LEGALIZATION OF MARIJUANA: THE IMPACTS ON UNIFORM CRIME REPORTING PART I AND PART II VIOLENT CRIME RATES

by

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ABSTRACT

KIARA SAVANNA BRUINSMA. Legalization Of Marijuana: Impacts of UCR Index Crime Rates. (Under the direction of DR. M. LYN EXUM)

The legalization of marijuana has gained various conclusions on its impact on Uniform Crime Reporting data, including Part I and Part II violent crime rates. The primary argument made for marijuana legalization is that it will reduce violent crime rates, in turn benefiting communities. Previous research has primarily focused on the comparison of crime trends between two states which does not provide a well-rounded conclusion for the United States as a whole. This study will include 20 US states including a treatment group and matched comparison group. This study will also use a paired samples t-test to account for mean crime rates across pretest and posttest periods, an independent samples t-test to determine the average change in mean crime rates among legalized states and if it differs from that of comparison states, as well as an OLS regression for the average annual percent change in crime rates controlling for past crime trends. Upon completion of the study, it will be shown that legalized states do not see a significant change in their mean crime rates across the pretest and posttest periods, the average change in mean crime rates among legalized states do not differ from that of comparison states for Part I crimes, and the legalization does not predict future crime trends (average annual percent change in crime rates), controlling for past crime trends.

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DEDICATION

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CHAPTER 1: INTRODUCTION

A hallmark of American society is the continual shift in cultural norms/perspectives. For example, in just the past 75 years, America has undergone such cultural changes as the civil rights movement, the hippie movement, and the MAGA (Make America Great Again) movement, to name a few. The civil rights movement was a socio-political shift in America's views about the basic rights of people of color, and initially began in the late 1940s with the termination of segregation in the Armed Services (Zapata et al., 2024). The movement grew as a result of (and in response to) such events as the Brown v. Board of Education Supreme Court case, the Emmett Till murder and assassinations of Malcom X and Martin Luther King, Jr., the Montgomery bus boycott with Rosa Parks, the Civil Rights Act of 1957 that protected voter rights, the 1963 March on Washington, the Civil Rights act of 1964 against employment discrimination, the Selma to Montgomery March, the Voting Rights Act of 1965 against literacy tests, as well as the Civil Rights Act of 1968 in reference to providing equal housing opportunities to all (Zapata et al., 2024). The end result of the movement was greater legal protection of civil rights for people of color, and their greater inclusion/acceptance in mainstream roles and responsibilities.

The hippie movement began in the 1960s and was characterized by a belief system in which the traditional American value of economic individualism was viewed as dehumanizing and alienating (Levin & Spates, 1970). In response, the movement emphasized non-materialism, spiritual connections, love of humankind, and freedom of expression. Members of the hippie movement adopted new hairstyles (long hair for both men and women), wore bright, colorful clothing, and often engaged in the use of

psychedelic drugs (Pruitt, 2023). While there are still a few instances where hippie movement acts remain today, the movement largely came to an end in the late 1960s (Pruitt, 2023), as Americans focus on materialism and more conservative political beliefs resurged in the 1970s and 1980s (Easterlin & Crimmins, 1991).

The MAGA movement is a recent political slogan that was mainly broadcasted by Donald Trump during his 2016, 2020, and 2024 presidential campaigns. The inspiration for the slogan came from Ronald Reagan's 1980 presidential campaign, which adopted the mantra "Let's Make America Great Again" (#MOVEME, n.d.). The main value of the MAGA movement is a focus on reducing inflation, lowering unemployment, nationalism, strengthening immigration control/border security, and law-and-order politics more broadly (Gardner, 2021; Harte et al., 2018; Schertzer & Woods, 2020). The lasting impact of the MAGA movement on American culture has yet to be determined. However, it is undeniable that American society will continue to shift alongside the new norms that individuals have formed through a variety of relationships and cultural ideals.

America's normative values about drugs—and in particular, marijuana—is yet another socio-political domain that has evolved over time, and whose long-term impacts are not fully known. During the Great Depression of the 1920s/1930s (and shortly after the Mexican Revolution), contingencies of Mexican immigrants began making their way to the United States. As they entered the country, they brought with them their recreational use of marijuana (Musto, 1991), which solidified in the mind of the American public the association between Mexican immigration and the prevalence of marijuana (Edsitement, 2012; Frontline, n.d.; Musto, 1991). Due to this, many in the US were not fond of the use of marijuana, or marijuana in general. Over time, public

opposition to marijuana weakened, so much so that movements to legalize (or, at least, decriminalize) its use became more popular. In 2012, Colorado and Washington state became the first US states to legalize marijuana, with several others soon following in their wake. While many individuals today understand and accept the fact that laws and regulations concerning marijuana will continue to become more relaxed, there are still many other individuals who continue to frown upon its use and will continue to do so, regardless of its legalization or decriminalization. As of 2024, marijuana is still illegal under the federal law, regardless of states' movements to legalize the drug.

According to the Pew Research Center, roughly 32% of individuals believe marijuana should be legal for medical use only, while roughly 57% believe it should be legal for both medical and recreational use. The remaining 11% believe that it should not be legalized at all (Schaeffer, 2024). That same study found that 52% of individuals believe marijuana legalization is good for local economies, 42% of individuals believe it will make the criminal justice system in the United States more fair, 42% of individuals believe that marijuana legalization will have no impact on the use of other drugs such as heroin, fentanyl, and cocaine, and—most importantly for the current study—roughly 44% of individuals believes that there will be *no impact* on making communities less or more safe (Schaeffer, 2024). The public's beliefs notwithstanding, empirical research is needed to best examine the criminogenic effects of legalized marijuana, regardless of whether it is for medicinal or recreational purposes.

The scant research to date suggests that violent crime rates in multiple states have decreased after the legalization of medical and recreational marijuana (Summers, 2023; Trumble, 2017). However, as the number of states that have legalized marijuana have increased, additional opportunities to explore its potential relationship to violent crime in

more detail have emerged. The current study seeks to address this gap by exploring the impact of legalized marijuana on Part I and Part II violent offenses.

Chapter 2 will discuss the multiple jurisdictions within the United States that have legalized or decriminalized marijuana. In addition, the literature review will discuss marijuana usage and the impacts of legalizing marijuana—including the ethical considerations, the influence of public safety and concerns, and the consideration of criminological theory related to the outcome of marijuana usage. Chapter 3 will then outline a plan for examining the sample, measures, analytic approach, as well as the process of creating the legal versus comparison state groups. The results of the study will be discussed in Chapter 4 along with the analysis of the primary hypothesis that legalization of marijuana will be associated with a decrease in alcohol consumption rates as well as violent crimes. Chapter 4 will include the results of the group equivalence across legalized and comparison states, and how crime rates were affected in states that legalized marijuana versus non-legalized. Chapter 4 will also provide a visual analysis of the results produced during the study using a series of graphical and t-test analyses. Chapter 5 will include the final discussion of the study while discussing further policy implications, the limitations of the study, as well as suggested future directions. In a socio-political climate where views of marijuana are ever evolving, the goal of the proposed study is to provide empirical evidence on the potential criminogenic effects of legalizing/decriminalizing marijuana.

CHAPTER 2: LITERATURE REVIEW

The Origin, Pharmacology, and Illegalization of Marijuana

In order to fully understand the potential impacts of the legalization of marijuana, it is important to understand its origin, pharmacological nature, and history of illegalization. The cannabis plant has been around for more than ten thousand years, and palaeobotanical research has found evidence of its use for medical purposes (Crocq, 2020). However, the Drug Enforcement Administration Museum (DEA Museum, 2021) states that a Chinese Emperor, Shen Nung, was the oldest recorded known user of cannabis in 2727 B.C., but does not establish how it was used or ingested. The statement made by the DEA Museum has the potential to argue that the origin of marijuana is in China or in surrounding countries within Asia.

The National Institute on Drug Abuse (NIDA, 2024, paragraph 1) states that marijuana is "dried leaves, flowers, stems, and seeds from the *Cannabis sativa* or *Cannabis indica* plant." There is a difference between the kinds of strain types and many forms of cannabis. In essence, strains of cannabis are based on what part of the plant they are coming from and the amount of THC it holds, whereas the different forms of cannabis pertain to how the plant can be consumed. For cannabis, the various kinds of strains are developed in order to provide different effects which includes various cannabinoid and terpene combinations (Kashouty, n.d). The different types of cannabis strains include sativa, hybrid, indica, and ruderalis (Kashouty, n.d). There is a significant difference between the sativa and indica cannabis strains. Generally, it is understood that the sativa cannabis strain is primarily used for its hash production for the use of cloths in European

countries (Clarke and Merlin, 2016). However, the sativa cannabis strain does not have the same production of TCH like the indica strains does. Clarke and Merlin (2016) state that the indica cannabis strain is commonly used in regard to its "psychoactive effects" which is produced by the large amount of THC the strain holds. The hybrid strain of cannabis is composed of a combination of both the indica strain and sativa strain (CANABO, n.d.). The strain of hybrid cannabis is a difficult product to measure due to the fact that both the indica and sativa strains have the capabilities to either produce less or more THC, as stated by the Canabo Medical Clinic (CANABO, n.d.). The main difference between the ruderalis strain of cannabis and the sativa and indica strains is that the ruderalis strain produces less seed, which in turn also means it produces less cannabinoid, or THC (Beutler & Marderosian, 1978).

The different forms of cannabis include herbal, hash, and hash oil (IPRC, n.d.; DEA Museum, 2021). The United Nations Office on Drugs and Crime states that herbal cannabis is "harvested and dried female flowering tops, which contain the highest concentrations of cannabinoids, THC, CBD, CBG (cannabigerol), etc" (UNODC, 2023, p. 41). The Government of the Netherlands (2024) states that hash, which is also known as hashish, is made by using the buds from cannabis which is then turned into a resin-like substance. Furthermore, hash oil is taken from the oils that the cannabis plant produces (DEA Museum, 2021; IPRC, n.d.). Depending on the strain used for marijuana consumption, the effects vary depending on the amount of THC it contains, as well as the quantity of consumption (Beutler & Marderosian, 1978; Clarke & Merlin, 2016; UNODC, 2023; Kashouty, n.d.).

Pharmacologically, cannabis impacts various bodily functions (Nagarkatti & Nagarkatti, 2023; Bridgeman & Abazia, 2017). That is, when the THC from cannabis is

taken by an individual, it will trigger a response from what is called the endocannabinoid (eCB) and cannabinoid receptor 1 (CB1). The eCB is what controls an individual's bodily functions such as "sleep, mood, appetite, learning, memory, body temperature, pain, immune functions, and fertility" (Nagarkatti & Nagarkatti, 2023, paragraph 16), as well as the slow/quick response of nerves sending signals to one's brain (Bridgeman & Abazia, 2017). Human bodies also contain a receptor called cannabinoid receptor type 1 (CB1). The CB1 receptor, in essence, causes an individual to feel the "high" sensation caused from the trigger of using THC that is in cannabis (Nagarkatti & Nagarkatti, 2023; Bridgeman & Abazia, 2017).

Generally, THC can affect the hippocampus (which is responsible for an individual's memory and learning), prefrontal cortex (which is responsible high-order thoughts and decision making), and amygdala (which is responsible for the emotions an individual may feel such as anxiety and fear) (Brumback et al., 2016; Stringer, 2023; Yavas et al., 2019). Due to all of the functions that the CB1 receptor and eCB work along with, the "potential effects of THC on brain function are equally broad" (Brumback et al., 2016, paragraph 3). Fundamentally, tetrahydrocannabinol (THC) is produced by the cannabis plant and is a psychoactive compound that causes the "high" sensation an individual may feel; however, this "high" sensation is primarily caused from the trigger of the CB1 receptors from the eCB's (Bridgeman & Abazia, 2017; Holland, 2024; Nagarkatti & Nagarkatti, 2023; Ng & Keshock, 2023). In contrast, CBD, also known as cannabidiol, is also produced by the cannabis plant but does not produce the psychological "high" sensation (Grinspoon, 2024; Holland, 2024; National Cancer Institute, n.d.).

There are various effects of marijuana to the body, and it is dependent on not only the individual and their own response, but as well as how much THC is being used (Geoffrion, 2024). Many individuals who use marijuana use it for the "relaxation and euphoric" feelings (Geoffrion, 2024, paragraph 7). However, other short-term effects of marijuana may include, but are not limited to: "altered sensory perception, changes in the perception of time, mood changes, impaired body movement, impaired cognition and memory, increased heart rate, bloodshot eyes, hallucinations, and delusions" (Geoffrion, 2024, paragraph 8, 9). In addition to these short-term effects, the long-term effects of marijuana use include, but are not limited to: "respiratory difficulties, pregnancy-related risks, an increased risk in testicular cancer, severe cyclic nausea and vomiting, adolescent brain development issues, psychiatric disorder, addiction, increased risk of other substance use disorder, and unknown consequences of high potency use" (Geoffrion, 2024, paragraph 11).

The main difference between the way that marijuana causes an effect on individuals is either by inhaling or ingesting (CCSA, 2019). If an individual is inhaling marijuana, by either smoking or vaping, it is estimated that they feel effects within the first initial minutes, have a peak within thirty minutes, and their effects may continue anywhere between six to twenty-four hours. By ingesting marijuana through eating or drinking, an individual is estimated to sense effects within thirty minutes to two hours, have a peak within four hours, and their effects may continue anywhere between twelve to twenty-four hours (CCSA, 2019).

For 52 years, the United States has been fighting the "War on Drugs" (Britannica,

2024). However, despite President Richard Nixon's proclamation of the War on Drugs, there has been a shift in what the primary goal was for the war, which was to eliminate drug trafficking (Cooper, 2015; Diaz Pascual, 2021). However, in response to how law enforcement would act against the illegal trade of drugs, many of the individuals who are impoverished, unemployed, minority, or all three, are being targeted (Cooper, 2015). The main notion of the "War on Drugs" was to stop the abuse of drugs, including marijuana. Undoubtedly, the proclamation was biased towards individuals who came from diverse ethnic and racial backgrounds (Britannica, 2024; Comment, 2018; Cooper, 2015). The "War on Drugs" did not have the outcome that President Richard Nixon expected. More specifically, the proclamation caused an increase in the bias and racially prejudiced stance towards individuals who were profiled based on their skin color, the way that they looked, and the areas that they came from.

Anti-legalization Arguments

The primary argument for opposing the legalization of marijuana is that doing so would produce conflicts with federal law makers and fail to eliminate the black-market sale of drugs (McGinty et al., 2017). The conflict with federal law makers stems from the fact that marijuana is illegal at the federal level, yet many states are continuing to legalize its use (Kellogg et al., 2022; McGinty et al., 2017). Thus, marijuana use, and production may be legal at the state level, but an individual is still able to be prosecuted under the federal law for possession, trade, or manufacture (Kellogg et al., 2022). It may be argued that without direct control of marijuana distribution, there is not a specific way to keep track of the alterations of the drug, especially on the black market. It also becomes

problematic when states are beginning to legalize marijuana and apply high taxes on the substance. Due to this, there are individuals who are unable to afford it who would then feel the need to turn to the black market to obtain the drug (Meadows, 2019). In essence, when there is a high taxation on the cannabis product and individuals are turning to the black market in order to obtain the drug, there is the possibility that crime can increase (Meadows, 2019).

Following the decriminalization of marijuana in Oregon in 1973, Alaska became the second state to decriminalize marijuana in 1975 (Moritz College of Law, 2024). Alaska decriminalized marijuana after the Supreme Court Case of Ravin v. State, which decided that marijuana use within one's residence was then protected under the constitutional right to privacy (Alaska Cannabis Information, n.d.). However, the decriminalization of marijuana in Alaska did not last long before it was then recriminalized in 1990. The re-criminalization of marijuana began taking effect when the drug became problematic. Marijuana became problematic in terms of it being excessively produced by private residences, as well as it being consumed by underaged individuals (Edge & Andrews, 2016). Due to this, the Measure 2 ballot of 1990 in Alaska recriminalized marijuana to be a misdemeanor punishable to 90 days in jail or a fine of $1,000 (Alaska Cannabis Information, n.d.; Edge & Andrews, 2016; Moritz College of Law, 2024).

As of 2024, the state of Alaska has fully legalized marijuana for both recreational and medicinal purposes (Alaska Department of Health, 2024). Furthermore, many contend that the legalization of marijuana will lead to a greater use by those under the “legal age” of 21, and as a result, promote neurological issues that will have long-term repercussions (CDC, 2024a). Lee et al. (2022) provided an insight on the two

noncontiguous states, Alaska and Hawaii, which included adolescents' use of recreational marijuana. Lee et al. (2021) concluded that the "reported findings on the effects of [recreational marijuana laws] among adolescents are emerging, and very little is known about the effect of [recreational marijuana laws]on adolescent [marijuana use]" (p. 66). The authors also discuss how current, and lifetime marijuana use among adolescents is contributed to different ethnic backgrounds, as well as different socio/cultural backgrounds.

