The Impact of Incarceration and Treatment on Substance Use in High-Risk Longitudinal Samples: Persistent and Interrupted Users

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Abstract

The present research was conducted to examine the association between environmental context and cannabis use in a high-risk, selected sample of adolescents that were participants in a multi-wave longitudinal study: Genetics of Antisocial Drug Dependence (GADD) (n = 1,165). The following study assessed whether certain restrictive conditions, such as incarceration and treatment, interrupted patterns of regular cannabis users that were separated into specific use trajectory classes. Results indicate a statistically significant difference between trajectory classes regarding the context of incarceration. The mean values for each restrictive condition also support the trajectory shapes of each class. These results suggest that environmental context is imperative to accurately understand and assess an individual's substance use behavior.

The Impact of Incarceration and Treatment on Substance Use in High-Risk Longitudinal Samples: Persistent and Interrupted Users

Drug addiction, or substance use disorder (SUD), refers to the chronic and complex pattern of behavior that involves recurrent cycles of substance misuse despite harmful consequences (Koob et al., 2013). Individuals with SUD often experience periods of intense cravings and compulsive substance use, leading to a cycle of dependence and withdrawal that is difficult to break (Koob et al., 2013). Substance use particularly involving cannabis use generally begins during late adolescence and persists into adulthood (Chan et al., 2021). This timeframe emphasizes a critical period for intervention where efforts to alter behaviors and attitudes towards cannabis usage may produce enormous benefits to individuals struggling with this disorder.

Cannabis use disorder (CUD), a disorder characteristic of the continued use of cannabis despite significant negative impacts on one's life and health, has had recent increasing rates of incidence (NIDA, 2021). According to the National Institute on Drug Abuse (NIDA), the prevalence of CUD has been on an upward trajectory, with approximately 30% of individuals who use cannabis developing some degree of CUD (NIDA, 2021). This trend can be attributed to several factors, one being the expansion of legalization of medical and recreational cannabis which has normalized the use of cannabis to a great extent (Hasin et al., 2015). Additionally, the potency of cannabis has increased within certain forms of the substance, such as within edibles and THC concentrates, which have heightened the risk of CUD development (Volkow et al., 2014). The widespread use of vaping devices has also greatly facilitated discreet and easy cannabis consumption, particularly among the younger demographic, contributing to the upward trajectory of CUD cases (Cullen et al., 2019). The motivation and temptation to use cannabis that

is associated with some of the mentioned factors makes it difficult for individuals to sustain a proper treatment method (Nordstrom and Levin, 2010). Individuals with CUD are often caught in a cycle of attending treatment facilities and then falling into relapse, where periods of abstinence are often followed by a resurgence of heavy substance use (Stephens et al., 2020). This recurrent pattern underscores the chronic nature of this disorder and emphasizes the need for more comprehensive methods of intervention.

Although the ramifications of prolonged substance use, particularly in the context of cannabis, can have direct effects on an individual's health, this condition also concerns broader societal implications. As CUD begins at a young age and extends into one's adult years, individuals may often find themselves transitioning into new living arrangements as they undergo developmental experiences, such as moving out of their childhood homes. However, not all transitions occur from positive experiences. Polysubstance use, or concurrent consumption of multiple substances, is an important feature to recognize amongst daily cannabis users as it is very common (Jones et al., 2017). Engaging with more serious drugs, or the financial strain associated with supporting this type of drug habit, may drive individuals toward criminal activities, thus increasing the risk of incarceration and legal entanglements (Bunting et al., 2021). From this, it is evident that the costs of CUD extend far beyond mere health consequences.

Longitudinal studies play a pivotal role in understanding the intricacies of SUD/CUD progression, especially in dynamic environments (Stallings et al., 2016). However, existing literature on longitudinal studies focusing on cannabis use often fall short in capturing the full spectrum of individuals with severe SUD, especially those recently incarcerated, undergoing treatment, or navigating environments with distinct context influences. For instance, Frieser et al. (in prep) conducted a comprehensive assessment of adult outcomes of individuals who began

their cannabis use during adolescence. Their findings delineated three distinct trajectory classes of cannabis use: non-users, persistent users (exhibiting frequent cannabis use across adolescence and adulthood), and adolescent-limited users (those who engaged in weekly or more frequency cannabis use during adolescence but tapered off in adulthood).

