
Electronic Theses and Dissertations, 2020-

2022

Mediation and Moderation Analyses Investigating Marijuana Use Among LGB Adults

Traccy Martins
University of Central Florida

 Part of the [Community-Based Research Commons](#)

Find similar works at: <https://stars.library.ucf.edu/etd2020>

University of Central Florida Libraries <http://library.ucf.edu>

This Doctoral Dissertation (Open Access) is brought to you for free and open access by STARS. It has been accepted for inclusion in Electronic Theses and Dissertations, 2020- by an authorized administrator of STARS. For more information, please contact STARS@ucf.edu.

STARS Citation

Martins, Traccy, "Mediation and Moderation Analyses Investigating Marijuana Use Among LGB Adults" (2022). *Electronic Theses and Dissertations, 2020-*. 1252.

<https://stars.library.ucf.edu/etd2020/1252>

MEDIATION AND MODERATION ANALYSES INVESTIGATING MARIJUANA USE
AMONG LGB ADULTS

by

TRACCY ARANHA WATANABE MARTINS

B.A. University of Central Florida, 2016

M.A. University of Central Florida, 2019

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Sociology
in the College of Sciences
at the University of Central Florida
Orlando, Florida

Summer Term
2022

Major Professor: Jason A. Ford

©2022 Tracy Martins

ABSTRACT

With marijuana use being at an all-time high, it is important to further analyze the factors associated with use. Utilizing the 2015-2019 National Survey on Drug Use and Health (N=205,083), the current study assesses marijuana use among LGB adults, as well as possible mediating (health-related measures) and moderating (criminal legal system exposure) factors. Findings using a chi-square analysis showed that overall, bisexual and lesbian/gay adults were more likely to use marijuana, while those who reported “not sure” were less likely to use. For the mediation analysis, when health measures were introduced to the logistic regression model, the outcome remained the same for all respondents, except for males who identified as gay did not maintain significance. As for those exposed to the criminal legal system, the moderation analysis with logistic regression showed respondents who identified as a lesbian/gay were less likely to use marijuana. Interestingly, when examining only female respondents those who were involved in the criminal legal system and responded to not being sure of their sexual identity had increased odds of using marijuana. This study offers evidence of differences in marijuana use among LGB+ individuals and factors that impact substance use behaviors, having important implications for inclusion of “other” individuals in the LGBTQIA+ as well as the criminal legal system.

KEY WORDS: marijuana use; sexual identity; health; criminal legal system; mediation; moderation

TABLE OF CONTENTS

LIST OF TABLES	v
CHAPTER ONE: INTRODUCTION.....	1
CHAPTER TWO: LITERATURE REVIEW	3
Health-Related Factors	5
Criminal Legal System (CLS) Exposure.....	6
CHAPTER THREE: METHODS	10
Sample.....	10
Variables.....	10
Sexual Identity	10
Dependent Variable	11
Independent Variables	11
Health-Related Factors.....	11
Criminal Legal System Exposure	12
Socio-Demographic Factors.....	13
Analytic Strategy.....	13
CHAPTER FOUR: RESULTS	16
Univariate Analysis	16
Bivariate Analysis	20
Mediation Analysis	22
Moderation Analysis	29
CHAPTER FIVE: DISCUSSION.....	31
Limitations	34
CHAPTER SIX CONCLUSION	35
LIST OF REFERENCES	36

LIST OF TABLES

Table 1: Sample Characteristics (2015-2019 NSDUH, N=205,083).....	18
Table 2: Marijuana Use and Sexual Identity.....	21
Table 3: Regression of potential health-related mediators on sexual identity	23
Table 4: Regression of marijuana use on sexual identity and health-related mediators.....	27
Table 5: Moderation Analysis (2015-2019 NSDUH).....	30

CHAPTER ONE: INTRODUCTION

Marijuana is the most widely used drug within the United States, reaching the highest level of daily use ever observed among young adults (Schulenberg et al., 2019); a record of 49.6 million users in the year 2020 (SAMHSA, 2020). There has been a drastic rise in marijuana use since 2006-2007 (Carliner et al., 2017), with increases in use corresponding with changes in state-level marijuana policy (Compton et al., 2016; Davis et al., 2016). Most states in the U.S. have gradually shifted policies toward the legalization of medical use and the decriminalization of recreational use. Data from the Drug Policy Alliance note that marijuana is now legally available for recreational use in 19 states and available for medical use in every state in the U.S. except for Nebraska and Idaho (Drug Policy Alliance, 2021). The increased prevalence of marijuana use is concerning given the likelihood of developing a substance use disorder (Nelson et al., 2015), creating even greater concern regarding the negative outcomes of cannabis use associated with health and social factors of individuals (Compton et al., 2016; SMAHSA, 2021). For these reasons, the National Institute on Drug Abuse has made research on marijuana a funding priority for fiscal year 2022 (National Institute on Drug Abuse, 2021).

The existing research has highlighted several factors that are significantly correlated with marijuana use. Adults ages 18- to 25-year-old have the highest rates of use (SAMHSA, 2021) and primarily consist of those who are Black (Berg, & Bryant, 2013; Schauer et al., 2016; Carliner et al., 2017; Chen, Yu, Lasopa, Cottler, 2017; Cerda, 2017; SAMHSA, 2020; Vidourek, Yockey, King, & Oliver, 2021) and male (Berg, & Bryant, 2013; Schauer et al., 2016; Carliner et al., 2017; Chen, Yu, Lasopa, Cottler, 2017; Cerda, 2017; SAMHSA, 2020; Vidourek, Yockey, King, & Oliver, 2021). Additionally, unemployment and low income (Schauer et al., 2016), less educational attainment (Han et al., 2018; Richmond-Rakerd, Slutske, & Wood, 2017; Chen, Yu,

Lasopa, Cottler, 2017; Cerda, 2017; Terry-McElrath et al., 2017) and marital status (Massoglia & Pridemore, 2015), are all significantly associated with marijuana use.

Sexual identity also stands out as an important factor, as sexual minorities have higher levels of use in comparison to heterosexual individuals (Schuler et al., 2018; Jabson, Farmer, & Bowen, 2014; McCabe, Hughes, & Boyd, 2004; Ford & Jasinski, 2006; Schuler & Collins, 2020). These observations have stressed the need for further research regarding those who identify as lesbian, gay, or bisexual (LGB) individuals and the details related to marijuana use. The goal of the current research is to examine differences in marijuana use by sexual identity and identify risk factors associated with use. While we know that LGB individuals are at an increased risk for substance use, less research assesses the factors that may contribute to this risk. The current research will investigate possible mediating (e.g., health) and moderating (e.g., criminal legal system exposure) mechanisms that link sexual identity and marijuana use. Identifying factors that contribute to differences in marijuana use based on sexual identity may provide policy implications and inform intervention strategies for an at-risk population.

CHAPTER TWO: LITERATURE REVIEW

Sexual minorities, those identifying as lesbian, gay, or bisexual, have been identified as an important at-risk population in substance use research (McCabe, Hughes, & Boyd, 2004; Ford & Jasinski, 2006; Schuler & Collins, 2020) and research shows that sexual minorities report higher levels of marijuana use than heterosexual individuals (Schuler et al., 2018; Jabson, Farmer, & Bowen, 2014). When examining differences in substance use by sexual identity, prior research has identified findings based on sex (Medley et al. 2016). Research has noted higher rates of marijuana use among bisexual women (Schuler & Collins, 2020; Ford & Jasinski, 2006; McCabe, Hughes, & Boyd, 2004).

To explain differences in substance use based on sexual identity, many studies have relied on the minority stress perspective (Jabson, Farmer, & Bowen, 2014; Goldbach, Schrage, Dunlap, & Holloway, 2015; Branstrom, 2017). Minority stress argues that an increased exposure to difficult social situations creates a state of chronic stress, which negatively impact health-related outcomes among sexual minorities (Meyer, 2003). Victimization or threats of assaults and a lack of social support experienced by LGB individuals contribute to chronic stress (Branstrom, 2017), which can vary by age and gender (Goldbach, Schrage, Dunlap, & Holloway, 2015). Stress may contribute to adverse health outcomes, such as anxiety (Branstrom, 2017) and depression, which can then impact the use of marijuana (Jabson, Farmer, & Bowen, 2014).

Another possible explanation for higher rates of substance use among sexual minorities, particularly gay males, relies on social networks and socialization. Carpiano, Kelly, Easterbrook, and Parsons (2011) noted that individuals who resided in gay neighborhoods were more likely to

use substances. This is because these neighborhoods become an important place for socialization, which impact an individual's use. The likelihood of substance use increases as the social networks and socialization with gay men increase (Carpiano, Kelly, Easterbrook, & Parsons, 2011). Additionally, this may be best explained using the findings of Boyle, LaBrie, and Omoto (2020). The authors discovered that interacting with peers influence the perceived norms associated with drug use, which differed from actual substance use norms. Here, individuals tended to over-estimate their peer's substance use, which influenced their own use of substances (Boyle, LaBrie, & Omoto, 2020).

Negative social experiences may also be associated with marijuana use. For example, LGB individuals experience greater discrimination compared to their heterosexual counterparts (Bostwick, Boyd, Hughes, 2010; McCabe, Bostwick, Hughes, et al., 2010), resulting in adverse mental health outcomes and increased marijuana use. Mental health issues and substance use often co-occur among LGB individuals (Pakula, Shoveller, Ratner, & Carpiano, 2016; Rosario, Schrimshaw, & Hunter, 2006). Co-occurring mental health problems and substances is more likely among gay men (relative to heterosexual men) and bisexual women (relative to heterosexual women) (Branstrom & Pachankis, 2018; Han, Duncan, Arcila-Mesa, & Palamar, 2020). Although substance use and mental health problems among lesbian, gay, or bisexual (LGB) individuals have been documented, research is limited on the co-occurrence of these factors in comparison to heterosexual individuals (Branstrom & Pachankis, 2018). Concern of the possible impacts of identifying as lesbian, gay, or bisexual in relation social consequences stresses the need to observe differences in factors related to marijuana use among sexual minorities in comparison to heterosexual individuals.

