UNCOVERING SUBSTANCE USE DYNAMICS: A STUDY OF INCARCERATED YOUTH

by

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UNCOVERING SUBSTANCE USE DYNAMICS: A STUDY OF INCARCERATED YOUTH

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Abstract

Substance use among adolescents—especially those involved in the juvenile justice (JJ) system—is a significant public health concern with lasting consequences. Youth involved in the legal system are at greater risk for developing substance use disorders (SUDs) and often face related challenges, including mental health issues and an increased likelihood of re-incarceration. Identifying substance use patterns in this population is essential for developing targeted treatment and intervention strategies that can mitigate these risks. This study examined the prevalence and patterns of substance use among incarcerated youth, focusing on how these patterns, as well as changes in use over time, relate to treatment needs. Data were analyzed as a sub-study of a larger project called the Leveraging Safe Adults (LeSA) project, a 5-year longitudinal study evaluating the effectiveness of Trust-Based Relational Intervention (TBRI) in reducing opioid use among youth after release from JJ facilities. Quantitative methods, including frequencies, cross-tabulations, and Analysis of Covariance (ANCOVA), were used to analyze self-report survey data. Results at baseline ($N = 250$) indicate that incarcerated youth report most frequent use of marijuana and alcohol and identify marijuana as the most problematic substance for them. However, a general decrease in marijuana and alcohol use was observed at a 3-month follow-up ($n = 90$) and 6-month follow-up ($n = 60$). These findings suggest a need for targeted interventions focused on marijuana use and provide preliminary evidence that substance use patterns in this population can improve over time. Findings could inform future interventions designed to address the unique challenges faced by adolescents within the juvenile justice system.

Introduction

Substance use among adolescents, particularly those involved in the juvenile justice (JJ) system, remains a critical public health issue with long-term consequences. This issue is widespread in the United States, with drug use continuing to rise each year. In 2020, the National Center for Drug Abuse Statistics (NCDAS) reported that 37 million Americans over the age of 12 were current illegal drug users. A "substance" can be defined as "any psychoactive compound with the potential to cause health and social problems, including addiction," (McClellan, 2017). Substance use in any shape or form is a severe problem, as it can lead to drug overdose, increased delinquency, mental and physical health issues, and arrests (Harrison & Gfroerer, 1992; Kandel et. al., 1986; Spencer et. al., 2024). Prolonged repeated use of any substance can lead to a diagnosable illness, generally called a substance use disorder (SUD). SUDs can range from mild to severe, and are diagnosed by the *Diagnostic and Statistical Manual, 5th Edition* (DSM-5).

The risks associated with substance use, however, are particularly severe for adolescents who begin using drugs at an early age. Research has shown that the risk of drug dependence, heavier drug use, and developing a SUD is significantly higher for individuals who begin using drugs between the ages of 11 and 17, compared to those who start after age 18. This finding holds across all types of drugs (Bava & Tapert, 2010; Casey & Jones, 2010; Chen et al., 2009; Dawson et al., 2008; Hurd et al., 2014; Jackson & Sartor, 2016; SAMHSA, 2016; Spear, 2016).

The risks are particularly heightened for adolescents involved in the juvenile justice system. The prevalence of substance use disorders among justice-involved youth is significantly higher than the rate observed in the general adolescent population in the United States, which is estimated to be 7% (Substance Abuse and Mental Health Services Administration, 2010). Not

only do they face a heightened risk of developing a SUD, but they are also far more likely to start using substances earlier than other youth, which leads to increased negative outcomes associated with substance use, including mental health issues and re-incarceration (Henggeler, Clingempeel, Brondino, & Pickrel, 2002; Hoeve, McReynolds, & Wasserman, 2013; Hoeve, McReynolds, Wasserman, & McMillan, 2013; Kandel & Yamaguchi, 2002). Adolescents in the JJ system are nine times more likely to have an SUD compared to their peers outside the legal system, with 45-65% meeting the diagnostic criteria (SAMHSA, 2016; Dennis et al., 2009). Early onset of substance use, and a history of prior arrests further increase their need for treatment. Additionally, factors such as childhood neglect and exposure to adult drug use exacerbate the vulnerability of these youth, compounding their risk for early-onset substance use and mental health challenges (Johnson, 2004). Frequent substance use not only predicts legal involvement but also heightens the likelihood of re-incarceration (Dir, Aalsma, & Wiehe, 2019; Stoolmiller & Blechman, 2005).

These interconnected risks create a cycle that makes it difficult for these adolescents to break free from addiction, thus increasing their chances of re-incarceration (Henggeler et. al., 2002). Understanding the substance use behaviors of incarcerated youth is critical, as they are disproportionately affected by SUDs and often continue to struggle with these issues well into young adulthood (Leve et al., 2015). Identifying substance use patterns among incarcerated adolescents is essential for developing more effective treatment and intervention strategies that could help mitigate the long-term consequences of substance abuse and legal involvement.

Literature Review

Research has consistently shown that youth involved in the JJ system experience significantly higher rates of SUDs compared to their peers in the general population (Beck et al.,

1988; Cantor, 1996; DeFrancesco, 1996). Despite this well-documented link, access to effective treatment remains limited. A substantial number of youth who exhibit signs of substance misuse are never referred for appropriate care (Dennis et al., 2019; Henggeler & Schoenwald, 2011). This treatment gap highlights a critical need for improved identification, referral, and intervention strategies tailored to justice-involved youth.