In studies utilizing unselected samples, such as the one conducted by Frieser et al., non-users predominantly comprised individuals who had never engaged in cannabis use, while adolescent-limited users were typically individuals who naturally reduced their cannabis consumptions as they transitioned out of adolescence. However, in high-risk samples, which specifically target individuals with heavy cannabis use, the dynamics shift significantly. Within these groups, non-users may not necessarily represent individuals who have willingly abstained from cannabis user. Instead, they might include "interrupted users" who have temporarily halted their use due to factors such as recent incarceration, undergoing treatment, or being subject to controlled and monitored environments, like probation or parole. Longitudinal assessments within high-risk samples must consider the contextual nuances surrounding an individual's assessment point in order to accurately capture the trajectory of cannabis use and its associated outcomes.

The lack of longitudinal studies on substance use that consider situational context has provoked the present study to investigate the extent to which environmental contexts, such as incarceration and treatment, affect longitudinal assessment of substance use. The present study hypothesizes that a trajectory displaying a high-low-high pattern of use will display higher rates of incarceration, treatment, and other restrictive conditions. Trajectories displaying a low-high-low pattern are hypothesized to display greater rates of normative aging out processes.

Methods

Design

The research design for the GADD study was a qualitive interview and observation study. In the present study, the predictor variable was living arrangement (assessment context), and the outcome variable was frequency of cannabis use in the past six months. These data were analyzed using Mplus (Muthén & Muthén, 1998-2017), Microsoft Excel (2018), and R Studio (2020).

Participants

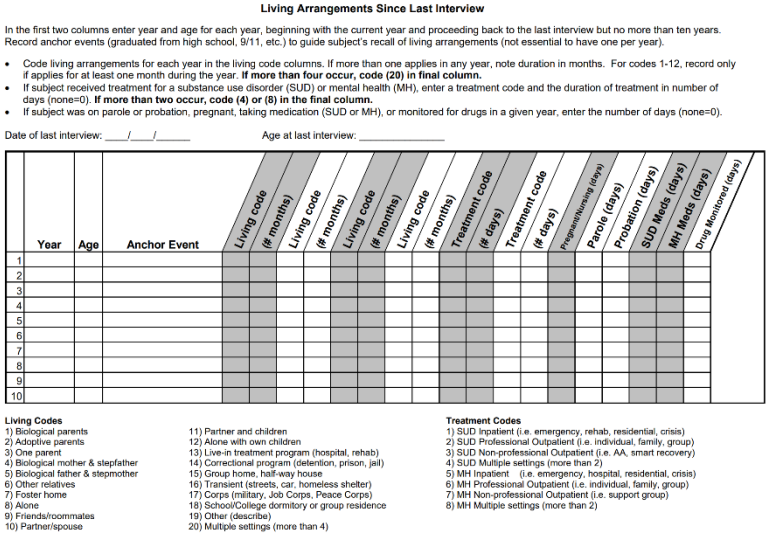
Subject data for the present study was obtained through the Center on Antisocial Drug Dependence (CADD), which was established in 1997, and the Genetics of Antisocial Drug Dependence (GADD), which was established in 2001. Both studies are multi-wave longitudinal studies. The CADD includes data on probands and any family member that cohabited with the proband for at least one year, such as parents, stepparents, half-siblings, and cousins. The GADD includes data on affected probands and only their biological siblings. The present study used 1,165 affected probands (selected for high levels of substance use) only. Only a subset of the sample are present within the analysis for wave-2 because information regarding assessment context for CADD subjects were not collected or assessed at wave-2 of the study. Subjects from the CADD were recruited in Colorado, and subjects for the GADD were recruited in both Colorado and California, specifically from treatment facilities, juvenile detention centers, and specialized high schools for at-risk youth. The University of Colorado Boulder, University of Colorado Denver, and the University of California, San Diego Institutional Review Boards approved all protocols at each wave of data collection for both the CADD and GADD studies.

