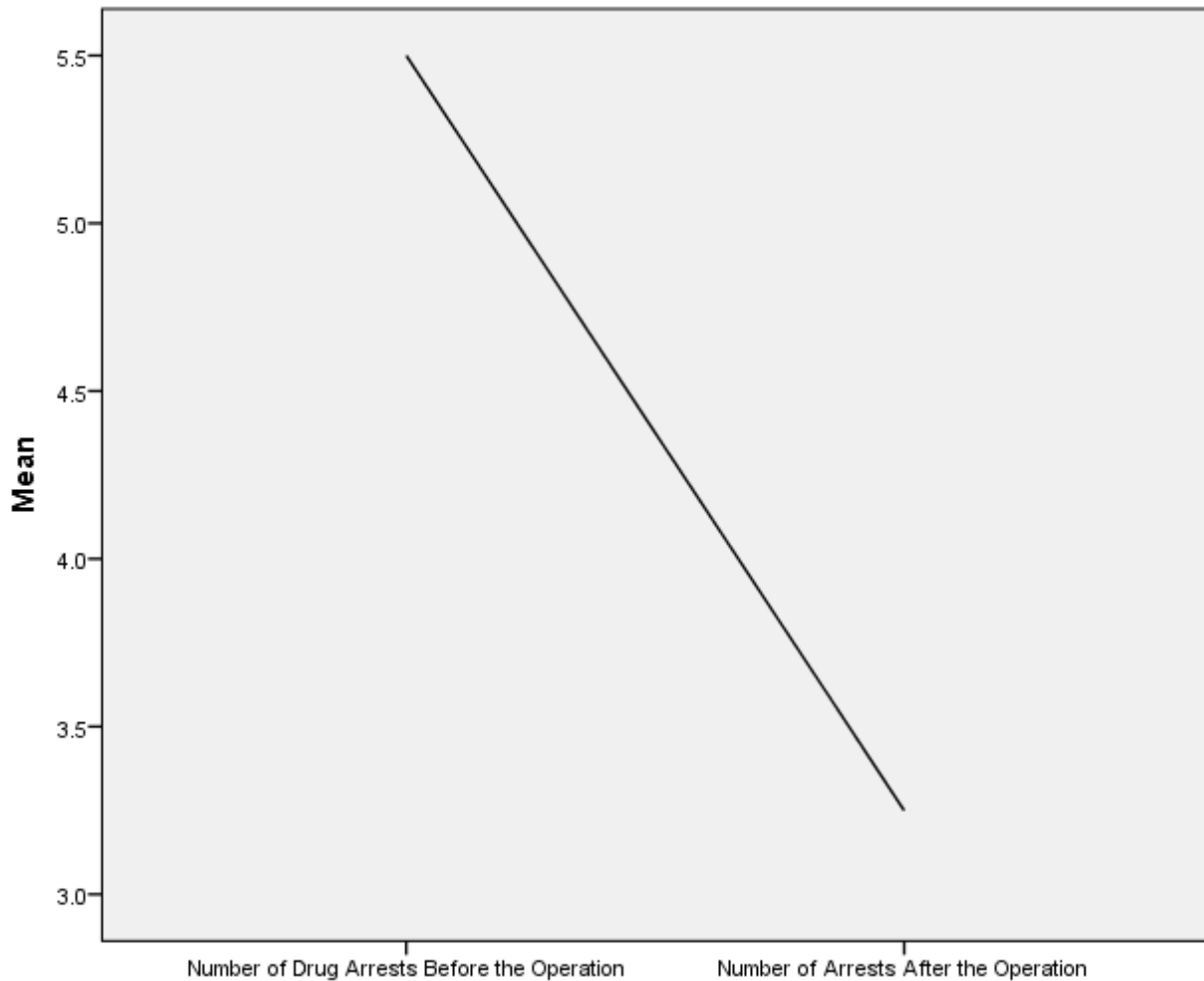
The Impact of Appalachian Action on Wise County in Comparison to Surrounding Counties

An ANOVA was used to determine if there were statistically significant differences in

drug arrest rates across counties after the implementation of Operation Appalachian Action.