Understanding how substances are categorized can inform how clinicians and systems respond to substance use. The Federal Controlled Substances Act of 1970 established a drug scheduling system that ranks substances from Schedule I to V based on medical use and potential for abuse. For instance, Schedule I drugs—such as heroin, marijuana, and ecstasy—are considered to have a high potential for abuse and no accepted medical use. However, as of May 21, 2024, the Department of Justice proposed a transfer for marijuana to be a Schedule III drug (DEA, 2024). Schedule II substances, like opioids and methadone, also have high abuse potential but may be prescribed medically. Lower schedules include drugs with decreasing abuse potential, such as certain prescription medications. While these categories are primarily intended for medical and legal regulation, they are often referenced in clinical and research contexts when discussing patterns of substance use.

One big issue that is unique to adolescents is that the brain goes through significant neurodevelopment between childhood and young adulthood (Giedd & Rapoport, 2010; Pfefferbaum et. al., 1994). Thus, substances have more severe long-term effects. Even though alcohol and marijuana are used recreationally by adults, these substances can do a lot more damage when used by young teens. Brain maturation continues until about age 25. Using toxic substances such as alcohol, cannabis, and other “hard” drugs, are likely to cause issues into adulthood, such as cognitive, emotional, and social functioning problems (Casey & Jones, 2010;

Gray & Squeglia, 2018; Nagy et. al., 2010). One 10-year longitudinal study found that alcohol and marijuana use during adolescence was found to cause poor memory, visuospatial functioning, and working memory and attention by age 25 (Hanson et. al., 2011).

In clinical and research settings, the DSM-5 provides a more functional framework for understanding SUDs. The DSM-5 classifies substance use disorders by substance type (e.g., alcohol, cannabis, opioids) and by severity—mild, moderate, or severe—based on the presence of up to 11 criteria, including impaired control, social impairment, risky use, and pharmacological factors (American Psychiatric Association, 2013). This classification system is particularly useful for assessing SUDs in justice-involved youth, as it allows for more nuanced evaluations of how specific substances impact functioning, risk, and rehabilitation prospects.

Research consistently indicates that alcohol, cannabis, and tobacco are the most commonly used substances among adolescents (Boak et al., 2020; Johnson et al., 2021; Schulenberg et al., 2018). Additionally, the *World Drug Report 2023* identifies cannabis as the most widely used illicit substance globally and emphasizes its potential for dependence (United Nations Office on Drugs and Crime, 2023). A systematic review by Halladay et al. (2020) analyzed 70 studies on adolescent polysubstance use, many of which identified similar usage patterns, including: low use; single or dual substance use; moderate, generalized multi-use; and high multi-use. Common combinations included alcohol only, alcohol with cannabis and/or tobacco, and concurrent use of all three—with or without additional substances. The review underscores the prevalence of cannabis and alcohol use, both independently and in combination. However, variation in methods across studies limits comparability and generalizability of findings.

Between 2008 and 2019, the legalization of recreational marijuana led to easier access, stronger products, and increased advertising (Chiu et. al., 2021; D'Amico et. al., 2018; Smart & Pacula, 2019). According to Mennis, McKeon, and Stahler (2023), past-month marijuana use rose among both adolescents and young adults following legalization. Their study also revealed key shifts in behavior and perception: youth who viewed marijuana as low-risk were more likely to use it; among adolescents, the link between frequent cannabis use and seeking treatment for cannabis use disorder (CUD) became weaker; and among young adults, higher cannabis use was actually associated with fewer CUD treatment admissions. These patterns suggest that legalization may have contributed to a lower perceived risk of harm, potentially driving increased use among young people. Despite its legal status in many places, marijuana remains addictive and can cause significant harm, especially for youth.

One theory that relates to early substance use is the "gateway hypothesis." This theory suggests that using substances like alcohol, marijuana, or tobacco at a young age may lead to the use of more dangerous drugs later in life (Lynskey et al., 2003). Nkansah-Amankra and Minelli (2016) analyzed data from the National Longitudinal Study of Adolescent to Adult Health to explore this relationship. They found that early use of legal substances during adolescence was linked to higher chances of using illicit drugs, including marijuana, illegal substances, and cocaine, in later adolescence. However, these patterns did not always continue into adulthood. This suggests that while early substance use often co-occurs with later drug use, the gateway hypothesis alone may not fully explain these trends—it may be part of a more complex pattern of risk behavior.

Prescription opioid misuse (POM) is another serious concern among youth. In 2017, 14% of U.S. high school students reported having misused prescription opioids (Clayton et al., 2017).

Kelley-Quon et al. (2022) conducted a longitudinal study of over 3,300 high school students in Los Angeles, tracking their substance use behaviors. The study found that early use of cannabis, tobacco, and other substances was strongly associated with different patterns of opioid misuse over time. These findings support the idea of a "common liability pathway," where youth who use one substance are at greater risk for using others. Each substance—whether cannabis, tobacco, or others—appeared to reflect unique risk factors contributing to later opioid misuse. Although less commonly used than marijuana or alcohol, opioids carry much more severe risks, including legal trouble, serious health consequences, and overdose (Gaither et al., 2018; Hu et al., 2017; Kelley-Quon et al., 2019). In fact, prescription opioid misuse was linked to 46 deaths per day in the U.S. in 2019 (Scholl et al., 2019). While opioid use tends to peak in young adulthood, many individuals begin using in adolescence. Early initiation is particularly dangerous, as it significantly increases the risk of developing opioid use disorder later in life (Schepis & Hakes, 2017). These patterns highlight the urgent need for early prevention and intervention efforts.