Measures

Living Arrangements

Living arrangements data were gathered through the administration of a comprehensive Living Arrangements Interview which asked participants about their environmental situation throughout their substance use history. The interview specifically inquired about the whereabouts of individuals over the past five years. However, for the purposes of the current data analysis, data regarding living situations were limited to the current and preceding year as these recent conditions were more likely to influence dynamics of cannabis use. Assessment of subject living arrangements occurred at both wave-2 and wave-3 for the GADD, but only took place at wave-3 for the CADD. To record living arrangements data, interviewers would ask the subject a question and record a code value in a chart under the column pertaining to the appropriate living condition. The Living Arrangement Interview charts for wave-2 and wave-3 are presented in Figure 1a and Figure 1b, respectively. If a subject reported that they had been in jail or prison (incarcerated) during the past year, the numbers of months incarcerated during that time were recorded. However, some questions were asked in terms of days instead of months. So that all living arrangements data were scored the same, the total number of months was multiplied by 30.33 to determine an individual's frequency in terms of the number of days per year. Minor differences can be found between questions asked at each wave, however living conditions and frequency options remain the same.

Figure 1a. Living Arrangements Interview chart for wave-2 assessment.



Living Arrangements Since Last Interview

In the first two columns enter year and age for each year, beginning with the current year and proceeding back to the last interview but no more than ten years. Record anchor events (graduated from high school, 9/11, etc.) to guide subject's recall of living arrangements (not essential to have one per year).

- Code living arrangements for each year in the living code columns. If more than one applies in any year, note duration in months. For codes 1-12, record only if applies for at least one month during the year. **If more than four occur, code (20) in final column.**
- If subject received treatment for a substance use disorder (SUD) or mental health (MH), enter a treatment code and the duration of treatment in number of days (none=0). **If more than two occur, code (4) or (8) in the final column.**
- If subject was on parole or probation, pregnant, taking medication (SUD or MH), or monitored for drugs in a given year, enter the number of days (none=0).

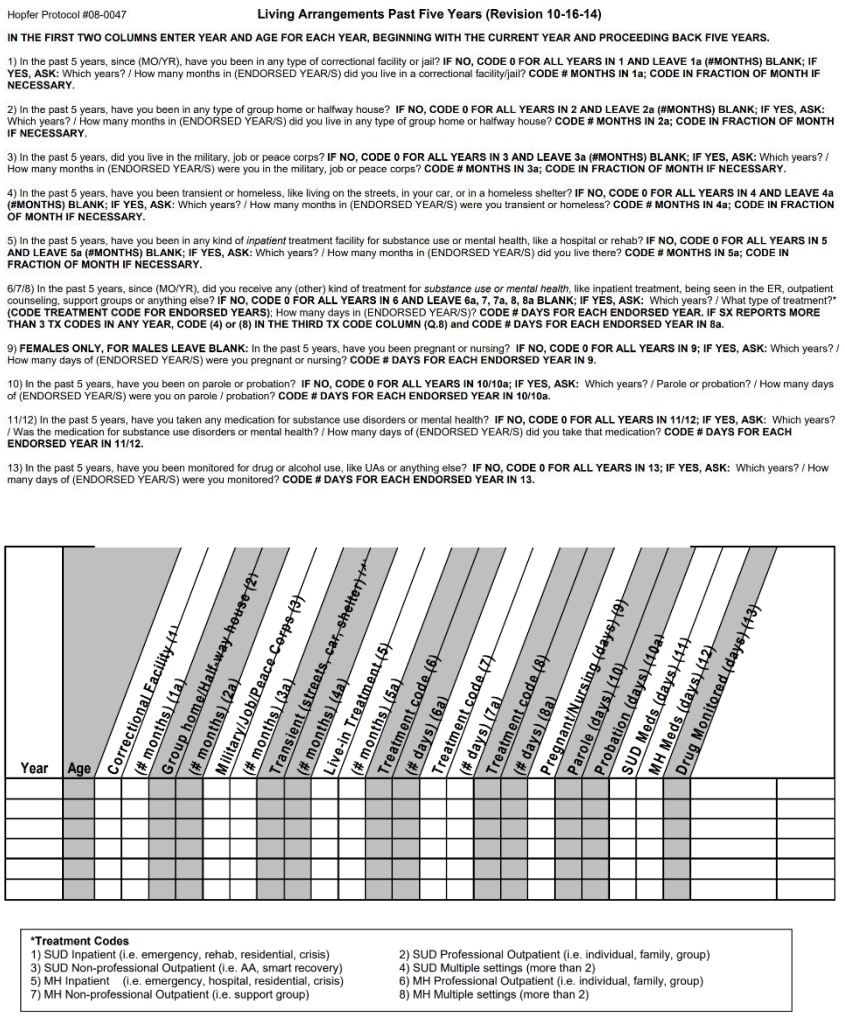
Date of last interview: ____/____/_____ Age at last interview: _____

