Published in final edited form as:

J Am Acad Child Adolesc Psychiatry. 2004 October ; 43(10): 1215–1224.

MULTIPLE SUBSTANCE USE DISORDERS IN JUVENILE DETAINEES

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Abstract

Objective—To estimate six-month prevalence of multiple substance use disorders (SUDs) among juvenile detainees by demographic subgroups (sex, race/ethnicity, age).

Method—Participants were a randomly selected sample of 1829 African American, non-Hispanic white and Hispanic detainees (1172 males, 657 females, ages 10–18). Patterns and prevalence of DSM-III-R multiple SUDs were assessed using the Diagnostic Interview Schedule for Children (DISC 2.3). We used 2-tailed F- and t-tests with an alpha of 0.05 to examine combinations of SUDs by sex, race/ethnicity, and age.

Results—Nearly half of detainees had one or more SUDs; over 21% had two or more SUDs. The most prevalent combination of SUDs was alcohol and marijuana use disorders (17.25% females, 19.42% males). Among detainees with *any* SUD, almost half had multiple SUDs. Among detainees with alcohol use disorder, over 80% also had one or more drug use disorders. Among detainees with a drug use disorder, approximately 50% also had an alcohol use disorder.

Conclusions—Among detained youth with any SUD, multiple SUDs are the rule, not the exception. Substance abuse treatments need to target detainees with multiple SUDs who, upon release, return to communities where services are often unavailable. Clinicians can help ensure continuity of care by working with juvenile courts and detention centers.

Keywords

juvenile detainees; substance use disorders

INTRODUCTION

Substance use disorders (SUDs) in adolescents are a serious public health concern. Nearly one in four youth in community populations has an alcohol disorder, a drug disorder, or both (Turner and Gil, 2002; Warner et al., 1995). Risk of SUDs is even higher among troubled youth -- homeless youth, school dropouts, and those with mental health disorders (Aarons et al., 2001; Gilvarry, 2000) -- many of whom cycle through the juvenile justice system. On a typical day, approximately 109,000 youth are in custody (Sickmund et al., 2002); as many as two thirds of them may have one or more SUDs (Aarons et al., 2001; Otto et al., 1992; Teplin et al., 2002).

Among adolescents who abuse substances, *multiple* SUDs are common (American Academy of Child and Adolescent Psychiatry [AACAP], 1997; Deas et al., 2000). Among 12–17 year old adolescents in the general population, 21% of those who abused substances had two or more SUDs (Kilpatrick et al., 2000). Among youth in substance abuse treatment, up to two thirds had at least two SUDs (Substance Abuse Mental Health Services Administration [SAMHSA], 2001a; Office of Applied Studies [OAS], 2001); among youth in alcohol treatment, over 80% had at least one other SUD (Martin et al., 1993).

Multiple SUDs are a challenge to psychiatry. Compared to individuals with one disorder, those who have *multiple* SUDs have greater treatment needs, are more recalcitrant to treatment, have higher dropout rates, and are more likely to relapse (Almog et al., 1993; Cohen, 1981; Rounsaville et al., 1987; Rowan-Szal et al., 2000). Abusing multiple substances also poses significant health risks: overdose, suicide, aggression, violent behavior, and other psychopathology (Cohen, 1981; Hubbard, 1990; Rounsaville et al., 1987).

Juvenile detainees are an important group to study for three reasons. First, multiple SUDs appear to be common among juvenile detainees. Prior studies suggest that as many as one half of serious juvenile offenders have multiple SUDs (McManus et al., 1984). Second, detained youth are captive and potentially amenable to intervention. Finally, because most detained youth are eventually released, sound data on juvenile detainees will help improve interventions for high-risk youth in the community.