Some research within juvenile justice populations has explored long-term patterns of substance use. For instance, Welty et al. (2018) conducted a 12-year longitudinal study of detained youth in Chicago, identifying distinct trajectories of SUDs over time. While some youth exhibited short-term or decreasing use, others followed more persistent and severe patterns, particularly involving comorbid or “other” illicit drug use. The study also found that males, older youth, and those identifying as Hispanic or non-Hispanic white were more likely to experience adverse outcomes. These findings highlight the long-term vulnerability of justice-involved youth and underscore the importance of early, individualized interventions—particularly for high-risk subgroups.

Other studies, while not focused on justice-involved populations, offer additional insight into substance use patterns. One study conducted in Spain examined the frequency and progression of substance use among adolescents using the Self-Reported Antisocial Behavior Questionnaire (SRA). Participants reported past three-month use of substances such as beer, wine, liquor, tobacco, marijuana, and other "strong" drugs (e.g., pills, cocaine, mushrooms) using a 4-point Likert scale. The sample included 879 students from eight high schools. Findings revealed a typical pattern of progression starting with alcohol (beer and wine), followed by tobacco, cannabis, and eventually other illicit substances. Frequent users showed higher probabilities of use across all categories. Although limited by geographic and demographic factors, the study contributes to understanding substance use escalation and provides a useful comparison for justice-involved populations.

While the literature on general adolescent substance use is robust, it remains limited in addressing how specific substances used by justice-involved youth influence post-release outcomes such as relapse and recidivism. Much of the current research focuses on adolescents in the general population, with relatively few studies examining substance use trajectories among youth in the JJ system. Although frameworks like the DSM-5 and the drug scheduling system help categorize substance use, they do not fully capture how the type and pattern of use may shape rehabilitation prospects. This represents a critical gap in the literature. Notably, there has been little exploration of whether patterns of substance use differ among justice-involved youth with more severe SUDs compared to those with mild or moderate cases. Understanding how severity influences substance use trajectories—and whether certain drugs are more commonly associated with poorer outcomes at different levels of severity—could inform more personalized

treatment approaches. Addressing these gaps is essential for developing targeted, evidence-based prevention, treatment, and reintegration strategies for this vulnerable population.

Current Study

The present study aimed to examine substance use patterns among incarcerated youth, with a particular focus on the frequency of use, the severity of SUDs, and how these relate to perceived problematic substances. Despite research showing that justice-involved youth experience elevated rates of SUDs (Beck et al., 1988; Cantor, 1996), many remain untreated (Dennis et al., 2019). Understanding the substances most frequently used and identified as problematic is crucial for informing more targeted and effective interventions.

The first aim was to identify which substances are used most frequently in the 12 months prior to incarceration. The research question guiding this aim was: *Which substances are most frequently used by incarcerated youth prior to detention?* It was expected that participants will report higher rates of alcohol and cannabis use compared to other drug categories, as these substances are the most commonly used by adolescents (Gobbi et al., 2019). Alcohol and cannabis are often referred to as "gateway drugs," which may lead adolescents to experiment with more illicit substances such as opioids and stimulants (Fiellin et al., 2012). Consequently, it was hypothesized that a significant number of youth will report using substances classified as Schedule I or II drugs (e.g., cannabis, heroin, methamphetamine, cocaine, fentanyl), which are considered to have the highest abuse potential.

The second aim was to assess which substances are identified as most problematic by youth who meet criteria for a moderate to severe SUD. The research question guiding this aim was: *Among youth with a diagnosed SUD, which substances are perceived as most problematic? Do these align with the substances most frequently used?* It was hypothesized that the youth

meeting criteria for an SUD will most often identify Schedule I and II drugs as problematic, and these will correspond with their most frequently used substances.

The third aim explored whether substance use patterns change following release from detention. The research question guiding this aim was: *Do youth report different levels of substance use at post-release follow-up assessments compared to pre-incarceration levels?* A short-term decrease in use was expected immediately after release, followed by potential increases over time—particularly for Schedule I and II substances, given their high abuse potential.

Methodology

This study examined data from an ongoing 5-year longitudinal study called the Leveraging Safe Adults (LeSA) project. The LeSA project aims to evaluate the effectiveness of Trust-Based Relational Intervention (TBRI) in reducing opioid use in adolescents after they are released from residential JJ facilities. This research in the LeSA project has been approved by the Texas Christian University (TCU) Institutional Review Board (IRB), and this study examined the approved data that has been collected by LeSA.

Participants

Participants for this study included incarcerated youth from 12 secure residential JJ facilities in both Texas (n = 7) and Illinois (n = 5). Each facility site included in the study provided medium security protocols and educational, behavioral and medical health services to its residents (Knight et al., 2021). Participants for the baseline assessment of this study consisted of 250 youth aged 15 to 18 (M = 16.2, SD = 1.06). Of the 250 participants, 83% were male (n = 207), and 17% were female (n = 43). Inclusion criteria for the participants at the time of enrollment included: (a) must be placed under community supervision (i.e., probation), must be

receiving care in a secure juvenile justice facility, (b) must show no signs of active suicide risk, and (c) must have collaborated with juvenile justice staff to identify a caregiver willing to participate in the study. Of the total sample (n = 250) racial/ethnic distributions were as follows; 41.6% Hispanic (n = 104), 28.8% Black/African American (n = 72), 18% White (n = 45), 8.4% more than one race (n = 21), 2% other (n = 5), 0.4% Asian (n = 1), 0.4% American Indian/Alaska Native (n = 1), and 0.4% Native Hawaiian/Pacific Islander (n = 1). Both English and Spanish speaking individuals were allowed to participate in this study.