Health-Related Factors

Previous research has noted several health and social measures that are associated with marijuana use (Schauer et al., 2016; Arria et al., 2016). In general, stress can lead to health issues. For example, stress is common to result in lower life satisfaction rates (Greydanus et al., 2013; Schauer et al., 2016); altering an individual's physiology and the way they think, feel, and behave (Cohen, Jacnicki-Deverts, & Miller, 2007). Individuals who use marijuana are more likely to report poor mental outcomes, such as depressive symptoms and injuries (Schauer et al., 2016; Arria et al., 2016). Khantzian (1997) stressed the importance of psychological factors, stating that they increase the risk of substance use disorders. In more detail, Khantzian (1997) concluded the use of substances is due to individuals seeking self-medication methods to relieve the negative symptoms associated with their mental illness; while Park and Wu (2017) expressed marijuana was used to relieve pain and anxiety.

Stress, mental health, and coping could inform explanations of the differences in health-related outcomes, especially among sexual minorities (Jabson, Farmer, & Bowen, 2014) and their use of substances. The increased exposure to various stressors by sexual minorities is associated with more susceptible behavioral risk and negative health outcomes compared to heterosexual individuals (Jabson, Farmer, & Bowen, 2014). Difficult social situations (e.g., stigma, discrimination) can create a state of chronic stress, leading to poor health outcomes for LGB individuals (Goldbach, Schrage, Dunlap, & Holloway, 2015). Due to LGB individuals experiencing greater discrimination, they are more likely to report psychosocial disorders compared to heterosexual individuals (Meyer, 2003; Bostwick, Boyd, Hughes, 2010; McCabe, Bostwick, Hughes, et al., 2010). Compared to heterosexual men, gay and bisexual men were more likely to report mental illness; compared to heterosexual women, bisexual women had

higher rates of reporting mental illness (Han, Duncan, Arcila-Mesa, & Palamar, 2020).

Marijuana use is highly correlated to mental health issues, more commonly symptoms of depression and anxiety (Wittchen et al., 2007; Deverts, Cohen, DiLillo, Lewis, Kiefe, Whooley, & Matthews, 2010), and suicide attempts (Boyas, Villarreal-Otalora, Alvarez-Hernandez, Fatechi 2019; Branstrom, 2017; Haas et al., 2011) among sexual minorities. These mental health issues may also be linked to structural stigma (Hatzenbuehler, 2016), and sociodemographic, lifestyle, and psychosocial factors collectively (Krueger & Upchurch, 2019).

Criminal Legal System (CLS) Exposure

Criminal legal system exposure is associated with various adverse health-related outcomes, higher rates of marijuana use, and other substance use (Bui et al., 2019; Chamberlain et al., 2019). Nearly 60% of incarcerated adults met the criteria for having a substance use disorder compared to approximately 5% of the general population, and nearly 80% of incarcerated adults reported lifetime use of marijuana compared to about 40% of adults in the general population (Bronson et al., 2017). Legal exposure, particularly incarceration, can be viewed as a chronic stressor that disrupts social integration, resulting in negative health outcomes and increasing the likelihood of substance use (Chamberlain et al., 2019; Massoglia & Pridemore, 2015).

According to Massoglia and Pridemore (2015), there are a few notable pathways linking criminal legal system exposure and negative health outcomes. This emphasize CLS exposure and marijuana use outcomes due to negative health issues. First, criminal legal exposure puts individuals at risk of infectious diseases such as HIV, hepatitis B, hepatitis C, and tuberculosis. This is more of an issue for incarcerated individuals and often associated with often

overcrowding, poor nutrition, poor health care, shared hygiene items, etc. Contracting these diseases while an individual is in prison increases the likelihood of poor health upon release and increases the risk of premature mortality. This is similar for those who serve short prison sentences who are exposed to such diseases (Massoglia, 2008).

Second, legal exposure is a life event that can be a major source of stress. Regardless of sentences, imprisonment causes acute shock and is followed by chronic stress the longer the sentence (Massoglia, 2008). Chronic stressors are associated with immune dysfunction or other stress-induced illnesses such as psychological issues, hypertension, heart disease (Massoglia & Pridemore, 2015). This stress continues once an individual is released from prison due to social stigma (being labeled as an ex-convict). Third, the stigma associated with criminal legal exposure disrupts prosocial social bonds associated with relationships and employment, and can be a major impediment to social integration. This may be the result of a lower position on the social hierarchy within society and other socio-economic and social integration factors. Criminal legal system exposed individuals experience difficulties in developing and maintaining healthy relationships (Massoglia, 2008). According to Massoglia and Pridemore (2015), this not only pertains to friendships, but also leads to lower rates of marriage and a greater risk of divorce. The criminal legal system involved population also face employer biases. Being labeled an ex-convict/inmate/prisoner limits the occupations available to these individuals, resulting in involvement in undesirable jobs that have low wages and poor benefits, all of which impact an individual's health (Massoglia & Pridemore, 2015).

There is currently no research, to my knowledge, that focuses on LGB adults exposed to the criminal legal system and their marijuana use. This is problematic for several reasons. First, research shows that LGB individuals are at greater risk for criminal legal exposure (Bureau of

Justice Statistics, 2018). Using 2019 National Survey on Drug Use and Health (NSDUH) data, Prison Policy Initiative (2021) discovered that LGB individuals were 2.25 times as likely to be arrested than heterosexual individuals; lesbian and bisexual women being 4 times as likely than heterosexual women, and gay and bisexual men being 1.35 times as likely to be arrested than heterosexual men. Compared to those not on probation, and those of the same sex, gay or bisexual men were 5.7% more likely to be on probation, while lesbian or bisexual women were nearly three times as likely (16.7%) (Prison Policy Initiative, 2021). Regarding parole, men on parole were nearly twice as likely to be gay or bisexual (7.9%) as men not on parole (4.1%), while women were nearly three times as likely to be lesbian or bisexual (17.6%) as women not on parole (6.4%) (Prison Policy Initiative, 2021).

Second, there is also evidence to suggest that LGBTQ individuals have different experiences within the legal system. LGBTQ individuals are more likely to experience abuse and harassment, solitary confinement, medical neglect, and denial of health care (Texas Criminal Justice Coalition, 2018). LGB individuals, mainly youth, also experience longer stays in the criminal legal system (UCLA Williams Institute, 2019). This can potentially influence the rates of homelessness, which is associated with health issues and incarceration rates stated previously. Massoglia and Pridemore (2015) stated that chronic stressors include the lack of privacy, overcrowded conditions, antagonistic relationships with guards and inmates, witnessing violence, and the threat of violent victimization. The experiences of LGB legal involved individuals express an additional level of stressors, which may suggest enhanced chronic stress by LGB individuals. This is important because it suggests a possible association of criminal legal system exposure, health, and the LGB population. Since the legal involved population often cope through substance use (Bui et al., 2019), this may propose an association of criminal legal

exposure and marijuana use; or that legal exposure and marijuana use may be moderated by poor health. The associations to health and the lack of research has led to this section being an exploratory element of this study due to the need for research to identify if outcomes associated with criminal exposure (i. e., marijuana use) vary by sexual identity.

The current study extends the extant literature on sexual identity and substance use in meaningful ways. The first aim is to verify the association between sexual identity and marijuana use. It is expected that LGB adults will be more likely to report marijuana use, and the current study explores possible mediating and moderating factors. The second aim is to determine if health-related behaviors mediate the association between sexual identity and marijuana use. A mediation analysis argues that sexual minorities have higher rates of marijuana use due to worse health outcomes, which increase the likelihood of marijuana use. The third aim of this study is to identify if criminal legal system exposure moderates the association between sexual identity and marijuana use. This analysis will determine how the association between sexual identity and marijuana use is influenced by criminal legal system exposure. This is important as sexual minority adults are more likely to experience criminal legal system exposure and encounter more adverse outcomes associated with criminal legal system exposure. The aims of the current study may aid in improving LGBTQIA+ resources, more specifically healthcare and addressing discrimination in the criminal legal system.

CHAPTER THREE: METHODS

Sample

The current study utilizes data from the 2015-2019 National Survey on Drug Use and Health (NSDUH), conducted by Research Triangle Institute. A leading source of epidemiological data on substance use in the U.S., the NSDUH is conducted annually and dates to 1971. The NSDUH reports estimates at the national level for tobacco, alcohol, other substance use, and mental health indicators for the general population within the United States. The sample collects data from residents in all 50 states, plus the District of Columbia, and is selected from 6,000 area segments that are different in size depending on the state sampling regions (SSRs). These SSRs were created to allow each region to produce approximately the same number of interviews during every period of data collection.

The NSDUH uses a combination of computer-assisted personal interviewing i-3 (CAPI) conducted by a field interviewer (FI) and audio computer-assisted self-interviewing (ACASI) to collect information from respondents aged 12 and older. The public use versions of the 2015-2019 NSDUH includes data from 282,768 respondents. As sexual identity was not assessed among respondents under the age of 18, the current study focuses solely on adult respondents aged 18 and older (N = 214,768).

Variables

Sexual Identity

The main variable of interest assesses sexual identity. Due to a limited sample, transgender and queer individuals were excluded. Respondents were asked “Which one of the following do you consider yourself to be?” and were able to respond as “heterosexual, that is,

straight,” “lesbian or gay,” “bisexual,” “don’t know.” These were then recoded: 1 = heterosexual, 2 = gay or lesbian, 3 = bisexual, or 4 = not sure. Individuals who did not answer this question were coded as missing, excluding 2,751 respondents. This variable will be treated as a categorical predictor.