Table 15 shows the descriptive statistics for average drug arrest rates across counties after the

implementation of Operation Appalachian Action. The mean drug arrests for each county are

plotted in Figure 8. Scott County had a higher average drug arrest rate after the implementation

of Operation Appalachian Action ($M = 9.25$, $SD = 6.85$) than all counties. However, as seen in Table 16, the differences in average drug arrest rates across counties after the implementation of Operation Appalachian Action were not statistically significant ($F[4,15] = 0.41$, $p = .79$). Dickenson County was excluded from this case study due to the missing drug type in the arrest statistics.

Table 15

Descriptive Statistics for Average Drug Arrests Across Counties After the Implementation of Operation Appalachian Action

County	N	M	SD	SE	95% CI Lower	95% CI Upper	Min	Max
Wise County	4	3.25	5.85	2.93	–6.06	12.56	0.00	12.00
Lee County	4	3.75	6.85	3.43	–7.15	14.65	0.00	14.00
Norton City	4	2.00	3.37	1.68	–3.36	7.36	0.00	7.00
Russell County	4	3.75	6.24	3.12	–6.18	13.68	0.00	13.00
Scott County	4	9.25	15.88	7.94	–16.02	34.52	0.00	33.00
Total	20	4.40	8.20	1.83	.056	8.24	0.00	33.00

Table 16

Results of the ANOVA for Average Drug Arrests Across Counties After the Implementation of Operation Appalachian Action

	Sum of Squares	df	Mean Square	F	p
Between Groups	125.80	4	31.45	.410	.79
Within Groups	1151.10	15	76.73		
Total	1276.80	19			

Figure 8

Plotted Means for Average Drug Arrests Across Counties After the Implementation of Operation

Appalachian Action
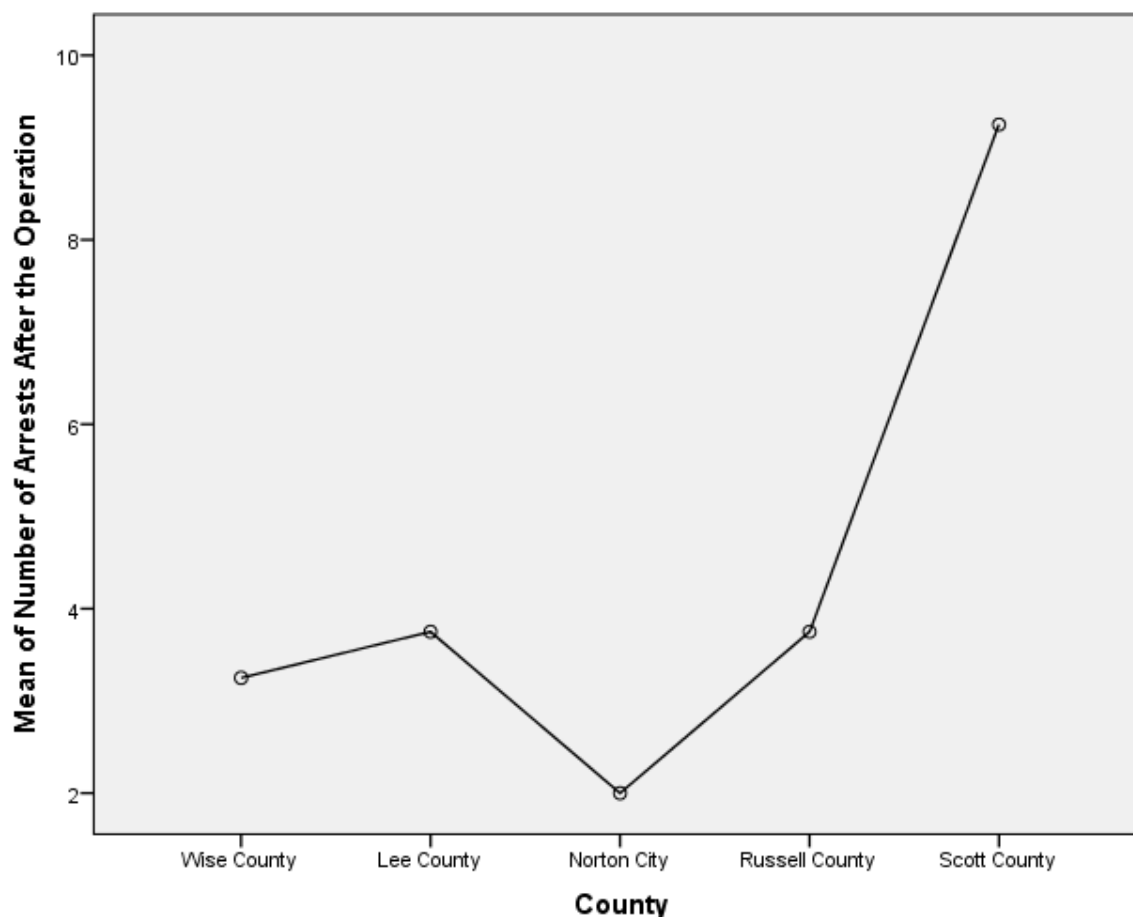
Given the findings, there was not sufficient evidence to conclude that Operation Appalachian Action initiated statistically significant displacement in the county in which the operation took place and in the surrounding counties.