Participants were randomly assigned to either the intervention condition, where they received TBRI, or the control condition, where they received standard re-entry protocol. It should be noted that the objectives of the current study were not to examine the effectiveness of TBRI, so condition was only used as a covariate in this study.

Procedure

All juvenile-justice residential facilities used in this study had medium security protocols, received JJ referrals from a wide geographical region, and provided educational, medical, and behavioral health services. The sites were either operated by independent agencies, the state JJ system, or local JJ departments. The research sites facilitated the recruitment of the participants.

Data was collected at three different time points. Assessments were collected using Qualtrics, delivered through secure online platforms to participants. The youth completed the self-report questionnaires with the help of an interviewer. Consent from participants was maintained prior to the study by RAs of the facilities or by the participants if they were over the age of 18. The youth were compensated with a $40 e-card for each assessment they completed. Confidentiality of participant identities was maintained. Participants were first surveyed at Baseline, or T1, which took place around 3 months prior to the youth's anticipated release dates.

Once baseline assessments were complete, researchers followed up with the youth once they were released from facilities. Follow-ups were conducted 30 to 45 days after the youth's release (T2), and about 3 to 6 months after the youth's release (T2). Follow-up assessments are still being collected by the researchers in the LeSA project.

Eligibility for post-release outcomes included: a) participant release days being documented, b) a confirmed release from the facility, c) agreement to stay in the study, and d) ability to contact the participant after release. Of the total sample ($N = 250$), 208 participants were eligible for post-release outcomes. Withdrawal/exclusion criteria included: a) inability to remain in contact with the youth, b) health issues, c) re-arrest, or d) the youth choosing to drop out of the study.

Measures

The primary instrument used in this study was the TCU Drug Screen 5 (TCU DS 5). The TCU Drug Screen II, a widely recognized tool for assessing substance use issues, was first created using the criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R). As the American Psychiatric association modified the DSM to be the DSM-5, the TCU Drug Screen II was modified to be the TCU DS 5 to reflect this change. The TCU DS 5 is an evidence-based self-report screening instrument designed to assess substance use disorders and was administered at baseline, T2, and T3 (Knight et. al., 2014). As previously mentioned, the time of the youth's enrollment in the study was approximately 3 months before their anticipated release date. Note that youth were in custody from 1 day to 1 year prior to the baseline assessment, so they were asked to report on their substance use in the 12 months prior to being locked up. The TCU DS 5 was administered again 3 months after the baseline assessment, which ended up being approximately one month after the participants were released from the facilities

(T2). Then 3 to 6 months after the baseline assessment, which ended up being 4 months after the youth were released, the TCU DS 5 was administered again (T3). At each follow up (T2 and T3), the youth were asked to report their substance use in the time between their last assessment (i.e. "since we last spoke, how often did you use…"). The TCU DS 5 was found to have strong internal reliability (Broome et. al., 1996; Knight et. al., 2000).

The TCU DS 5 features questions entailing commonly used illicit substances and asks respondents to indicate how frequently they use each drug. They were asked to choose one of 5 multiple choice questions. Options included: Never, Only a few times, 1-3 times per month, 1-5 times per week, and Daily. The substance categories included in the analysis were: Alcohol, Marijuana (weed), Hashish (hash), Synthetic Marijuana (K2/Spice), Heroin (smack), Opium (tar), Powder Cocaine (coke), Crack Cocaine (rock), Amphetamines (speed), Methamphetamine (meth), Synthetic Cathinones (Bath Salts), Club Drugs – MDMA/GHB/Rohypnol (Ecstasy), Dissociative Drugs – Ketamine/PCP (Special K), Hallucinogens – LSD/Mushrooms (acid), Inhalants – Solvents (paint thinner), Prescription Depressants, Prescription Stimulants, Prescription Opioid Pain Relievers, and Other. This information can help identify the substances that are most problematic for them (Weise et. al., 2022). This self-report questionnaire contains 38 items that will be used in this study (excluding the opioid only questions).

The TCU DS 5 also contains 11 items containing questions related to the DSM-5-TR criteria for diagnosing substance use disorders (i.e., Item Y_TCUDS_1_0_1 - Item Y_TCUDS_11b_0). Questions include: Did you use larger amounts of drugs or use them for a longer time than you planned or intended (Yes or No)? Did you try to control or cut down on your drug use but were unable to do it (Yes or No)? Did you spend a lot of time getting drugs, using them, or recovering from their use (Yes or No)? Did you have a strong desire or urge to

use drugs (Yes or No)? Did you get so high or sick from using drugs that it kept you from working, going to school, or caring for children (Yes or No)? Did you continue using drugs even when it led to social or interpersonal problems (Yes or No)? Did you spend less time at work, school, or with friends because of your drug use (Yes or No)? Did you use drugs that put you or others in physical danger (Yes or No)? Did you continue using drugs even when it was causing you physical or psychological problems (Yes or No)? Did you need to increase the amount of a drug you were taking so that you could get the same effects as before (Yes or No)? Did using the same amount of a drug lead to it having less of an effect as it did before (Yes or No)? Did you get sick or have withdrawal symptoms when you quit or missed taking a drug (Yes or No)? Did you ever keep taking a drug to relieve or avoid getting sick or having withdrawal symptoms? The youth who answered "Yes" to the questions would be assigned 1 point. If they scored 2-3 points, they were considered to have a mild disorder. If they scored 4-5 points, they met criteria for a moderate disorder. If they scored 6 or more points, they were considered to have a severe disorder. So, those with 3 points or less were grouped into the "Mild or No SUD" group, and those with 4 points and above were grouped into the "Moderate to Severe SUD" group.