Dependent Variable

The dependent variable measures the use of marijuana. Focusing on the use of marijuana in the past month, the dependent variable was coded 0-no, they did not use marijuana in the past 30 days and 1=yes, marijuana was used in the past 30 days.

Independent Variables

Health-Related Factors

Due to the potential use of marijuana as self-medication and health (Park & Wu, 2017), health-related factors of respondents were examined. These measures include the respondents self-rated health, major depressive episode, and suicide ideation, and illicit drug use other than marijuana.

The respondents were able to rate their perspective on their overall health. These responses were “excellent, very good, good, fair, or poor” and were recoded to group certain categories and measure excellent, very good, or good (0) and fair or poor (1).

Continuing, a respondent was recorded as having a major depressive episode if they reported five of the following nine symptoms of depression in the past year (i.e., feeling sad/empty, lost interest or pleasure, changes in appetite, sleep problems, restless or lethargic, tired or low energy, felt worthless, inability to concentrate, and thoughts of suicide). Past year

major depressive episode was coded to focus on those who did have a major depressive episode 0-no and 1-yes. A respondent was coded yes for the suicide ideation measure if they responded yes to one of the following three items: seriously thought about killing self, made plans to kill self, attempted to kill self.

To better understand health related to drug use, respondents were asked if they have used illicit drugs other than marijuana within the past 30 days. This includes this includes cocaine, heroin, meth, hallucinogens, inhalants, and prescription drug misuse. The variable was recoded to represent 0-never used illicit drugs/only used marijuana within the past month, 1-used illicit drugs within the past month (other than marijuana).

Criminal Legal System Exposure

Due to literature expressing health issues related to the “justice involved” population (Bronson & Berzofsky, 2017; Massoglia et al. 2011), variables related to being arrested, on probation, and on parole during the past 12 months were recoded. The respondents were asked “Not counting minor traffic violations, have you ever been arrested and booked for breaking the law?” was coded to 0-no, 1-yes. Individuals were also asked “Were you on probation at any time during the past 12 months?” This variable was coded 0-no, 1-yes. Additionally, respondents were asked “Were you on parole, supervised release, or other conditional release from prison at any time during the past 12 months?” which was recoded to measure 0- no and 1-yes. These recoded variables were then combined to measure whether the individual was involved in the criminal legal system 0-no, 1-yes.

Socio-Demographic Factors

The sociodemographic factors are used as control variables. Age was grouped into categories of ages 1=18-25, 2=26-34, 3=35-49, and 4=50+. Sex was included to examine possible differences (male, female). Race and ethnicity were categorized as 1-white, 2-Black or African American, 3-Hispanic, and 4-other (Native American or Alaskan Native, Hawaiian or Pacific Islander, Asian, more than one). Income was recoded and grouped to 1- less than \$20,000; 2- \$20,000-\$49,999; 3- \$50,000 – \$74,999; 4- \$75,000 or more). Educational attainment was (1-less than high school, 2-high school graduate, 3-some college, or 4-college graduate). Additionally, county status was accounted for. This variable was coded “large metro,” “small metro,” and “nonmetro.” It was recoded to be 1- large metro, 2- small metro, and 3- nonmetro. Employment and marital status were included. Employment status remained the same representing 1- full time, 2-employed part-time, 3-unemployed, 4-other, or not in labor force. Marital status was also left alone and coded 1-married, 2-widowed, 3-separated or divorced, and 4-never married). In addition to the sociodemographic control variables, survey year was included as a control measure, categorizing each year (2015, 2016, 2017, 2018, and 2019).

Finally, whether the respondent had health insurance was also included. The respondents were asked “during the past 12 months, that is from [DATE FILL] through today, was there any time when [SAMPLE MEMBER] did not have any kind of health insurance or coverage?” The responses were recoded to 0-no and 1-yes.

Analytic Strategy

To begin, descriptions of each variable were conducted to view the prevalence of each measure. Once this was done, a chi square test was run to identify differences in the prevalence

of marijuana use based on sexual identity. Next, logistic regression models were estimated to assess the aims of the current study. For the logistic regression analysis sexual identity was included as a categorical predictor variable, with heterosexual respondents as the reference category. All analyses were run separately for males and females, staying consistent with previous research on sexual identity and substance use (Conron, Mimiaga, Landers 2010; Schuler, Rice, Evans-Polce, & Collins, 2018). In order to take into account the complex multistage sampling design of the NSDUH, analyses were conducted using the SVYSET and SVY commands in STATA 16.0. These commands allowed STATA to consider survey design effects, including stratification and weight variables and the primary sampling unit, when estimating test statistics.

The first aim of the study is to assess the association between sexual identity and marijuana use using a chi-square analysis. To assess the second aim, several logistic regression models are estimated to determine if health-related behaviors mediate the association between sexual identity and marijuana use. In the first stage of the mediation analysis there is an evaluation of the association between sexual identity and health-related behaviors (dependent variable). In the second stage of the mediation analysis, we assess the association between sexual identity and marijuana use (dependent variable) with and without mediating factors. In Model 1, the baseline model, sexual identity and sociodemographic control measures are included. In Models 2-6, health-related measures are added to the baseline model to determine if they account for the association between sexual identity and marijuana use. Model 2 adds perception of overall health, Model 3 adds major depression, Model 4 adds suicide ideation, Model 5 adds illicit drug use other than marijuana use, and Model 6 includes all health-related behaviors. If the

effect of sexual identity is substantially reduced or becomes insignificant when the health measures are included, this will be considered evidence of mediation.

The third aim of this study is to identify if criminal legal system exposure moderates the association between sexual identity and marijuana use, in other words, if the association depends on criminal legal system exposure. A logistic regression model with an interaction term that measures sexual identity and criminal legal system exposure within the past year will be used to determine moderation effects. This is to view the impact of the criminal legal system exposure on marijuana use and how it varies based on sexual identity.

CHAPTER FOUR: RESULTS

Univariate Analysis

Sample characteristics for all measures are shown in Table 1. The majority of the sample reported no marijuana use in the past 30 days, with 9.98% reporting marijuana use within the past month. When examining sexual identity, most respondents stated that their sexual identity was heterosexual (94.57%), followed by bisexual (3.08%), lesbian/gay (1.93%), and those who were not sure (0.42%). The sample additionally consisted primarily of those who were not involved in the criminal legal system (97.29%), where 2.71% were involved.

Regarding the health measures, see Table 1, the minority would rate their health as fair or poor (13.53%), had a depressive episode within the past year (7.22%), or had suicidal ideation within the past year (4.32%) within the past year. There were also a few respondents who did use illicit drugs other than marijuana in the past month (3.43%).

To get a better understanding of the sample, sex patterns related to gender were examined. Female respondents (N=109,805) who used marijuana within the past 30 days consisted of 7.64% of the sample. Respondents mainly identified as heterosexual (93.53%), followed by lesbian (4.26%), bisexual (1.64%), and not sure (0.57%). Of those female respondents, 1.5% of the individuals were involved in the criminal legal system. The minority of female respondents would rank their overall health as fair or poor (13.95%), had a depressive episode within the past year (9.01%), had suicidal thoughts within the past year (4.54%), and used illicit drugs other than marijuana in the past 30 days (2.79%).

Males respondents (N= 95,278) had a higher prevalence of marijuana use compared to females within the past month (12.49%). Most male individuals identified as heterosexual

(95.69%), followed by bisexual (2.23%), gay (1.82%), and not sure (0.26%). Within the past year, 3.99% of the male respondents were involved in the criminal legal system. Health wise, 13.01% rated their overall health as fair or poor, 5.29% experienced depression within the past year, 4.08% dealt with suicidal ideation, and 4.12% used illicit drugs other than marijuana within the past 30 days.

Table 1: Sample Characteristics (2015-2019 NSDUH, N=205,083)

Measure	All Respondents N=205,083 % (95% CI)	Male Respondents N=95,278 % (95% CI)	Female Respondents N=109,805 % (95% CI)
Marijuana Use	9.98% (9.82, 10.14)	12.49% (12.25, 12.74)	7.64% (7.43, 7.86)
Sexual Identity			
Heterosexual	94.57% (94.44, 94.70)	95.69% (95.49, 95.88)	93.53% (93.34, 93.73)
Lesbian/Gay	1.93% (1.84, 2.02)	2.23% (2.09, 2.39)	1.64% (1.52, 1.77)
Bisexual	3.08% (3.00, 3.17)	1.82% (1.73, 1.92)	4.26% (4.12, 4.41)
Not sure	0.42% (0.37, 0.48)	0.27% (0.21, 0.32)	0.57% (0.49, 0.66)
Health-Related Factors			
Fair/Poor Health	13.53% (13.21, 13.85)	13.08% (12.69, 13.48)	13.95% (13.58, 14.32)
Major Depression	7.22% (7.06, 7.37)	5.29% (5.12, 5.46)	9.01% (8.78, 9.25)
Suicide Ideation	4.32% (4.19, 4.45)	4.08% (3.88, 4.30)	4.54% (4.38, 4.71)
Illicit Drug Use	3.43% (3.32, 3.55)	4.12% (3.97, 4.27)	2.79% (2.66, 2.93)
Criminal Legal System			
Criminal Exposure	2.71% (2.62, 2.80)	4.00% (3.84, 4.15)	1.51% (1.42, 1.61)
Sociodemographics			
Insured	90.39% (90.17, 90.60)	88.82% (88.44, 89.20)	91.85% (91.64, 92.05)
Age Group			
18-25	13.82% (13.63, 14.02)	14.32% (14.04, 14.60)	13.36% (13.13, 13.59)
26-34	15.94% (15.69, 16.18)	16.39% (16.08, 16.70)	15.51% (15.24, 15.79)
35-49	24.62% (24.32, 24.92)	25.05% (24.66, 25.45)	24.22% (23.86, 24.58)
50+	45.62% (45.13, 46.11)	44.24% (43.62, 44.86)	46.91% (46.37, 47.44)
Sex			
Male	48.22% (47.88, 48.57)	---	---
Race/Ethnicity			
White	64.80% (64.29, 65.30)	65.30% (64.76, 65.84)	64.33% (63.67, 64.97)
Black	11.69% (11.34, 12.04)	10.89% (10.57, 11.22)	12.42% (11.98, 12.87)
Hispanic	15.55% (15.16, 15.94)	15.96% (15.51, 16.43)	15.16% (14.67, 15.66)
Other	7.97% (7.75, 8.19)	7.84% (7.55, 8.14)	8.09% (7.77, 8.42)