Research Question 6

Research Question 6 asked, "Has Operation Appalachian Action initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?" The corresponding hypotheses were as follows:

H₀6. Operation Appalachian Action had no statistically significant impact on the area in which the operation took place and the surrounding areas.

Hₐ6 Operation Appalachian Action has initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

To determine if diffusion occurred, the researcher assessed changes in the counties' average arrest rates from pre- to post-Operation Appalachian Action. ANOVA was used and the dependent variable was *change* in the average number of arrests from pre- to post-operation. Table 17 shows the descriptive statistics for change in the average number of arrests from pre- to post-Operation Appalachian Action across counties. As seen in Table 18, there was no statistically significant difference for change in the average number of arrests from pre- to post-Operation Appalachian Action across counties ($F[4,15] = 1.42$, $p = .28$). All counties experienced a reduction in arrests, except for Lee County and Norton County. The mean change in number of arrests from pre- to post-Operation Appalachian Action is plotted in Figure 9.

Table 17

Descriptive Statistics for Change in the Average Number of Arrests from Pre- to Post-Operation Appalachian Action by County

County	N	M	SD	SE	95% CI Lower	Upper	Min	Max
Wise County	4	–2.25	3.86	1.93	–8.40	3.90	–8.00	.00
Lee County	4	1.75	2.87	1.44	–2.82	6.32	0.00	6.00
Norton City	4	1.75	2.87	1.44	–2.82	6.32	0.00	6.00
Russell County	4	–1.25	3.40	1.70	–6.67	4.17	–6.00	2.00
Scott County	4	–2.25	4.03	2.02	–8.66	4.16	–8.00	1.00
Total	20	–0.45	3.59	0.80	–2.13	1.23	–8.00	6.00

Table 18

Results of the ANOVA for Change in the Average Number of Arrests from Pre- to Post-

Operation Appalachian Action by County

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	67.20	4	16.80	1.42	.28
Within Groups	177.75	15	11.85		
Total	244.95	19			

Figure 9

Plotted Means for Change in the Average Number of Arrests from Pre- to Post-Operation