Item Y_TCUDS_12_0 is an important item because it asks which drug caused the youth the most problems, and lists out each type of drugs to choose from. This will be used to look at correlations between frequency of use and most problematic use. Next, the items Y_TCUDS_13_0_1 through Y_TCUDS_13_0_19 ask the youth to indicate how often they used each drug during the 12 months prior to entering the facilities. For each item, they can indicate daily use, 1-3 times per month, 1-5 times per week, or no use at all. Each answer choice is assigned a number 1-5. This will help determine which drugs are used the most because they will have the highest scores across the total sample. Next, item Y_TCUDS_14_0 asks how many

times the youth have been in a treatment program. Y_TCUDS_15_0 asks how serious the youth think their drug problems are (5 = serious, 1 = not serious). These items can be used to determine severity of use. Y_TCUDS_16_0 asks how many times they have injected drugs with a needle in the last 12 months. The answers to this question will be grouped into the reports of frequency of use for the other drugs. Finally, Y_TCUDS_16_0 asks the youth to indicate how important it is for them to get drug treatment. This can be considered for determining severity of use.

Data Analysis

Descriptive Statistics

Descriptive statistics were used to analyze the first hypothesis, focusing on summarizing the types of drugs used. The TCU DS 5 includes 19 items (Y_TCUDS_13_0_1 through Y_TCUDS_13_0_19) that ask how often youth used specific substances during the 12 months prior to entering the facility. Each item was rated on a 5-point scale: 1 = “Never,” 2 = “Only a few times,” 3 = “1–3 times per month,” 4 = “1–5 times per week,” 5 = “Daily.” Substances assessed included: Alcohol, Marijuana (weed), Hashish (hash), Synthetic Marijuana (K2/Spice), Heroin (smack), Opium (tar), Powder Cocaine (coke), Crack Cocaine (rock), Amphetamines (speed), Methamphetamine (meth), Synthetic Cathinones (Bath Salts), Club Drugs – MDMA/GHB/Rohypnol (Ecstasy), Dissociative Drugs – Ketamine/PCP (Special K), Hallucinogens – LSD/Mushrooms (acid), Inhalants – Solvents (paint thinner), Prescription Depressants, Prescription Stimulants, Prescription Opioid Pain Relievers, and Other.

Using SPSS, a frequency distribution will be calculated for each drug to determine which were most commonly used. A frequency table will display the distribution of responses, with a focus on identifying substances with the highest rates of daily use. Frequencies for “Never” and “1–3 times per month” will also be reported to give a more complete picture of usage patterns.

This analysis will help identify trends in substance use within this population. For example, if a significant portion of youth report daily use of certain substances, it may indicate a need for further research into targeted interventions.

Crosstabulations

To determine whether the most commonly used substances were also the most problematic for these youth, crosstabulations were conducted. This analysis examined the relationship between two key variables: the severity of SUD and the most problematic substance reported. Each participant's score on the Texas Christian University Drug Screen 5 (TCU DS 5) was used to determine the presence and severity of SUD (i.e., mild, moderate, or severe), based on the DSM-5 diagnostic criteria. Items Y_TCUDS_1_0_1 through Y_TCUDS_11b_0 assessed substance-related behaviors, including items such as, *"During the last 12 months (before coming to a locked facility, if applicable), did you try to control or cut down on your drug use but were unable to do it?"* and *"Did using the same amount of a drug lead to it having less of an effect than before?"* Participants responded with 1 = "Yes" and 2 = "No."

A new binary variable was created to group participants into either *moderate to severe SUD* (coded as 1.00) or *mild/no SUD* (coded as 0.00). Crosstabulations were then performed using this grouping variable and participant responses to item Y_TCUDS_12_0, which asks, *"Which drug caused the most serious problem during the last 12 months (prior to coming to a locked facility)? [CHOOSE ONE]."*

To determine whether the most commonly used substances are also the most problematic for these youth, crosstabulations (crosstabs) were used. This analysis examined the relationship between two categorical variables: severity of substance use disorder (SUD) and the most problematic substance reported**.**

Participants selected from a list of 20 substances, each assigned a numerical value: 1 = None, 2 = Alcohol, 3 = Cannabinoids – Marijuana, 4 = Cannabinoids – Hashish (hash), 5 = Synthetic Marijuana (K2/Spice), 6 = Opioids – Heroin (smack), 7 = Opioids – Opium (tar), 8 = Stimulants – Powder Cocaine (coke), 9 = Stimulants – Crack Cocaine (rock), 10 = Stimulants – Amphetamines (speed), 11 = Stimulants – Methamphetamine (meth), 12 = Synthetic Cathinones (Bath Salts), 13 = Club Drugs – MDMA/GHB/Rohypnol (Ecstasy), 14 = Dissociative Drugs – Ketamine/PCP (Special K), 15 = Hallucinogens – LSD/Mushrooms (acid), 16 = Inhalants – Solvents (paint thinner), 17 = Prescription Depressants, 18 = Prescription Stimulants, 19 = Prescription Opioid Pain Relievers, and 20 = Other.

The five most frequently identified problematic substances were presented in a contingency table and interpreted in relation to SUD severity to identify potential trends. The substance categories defined the rows of the table, while SUD severity categories (i.e., moderate/severe vs. mild/none) will define the columns. Each cell in the table indicated the frequency with which a given substance was reported as most problematic for each SUD severity group. Totals for both rows and columns were calculated to provide a clearer picture of distribution patterns.