Measure	All Respondents N=205,083 % (95% CI)	Male Respondents N=95,278 % (95% CI)	Female Respondents N=109,805 % (95% CI)
Income			
Less than \$20,000	15.71% (15.42, 16.00)	13.53% (13.19, 13.89)	17.74% (17.33, 18.15)
\$20,000 - \$49,999	29.16% (28.76, 29.56)	27.98% (27.50, 28.45)	30.26% (29.77, 30.76)
\$50,000 - \$74,999	16.13% (15.88, 16.38)	16.38% (16.08, 16.68)	15.90% (15.54, 16.26)
\$75,000+	39.00% (38.46, 39.55)	42.11% (41.53, 42.70)	36.11% (35.45, 36.76)
Educational Attainment			
Less than High School	11.96% (11.69, 12.22)	12.66% (12.33, 12.99)	11.30% (10.94, 11.67)
High School Graduate	24.52% (24.20, 24.84)	26.17% (25.76, 26.58)	22.98% (22.59, 23.38)
Some College	31.24% (30.91, 31.58)	29.15% (28.65, 29.65)	33.19% (32.80, 33.59)
College Graduate	32.28% (31.80, 32.76)	32.02% (31.47, 32.57)	32.52% (31.95, 33.11)
County			
Large Metropolitan	55.74% (55.20, 56.29)	55.89% (55.17, 56.61)	55.61% (55.05, 56.17)
Small Metropolitan	30.07% (29.56, 30.58)	29.97% (29.37, 30.59)	30.16% (29.60, 30.73)
Non-metropolitan	14.19% (13.81, 14.58)	14.14% (13.71, 14.58)	14.23% (13.78, 14.70)
Employment Status			
Full-time	50.00% (49.62, 50.39)	58/36% (57.79, 58.92)	42.23% (41.76, 42.69)
Part-time	13.16% (12.95, 13.37)	10.10% (9.84, 10.36)	16.01% (15.72, 16.30)
Unemployed	4.24% (4.10, 4.38)	4.70% (4.53, 4.89)	3.81% (3.62, 4.00)
Other	32.60% (32.22, 32.98)	26.84% (26.38, 27.31)	37.96% (37.42, 38.50)
Marital Status			
Married	52.07% (51.60, 52.54)	54.15% (53.65, 54.65)	50.13% (49.48, 50.79)
Widowed	5.88% (5.72, 6.05)	3.02% (2.88, 3.17)	8.54% (8.27, 8.82)
Divorced/Separated	13.80% (13.53, 14.06)	11.93% (11.63, 12.24)	15.53% (15.15, 15.93)
Never Married	28.25% (27.90, 28.61)	30.89% (30.50, 31.29)	25.79% (25.33, 26.26)
Year			
2015	19.76% (19.41, 20.12)	19.75% (19.27, 20.23)	19.78% (19.36, 20.20)
2016	19.80% (19.49, 20.11)	19.77% (19.37, 20.17)	19.83% (19.46, 20.20)
2017	20.08% (19.82, 20.35)	20.11% (19.73, 20.49)	20.06% (19.73, 20.39)
2018	20.14% (19.90, 20.38)	20.18% (19.82, 20.54)	20.11% (19.77, 20.45)
2019	20.22% (19.82, 20.63)	20.20% (19.70, 20.71)	20.24% (19.77, 20.71)

Bivariate Analysis

The prevalence of marijuana use across sexual identity is important to note and can be seen in Table 2. The relationship between marijuana use within the past month and sexual identity is significant for all respondents and for males and females separately. Generally, respondents who identified as bisexual reported the highest prevalence of marijuana use within the past month (27.86% [26.37, 29.4]), followed by respondents who identify as lesbian/gay (20.8% [19.14, 22.56]), heterosexual (9.22% [9.06, 9.38]), and not sure (3.34% [2.32, 4.79]). Focusing on female respondents, marijuana use was more frequent among bisexual individuals (29.18% [27.51, 30.9]), lesbian (18.45% [16.06, 21.11]), heterosexual (6.50% [6.29, 6.72]), and not sure (2.01% [1.22, 3.30]), respectively. Among male respondents, bisexual men also reported the highest prevalence of marijuana use within the past month (24.61% [22.04, 27.37]), while gay (22.64% [20.4, 25.05]), heterosexual (12.05% [11.8, 12.3]), and not sure (5.81% [3.62, 9.20]) come after.

Table 2: Marijuana Use and Sexual Identity

	Heterosexual % (95% CI)	Lesbian/Gay % (95% CI)	Bisexual % (95% CI)	Not Sure % (95% CI)
All Respondents Chi2=3059.18, p<0.00	9.22% (9.06, 9.38)	20.8% (19.14, 22.56)	27.86% (26.37, 29.4)	3.34% (2.32, 4.79)
Only Male Respondents Chi2=485.58 , p<0.00	12.05% (11.8, 12.3)	22.64% (20.4, 25.05)	24.61% (22.04, 27.37)	5.81% (3.62, 9.20)
Only Female Respondents Chi2=3724.08 , p<0.00	6.50% (6.29, 6.72)	18.45% (16.06, 21.11)	29.18% (27.51, 30.9)	2.01% (1.22, 3.30)

Mediation Analysis

The first stage of the mediation analysis is to determine if sexual minorities are more likely to experience adverse health-related behaviors. Table 3 shows the health-related factors as the dependent variables, with logistic regression models run for all respondents as well as males and females separately. This analysis accounts for various controls related to sociodemographic characteristics, criminal legal system exposure, marijuana use, and survey year. The results show that sexual minorities are more likely to report poor health, depression, suicide ideation, and more illicit drug use than heterosexual adults. Compared to heterosexual individuals, respondents who identified as lesbian/gay (OR= 1.17 [1.01, 1.36]) and bisexual (OR= 1.72 [1.55, 1.90]) were at an increased likelihood to rate their overall health as poor. Those who identified as lesbian/gay (OR= 1.81 [1.62, 2.02]) and bisexual (OR= 2.74 [2.52, 2.97]) were at an increased likelihood to experience depressive episodes compared to heterosexual respondents. Suicide ideation is noted to have the biggest impact. Compared to heterosexual respondents, lesbian/gay individuals (OR= 2.23 [2.02, 2.45]) and bisexual respondents (OR=3.16 [2.94, 3.39]) were at an increased likelihood to experience suicide ideation. Individuals who identified as lesbian/gay (OR=1.88 [1.66, 2.12]) and bisexual (OR= 1.79 [1.65, 1.93]) were also at an increased likelihood than heterosexual respondents to use illicit drugs other than marijuana. When focusing on males or females, the results did not change for any health-related factor except for poor overall health. Males who identified as gay and rated their overall health as poor was no longer significant.

Table 3: Regression of potential health-related mediators on sexual identity

	Overall Health OR (95% CI)	Depression OR (95% CI)	Suicide Ideation OR (95% CI)	Illicit Drug Use OR (95% CI)
All Respondents				
Heterosexual	ref. (1.00)	ref. (1.00)	ref. (1.00)	ref. (1.00)
Lesbian/Gay	1.17* (1.01, 1.36)	1.81*** (1.62, 2.02)	2.23*** (2.02, 2.45)	1.88*** (1.66, 2.12)
Bisexual	1.72*** (1.55, 1.90)	2.74*** (2.52, 2.97)	3.16*** (2.94, 3.39)	1.79*** (1.65, 1.93)
Not Sure	0.96 (0.72, 1.26)	0.70 (0.46, 1.05)	0.81 (0.55, 1.17)	1.26 (0.91, 1.72)
Only Males				
Heterosexual	ref. (1.00)	ref. (1.00)	ref. (1.00)	ref. (1.00)
Gay	0.92 (0.73, 1.15)	2.06*** (1.66, 2.54)	2.50*** (2.13, 2.93)	2.39*** (2.00, 2.84)
Bisexual	1.32** (1.11, 1.56)	3.10*** (2.55, 3.75)	3.43*** (2.90, 4.05)	1.58*** (1.33, 1.87)
Not Sure	0.81 (0.53, 1.23)	0.66 (0.25, 1.67)	1.06 (0.52, 2.15)	1.00 (0.55, 1.82)
Only Females				
Heterosexual	ref. (1.00)	ref. (1.00)	ref. (1.00)	ref. (1.00)
Lesbian	1.47** (1.19, 1.81)	1.58*** (1.36, 1.84)	1.92*** (1.69, 2.17)	1.30** (1.08, 1.56)
Bisexual	1.81*** (1.60, 2.04)	2.61*** (2.39, 2.84)	2.96*** (2.68, 3.26)	1.88*** (1.70, 2.08)
Not Sure	1.02 (0.72, 1.44)	0.71 (0.44, 1.14)	0.67 (0.43, 1.04)	1.46 (0.94, 2.25)

Note: ***p<0.001, **p<0.01, *p<0.05. All models include controls for criminal legal system exposure, sociodemographic characteristics, marijuana use, and survey year.