	Year	Age	Anchor Event	Living code	(# months)	Living code	(# months)	Living code	(# months)	Living code	(# months)	Treatment code	(# days)	Treatment code	(# days)	Pregnant/Nursing (days)	Parole (days)	Probation (days)	SUD Meds (days)	MH Meds (days)	Drug Monitored (days)
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Living Codes
1) Biological parents
2) Adoptive parents
3) One parent
4) Biological mother & stepfather
5) Biological father & stepmother
6) Other relatives
7) Foster home
8) Alone
9) Friends/roommates
10) Partner/spouse
11) Partner and children
12) Alone with own children
13) Live-in treatment program (hospital, rehab)
14) Correctional program (detention, prison, jail)
15) Group home, half-way house
16) Transient (streets, car, homeless shelter)
17) Corps (military, Job Corps, Peace Corps)
18) School/College dormitory or group residence
19) Other (describe)
20) Multiple settings (more than 4)

Treatment Codes
1) SUD Inpatient (i.e. emergency, rehab, residential, crisis)
2) SUD Professional Outpatient (i.e. individual, family, group)
3) SUD Non-professional Outpatient (i.e. AA, smart recovery)
4) SUD Multiple settings (more than 2)
5) MH Inpatient (i.e. emergency, hospital, residential, crisis)
6) MH Professional Outpatient (i.e. individual, family, group)
7) MH Non-professional Outpatient (i.e. support group)
8) MH Multiple settings (more than 2)

Figure 1b. Living Arrangements Interview chart for wave-3 assessment.



Hopfer Protocol #08-0047

Living Arrangements Past Five Years (Revision 10-16-14)

IN THE FIRST TWO COLUMNS ENTER YEAR AND AGE FOR EACH YEAR, BEGINNING WITH THE CURRENT YEAR AND PROCEEDING BACK FIVE YEARS.

1) In the past 5 years, since (MO/YR), have you been in any type of correctional facility or jail? **IF NO, CODE 0 FOR ALL YEARS IN 1 AND LEAVE 1a (#MONTHS) BLANK; IF YES, ASK:** Which years? / How many months in (ENDORSED YEAR/S) did you live in a correctional facility/jail? **CODE # MONTHS IN 1a; CODE IN FRACTION OF MONTH IF NECESSARY.**

2) In the past 5 years, have you been in any type of group home or halfway house? **IF NO, CODE 0 FOR ALL YEARS IN 2 AND LEAVE 2a (#MONTHS) BLANK; IF YES, ASK:** Which years? / How many months in (ENDORSED YEAR/S) did you live in any type of group home or halfway house? **CODE # MONTHS IN 2a; CODE IN FRACTION OF MONTH IF NECESSARY.**