However, it should still be understood that marijuana can affect brain development if used during adolescent years (NIAAA, 2024; NIDA, 2024). More specifically, underage marijuana use may affect neurological functions such as thinking, memory, and learning capabilities. As discussed by NIDA (2024) physical and mental health effects of marijuana use may include breathing problems, increased heart rate, problems with child development during and after pregnancy, intense nausea and vomiting, temporary hallucinations, temporary paranoia, anxiety, depression, and worsening of symptoms such as schizophrenia. Another main concern with the legalization of marijuana is that it can be altered and laced with lead, glass, fungus and bacteria, heroin, embalming fluid, cocaine, laundry detergent, methamphetamine, and ketamine, which can cause negative effects that can severely harm or cause death to an individual (Watkins, 2023). The legalization of marijuana has the potential to lead to the exposure of impurities that have been altered to the drug, worsening the health of individuals. Nonetheless, one could argue that despite the legality of alcohol and nicotine products, people who do not want them around are still exposed to their impurities (Dryburgh et al., 2018; NIDA, 2024; Wang et al., 2024).

When marijuana becomes legalized, whether for recreational or medicinal purposes, it is undeniable that the use of the drug will increase. Marijuana use will increase amongst individuals who are of the legal age of consumption, and unfortunately as well as adolescents. With the greater use of marijuana, there also comes the greater possibility and inevitable consequences associated with its use. Fischer et al. (2021) discuss the effects of marijuana both prior to and following legalization in Canada with comparisons to the United States. Throughout the analysis, Fischer et al. (2021) concluded that after the recreational legalization of marijuana in Canada, individuals who range from middle to older ages increasingly use the drug by 14.9%. Nonetheless, Fischer et al. (2021) also point out that with the increased use of the drug for individuals middle to older ages, there is also a higher probability of adolescent use. Canada's experiment with the legalization of marijuana revolves around the main concern of public safety and health concerns, as with every country and state. However, Fischer et al. (2021) also provide insight on the fact that daily/near daily cannabis use remained steady between 5.9% and 7.9%, the most commonly used form of marijuana consumption was smoking remained unchanged, operating a vehicle within two hours of consuming marijuana remained unchanged at 14.2%, and obtaining the drug through illegal methods decreased over time by 51.3%. In regard to the method of consumption of marijuana, vaping, and eating or drinking had an overall increase. More specifically, the consumption of marijuana through vaping and eating or drinking, was most prevalent amongst adolescents.

Pro-legalization Arguments

As previously discussed, even though there are negative views on marijuana being legalized for recreational purposes, approximately 32% of individuals believe that marijuana should be legalized for medical purposes only (Pew Research Center, 2024). There are vast arguments for why marijuana should be legalized throughout the United States. A study conducted by McGinty et al. (2017) provided information from individuals who believe marijuana legalization will increase tax revenue, reduce prison overcrowding, reduce crime, and lower law enforcement costs. The positive views on marijuana legalization stem from the fact that it can decrease the chances of individuals relying on more harmful substances such as alcohol, opioids, and cocaine.

There are various potential health benefits of marijuana. For example, Dills et al. (2021) discuss the potential for medical marijuana to decrease the number of suicides among individuals who suffer from bipolar disorder and depression. Additionally, it can potentially help mitigate symptoms due to epilepsy, sclerosis, Parkinson's disease, migraines, and human immunodeficiency virus (HIV), without risking the cause of opiate abuse (Furler et al., 2004; Szaflarski & Sirven, 2017). Individuals who suffer from chronic pain tend to resort to the use of marijuana because of the therapeutic effects it provides (Webb & Webb, 2014). Furthermore, according to the Institute of Medicine, "In 2010 prescription opioid overdoses were responsible for well over 16,000 deaths" (Webb & Webb, 2014, p. 110), suggesting that the legalization of marijuana can help to combat the opioid overdose crisis because it is less likely to cause fatality.

In order to fully understand the difference between Schedule I and Schedule II substances it should be noted that Schedule I substances are the "highest potential for use

disorder and misuse. They have no medical use and are illicit or "street" drugs" (Preuss et al., 2023, paragraph 19). Whereas Schedule II substances are "high risk for both physical and psychological dependence. They have a high capacity for both use disorder and misuse" (Preuss et al., 2023, paragraph 20).

States that have medically legalized the use of marijuana have been predominantly using it for patients who are diagnosed with cancer. With marijuana still being classified as a Schedule I substance under the federal law, it remains difficult for cancer patients to receive marijuana prescriptions (Birdsall et al., 2016). During different treatment phases for individuals who are diagnosed with cancer, it is considered highly possible they will begin to lose their appetite (American Cancer Society, 2022; Birdsall et al., 2016). However, cancer patients who have used marijuana during their treatments have more of an appetite. Loss of appetite in cancer patients is caused by a variety of different factors including what sort of cancer they are diagnosed with, and where the cancer is located in their body. Moreover, cancer patients who have used marijuana for medical purposes have also discussed how it has alleviated their nausea, sleep, and anxiety (Birdsall et al., 2016). During cancer treatments, there are instances in which other legalized medication is not alleviating the nausea, sleep, anxiety or appetite that these individuals are enduring (Birdsall et al., 2016; Hill, 2020). If other medications being used are not reducing the symptoms during treatments, many individuals turn towards the use of marijuana for the beneficial effects (Hill, 2020; Webb & Webb, 2014).

The Rise of Public Support for Legalization

The public support of legalizing marijuana has shown growth throughout the years. It can and may be argued that many individuals, regardless of political views, have

changed their mindset about the legalization of marijuana (either for medical or recreational purposes) due to the fact that they are now able to see the cost and benefits of it. Subbaraman and Kerr (2017) discuss the rise for public support of marijuana legalization in the state of Washington. The authors conducted a study which determined the rise or decline of support for marijuana legalization. The main conclusion of the study was that the potential advantages of legalizing marijuana include various economic benefits. Generally speaking, individuals who believe and are supportive of the legalization or decriminalization of marijuana are counting on the economic benefits that it brings to society, including state revenue, employment opportunities, as well as a potential *decrease* in crimes (Subbaraman and Kerr, 2017).

Senator Cory Booker of New Jersey is an advocate for the legalization of marijuana, arguing that it would alleviate "economic inequality at both the individual and communal level" (Comment, 2018). He outlines a plan in which to bring about legalized marijuana. First, he advocates for the elimination of marijuana as a Schedule I substance. By doing so, it would result in an increase in business operations through the sale of marijuana, which will expand on employment opportunities. Senator Booker then claims that the legalization of marijuana will result in a decrease in the need to build additional correctional facilities, which will slow down the excessive number of people of color incarcerated and lessen racial inequality. With the release of individuals incarcerated for marijuana offenses, it is then proposed that there should be a program that will aid with job training and health education programs. Ultimately, Senator Booker proposes that individuals who are serving time for marijuana offenses should have their sentences reevaluated/reduced, and individuals who are released from prison should receive a form of relief payment. With the proposed legislation, Senator Booker attempts to repair the

unjust incarcerations that many minority and impoverished individuals faced, primarily due to the war on drugs (Comment, 2018).

Legalization/Decriminalization Trends in the US

It should be noted that there is a difference between the *legalization of marijuana* and the *decriminalization of marijuana*. As defined by the Legal Information Institute at Cornell Law School (2022a), decriminalization is where there are prohibitions against an act, but no criminal sanctions are applied to the offending individual. In this case, the decriminalization of marijuana means that individuals who possess marijuana up to a certain amount are not going to be charged for the offense, but rather they may receive a civil fine. In contrast, legalization means to allow something by law and to not have any legal prohibitions against the behavior (Cornell Law School 2022b). This means that individuals may possess and use marijuana up to a specific amount without any legal or civil repercussions. It should also be noted that there are some states that have allowed medicalization, but not full legalization. As of 2024, these states include Alabama, Arkansas, Hawaii, Louisiana, Mississippi, New Hampshire, North Dakota, Oklahoma, Pennsylvania, South Dakota, Utah, and West Virginia.

Society has advanced from marijuana being entirely illegal to having 24 states, as well as the District of Columbia, legalizing both recreational and medical marijuana use (Chapekis & Shah, 2024). There has been an increase to 27 states that have decriminalized marijuana either entirely or to a limited extent (NORML, 2023a). North Carolina is one of three states that has decriminalized marijuana along with North Dakota and Louisiana. North Carolina's decriminalization of marijuana is, to a limited extent,

still considered a criminal offense (NORML, 2023a, 2023b). For North Carolina, the fine and jail time is dependent on the amount of marijuana in an individual's possession, the specific kind of marijuana (such as hash), if there is the intent to distribute, and if the individual possessing the drug is under the legal age of 21. As of April 2, 2024, there are four remaining states in the United States that marijuana is fully illegal and is not decriminalized (NORML, 2023a). These four states include South Carolina, Kansas, Wyoming, and Idaho. There are currently 38 states that have legalized marijuana for medical justifications (American Nonsmokers' Rights Foundation, 2024; NCSL, 2023). Although, it should be understood and acknowledged that even if a specific state or jurisdiction has decriminalized marijuana, it does not mean it is fully legal. The table below summarizes the legalization, as well as decriminalization, status of marijuana in each state.

STATE	LEGALIZED RECREATIONAL	LEGALIZED MEDICINAL ONLY	DECRIMINALIZED	FULLY ILLEGAL
ALABAMA		✓		
ALASKA	✓	✓	✓	
ARIZONA	✓	✓	✓	
ARKANSAS		✓		
CALIFORNIA	✓		✓	
COLORADO	✓	✓	✓	
CONNECTICUT	✓	✓	✓	
DELAWARE	✓	✓	✓	
DISTRICT OF COLUMBIA	✓	✓	✓	
FLORIDA		✓		
GEORGIA		CBD OIL ONLY		
HAWAII		✓	✓	
IDAHO				✓
ILLINOIS	✓	✓	✓	
INDIANA		CBD OIL ONLY		
IOWA		CBD OIL ONLY		
KANSAS				✓
KENTUCKY		CBD OIL ONLY		
LOUISIANA		✓	✓	
MAINE	✓	✓	✓	

STATE	LEGALIZED RECREATIONAL	LEGALIZED MEDICINAL ONLY	DECRIMINALIZED	FULLY ILLEGAL
MARYLAND	✓	✓	✓	
MASSACHUSETTS	✓	✓	✓	
MICHIGAN	✓	✓	✓	
MINNESOTA	✓	✓	✓	
MISSISSIPPI		✓	✓	
MISSOURI	✓	✓	✓	
MONTANA	✓	✓	✓	
NEBRASKA			✓	✓
NEVADA	✓	✓	✓	
NEW HAMPSHIRE		✓	✓	
NEW JERSEY	✓	✓	✓	
NEW MEXICO	✓	✓	✓	
NEW YORK	✓	✓	✓	
NORTH CAROLINA			✓	✓
NORTH DAKOTA		✓	✓	
OHIO	✓	✓	✓	
OKLAHOMA		✓		
OREGON	✓	✓	✓	
PENNSYLVANIA		✓		
RHODE ISLAND	✓	✓	✓	

STATE	LEGALIZED RECREATIONAL	LEGALIZED MEDICINAL ONLY	DECRIMINALIZED	FULLY ILLEGAL
SOUTH CAROLINA				✓
SOUTH DAKOTA		✓		
TENNESSEE		CBD OIL ONLY		
TEXAS		CBD OIL ONLY		
UTAH		✓		
VERMONT	✓	✓	✓	
VIRGINIA	✓	✓	✓	
WASHINGTON	✓	✓	✓	
WEST VIRGINIA		✓		
WISCONSIN		CBD OIL ONLY		
WYOMING				✓

Figure 1: Legalization and Decriminalization of Marijuana

Data regarding the legalization of marijuana for states was provided by DISA Global Solutions (2024).

Public Safety, Concerns and Policies

Marijuana legalization has been a controversial topic, especially within the sector of politics. This data has slightly changed from 2022 where there was 58% of individuals stating that marijuana should be legalized, 30% solely for medical purposes, and approximately 10% completely illegal (Van Green, 2022).

In 2019, the Federal Bureau of Investigation reported arrests for drug abuse violations. There was a total of 2.9 percent distribution in the United States for marijuana arrests due to sale or manufacturing (FBI, n.d.). The highest arrest for drug abuse violations of sale and manufacturing was other dangerous non-narcotic drugs having a 0.2 difference from heroin or cocaine and their derivatives of a 4.2 percent distribution. There was a total of 32.1 percent distribution in the United States for marijuana possession, which was the highest out of four other drugs. In 2019, there were roughly

73,210 individuals who were sentenced to federal prison for drug related crimes (Stillkind, 2023). That same year, there were roughly 171,300 individuals who were sentenced to state prison for drug related crimes.

Crime rates, including both property and violent crimes, will never vanish, regardless of any law enforcement practice or advanced laws. However, legalization will reduce drug-related crimes and has the potential to reduce other crimes as well—especially marijuana use-related crimes. This is due simply to the fact that if marijuana is legalized, there is in essence, no law prohibiting the use for it to be considered a crime. For example, between the years of 2015 and 2019, there was a 51.6 percent decrease of marijuana trafficking offenders (United States Sentencing Commission, 2020). Similarly, there were 17,963 homicides in 1987 with 4.9% of them being drug related. However, in 2007 (at which time 12 states had legalized marijuana for medicinal purposes) there were 14,831 homicides with 3.9% of them being drug related (Bureau of Justice Statistics, 2021; MJBiz Daily, 2023). It is important to note that the Uniform Crime Reporting Program of the Federal Bureau of Investigation considers drug trafficking and manufacturing as drug related during reported homicides (Bureau of Justice Statistics, 2021). It may be concluded that after the legalization of marijuana, whether for recreational or medicinal purposes, many crimes that are associated with the trafficking, or manufacturing, of the drug will begin to decrease (Bureau of Justice Statistics, 2021; MJBiz Daily, 2023; United States Sentencing Commission, 2020). However, Wu et al. (2020) counter the notion that marijuana legalization will decrease crime rates, especially states that have legalized recreational marijuana. Wu et al. (2020) primarily focused on the state of Oregon with a control group of 19 non-legalized states. Following their study, Wu et al. (2020) concluded that there was an increase in property crimes by 365.4 cases

per 100,000 population in comparison to the states that had not legalized marijuana. In regard to other crimes, burglary rates increase by 103.6 cases, 56.2 cases for motor vehicle thefts, 49.4 for violent crime cases, 39.4 for aggravated assault cases, and 205.3 cases for larceny. Following the evidence presented, Wu et al. (2020) concludes that crime generally increases in response to the legalization of recreational marijuana. As a whole, it can be established that even though marijuana legalization may decrease some forms of crime, it may cause an increase in other forms of crime such as burglary and motor vehicle thefts.

Public safety is a main concern throughout the nation. Yet, many public safety and policy implications potentially do more harm than good. For example, it may be argued that the war on drugs has caused more harm than good. Marijuana can be a difficult concept to measure due to all of the impacts that legalization may have, such as its impact on crime rates; however, there seems to be a neutral stance on the potential hazardous impact that it has. Farrelly et al. (2023) discusses that even though marijuana legalization comes with its limitations, like many other laws, there is no direct evidence that proves marijuana legalization is a hazardous impact to the country.

Testing for driving under the influence of alcohol is much easier than being able to conduct a field sobriety test for marijuana (NCSL, 2024; Turnbull & Hodge, 2017). Grabenauer (2020) conducted a study that evaluated the THC (tetrahydrocannabinol) dosages ingested or inhaled by participants. During the study, for both inhalation and ingestion of THC, participants had negative effects of cognitive and psychomotor reactions, yet it did not affect their capabilities to engage in a field sobriety test. It was overall determined that field sobriety tests used to determine alcohol impairment are not efficient for determining marijuana impairment. This may cause a concern for public

safety due to the fact that individuals may feel that they are capable of operating a motor vehicle, yet they should not be. Post legalization, this concern has the potential and probability to raise the rates of driving under the influence due to the consumption of marijuana.

