Fall 2023

Educational Attainment and Employment Status of Medical Cannabis Users in the Bay Area of California

Kristi M. Sadler
San Jose State University

EDUCATIONAL ATTAINMENT AND EMPLOYMENT STATUS OF MEDICAL CANNABIS USERS IN THE BAY AREA OF CALIFORNIA

A Thesis

Presented to

The Faculty of the Department of Psychology

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Kristi M. Sadler

December 2023

The Designated Thesis Committee Approves the Thesis Titled

EDUCATIONAL ATTAINMENT AND EMPLOYMENT STATUS OF MEDICAL CANNABIS USERS IN THE BAY AREA OF CALIFORNIA

by

Kristi M. Sadler

APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

SAN JOSÉ STATE UNIVERSITY

December 2023

Susan Snycerski, Ph.D.	Department of Psychology
Sean Laraway, Ph.D.	Department of Psychology
Sean Pradhan, Ph.D.	Menlo College School of Business

ABSTRACT

EDUCATIONAL ATTAINMENT AND EMPLOYMENT STATUS OF MEDICAL CANNABIS USERS IN THE BAY AREA OF CALIFORNIA

by Kristi M. Sadler

This research assesses whether participants' responses align with the literature concerning cannabis use on educational attainment and employment outcomes. Mainly, cannabis use in adolescence is associated with lower educational attainment, and cannabis use in general may lead to poor employment outcomes, as described in the literature. Participants were medical cannabis dispensary patients with a California medical cannabis card residing in 11 counties in or near the San Francisco Bay Area. Data were collected via an internet survey from October to December 2017 via 32 medical cannabis dispensaries. Medical cannabis users reported having bachelor's degrees at double the current national average. The majority reported working in positions without random drug screening. Company drug screening policies affected participants' job opportunities and upward mobility. Many use medical cannabis throughout the day, especially in jobs related to the cannabis industry and among those with high personal use disclosure among work individuals. Most participants used tetrahydrocannabinol (THC) and cannabidiol (CBD) at an approximate 2:1 ratio. Cannabis was used for pain, anxiety, insomnia, and depression. One limitation is that this study lacks a more diverse sampling of individuals who do not obtain cannabis from dispensaries. Medical cannabis users in this sample held college degrees, were gainfully employed, and reported experiencing little to no stigmatization concerning cannabis use.

ACKNOWLEDGEMENTS

I am thankful to many individuals who helped me achieve my goals these last years. Firstly, Dr. Susan Snycerski has freely shared her knowledge and experience with me throughout this thesis experience. A special thanks to my defense committee, Dr. Sean Laraway and Dr. Sean Pradhan, for supporting me in my research endeavors. Additionally, this research project would not have been possible without the generous support from the McNair Scholars Program, which provided educational and financial support for my journey, and its former director, Jeannine Slater, who believed that a nontraditional student, such as myself, had worth and value.

I am also grateful to the students and faculty of SJSU, the individuals in my cohort who took an interest in my study area and encouraged me to continue. Dr. Megumi Hosoda taught me about being a part of a successful research lab and preparing successful conference presentations, all the while proving that experimental research was fun. I would also like to thank the many lab members of the Work Place Diversity Lab who helped me research and refine my project over the years.

Lastly, I must thank my family, especially my husband Joel, my children, and the residents of The Ranch. They have all helped care for my son Joshua and allowed me the time and freedom to finish this journey. They supported and believed in me throughout my academic process and never let me give up on myself.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

Cannabis use is growing globally, and the adverse consequences of such use are plentiful in the academic literature. The legal status of cannabis and its use is changing rapidly. Although cannabis laws started with medical compassion acts for treating specific health disorders, they have grown to encompass recreational adult use. Some countries, such as Uruguay and Canada, have fully legalized cannabis at a federal level. In contrast, other countries, such as Australia and the United States (US), still have a mixture of laws allowing medicinal and recreational use. The growing use and acceptance of cannabis have resulted in a myriad of educational and employment cannabis issues. Over the last few decades, the research consensus has been that cannabis use lowers educational attainment rates and leads to poor employment outcomes. However, more recent research has examined the role of confounding variables in such studies and has found opposing findings. As more information becomes available, questions about the effects of cannabis use on education and employment-related outcomes have grown. Due to the paucity of literature on functional cannabis users, this study aims to determine if such negative impacts of cannabis use are found on educational attainment and employment outcomes in a sample of medical cannabis users in the Bay Area of California.

Research Objectives

This research assesses whether participants' responses align with the literature concerning cannabis use on educational attainment and employment outcomes. The literature generally concludes that cannabis use in adolescence leads to lower educational attainment and, overall, to poor employment outcomes. Along with educational and employment

information, this research also measures the amount of cannabis use and the route of administration. It also examines the type of cannabis used, how often it is ingested, and the reasons for consumption. In addition, this research seeks to determine how workplace drug testing affects participants' cannabis use and upward mobility in the workplace. The aim of this study is to add to the literature a snapshot of educational attainment and employment information among medical cannabis users in the Bay Area of California.

Literature Review

History of Cannabis

The use of cannabis, also known as marijuana, has a rich historical background, spanning thousands of years and encompassing ancient civilizations in China, India, and Egypt. Historical texts from China dating back to 2737 BCE mention cannabis for treating various ailments, including pain and inflammation (Russo, 2007). In India, cannabis was traditionally used in Ayurvedic medicine for its analgesic and psychoactive properties. Mummies in Egypt have been found with trace amounts of cannabis, suggesting its use for medicinal purposes. In Egypt, the French emperor, Napoleon Bonaparte, was fond of cannabis and its calming effects. Napoleon's doctors then introduced cannabis to Europe in the 1700s, where it was primarily used medicinally to treat many conditions, including pain, asthma, depression, and loss of appetite (Charitos et al., 2021).

The medicinal properties of cannabis gained further recognition in the 19th century with the introduction of the plant into Western medicine by Dr. William Brooke O'Shaughnessy (Crocq, 2020), who made a groundbreaking discovery regarding the therapeutic effects of cannabis as an analgesic, anti-inflammatory, and anticonvulsant substance. His pioneering work contributed significantly to our modern understanding of this ancient medicine.

In the 20th century, extensive scientific research was conducted on cannabis by renowned scientists, such as Dr. Ralph Mechoulam of Israel. His groundbreaking research led to significant discoveries and isolation of the plant's main bioactive compounds, namely cannabidiol (CBD) and delta-9-tetrahydrocannabinol (THC) (Pertwee, 2006). These

breakthroughs revolutionized our understanding of the medicinal properties of cannabis and paved the way for further scientific exploration into its potential medical uses.

Pharmacology of Cannabis

Chemical Composition of Cannabis

The cannabis plant produces multiple compounds of interest to researchers, including phytocannabinoids, terpenes, and flavonoids. The cannabinoids belong to the aromatic hydrocarbon family and comprise a complex arrangement of carbon, hydrogen, and oxygen atoms. There are 100 phytocannabinoids identified and over 400 other compounds in cannabis (Radwan et al., 2021). Phytocannabinoids are the naturally occurring terpenophenolic compounds found in cannabis and are present in both hemp and marijuana plants. THC, a phytocannabinoid identified by Dr. Mechoulam in 1968, is responsible for the psychoactive effects commonly associated with cannabis inebriation. In contrast, CBD, the other main phytocannabinoid, has gained popularity for its potential therapeutic benefits without causing inebriation (Gülck & Møller, 2020). Researchers worldwide are investigating these two components of phytocannabinoids and other compounds for possible beneficial medicinal properties.

Phytocannabinoids are not the only area of ongoing cannabinoid research. The arachidonic fatty acids anandamide and **2**-Arachidonoylglycerol (AG-2) naturally occur in animals (Behl et al., 2022). These molecules can be found throughout the human body and are involved in many brain and body processes. Both exogenous and endogenous cannabinoid compounds work on cannabinoid receptors that contribute to the regulation of various physiological processes (Komarnytsky et al., 2021). The chemical composition and

actions of phytocannabinoids and naturally occurring endocannabinoids in the human body are topics of great medicinal interest.

The pharmacological actions of cannabinoids are mediated through the endocannabinoid system, which consists of cannabinoid receptors (CB_1 and CB_2). This internal receptor system was first discovered in Raphael Mechoulam's lab in 1988 (Mechoulam & Parker, 2013). The effects of THC are primarily attributed to its interaction with cannabinoid receptors type 1 and type 2 by acting as a partial agonist. CB_1 receptors are found mainly in the brain's gray matter and the stomach, whereas CB_2 receptors are in the brain's hippocampal cells, glial, and immune system (Bie et al., 2018). THC can stimulate their activity and produce psychoactive effects such as euphoria and impairment (Śmiarowska et al., 2022). In contrast, CBD does not produce the psychomimetic effects commonly associated with cannabis use. Producing little to no euphoric or impairing effects, CBD has been found to be a more desirable option for medicinal purposes (Crippa et al., 2018). Because of these different effects, some individuals use cannabis for symptom treatment and never experience a "high" or being inebriated. As such, much of the research has centered on THC consumption and the CB_1 receptors in the brain, especially during formative growth periods.

Neurological Correlations and Cannabis Use

According to the United Nations Office on Drugs and Crime (UNODC, 2023), cannabis is one of the most used drugs among all demographics worldwide, and usage is increasing yearly. In 2008, an estimated 3.6% of the world's population used cannabis. By 2018, this estimate had risen to 3.8%; in 2021, it was estimated to be 4.3%. North America has seen a

sharp increase in self-reported cannabis use from 8.4% in 2014 to 17.7% in 2021, meaning 57,170,000 people identified as regular cannabis users (UNODC, 2023). Gallup Polls found increasing support for total cannabis legalization in the US using combined data from 2018 to 2022, with the greatest support for such legalization centered in the working-age population. Survey respondents aged 18–29 indicated a 79% approval rate, with 73% of 30- to 49-year-olds and 63% of those aged 50–64 expressing approval for legislation (Han & Palamar, 2020). Cannabis use in medical and recreational forms is increasingly normalized in younger generations. Despite cannabis users becoming more open and cannabis use itself more accepted, it is important to acknowledge how cannabis use may impact neurological development.

The potential impact of cannabis use on intelligence has been the subject of studies for decades. A correlation has been found between cannabis use and lower cognitive abilities, specifically intelligence and cognitive function. Meier et al. (2012) found that persistent cannabis dependency from adolescence to midlife was correlated with an eight-point decline in the intelligence quotient (IQ). A study with young adults who smoked cannabis prior to and up until age 17 found that young-onset cannabis use was possibly linked to reduced overall Verbal Intelligence Quota (VIQ) (Pope et al., 2003) and among those aged 18 – 26, slower psychomotor speed and sequencing ability, increased cognitive inhibition errors, and less efficient sustained attention (Lisdahl & Price, 2012). MRI analysis has also contributed to understanding the relationship between cannabis use and intelligence. Nevertheless, the long-term effects of cannabis on intelligence are still under-researched and lacking causal evidence. It is important to note that several potential confounding factors, such as

intelligence, attention deficit hyperactivity disorder, social circumstances, alcohol use, and cigarette smoking, may all affect the asserted association between cannabis use and lower cognitive abilities.