3) In the past 5 years, did you live in the military, job or peace corps? **IF NO, CODE 0 FOR ALL YEARS IN 3 AND LEAVE 3a (#MONTHS) BLANK; IF YES, ASK:** Which years? / How many months in (ENDORSED YEAR/S) were you in the military, job or peace corps? **CODE # MONTHS IN 3a; CODE IN FRACTION OF MONTH IF NECESSARY.**

4) In the past 5 years, have you been transient or homeless, like living on the streets, in your car, or in a homeless shelter? **IF NO, CODE 0 FOR ALL YEARS IN 4 AND LEAVE 4a (#MONTHS) BLANK; IF YES, ASK:** Which years? / How many months in (ENDORSED YEAR/S) were you transient or homeless? **CODE # MONTHS IN 4a; CODE IN FRACTION OF MONTH IF NECESSARY.**

5) In the past 5 years, have you been in any kind of *inpatient* treatment facility for substance use or mental health, like a hospital or rehab? **IF NO, CODE 0 FOR ALL YEARS IN 5 AND LEAVE 5a (#MONTHS) BLANK; IF YES, ASK:** Which years? / How many months in (ENDORSED YEAR/S) did you live there? **CODE # MONTHS IN 5a; CODE IN FRACTION OF MONTH IF NECESSARY.**

6/7/8) In the past 5 years, since (MO/YR), did you receive any (other) kind of treatment for *substance use or mental health*, like inpatient treatment, being seen in the ER, outpatient counseling, support groups or anything else? **IF NO, CODE 0 FOR ALL YEARS IN 6 AND LEAVE 6a, 7, 7a, 8, 8a BLANK; IF YES, ASK:** Which years? / What type of treatment?* **(CODE TREATMENT CODE FOR ENDORSED YEARS)**; How many days in (ENDORSED YEAR/S)? **CODE # DAYS FOR EACH ENDORSED YEAR. IF SX REPORTS MORE THAN 3 TX CODES IN ANY YEAR, CODE (4) or (8) IN THE THIRD TX CODE COLUMN (Q.8) and CODE # DAYS FOR EACH ENDORSED YEAR IN 8a.**

9) **FEMALES ONLY, FOR MALES LEAVE BLANK:** In the past 5 years, have you been pregnant or nursing? **IF NO, CODE 0 FOR ALL YEARS IN 9; IF YES, ASK:** Which years? / How many days of (ENDORSED YEAR/S) were you pregnant or nursing? **CODE # DAYS FOR EACH ENDORSED YEAR IN 9.**

10) In the past 5 years, have you been on parole or probation? **IF NO, CODE 0 FOR ALL YEARS IN 10/10a; IF YES, ASK:** Which years? / Parole or probation? / How many days of (ENDORSED YEAR/S) were you on parole / probation? **CODE # DAYS FOR EACH ENDORSED YEAR IN 10/10a.**

11/12) In the past 5 years, have you taken any medication for substance use disorders or mental health? **IF NO, CODE 0 FOR ALL YEARS IN 11/12; IF YES, ASK:** Which years? / Was the medication for substance use disorders or mental health? / How many days of (ENDORSED YEAR/S) did you take that medication? **CODE # DAYS FOR EACH ENDORSED YEAR IN 11/12.**

13) In the past 5 years, have you been monitored for drug or alcohol use, like UAs or anything else? **IF NO, CODE 0 FOR ALL YEARS IN 13; IF YES, ASK:** Which years? / How many days of (ENDORSED YEAR/S) were you monitored? **CODE # DAYS FOR EACH ENDORSED YEAR IN 13.**

Year	Age	Correctional Facility (1a)	(# months) (1a)	Group home/Halfway house (2)	(# months) (2a)	Military/Job/Peace Corps (3)	(# months) (3a)	Transient (streets, car, shelter) (4)	(# months) (4a)	Live-in Treatment (5)	(# months) (5a)	Treatment Code (6)	(# days) (6a)	Treatment code (7)	(# days) (7a)	Treatment code (8)	(# days) (8a)	Pregnant/Nursing (days) (9)	Parole (days) (10)	Probation (days) (10a)	SUD Meds (days) (11)	MH Meds (days) (12)	Drug Monitored (days) (13)		