Analysis of Covariance

An Analysis of Covariance (ANCOVA) was used to analyze the change in use overtime based on mean differences of the highest reported (or most problematic) drug at baseline (T1), 1-month post-release (T2), and 3-6 months post-release (T3). An ANCOVA measures how much a dependent variable changes because of a continuous variable, or a covariate, and separates that from the changes caused by a categorical variable (Khammar, Yarahmadi & Madadizadeh, 2020). In this analysis, the dependent variable used was substance use of whichever drug the

youth reported the highest frequencies of use, which was expected to be marijuana. The independent categorical variable was time. The covariate that was controlled for was the condition (TBRI vs. Control). The primary goal was to determine if drug use changed over time, particularly whether there was a decrease in use or potential relapse at either follow-up. Specifically, we aimed to identify whether drug use decreases between baseline and the 3-month follow-up, and whether there was a potential increase in use at the 6-month follow-up.

First, the data sets (baseline and follow-ups) were merged to include participant responses from each time point. At the time of data analysis, 94 participants had successfully completed the survey at T2, and 53 participants had provided responses at T3. Only 51 participants had complete data across all three time points. Thus, the sample eligible for the ANCOVA consisted of 51 participants. The within-subjects factor was the frequency of drug use at each time point (T1, T2, T3). Descriptive statistics were used to summarize the frequency of drug use at each time point. Pairwise comparisons assessed differences in drug use between specific time points, such as T1 compared to T3 and T2, and T2 compared to T3. Finally, multivariate tests were conducted to determine the overall effect of time on drug use, controlling for condition.

Results

Descriptive Statistics

Descriptive statistics at baseline were used to determine which substances the youth reported as the highest frequency of use during the past 12 months prior to entry into JJ facilities. Out of the 250 youth sampled at baseline, marijuana (weed) was reported as the most frequently used substance, with only 2 participants missing data. Specifically, 56.8% of the youth (n = 142) reported daily use of marijuana in the past year. Whereas only 12% (n = 30) reported no use at

all, meaning the majority of these youth used marijuana at least once in the year prior to their arrest. Thus, marijuana was not only used by the majority of this sample, but it also was used daily by more than half of them. This finding is consistent with hypothesis 1, though the numbers were higher than anticipated, especially for daily use. Additionally, alcohol was the second most frequently reported substance, with only 26% of youth (*n* = 65) reporting no use within the year before their arrest. Interestingly, daily use for prescription pain relievers and depressants were higher than alcohol use. See Table 3 for a summary of descriptive statics for the top 5 substances with the highest reported use over the past 12 months.

Table 1

Descriptive Statistics – Frequencies

Substance	Frequency			Percent		
	Never	1-3x a Month	Daily	Never	Daily	1-3x a Month
Cannabinoids – Marijuana (*n* = 248)	30	51	142	12%	56.8%	7.6%
Alcohol (*n* = 247)	65	19	17	26%	6.8%	20.4%
Prescription Opioid Pain Relievers (*n* = 240)	155	19	22	62%	8.8%	7.6%
Prescription Depressants (*n* = 242)	184	13	21	73.6%	8.4%	5.2%
Stimulants – Powder cocaine (*n* = 244)	178	16	11	71.2%	4.4%	6.4%

Crosstabulations

Out of 247 participants, 61.9% (*n* =153) were considered to have a moderate to severe SUD based on the TCU DS 5. This is a substantial majority. Only 38% (*n* = 94) either had no SUD or a mild SUD. Out of those with a moderate to severe SUD, approximately 95% reported at least one of the 15 substances as causing the most problems for them prior to their arrest, with only 6 individuals reporting that none of the drugs caused them the most problems. This implies that almost all youth who meet criteria for a moderate to severe SUD reported that there is at least one substance that caused the most severe problems for them in the year before their arrest. Out of those with a moderate to severe SUD, approximately 40% indicated marijuana as the

substance that caused them the most problems. For those with a mild SUD or no SUD, approximately 30% indicated marijuana as the substance that caused them the most problems. For most other substances, including alcohol, the numbers are much lower (e.g. less than 15%). The three substances that caused the most problems for the youth outside of marijuana and alcohol were prescription opioid pain relievers, meth, and cocaine.

Table 2

Crosstabulations between SUD severity and problematic substance

Substance	Mild/No SUD	Moderate/Severe SUD	Total
None	46	6	52
Marijuana	29	61	90
Alcohol	11	12	23
Prescription Opioid Pain Relievers	1	18	19
Stimulants – Meth	1	11	12
Stimulants – Cocaine	1	10	11
Total	89	118	207

Note. The table above shows the number of participants within each category.

Analysis of Covariance (ANCOVA)

A within-subjects (n = 51) analysis of covariance (ANCOVA) was used to assess change over time in marijuana use while controlling for condition (i.e., control group or intervention group). As previously discussed, participants were randomly assigned into different conditions (i.e., standard re-entry or the TBRI intervention). Results showed a significant difference in marijuana use across all three time points (i.e., T1, T2, and T3), $F(2, 98) = 3.15$, $p = 0.47$. Furthermore, results indicated there was no significant effect between time and condition on marijuana use, $F(2, 98) = .95$, $p = .39$, meaning that the changes in marijuana use across time were not influenced by condition. Therefore, though marijuana use did significantly change across time following release, it does not appear that use was significantly affected by condition. Additionally, pairwise comparisons showed that from T1 ($M = 3.41$, $SD = 1.59$) to T2 ($M = 1.37$,

SD = 1.06) and from T1 to T3 (*M* = 2.02, *SD* = 1.58) there was a significant decrease in marijuana use ($p < .001$). However, there was a significant increase in use from T2 to T3 ($p < .001$). Thus, although use at T3 never superseded initially reported use at T1, there seemed to be an initial improvement in marijuana use shortly after release, but there were more instances of relapse as more time passed.