In Table 4, the baseline model (Model 1), respondents at various responses for sexual identity, lesbian/gay (OR= 1.76 [1.56, 1.98]) and bisexual (OR=2.56 [2.34, 2.79]) adults were at an increased likelihood of marijuana use compared to respondents who identified as heterosexual; while not sure (OR= 0.37 [0.26, .53]) adults were at a decreased likelihood of marijuana use compared to heterosexual individuals.

When shifting the focus to only female or only male respondents, there were no changes in the findings from the previous model, meaning the likelihood of sexual identities being related to marijuana use remained the same. Males who identified as gay (OR= 0.92 [0.73, 1.15]) and bisexual (OR=1.32 [1.11, 1.56]) adults were at an increased odds of marijuana use compared to respondents who identified as heterosexual; while those who were not sure of their sexual identity (OR= 0.81 [0.53, 1.23]) were at a decreased odds of marijuana use compared to heterosexual individuals. Similarly, females who identified as lesbian (OR= 1.47 [1.19, 1.81]) and bisexual (OR=1.81 [1.60, 2.04]) adults were at an increased odds of marijuana use compared to respondents who identified as heterosexual; while those who were not sure of their sexual identity (OR= 1.02 [0.72, 1.44]) were at a decreased odds of marijuana use compared to heterosexual individuals.

The baseline model (Model 1) established that sexual minorities are more likely to report marijuana use. The next stage of the mediation analysis is to assess the relationship between sexual identity and marijuana use with the health-related factors. To do this the health-related variables were added to the baseline model, shown in Table 4. Focusing on Model 6, which includes all health-related measures collectively, respondents who reported being lesbian/gay (OR= 1.41 [1.24, 1.60]), bisexual (OR= 2.01 [1.81, 2.21]), and not sure (OR= 0.26 [0.16, 0.39]) maintained significance. Although they remain significant, the odds ratios for sexual identity are

slightly diminished once the health measures are included in the model. For the health-related measures, poor self-rated health (OR= 1.34 [1.24, 1.44]), major depression (OR= 1.33 [1.25, 1.41]), and suicide ideation (OR= 1.25 [1.15, 1.34]) all increased the odds of marijuana use. Respondents who reported illicit drug use other than marijuana (OR= 6.16 [5.85, 6.47]) were at an increased odds of marijuana use.

For females, adding the health-related variables to the baseline model resulted in no changes regarding significance. Sexual identity remained significant; adults who reported being lesbian/gay (OR= 1.95 [1.63, 2.32]) and bisexual (OR= 2.29 [2.04, 2.57]) were at an increased odds of marijuana use, and those who were not sure of their sexual identities (OR= 0.21 [0.11, 0.38]) were at decreased odds for using marijuana. For the health-related measures, poor self-rated health (OR= 1.42 [1.30, 1.54]), major depression (OR= 1.45 [1.32, 1.58]), suicide ideation (OR= 1.24 [1.13, 1.35]), and respondents who reported illicit drug use other than marijuana (OR= 5.59 [5.23, 5.97]) all increased the odds of marijuana use.

For male respondents, adding health-related measures to the baseline model shifted for those who reported they were gay; meaning sexual identity was no longer significant when considering health. Regarding significance, males who identified as being bisexual (OR= 1.38 [1.18, 1.60]) remained at an increased odds of marijuana use, while not sure (OR= 0.33 [0.18, 0.60]) remained at decreased odds. Regarding the health-related measures, poor self-rated health (OR= 1.27 [1.13, 1.43]), major depression (OR= 1.18 [1.05, 1.31]), suicide ideation (OR= 1.26 [1.12, 1.40]), and respondents who reported illicit drug use other than marijuana (OR= 6.58 [6.14, 7.05]) all increased the odds of marijuana use.

In Table 4, models 2 thru 5 assess the influence of each health-related mediator individually. It is evident that illicit drug use other than marijuana, Model 5, is the most powerful

mediator. For all respondents the odds ratio for lesbian/gay adults decreased by 17% from 1.76 in model 1 to 1.46 in model 5. Other illicit drug use was more impactful for male respondents as gay men were no longer at increased likelihood for marijuana use once other drug use was accounted for. For all respondents the odds ratio for bisexual adults decreased by 15% from 2.56 in model 1 to 2.18 in model 5, a similar reduction in odds was observed among male and female respondents. Finally, this analysis also shows that mental health has a more powerful impact on the association of sexual identity and marijuana use than an individual's perception of their overall health.

Table 4: Regression of marijuana use on sexual identity and health-related mediators

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)	Model 6 OR (95% CI)
All Respondents						
Heterosexual	ref. (1.00)					
Lesbian/Gay	1.76*** (1.56, 1.98)	1.75*** (1.55, 1.97)	1.68*** (1.49, 1.89)	1.68*** (1.48, 1.89)	1.46*** (1.29, 1.65)	1.41*** (1.24, 1.60)
Bisexual	2.56*** (2.34, 2.79)	2.50*** (2.28, 2.73)	2.33*** (2.12, 2.56)	2.34*** (2.13, 2.58)	2.18*** (1.98, 2.39)	2.01*** (1.81, 2.21)
Not Sure	0.37*** (0.25, 0.53)	0.37*** (0.25, 0.53)	0.26*** (0.16, 0.40)	0.37*** (0.25, 0.52)	0.35*** (0.24, 0.49)	0.26*** (0.16, 0.39)
Overall Health	-----	1.51*** (1.41, 1.61)	-----	-----	-----	1.34*** (1.24, 1.44)
Depression	-----	-----	1.84*** (1.74, 1.93)	-----	-----	1.33*** (1.25, 1.41)
Suicide Ideation	-----	-----	-----	1.94*** (1.81, 2.06)	-----	1.25*** (1.15, 1.34)
Illicit Drugs	-----	-----	-----	-----	6.44*** (6.14, 6.75)	6.16*** (5.85, 6.47)
Only Males						
Heterosexual	ref. (1.00)					
Gay	1.53*** (1.31, 1.78)	1.54*** (1.31, 1.79)	1.48*** (1.26, 1.73)	1.46*** (1.25, 1.71)	1.16 (0.98, 1.37)	1.14 (0.96, 1.34)
Bisexual	1.67*** (1.44, 1.93)	1.65*** (1.42, 1.92)	1.56*** (1.33, 1.82)	1.54*** (1.32, 1.80)	1.46*** (1.26, 1.68)	1.38*** (1.18, 1.60)
Not Sure	0.42** (0.26, 0.68)	0.42** (0.25, 0.68)	0.30*** (0.16, 0.54)	0.42** (0.25, 0.68)	0.42** (0.26, 0.68)	0.33** (0.18, 0.60)
Overall Health	-----	1.42*** (1.28, 1.58)	-----	-----	-----	1.27*** (1.13, 1.43)
Depression	-----	-----	1.69*** (1.53, 1.86)	-----	-----	1.18*** (1.05, 1.31)
Suicide Ideation	-----	-----	-----	1.88*** (1.70, 2.06)	-----	1.26*** (1.12, 1.40)
Illicit Drugs	-----	-----	-----	-----	6.78*** (6.33, 7.24)	6.58*** (6.14, 7.05)
Only Females						
Heterosexual	ref. (1.00)					
Lesbian	2.17*** (1.83, 2.55)	2.11*** (1.79, 2.49)	2.06*** (1.73, 2.43)	2.07*** (1.75, 2.45)	2.06*** (1.73, 2.44)	1.95*** (1.63, 2.32)
Bisexual	3.00*** (2.69, 3.33)	2.91*** (2.62, 3.23)	2.71*** (2.43, 3.00)	2.74*** (2.46, 3.06)	2.52*** (2.25, 2.83)	2.29*** (2.04, 2.57)
Not Sure	0.33*** (0.19, 0.54)	0.33*** (0.20, 0.54)	0.23*** (0.12, 0.42)	0.33*** (0.19, 0.55)	0.29*** (0.17, 0.49)	0.21*** (0.11, 0.38)
Overall Health	-----	1.62*** (1.49, 1.75)	-----	-----	-----	1.42*** (1.30, 1.54)
Depression	-----	-----	1.94*** (1.79, 2.09)	-----	-----	1.45*** (1.32, 1.58)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	OR	OR	OR	OR	OR	OR
	(95% CI)					
Suicide	-----	-----	-----	1.97***	-----	1.24***
Ideation				(1.83, 2.12)		(1.13, 1.35)
Illicit Drugs	-----	-----	-----	-----	5.97***	5.59***
					(5.59, 6.37)	(5.23, 5.97)

Note: ***p<0.001, **p<0.01, *p<0.05. All models include controls for criminal legal system exposure, sociodemographic characteristics, and survey year.

Moderation Analysis

The final analysis assessed whether the association between sexual identity and marijuana use was moderated by criminal legal system exposure. To do this an interaction term was created between sexual identity and criminal legal system exposure, results shown in Table 5. In comparison to those who identified a heterosexual and had exposure to the criminal legal system, those who were lesbian/gay (OR= 0.52 [0.32, 0.85]) and involved in the criminal legal system were at a decreased odds of marijuana use. Respondents who were bisexual or were not sure and had criminal legal system exposure were not significant.

Regarding female respondents only, there is a difference in the moderation term. Those who are involved in the criminal legal system were only significantly more likely to use marijuana if they responded to not being sure of their sexual identity (OR= 11.34 [1.74, 73.74]) as compared to heterosexual individuals. This shows that those who were not sure of their sexual identity were at an increased odds of marijuana use. For males, on the other hand, of those involved in the criminal legal system showed significance only among those who identified as gay (OR= 0.34 [0.18, 0.62]) compared to heterosexual individuals. Respondents who identified as gay were at a decreased odds of marijuana use in the past 30 days.