Appalachian Action by County
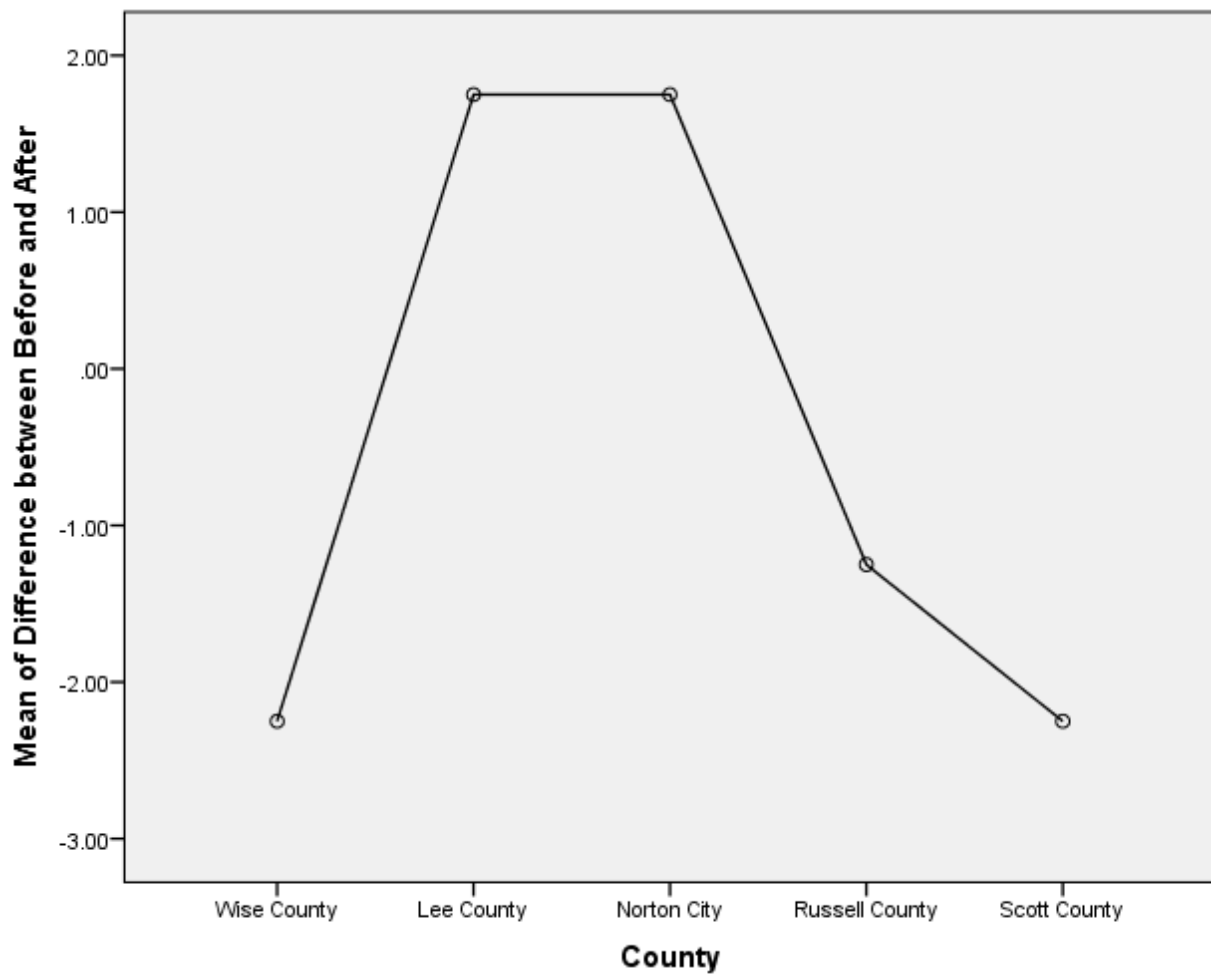
Given the findings, there was not sufficient evidence to claim that Operation Appalachian Action initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas.

Summary

After performing the statistical analysis for the six research questions, all the hypothesized differences were supported by the descriptive statistics. Because of the small sample size due to reality limitation, these differences are not statistically significant. A summary of each question is described below.

There is not sufficient evidence to conclude that Operation Trap Door initiated statically significant displacement in the county in which the operation took place and in the surrounding counties. There is not sufficient evidence to conclude that Operation Trap Door initiated statistically significant diffusion of benefits in the area in which the operation took place and the surrounding areas. Therefore, both Research Questions 1 and 2 failed to reject the null hypothesis.

Due to the lack of sufficient evidence to claim that Operation Pandemic initiated statistically significant displacement in the county in which the operation took place and in the surrounding counties, Research Question 3 failed to reject the null hypothesis. Due to the lack of sufficient evidence to claim that Operation Pandemic initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas, Research Question 4 failed to reject the null hypothesis.

There was not sufficient evidence to conclude that Operation Appalachian Action initiated statistically significant displacement in the county in which the operation took place and in the surrounding counties; therefore, Research Question 5 failed to reject the null hypothesis.

There was not sufficient evidence to claim that Operation Appalachian Action initiated statistically significant diffusion of benefits on the area in which the operation took place and the surrounding areas; therefore, Research Question 6 failed to reject the null hypothesis.