Adolescence

The impact of cannabis use on the adolescent brain has been a growing area of research as legalization efforts progress. With cannabis products becoming more widely available, understanding the potential effects of cannabis use on the developing brain is imperative. Over the past decade, numerous neuroimaging studies have provided insights into the structural and functional changes in the brains of adolescent cannabis users. One major longitudinal study on this topic is the National Institutes of Health's Adolescent Brain Cognitive Development (ABCD) Project (Bjork et al., 2017). This project utilizes neuroimaging techniques to track the impact of cannabis use on young Americans from late childhood to early adulthood. The findings from these neuroimaging studies provide possible evidence for the detrimental effects of cannabis use on the developing adolescent brain. Another study correlated cannabis use during adolescence to altered brain morphometry or changes in the external shape and dimensions of the brain and neural functioning (Batalla et al., 2013). A third study considered that exogenous cannabinoids could disrupt normal adolescent processes, such as neuronal pruning (Albaugh et al., 2021). Exogenous cannabinoids taken in adolescence may have a neurotoxic effect on the adolescent brain, impacting various cognitive functions.

The neurotoxic effects appear to persist even after cessation of cannabis use, as studies have concluded that the neuropsychological decline observed among adolescent-onset users

is not fully reversed. A recent review of evidence by Blest-Hopley et al. (2020) indicated that even with long periods of abstinence allowing for cannabis metabolites to clear the body, adolescent cannabis users persisted in showing altered activity in neural networks of the brain governing mental tasks. Additional reviews concerning adolescent drug exposure and long-term effects on the adult brain appear to support these findings. A review by Salmanzadeh et al. (2020) found support indicating that cannabis use in adolescence could trigger epigenetic mechanisms in the brain. The results could induce modifications in the brain that carry over into adulthood. The available evidence from neuroimaging studies strongly supports the notion that cannabis use during adolescence has detrimental effects on brain development and cognitive functioning that affect multiple aspects of life in both the short term and long term.

In adolescents, the prefrontal cortex, limbic regions, and neural pathways connecting different brain regions are the areas of the brain that are presumed to be most affected by cannabis use. These regions are crucial in emotion regulation, memory formation, and reward processing. Cannabis use is believed to create neural deficits in memorization, focus, logical thinking, and visual processing (Goud et al., 2022; Owens et al., 2022) and impairs memory, attention, and decision-making abilities (Dougherty et al., 2013). In the prefrontal cortex, repeated cannabis use during adolescence has been correlated to gray and white matter changes, including reduced volume and altered structure (Renard et al., 2016; Wrege et al., 2014). These changes are particularly pronounced in brain regions with high expression of the cannabinoid receptor type CB_1 gene. The limbic regions, such as the hippocampus, amygdala, and cingulate cortex, have also been thought to be affected by cannabis use in

adolescents (Burggen et al., 2019). Furthermore, research has postulated that cannabis use in adolescence may lead to abnormal connectivity within the hippocampal afferent fibers, which are essential for learning and memory processes (Lupica & Hoffman, 2018; Renard et al., 2016). Functional connectivity of the brain, particularly in individuals who start using cannabis during adolescence or young adulthood, can be significantly affected by cannabis use (Martín-Santos et al., 2010). Many changes in the hippocampus and cingulate cortex may also impact the ability to learn. It is hypothesized that poor connections between brain regions attributed to cannabis use may diminish learning ability. The scientific consensus is that cannabis use diminishes adolescents' ability to learn and emotionally regulate. This may help explain the association between frequent cannabis use from adolescence into adulthood and the corresponding declines in IQ found by Meier et al. (2012) in a longitudinal study following a birth cohort of 1,037 individuals born in the early 1970s until 38 years of age. The research team conducted follow-up interviews of the cohort at ages 18, 21, 26, 32, and 38. They concluded that persistent cannabis use was associated with neurological declines across neurological domains. Their study also supports the conclusion by previous researchers that the neurotoxic effects of cannabis are non-reversible and persistent with age.

As previously discussed, multiple studies suggest that persistent cannabis use during high school is linked to lower GPAs, decreased SAT scores, and increased externalizing symptoms (Horwood et al., 2010; Meda et al., 2017). For instance, in the work by Arria et al. (2015), a structural equation modeling study revealed that marijuana use during the first semester of college was related to lower GPA among students. Furthermore, Patte et al. (2017) published results from a three-year longitudinal cohort study which determined that

high school students who smoked cannabis regularly had significantly lower GPAs and academic outcomes than those who did not smoke cannabis. This study indicated that cannabis use during college can directly impact academic performance. Furthermore, this study confirms and extends the previous findings by exploring the effects of cannabis use on academic performance among individuals who use other polydrug combinations, such as prescription drugs like Adderall or other illicit drugs, while excluding tobacco and alcohol.

Research has consistently indicated that cannabis use, particularly when started at a young age, has detrimental effects on academic achievement. However, research by Meda et al. (2017) reported that once alcohol and tobacco use were controlled for, the effects of cannabis on a student's academic performance became nonsignificant. A few studies have also shown no difference in outcomes between moderate cannabis users and nonusers in educational performance. For example, Fergusson et al. (2003) followed a birth cohort of 1,265 children in New Zealand for 25 years, measuring the frequency of cannabis use from 15 to 25 years, educational achievement, and social, family, and individual characteristics prior to age 16. The results found no significant difference in educational attainment between moderate cannabis users and nonusers when controlling for confounding variables. The conclusions of their study revealed that although cannabis use was associated with decreased educational achievement, it was more likely due to social context than the effect of cannabis on ability or motivation. This observation of confounding variables with negative correlations is supported by Maggs et al. (2015). They found that controlling for confounding factors, such as alcohol consumption, significantly diminished the association between cannabis use and college entry. This rendered the difference between self-reported cannabis

users and non-users practically and statistically nonsignificant. Once adjusted, the university entry rate for individuals who used cannabis alone at least 100 times, without polydrug consumption by age 17, was comparable to that of nonusers. The findings from these studies suggest that while there may be an initial association between cannabis use and lower academic performance, this relationship becomes nonsignificant when controlling for other factors, such as alcohol and tobacco use, and confounding variables, such as social context (Meier et al., 2015).

Cannabis users who have moderately used cannabis from a young age and with moderate polydrug use, including alcohol and tobacco, may be at a lower risk for adverse effects on the brain and cognitive function than heavy long-term cannabis users. Ong et al. (2021) defined light users as less than 10 times in 30 days, moderate use as 10 to 20 times within 30 days, and frequent use as +20 times in 30 days. Ellingson et al. (2021) defined moderate use as 1.9 times per week when examining siblings with discordant cannabis use and measures such as verbal memory. Until there is a way to categorize use consistently and standard consumption measures are available, the actual effects of cannabis use among adults remain unsettled.

Adults

Cannabis consumption for individuals over 21 has grown with the legalization movement over the past decades. Several longitudinal studies on birth cohorts, including Fergusson et al. (2003), who followed individuals to age 25, and Meier et al. (2012), who followed individuals to age 38, have investigated the residual effects of recreational cannabis use on brain function in adult cannabis users and the results were mixed. A meta-analysis conducted by Lovell et al. (2020) looked closer at adults who used cannabis. The research team

examined the literature for performance studies conducted in six cognitive domains (attention, executive function, learning and memory, decision making, information processing, and working memory) to examine the possible impact of cannabis use on neurological outcomes in the 25 to 36 age group. Their findings indicated that only small to moderate deficits were found in all domains except executive functioning, which was nonsignificant in participants abstinent for 25 days or longer. Meta-analysis of studies on brain volume in adults has found no significant differences in multiple brain areas of adult cannabis users and non-users (Thayer et al., 2017). Additionally, evidence suggests that long-term heavy cannabis use may lead to structural changes in the brain. Functional neuroimaging studies have reported increases in neural activity in regions associated with cannabis intoxication or mood changes and a decrease in the activity of regions related to cognitive functions impaired during acute intoxication (Jager, 2012).

Other functional studies, such as Troup et al. (2016), have investigated emotional processing through event-related potential paradigms (ERPs). ERPs involve measuring the small voltages of electrical generation within brain structures when responding to stimuli. The researchers found that participants with the highest consumption of cannabis showed deficits in explicit processing and negative emotions.

Further research among adults looking at the baseline resting state of the brain and functional connectivity using electroencephalography (EEG) between cannabis users and non-users found what researchers deemed a “noisy brain.” Investigations by Prashad et al. (2018) reported differences in beta, theta, and delta brain wave activity among adult female cannabis users in a resting state compared to controls. These findings suggest increased

cortical activation and relaxed inhibitory function may intrude on cognitive processes. This ongoing increase in neuronal wave activity may interrupt cognitive processes, creating the "noisy brain," making it more challenging to direct and hold attention due to the loss of neural refinement and efficiency.

In addition, a systematic review of evidence conducted by Ogunbiyi et al. (2020) indicated that adult cannabis users have lower resting global and prefrontal blood flow than do nonusers, which could affect the hippocampus, impacting memory retention and cognitive functioning. Such lowered blood flow to the prefrontal cortex, which governs impulse control, decision-making, and executive functioning, is believed to cause cannabis inebriation. Researchers believe decreased blood flow to these regions may result in morphology previously observed in adolescents' brain structure. The amygdala is also affected during inebriation, which may alter mood and cause anxiety. In addition, the cerebellum, which controls motor skills such as balance and coordination, is possibly also affected during cannabis inebriation.

The current research on cannabis use and its effects on the brain by neuroimaging in adults is complex, partly due to comorbidities and confounding variables also noted in adolescents (Lisdahl et al., 2014). In addition, sample adult populations involved in research often consist of individuals considered heavy users and diagnosed with disorders such as Cannabis Use Disorder (CUD), which may limit the generalizability of the findings to the broader population.

Middle-Aged and Older Adults

Middle-aged and older adults also use cannabis, and their use has seen the most significant increase as a result of its legalization. Adults aged 35 to 44 showed a 43% increase in usage, adults aged 45 to 54 had a 48% increase, and seniors aged 55–64 had a whopping 455% increase (Azofeifa et al., 2016). One possible explanation for the growing cannabis use among adults is the perception of cannabis as having many medicinal effects. Middle-aged adults may use cannabis to manage various age-related conditions such as chronic pain, insomnia, and anxiety. The main area of research among the older population has been on Alzheimer's disease. Researchers believe that the cannabis compounds CBD and THC can help reduce inflammation and improve cognitive function (Kim et al., 2019). Motor coordination and tremor control of Parkinson's disease have also improved with cannabis treatment (Varshney et al., 2023). Cannabis studies on this population indicate that its use helps with treating chronic pain, insomnia, arthritis, and inflammation (Guillouard et al., 2021). However, more studies are needed to fully understand these potential benefits. Additionally, there is a lack of research examining the neuroimaging and behavioral effects of cannabis use in middle-aged and older adults. With most research focused on adolescents and young or emerging adults, limited clinical evidence supports cannabis use in the older population. Thus, our understanding of the potential benefits and risks of cannabis use in this age group remains limited.