Despite the need for data on multiple SUDs in juvenile detainees, there have been few studies. Although Dolamanta et al. (2003) provide some information on the prevalence of overlapping alcohol and drug use disorders, they did not examine these patterns by sex, race/ethnicity and age. Other available studies of incarcerated and detained delinquents provide some information about multiple SUDs, but many have one or more of the following methodological limitations:

1. **Small samples.** Previous studies did not have samples large enough or diverse enough to compare rates by sex, race/ethnicity, and age (Gibbs, 1982; Jackson, 1992; McKay et al., 1992; McManus et al., 1984; Milin et al., 1991).
2. **Non-representative samples.** Previous studies included few females (Jackson, 1992; Milin et al., 1991; Neighbors et al., 1992), included only violent detainees (McManus et al., 1984), or included only offenders with known or suspected SUDs (Milin et al., 1991; Neighbors et al., 1992).
3. **Non-standard measures of substance use disorder.** Many studies measure substance *use*, not disorder (Dembo et al., 1988; Gibbs, 1982; Jackson, 1992; McKay et al. 1992), and definitions of “use” vary across studies.

We present six-month prevalence of multiple SUDs in a random sample of 1829 juvenile detainees. Our sample is large enough to examine key demographic subgroups; SUDs are determined by the Diagnostic Interview Schedule for Children (DISC), a widely used and reliable measure of SUDs.

METHOD

Participants and Sampling Procedures

Participants were 1829 males and females, 10–18 years old, randomly sampled at intake into the Cook County Juvenile Temporary Detention Center (CCJTDC) from November 1995 through June 1998. The sample was stratified by sex, race/ethnicity (African American, non-Hispanic white, Hispanic), age (10–13 years of age or 14 years and older), and legal status (processed as a juvenile or as an adult) to obtain enough participants in key subgroups, e.g., females, Hispanics, and younger children.

Participants were interviewed in a private area, almost always within two days of intake. Most interviews lasted two to three hours, depending on how many symptoms were reported. Interviewers were trained for at least a month; most had a Master's degree in psychology or an associated field and experience interviewing high risk youth. One third of our interviewers were fluent in Spanish. Detainees were eligible to be sampled regardless of their psychiatric morbidity, state of drug or alcohol intoxication, or fitness to stand trial.

Of the 2275 names selected, 4.2% (34 youth and 62 parents or guardians) refused to participate. There were no significant differences in refusal rates by sex, race/ethnicity, or age. Twenty-seven youth left the detention center before we could schedule an interview; 312 were not interviewed because they left while we were attempting to locate their caretakers for consent. Eleven others were excluded: nine became physically ill during the interview and could not finish it, one was too cognitively impaired to participate, and one participant was uncooperative with the interviewer.

We excluded an additional 55 participants because data necessary to diagnose substance use disorder were missing. There were no significant differences among these 55 cases by sex, race/ethnicity, or age at $p=.05$ in bivariate analyses. In most cases, these missing data were the functional impairment items of the DISC; our decision to exclude these cases may lower the estimates of the prevalence of SUDs.

All available cases were used for each reported diagnosis. Our final sample size is 1774. This sample size allowed us to reliably detect (i.e., distinguish from zero) disorders that have a base rate in the general population of 1.0% or greater with a power of .80 (Cohen, 1988).

The final sample comprised 1143 males (64.4%) and 631 females (35.6%), 980 African Americans (55.24%), 289 non-Hispanic whites (16.29%), 503 Hispanics (29.35%), and 2 “others” (0.11%). The mean age of participants was 14.9 years, and the median age was 15; age range was 10–18. (Additional information on our methods is available from the authors, and from Abram et al., 2003; Teplin et al., 2002).

Measures and Definitions

We used the Diagnostic Interview Schedule for Children (DISC) Version 2.3, (Bravo et al., 1993; Shaffer et al., 1996), the most recent English and Spanish versions then available. The DISC is highly structured, contains detailed symptom probes, has acceptable reliability and validity (Fisher, 1993; Piacentini et al., 1993; Shaffer et al., 1996), and requires relatively brief training. The substance use module of the DISC assesses the presence of DSM-III-R alcohol, marijuana, and other drug abuse and dependence in the past six months. The other drug category of the DISC 2.3 includes seven classes of illicit drugs: “uppers” (e.g. speed, amphetamines), “downers” (e.g. sleeping pills, barbiturates), other tranquilizers (e.g. diazepam [Valium®], chlordiazepoxide [Librium®]), opiates (e.g. heroin, opium, methadone, codeine), cocaine or crack, hallucinogens (e.g. LSD, peyote, PCP, etc.), and inhalants (e.g. glue, solvents).