Driving under the influence of marijuana has had mixed and inconclusive results which makes it difficult to determine what harmful effects it may have on driving safety (Turnbull & Hodge, 2017). There are states that have introduced a measure, like blood alcohol content levels, to determine if an individual is capable of operating a motor vehicle. As of 2024, there are five states that have introduced "*per se blood cannabis content* (BCC)" laws—Illinois, Montana, Nevada, Ohio, and Washington—that range from two to five nanograms per milliliter of blood (NCSL, 2024). Similar to the legal limit of blood alcohol content, the range of BCC levels is what has been established in order to determine an individual's impairment if they reached or over the state's BCC legal limit. However, the fact that there are instances where individuals use marijuana in extreme amounts and continue to operate a motor vehicle causes an issue with public safety and not following the notion of societal standards.

Alcohol is a legal substance, yet there are many underage individuals who consume it. There is the argument and potentiality that alcohol use is more dangerous in various aspects for youth than marijuana consumption. Individuals are likely to use marijuana rather than other more harmful substances, even without legalization. With legalization of marijuana for medical purposes, it has continued to be an increased option for individuals who do not respond to other medications (Hill, 2020). With this outlook, marijuana legalization could perhaps cause a decline in the number of opioid addictions, overdoses and deaths, and prescriptions.

Theoretical Foundation

Routine Activity Theory (RAT) was introduced in 1979 by Lawrence E. Cohen and Marcus Felson (Miró, 2014). Since its introduction, Cohen and Felson's theory has remained the center of the idea of the theory of victimization. There are three elements that are said to be needed for a criminal act to happen: a motivated offender, a suitable target, and a lack of a capable guardian (Miró, 2014). As its name suggests, a motivated offender is an individual who is willing to, as well as wanting to, commit a criminal act. A suitable target may be understood as any individual(s), or property, that can be easily identified as threatened or vulnerable (Miró, 2014; Kitteringham & Fennelly, 2020; Simply Psychology, 2024). A lack of a capable guardian may be understood as there not being anyone around to stop, or confront, the criminal act, such as a law enforcement official. Furthermore, Cohen and Felson (1979) do not clearly distinguish between what 'motivates' an offender, which leaves the unanswered question of "why is crime committed."

RAT argues that as a society's routine activities change, then crime rates will change alongside it. For example, during the pandemic of the coronavirus (COVID-19) there was a mandate for individuals to remain in their homes in order to reduce the risk of spreading and attracting the disease. During this time, many individuals continued their schooling and work from home. When the restriction to remain home was lifted, many individuals still continued to work from home as well as finish their schoolwork. Continuing work and school activities from one's home was an enormous shift for many which also in turn affected community members' routine activities. During the pandemic, the number of crime rates for property crimes, drug offenses, serious assault, robbery, and

larceny decreased as individuals spent more time in their homes, away from their routine activities (Lopez & Rosenfeld, 2021).

Cohen and Felson (1979) discuss the social change of routine activities amongst individuals between 1960 and 1970 and its crime rates. Cohen and Felson (1979) specifically state that the "dramatic increase in the reported crime rates in the U.S. since 1960 is linked to changes in routine activity structure of American society and to a corresponding increase in target suitability and decrease in guardian presence" (p. 598). During this time period, many women were beginning to enter the education system as well as the workforce. With that, living conditions may have improved during this decade, however, crime rates began to increase. This is due to the fact that more individuals, specifically women, were beginning to leave their homes more often. With women entering the workforce, families were now receiving a double income which allowed them to "invest in durable goods" (p. 599), which were often more expensive. Cohen and Felson (1979) conclude that due to these changes, the likelihood that a motivated offender would come into contact with suitable targets absent of any capable guardians increases.

The legalization of marijuana is a shift in American culture, which is continuously evolving. Due to this continuous shift, routine activities by individuals are fluctuating constantly. This will then impact the convergence of a motivated offender in addition to the varied suitable targets where there is an absence of a capable guardian. With this, legalization may increase guardianship, may decrease the convergence of offenders and targets/ victims, and may reduce the number of motivated offenders, specifically violent offenders.

The primary idea behind the proposition that legalization can increase guardianship is that when marijuana is legalized, law enforcement personnel are able to shift their attention to addressing, as well as solving, other crimes. The argument here is that if police are not needing to monitor/ control marijuana offenses, then they will evidently have more time to focus on other issues in the communities they serve. According to RAT, this increase in police resources, also known as an increase in capable guardians, should decrease crime. Furthermore, Makin et al. (2018) conducted a study in which analyzed the crime clearance rates for the states of Washington and Colorado. Makin et al. (2018) used a multigroup interrupted time-series model in order to determine the short-term effects marijuana legalization. The authors concluded that clearance rates amongst law enforcement personnel have improved following the legalization of marijuana. With this, Makin et al. 's (2018) study provides a significant argument that once marijuana is legalized, law enforcement personnel are not only able to allocate the time and resources to other crimes, but to also solve the crimes more quickly. While this idea is not specifically being examined in the current study's assessment of the impact of marijuana legalization on violent crime rates, it offers a theoretical basis for the idea that legalization will lower violent crime rates.

Additionally, with the legalization of marijuana, the likelihood of individuals turning towards the black market to obtain the drug should decline (McGinty et al., 2017). As a result of this, those individuals seeking to purchase marijuana will no longer have to approach known offenders, in this case drug dealers, in what may be "high crime" areas. With that, fewer individuals are coming into contact in time and space in an area that may have motivated offenders. The current study is unable to examine this

proposition directly, but the theoretical reduction in black market activities further supports the idea that legalization will reduce violent crime rates.

Legalization should also reduce the number of motivated offenders, especially those who are violent offenders. It may be argued that with legalization, there also comes greater use of marijuana. Generally, as an individual consumes more marijuana, they will in turn to alcohol less often (Morris et al., 2014). It can then be argued that marijuana has a calming effect on individuals as opposed to alcohol's aggressive effect (Morris et al., 2014; Exum, 2006). As discussed by Exum et al. (2017), the pharmacological properties of alcohol, especially when it is consumed while the individual is at an intense emotional state such as anger, can encourage violent decision making. It can then be argued that when individuals begin using marijuana as a substitute for alcohol, then there should be a decline in the amount of alcohol intoxicated individuals becoming motivated offenders (Exum, 2006; Morris et al., 2014; Kuhns et al., 2013). Furthermore, if the number of motivated offenders is reduced, then according to RAT, crime will also be reduced. Sontate et al. (2021) conducted an analysis of how alcohol, aggression, and violence can be associated with neurological factors. In regard to alcohol, aggression and crime specifically, alcohol consumption has the ability to lead an individual to lose control of themselves, leading to "unacceptable social behavior including violence" (p. 3). Generally, it can be understood that when an individual is not at a positive mental state prior to, or while, consuming alcohol, negative emotions as well as impulsive acts will begin to rise for the individual (Sontate et al., 2021).

Given the link between alcohol and aggressive/ violent behavior, it can be asserted that violent crime will decrease following marijuana legalization, specifically anger driven acts of violence. For example, anger driven acts of violence may include

murder, aggravated assault, as well as simple assault. The current study will explore this relationship between legalization, alcohol and violent crime rates.

While RAT offers a framework in which to predict that marijuana legalization should decrease violent crime rates, there are counterarguments to suggest that legalization may increase crime. This argument largely rests in the argument that marijuana is a gateway drug. A *gateway drug* is defined as "a drug (such as alcohol or marijuana) whose use is thought to lead to the use of and dependence on a harder drug (such as cocaine or heroin)" (Merriam-Webster, 2024, paragraph 1). With the rise of legalization, many individuals are making the argument that marijuana is a gateway drug for users to expand their drug use, which will in turn result in more crimes committed (Williams, 2020; Wu et al., 2021). However, it should be noted that marijuana is not the primary gateway to developing a disorder for other drugs. Other factors that have the potential to contribute to the gateway of developing a disorder for other drugs include, but not limited to, "family history, having another mental illness, having peers with substance use disorder, loneliness or social isolation, lack of family involvement, drug availability, and socioeconomic status" (CDC, 2024b, paragraph 4; Williams, 2020).

Sabia et al. (2021) conducted a synthetic control analyses in order to determine whether recreational marijuana is considered a gateway drug. Sabia et al. (2021) concluded that there was not a significant amount of evidence to support the fact that recreational marijuana is a gateway drug, as well as little evidence for an increase in on harder drugs (such as cocaine or heroin), drug involved overdoses, or drug-related treatment admissions for addiction (p. 28).

There are many arguments made towards the fact that marijuana legalization will be more of a gateway drug, however, the counter is that there are also various arguments made that with the legalization of marijuana, violent crime rates will begin to decline. Anderson and Rees (2013) argue that with the legalization of marijuana, alcohol consumption will decrease as will violent crimes such as domestic violence. Anderson and Rees' (2013) argument are in regard to the primary fact that alcohol consumption is "associated with violent crimes and domestic violence" (Sontate et al., 2021, paragraph 1). As with many legal substances, there is the concern that its use opens the door to other substances that are potentially more harmful. Anderson and Rees (2013) do not deny the idea that legalizing marijuana can provide a gateway to drugs such as cocaine and heroin, but that idea is also studied by Morral et al. (2002) and they state that it may not be marijuana itself, but the individual who has the "first opportunity to use each drug" (paragraph 3).

The gateway effect hypothesis has been researched in order to determine how different forms of drugs, including marijuana, have an effect on promoting future drug use within individuals. Miller and Hurd (2017) conclude that even though the gateway effect has shown to have some potential for further drug use, there is still a "significant gap of knowledge" (paragraph 7). Due to this gap of knowledge, it becomes difficult for researchers, as well as potential drug users, to hold marijuana itself responsible for individuals using cocaine or heroin (Miller & Hurd, 2017).

Past Empirical Research

There are various research studies that are either for or against the legalization of marijuana; many are one sided and do not provide both sides of the evidence. However,

there are aspects to marijuana legalization that are undeniable. One such aspect is whether legalization results in an increase or decrease in crime rates.

Many individuals believe that crime will increase due to the legalization of marijuana; however, in the state of Colorado, the amount of marijuana arrests decreased by 68% from when marijuana was legalized in 2012 to 2019 (Colorado Division of Criminal Justice, 2021). More specifically, it can be argued that since marijuana had been legalized, that marijuana arrests would vanish entirely. However, even though the substance was legalized, there is still the event in which individuals who are not of the legal age to consume the substance are using and possessing it.

Dragone et al. (2019) conducted a study in which revealed that many of the arguments against the legalization/decriminalization of marijuana are not proven to be reasonable. Dragone et al. (2019) focused their study primarily on the legalization of recreational marijuana for counties that border between Washington and Oregon. For their study, the authors used a pretest/ posttest quasi-experiment in which it showed the crime rates for the year of legalization of marijuana and four years later. More specifically, the study used Washington as the treatment group and Oregon as the control group with the pretest years being 2010 to 2012 and the post-test being 2013-2014. To narrow down the border between Washington and Oregon, the authors used the crime statistics at the county level, but they were only able to use what was publicly available for the years 2010 to 2014. In total, the study contained 75 counties in which there were 355 observations. There were 39 counties in Washington and 36 counties in Oregon that were observed. The authors also took it a step further to analyze the substance consumption with alcohol, other drugs, and marijuana post the legalization. For the substance consumption data, the National Survey on Drug Use and Health was used.

Throughout their study, Dragone et al. (2019) provided an analysis which showed that the legalization of marijuana decreased crime rates in both Washington and Oregon. Moreover, they found that in Washington specifically rapes decreased between 15% and 30%, property crimes decreased between 10% and 20%, and theft decreased between 13% and 22%, after the legalization of marijuana. The crime rates that were evaluated for the study included all violent crimes, murder, rape, assault, robbery, all property crimes, burglary and theft each independently. The data for crime rates from when marijuana was legalized in 2010 to 2014 were obtained from the Uniform Crime Reporting database. After determining the impact that marijuana legalization had on the bordering counties between Washington and Oregon, Dragone et al. (2019) found that "Washington counties experienced an increase in marijuana consumption relative to their Oregon counterparts, and a decrease in the consumption of other drugs and binge alcohol" (p. 495). However, this study only took into consideration the legalization of marijuana in just one state. More research is needed on other states with legalized marijuana besides Washington.

Morris (2018) put together conclusions from various studies and research journals in order to answer the question: Does Legalizing Marijuana Reduce Crime? Within the first section, Morris discussed the impact of production, distribution, and use of marijuana after legalization of the drug. Morris (2018) states that when Colorado legalized the drug, the cases of "cultivation, distribution and possession of marijuana fell by 85%" (p. 2). Statistically speaking, that shows a drastic change in the crime impacts of marijuana legalization. Furthermore, it is not a crime to possess the, now legalized, substance, as long as an individual is above the age of 21. With that, Morris (2018) states that "the number of those under 21 convicted for possession fell by about 50% between

2012 and 2013" (p. 2). As one would expect, the number of misdemeanor charges of marijuana possession for individuals 21 and older decreased from 297 to 0 by January 2013.

In the following section of the report, Morris (2018) discusses what effects marijuana legalization had on other drug use, whether it would be considered a gateway or not. In 2014, states that legalized marijuana for medicinal purposes, had a 25% lower opioid overdose rate. However, the primary concern about marijuana legalization is its impact on crime rates. Furthermore, Morris discusses a study conducted by Morris et al. (2014) that provides evidence that after the legalization of medical marijuana, crimes that were Part I offenses included homicide, rape, robbery, assault, burglary, larceny, and auto theft declined. During this study, Morris et al. (2018) collected the data from the Uniform Crime Reporting database for each state from 1990 to 2006 which included 11 states which had legalized marijuana for medicinal purposes. For the study, Morris et al. (2018) used a fixed-effects panel design which also included sociodemographic control variables per 100,000 individuals. However, Morris et al. (2014) primarily focused on the legalization of medical marijuana laws rather than the entirety of marijuana legalization, which includes recreational use.

Rice (2019) conducted a study which focused on the legalization of both medical and recreational marijuana and the change of violent crime rates. Rice (2019) not only accounted for each violent crime at an individual level and its effect on marijuana legalization, but also considered violent crimes as a whole. After the study, Rice (2019) concluded that robbery, aggravated assault, and homicide violent crimes have decreased by at the one percent level. Additionally, this study primarily focused on violent crime

rates and its effect on marijuana legalization rather than also including the property crime rates that may have had an effect due to legalization status.

The Proposed Study

Prior research shows mixed conclusions on the impact that marijuana legalization has on crime rates . However, as more states have begun to allow for the use of recreational and medicinal marijuana, as well as begin to decriminalize it, there is more research that needs to be done. Past research has primarily focused on just a single state; however, the proposed study will look at the impact of legalization on violent crime rates across multiple states. The study will examine the impact of legalization on state-level violent crimes, mindful of the crime trends for states that have not yet legalized marijuana. Additional research such as this will further our understanding about the impact of legalization of marijuana on crime, which is an important concern for policy makers.

CHAPTER 3: METHODOLOGY

Sample

The current sample for the study includes a total of 20 U.S. states. The study focuses primarily on the ten states that fully legalized marijuana prior to the year 2019. These legalized states include Alaska, California, Colorado, Maine, Massachusetts, Michigan, Nevada, Oregon, Vermont, and Washington. For the purposes of comparison, an additional ten states that legalized marijuana during or after 2019 are included in the study and serve as a wait-list control group. The comparison states include Arizona, Connecticut, Delaware, Minnesota, Montana, New Mexico, New York, Ohio, Rhode Island, and Virginia.

Measures

The year in which marijuana was legalized in each state was determined by DISA Global Solutions (DISA, 2024). This information was used to divide the sample's 20 states into a "legal" group and "comparison" group.

Furthermore, estimates of state-level alcohol consumption per capita were taken from the National Institute on Alcohol Abuse and Alcoholism's (NIAAA) *Surveillance Report #121* (Slater & Alpert, 2024). The NIAAA collects annual data on alcohol sales in each state and converts this information into an estimate for the amount of beer, wine, and distilled spirits purchased. By using the census data, the NIAAA also estimates the number of individuals 14 years of age and older in each state. According to numerous self-reporting surveys, many youth consume alcohol by the age of 14, which is why this

age was chosen. The alcohol sales data, as well as the census data, are combined to then estimate the per capita annual consumption of beer, wine, and distilled spirits. While estimates are provided for each type of alcohol separately, the current study used the *total* per capita consumption, which is measured in gallons. Illustratively, the national per capita consumption of alcohol among individuals aged 14 and older in the year 2022 is 2.50 gallons. To put that into perspective, 2.50 gallons equates to 533 standard drinks.

State level crime rates and population data come from the Uniform Crime Reporting (UCR) program's *Crime in the United States* annual publication for the years 2009 to 2019 (see https://ucr.fbi.gov/crime-in-the-u.s). The data collected from the UCR in 2020 and in later years proved to have many instances of missing data. Therefore, the decision was made to use data only collected in 2019 or earlier. Crime data were collected for the violent Part I crimes of homicide, robbery, and aggravated assault. However, while also a violent Part I crime, rape was excluded because of changes in how the UCR program began to define and measure rape in 2013. Due to this change, making the comparison of rape rates over time becomes problematic.