Future of Cannabis Research

Although cannabis research has seen significant advancements, it still faces numerous challenges and remains largely understudied by the scientific community. One area that has

gained attention is the potential therapeutic use of cannabis through the effects of cannabinoids on the brain and body (Leinen et al., 2023). Researchers are studying the mechanisms of action of cannabinoids to understand better how they interact with the endocannabinoid system and target specific symptoms or conditions (Fowler, 2020). Federal regulations that hinder comprehensive cannabis research are a primary reason for the stalled progress. Cannabis is a Schedule I drug classified as having no accepted medical use and a high potential for abuse (Drug Enforcement Agency, 2018). These regulatory barriers make it difficult for researchers to obtain the necessary approvals and funding for in-depth studies. Animal research is also limited to rodents and non-human primates due to ethical concerns and the lack of appropriate models for studying the effects of cannabis on other animals. The scarcity of federal research funding for investigating constituent compounds further restricts cannabis research. Despite these challenges, several areas of cannabis research have received significant attention in recent years, and more research may be on the horizon if the US Congress moves to change cannabis to a Schedule III classification, allowing more research to be conducted (Jacobs, 2023).

Historical Stereotypes and Resulting Stigma

Cannabis has a long and complex history. It has been praised for its medicinal properties and also demonized as a dangerous and illicit substance. Cannabis has long been the subject of various stereotypes that have shaped public opinion, policies, and attitudes toward users (Tews et al., 2023). Users are often portrayed as rebellious, lazy, and irresponsible; they have been deemed individuals who reject mainstream societal norms (Hirst et al., 2017; Reid,

2020). Many of these negative attitudes toward cannabis users can be attributed to racial prejudices and furthered by media portrayals.

During the 1930s, there was a significant stigmatization of marijuana and cannabis use, particularly toward People of Color (POC). This stigmatization was fueled by prevalent anti-immigrant sentiment and racial prejudices. POC populations were stereotyped as dangerous, unpredictable, and morally deviant. This stigma was often used to justify the prohibition of marijuana and the implementation of strict drug laws targeting entire POC communities. Mexican immigrants who used cannabis were looked down upon and considered a threat to society (Cummings & Ramirez, 2021). This negative depiction of marijuana and cannabis use among POC perpetuated harmful stereotypes and further marginalized these communities (Campos, 2018).

Cannabis stereotypes were reinforced by the media as early as 1936. This was when films such as *Reefer Madness* (1936) were first introduced. This film depicted marijuana use as leading to madness, violence, and moral decay, contributing to the "gateway drug" myth and cementing the association of marijuana with criminality (Taylor, 2018). Throughout the 1940s and 1950s, state and federal prohibitions and government policies shaped the social and cultural perceptions of marijuana. Policies such as the Marijuana Tax Act of 1937 led to the delisting of cannabis from the American Medical Association's US Pharmacopeia in 1942 (Rasmusson, 2014). Such targeted policies further marginalized cannabis and limited opportunities for research and exploration of its therapeutic potential. Overall, the social and cultural perceptions of cannabis in the 1940s and 1950s continued to be heavily influenced by prejudices, government policies, and media propaganda deeply rooted in racial fears and

xenophobia. The continued influx of Mexican and Latin American immigrants and media campaigns propagated negative stereotypes of marijuana users as POC and criminals.

In the decades following the 1960s, marijuana stereotypes and discrimination continued to shape public opinion, policies, and attitudes toward its use. The criminalization of marijuana and the creation of the Controlled Substances Act in the US in the 1970s further fueled negative attitudes and perceptions surrounding its use. Criminalization disproportionately affected marginalized POC communities, particularly African Americans and Latinos, which led to racial disparities in marijuana-related arrests and incarceration rates (Harris & Martin, 2021; Tews et al., 2023). During this period, the counterculture movement and US hippies also became closely associated with cannabis stereotypes.

The War on Drugs, initiated in the 1970s by President Nixon, specifically targeted POC and the US anti-war faction. The Nixon administration created the Federal Drug Schedule, which classified cannabis as a highly addictive, dangerous drug with no medicinal value, in the same category as drugs such as heroin. These policies further entrenched negative stereotypes and discrimination against cannabis users, with far-reaching consequences (Cummings & Ramirez, 2021).

The Reagan administration in the 1980s focused federal government efforts again on the War on Drugs. With support from First Lady Nancy Reagan, his administration created, launched, and promoted the Drug Abuse Resistance Education Program, or DARE. Widely implemented in public schools during the 1980s and 1990s, this drug education program advised children and teens to say “no” to drugs as it sought to educate students about the

dangers of drug use, including cannabis, and to promote a drug-free lifestyle (Matson et al., 2019).

With the federal scheduling of cannabis as a dangerous drug, users faced social exclusion and discrimination in federal programs such as employment and housing. The history of negative stereotyping has persisted with media portrayals of cannabis users as lazy, unmotivated, and intellectually impaired, thus narrowing opportunities and leading to unequal treatment (Tews et al., 2023). These stereotypes and discriminatory practices have not only hindered acknowledging the full potential medicinal benefits of cannabis but have also perpetuated harmful societal divisions and contributed to the unjust targeting of specific individuals and communities (Habecker & Bevins, 2022). The stigma has made individuals feel ashamed or fearful of disclosing their cannabis use (Newhart & Dolphin, 2021), creating barriers to accessing healthcare, employment, and other essential services.

The end of the 1990s marked the beginning of change in cannabis use. In 1996, California became the first state to legislate cannabis use for medical purposes. Voter-approved Proposition 215, or the Compassionate Use Act, allowed cannabis to be sold in state-licensed dispensaries with a physician's recommendation (California Legislator, 1996). While California was the first state to open the doors to medical cannabis use, it was not the last.

The widening acceptance of cannabis for medicinal purposes started in the early 2000s, as three more states, Hawaii, Colorado, and Nevada, gained voter approval for medicinal cannabis (Mallinson & Hannah, 2020). Nevertheless, society continued to be influenced by the popular media, which continued to depict cannabis users as lazy, unproductive, and

irresponsible. In Afroman's album (2001) *Portrayal of Irresponsibility*, "Because I Got High" humorously narrates a series of negative consequences of cannabis use. This song reinforces the stereotype of cannabis users as careless, unmotivated, and unethical, aligning with the media's focus on the recreational use of cannabis for escapism and amusement. These portrayals contribute to the perception that cannabis is primarily used for getting high and having fun, overlooking its medical and therapeutic applications. As a result, negative stereotypes and misconceptions overshadowed the benefits and potential therapeutic uses of cannabis.

More balanced and accurate portrayals of cannabis use in media were made in the 2000s (Haines-Saah et al., 2014). Television shows like CBS's *The Big Bang Theory* (Lorre & Prady, 2007) depict intelligent, well-educated individuals supporting cannabis research as one of the main characters, Leonard, is often seen wearing a tee shirt with a THC molecule depicted on the front. *Kim's Convenience* (Fecan & Raffe, 2016) from Canadian television depicted family conversations about medical cannabis use for the treatment of multiple sclerosis. Another popular television show, *Silicon Valley* (Judge & Berg, 2014), on HBO, centers around tech industry employees and includes many scenes where cannabis and paraphernalia is present or purchased, with no negative consequences for the characters. Once a taboo subject, cannabis has been increasingly portrayed positively by the mainstream media both for research and medical use. Significantly, these representations are becoming more widespread and generally more nuanced when depicting cannabis use (Duff & Erikson, 2014).

In addition to television, movies also shaped public perception of cannabis use. Films show cannabis users as resourceful, intelligent, and fun. In stark contrast to the terrible outcomes depicted in *Reefer Madness* (1936), the movie *Pineapple Express* (2008) exemplified the sharp contrast between early depictions of cannabis users driven to violence, insanity, and suicide by sharing a marijuana cigarette and modern protagonists who solve mysteries by deciphering clues aided by cannabis (Taylor, 2018). These portrayals are often bolstered by the emergence of public figures, such as Former President Obama, who admitted to using cannabis as a young person, and celebrities, such as Seth Rogan and Snoop Dog who still produce artistic content while openly discussing their cannabis use to the press and the public (Graves, 2019; Moreno, 2018; Youngers, 2012). These factors have helped to continue to normalize cannabis use in the 21st century.

Challenging the Stigma of Cannabis Use

Since the inception of cannabis legislation, various efforts have been made to help reduce the stereotypes and stigmas associated with use, particularly in countries and states where cannabis has been legalized for medical and recreational purposes. These efforts have primarily focused on education and changes in legislation surrounding cannabis-related issues.

The legalization of medical marijuana in many countries and some US states has played a significant role in reducing the stigma associated with its use. It has helped people see cannabis as a legitimate medicine that can relieve the symptoms of various medical conditions (Shu-Acquaye, 2016). In addition to medical and recreational use legislation, many states, such as California, have implemented avenues to expunge cannabis-related

criminal convictions from individuals' records. The Marijuana Conviction Relief, or Proposition 64, was approved by the voters in November 2016. It allows individuals to request that criminal offenses, such as cannabis possession or growing, be removed from their criminal records (California Courts, 2023). Similar acts have passed through Congress, such as the 2023 Cannabis User Restoration of Eligibility (CURE) Act, which prevents past cannabis use from disqualifying individuals from federal employment opportunities or failing to be granted a security clearance (Raskin, 2023).

Although progress has been made in reducing stigma in some areas, there are still communities where cannabis stigma remains a significant issue. For instance, Skliamis and Korf (2020) surveyed 1,225 individuals aged 18–40 who had used cannabis within the last year and lived in seven European countries with different cannabis policies. Users were surveyed about perceived discrimination, devaluation, and alienation. The study revealed that those in more conservative areas perceived a greater bias against cannabis than those in countries with liberal cannabis use policies. Greek participants cited discrimination in the form of being rejected by friends, French participants reported higher instances of viewing cannabis users as dangerous, and Germans considered cannabis users as unreliable. This finding is supported to some extent in the US. Qualitative research by Lim (2023) showed that the more conservative states, such as the abolitionist state of Nebraska with no cannabis allowances, still fear THC and its psychotropic effects but are more accepting of CBD and hemp-derived products for medicinal use. Habecker and Bevins (2022) found a high level of support for medical marijuana legalization, with 83.18% of Nebraskans favoring action, yet less support for legal recreational use. Siddiqui et al. (2022) compiled a review on the subject

over the past ten years. Their research investigated participants' reports from various communities as to racial stigma and perceived discrimination toward people who use various substances, including cannabis. The findings indicated a difference in the degree of support between cannabis for medical use and cannabis for recreational. The difference in support was influenced by age, gender, political party, and religious affiliation, as to the stigma experienced. These findings support the view that cannabis culture can influence the acceptance or rejection of cannabis based on the reason for its use.