We defined multiple SUD as two or more substance use disorders assessed by the DISC 2.3 within the six months prior to the interview.

Data Analysis

Data reduction

Each of the three DISC substance categories (alcohol, marijuana, and other drug) has three possible diagnoses (abuse, dependence, and no disorder). Thus, there are 27 possible combinations of SUD diagnoses ($3^3=27$). Before analyzing the data, we first determined the best *typology* of SUDs, that is, the most common combinations. We investigated two questions:

Should we combine abuse and dependence?—Only 2.36% of the sample had alcohol abuse, 6.10% had marijuana abuse, and 0.39% had other drug abuse; in contrast, 22.77% had alcohol dependence, 38.34% had marijuana dependence, and 2.27% had other drug dependence. Because so few participants had a diagnosis of abuse, we combined abuse and dependence for each type of substance (alcohol, marijuana, and other drug). To confirm that combining abuse and dependence did not obfuscate important differences, we also analyzed the data combining no disorder and abuse and compared this grouping to those with a diagnosis of dependence only. These analyses were substantially similar to those presented here (available from the authors).

What is the best typology?—We used loglinear and latent class models (Agresti, 1990) to empirically identify the most common combinations of alcohol, marijuana, and other drug use disorders. We confirmed these findings using cluster analysis (Blashfield and Aldenderfer, 1988). Our analyses resulted in a mutually exclusive, five-category typology of common combinations of alcohol, marijuana and other drug use disorders: **Group 1** = no disorder, **Group 2** = alcohol use disorder only, **Group 3** = marijuana use disorder only, **Group 4** = both alcohol and marijuana use disorders, and **Group 5** = other illicit drug use disorders inclusive of alcohol or marijuana. In other words, **Group 5**, comprises all participants meeting criteria for the DISC 2.3 other drug use disorder, whether or not they also had alcohol and/or marijuana use disorders.

Statistical Techniques

Because the sample is stratified by sex, race/ethnicity, and age, we weighted all estimates to represent the population of the detention center during the period of the study; all inferential statistics were corrected for sample design using the Taylor series linearization. We used 2-tailed F- and t-tests with an alpha of 0.05 to examine combinations of SUDs by sex, race/ethnicity, and age. We used Fisher's method to protect against Type I error. That is, we report tests of significance for specific contrasts of race/ethnicity and age only when the overall test was significant (Snedecor and Cochran, 1980). We report disorders for males and females separately because combining these groups masks important differences.

RESULTS

Prevalence of SUDs in the detained population (N=1774)

Sex differences—Nearly 50% of males and 45% of females had **one or more** SUDs; 21.35% of males and 22.19% of females had **two or more** SUDs. Figures 1 and 2 report the prevalence of SUDs in the past six months by sex for the entire sample. Group 2 (alcohol use disorder only) comprised 4.59% of males and 3.82% of females. Significantly more males (23.63%) than females (18.45%) were in Group 3 (marijuana use disorder only) ($t = -2.16$, $df = 4,1757$, $p = 0.03$). Group 4 (both alcohol and marijuana use disorders) comprised 19.42% of males and 17.25% of females. Significantly more females (5.47%) than males (2.44%) were in Group 5 (other illicit drug use disorders inclusive of alcohol or marijuana) ($t = 2.92$, $df = 4,1757$, $p = 0.01$).

Racial/ethnic differences—Table 1 reports types of SUDs by sex and race/ethnicity for the complete sample (N=1774). Among males, significantly more non-Hispanic white and Hispanics were in Group 5 compared to African Americans; significantly more non-Hispanic whites were in Group 5 than Hispanics.

Similarly, among females, significantly more non-Hispanic whites and Hispanics were in Group 5 than African Americans.

Age differences—Table 2 reports types of SUDs by sex and age for the entire sample. Among males, the youngest participants (ages 10–13) had significantly lower prevalence of all combinations of SUDs than youth 16 years and older. The youngest participants also had significantly lower prevalence of all combinations of SUDs than youth 14–15 years except for Group 2 (alcohol use disorder only). There were no significant differences in prevalence of SUDs between the two older age groups (14–15 and 16+).