CHAPTER FIVE: CONCLUSIONS

Overview

Research on displacement and diffusion can have a significant impact on how law enforcement can target drug operations in rural areas by identifying patterns of drug movements throughout the counties after a major drug operation. This chapter is concerned with the implications of the findings in relation to the practical applications for researchers, criminal justice practitioners, law enforcement, and scholars. The chapter concludes with the discussion of the limitations of this study and recommendations for future research.

Summary of Findings

Operation Trap Door

Research Question 1

Has Operation Trap Door initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

Findings. Operation Trap Door was a drug operation in Southwest Virginia, centering in Carroll County, that targeted methamphetamine (Virginia State Police, 2019). Research question one examined if there was evidence of displacement following the operation both in Carroll County and the surrounding counties. The first examination of displacement, through a paired *t*-test, compared the "before" average number of arrests in Carroll County to the "after" average number of arrests. The average number of post-operation drug arrests in Carroll County was lower than the average number of pre-operation arrests; however, this change was not statistically significant. The second examination compared the "after" average number of drug arrests in Carroll County to the surrounding counties. Research determined that the relationship between Carroll County and the surrounding counties was not statistically significant after

Operation Trap Door. There is no statistically significant displacement present in Carroll County and the surrounding counties after Operation Trap Door.

Research Question 2

Has Operation Trap Door initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

Findings. Research Question 2 addressed the possibility of diffusion of benefits that may have occurred after Operation Trap Door. The researcher compared pre-operation arrest rate averages for Carroll County combined with the surrounding counties and compared them to post-operation arrest rate averages for the same locations through ANOVA. Carroll County, Galax City, and Wythe County all showed lower arrest rates after Operation Trap Door as noted with the negative mean implying a reduction. Grayson County was the only county that experienced an increase in the number of drug arrests after Operation Trap Door as noted with the positive mean. Research found that overall average drug arrest rates in the 3 months following Operation Trap Door were lower; however, they were not statistically significant. There is no statistically significant diffusion of benefits detected after Operation Trap Door.

Operation Pandemic

Research Question 3

Has Operation Pandemic initiated statistically significant displacement in the county in which the operation took place and surrounding counties?

Findings. Operation Pandemic was a drug operation that focused on methamphetamine trafficking in Washington County and the surrounding areas. Research Question 3 examined Operation Pandemic and the impact it had on Washington County and the surrounding areas. First, the average number of arrests in Washington County pre-operation was compared to the

average post-operation number of arrests using a paired *t*-test. Washington County experienced

an increase in the average number of post-operation drug arrests in Washington County. The

noted increase in the average number of drug arrests after the operation can imply a future trend

moving towards some displacement; however, the increase was not statistically significant.

Research Question 3 also compared the average number of drug arrests in Washington County

after Operation Pandemic to the average number of drug arrests in the surrounding areas through

ANOVA. The average number of drug arrests in the surrounding counties, when compared to

Washington County, was also not statistically significant. This implies that there was minimal

impact on the surrounding counties after Operation Pandemic.

Research Question 4

Has Operation Pandemic initiated statistically significant diffusion of benefits in the

county in which the operation took place and surrounding counties?

Findings. Research Question 4 examined if Operation Pandemic initiated diffusion of

benefits when pre-operation averages was compared to post-operation averages for all counties.

Research Question 4 found that the change of pre-operation arrests in Washington County and

surrounding areas was not statistically significant when compared to post-operation arrests. All

counties except for Russell County and Smyth County noted an increase, as implied by the

positive mean in drug arrests pre- to post-operation. However, the change in average number of

drug arrests pre- to post-operation was not statistically significant.

Operation Appalachian Action

Research Question 5

Has Operation Appalachian Action initiated statistically significant displacement in the

county in which the operation took place and surrounding counties?