Legality of Cannabis

The legal status of cannabis in the US has changed significantly. Cannabis was widely prohibited at both the state and federal levels, with states implementing prohibition laws as early as 1911 (Campos, 2018). The Marihuana Tax Act followed this in 1937, which effectively outlawed the growth and possession of cannabis nationwide (Musto, 1972). However, the tide shifted in 1996 when California passed the Compassionate Use Act, becoming the first state to legalize cannabis for medical purposes. This marked a turning point in the perception of cannabis, as it was now recognized for its potential medicinal benefits. Since then, the acceptance of medical cannabis has been steadily growing. Today, medical use of cannabis is legal in 38 states, with varying regulations and approval indications.

The legalization of cannabis for recreational purposes has also gained traction in recent years (Hall & Lynskey, 2020). Recreational adult cannabis use is legal in 23 states, as well as the District of Columbia and Guam; more states are considering or actively working toward legalization (Hansen et al., 2023). This shift in cannabis legislation can be attributed to

several factors. One is the growing body of research indicating the potential therapeutic benefits of cannabis. Another is the economic potential of the cannabis industry, which has played a role in shaping the legal landscape. As more states legalize and regulate cannabis, the industry has grown substantially, generating job opportunities and significant tax revenue (Young et al., 2020). The California Department of Tax and Fee Administration (2023) reported collection from cannabis excise and sales taxes in the second quarter of 2023 at $276,238,550. Another state with legal recreational cannabis, Colorado, reported cannabis tax collections at $187,515,080 from January through August of 2023, bringing Colorado's total cannabis revenue to $2,531,551,769 since the first sales in 2014 (Colorado Department of Revenue, 2023). With more than two-thirds of the adult population in the US having legal access to cannabis for either medical or recreational purposes, it is evident that public support for legalization is on the rise, and more and more individuals are starting or restarting cannabis use.

Many cannabis users are among the working population, and employers have begun to address cannabis use among employees. Various workplace drug testing policies can be found across the US. Depending on the type of job and employer, workplace drug screenings can be mandatory for some jobs with federal oversight, such as transportation. Drug screenings can be implemented with a cause, such as when an accident occurs, or an employee appears to be under the influence on the job. In some cases, the employee is notified prior to the screening; in other cases, drug testing is required for no reason in random screenings, depending on the individual company’s policy. Some companies have

multilayered drug screening policies wherein only certain employees in specific jobs are drug screened.

Amazon is an example of a company with layered drug screenings. Because the company's drivers are still under the Federal Department of Transportation's purview, these individuals are still screened for drugs, and a drug-free workplace is mandated. This is because cannabis is still federally illegal as a Schedule I drug, and cannabis can cause adverse effects on spatial memory and difficulty in driving (Desrosiers et al., 2015). However, for other jobs at Amazon not involved in federally regulated positions, the company has stopped random testing and implemented with-cause testing among employees. Amazon has further stated that pre-employment drug screenings are no longer required for many of its employees (Nagele-Piazza, 2021). The company has likened cannabis consumption to alcohol consumption and has chosen to remove the cannabis drug screening protocol.

Although the federal government still has a drug-free workplace policy, some agencies, such as the Federal Bureau of Investigations (FBI), had limits on the time that had to have passed since the last use of cannabis before being hired. An individual applying for a position must be abstinent from cannabis for one year prior to being hired (FBI Jobs, 2022). This is reduced from the original ten years of abstinence required before 2014 (Jaeger, 2021). The main impetus for the change was the inability of the FBI to hire cybersecurity personnel. Although many individuals consume cannabis regularly, it appears that use among computer programmers, or hackers, is among the highest, according to Endres et al. (2022), who researched programmers' use, perception, and motivation for cannabis use. Tech-savvy

individuals using psychoactive substances to help improve programming skills are further supported by research from Newman et al. (2023), who also investigated the use of psychoactive substances, including cannabis, among computer engineers. Their research found that participants used cannabis to increase brainstorming and improve creativity and enjoyment of work.

Method

Sampling and Participant Selection

Participants were medical cannabis dispensary patients with a California medical cannabis card residing in 11 counties in or near the San Francisco Bay Area: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, Santa Cruz, and San Benito. Of the 89 responses, three data points were discarded because all the survey questions were unanswered aside from the amount of cannabis used. However, not all participants (n = 86) answered every question.

Data Collection Methods

Flyers with an internet survey link and information in online club newsletters were distributed from October to December 2017 via 32 medical cannabis dispensaries. Interested participants used the link to access an online Qualtrics survey page. After providing informed consent, they completed an approximately 15-minute-long survey, after which they were debriefed and thanked for their time. The San José State University Internal Review Board approved all materials and protocols before conducting the research.

Measures

Survey questions allowed for more than one option to be selected. Participants were asked about their cannabis use preferences, including the time of day when cannabis was consumed, the amount of THC and CBD, and the method of ingestion, including edibles, topicals, vaporizers, concentrates, oral spray, and rolled-in paper or tobacco. We also asked about the amount of cannabis, in grams, used per dose and per week, the source of cannabis

(home-grown, dispensary, or another source), how often users visit dispensaries, and how much money they usually spent during an average visit.

Participants' history of cannabis use was also examined. These questions included what age participants first began cannabis use, when they obtained a medical card, and how long they had been continuously using by asking if they had ever quit cannabis for an extended time. If participants reported an extended period of cannabis abstinence, they were questioned about the length and the reason for the break.

Medicinal uses of cannabis were determined, such as how effective cannabis use was for their medical treatment and if a change in tolerance had occurred to modify the amount or administration of cannabis. Participants indicated the most important reasons for cannabis use from the provided physical and psychological symptoms list. Condition improvement (i.e., appetite, concentration) and condition prevention (i.e., seizures, anxiety) were presented, as well as a place for "other" reasons to be specified. The survey also addressed whether cannabis use was a substitute for alcohol, medication (prescription or over-the-counter), tobacco, or other drugs. The survey also measured educational attainment. Questions in this section assessed the highest level of education and any degree received. It also asked for information about the specific major (e.g., Communications, Psychology, etc.) and whether the participant received a minor degree.

Employment questions included current employment status (employed, retired, unable to work, and unemployed looking or not looking for work), whether they were full- or part-time employees, pay conditions, hourly or salaried, and information on the employer's drug testing policy. Participants were also asked to indicate if they ever turned down a job or a

promotion because of workplace drug screening policies. Lastly, participants reported with whom (family, friends, supervisors, co-workers, subordinates, customers, and professional medical providers) they felt comfortable sharing information about their medical cannabis use.

Data Analysis

Data were downloaded from Qualtrics Software through the San José State University account. The data were cleaned, coded for analysis, and analyzed with IBM SPSS software (Version 27). Percentages and frequencies of the questionnaire are reported. Being investigatory, this research employed a cross-sectional sampling technique. There were no random assignments to conditions. The research investigated the percentage of employed individuals, including those self-reporting early onset cannabis exposure under age 21, and their educational and employment outcomes. The research also collected information about participants' medical cannabis use and their demographic information.

Participant Demographics

Demographic information of the sample revealed that those identifying as male were 41.89% (n = 31), those identifying as female were 57.76% (n = 48), and those who self-identified via text entry as “both” were 1.15% (n = 1). The racial composition of the sample included White 59.77% (n = 52), Hispanic 10.34 % (n = 9), American Indian 1.15% (n = 1), Asian 1.15% (n = 1), Other 2.30% (n = 1), and Biracial 9.20% (n = 8). The median income of the sample was $50,000 per year. Of the respondents, 92.41% (n = 73) reported starting cannabis use before age 21, with an age range of starting cannabis reported from 9 through 70.

Educational Attainment

Of the sample, 100% (*n* = 86) reported graduating from high school. Those reporting not continuing to college comprised 5.13% (*n* = 4), and those reporting only attending some college was 49.74% (*n* = 31) of respondents. The college educational attainment can be seen in Table 1.

Table 1

Educational Attainment

Level of Achievement	*f* (%)	*n*
Associates	18.60	8
Bachelors	48.84	21
Masters	20.93	9
Ph. D or Other	11.64	5

Of the sample, 95% of participants enrolled in college after high school, of which 55.13% (*n* = 43) reported obtaining a degree. The degree discipline areas varied, with 39.81 % (*n* = 17) of the respondents majoring in STEM (Science, Technology, Engineering, and Math). Degree types received consisted of Social Sciences at 12.64% (*n* = 11), Business at 9.70% (*n* = 9), Humanities and Science at 9.20% (*n* = 8), and Engineering degrees and Applied Science and Arts degrees both at 1.15% (*n* = 1). Additionally, 39.5% (*n* = 17) of those obtaining a degree reported receiving a minor degree. The minors received included Humanities 7.24% (*n* = 6), Social Sciences 5.15% (*n* = 5), Business 3.45% (*n* = 3), Applied Science and Arts 2.21% (*n* = 2), and Media 1.15% (*n* = 1).

Employment Measures

Many individuals reported working at the time of the survey. The employment status of the sample can be found in Table 2.

Table 2

Employment Status

Employment Status	*f* (%)	*n*
Employed	79.49	62
Unemployed	10.35	7
Retired	8.97	7
Seeking	1.19	3

Of those 62 participants employed, 78.33% (*n* = 47) reported being in full-time positions. The employment condition most reported by respondents was hourly wage work at 56.67% (*n* = 34). Workplace drug testing policy was also analyzed. Most of those working, 78.33% (*n* = 47), revealed their workplace had a no-drug screening policy for employment. Respondents reporting pre-employment screening comprised only 6.67% (*n* = 4) of the sample, for a cause drug screening (i.e., a workplace accident) comprised 6.67% (*n* = 4), and drug screening with notification comprised 1.67% (*n* = 1). Those employed and subject to random drug screening comprised 1.67% (*n* = 1) of the sample.

When asked if a company drug testing policy would deter respondents from applying for work, 44.59% (*n* = 33) responded "yes." When asked if participants had turned down a promotion over drug testing, 6.76% (*n* = 5) responded they had, and 21.62% (*n* = 16) answered "yes" to having turned down a job because of testing policies. The participants reported working across multiple industries, with business as the most reported at 24.15% (*n* = 21) of respondents. Next was the service industry, 21.14% (*n* = 18); trade jobs, 14.18% (*n* = 12); education, 8.23% (*n* = 7); technology, 7.38% (*n* = 6); health care, 6.53% (*n* = 5), and the cannabis industry with 2.30% (*n* = 2) of participants.