***Treatment Codes**
1) SUD Inpatient (i.e. emergency, rehab, residential, crisis)
2) SUD Professional Outpatient (i.e. individual, family, group)
3) SUD Non-professional Outpatient (i.e. AA, smart recovery)
4) SUD Multiple settings (more than 2)
5) MH Inpatient (i.e. emergency, hospital, residential, crisis)
6) MH Professional Outpatient (i.e. individual, family, group)
7) MH Non-professional Outpatient (i.e. support group)
8) MH Multiple settings (more than 2)

Substance Use Frequency

In addition to living arrangements data, subjects were inquired about their substance use frequency. Subjects were asked how often they used cannabis in the past six months. The maximum value for substance use frequency was 180, which translated to daily usage.

Statistical Analyses

Class trajectories were estimated using Mplus. Living arrangements data and substance use frequency data were scored and analyzed using Microsoft Excel and R Studio.

Procedures

RStudio Analysis

Microsoft Excel datasheets from wave-2 and wave-3 were read into RStudio where I was able to create a line of code that searched for all subjects with a specific value that corresponded with a specific living code. For example, a code of "14" indicated that these individuals were in a correctional facility at some point during assessment. Once each subject was separated by living arrangement, I created a line of code that summed the total number of months that each subject spent within that specific living arrangement. These numbers of months were multiplied by 30.33 to convert the value into the number of days per year. This coding process was repeated for each condition (incarceration, parole, probation, residential treatment, mental health treatment, and substance use disorder treatment).

A One-Way ANOVA and Tuckey test was conducted on each restrictive condition to assess any statistically significant differences between trajectory classes. A Pairwise T-Test was

used to determine which specific classes were statistically significant from one another using a Bonferroni correction to adjust for multiple testing.

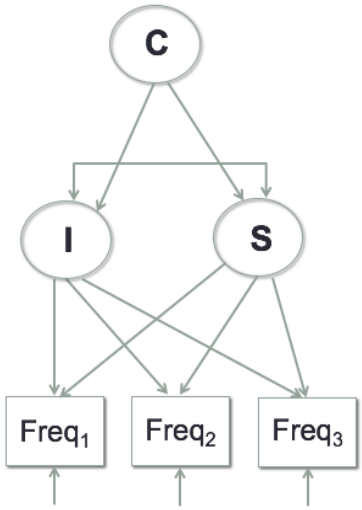
Mplus Analysis

Longitudinal assessments of frequency of cannabis use were examined through the application of Growth Mixture Models (GMM) and Latent Class Growth Analysis (LCGA). The frequency of cannabis use within the past six months served as the dependent variable and was evaluated across the three time points corresponding to each assessment wave. The GMM and LCGA models were conducted using Mplus (version 8.3; Muthén & Muthén, 1998-2017). Figure 2 illustrates an LCGA model, a subtype of GMM, where the observed frequencies of cannabis use at each wave are represented by the dependent variables (Freq1, Freq2, Freq3), while latent growth variables depict the Intercept (I), linear growth or slope (S), and quadratic growth (Q; representing development change), respectively.

Due to the limited number of time points, only the mean quadratic term could be estimated, with variances and covariances constrained to zero. Within the LCGA model, the "C" refers to trajectory class, allowing for the identification of multiple developmental trajectories. Initially, a single class model was attempted but failed to adequately fit the data. The number of classes were then incrementally increased until an optimal fit was achieved, which was indicated by maximum entropy and other model fit statistics. Ultimately, a 6-class solution emerged as the best fit to the data, with neither a 5-class nor 7-class solutions yielding superior fit. These analyses were conducted utilizing data from 434 subjects who provided frequency of cannabis use data at all three assessment waves. The identified trajectory classes included: 1) high, low, low frequency, 2) low, low, low frequency, 3) an increasing frequency pattern with highest

frequency at wave-3, 4) low, high, low frequency, 5) high, high, high frequency, and 6) high, low, high frequency. See Table 1.