Findings. Wise County and the surrounding areas were the focus for Operation Appalachian Action, primarily targeting methamphetamine sellers and users (Igo, 2020). Research Question 5 compared the average number of arrests in Wise County for the 3 months before the operation to the 3 months after the operation, through a paired *t*-test. The data did not show a statistically significant difference in the number of drug arrests pre-operation to post-operation in Wise County; therefore, the statistically significant displacement is not detected. Also compared in Research Question 5 was the impact of Operation Appalachian Action in the surrounding counties post-operation when compared to Wise County post-operation. Operation Appalachian Action did not have a statistically significant impact on the surrounding counties, indicating no statistically significant displacement is present.

Research Question 6

Has Operation Appalachian Action initiated statistically significant diffusion of benefits in the county in which the operation took place and surrounding counties?

Findings. Research Question 6 addressed diffusion of benefits when comparing Wise County and the surrounding areas pre-operation to post-Operation Appalachian Action; however, it was not statistically significant. ANOVA indicated that although Wise County, Russell County, and Scott County experienced a decrease in drug arrests pre-operation to post-operation, the change was not significant enough to indicate diffusion of benefits. The decrease is noted by the negative mean. Research Question 6 found there is no statistical significance in the number of arrests pre- to post-Operation Appalachian Action.

Theorical Implications

Environmental criminology uses data concerning offenders, victims, times, and places to study the behavior of a person when they interact with their environment (Brantingham &

Brantingham, 1991). This data can be utilized when targeting hotspot crime areas both in urban and rural areas. Major drug operations in rural areas can and should be considered hotspot policing (Ariel et al., 2016). Some of these hotspot policing efforts can be concentrated in small areas, while others may target neighborhoods or entire counties (Scott, 2018). Drug operations tend to have three elements: heightened police presence, increased severity of sanctions, and publicity. While the elements typically produce positive benefits, there are times when these three elements can work against one another. For example, police officers, post-operation, may depart the impacted area to transport and book offenders, thus leaving the targeted area with a reduced police presence and reducing the impact of diffusion of benefits post operation. Publicity about the drug operation can force offenders to avoid the area for a specific period or displace from their usual crime location, leading them to offend elsewhere (Scott, 2018).

Investing resources on hotspot policing to a specific location within the rural area may prevent immediate and future crime both in this area and the surrounding areas (Braga et al., 2012). Some researchers believe that the best way to maximize the impact of a drug operation, or hotspot policing, is to conduct the operation briefly while imposing the greatest amount of impact possible and to rotate among several hotspot locations with as much unpredictability as possible (Scott, 2018). Many critics of hotspot policing believe that targeted operations will end in displacement; however, as shown in all operations, no statistically significant displacement was found.

Weisburd and Braga (2006) suggested, through environmental theory within the study of criminology, that understanding the impact of where the crime took place is equally as valuable as understanding the crime itself. Three crime opportunity theories that can be applied in relation to each operation are rational choice, routine activity, and environmental criminology (Braga &

Clarke, 2014; Braga et al., 2019; Eck & Weisburd, 1995). L. Cohen and Felson (1979) explained how opportunities for crime are produced through routine activities. Cornish and Clarke (1987) found that offenders, through rational choice theory, will still make the choice to commit a crime even if the conditions are difficult or risky. Rational choice theory states that criminal behavior can be predictable (Clarke, 1980). However, Glaser (1977) argued that those who choose to participate in criminal activities will often make other choices when the threat of being arrested is higher than normal. If the offender's reason for choosing to commit a crime is unaffected by situational crime prevention methods such as a drug operation, it can be plausible to assume that being denied one opportunity, offenders will continue to search until another opportunity presents itself or will cease illegal activity until the offender believes it is safe resume criminal activity.

If any post-operation analysis trends toward diffusion of benefits, it would imply that offenders may have made a rational choice to cease criminal activity due to the increased police presence in the area, the severity of the punishments imposed after the operation, less offenders in the area due to incarceration, or the negative publicity for those who were arrested. While it is possible to have both displacement and diffusion present in the targeted area and the surrounding areas at the same time, the lack of displacement, diffusion, or both is not the measure of how successful the operation was. Any operation resulting in the incarceration of criminals, drugs being removed from the area, and all law enforcement and citizens remaining safe is a successful operation.