Cannabis Use Preferences

We found that 13.91% (*n* = 21) of the sample (*n* = 80) reported using cannabis in the morning, 9.93% (*n* = 15) in the afternoon, 23.18% (*n* = 36) in the evening, 23.84% (*n* = 35) prior to sleep, and 25.17% (*n* = 38) reporting using cannabis during all times of the day. When asked if participants restrict their cannabis use to weekends or time off only, 79.01% of participants (*n* = 64) responded "no." Participants (*n* = 79) reported taking a drug break, or "holiday," from using cannabis with a range of cessation reported from a few days to 30 years. When asked about the reasons for taking a cannabis "holiday," the largest was personal choice, 44.83% (*n* = 26), followed by other, 25.86% (*n* = 15), and due to job requirements at 10.34% (*n* = 6) of respondents answering.

For the reported amounts of active compounds used per dose, two of the respondents (*n* = 80) reported using CBD alone, and seven reported only the use of THC. Of the remaining 71 respondents, use consisted of THC (*M* = 61.85 grams, *SD* = 30.48) and CBD (*M* = 32.05 grams, *SD* = 28.17) as an average dose. Among the 80 participants answering, 80% (*n* = 64) reported using 1-3 grams per day, 12.50% (*n* = 10) reported using 4 – 6 grams, 2.50% (*n* = 2) reported 7 – 9 grams, and 5.00% (*n* = 5) reported using 10 grams or more. When participants (*n* = 83) were asked about the source of cannabis, 40.20% (*n* = 35) reported purchasing all their cannabis through local dispensaries. In comparison, 3.45% (*n* = 3) reported using only self-grown cannabis, and 6.02% (*n* = 5) reported only private sources as their primary supply of cannabis. The range of spending reported in dispensaries was $20 to $500, and bimodal at $50 and $100 each at 13% (*n* = 11), noted for participants' average purchase amount when visiting the dispensary. Participants (*n* = 68) visited dispensaries most often on a bi-weekly

basis 24.14% (*n* = 21), followed by monthly visits 17.24% (*n* = 15), weekly visits 14.95% (*n* = 13), less than once a month 11.49% (*n* = 10), and more than once a week at 10.34% (*n* = 9). The amount of cannabis flower purchased per visit ranged from a single gram pre-rolled joint up to an ounce.

The range of medical cannabis card attainment was from 1996 through 2018. 19.50% (*n* =17) of respondents obtained a medical cannabis card in 2017. When participants (*n* = 77) were asked about the effectiveness (less, same, more) of cannabis when compared to other treatment options for symptom relief, 79.30% (*n* = 69) responded that cannabis was more effective for treating their symptoms, and 6.90% (*n* = 6) reported cannabis as having the same effectiveness. Questions concerning cannabis tolerance, or becoming less effective over time and use, were also asked. Among the respondents, 64.50% (*n* = 49) reported not having to use more cannabis to achieve the same effects.

The preferred route of administration reported by participants can be seen in Table 3.

Table 3

Administration Route

Route of Administration	*f* (%)	*n*
Edible Food Products	22.31	54
Vaporizer	20.66	50
Rolled in Paper	19.83	48
Rolled in Tobacco Wrap	6.20	15
Concentrate	13.64	33
Topical	11.57	28
Oral Spray	5.79	14

When asked if cannabis use was for physical or psychological reasons, 81.25% (*n* = 52) indicated it was for both reasons. Psychological use was only reported by 10.94% (*n* = 7),

and physical alone accounted for 7.81% (*n* = 5) of respondents. When asked if respondents (*n* = 71) medicated with cannabis for pain, 48.28% (*n* = 42) responded "yes." Cannabis use for treating "other" was chosen by 25.29% (*n* = 29) of the sample. Participants reported using cannabis as a substitute for prescription and over-the-counter drugs at 36.15 % (*n* = 49) and 23.60% (*n* = 31), respectively. Respondents also reported using cannabis as a substitute for alcohol 24.14% (*n* = 35), tobacco 9.45% (*n* = 14), and other drugs 4.60% (*n* = 7). The primary use for symptom improvement was insomnia at 23.83% (*n* = 66) and relaxation at 22.38% (*n* = 62). Of the respondents citing cannabis for symptom prevention, psychological reasons were most reported; the treatment of anxiety, 21.74% (*n* = 60), and depression, 117.39% (*n* = 48), were the most selected.

When asked with whom they felt comfortable sharing their status as a medical cannabis user, participants' (*n* = 74) responses can be seen in Table 4.

Table 4

Medical Use Confidants

Confidant Group	Percentage of Sample	Number of Individuals
Friends	95.94	71
Siblings	66.21	49
Medical Professionals	66.21	49
Parents	64.86	48
Co-Workers	59.45	44
Psychologist/Counselor	50.00	37
Children	44.59	33
Supervisors	31.08	25
Subordinates	31.08	23
Customers	31.08	23
Other	16.21	12

Discussion

Interpretation of Results

Many medical cannabis users in the Bay Area use cannabis throughout the day, especially in jobs related to the cannabis industry and among those with high personal use disclosure among work individuals. More participants reported morning use than afternoon use, with the lowest reported use of cannabis was during the afternoon. Many workers reported cannabis use as a relaxant after work or before sleep. The preferred usage of cannabis is a mixture containing both main phytocannabinoids in an approximate 2:1 THC to CBD ratio. A single participant working in law enforcement reported using only CBD and being subject to random drug screenings. This poses multiple questions concerning what is considered "acceptable" cannabis use in critical work environments and how regulations are needed to ensure the purity of cannabis products. Consumers should have certainty that the products purchased in dispensaries contain only the proportion of cannabinoids listed and no others.

Educational Attainment

All participants reported graduating high school. Previous research indicates that cannabis use while young would correlate to dropping out due to amotivation and changes in the brain. However, when polydrug use (alcohol and tobacco) is considered, and the amount of cannabis use (i.e., moderate or heavy) is operationalized, the differences in adverse effects contributed to cannabis use become non-significant between cannabis users and nonusers. Motivation for both education and work appeared to be present in the sample, and the results of this study support those found by Barnwell et al. (2006) concerning cannabis use, motivation, and life satisfaction measures. That study revealed that motivation was non-

significant between all cannabis users and controls. In addition, Barnwell et al. found on a self-reported internet survey that there was a positive effect among daily cannabis users on life satisfaction measures compared to non-users. Although this only held for those participants not using cannabis for serious medical issues compared to controls, there was an effect of having higher life satisfaction while being a daily cannabis user.

College enrollment was also high among the sample, with more than half who began college finishing with a degree and almost half of those with a minor degree. Although the sample's high school graduation and college entry rates were higher than the US National average (US Census Bureau, 2022) four years after our survey was collected, associate degrees (9%) were less than the national average (10%) nationwide. However, bachelor's degree attainment in our sample (49%) was approximately double the national average (24%). Advanced professional degrees (master's and above) were 10% higher in the national average than our sample at 4%.

Employment

Most participants reported working in the field of business, including account managers and brand promoters. This matches our educational attainment responses as business is the second most reported of the degrees received among the sample. The largest portion of participants reported being full-time employees in working conditions of hourly pay. Many of the respondents acknowledged feeling comfortable sharing their medical cannabis use with individuals at work, including supervisors, co-workers, subordinates, and customers.

The area wherein this research was conducted has a sizeable technological presence, denoted by the nickname, "The Silicon Valley." With the close association between cannabis

and computer jobs, one concern we had was that there may be an overrepresentation of tech industry workers where cannabis is accepted more openly. This was not the case, as only six (13.95%) participants reported working in computer technology. The majority of respondents indicated working for businesses and in the service industry.

In addition, employer drug screening policy did, in fact, influence employment choices among the sample. The only participant working in a mandatory drug testing job reported only ingesting CBD. Others reported working with only pre-hiring screenings, notification to screening, and for-cause screenings. Participants declined to apply for positions with random screenings and tuned down promotions because it would involve drug screenings. This indicates employers may miss out on talented workers because of their drug screening policies. Much like Amazon, companies may need to review and update drug screening policies to hire and retain employees as cannabis use becomes more acceptable in the US, especially among working-age individuals (Nagele-Piazza, 2021).

Cannabis Use

Most cannabis use was reported in the lowest category of 1 to 3 grams, equivalent to, at the most, three "joints" per day (Kögel et al., 2017). There was also reported use of vaporized and concentrated products. Concentrates, such as wax and resins, contain higher amounts of THC and CBD than those found in vaporizers and rolled cannabis. When administered by gram weight, these products would equate to the consumption of higher amounts of THC and CBD per dose. Those reporting using oral sprays are ingesting approximately 2.5 mg per spray if they purchased a spray from a regulated brand in a dispensary.

When asked about the reason for cannabis use, the main reason indicated was physical pain relief. Many respondents chose multiple reasons for use in addition to pain relief. The top reasons included in the survey were insomnia, anxiety, depression, and inflammation. Treatment of "other" filled in by participants included Crohn's Disease, the symptoms of Lyme Disease, and to prevent the recurrence of breast cancer. Respondents cited cannabis use as a replacement for both OTC and prescription drugs. This indicates that respondents used cannabis for the treatment of multiple symptoms, both physical and psychological, rather than taking multiple medications.

Participants felt comfortable sharing their status as medical cannabis users with others. Friends and family were highest on the list of confidants, with medical professionals second. Many indicated that they shared such information with multiple on-the-job individuals. This is the case, especially among individuals working in the cannabis industry, such as in dispensaries or as growers. The stigma surrounding cannabis use appears to be lifting as more individuals feel comfortable sharing their use of cannabis with others. One participant indicated sharing their medical cannabis use "with the whole world." This is significant in that many of the participants may share that they use medical cannabis in personal relationships and across other platforms, such as social media.

Although the stigmatization of medical cannabis use is diminishing, it is still present in the US. Among our sample, the stigmatization surrounding cannabis use appears to be low. This is evidenced by the participants' reported disclosure of their medical card status and cannabis use among a wide and varied number of confidants. The openness of participants to share their medical use status among even employment supervisors and co-workers indicates

that, in many areas, the stigma surrounding cannabis use is fading. However, the range of answers participants submitted about confidants ranged from sharing their medical use status information with "only the cannabis community" to "everybody." These answers indicate that those participants in more conservative positions, such as education and government jobs, may still feel a need to hide their medical cannabis use even in a liberal and accepting place such as the Bay Area of California.

A large number of participants reported starting cannabis use from an early age. Although many reported beginning cannabis use in or before adolescence, there appear to be no long-term negative consequences on educational attainments or employment outcomes. Our sample achieved higher than the national average in obtaining a high school diploma and twice the national average for obtaining a bachelor's degree. Only a small portion of respondents indicated they were unemployed or seeking employment. In addition, the work history data collected indicated that most respondents maintained a long working history and did not spend much time out of a job. On measures of education and employment, our sample did not appear to experience the adverse outcomes prevalent throughout the literature.