Table 5: Moderation Analysis (2015-2019 NSDUH)

Measure	All Respondents OR (95% CI)	Male Respondents OR (95% CI)	Female Respondents OR (95% CI)
Sexual Identity			
Heterosexual	ref (1.00)	ref (1.00)	ref (1.00)
Lesbian/Gay	1.49 (1.30, 1.71)***	1.24 (1.04, 1.48)*	1.97 (1.64, 2.37)***
Bisexual	2.10 (1.92, 2.30)***	1.45 (1.24, 1.70)***	2.42 (2.17, 2.71)***
Not sure	0.28 (0.17, 0.46)***	0.38 (0.19, 0.74)**	0.22 (0.11, 0.43)***
CLS Exposure			
CLS Exposure	1.54 (1.41, 1.70)***	1.45 (1.29, 1.62)***	1.76 (1.48, 2.09)***
Interaction Term			
Heterosexual-CLS Exposure	ref (1.00)	ref (1.00)	ref (1.00)
Lesbian/gay-CLS Exposure	0.52 (0.32, 0.85)*	0.34 (0.18, 0.62)**	0.87 (0.47, 1.61)
Bisexual-CLS Exposure	0.87 (0.66, 1.13)	0.84 (0.46, 1.55)	0.84 (0.60, 1.19)
Not sure-CLS Exposure	1.62 (0.12, 22.28)	0.77 (0.04, 17.25)	11.34 (1.74, 73.74)*

Note: ***p<0.001, **p<0.01, *p<0.05. All health-related factors and sociodemographic measures are included in the models but not shown. CLS= Criminal Legal System

CHAPTER FIVE: DISCUSSION

Previous research has noted that the sexual minorities are not only an at-risk population for substance use behaviors (McCabe, Hughes, & Boyd, 2004; Ford & Jasinski, 2006; Schuler & Collins, 2020), but are also more likely to experience negative health outcomes compared to heterosexual individuals (Jabson, Farmer, & Bowen, 2014). Additionally, research shows that health-related issues and marijuana and other substance use behaviors are higher among those exposed to the criminal legal system (Bui et al., 2019; Chamberlain et al., 2019). Taken together, the current research seeks to discover possible associations in high-risk adults. This study contributes to research involving LGB marijuana use by investigating the mediating (health related) and moderating (criminal legal system exposure) factors, as well as those who were “not sure” about their sexual identity and sex differences among all groups.

Findings show that the prevalence of marijuana use is higher among respondents who identified as bisexual, followed by respondents who identified as lesbian/gay compared to heterosexual adults. This is consistent with previous research that showed sexual minorities report higher levels of marijuana use than heterosexual individuals (Schuler et al., 2018; Jabson, Farmer, & Bowen, 2014). Schuler and Collins (2020), Ford & Jasinski (2006), and McCabe, Hughes, and Boyd (2004), all noted higher rates of substance use among bisexual women. Similarly, among female respondents, this study found marijuana use was more frequent among bisexual and lesbian adults compared to heterosexual individuals. When considering male respondents only, bisexual men reported the highest prevalence of marijuana use within the past month, followed by gay respondents compared to heterosexual adults. Those who responded “not sure” were less prevalent, but this may be due to the sample size for this group. This was able to

support the first aim, which intended to verify the association between sexual identity and marijuana use.

Health-related measures were examined to discover if they mediate the association between marijuana use and sexual identity. Jabson, Farmer and Bowen (2014) emphasized that sexual minorities have worse health outcomes than heterosexual individuals. The current research had similar findings, as bisexual and lesbian/gay adults were more likely to have worse health outcomes, compared to heterosexual individuals. Additionally, respondents who rated their overall health as fair or poor, had major depression, experienced suicide ideation, and used illicit drugs other than marijuana were all more likely to use marijuana. These findings are consistent with studies that show marijuana use is linked to mental health issues, more commonly symptoms of depression (Wittchen et al., 2007; Deverts, Cohen, DiLillo, Lewis, Kiefe, Whooley, & Matthews, 2010), and suicide attempts (Boyas, Villarreal-Otalora, Alvarez-Hernandez, Fatechi 2019; Branstrom, 2017; Haas et al., 2011) among sexual minorities.

For male respondents, adding health-related measures made changes to the association between sexual identity and marijuana use that are worth discussing. Once health-related factors were included in the model, gay males were no longer significantly more likely to use marijuana. This is clear evidence that health was a mediator for gay males and is consistent with research by Han, Duncan, Arcila-Mesa and Palamar (2020), which found higher rates of poor mental health among gay men and that it often co-occurred with substance use. The discovery is important because it stresses the need for health resources for the LGBTQIA+ community. This finding can also be connected to previous studies explanation of the minority stress perspective (Jabson, Farmer, & Bowen, 2014; Goldbach, Schrage, Dunlap, & Holloway, 2015; Branstrom, 2017), and may be related to exposure to difficult social situations, which creates a state of chronic

stress, negatively impacting the health outcomes of gay males, as supported by Meyer (2003), which can then impact the use of marijuana (Jabson, Farmer, & Bowen, 2014).

Respondents who identified as lesbian/gay and were exposed to the criminal legal system were at decreased odds of marijuana use compared to heterosexual adults with criminal legal system exposure. The study findings suggests that criminal legal exposure moderate marijuana use. These results remained the same when restricting the sample to male respondents only; gay individuals who were involved in the criminal legal system were less likely to use marijuana compared to heterosexual adults. This may best be explained by the decline in arrests for marijuana-related offenses due to changing marijuana policies (Drug Policy Alliance, 2021). The legalization of marijuana would lead to less arrests for marijuana use. This is important as these issues were shown to push respondents away from marijuana use rather than toward it. Previous research, focusing on the general public, reported higher rates of marijuana use and other substance use among CLS exposed individuals (Bui et al., 2019; Chamberlain et al., 2019). This study's findings potentially differ due to the focus on separate groups of sexual minorities (LGB respondents) as well as sex differences.

Female respondents, on the other hand, changed. Females who were involved in the criminal legal system were only significant if they responded to not being sure of their sexual identity compared to heterosexual individuals; increasing the odds of marijuana use. This finding is consistent with previous studies, such as, Bui et al. (2019) and Chamberlain et al. (2019), who noted higher rates of marijuana use when an individual is exposed to the CLS. Although this was consistent with prior literature, the contrast compared to gay men stress the importance of looking at the differences among sexual minorities and sex regarding the association of criminal legal system exposure and marijuana use.

Limitations

The National Survey on Drug Use and Health (NSDUH) is a well-known data set to assess substance use behaviors, but still has its limitations. First, it is difficult to conclude causal relationships or impacts due to NSDUH being a cross-sectional design. Second, responses involve self-selection, which not only leads to some individuals not feeling comfortable to answering the sexual identity question, but may also decline to participate in the study. Third, the sexual identity question is limited in the number of individuals who are transgender and does not specify those who may identify as part of the LGBTQIA+ community (i.e. non-binary), which may also display differences in marijuana use. Fourth, the criminal legal system exposure is limited as it does not include individuals who are incarcerated or homeless. Finally, the operationalization of important measures were dictated by NSDUH, meaning respondents were only given yes or no responses to criminal legal system exposure, limiting other details that could measure the severity of their experiences in the system.

CHAPTER SIX CONCLUSION

The current research assessed the association between marijuana use and sexual identity, examining the mediation of health-related factors and the moderation of criminal legal system exposure. Results specify that it is important to consider differences in marijuana use based on sexual identity and the factors that may influence said use. This study was able to contribute to current research by discovering that health factors mediate differences in sexual identity and marijuana use. The finding is important as it allows for a better understanding of the association between health and marijuana use, as well as specific differences related to sexual identity, all of which has been limited in previous studies. Additionally, exposure to the criminal legal system moderates marijuana use and sexual identity to some extent. This investigation allowed for the determination of whether the relationship between sexual identity and marijuana use was dependent on criminal legal system exposure. Legal exposure was not analyzed previously among LGB individuals and marijuana use, and was able to provide evidence of new factors that play a part in marijuana use. These findings suggest that more resources are necessary in regard to centering LGBTQIA+ individuals' mental health as it can contribute to the prevention of additional stressors on the community. This study suggests further research associated with criminal legal system exposure and the LGBTQIA+ community. Future research encourages the examination of the criminal legal system differences between those who were arrested, on probation, on parole, and potentially those who are incarcerated as well.