Figure 2. Latent Growth Class Analysis (LCGA)



Results

Results indicated a statistically significant difference between trajectory classes in regards to the condition of incarceration at wave-3 only (p = 0.0003). Although no other conditions had a statistically significant difference between each trajectory class, the mean value for each condition seems to be consistent with the shape of each trajectory class. **Table 1** describes basic features of each class, along with assessments over the entire sample. **Table 2** represents the average amount of subjects in each restrictive condition according to class for wave-2 of the study. **Table 3** represents the average amount of subjects in each restrictive condition according to class for wave-3 of the study. Mean values may appear larger when observing individuals at certain conditions, rather than the entire trajectory class.

Table 1. Descriptive statistics of subjects based on each trajectory class.

Class	N	% Female	% Male	Age	$\bar{x}$ F1	$\bar{x}$ F2	$\bar{x}$ F3
1	65	20	80	16.18	142.47	1.0	1.26
2	129	43.41	56.59	16.56	3.23	1.4	0.75
3	66	27.27	72.73	16.44	9.67	111.29	164.02
4	38	10.53	89.47	16.21	55.37	153.07	11.4
5	99	14.14	85.86	16.41	142.65	164.18	168.42
6	37	21.62	78.38	16.48	146.86	9.33	143.83
Total	434	25.98	73.79	16.43	77.85	55.04	62.28

[1]

[1] Frequency value reference: 180 = daily use, 90 = every other day, 80 = three times per week, 45 = twice per week, 25 = once per week, 12 = twice per month, 6 = once per month.

Table 2. Average number of subjects for each living condition based on trajectory class at wave-2 assessment.

Class	$\bar{x}$ Incarceration	$\bar{x}$ Residential Tx	$\bar{x}$ Parole	$\bar{x}$ Probation	$\bar{x}$ SUD Tx	$\bar{x}$ MH Tx
1	62.35	1.69	6.25	67	34.83	10.39
2	28.41	7.68	3.38	87.77	27.19	5.82
3	12.58	0	6.59	19.51	3.17	0.85
4	4.33	0	0	55.14	2.86	0
5	2.17	3.61	0	75.21	3.98	0
6	50.16	0	25.58	88.42	46.42	28.85
Total	25.77	3.77	5.89	68.75	21.59	5.78

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[2] Tx = Treatment
SUD Tx = Substance Use Disorder Treatment
MH Tx = Mental Health Treatment
[3] Average across current and past year

Table 3. Average number of days for each living condition based on trajectory class at wave-3 assessment.

Class	$\bar{x}$ Incarceration	$\bar{x}$ Residential Tx	$\bar{x}$ Parole	$\bar{x}$ Probation	$\bar{x}$ SUD Tx	$\bar{x}$ MH Tx
1	131.58	5.85	19.42	52.23	17.67	18.25
2	51.88	1.14	12.14	46.75	10.16	4.57
3	42.74	1.6	12.21	38.18	4.67	5.7
4	104.04	5.62	11.04	67.94	4.81	8.07
5	10.52	1.2	8.43	46.86	7.0	0.71
6	6.84	0.28	6.67	50.15	2.11	0
Total	59.9	2.88	14.26	59.59	9.87	7.01

Figure 3. P-values for mean comparison among 6 trajectory classes for days incarcerated at wave-3.

```
        Pairwise comparisons using t tests with pooled SD

data:  incar3 and class

  1       2       3       4       5
2 0.00133 -       -       -       -
3 0.00171 0.71103 -       -       -
4 0.33452 0.03833 0.03214 -       -
5 3.8e-06 0.06085 0.21281 0.00041 -
6 0.00042 0.16475 0.30661 0.00629 0.91204
```