Limitations

This study was conducted on a small sample in a liberal area known for cannabis acceptance. The researchers acknowledge the regional and cultural acceptance of cannabis in the Bay Area. As the first state to pass an amendment for cannabis use, the Bay Area was the movement's epicenter and home to the first dispensary to open in the US. This area is historically more accepting of cannabis and cannabis users than other regions. It is important

to note that these findings are associated with liberal legislative conditions and widespread social acceptance of cannabis and its use.

The study information was only available through dispensary websites or in-person visits. Although some respondents indicated not purchasing cannabis through dispensaries, the researchers suspect that the study link was shared among participants. This study lacks a more diverse sampling of individuals who do not obtain cannabis from dispensaries. In addition, the sample participants could be considered to have a higher socio-economic status to have the ability to purchase cannabis even with the median income reported at $50,000. Few low-income individuals participated in the survey.

The survey measures were self-reported by participants and may be subject to biases such as social desirability. Responses may be exaggerated, and some questions may be considered too personal for the participants to answer. The study contained many medical cannabis users who indicated that pain relief was the main reason for cannabis use; given the cognitive effects of pain, participants may experience pain-induced cognitive impairments, as discussed in a review by Khera and Rangasamy (2021). Additionally, participants may have experienced adverse outcomes related to education or employment and not linked them to cannabis use.

Directions for Future Research

Future research should include more of the variables often discussed in the literature. These variables include GPA or SAT scores, polydrug use (tobacco and alcohol), an operationally defined level of cannabis consumption (low, medium, high), and the percentage of THC and CBD per dose. This percentage is easily attainable by participants purchasing

cannabis from dispensaries, as it is reported on product packaging. This measurement could help differentiate the effects between concentrated products and those consumed in the plant form. Additionally, more questions about dispensary purchases should be considered. This research only asked how much cannabis flowers or joints were purchased by participants. This approach did not acknowledge the vast number of products, such as edibles and sprays, currently available to individuals. The collection of such data mentioned could help support previous findings and provide a continuous thread through time and across geographical locations on the subject matter.

Future research directions should focus on possible discrimination and bias against potential employees affiliated with cannabis. While all cannabis remains federally illegal, only metabolites of THC are tested in drug screenings by employers. This allows for the use of CBD products in a drug-free workplace. Greater social acceptance may lead individuals to associate more with cannabis on public platforms, such as social media. Employment issues facing medicinal cannabis users should be examined closely by researchers. As cannabis use legislation continues to change on a state-by-state level and with the possible rescheduling of cannabis on a federal level in the future, there is a need to assess potential stigma, stereotyping, and bias in other regions of the US. Empirical quantitative research in this area has been undertaken by Tews et al. (2023), indicating that there is a difference in perceived job fit measures between potential employees affiliated with medical cannabis use compared to recreational cannabis use. This effect of possible bias in hiring should be further explored.

Conclusion

This study found that cannabis users in the Bay Area of California held much the same or higher educational attainment as the national average, even with many participants reporting early onset cannabis use. Of those with college degrees, most participants were found to hold a bachelor's degree and work in non-STEM fields. Participants also reported working in various industries without drug screening policies. Those who did work where drug screening is possible chose to work where screening notification was given to employees or only for cause testing was implemented. The one exception was a participant in law enforcement who reported only using CBD products. The results also show that medical cannabis users choose not to apply for jobs or take promotions to positions in companies where random drug screenings are mandatory.

The primary source of participants' medical cannabis acquisition was via dispensaries; the main active ingredient used by individuals was THC. The mean dosage ratio per use was approximately 2 THC: 1 CBD. Individuals consumed 1–3 grams per day mainly through smoking or ingestion. Most cannabis use was in the evenings, before sleep, and throughout the day, and used in treating both physical and psychological symptoms, including pain, anxiety, and depression.

With growing acceptance nationwide and fast-moving cannabis reform happening at the state and federal level, more information is needed regarding the functional cannabis user. Rescheduling cannabis could cause employers to change drug screening policies for specific positions and, much like Amazon has done, treat cannabis use the same as alcohol use, with the rising acceptance of medical and recreational cannabis use, especially among young

individuals. More companies may soon reevaluate their drug screening policies to a more lenient position, opening up more opportunities in the workplace for cannabis users. More research should begin to investigate the impact of negative stereotypes leading to bias and discrimination against cannabis users in the workplace.

Industrial Organizational (I/O) Psychology researchers who study workplace environment and how company policy measures affect employees should consider expanding investigations into cannabis users in the workplace. Such investigations could help shed light on the hiring process and retention of workers who use medical cannabis. As support for cannabis use grows among the US population, more states are enacting cannabis use legislation, increasing the number of individuals, including work-aged individuals, who can use cannabis. This rise in possible users may pressure companies to reevaluate drug screening policies.

Employers often do not test for Schedule III prescription drugs, which cannabis replaces for many employees (Substance Abuse and Medical Health Service Administration, 2023). If cannabis is rescheduled in the future, employers will have to review drug screening policies and what drugs to include or remove from future workplace testing policies. Rescheduling cannabis creates many new questions concerning cannabis in the workplace. Questions to be answered include: Will employers begin screening for all Schedule III drugs if cannabis is rescheduled? Can employers still exclude cannabis use as a reason for employment? What will employees' legal rights be under the Americans with Disabilities Act? Will cannabis users face discrimination in hiring? As cannabis issues change, more research must be undertaken in these and multiple other areas surrounding this issue.

References

Afroman. (2001). *Portrayal of irresponsibility* [Album]. T-Bones, Universal, Uptown.

Albaugh, M. D., Ottino-Gonzalez, J., Sidwell, A., Lepage, C., Juliano, A., Owens, M. M., Chaarani, B., Spechler, P., Fontaine, N., Rioux, P., Lewis, L., Jeon, S., Evans, A., D'Souza, D., Radhakrishnan, R., Banaschewski, T., Bokde, A. L. W., Burke Quinlan, E., Conrod, P., …, & IMAGEN Consortium. (2021). Association of cannabis use during adolescence with neurodevelopment. *JAMA Psychiatry*, *78*(9), 1031-1040. https://doi.org/10.1001/jamapsychiatry.2021.1258

Arria, A. M., Caldeira, K. M., Bugbee, B. A., Vincent, K. B., & O'Grady, K. E. (2015). The academic consequences of marijuana use during college. *Psychology of Addictive Behaviors, 29*(3), 564–575. https://doi.org/10.1037/adb0000108

Azofeifa, A., Mattson, M. E., Schauer, G. L., McAfee, T., Grant, A. M., & Lyerla, R. (2016). National estimates of marijuana use and related indicators — National survey on drug use and health, United States, 2002–2014. *Morbidity and Mortality Weekly Report*, *65*(11), 1–28. https://doi.org/10.15585/mmwr.ss6511a1

Barnwell, S. S., Earleywine, M., & Wilcox, R. (2006). Cannabis, motivation, and life satisfaction in an internet sample. *Substance Abuse Treatment, Prevention, and Policy (1)*2. https://doi.org/10.1186/1747-597X-1-2

Batalla, A., Bhattacharyya, S., Yuecel, M., Fusar-Poli, P., Crippa, J. A., Nogue, S., Torrens, M., Pujol, J., Farré, M., & Martin-Santos, R. (2013). Structural and functional imaging studies in chronic cannabis users: A systematic review of adolescent and adult findings. *PloS One, 8*(2), e55821. https://doi.org/10.1371/journal.pone.0055821

Behl, T., Makkar, R., Sehgal, A., Singh, S., Makeen, H. A., Albratty, M., Alhazmi, H. A., Meraya, A. M., & Bungau, S. (2022). Exploration of multiverse activities of endocannabinoids in biological systems. *International Journal of Molecular Sciences*, *23*(10), 5734. https://doi.org/10.3390/ijms23105734

Bie, B., Wu, J., Foss, J. F., & Naguib, M. (2018). An overview of the cannabinoid type 2 receptor system and its therapeutic potential. *Current Opinion in Anaesthesiology*, *31*(4), 407–414. https://doi.org/10.1097/ACO.0000000000000616

Bjork, J. M., Straub, L. K., Provost, R. G., & Neale, M. C. (2017). The ABCD study of neurodevelopment: Identifying neurocircuit targets for prevention and treatment of adolescent substance abuse. *Current Treatment Options in Psychiatry, 4*, 196–209. https://doi.org/10.1007/s40501-017-0108-y

Blest-Hopley, G., Colizzi, M., Giampietro, V., & Bhattacharyya, S. (2020). Is the adolescent brain at greater vulnerability to the effects of cannabis? A narrative review of the

evidence. *Frontiers in Psychiatry*, *11*, 859. https://www.frontiersin.org/articles/10.3389/fpsyt.2020.00859/full

Burggren, A. C., Shirazi, A., Ginder, N., & London, E. D. (2019). Cannabis effects on brain structure, function, and cognition: Considerations for medical uses of cannabis and its derivatives. *The American Journal of Drug and Alcohol Abuse*, *45*(6), 563–579. https://doi.org/10.1080/00952990.2019.1634086

California Courts. (2023). *Proposition 64: The adult use of marijuana act - Criminal justice Prop-64.* https://www.courts.ca.gov/prop64.htm#:~:text=Effective%20November%209%2C%202016%2C%20Proposition,sealing%20of%20prior%2C%20eligible%20marijuana%2D

California Department of Tax and Fee Administration. (2023). *Cannabis tax revenues, grid view*. https://www.cdtfa.ca.gov/dataportal/dataset.htm?url=CannabisTaxRevenues

California Legislator. (1996). *Compassionate use act of 1996*. California Legislative Information. https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=11362.5.&lawCode=HSC

Campos, I. (2018). Mexicans and the origins of marijuana prohibition in the United States: A reassessment. *The Social History of Alcohol and Drugs*, *32*(1), 6–37. https://www.journals.uchicago.edu/doi/epdf/10.1086/SHAD3201006

Charitos, I. A., Gagliano-Candela, R., Santacroce, L., & Bottalico, L. (2021). The cannabis spread throughout the continents and its therapeutic use in history. *Endocrine, Metabolic & Immune Disorders-Drug Targets*, *21*(3), 407-417. https://doi.org/10.2174/1871530320666200520095900

Crippa, J. A., Guimarães, F. S., Campos, A. C., & Zuardi, A. W. (2018). Translational investigation of the therapeutic potential of cannabidiol (CBD): Toward a new age. *Frontiers in Immunology*, *9*, 2009.