LIST OF REFERENCES

- Abrams, D. I., Jay, C. A., Shade, S. B., Vizoso, H., Reda, H., Press S., et al. (2007). Short-term effects of cannabinoids in patients with HIV-1 infection: A randomized placebo-controlled clinical trial. *Annals of Internal Medicine*, *139*(4), 258-266.
- Alper, M., Durose, M. R., Markman, M. (2018). 2018 Update on Prisoner Recidivism: A 9-Year Follow-up Period (2005-2014). US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. <https://bjs.ojp.gov/content/pub/pdf/18upr9yfup0514.pdf>
- Arria, A. M., Caldeira, K. M., Bugbee, B. A., Vincent, K. B., & O'Grady, K. E. (2016). Marijuana use trajectories during college predict health outcomes nine years postmatriculation. *Drug and alcohol dependence*, *159*(1), 158-165.
- Bonn-Miller, M. O., Vujanovic, A. A., Twohig, M. P., Medina, J. L., & Huggins, J. L. (2010). Posttraumatic Stress Symptom Severity and Marijuana Use Coping Motives: A Test of the Mediating Role of Non-Judgmental Acceptance within a Trauma-Exposed Community Sample. *Mindfulness*, *1*(1), 98-106. doi: 10.1007/s12671-010-0013-6.
- Bostwick, W. B., Boyd, C. J., Hughes, T. L., & McCabe, S. E. (2010). Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the United States. *American Journal of Public Health*, *100*(1), 468-475.
- Boyas, J. F., Villarreal-Otálora, T., Alvarez-Hernandez, L. R., & Fatehi, M. (2019). Suicide ideation, planning, and attempts: the case of the Latinx LGB youth. *Health Promotion Perspectives*, *9*(3),198-206. doi:10.15171/hpp.2019.28
- Boyd, C. J., Veliz, P. T., & McCabe, S. E. (2020). Severity of DSM-5 cannabis use disorders in a nationally representative sample of sexual minorities. *Substance Abuse*, *41*(2), 191–195. doi:[10.1080/08897077.2019.1621242](https://doi.org/10.1080/08897077.2019.1621242).
- Boyle, S. C., LaBrie, J. W., Costine, L. D., & Witkovic, Y. D. (2017). “It’s how we deal”: Perceptions of LGB peers’ use of alcohol and other drugs to cope and sexual minority adults’ own coping motivated substance use following the pulse nightclub shooting. *Addictive Behaviors*, *65*(1), 51–55. doi:[10.1016/j.addbeh.2016.10.001](https://doi.org/10.1016/j.addbeh.2016.10.001).

- Boyle, S. C., LaBrie, J. W., Omoto, A. M. (2020). Normative substance use antecedents among sexual minorities: a scoping review and synthesis. *Psychology of Sexual Orientation and Gender Diversity*, 7(2), 117-131. doi:10.1037/sgd0000373
- Branstrom, R. (2017). Minority stress factors as mediators of sexual orientation disparities in mental health treatment: a longitudinal population-based study. *J Epidemiol Community Health*, 71(5), 446-452. <https://doi.org/10.1136/jech-2016-207943>.
- Branstrom, R., & Pachankis, J. E. (2018). Sexual orientation in the co-occurrence of substance use and psychological distress: a national population-based study (2008-2015). *Social Psychiatry and Psychiatric Epidemiology*, 53(1), 403-412.
- Brewster, K. L., & Tillman, K. H. (2012). Sexual orientation and substance use among adolescents and young adults. *American Journal of Public Health*, 102(6), 1168-1176. doi:10.2105/AJPH.2011.300261
- Bronson, J., Stroop, J., Zimmer, S., & Berzofsky, M. (2017). Drug use, dependence, and abuse among state prisoners and jail inmates, 2007-2009. US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. <https://bjs.ojp.gov/content/pub/pdf/dudaspi0709.pdf>.
- Bruce, D., Harper, G. W., & Fernandez, M. I. (2013). Heavy marijuana use among gay and bisexual male emerging adults living with HIV/AIDS. *Journal of HIV/AIDS and Social Services*, 12(1), 26-48. doi: 10.1080/15381501.2012.735171.
- Bui, J., Wendt, M., & Bakos, A. (2019). Understanding and addressing health disparities and health needs of justice-involved populations. *Public Health Reports*, 134(1), 3S-7S. DOI:10.1177/0033354918813089.
- Carliner, H., Brown, Q. L., Sarvet, A. L., & Hasin, D. S. (2017). Cannabis use, attitudes, and legal status in the U.S.: A review. *Preventive medicine*, 104, 13-23. <https://doi.org/10.1016/j.ypmed.2017.07.008>
- Carpiano, R. M., Kelly, B. C., Easterbrook, A., & Parsons, J. T. (2011). Community and Drug Use among Gay Men: The Role of Neighborhoods and Networks. *Journal of Health and Social Behavior*, 52(1), 74-90. doi:10.1177/0022146510395026

- Center for American Progress. (2012). The unfair criminalization of gay and transgender youth: An overview of the experiences of LGBT youth in the juvenile justice system. Center for American Progress. https://cdn.americanprogress.org/wp-content/uploads/issues/2012/06/pdf/juvenile_justice.pdf
- Cerdá, M. (2017). Commentary: Does early cannabis initiation reduce educational attainment? New contributions and unanswered questions. *International journal of epidemiology*, 46(5), 1650-1652.
- Chamberlain, A, Nyamu, S, Aminawung, J, Wang, EA, Shavit, S, & Fox, AD (2019). Illicit substance use after release from prison among formerly incarcerated primary care patients: A cross-sectional study. *Addiction Science & Clinical Practice*, 14(7), 7-8. <https://doi.org/10.1186/s13722-019-0136-6>.
- Chen, X., Yu, B., Lasopa, S. O., & Cottler, L. B. (2017). Current patterns of marijuana use initiation by age among US adolescents and emerging adults: implications for intervention. *The American journal of drug and alcohol abuse*, 43(3), 261-270.
- Cohen, S., Janicki-Deverts, D., & Miller, G. E. (2007). Psychological stress and disease. *Journal of American Medical Association*, 298(14), 1685-1687.
- Compton, W. M., Han, B., Jones, C. M., & Blanco, C. (2019). Cannabis use disorders among adults in the United States during a time of increasing use of cannabis. *Drug and Alcohol Dependence*, 204(1), 107468-6. doi:10.1016/j.drugalcdep.2019.05.008.
- Conron, K. J., Mimiaga, M. J., & Landers, S. J. (2010). A population-based study of sexual orientation identity and gender differences in adult health. *American Journal of Public Health*, 100(10), 1953-1960.
- Davis, J. M., Mendelson, B., Berkes, J. J., Suleta, K., Corsi, K. F., & Booth, R. E. (2016). Public Health Effects of Medical Marijuana Legalization in Colorado. *American Journal Of Preventive Medicine*, (3), 373. doi:10.1016/j.amepre.2015.06.034.
- Deverts, D. J., Cohen, S., DiLillo, V. G., Lewis C. E., Kiefe C., Whooley, M., & Matthews, K. A. (2010). Depressive symptoms, race, and circulating-reactive protein: the coronary artery risk development in young adults (CARDIA) study. *Psychosomatic Medicine*, 72(8), 734-741.

- Drug Policy Alliance (2021). Marijuana Legalization and Regulation. DPA. Retrieved from <https://drugpolicy.org/issues/marijuana-legalization-and-regulation>). Accessed on January 2, 2022.
- Eisenberg, M., & Wechsler, H. (2003). Substance use behaviors among college students with same-sex and opposite-sex experience: results from a national study. *Addictive Behaviors*, 28(5), 899-913. doi:10.1016/s0306-4603(01)00286-6.
- Evans-Polce, R., Veliz, P., Boyd, C., Hughes, T., McCabe, S. (2019). Associations between sexual orientation discrimination and substance use disorders: Differences by age in US adults. *Social Psychiatry and Psychiatric Epidemiology*, 55(1), 101–110. doi:[10.1007/s00127-019-01694-x](https://doi.org/10.1007/s00127-019-01694-x)
- Ford, J. A., & Jasinski, J. L. (2006). Sexual orientation and substance use among college students. *Addictive Behaviors*, 31(3), 404–413. <https://doi.org/10.1016/j.addbeh.2005.05.019>.
- Fredriksen-Goldsen, K. I., Kim, H. J., Barkan, S. E., Muraco, A., & Hoy-Ellis, C. P. (2013). Health disparities among lesbian, gay, and bisexual older adults: results from a population-based study. *American Journal of Public Health*, 103(10), 1802-1809. doi:10.2105/AJPH.2012.301110.
- Goldbach, J. T., Schrage, S. M., Dunlap, S. L., & Holloway, I. W. (2015). The application of minority stress theory to marijuana use among sexual minority adolescents. *Substance Use & Misuse*, 50(3), 366-375.
- Greydanus, D., Hawver, E. K., Greydanus, M. M., & Merrick, J. (2013). Marijuana: current concepts. *Frontiers in public health*, 1, 42.
- Haas, P., Eliason, M., Mays, V. M., Mathy, R. M., Cochran, S. D., & D'Augelli, A. R. (2011). Suicide and suicide risk in lesbian, gay, bisexual, and transgender populations: reviews and recommendations. *Journal of Homosexuality*, 58(1), 10–51. doi:10.1080/00918369.2011.534038
- Han, B. H., Duncan, D. T., Arcila-Mesa, M., Palamar, J. J. (2020). Co-occurring mental illness, drug use, and medical multimorbidity among lesbian, gay, and bisexual middle-aged and older adults in the United States: a nationally representative study. *BMC Public Health*, 20(1), 1-9. <https://doi.org/10.1186/s12889-020-09210-6>.

- Han, B., Compton, W. M., Blanco, C., & Jones, C. M. (2018). Trends in and correlates of medical marijuana use among adults in the United States. *Drug and alcohol dependence, 186*, 120-129.
- Hatzenbuehler, M. L. (2016). Structural Stigma and Health Inequalities: Research Evidence and Implications for Psychological Science. *American Psychologist, 71*(8), 742–751. doi:10.1037/amp0000068.
- Jabson, J. M., Farmer, G. W., & Bowen, D. J. (2014). Stress mediates the relationship between sexual orientation and behavioral risk disparities. *BMC Public Health, 14*(1), 1-8.
- Johnston, L. D., O'Malley, P. M., Miech, R. A., Bachman, J. G., & Schulenberg, J. E. (2016). Monitoring the Future national survey results on drug use, 1975-2015. Overview, key finding on adolescent drug use. Ann Arbor: Institute for Social Research, the University of Michigan, 98 pp.
- Kennedy-Turner, K., Serbin, L. A., Stack, D. M., Ledingham, J. E., & Schwartzman, A. E. (2021). Beyond educational attainment: The role of achievement and school absence in the development of criminal justice involvement. *Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement, 53*(4), 412–422. <https://doi.org/10.1037/cbs0000260>
- Krueger, E. A., & Upchurch, D. M. (2019). Are sociodemographic, lifestyle, and psychosocial characteristics associated with sexual orientation group differences in mental health disparities? Results from a national population-based study. *Social Psychiatry and Psychiatric Epidemiology 54*(1), 755–770. <https://doi.org/10.1007/s00127-018-1649-0>
- Maruschak, L., & Berzofsky, M. (2015). Medical problems of state and federal prisoners and jail inmates, 2011-12. US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. <https://www.bjs.gov/content/pub/pdf/mpsfj1112.pdf>.
- Massoglia, M. (2008). Incarceration, health, and racial disparities in health. *Law & Society Review, 42*(2), 275–306. doi: 10.1111/j.1540-5893.2008.00342.x
- Massoglia, M., & Pridemore, W. A. (2015). Incarceration and Health. *Annual Review of Sociology, 41*(1), 291-310. DOI:10.1146/annurev-soc-073014-112326.