Table 3

Descriptive Statistics showing mean marijuana use

Time	Mean	Std. Deviation	*N*
T1	3.41	1.59	51
T2	1.37	1.06	51
T3	2.02	1.58	51

Table 4

Tests of Within-Subjects Effects

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*-value.
Time	9.54	2	4.77	3.15	.05
Time * Condition	2.87	2	1.43	.95	.39

Table 5

Pairwise Comparisons across T1, T2, and T3

Time	Time	Mean Difference	Std. Error	Sig.
T1	T2	2.04	.23	<.001
	T3	1.39	.26	<.001
T2	T1	-2.04	.23	<.001
	T3	-6.47	.24	.03
T3	T1	-1.39	.26	<.001
	T2	.65	.24	.03

Discussion

This study aimed to explore patterns of substance use among justice-involved youth before and after incarceration. Results revealed that marijuana was the most frequently used substance in the year prior to incarceration, with 56.8% of participants reporting daily use.

Among youth with moderate to severe substance use disorders (SUDs), which accounted for 61.9% of the sample, 40% identified marijuana as their most problematic substance. Even among youth with mild or no SUD, 30% cited marijuana as most problematic, underscoring its prominence regardless of severity level.

An analysis of covariance (ANCOVA) showed a significant decrease in marijuana use from baseline (T1) to three months post-release (T2), followed by a slight increase at six months (T3). However, marijuana use at T3 still remained lower than pre-incarceration levels. These findings reflect existing literature suggesting that while short-term reductions in substance use post-incarceration are common, relapse can occur over time—particularly without continued intervention or support (Leve et al., 2015).

These findings align with existing research showing marijuana as a dominant and increasingly normalized substance among youth. As noted by Mennis, McKeon, and Stahle (2023), the legalization of recreational marijuana between 2008 and 2019 contributed to increased use, especially among adolescents and young adults. Legalization was linked to a reduced perception of harm and, in some cases, a weaker connection between heavy use and seeking treatment. This mirrors our findings, where marijuana was not only heavily used but also often not addressed through treatment, even in more severe SUD cases.

While this study focused on marijuana, it's possible that early and frequent cannabis use among justice-involved youth could increase the risk for other substance use down the line, particularly in the absence of intervention. The link between early substance use and progression to harder drugs has been supported in research on both cannabis and prescription opioids (Kelley-Quon et al., 2022), where early use patterns tend to predict more serious outcomes.

This study contributes to the field in several important ways. While previous research has shown high rates of substance use among justice-involved youth (Dennis et al., 2009; SAMHSA, 2016), few studies have broken down use patterns by substance type or SUD severity over time. This study helps fill that gap by showing that marijuana is prominent across severity levels, suggesting the need for interventions that are both marijuana-specific and severity-tailored. One-size-fits-all models may overlook how different youth experience and manage substance use, and our findings suggest that treatment may need to be more customized.

Another underexplored area in the literature is whether youth with moderate to severe SUDs follow different use trajectories than those with mild or no SUD, particularly post-release. While this study did not compare these subgroups longitudinally in depth, the high prevalence of moderate to severe SUDs in this sample suggests an urgent need for treatment approaches tailored to severity level. Existing interventions often take a one-size-fits-all approach, despite the fact that youth with different SUD levels may require different types or intensities of care.

Despite these contributions, this study has several limitations. First, its observational nature and reliance on self-reported survey data make it impossible to infer causality. Youth may have underreported their use due to social desirability bias or fear of consequences—especially while still detained. Additionally, the follow-up periods at 3 and 6 months are relatively short and may not reflect long-term patterns. Substance use behaviors could evolve over a year or more, and follow-up data is still being collected to assess these longer-term outcomes.

The study also lacks generalizability beyond its sample, which consisted of 250 youth from only two states. Demographic factors such as age, gender, and race/ethnicity were not analyzed in relation to use patterns, and could be important moderators of substance use behaviors. External factors like peer and family environment, trauma history, and community

context—while known to influence adolescent substance use—were also not controlled for in this study.

Despite these limitations, this research offers valuable implications. The short-term reduction in marijuana use post-release suggests that justice-involved youth may benefit from the structure and services offered during incarceration or treatment, but that these gains can diminish without continued support. This underscores the need for sustained interventions after release, particularly those focused on marijuana use, which was clearly the most prevalent and problematic substance in this study.

Given the early signs of relapse at six months, future research should include longer-term follow-ups (e.g., 12, 18, 24 months) to better understand substance use trajectories over time. It should also investigate re-arrest and recidivism outcomes in relation to marijuana use, to clarify whether continued use after release contributes to further legal involvement. Moreover, future studies should control for demographic and psychosocial factors, and explore why marijuana appears to be such a dominant substance in this population. Are there specific social, cultural, or environmental factors making marijuana more accessible or appealing? These are critical questions for prevention and intervention work.

Finally, since this study drew from a larger project focused on substance use interventions, it is not yet possible to determine whether the observed declines in use were directly influenced by those interventions. However, the preliminary trends are promising and support the continued development of tailored, substance-specific treatment approaches. Marijuana use, in particular, deserves focused attention, both during and after incarceration.

Ultimately, this study aims to inform better strategies for reducing substance use and recidivism among incarcerated youth—a population at heightened risk for long-term challenges.