Crocq, M. A. (2020). History of cannabis and the endocannabinoid system. *Dialogues in Clinical Neuroscience, 22*(3), 223-228. https://doi.org/10.31887/DCNS.2020.22.3/mcrocq

Cummings, A. D. P., & Ramirez, S. A. (2021). The racist roots of the war on drugs & the myth of equal protection for people of color. *University of Arkansas Little Rock Law Review*, 44, 453. https://lawrepository.ualr.edu/lawreview/vol44/iss4/1

Desrosiers, N. A., Ramaekers, J. G., Chauchard, E., Gorelick, D. A., & Huestis, M. A. (2015). Smoked cannabis' psychomotor and neurocognitive effects in occasional and frequent smokers. *Journal of Analytical Toxicology*, *39*(4), 251-261. https://doi.org/10.1093/jat/bkv012

Dougherty, D. M., Mathias, C. W., Dawes, M. A., Furr, R. M., Charles, N. E., Liguori, A., Shannon, E. E., & Acheson, A. (2013). Impulsivity, attention, memory, and decision-making among adolescent marijuana users. *Psychopharmacology, 226*, 307–319. https://doi.org/10.1007/s00213-012-2908-5

Drug Enforcement Agency. (2018). *Drug scheduling*. https://www.dea.gov/drug-information/dDEA.

Duff, C., & Erickson, P. G. (2014). Cannabis, risk and normalisation: Evidence from a Canadian study of socially integrated, adult cannabis users. *Health, Risk & Society*, *16*(3), 210–226. https://doi.org/10.1080/13698575.2014.911823

Ellingson, J. M., Ross, J. M., Winiger, E., Stallings, M. C., Corley, R. P., Friedman, N. P., Hewitt, J. K., Tapert, S. F., Brown, S. A., Wall, T. L., & Hopfer, C. J. (2021). Familial factors may not explain the effect of moderate-to-heavy cannabis use on cognitive functioning in adolescents: A sibling-comparison study. *Addiction*, *116*(4), 833–844. https://doi.org/10.1111/add.15207.

FBI Jobs. (2022). *Employment eligibility*. https://fbijobs.gov/sites/default/files/2022-05/Guides_FBI%20Jobs%20Eligibility%20Guide%202022.pdf

Endres, M., Boehnke, K., & Weimer, W. (2022). Hashing it out: A survey of programmers' cannabis usage, perception, and motivation. *Proceedings of the 44th International Conference on Software Engineering*, 1107–1119. https://doi.org/10.1145/3510003.3510156

Fecan, I., & Raffe, A. (Executive producers). (2016). *Kim's convenience* [Television series]. U.S.: Thunderbird Films; CBC Television.

Fergusson, D. M., Horwood, L. J., & Beautrais, A. L. (2003). Cannabis and educational achievement. *Addiction*, *98*(12), 1681–1692. https://doi.org/10.1111/j.1360-0443.2003.00573.x

Fowler, C. J. (2020). The endocannabinoid system–Current implications for drug development. *Journal of Internal Medicine*, *290*(1), 2-26. https://doi.org/10.1111/joim.13229

Gasnier, L. J. (Director). (1936). *Reefer madness*. U.S.: New Line Cinema.

Graves, A. (2019). *Pop culture's influence on recreational marijuana use & legislation: A case study on Snoop Dogg* [Working paper, Ohio State University]. Social Science Research Network. https://doi.org/10.2139/ssrn.3465655

Green, D. G. (Director). (2008). *Pineapple express*. U.S.: Columbia Pictures; Sony Pictures Releasing.

Goud, S. S., Radhika, M. S., Indla, V., & Kolli, N. (2022). Cannabis use and effect of cannabis abstinence on cognitive functioning in young people — An observational case-control follow-up study from rehabilitation centre in Andhra Pradesh. *Middle East Current Psychiatry, 29*(61). https://doi.org/10.1186/s43045-022-00228-7

Guillouard, M., Authier, N., Pereira, B., Soubrier, M., & Mathieu, S. (2021). Cannabis use assessment and its impact on pain in rheumatologic diseases: A systematic review and meta-analysis. *Rheumatology*, *60*(2), 549-556. https://doi.org/10.1093/rheumatology/keaa534

Gülck, T., & Møller, B. L. (2020). Phytocannabinoids: Origins and biosynthesis. *Trends in Plant Science, 25*(10), 985–1004. https://doi.org/10.1016/j.tplants.2020.05.005.

Habecker, P., & Bevins, R. A. (2022). Attitudes in 2020 towards medical and recreational marijuana in prohibitionist Nebraska. *Journal of Drug Issues, 53*(1), 79–95. https://doi.org/10.1177/00220426221087913

Haines-Saah, R. J., Moffat, B., Jenkins, E. K., & Johnson, J. L. (2014). The influences of health beliefs and identity on adolescent marijuana and tobacco co-use. *Qualitative Health Research, 24*(7), 946-956. https://doi.org/10.1177/1049732314539854

Han, B. H., & Palamar, J. J. (2020). Trends in cannabis use among older adults in the United States, 2015-2018. *JAMA Internal Medicine, 180*(4). https://doi.org/10.1001/jamainternmed.2019.7517

Hall, W., & Lynskey, M. (2020). Assessing the public health impacts of legalizing recreational cannabis use: The US experience. *World Psychiatry*, *19*(2), 179-186. https://doi.org/10.1002/wps.20735

Harris, K. N., & Martin, W. (2021). Persistent inequities in cannabis policy. *Judges' Journal*, *60*(1), 9-13.

Hirst, R. B., Enriquez, R. H., Wickham, R. E., Gretler, J., Sodos, L. M., Gade, S. A., Rathke, L. K., Han, C. S., Denson, T. F., & Earleywine, M. (2017). Marijuana stereotypes and the "jay-dar": Perceptions of cannabis use and memory abilities based upon appearance. *Personality and Individual Differences*, *110,* 131–138. https://doi.org/10.1016/j.paid.2016.12.056

Horwood, L. J., Fergusson, D. M., Hayatbakhsh, M. R., Najman, J. M., Coffey, C., Patton, G. C., Silins, E., & Hutchinson, D. M. (2010). Cannabis use and educational achievement: Findings from three Australasian cohort studies. *Drug and Alcohol Dependence*, *110*(3), 247-253. https://doi.org/10.1016/j.drugalcdep.2010.03.008

Jacobs, P. (2023). Researchers applaud HHS push to ease cannabis restrictions. *Science*, *381*(6662), 1041-1041.

Jaeger, K. (2021). *FBI clarifies that using marijuana more than 24 times disqualifies would-be agents*. Marijuana Moment. https://www.marijuanamoment.net/fbi-clarifies-that-using-marijuana-more-than-24-times-disqualifies-would-be-agents/

Jager, G. (2012). Cannabis. In *Drug abuse and addiction in medical illness: Causes, consequences and treatment* (pp. 151-162). Springer. https://link.springer.com/chapter/10.1007/978-1-4614-3375-0_11

Judge, M., & Berg, A. (Executive producers). (2014). *Silicon valley* [TV Series]. U.S.: 3 Arts Entertainment; HBO Entertainment.

Kim, S. H., Yang, J. W., Kim, K. H., Kim, J. U., & Yook, T. H. (2019). A review on studies of marijuana for Alzheimer's Disease - Focusing on CBD, THC. *Journal of Pharmacopuncture*, *22*(4), 225–230. https://doi.org/10.3831/KPI.2019.22.030

Khera, T., & Rangasamy, V. (2021). Cognition and pain: A review. *Frontiers in Psychology*, *12*, 1819. https://doi.org/10.3389/fpsyg.2021.673962

Kögel, C. C., Balcells-Olivero, M. M., López-Pelayo, H., Miquel, L., Teixido, L., Colom, J., Nutt, D. J., Rehm, J., & Gual, A. (2017). The standard joint unit. *Drug and Alcohol Dependence*, *176*, 109-116. https://doi.org/10.1016/j.drugalcdep.2017.03.010

Komarnytsky, S., Rathinasabapathy, T., Wagner, C., Metzger, B., Carlisle, C., Panda, C., Le Brun-Blashka, S., Troup, J. P., & Varadharaj, S. (2021). Endocannabinoid system and its regulation by polyunsaturated fatty acids and full spectrum hemp oils. *International Journal of Molecular Sciences*, *22*(11), 5479. https://doi.org/10.3390/ijms22115479

Leinen, Z. J., Mohan, R., Premadasa, L. S., Acharya, A., Mohan, M., & Byrareddy, S. N. (2023). Therapeutic potential of cannabis: A comprehensive review of current and future applications. *Biomedicines*, *11*(10), 2630. https://doi.org/10.3390/biomedicines11102630

Lim, A. (2023). *Midweed: A comparison between marijuana laws, regulations, and social attitudes in cannabis-legal vs. cannabis-illegal Midwest states* [Professional project, University of Nebraska-Lincoln]. https://digitalcommons.unl.edu/journalismprojects/33/

Lisdahl, K. M., & Price, J. S. (2012). Increased marijuana use and gender predict poorer cognitive functioning in adolescents and emerging adults. *Journal of the International Neuropsychological Society, 18*(4), 678–688. https://doi.org/10.1017/S1355617712000276

Lisdahl, K. M., Wright, N. E., Medina-Kirchner, C., Maple, K. E., & Shollenbarger, S. (2014). Considering cannabis: The effects of regular cannabis use on neurocognition in adolescents and young adults. *Current Addiction Reports*, *1*, 144–156. https://link.springer.com/article/10.1007/s40429-014-0019-6

Lorre, C., Prady, B. (Executive producers). (2007). *The big bang theory* [TV series]. U.S.: Chuck Lorre Productions; Warner Bros. Television; CBS Productions.

Lovell, M. E., Akhurst, J., Padgett, C., Garry, M. I., & Matthews, A. (2020). Cognitive outcomes associated with long-term, regular, recreational cannabis use in adults: A meta-analysis. *Experimental and Clinical Psychopharmacology*, *28*(4), 471. https://doi.org/10.1037/pha0000326

Lupica, C. R., & Hoffman, A. F. (2018). Cannabinoid disruption of learning mechanisms involved in reward processing. *Learning & Memory*, *25*(9), 435-445. https://pubmed.ncbi.nlm.nih.gov/30115765/

Maggs, J. L., Staff, J., Kloska, D. D., Patrick, M. E., O'Malley, P. M., & Schulenberg, J. (2015). Predicting young adult degree attainment by late adolescent marijuana use. *Journal of Adolescent Health*, *57*(2), 205-211. https://doi.org/10.1016/j.jadohealth.2015.04.028

Mallinson, D. J., & Hannah, A. L. (2020). Policy and political learning: The development of medical marijuana policies in the states. *Publius: The Journal of Federalism*, *50*(3), 344-369.