4

[4] Entries reflect Bonferroni adjusted values; $p < 0.05$ = statistically significant

Discussion

Although incarceration at wave-3 was the only condition that resulted in a statistically significant difference between trajectory classes, the mean values for subjects in each condition seem to align with the shape of their respective trajectory class. For example, class-5, which consists of nearly daily cannabis users at all three assessment waves, shows the lowest mean days of incarceration at wave-2 and the second lowest incarceration at wave-3. On the other hand, class-1, which consists of subjects demonstrating a high frequency at wave-1 but minimal use at wave-2 and wave-3, might be considered a successful decreasing trajectory class, but had the highest mean days incarcerated compared to other classes at both wave-2 and wave-3. Thus, although some of the individuals in class-1 may be aging out of high frequency use, others were incarcerated during the assessment period (frequency of cannabis use in the past six months) and may be characterized as 'interrupted users' rather than individuals who have chosen to decrease use. Class-6, which consists of nearly daily cannabis users at wave-1, minimal use at wave-2, and nearly daily use at wave-3, demonstrates the second highest mean days incarcerated at wave-2 and the lowest incarceration at wave-3. Upon initial glance at class-6, it seems strange that individuals return to high-risk use after a period of low, minimal use. However, when considering the context of how this class had the second highest mean of incarceration at wave-2, it can be inferred that the restrictive environment of incarceration prevented subjects from engaging in their typical use pattern, which they returned to in wave-3 when they were no longer incarcerated.

Although the point estimates of the means at wave-2 show a very similar pattern as at wave-3, the lack of statistical significance is likely due to the decrease in power due to missing

CADD subjects in wave-2. Despite the lack of statistical significance, the point estimates of the means for each restrictive conditions support my initial hypotheses.

Limitations

One limitation within this study was that subjects were not asked about their substance usage during the past six months or past year specifically. If a subject was assessed during the month of February and was asked about their substance usage within the past year, they would only report their use for the last two months. This leads to an inaccurate depiction of that subject's overall use and behavior. Asking a subject about the past six months specifically may avoid this lack of accurate representation. Another limitation within this study was that subjects were asked about the number of days they used a particular substance. However, some subjects use cannabis multiple times a day. In these cases, subjects were limited to an answer of 180, which also leads to an incomplete assessment of one's use.

The overall means for each restrictive condition were assessed across each subject within their respective class. However, not all individuals within these classes were associated with every restrictive condition. Therefore, the means include values of 0. These values would change if I were to assess only individuals who reported association in a specific condition, thus producing different trajectory patterns from these new point estimates.

Subjects were also polysubstance users. Therefore, their living assessments could have been impacted by their use of other substances, rather than cannabis specifically. Additionally, one's living assessment could have impacted their use with other substances, but not their use with cannabis. For example, an individual could report that their association with a correctional facility impacted their use with alcohol, but not cannabis.

Future Directions

Wave-4 of the GADD aims to enhance the living arrangements interview process by inquiring about an individual's substance use frequency and living condition in further detail. The process for wave-4 begins with asking subjects about their substance use over the past six months. The interviewer will then ask about living conditions from the current and past year. If a subject reports being involved in a certain living condition, the interviewer will then follow up by asking the subject whether they believe their environment has impacted their substance use. For example, if a subject reports being incarcerated during the past year, the interviewer would directly ask whether their experience in jail or prison increased or decreased their use, thus providing a more comprehensive review about that individual's usage.

Another future aim of this study is to make environmental or assessment context a requirement when observing an individual's substance use. Society is typically inclined to believe that an individual's high-risk substance use is due to poor judgment or negative qualities pertaining to that individual. However, emphasis on social factors, such as living environment, can reduce these harmful biases and the overall stigma against high-risk substance use. As high-risk samples often display different trends compared to normative samples, it is crucial to acknowledge these differences in order to accurately understand high-risk substance use. This enhanced understanding may pave the way for improved methods of intervention for individuals struggling with SUD or CUD.

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