Hotspot policing, through rational choice, can reduce crime in two ways: by increasing certainty that offenders will get caught and by increasing the perception that an offender is more likely to be caught and punished (Scott, 2018). It can be argued that the crimes that occurred in

these operations are not random incidents but structured phenomena. L. Cohen and Felson

(1979) argued that crime needs three elements to occur: motivated offenders, suitable targets,

and the absence of those who can prevent crime. Concentrating drug operations in one county

can have a positive impact on the surrounding areas. Using this definition of crime, it can be

assumed that since the offenders did not know of the impending seizure,

there was a belief there was some protection from law enforcement action.

Given that each operation was conducted by law enforcement who were actively seeking

drug activity, the rational choice would be for drug traffickers, users, and distributors to cease,

reduce, or move drug activity during and for a few months following the operation. However, as

displayed in the results, arrests did occur after each operation both in the targeted county and the

surrounding areas; therefore, offenders did not always make a rational choice. Rational choice,

when combined with routine activity, provides a path for displacement or diffusion of benefits to

be present in both the county in which the operation took place and the surrounding areas.

Hotspot policing treats each location as the unit of analysis and therefore provides for the

study of the location of the crime rather than each offender. For the purposes of this study, the

county in which the drug operation took place is considered a hotspot policing location. Hotspot

studies suggest that most crime does not occur evenly but is concentrated in small areas (Pierce

et al., 1988; Sherman et al., 1989; Weisburd et al., 1992). Chainey et al. (2018), defines hotspot

analysis as the ability to predict where a crime may happen next. By studying major drug

operations in Southwest Virginia and the impact on the county in which the operation took place

along with the impact on surrounding counties, law enforcement may be able to predict the

county or area on which they may need to center their next operation. By quickly initiating this

policing effort, police are able to impose the greatest amount of impact on drug trafficking, sale, and distribution as possible (Scott, 2018).

Limitations

Several limitations to this study exist. First, the study was limited to Southwest Virginia. It did not account for any drug activity that came from other locations outside Southwest Virginia or crossed into Virginia from neighboring states. Southwest Virginia borders North Carolina, Tennessee, Kentucky, and West Virginia and contains a major drug corridor that runs from the west coast to the east coast. This study did not include any counties that are not considered Southwest Virginia even if they are geographically located in Virginia. Second, the study examined only three of multiple major drug operations that have been conducted in Southwest Virginia in the past 10 years. The drug operations included in this study were selected to cover as many Southwest Virginia counties as possible, rather than focusing on several operations that took place in the same area. Finally, this study only included the drug arrest statistics for the 3 months prior and 3 months following the drug operation. Excluding drug statistics outside the 3-month window allowed for only the immediate reaction to the drug operation to be examined. It did not examine any long-term effects the operation had on the area. It also did not examine pre-operation to post-operation drug arrest patterns over extended periods of time.

Recommendations for Future Research

Recommendations for future research include the extension of the pre-operation and post-operation time to at least 6 months or more. A second way to further this research is to focus on only one type of drug arrest such as only methamphetamine or fentanyl. Third, future research should be conducted to determine which counties are impacted the most after a drug operation.

Lastly, it is recommended that more research be conducted on hotspot policing, including the impact of major drug operations, on rural areas. There is a gap in the research for hotspot policing in rural areas including how displacement and diffusion of benefits impact these areas that are less populated and where police have greater patrol areas but significantly less resources.

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APPENDIX: IRB Approval Letter

From: irb@liberty.edu <irb@liberty.edu>
Sent: Tuesday, February 16, 2021 8:26:53 AM
To: Perry, Jared (Helms School of Government) <jperry32@liberty.edu>; Minton, Melissa Courtney <mhillis3@liberty.edu>
Subject: IRB-FY20-21-562 - Initial: Initial - Exempt

February 16, 2021

Melissa Minton
Jared Perry

Re: IRB Exemption - IRB-FY20-21-562 Displacement and Diffusion: Drug arrests in Southwest Virginia

Dear Melissa Minton, Jared Perry:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:
    (i) The identifiable private information or identifiable biospecimens are publicly available;
    (ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;
    (iii) The research involves only information collection and analysis involving the investigator's use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of "health care operations" or "research" as those terms are defined at 45 CFR 164.501 or for "public health activities and purposes" as described under 45 CFR 164.512(b); or
    (iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information

collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office