- McCabe, S. E., Bostwick, W. B., Hughes, T. L., et al. (2010). The relationship between discrimination and substance use disorders among lesbian, gay, and bisexual adults in the United States. *American Journal of Public Health, 100*(1), 1946-1952.
- McCabe, S., Boyd, C., Hughes, T., & d'Arcy, H. (2003). Sexual Identity and Substance Use Among Undergraduate Students. *Substance Abuse, 24*(2), .77-91.
doi:10.1023/A:1023768215020.
- McCabe, S. E., Hughes, T. L., & Boyd, C. J. (2004). Substance Use and Misuse: Are Bisexual Women at Greater Risk? *Journal of Psychoactive Drugs, 36*(2), 217-225.
<https://doi.org/10.1080/02791072.2004.10399732>
- McCauley, E., Eckstrand, K., Desta, B., Bouvier, B., Brockmann, B., & Brinkley-Rubinstein, L. (2018). Exploring Healthcare Experiences for Incarcerated Individuals Who Identify as Transgender in a Southern Jail. *Transgender health, 3*(1), 34–41.
<https://doi.org/10.1089/trgh.2017.0046>
- Medley, G., Lipari, R. N., Bose, J., Cribb, D., Kroutil, L.A., & McHenry, G. (2016). Sexual orientation and estimates of adult substance use and mental health: results from the 2015 national survey on drug use and health. Substance Abuse and Mental Health Services Administration. National Survey on Drug Use and Health.
- Meyer, I. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psycho Bull, 129*(1), 674-697.
<https://doi.org/10.1037/0033-2909.129.5.674>.
- Nelson, S. E., Van Ryzin, M. J., & Dishion, T. J. (2015). Alcohol, marijuana, and tobacco use trajectories from age 12 to 24 years: Demographic correlates and young adult substance use problems. *Development and psychopathology, 27*(1), 253-277.
- Pakula, B., Shoveller, J., Ratner P. A., Carpiano, R. (2016). Prevalence and co-occurrence of heavy drinking and anxiety and mood disorders among gay, lesbian, bisexual, and heterosexual Canadians. *American Journal of Public Health, 106*(6), 1042-1048.
- Patton, G. C., Coffey, C., Lynskey, M. T., et al. (2007). Trajectories of adolescent alcohol and cannabis use into young adulthood. *Addiction, 102*(1), 607-615.

- Prison Policy Initiative. (2019). LGBTQ youth are at greater risk of homelessness and incarceration. Prison Policy Initiative. https://www.prisonpolicy.org/blog/2019/01/22/lgbtq_youth/
- Prison Policy Initiative. (2021). Vizualizing the unequal treatment of LGBTQ people in the criminal justice system. Prison Policy Initiative. <https://www.prisonpolicy.org/blog/2021/03/02/lgbtq/>
- Richmond-Rakerd, L. S., Slutske, W. S., & Wood, P. K. (2017). Age of initiation and substance use progression: A multivariate latent growth analysis. *Psychology of Addictive Behaviors*, 31(6), 664.
- Rogers, R. W., & Prentice-Dunn, S. (1997). Protection motivation theory. In D. S. Gochman (Ed.), *Handbook of health behavior research 1: Personal and social determinants* (pp. 113–132). Plenum Press.
- Rosario, M., Schrimshaw, E. W., & Hunter J. (2006). A model of sexual risk behaviors among young gay and bisexual men: longitudinal associations of mental health, substance abuse, sexual abuse, and the coming-out process. *AIDS Education and Prevention*, 18(5), 444-460.
- Ross, C. E., Masters, R. K., & Hummer, R. A. (2012). Education and the gender gaps in health and mortality. *Demography*, 49(4), 1157-1183.
- Rudy, A. K., Barnes, A. J., Cobb, C. O., & Nicksic, N. E. (2021). Attitudes about and correlates of cannabis legalization policy among U.S. young adults. *Journal of American College Health*, 69(8), 889-896. doi:[10.1080/07448481.2020.1713135](https://doi.org/10.1080/07448481.2020.1713135).
- Schauer, G. L., King, B. A., Bunnell, R. E., Promoff, G., & McAfee, T. A. (2016). Toking, vaping, and eating for health or fun: marijuana use patterns in adults, US, 2014. *American journal of preventive medicine*, 50(1), 1-8.
- Schauer, G. L., Berg, C. J., & Bryant, L. O. (2013). Sex differences in psychosocial correlates of concurrent substance use among heterosexual, homosexual and bisexual college students. *The American Journal of Drug and Alcohol Abuse*, 39(4), 252- 258. Doi:10.3109/00952990.2013.796962.

- Schulenberg, J. E., Johnston, L. D., O'Malley, P. M., Bachman, J. G., Miech, R. A. & Patrick, M. E. (2019). Monitoring the Future national survey results on drug use, 1975–2018: Volume II, College students and adults ages 19–60. Ann Arbor: Institute for Social Research, The University of Michigan. Available at: <http://monitoringthefuture.org/pubs.html#monographs>
- Schuler, M. S., Prince, D. M., Breslau, J., & Collins, R. L. (2020). Substance use disparities at the intersection of sexual identity and race/ ethnicity: results from the 2015-2018 National Survey on Drug Use and Health. *LGBT HEALTH*, 7(6), 283-291. doi:10.1089/lgbt.2019.0352.
- Schuler, M. S., Stein, B. D., Collins, R. L. (2019). Differences in substance use disparities across age groups in a national cross-sectional survey of lesbian, gay, and bisexual adults. *LGBT Health* 6(2), 68–76. doi:[10.1089/lgbt.2018.0125](https://doi.org/10.1089/lgbt.2018.0125).
- Schuler, M. S., & Collins, R. L. (2019). Sexual minority substance use disparities: Bisexual women at elevated risk relative to other sexual minority groups. *Drug and Alcohol Dependence*, 206 (1), 1-7. doi:10.1016/j.drugalcdep.2019.107755.
- Schuler, M. S., Rice, C. E., Evans-Polce, R. J., Collins, R. L. (2018). Disparities in substance use behaviors and disorders among adult sexual minorities by age, gender, and sexual identity. *Drug and Alcohol Dependence* 189(1), 139–146. doi:[10.1016/j.drugalcdep.2018.05.008](https://doi.org/10.1016/j.drugalcdep.2018.05.008).
- Skalamera, J., & Hummer, R. A. (2016). Educational attainment and the clustering of healthrelated behavior among US young adults. *Preventive medicine*, 84, 83-89.
- Smith, L. L., Yan, F., Charles, M., Mohiuddin, K., Tyus, D., Adekeye, O., Holden, K. B. (2017). Exploring the Link Between Substance Use and Mental Health Status: What Can We Learn from the Self-medication Theory? *Journal of Health Care for the Poor and Underserved*, 28(2), 113-131. <https://doi.org/10.1353/hpu.2017.0056>
- Substance Abuse and Mental Health Services Administration. (2020). Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health (HHS Publication No. PEP21-07-01-003, NSDUH Series H-56). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. Retrieved from <https://www.samhsa.gov/data/>

Substance Abuse and Mental Health Services Administration (SAMHSA). (2021). Know the risks of marijuana. Available at: <https://www.samhsa.gov/marijuana>

Terry-McElrath, Y. M., O'Malley, P. M., Johnston, L. D., Bray, B. C., Patrick, M. E., & Schulenberg, J. E. (2017). Longitudinal patterns of marijuana use across ages 18–50 in a US national sample: A descriptive examination of predictors and health correlates of repeated measures latent class membership. *Drug and alcohol dependence*, 171, 70-83.

Texas Criminal Justice Coalition. (2018). Out of Sight: LGBTQ youth and adults in Texas' justice systems. <http://www.njjn.org/uploads/digital-library/Out%20of%20Sight%20LGBTQ%20Youth%20and%20Adults%20in%20Texas%20Justice%20Systems.pdf>

UCLA Williams Institute. (2019). LGBTQ Youth of Color Impacted by the Child Welfare and Juvenile Justice Systems. <https://williamsinstitute.law.ucla.edu/publications/lgbtq-yoc-social-services/>

Vidourek, R. A., Yockey, R. A., King, K. A., & Oliver, A. (2021). Recent marijuana use among young adults, 2015-2018, USA. *International Journal of Mental Health and Addiction* <https://doi.org/10.1007/s11469-021-00566-3>

Wittchen, H. U., Fröhlich, C., Behrendt, S., Günther, A., Rehm, J., Zimmermann, P., Lieb, R., Perkonig, A. (2007). Cannabis use and cannabis use disorders and their relationship to mental disorders: A 10-year prospective-longitudinal community study in adolescents. *Drug and Alcohol Dependence*, 88(1), S60-S70. <https://doi.org/10.1016/j.drugalcdep.2006.12.013>.