Crime data were also collected for the Part II offenses of simple assault and disorderly conduct. As defined by the Department of Justice (n.d.), simple assault is "Assaults and attempted assaults where no weapon was used, or no serious or aggravated injury resulted to the victim." Disorderly conduct is defined as "Any behavior that tends to disturb the public peace or decorum, scandalize the community, or shock the public sense of morality" (Department of Justice, n.d.). While disorderly conduct does not necessarily result in physical harm, acts that disturb the public peace can include verbal arguments, which also represents a form of aggression and/or violence.

For Part I crimes, the UCR calculates the state-level rate of each offense as the number of crimes known to police per 100,000 residents. For Part II crimes, the UCR reports the total number of reported *arrests* for each offense in the state. While the number of arrests is not necessarily an accurate measure of the number of criminal incidents, it offers a basic measure of the crime. Using the number of arrests and the population estimate for each state, Part II crime rates for each offense were calculated as the number of arrests per 100,000 residents.

The total number of law enforcement employees for each state was determined through the UCR as well. This value represents the number of sworn officers *and* civilian employees, as both play a role in the operations of a given agency. Using state level population data, the rate of law enforcement employees per 100,000 residents was calculated, and serves as a measure of the criminal justice resources in the state.

Analytic Approach

The current study predicts that marijuana legalization will lead to a reduction in violent crime. This hypothesis is grounded in Routine Activity Theory (Cohen & Felson, 1979), and presumes that marijuana legalization will decrease motivated offenders through the reduction of alcohol consumption. Legalization may also increase guardianship by allowing law enforcement personnel to devote more time to other (nonmarijuana-related) crimes, and by reducing the convergence of offenders and targets by moving the sale of marijuana to a legal market.

To examine the hypothesis that marijuana legalization leads to a reduction in violent crime, the following analyses will be performed. A graphic analysis of the ten

legal states will be conducted to show a visual representation of how alcohol consumption and crime rates vary prior to and post marijuana legalization. A series of paired-sample t-tests will be performed on the ten legal states to empirically measure the change in alcohol consumption and crime rates prior to and post marijuana legalization. Additionally, a similar set of analyses will also be performed on the set of comparison states. A series of independent samples t-test will be performed across the set of legal and comparison state groups to determine if there are significant changes in alcohol consumption and violent crime rates. Specifically, the *change in mean values* across pre-test and post-test periods for each group of states will be compared. Finally, a series of OLS regressions will be performed to provide an additional examination of the effect of legalization on alcohol consumption/ crime rate *trends* across legalized and comparison states.

Prior to these analyses, a discussion of how the comparison states were selected is presented. Additionally, a series of tests are presented to show how comparable the comparison and legal states are on key theoretical variables.

Creating the Legal vs. Comparison State Groups

In order to examine the impact of marijuana legalization on crime, a pre-test window and post-test window is needed to observe changes in crime rates. To create a more stable estimate of crime during these periods, a *three-year* pre- and post-test window was targeted. However, due to data limitations in the UCR, the post-test window could not extend beyond the year 2019. This means that only those states that legalized marijuana in 2016 or earlier (n=8) would have a *three-year* post-test window. To allow for

the addition of as many legal states as possible, a decision was made to allow post-test windows of just one year where necessary. This adjustment allows states that legalized marijuana as late as 2018 to be included in the study's sample, resulting in the inclusion of two additional legal states (n=10). Shown below and for better visualization, the ten states that legalized marijuana in 2018 or earlier are denoted by the color green, and the 14 other states that legalized marijuana in 2019 or later are denoted by the color yellow. The ten green states shown in the figure constitute the study's primary sample of "legal states" and will be used to study the impact of legalization on crime. However, to better understand the impact of legalization, a comparison group of states is needed.

It is difficult to identify a perfectly identical comparison group of states due to the unique nature of each U.S. state, as well as how state characteristics may impact offending rates. For example, factors such as population size and geographic location are known to be correlated with crime rates, and state politics can impact the allocation of criminal justice resources in order to combat crime. Moreover, the willingness of some states, but not others, to legalize marijuana speaks to the variability in the cultural acceptance of marijuana across the United States.

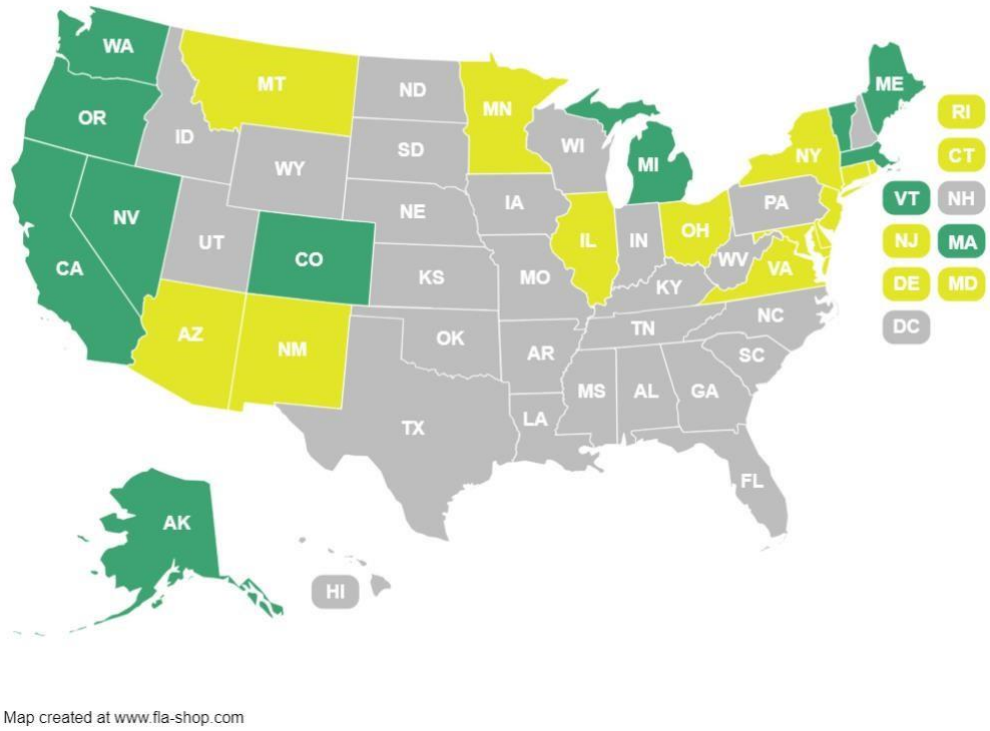

Figure 2: States that Legalized in 2018 or earlier (Green) vs. those that Legalized During/After 2019 (Yellow)

In order to create a comparison group of states that are reasonably well-matched as much as possible to the ten legal states, the following steps were taken. Ten comparison states were selected from the 14 states that legalized marijuana during or after the year of 2019. This assists in identifying states that may share a similar level of cultural acceptance of marijuana. Population size and geographic region were also taken into consideration to identify states that can best compliment, or "match", the ten legal states. Additionally, consideration was given to whether the states were either "red states" or "blue states" in the 2008, 2012, and 2016 presidential elections (as reported by https://www.270towin.com). A visualization of the ten comparison states, as shown below.

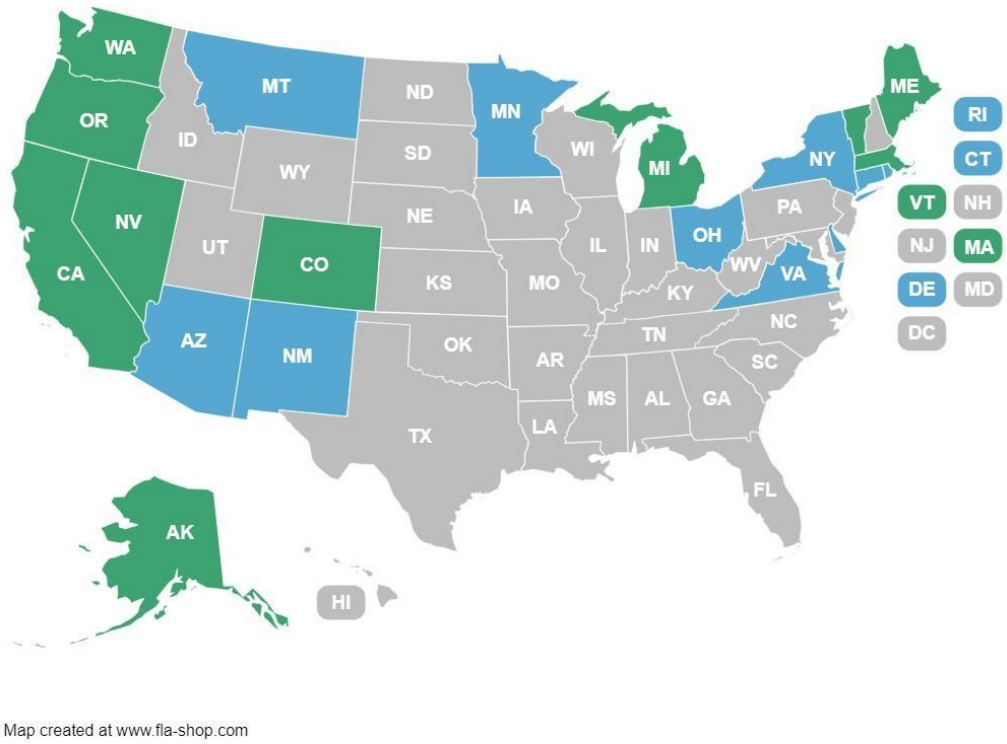

Figure 3: Sample of Legal States (Green) and Comparison Group States (Blue)

The table below denotes which pairs of states were matched together. Generally, most of the matches appear to be reasonable choices given the limited number of pairing options available, but with some expectations (e.g. Oregon and Virginia).

Table 1: List of Legal States and Matched Comparison State

Legal States	Matched Comparison States
Alaska	Montana
California	New York
Colorado	New Mexico
Maine	Rhode Island
Massachusetts	Connecticut
Michigan	Ohio
Nevada	Arizona
Oregon	Virginia
Vermont	Delaware
Washington	Minnesota

Data was collected on each legal state and its matched comparison during the pertinent pre-test and post-test windows. The table below shows these two windows of time for each pair of states. However, it should be noted that the Michigan/Ohio and

Vermont/Delaware pairings have only a one-year posttest window. This is due to the limitation of reported data.

Table 2: Pre- and Post-Test Periods for Legal and Comparison States

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AK			pre	pre	pre	**LEGAL**	**post**	**post**	**post**		
MT			pre	pre	pre	--	**post**	**post**	**post**		
CA					pre	pre	pre	**LEGAL**	post	post	post
NY					pre	pre	pre	--	post	post	post
CO	pre	pre	pre	**LEGAL**	post	post	post				
NM	pre	pre	pre	--	post	post	post				
ME					pre	pre	pre	**LEGAL**	post	post	post
RI					pre	pre	pre	--	post	post	post
MA					pre	pre	pre	**LEGAL**	post	post	post
CT					pre	pre	pre	--	post	post	post
MI							pre	pre	pre	**LEGAL**	post
OH							pre	pre	pre	--	post
NV					pre	pre	pre	**LEGAL**	post	post	post
AZ					pre	pre	pre	--	post	post	post
OR			pre	pre	pre	**LEGAL**	post	post	post		
VA			pre	pre	pre	--	post	post	post		
VT							pre	pre	pre	**LEGAL**	post
DE							pre	pre	pre	--	post
WA	pre	pre	pre	**LEGAL**	post	post	post				
MN	pre	pre	pre	--	post	post	post				

CHAPTER 4: RESULTS

Assessing Group Equivalence across Legalized and Comparison States

Comparison states are included in this study as an estimate of the counterfactual condition. That is, they are included to show what the crime rates would have essentially been like had marijuana not been legalized. The ability of the comparison states to provide a useful counterfactual rests in how comparable they are initially to the set of legal states. In order to determine how well the comparison states initially match the legal states on key theoretical measures, data from the pre-test periods were examined. More specifically, the two groups of states were compared on their initial pre-test population size, law enforcement personnel employee rate, alcohol consumption rates, as well as the five selected crime rates. The graphs shown below show how the two groups compare at each of the three pre-test periods, which are denoted as Year-3, Year-2, and Year-1.

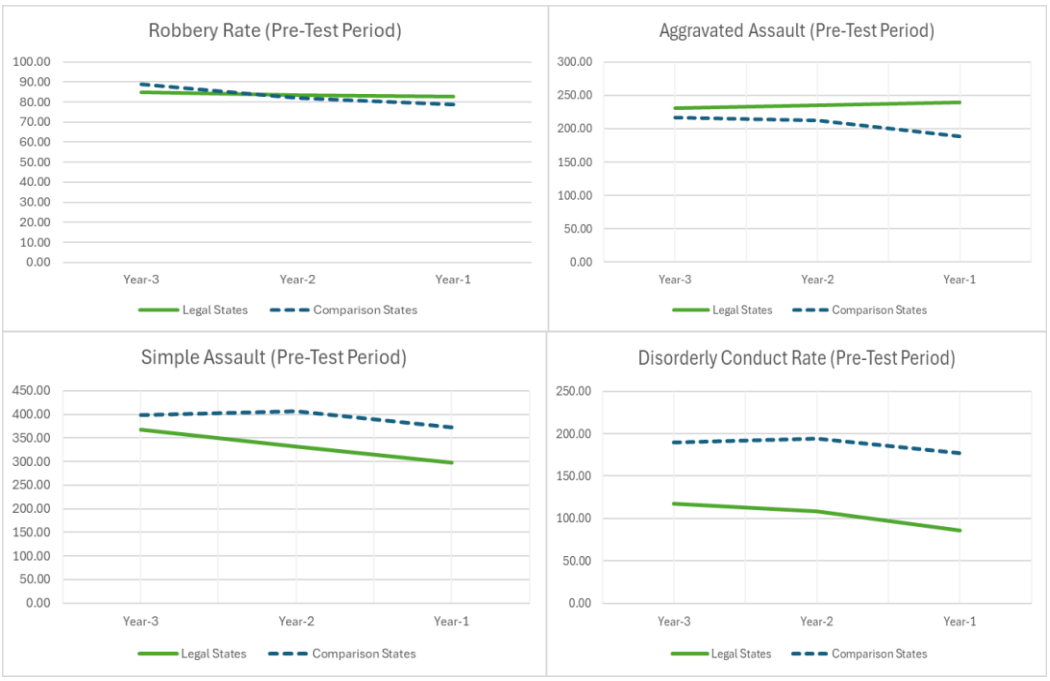

Figure 4: Pretest Period Comparisons

Independent sample t-tests were conducted to compare the two groups of states on each variable and at each pre-test period (i.e., at Year-3, Year-2, Year-1). These results show if the two groups have comparable *amounts* of population, law enforcement personnel employment rates, alcohol consumption rates, and crime rates at those individual points in time. To better understand if the two groups of states are *trending* similarly on each variable, the *average annual percent change* was computed for each state. For example, for a given state, the percent change in population from Year-3 to Year-2 was determined, as was the percent change from Year-2 to Year-1. These two values were then averaged together. The average annual percent change values for population were compared across the set of legal and comparison states by way of an independent sample t-test. An identical set of analyses was conducted for the average annual percent change value for the remaining variables. Additionally, it should be understood that the average annual percent change was chosen instead of the simple

percent change from Year-3 to Year-1 in order to better express variations that occur between the two end points.

The table below provides a visual representation and summary of the results of these t-tests. As seen in the table, most of the t-test results are not statistically significant indicating that legal states and comparison states are largely comparable during the pretest period both in terms of the *amount* of the measure and its *trend* over time. The exceptions include the measures of the Part II offenses. Specifically, legal and comparison states differ on the average annual percent change for simple assault ($p < 0.10$), and for each of the measures of disorderly conduct ($ps < 0.10$ or < 0.05). Ultimately, despite these few differences, the results collectively show that the comparison group states match the set of legal states reasonably well during the pre-test period.