Colorado Department of Revenue. (2023). *Marijuana tax reports*. https://cdor.colorado.gov/data-and-reports/marijuana-data/marijuana-tax-reports

Martín-Santos, R., Fagundo, A. B., Crippa, J. A., Atakan, Z., Bhattacharyya, S., Allen, P., Fusar-Poli, P., Borgwardt, S., Seal, M., Busatto, G. F., & McGuire, P. (2010). Neuroimaging in cannabis use: A systematic review of the literature. *Psychological Medicine*, *40*(3), 383–398. https://doi.org/10.1017/S0033291709990729

Matson, K. L., Orr, K. K., Marino, C., & Cohen, L. B. (2019). The effect of a student pharmacist directed health-education program for elementary-school children. *Innovations in Pharmacy*, *10*(4). https://doi.org/10.24926/iip.v10i4.1457

Mechoulam, R., & Parker, L. A. (2013). The endocannabinoid system and the brain. *Annual Review of Psychology*, *64*, 21–47. https://doi.org/10.1146/annurev-psych-113011-143739

Meda, S. A., Gueorguieva, R. V., Pittman, B., Rosen, R. R., Aslanzadeh, F., Tennen, H., Leen, S., Hawkins, K., Raskin, S., Wood, R. M., Austad, C. S., Dager, A., Fallahi, C., & Pearlson, G. D. (2017). Longitudinal influence of alcohol and marijuana use on academic performance in college students. *PLOS ONE, 12*(3), e0172213. https://doi.org/10.1371/journal.pone.0172213

Meier, M. H., Caspi, A., Ambler, A., Harrington, H., Houts, R., Keefe, R. S., McDonald, K., Ward, A., Poulton, R., & Moffitt, T. E. (2012). Persistent cannabis users show

neuropsychological decline from childhood to midlife. *Proceedings of the National Academy of Sciences*, *109*(40), E2657-E2664. https://doi.org/10.1073/pnas.1206820109

Meier, M. H., Hill, M. L., Small, P. J., & Luthar, S. S. (2015). Associations of adolescent cannabis use with academic performance and mental health: A longitudinal study of upper middle class youth. *Drug and Alcohol Dependence*, *156*, 207–212. https://doi.org/10.1016/j.drugalcdep.2015.09.010

Moreno, J. A. (2018). Half-baked: The science and politics of legal pot. *Penn State Law Review, 123*, 401. https://elibrary.law.psu.edu/pslr/vol123/iss2/3

Musto, D. F. (1972). The marijuana tax act of 1937. *Archives of General Psychiatry*, *26*(2), 101–108. https://doi.org/10.1001/archpsyc.1972.01750200005002

Nagele-Piazza, L. (2021). *Amazon drops marijuana screening, supports federal MORE act*. SHRM. https://www.shrm.org/resourcesandtools/legal-and-compliance/employment-law/pages/amazon-drops-marijuana-screening.aspx

Newhart, M., & Dolphin, W. (2021). Legitimacy strategies of medical cannabis patients. In *The Routledge handbook of post-prohibition cannabis research*. Routledge.

Newman, K., Endres, M., Weimer, W., & Johnson, B. (2023). From organizations to individuals: Psychoactive substance use by professional programmers. *2023 IEEE/ACM 45th International Conference on Software Engineering (ICSE)*, 665-677. https://doi.org/10.48550/arXiv.2305.01056

Ogunbiyi, M. O., Hindocha, C., Freeman, T. P., & Bloomfield, M. A. (2020). Acute and chronic effects of Δ9-tetrahydrocannabinol (THC) on cerebral blood flow: A systematic review. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *101*, 109900. https://doi.org/10.1016/j.pnpbp.2020.109900

Ong, L. Q., Bellettiere, J., Alvarado, C., Chavez, P., & Berardi, V. (2021). Cannabis use, sedentary behavior, and physical activity in a nationally representative sample of US adults. *Harm Reduction Journal 18*(48). https://doi.org/10.1186/s12954-021-00496-2

Owens, M. M., McNally, S., Petker, T., Amlung, M. T., Balodis, I. M., Sweet, L. H., & MacKillop, J. (2019). Urinary tetrahydrocannabinol is associated with poorer working memory performance and alterations in associated brain activity. *Neuropsychopharmacology, 44*, 613–619. https://doi.org/10.1038/s41386-018-0240-4

Patte, K. A., Qian, W., & Leatherdale, S. T. (2017). Marijuana and alcohol use as predictors of academic achievement: A longitudinal analysis among youth in the COMPASS study. *Journal of School Health*, *87*(5), 310-318. https://doi.org/10.1111/josh.12498

Pertwee R. G. (2006). Cannabinoid pharmacology: The first 66 years. *British Journal of Pharmacology*, *147*(1), S163–S171. https://doi.org/10.1038/sj.bjp.0706406

Pope Jr, H. G., Gruber, A. J., Hudson, J. I., Cohane, G., Huestis, M. A., & Yurgelun-Todd, D. (2003). Early-onset cannabis use and cognitive deficits: What is the nature of the association? *Drug and Alcohol Dependence*, *69*(3), 303-310. https://doi.org/10.1016/S0376-8716(02)00334-4

Prashad, S., Dedrick, E. S., & Filbey, F. M. (2018). Cannabis users exhibit increased cortical activation during resting state compared to non-users. *NeuroImage*, *179*, 176-186. https://doi.org/10.1016/j.neuroimage.2018.06.031

Radwan, M. M., Chandra, S., Gul, S., & ElSohly, M. A. (2021). Cannabinoids, phenolics, terpenes and alkaloids of cannabis. *Molecules*, *26*(9), 2774. https://doi.org/10.3390/molecules26092774

Rasmusson, X. (2014). History and policy of clinical cannabis versus medical marijuana: US history and policy. *Journal of Social Science for Policy Implications*, *2*(1), 15-30.

Reid, M. (2020). A qualitative review of cannabis stigmas at the twilight of prohibition. *Journal of Cannabis Research*, *2*(1). https://doi.org/10.1186/s42238-020-00056-8

Renard, J., Vitalis, T., Rame, M., Krebs, M. O., Lenkei, Z., Le Pen, G., & Jay, T. M. (2016). Chronic cannabinoid exposure during adolescence leads to long-term structural and functional changes in the prefrontal cortex. *European Neuropsychopharmacology*, *26*(1), 55-64. https://doi.org/10.1016/j.euroneuro.2015.11.005

Raskin, J. (2023). *Rep. Raskin's CURE act passes through oversight committee with bipartisan support*. https://raskin.house.gov/2023/9/rep-raskin-s-cure-act-passes-through-oversight-committee-with-bipartisan-support

Russo, E. B. (2007). History of cannabis and its preparations in saga, science, and sobriquet. *Chemistry & Biodiversity*, *4*(8), 1614–1648. https://doi.org/10.1002/cbdv.200790144

Salmanzadeh, H., Ahmadi-Soleimani, S. M., Pachenari, N., Azadi, M., Halliwell, R. F., Rubino, T., & Azizi, H. (2020). Adolescent drug exposure: A review of evidence for the development of persistent changes in brain function. *Brain Research Bulletin*, *156*, 105-117. https://doi.org/10.1016/j.brainresbull.2020.01.007

Skliamis, K., & Korf, D. J. (2022). How cannabis users obtain and purchase cannabis: A comparison of cannabis users from European countries with different cannabis policies. *Substance Use and Misuse*, *57*(7), 1043-1051. https://doi.org/10.1080/10826084.2022.2058707

Substance Abuse and Medical Health Service Administration. (2023). *Develop a policy*. https://www.samhsa.gov/workplace/employer-resources/develop-policy

Shu-Acquaye, F. (2016). The role of states in shaping the legal debate on medical marijuana. *Mitchell Hamline Law Review,* 42, 697. https://heinonline.org/HOL/LandingPage?handle=hein.journals/wmitch42&div=31&id=&page=

Siddiqui, S. A., Singh, P., Khan, S., Fernando, I., Baklanov, I. S., Ambartsumov, T. G., & Ibrahim, S. A. (2022). Cultural, social and psychological factors of the conservative consumer towards legal cannabis use—A review since 2013. *Sustainability, 14*(17), 10993. https://doi.org/10.3390/su141710993

Śmiarowska, M., Białecka, M., & Machoy-Mokrzyńska, A. (2022). Cannabis and cannabinoids: Pharmacology and therapeutic potential. *Neurologia i Neurochirurgia Polska, 56*(1), 4–13. https://doi.org/10.5603/PJNNS.a2022.0015

Taylor, C. (2018). Marijuana representation on screen: There's still a long way to go. *Mashable*. https://mashable.com/article/stoner-weed-representation-movies-tv-media

Tews, M. J., Pons, S., & Yu, H. (2023). Marijuana use and perceptions of employment suitability. *Journal of Personnel Psychology.* https://doi.org/10.1027/1866-5888/a000332

Thayer, R. E., York Williams, S., Karoly, H. C., Sabbineni, A., Ewing, S. F., Bryan, A. D., & Hutchison, K. E. (2017). Structural neuroimaging correlates of alcohol and cannabis use in adolescents and adults. *Addiction, 112*(12), 2144–2154. https://doi.org/10.1111/add.13923

Troup, L. J., Bastidas, S., Nguyen, M. T., Andrzejewski, J. A., Bowers, M., & Nomi, J. S. (2016). An event-related potential study on the effects of cannabis on emotion processing. *PLoS One, 11*(2), e0149764. https://doi.org/10.1371/journal.pone.0149764

United Nations Office on Drugs and Crime. (2023). *Drug use & treatment*. https://dataunodc.un.org/dp-drug-use-prevalence

U.S. Census Bureau. (2022). *Census Bureau releases new educational attainment data*. https://www.census.gov/newsroom/press-releases/2022/educational-attainment.html

Varshney, K., Patel, A., Ansari, S., Shet, P., & Panag, S. S. (2023). Cannabinoids in treating Parkinson's Disease symptoms: A systematic review of clinical studies. *Cannabis and Cannabinoid Research*, 8(5). https://doi.org/10.1089/can.2023.0023

Hansen, C., Alas, H., & Davis Jr., E. (2023). *Where is marijuana legal? A guide to marijuana legalization.* U.S. News. https://www.usnews.com/news/best-states/articles/where-is-marijuana-legal-a-guide-to-marijuana-legalization

Wrege, J., Schmidt, A., Walter, A., Smieskova, R., Bendfeldt, K., Radue, E. W., Undine, L., & Borgwardt, S. (2014). Effects of cannabis on impulsivity: a systematic review of neuroimaging findings. *Current Pharmaceutical Design*, *20*(13), 2126-2137. https://www.ingentaconnect.com/content/ben/cpd/2014/00000020/00000013/art00006

Young, D., Bazan, G., Martinez, J., Rodriguez, S., Boudreault, A., Hoover, S., McLaughlin, R., & Yocom, L. (2020). *Cannabis economic impact report*. California State University San Marcos. https://www.csusm.edu/coba/obrc/reports/cannabisindustry/reports/adareport.pdf

Youngers, C. A. (2012). US elections and the war on drugs. *NACLA Report on the Americas*, *45*(4), 71-75. https://doi.org/10.1080/10714839.2012.11722043