Among females, there were no significant differences among the three age groups.

Combinations of SUDs among detainees with any SUD (N=851)

Next, we examined *only* those detainees who had one or more SUDs. (This analysis is available from the authors).

Among youth with any SUD, 42.66% of males and nearly half (49.43%) of females had two or more SUDs. Among youth with an alcohol use disorder, 81.84% of males and 84.56% of females also had a drug use disorder (marijuana and/or other drugs). Conversely, among detained youth with a drug use disorder (marijuana and/or other illicit drugs), 45.46% of males and 50.89% of females also had an alcohol use disorder.

Among those in Group 5 (other illicit drug use disorders inclusive of alcohol or marijuana), 79.17% of males and 90.51% of females also had either alcohol or marijuana use disorders, or both. Specifically, among detainees with an illicit drug use disorder: 1.14% of males and 2.42% of females also had alcohol use disorder; 27.64% of males and 23.41% of females also had marijuana use disorder; and 50.39% of males and 64.68% of females also had both alcohol and marijuana use disorders.

DISCUSSION

In the overall sample, nearly one quarter of detainees had *multiple* SUDs in the past six months. Nearly two fifths had both alcohol and marijuana use disorders, the most common combination. Marijuana use disorder, either alone or in combination with alcohol, was by far the most commonly abused substance. These findings are similar to prior studies that found high rates of multiple SUDs among delinquents (Domalanta et al., 2003; Jackson, 1992; McKay et al., 1992; McManus et al., 1984; Milin et al., 1991; Neighbors et al., 1992).

Fewer than 6% of detainees had disorders involving illicit drugs other than marijuana; among these youth, over 80% *also* had either alcohol use disorder or marijuana use disorder, and over 50% had both. Although few in number, detained youth who use illicit drugs in addition to marijuana and alcohol are a concern. Abuse of illicit drugs in combination with marijuana and/or alcohol indicates a progression of serious and problematic use (Kandel, 1975), and places youth at great risk for continued dysfunction and delinquency (Elliot et al., 1989).

Comparing our findings to community and treatment studies is difficult because most of the larger surveys examine substance *use*, not disorder or multiple disorder. However multiple SUDs among detainees appear to be substantially higher than community rates (21.4% – 22.2% vs. 0.4% – 11%) (Cohen et al., 1993; Kandel et al., 1997b; Kilpatrick et al., 2000; Substance Abuse and Mental Health Services Administration, 2001b).

We found some demographic differences:

Racial/ethnic differences Among both males and females, significantly more non-Hispanic whites and Hispanic detainees had combinations of SUDs involving illicit drugs other than marijuana than did African Americans. These racial/ethnic differences of

multiple SUDs confirm those of prior studies of general population youth (Kandel, et al., 1997b; Kilpatrick et al., 2000).

Sex differences Significantly more females than males had disorders involving illicit drugs other than marijuana. These findings are consistent with prior studies (Abram et al., 2003; McCabe et al., 2002; Teplin et al., 2002) that found females *enter* the juvenile justice system with higher rates of disorder than males. Adolescent females may be also more vulnerable to becoming dependent on these illicit drugs than males (Kandel et al., 1997a), placing them at greater risk for multiple SUDs.

Age differences Our findings among males mirror patterns found in general population adolescents. Older adolescents report higher rates of disorder (Cohen et al., 1993; Kilpatrick et al., 2000). Among females, our sample size may have been too small to detect age differences.

Directions for future research—We recommend research in three areas:

1. *Trajectories of multiple SUDs* Our data revealed important sex, racial/ethnic, and age differences in patterns of multiple SUDs. These differences suggest varying trajectories for multiple SUDs among youth at risk for delinquency. Longitudinal studies of high risk youth will allow us to identify social, psychological, and environmental factors contributing to the initiation, persistence and escalation of substance use disorders, and also identify factors that lead to remission. This information is needed to help guide gender and culturally specific treatment interventions.
2. *Treatment outcomes of detainees with multiple SUDs* Several empirically-supported treatments have been developed for adolescents who abuse substances (Catalano et al., 1991; Cormack and Carr, 2000; Henggeler et al., 1992, 1999, 2002), the majority of whom use multiple substances (AACAP, 1997; Deas et al., 2000). Despite this, few studies have examined the effectiveness of treatment modalities for *specific combinations* of substance disorder among juveniles. Future studies can identify differences in treatment outcome among adolescents with different combinations of SUDs, establish what characteristics of treatment are most beneficial, and create model treatments that can be easily disseminated and replicated (Dennis et al., 2003).