Table 3: Pre-Test Comparisons for Group Equivalence across Legal and Comparison States

	Legal States	Comparison States	t-ratio	p-value
Population				
Year-3 Mean (sd)	7.6M (11.2M)	6.0M (6.0M)	0.40	0.693
Year-2 Mean (sd)	7.7M (11.3M)	6.0M (6.0M)	0.40	0.691
Year-1 Mean (sd)	7.7M (11.4M)	6.1M (6.0M)	0.41	0.688
Ave. Annual % Δ Mean (sd)	0.74 (0.59)	0.75 (0.59)	-0.15	0.988
Police Employee Rate				
Year-3 Mean (sd)	269.40 (45.58)	295.61 (63.31)	-1.06	0.392
Year-2 Mean (sd)	268.23 (44.39)	289.78 (68.37)	-0.84	0.414
Year-1 Mean (sd)	266.46 (42.67)	289.91 (68.84)	-0.92	0.372
Ave. Annual % Δ Mean (sd)	-0.45 (2.04)	-0.97 (2.92)	0.45	0.660
Alcohol Consumption Rate				
Year-3 Mean (sd)	2.67 (0.34)	2.52 (0.48)	0.79	0.443
Year-2 Mean (sd)	2.68 (0.35)	2.50 (0.51)	0.92	0.368
Year-1 Mean (sd)	2.67 (0.36)	2.51 (0.48)	0.87	0.396
Ave. Annual % Δ Mean (sd)	-0.24 (1.41)	-0.23 (1.16)	-0.01	0.995
Murder Rate				
Year-3 Mean (sd)	3.39 (1.61)	4.16 (2.20)	-0.89	0.384
Year-2 Mean (sd)	3.34 (1.66)	3.93 (1.75)	-0.77	0.449
Year-1 Mean (sd)	3.44 (1.71)	4.02 (1.90)	-0.72	0.482
Ave. Annual % Δ Mean (sd)	-0.44 (4.45)	-0.97 (9.28)	0.15	0.887
Robbery Rate				
Year-3 Mean (sd)	85.01 (50.67)	88.74 (35.70)	-0.19	0.854
Year-2 Mean (sd)	83.48 (54.68)	82.18 (36.53)	0.06	0.951
Year-1 Mean (sd)	82.66 (57.90)	78.88 (29.03)	0.19	0.856
Ave. Annual % Δ Mean (sd)	-1.65 (6.70)	-2.03 (13.41)	0.07	0.945
Aggravated Assault Rate				
Year-3 Mean (sd)	231.01 (120.67)	216.56 (111.55)	0.28	0.784
Year-2 Mean (sd)	234.84 (114.48)	212.29 (110.83)	0.45	0.660
Year-1 Mean (sd)	239.24 (120.56)	188.24 (120.11)	0.95	0.356
Ave. Annual % Δ Mean (sd)	-0.19 (4.45)	-7.86 (15.39)	1.36	0.212
Simple Assault Rate				
Year-3 Mean (sd)	367.79 (162.69)	398.76 (149.64)	-0.44	0.663
Year-2 Mean (sd)	331.99 (126.03)	406.78 (153.62)	-1.19	0.249
Year-1 Mean (sd)	298.03 (117.41)	372.03 (133.60)	-1.32	0.205
Ave. Annual %Δ Mean (sd)	23.56 (55.89)	-23.04 (47.83)	2.00	0.06†
Disorderly Conduct Rate				
Year-3 Mean (sd)	117.65 (76.35)	189.78 (98.39)	-1.83	0.084†
Year-2 Mean (sd)	108.34 (73.41)	194.10 (105.03)	-2.12	0.049*
Year-1 Mean (sd)	86.26 (51.92)	177.08 (93.21)	-2.69	0.015*
Ave. Annual % Δ Mean (sd)	-15.01 (9.18)	-4.56 (7.44)	-2.50	0.025*

†p<.10, *p<.05 (all tests are two-tailed)

Analysis of the Main Hypothesis

The current study's main hypothesis is grounded in the prediction that the legalization of marijuana will be associated with a decrease in alcohol consumption rates. To explore this connection, a series of graphical and t-test analyses were performed. Below is a graph showing alcohol consumption trends across the ten legal states relative to the general consumption trend in the United States population over time.

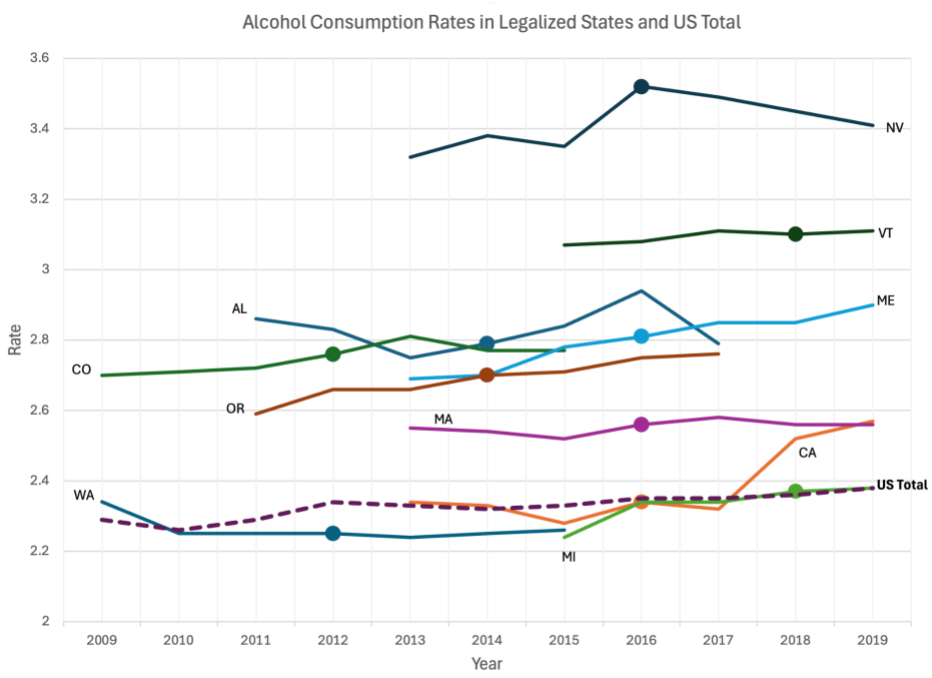

Figure 5: Alcohol Consumption Rates in Legalized States and US Total

To more easily see the consumption patterns before and after legalization, the trend lines from the previous graph were subsequently "stacked" over their year of legalization (i.e., over Y0). The resulting graph is shown below. As seen in the graph, the collective amount of alcohol consumption appears to be steady post marijuana legalization, but the results vary by state. More specifically, Nevada shows a complete decline in alcohol consumption post legalization. The limited data on Vermont shows a

steady rate with a small incline in consumption. Alaska shows an incline in consumption, however at Year-2 there is a drastic decline in consumption. Maine shows an incline in alcohol consumption. Colorado shows an incline in alcohol consumption up until Year-1, and shows a decline thereafter. Oregon shows a slight incline in alcohol consumption. Massachusetts shows a slight incline finishing with a decline in consumption. Michigan shows limited data with a slight incline in marijuana consumption. California shows a slight decline in consumption up until Year-1, and a drastic increase in consumption. Furthermore, Washington shows a steady rate with a slight incline following Year-2.

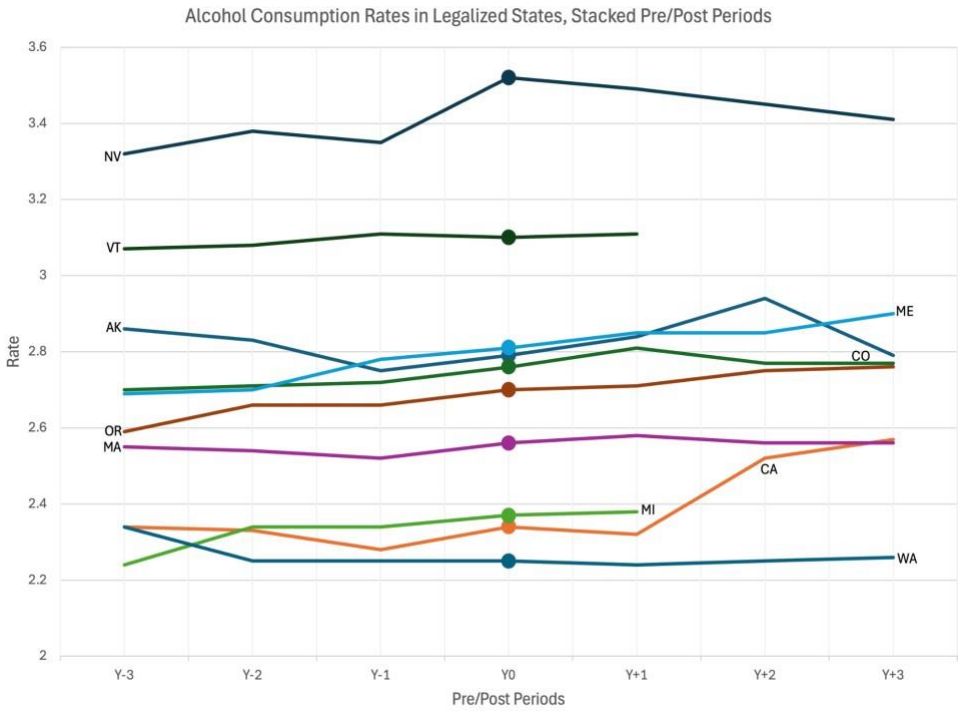

Figure 6: Alcohol Consumption Rates in Legalized States, Stacked Pre/Post Periods

To show the changes in the legal states relative to the counterfactual, a graph of the pre-test and post-test means for legal and comparison states was created. The y-axis is not scaled to 0 intentionally in order to highlight the subtle differences between the two

groups. Additionally, a series of paired sample t-tests and independent samples t-tests were performed. See below for the graph and table providing this information.

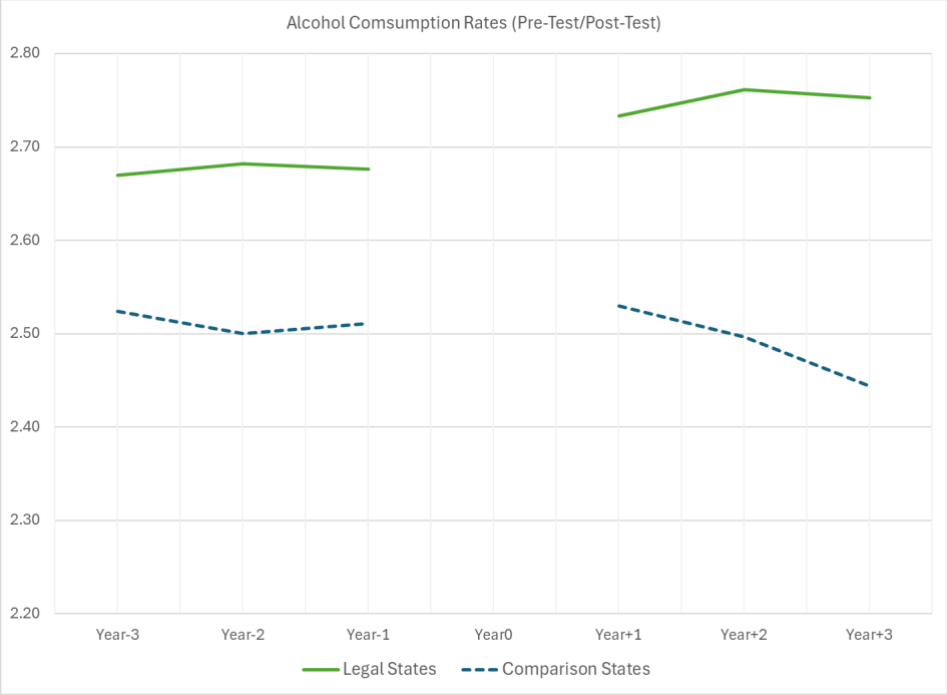

Figure 7: Alcohol Consumption Rates (Pre/Post Test)

Table 4: Alcohol Consumption Pre-Test and Post-Test Mean Values across Legal and Comparison States (n=20)

	Pre-Test $\underline{x}$ (sd)	Post-Test $\underline{x}$ (sd)	Paired Samples t-test	Pre/Post Mean Diff. $\underline{x}$ (sd)	Mean Diff. t-test
Alcohol Consumption Rate					
Legal States	2.68 (0.35)	2.75 (0.36)	4.02**	0.07 (0.06)	1.29
Comparison States	2.51 (0.49)	2.53 (0.45)	0.33	0.02 (0.13)	

†p<.10, *p<.05, **p<.01 (all tests are two-tailed)

As seen in the graph, and contrary to the prediction, alcohol consumption appears to increase from the pre-test to post-test period for legal states. The mean values reported in the table show that alcohol consumption increased from an average of 2.68 gallons per

capita prior to marijuana legalization to an average of 2.75 gallons per capita after legalization. A paired-sample t-test revealed that this increase in consumption among legal states was statistically significant. Among the comparison states, however, the mean pre-test and post-test values changed very little, and the paired-sample t-test showed the change was not statistically significant. Importantly, while alcohol consumption rates did increase significantly among just the legal states, an independent sample t-test comparing the mean difference values across legal and comparison states was not statistically significant.

The results thus far compare the mean consumption rates. However, by focusing on just the mean values, the analyses may be overlooking the *trends* in the scares (i.e., are the rates increasing or decreasing during the post-test period?). To examine the impact of legalization on alcohol trends, an OLS regression was conducted in which post-test annual percent change scores were regressed onto the state grouping variable (1=legal states; 0=comparison group) and the pre-test annual percent change scores. This analysis examines the impact of marijuana legalization on future consumption *trends* while also controlling for each state's historical trends. The results of this regression are shown below. It should also be noted that states with a post-test window of only one year are not included because no percent change in post-test scores could be computed in those cases. Therefore, the regression analysis is based on a sample of 16 states.

Table 5: OLS Regression Predicting Post-Test Average Annual Percent Change in Alcohol Consumption Rates (n=16)

	b	SE	B	t	p
State Group (1=Legal)	1.28	1.03	0.33	1.24	0.24
Pre-test average annual % Δ	-0.01	0.42	-0.01	-0.02	0.98
Constant	-0.71	0.73		-0.97	0.35
$R^2 = 0.11$ F-ratio = 0.77, *p*=0.48 n = 16					

†p<.10, *p<.05, **p<.01

As seen in the table above, the F-test of the model is not statistically significant. The model is a poor fit, further suggesting that marijuana legalization had no meaningful impact on alcohol consumption trends across legal and comparison states.

Impact of Marijuana Legalization on Crime

The study's primary hypothesis is that marijuana legalization will reduce violence crime. The analysis of state crime measures will follow the same set of procedures as in the analysis of alcohol consumption patterns. Shown below are a series of graphs showing the homicide/murder, robbery, aggravated assault, simple assault, and disorderly conduct measures among the ten legal states and the United States as a whole, followed by a series of stacked graphs.