By identifying marijuana as a central issue, and spotlighting differences by SUD severity, these findings can help guide more targeted, effective interventions that address both the behaviors and the underlying conditions that sustain them.

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Appendix

Y_TCUDS_1_0_1	During the last 12 months (before coming to a locked facility, if applicable) - Did you use larger amounts of drugs or use them for a longer time than you planned or intended?	1 = Yes 2 = No
Y_TCUDS_1_0_2	During the last 12 months (before coming to a locked facility, if applicable) - Did you try to control or cut down on your drug use but were unable to do it?	1 = Yes 2 = No
Y_TCUDS_1_0_3	During the last 12 months (before coming to a locked facility, if applicable) - Did you spend a lot of time getting drugs, using them, or recovering from their use?	1 = Yes 2 = No
Y_TCUDS_1_0_4	During the last 12 months (before coming to a locked facility, if applicable) - Did you have a strong desire or urge to use drugs?	1 = Yes 2 = No
Y_TCUDS_1_0_5	During the last 12 months (before coming to a locked facility, if applicable) - Did you get so high or sick from using drugs that it kept you from working, going to school, or caring for children?	1 = Yes 2 = No
Y_TCUDS_1_0_6	During the last 12 months (before coming to a locked facility, if applicable) - Did you continue using drugs even when it led to social or interpersonal problems?	1 = Yes 2 = No
Y_TCUDS_1_0_7	During the last 12 months (before coming to a locked facility, if applicable) - Did you spend less time at work, school, or with friends because of your drug use?	1 = Yes 2 = No

Y_TCUDS_1_0_8	During the last 12 months (before coming to a locked facility, if applicable) - Did you use drugs that put you or others in physical danger?	1 = Yes 2 = No
Y_TCUDS_1_0_9	During the last 12 months (before coming to a locked facility, if applicable) - Did you continue using drugs even when it was causing you physical or psychological problems?	1 = Yes 2 = No
Y_TCUDS_10a_0	During the last 12 months (before coming to a locked facility, if applicable) - Did you need to increase the amount of a drug you were taking so that you could get the same effects as before?	1 = Yes 2 = No
Y_TCUDS_10b_0	During the last 12 months (before coming to a locked facility, if applicable) - Did using the same amount of a drug lead to it having less of an effect as it did before?	1 = Yes 2 = No
Y_TCUDS_11a_0	During the last 12 months (before coming to a locked facility, if applicable) - Did you get sick or have withdrawal symptoms when you quit or missed taking a drug?	1 = Yes 2 = No
Y_TCUDS_11b_0	During the last 12 months (before coming to a locked facility, if applicable) - Did you ever keep taking a drug to relieve or avoid getting sick or having withdrawal symptoms?	1 = Yes 2 = No
Y_TCUDS_12_0	Which drug caused the most serious problem during the last 12 months (prior to coming to a locked facility)? [CHOOSE ONE]	1 None 2 Alcohol 3 Cannaboids – Marijuana (weed) 4 Cannaboids – Hashish (hash)

		5	Synthetic Marijuana (K2/Spice)
		6	Opioids – Heroin (smack)
		7	Opioids – Opium (tar)
		8	Stimulants – Powder Cocaine (coke)
		9	Stimulants – Crack Cocaine (rock)
		10	Stimulants – Amphetamines (speed)
		11	Stimulants – Methamphetamine (meth)
		12	Synthetic Cathinones (Bath Salts)
		13	Club Drugs – MDMA/GHB/Rohypnol (Ecstasy)
		14	Dissociative Drugs – Ketamine/PCP (Special K)
		15	Hallucinogens – LSD/Mushrooms (acid)
		16	Inhalants – Solvents (paint thinner)
		17	Prescription Medications – Depressants
		18	Prescription Medications – Stimulants
		19	Prescription Medications – Opioid Pain Relievers
		20	Other (Specify)
Y_TCUDS_13_0_1	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Alcohol**	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily	

Y_TCUDS_13_0_2	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Cannaboids** –Marijuana (weed)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_3	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Cannaboids** –Hashish (hash)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_4	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Synthetic Marijuana** (K2/Spice)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_5	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Opioids** – Heroin (smack)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_6	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Opioids** – Opium (tar)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_7	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Stimulants** –Powder cocaine (coke)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week

		5 = Daily
Y_TCUDS_13_0_8	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Stimulants** – Crack Cocaine (rock)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_9	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Stimulants** – Amphetamines (speed)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_10	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Stimulants** – Methamphetamine (meth)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_11	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? **Synthetic Cathinones** (Bath Salts)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_12	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? **Club Drugs** – MDMA/GHB/Rohypnol (Ecstasy)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_13	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? -	1 = Never 2 = Only a few times 3 = 1-2 times per month

	Dissociative Drugs – Ketamine/PCP (Special K)	4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_14	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Hallucinogens** – LSD/Mushrooms (acid)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_15	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Inhalants** – Solvents (paint thinner)	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_16	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Prescription Medications** – Depressants	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_17	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? **Prescription Medications** – Stimulants	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_18	How often did you use each type of drug during the last 12 months (prior to coming to a locked facility)? - **Prescription Medications** – Opioid Pain Relievers	1 = Never 2 = Only a few times 3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily
Y_TCUDS_13_0_19	How often did you use each type of drug during the last 12 months (prior to coming	1 = Never 2 = Only a few times

	to a locked facility)? – **Other** (specify)	3 = 1-2 times per month 4 = 1-5 times per week 5 = Daily