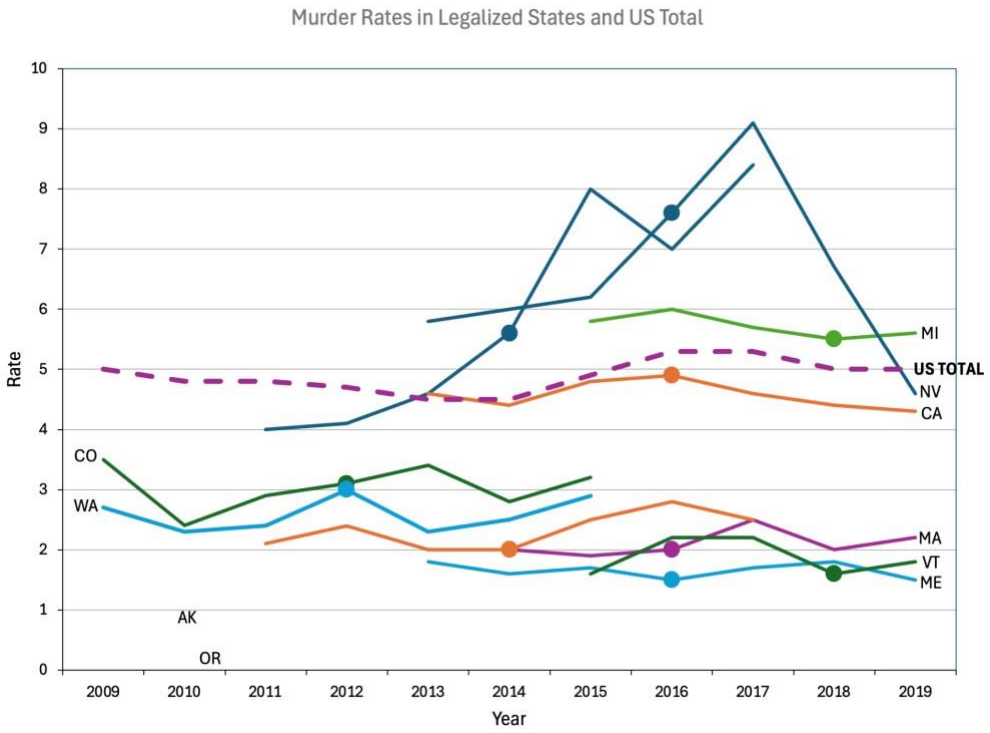

Figure 8: Murder Rates in Legalized States and US Total

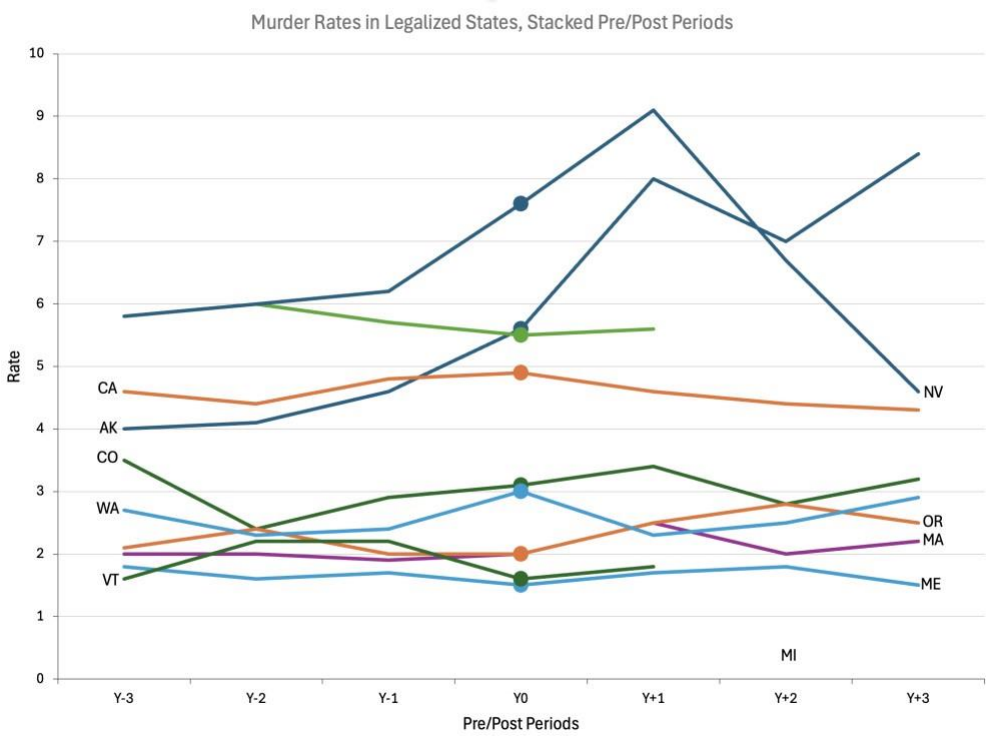

Figure 9: Murder Rates in Legalized States, Stacked Pre/Post Periods

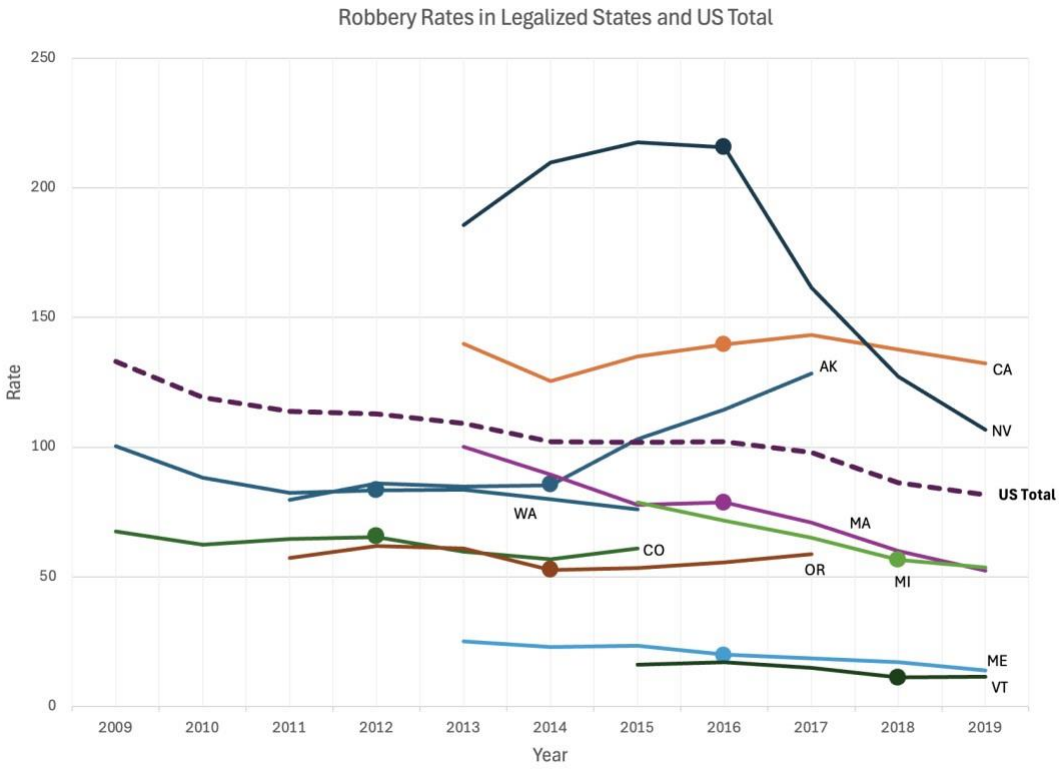

Figure 10: Robbery Rates in Legalized States and US Total

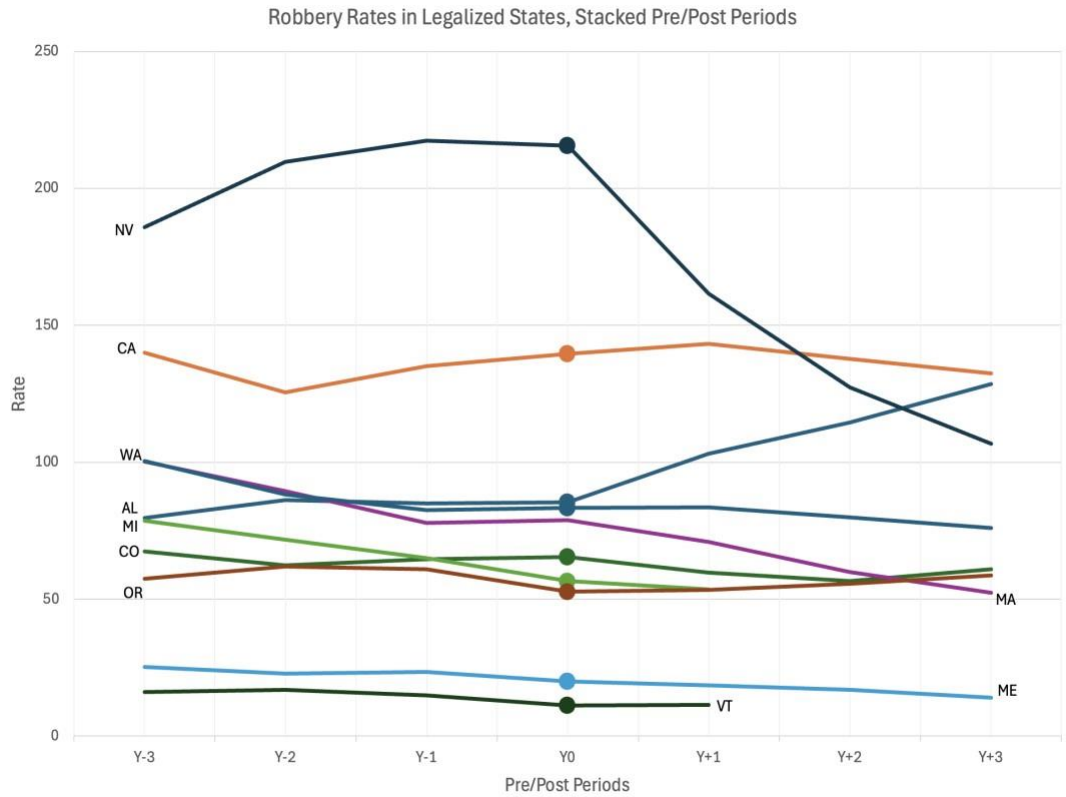

Figure 11: Robbery Rates in Legalized States, Stacked Pre/Post Periods

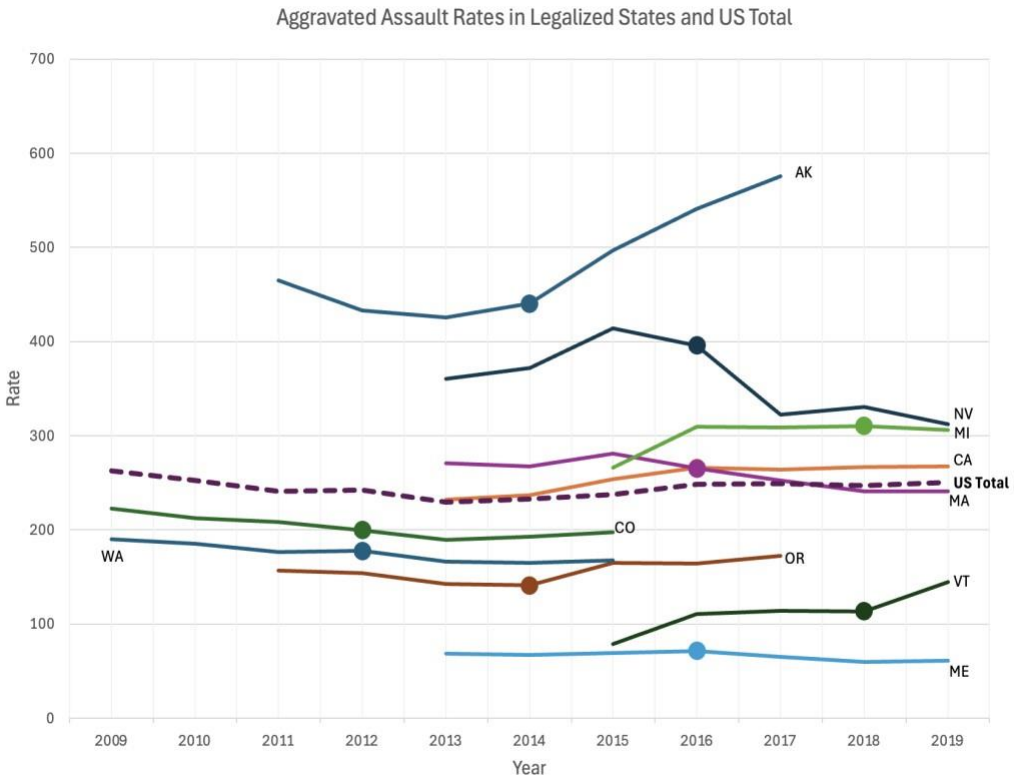

Figure 12: Aggravated Assault Rates in Legalized States and US Total

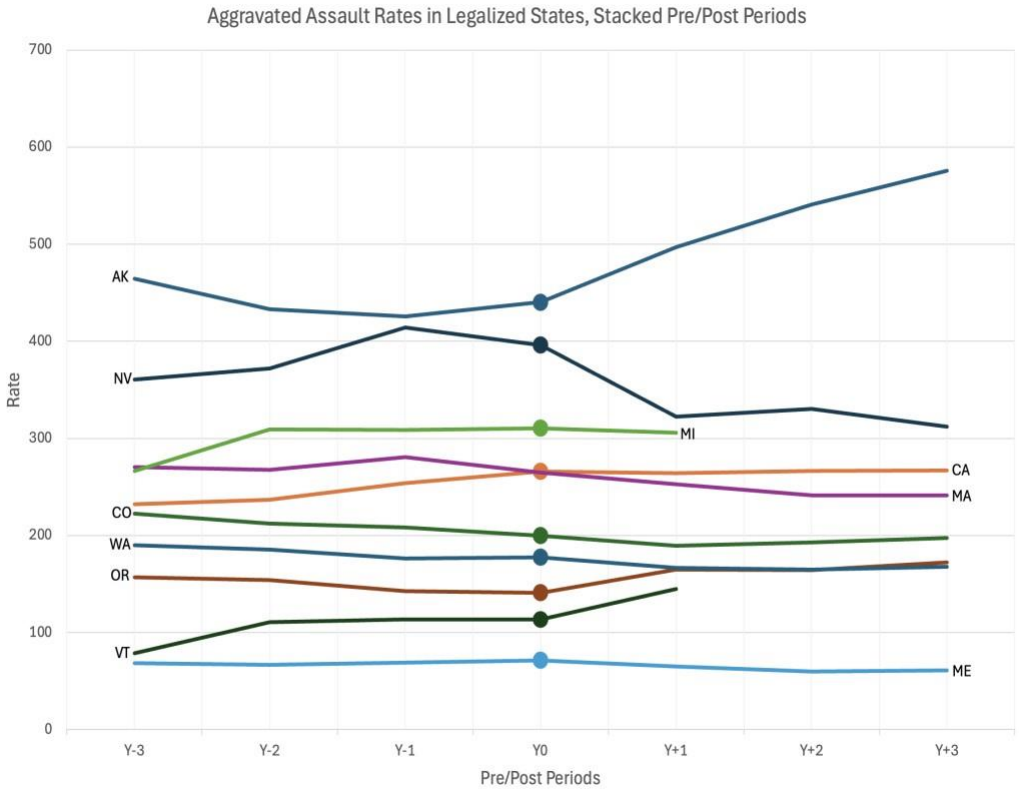

Figure 13: Aggravated Assault Rates in Legalized States, Stacked Pre/Post Periods

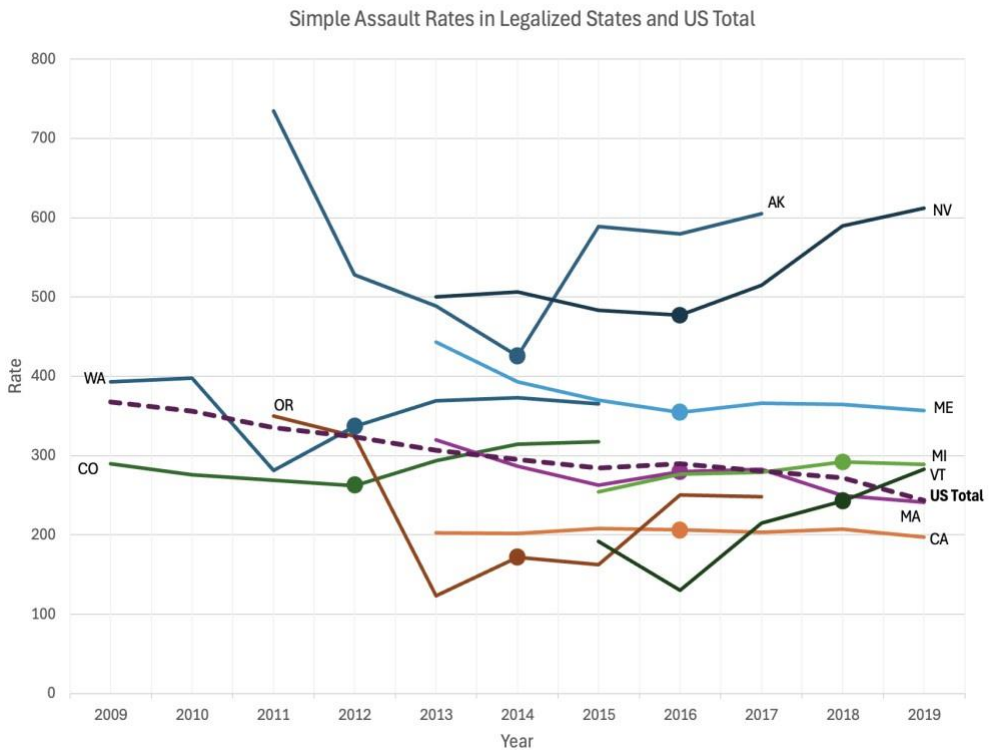

Figure 14: Simple Assault Rates in Legalized States and US Total

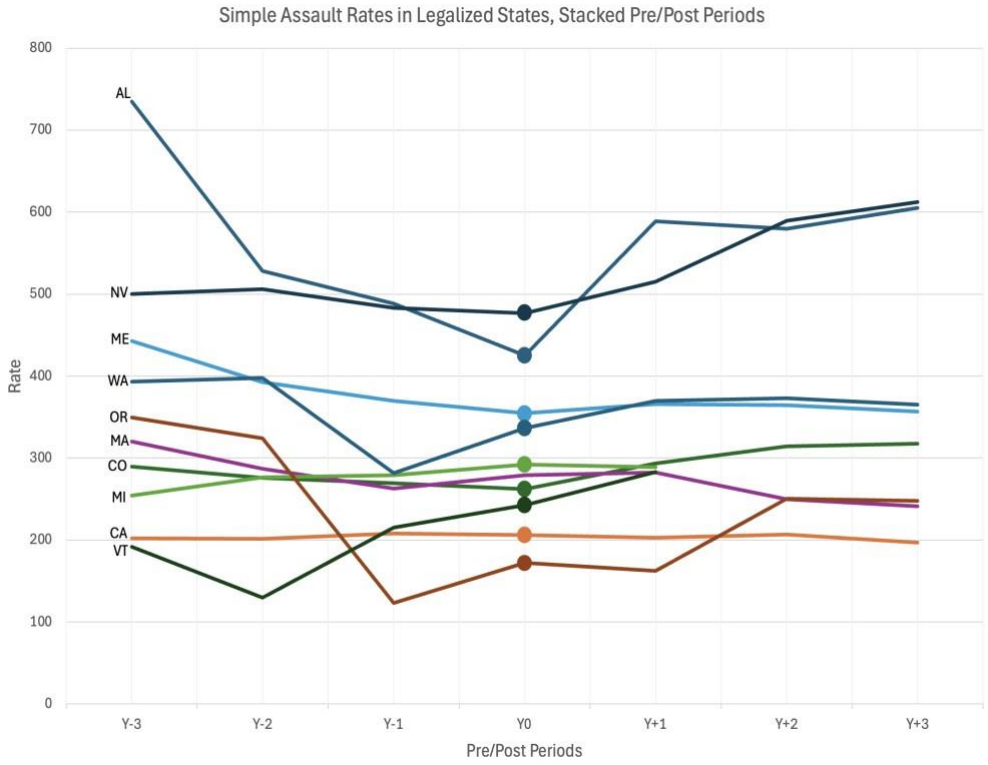

Figure 15: Simple Assault Rates in Legalized States, Stacked Pre/Post Periods

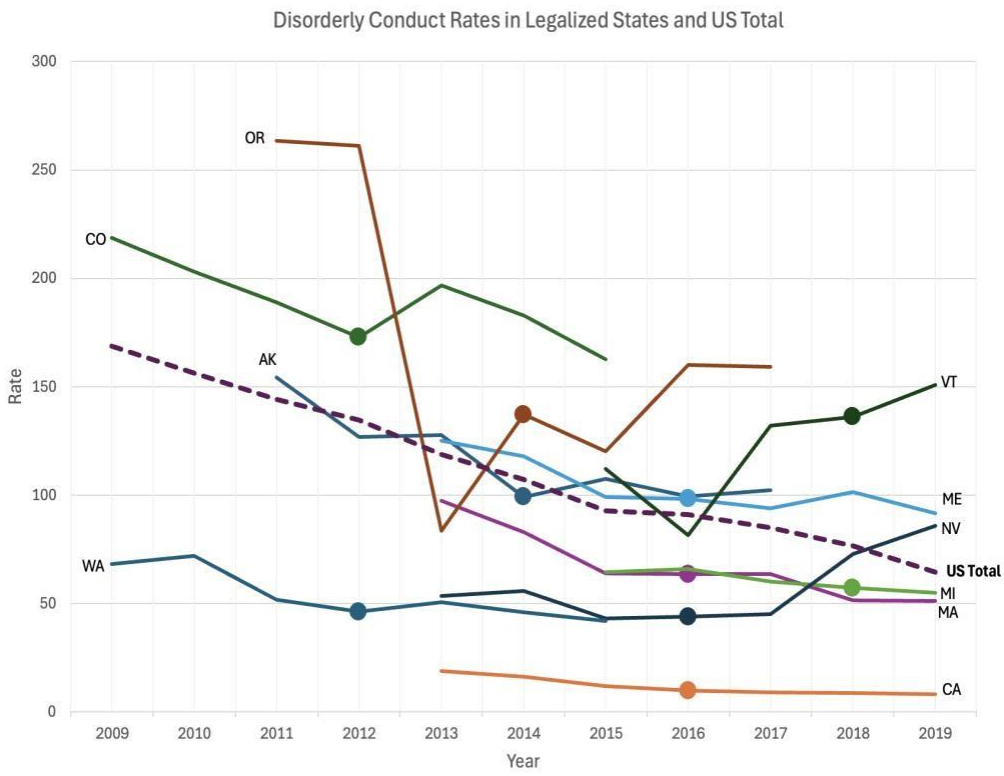

Figure 16: Disorderly Conduct Rates in Legalized States and US Total

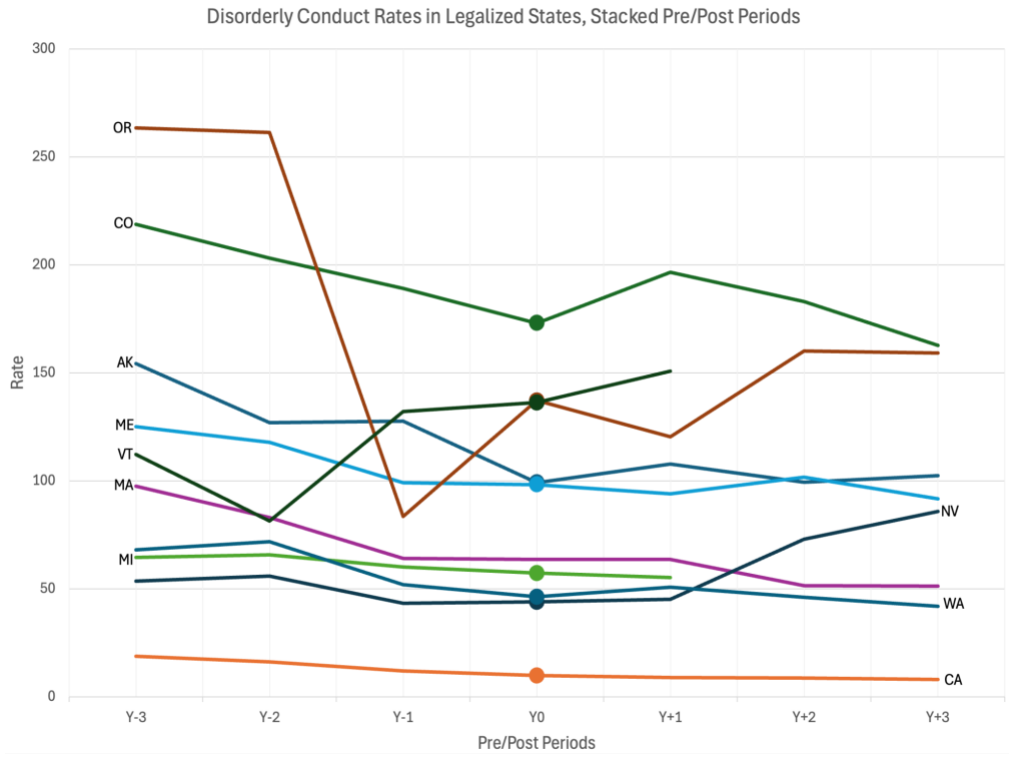

Figure 17: Disorderly Conduct in Legalized States, Stacked Pre/Post Periods

Collectively, the trends in crime vary considerably from pre-test to post-test period, and generally, makes it difficult to determine a distinct trend. For Murder Rates in Legalized States and US Total, the trend in murder generally decreases post-legalization with the exception of Michigan, Massachusetts, and Vermont. Robbery rates and aggravated assault rates post-legalization remained considerably steady with the exception of Nevada having a drastic decrease and Alaska having an increase, and aggravated assault rates for Vermont having an increase. Generally, simple assault rates and disorderly conduct increased for most states with the exception of Massachusetts decreasing, and California remaining fairly steady, and Colorado decreasing for disorderly conduct.

To further analyze the impact of legalization on crime, graphs of the pre-test and post-test crime means for legal and comparison states were created, with paired sample t-tests and independent sample t-tests were performed. See the graphs and table below for a visualization of the information.

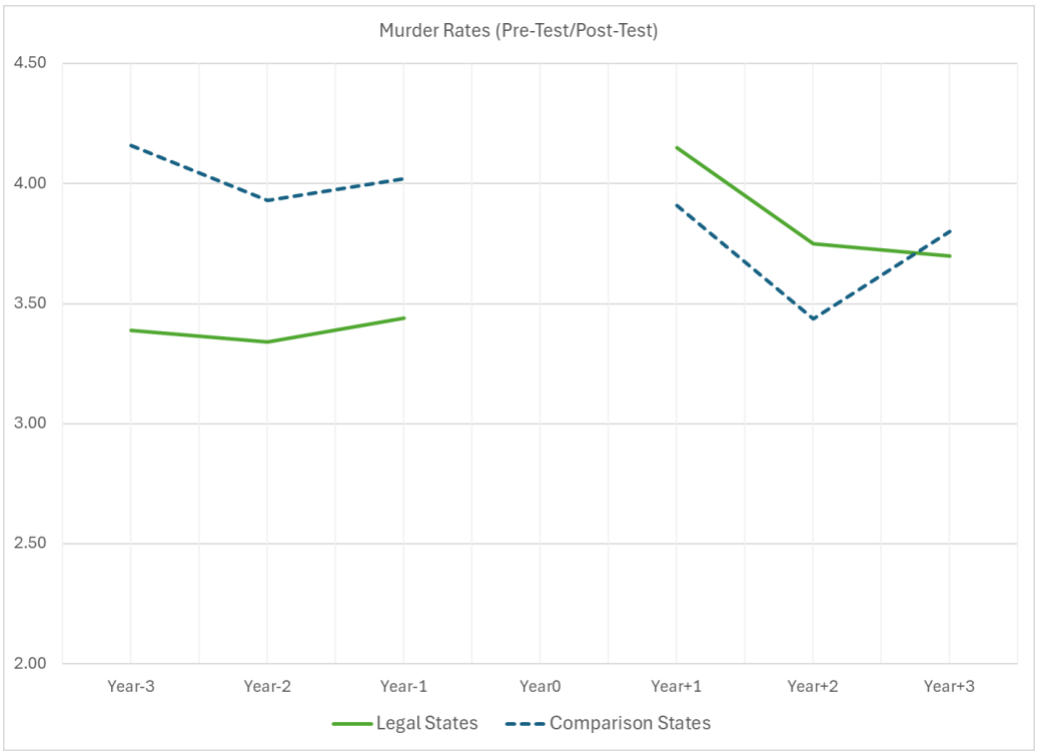

Figure 18: Murder Rates Pretest/Posttest

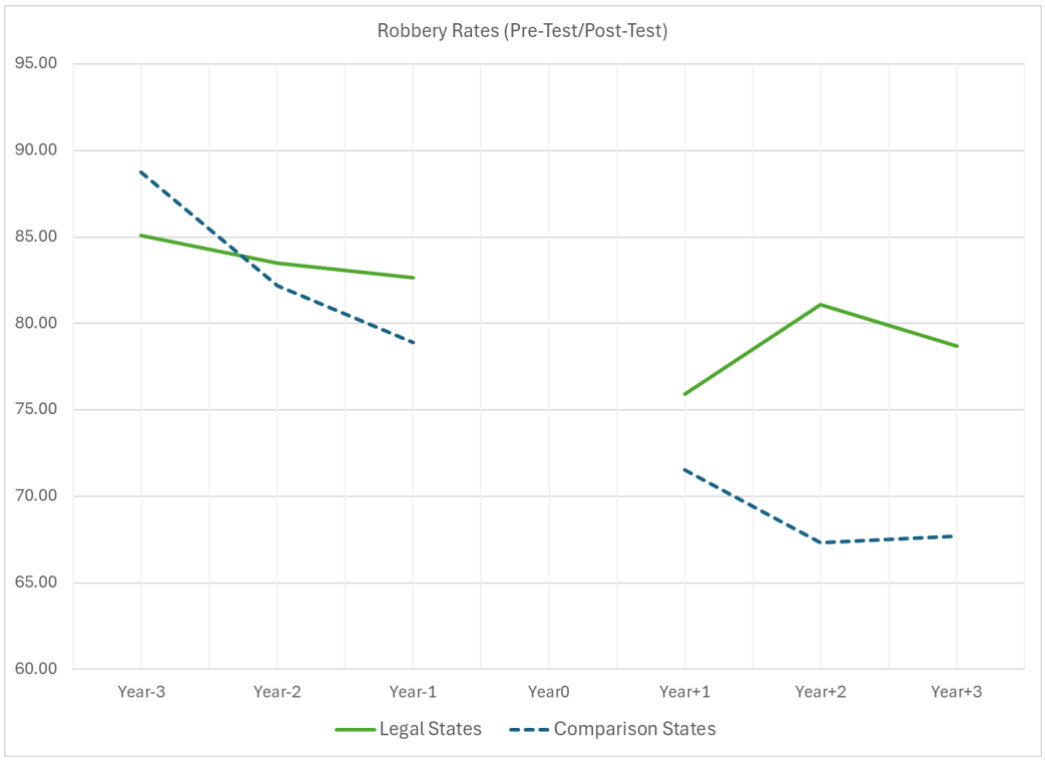

Figure 19: Robbery Rates Pretest/Posttest

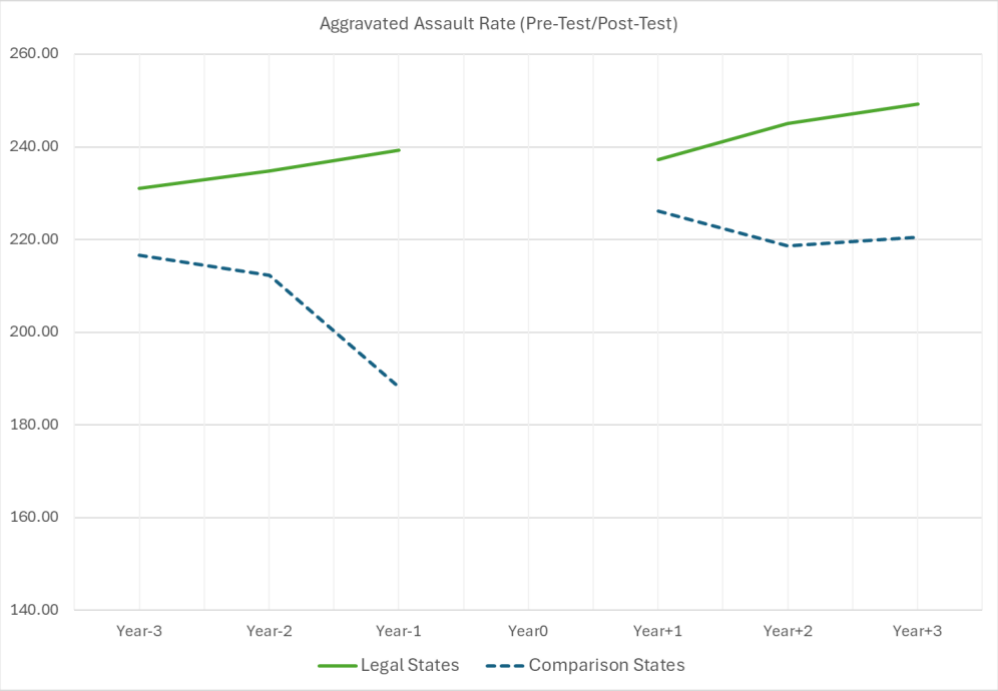

Figure 20: Aggravated Assault Rates Pretest/Posttest

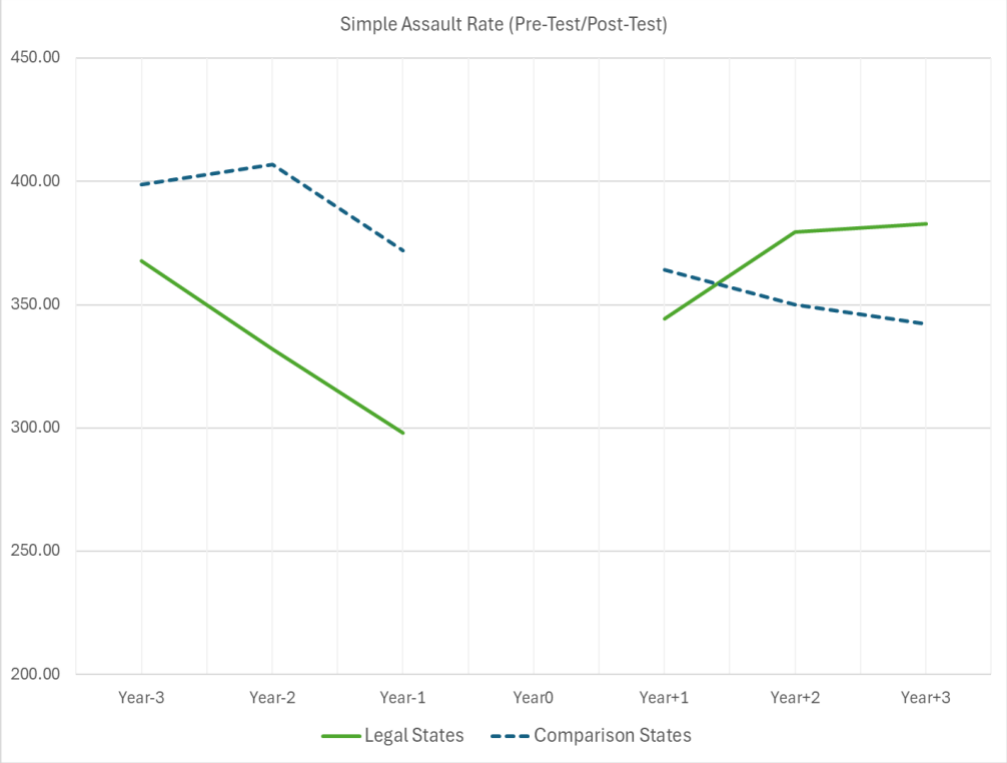

Figure 21: Simple Assault Rates Pretest/Posttest

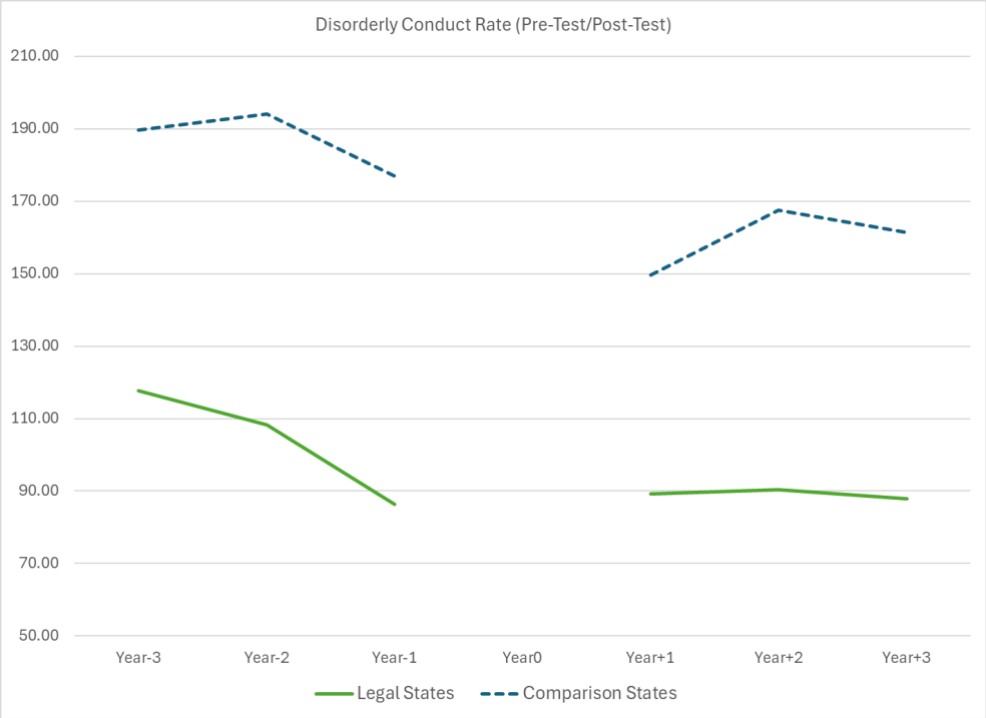

Figure 22: Disorderly Conduct Rates Pretest/Posttest

Table 6: Crime Rate Pre-Test and Post-Test Mean Values across Legal and Comparison States (n=20)

	Pre-Test $\underline{x}$ (sd)	Post-Test $\underline{x}$ (sd)	Paired Samples t-test	Pre/Post Mean Diff. $\underline{x}$ (sd)	Mean Diff. t-test
Murder Rate					
Legal States	3.39 (1.64)	3.86 (2.19)	1.32	0.47 (1.13)	1.29
Comparison States	4.04 (1.91)	3.87 (1.41)	-0.49	-0.17 (1.10)	
Robbery Rate					
Legal States	83.74 (54.09)	72.25 (44.07)	-1.37	-11.49 (26.50)	0.14
Comparison States	83.27 (33.47)	70.30 (24.92)	-2.07*	-12.97 (19.85)	
Aggravated Assault Rate					
Legal States	235.03 (117.86)	240.92 (130.81)	0.43	5.89 (43.62)	-0.60
Comparison States	205.70 (110.69)	223.74 (111.48)	1.21	18.04 (47.30)	
Simple Assault Rate					
Legal States	332.60 (128.53)	356.14 (126.85)	1.33	23.54 (55.88)	2.00*
Comparison States	392.53 (114.04)	369.49 (137.16)	-1.52†	-23.04 (47.83)	
Disorderly Conduct Rate					
Legal States	104.08 (62.54)	91.05 (54.53)	-1.52†	-13.03 (27.07)	1.90*
Comparison States	186.99 (97.84)	150.77 (92.42)	-4.17**	-36.22 (27.47)	

†p<.10, *p<.05 **p<.01 (all tests are one-tailed)

Contrary to predictions, none of the paired sample t-tests for the legal states show a statistically significant decline from pre-test to post-test except for disorderly conduct (as $p < 0.10$). Disorderly conduct arrest rates fell from 104.08 to 91.05, for a difference of 13.03 arrests per 100,000 residents. Interestingly, the comparison states' paired sample t-test results showed a significant decline for robbery ($p < 0.05$), simple assault ($p < 0.10$) and disorderly conduct ($p < 0.01$). The fact that robbery and simple assault rates fell in the comparison group but not the legal group suggests that marijuana legalization may actually be preventing the decline of crime in those legal states. Similarly, while

disorderly conduct rates fell for both legal and comparison group states, the change was greater among the comparison group. This again suggests that marijuana legalization may be slowing the decline of disorderly conduct.

When analyzing the mean difference scores across the set of legal and comparison states, the t-test results show that none of the Part I crimes are impacted by legalization but both Part II offenses were (ps < 0.05). When comparing the mean difference values, we see that while comparison states experienced a decline in both simple assault and disorderly conduct, legal states actually saw an increase in simple assault rates and a lesser decline in disorderly conduct. This again suggests that marijuana legalization may be increasing, or slowing the decline of, these Part II offenses. Furthermore, in order to examine the impact of legalization on crime trends, a series of OLS regression were run in which each crime's post-test annual percent change scores were regressed onto the state grouping variable and the pre-test annual percent change scores. As previously discussed, this analysis will examine the impact of marijuana legalization on future *trends* while also controlling for past trends. The results of these regressions are shown in the table below.

As seen in the table, none of the models' F-tests are statistically significant, representing that the models are poor fits for the data. This also suggests that marijuana legalization had no meaningful impact on these crime rate trends across legal and comparison states.

Table 7: OLS Regression Predicting Posttest Average Annual Percent Change in Crime Rates

	b	SE	t	R^2	F-ratio
Murder					
State Group (1=Legal)	-8.88	5.34	-1.66		
Pre-test average annual % Δ	0.02	0.39	0.47	.018	1.39
Constant	5.45	3.79	1.44		
Robbery					
State Group (1=Legal)	-4.63	5.06	0.92		
Pre-test average annual % Δ	0.53	0.26	2.09	0.28	2.57
Constant	0.93	3.61	0.26		
Aggravated Assault					
State Group (1=Legal)	2.39	1.96	1.22		
Pre-test average annual % Δ	-0.10	0.09	-1.10	0.13	1.01
Constant	-1.62	1.47	-1.10		
Simple Assault					
State Group (1=Legal)	2.17	5.19	0.42		
Pre-test average annual % Δ	-0.20	0.28	-0.71	0.01	0.54
Constant	0.10	3.54	0.03		
Disorderly Conduct					
State Group (1=Legal)	4.22	8.73	0.48		
Pre-test average annual % Δ	0.14	0.46	0.29	0.01	0.12
Constant	0.36	5.55	0.07		

†p<.10, *p<.05, **p<.01

CHAPTER 5: DISCUSSION

The primary purpose of this study was to determine whether the legalization of marijuana for both medicinal and/or recreational use would cause a decline in violent crime rates as well as alcohol consumption. The theoretical foundation of the study is based on the acts of Routine Activity Theory introduced by Marcus Felson and Lawrence Cohen in 1979. Routine Activity Theory focuses on the routine activities in which includes a motivated offender, suitable target and an absence of a capable guardian, which all three must be present in order for a crime to be committed. Furthermore, the study's primary hypothesis is that marijuana legalization will reduce state-level violent crime rates, in part by reducing the state-level alcohol consumption per capita levels. While mean alcohol consumption rates increased in the legal states, there were no significant differences in either the *mean* difference scores or *average annual percent change scores* between legal and comparison states. Overall, there seems to be little to support the idea that legalization had a meaningful effect/ impact on alcohol consumption. For the Part I violent crimes, legalization did not impact the mean crime rates for legal states. For example, *mean* robbery showed a significant decline from pretest to post-test for comparison states, but not for legal states. Essentially, this would suggest that marijuana legalization may be interfering with the expected decline in robbery among states who have legalized marijuana. As with the Part I crimes, among the Part II crimes of simple assault and disorderly conduct, comparison states experienced a more drastic decline in both crimes compared to the legal states. Again, this may be suggesting that marijuana legalization is interfering with the natural decline in these criminal offenses. Furthermore, despite the fact that marijuana legalization may be

slowing the decline for specific types of crime, none of the OLS regression model's posttest crime trends were statistically significant. This would suggest that legalization is a poor predictor of the future crime trends.

As marijuana laws continue to advance, there are many research studies that discuss its influence on crime rates. Dragone et al. (2019) conducted a study that focused on the use of county-level measures at the border of Washington and Oregon. Even though the study provides valuable insight on how marijuana legalization affected bordering counties for each state, it does not consider a state-level measure. The analysis that was conducted in this research study, provides a state-level analysis and conclusion on the impacts of legalization on crime rates. However, similar to this research study, Dragone et al. (2019) also included the substance consumption with alcohol following marijuana legalization. Furthermore, Dragone et al. (2019) state that the evidence used in their study points to show that crime rates did not increase, and rather have the potential to decrease. Dragone et al. (2019) only focused on two states' bordering counties which may provide partial insight into marijuana legalization and crime rates, but not a significant influence, or well-rounded conclusion for other states.

Morris et al. (2018) conducted a study in which analyzed Part I offenses: homicide, rape, robbery, assault, burglary, larceny, and auto theft, following the legalization of medical marijuana amongst 11 states. Morris et al. 's (2018) study also included data from the year 1990 to 2006 which provides an extensive time frame to analyze the legalization impact on crime. However, the study only focused on the legalization of medicinal marijuana rather than marijuana legalization as a whole, including recreational use. This research study includes states that have fully legalized marijuana for both recreational and medicinal purposes to further expand its impact on

crime rates. By only including crime rates for when marijuana was legalized solely for medicinal purposes, adds a gap in its usage from individuals who did not have a medical marijuana identification card. Morris et al. (2018) also only focused on Part I offenses, where this research study included violent crimes associated with Part II offenses along with Part I offenses. Furthermore, Morris et al. (2018) concluded that marijuana legalization allows individuals to (1) "substitute marijuana for other drugs, including opiates, (2) substitute legitimate marijuana for illicit marijuana, (3) shows a reduction in crime rates associated with marijuana production, distribution, sale and possession, (4) as well as shows a reduction in other crimes, including some property and violent crimes" (p. 9). This research study presented provides evidence to the contrary.

Rice (2019) conducted a study which focused on a full legalization of marijuana and its impact on violent crime rates. Rice's (2019) was quite similar to the research study presented; however, it considered 32 states and included a timeline from the year 1990 to 2017. Furthermore, Rice (2019) concluded that violent crime rates had declined following the legalization of marijuana, for both medicinal and recreational purposes. Rice (2019) also uses a differences-in-differences research design, fixed effects ordinary least squares (OLS) panel data models, as well as a state fixed effects and region-by-year fixed effects. The methodology, as well as concluding remarks, were different from the research study presented here.

Policy Implications

The hypothesis presented for this study was not supported by the data, meaning that crime rates did not decline as initially thought.

In order to effectively produce new policy strategies in response to marijuana legalization, there needs to be a definite understanding of whether crime rates increase or decrease following legalization. However, given the many research studies conducted and mixed results produced, it becomes difficult to establish whether marijuana legalization positively or negatively impacts crime rates. As with the marijuana legalization laws amongst states, the nation as a whole is continuously evolving, which means there is now more research about certain topics than there used to be.

Marijuana is still classified as illegal under the federal law which makes it difficult to fully understand how the drug can be used legally, especially if each state has varying laws as well. Furthermore, in order to better establish a solid baseline on the legal use of marijuana, especially at the federal level, there needs to be a common law passed. By this, it is meant that each state would need to adhere to the law which will then provide an equal stance on marijuana use across all states, with no worry of the technicalities of crossing state borders. For example, as done with alcohol; a legal drug, the minimum age of consumption, as well as for purchase, is 21 years old. States who have legalized, or decriminalized marijuana, have also set the age minimum to be 21 years old. Alcohol sales are taxed at ten percent by the federal government as an "incentive to promote certain alcohol policies" (NIAAA, n.d.).

Ideally, with the legalization of marijuana it is wanted that individuals would use it responsibly and legally. However, it is not realistic as there will be individuals who consume the drug underage, and there will also still be illegal production and distribution. However, with specific policy tactics such as minimum age requirements, taxation, and *per se blood cannabis content* (BCC) laws, there are ways to regulate its effect on crime.

Limitations

The set of comparison states were not perfect matches for the legal states. This compromises the comparison states' ability to provide a valid counterfactual, and in turn, introduces some error into the analyses. If there was the possibility of finding a better set of comparison states, the findings from the study would then be different. However, due to the number of U.S. states, the amount of comparison states available is small, and each state has its own natural and unique qualities. This makes finding a stronger group of comparison states quite difficult and problematic. Furthermore, due to the limitation of insufficient data for states who legalized marijuana after 2019, the post-test window was limited and did not extend beyond the year 2019. With the post-test window not extending beyond the year 2019, there are states such as Michigan and Vermont that did not have data three years following their marijuana legalization, which becomes problematic when attempting to fully grasp the influence it had on crime rates. Moreover, with only a three-year pre-test and post-test windows, the influence of legalization on crime is limited and has the possibility to show more of a significant influence in later years.

The measurement of Part I and Part II offenses can both be seen as problematic in their own ways. Part I offenses may be seen as problematic due to the fact that they are based on crimes that are known to law enforcement officers. However, Part II offenses can be seen as more problematic than Part I offenses. This is due to the fact that the UCR reports the number of arrests for Part II offenses, and arrests are an imperfect measure of offending rates. Recall from the study that most of the significant results are largely with

the Part II offenses, which raises the concern that these findings may not be entirely realistic and a result of measurement error.

The reliance of state-level data itself has the potential to also be a concern. When marijuana becomes legalized, only a subset of the state population will actually use the drug. If that subset is relatively small, then this change in routine activities for this group may not be large enough to impact crime rates measured at a state-level. For example, if access to legal marijuana does discourage users from consuming alcohol, that reduction in alcohol among a small subset of drinkers may not be large enough to have an impact on state-level consumption rates.

Future Directions

The impact of marijuana legalization on crime will continue to be a topic further explored in various directions. However, it should be acknowledged, as previously stated, it becomes difficult to compare states on their crime rates following legalization as not two states are exactly the same.

Mindful of this issue, there are various directions that can be taken to further the understanding of marijuana legalization and its effect on crime rates. As more data becomes available for states that have recently legalized marijuana, it will allow there to be a more well-rounded conclusion on the crime rates for the post-test windows. Future researchers may also explore the process of surveying individuals to collect data on their own marijuana usage after legalization, if/ how their offending or victimizations have changed following legalization, and how their opinion on marijuana usage has evolved.

By doing this, further researchers are able to develop a better understanding of individual-level relationships between legalization and crime.

Many states have already legalized marijuana which leads to concerns about new public safety policy implications. Further researchers should address public safety concerns as they arise, as well provide a proposition on how community members can remain safe being around and/or using marijuana.

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