Limitations

The DISC 2.3 does not assess the sequence of onset of SUDs. Nor could we investigate whether substance use causes delinquency, or is merely a frequent characteristic of detainees. Our data may be generalizable only to detained youth in urban detention centers with a similar demographic composition. Because we did not interview caretakers (few would have been available), the reliability of our data is limited by the veracity of our respondents' self-report (McClelland et al., in press). Underreporting of symptoms and of impairment related to use is common among adolescents (Schwab-Stone et al., 1996). Thus, our rates may understate the true prevalence of SUDs. Our findings may have been different if we had used DSM-IV criteria. Finally, the DISC 2.3 combines diagnoses for several drugs (i.e., heroin, cocaine, PCP, barbiturates, etc.) into one category, other drug. This limited our assessment of the patterns and prevalence of specific combinations of drug use.

Despite these limitations, our findings may provide important implications for mental health policy and clinical treatment.

Implications for Mental Health Policy

1. *Ensure continuity of services in the community* The average stay in detention centers is two weeks (Snyder and Sickmund, 1999); many youth then return to the same high risk environment where substance use began (Dembo et al., 1993). Most communities lack sufficient treatment programs for youth after detention (Faenza et al., 2000). In the general population, approximately half of all youth, and even more minority youth, who need services do not receive them (US Department of Health and Human Services, 1999; US Department of Health and Human Services, 2001). Clinicians can help eliminate these disparities by working with juvenile courts and detention centers to ensure successful transitions into treatment in the community.
2. *Target high risk youth without addictions* Half of the detainees in our sample have not yet developed SUDs. While this does not indicate abstinence, prevention programs targeted towards these youth could reduce the likelihood that substance use will escalate into one or more substance use disorders. Programs must be repeated over time (National Institute on Drug Abuse, 1997), and must target multiple domains of the adolescent's life (AACAP, 1997; Winters, 1999), e.g. the youth's family, peers, and school system. Developing the skills to resist drugs will reinforce personal attitudes toward abstinence, and increase social competency (NIDA, 1997; Office of National Drug Control Policy, 2000).

Clinical Implications—Among youth who abuse substances, multiple SUDs are the rule and not the exception; among detained youth with any SUD, nearly half had multiple SUDs. Treatment programs for youth should not mimic successful adult treatment programs (Crowe and Reeves, 1994). Rather, treatment programs for youth must target the specific needs of adolescents: level of cognitive development, family situation, educational needs, and many other factors (AACAP, 1997; Winters, 1999). We must:

1. Target all substances of abuse, especially marijuana. All major substances of abuse, including alcohol and nicotine, should be targeted for effective treatment and intervention. Further, because our findings show that marijuana abuse is so prevalent among detainees, and because it is a major gateway drug (Yamaguchi and Kandel, 1984), it requires special attention. National data indicate that adolescents are increasingly dependent on cannabis (Dennis et al., 2002), particularly in conjunction with alcohol use (OAS, 2001). Moreover, adolescents are three times more likely than adults to experience one or more symptoms associated with cannabis dependence (OAS, 2000). Clinicians need to be aware of the widespread use and significant dysfunction associated with this substance use disorder in adolescents.
2. *Address comorbid mental disorders* Compared to youth who have a single SUD, youth with multiple SUDs have higher rates of comorbid psychopathology (Milin et al., 1991; Neighbors et al., 1992) and require a continuum of services. A recent report to Congress noted that there are few effective treatments for adolescents with comorbid disorders (Substance Abuse and Mental Health Services Administration, 2002). Clinicians must be responsive to the needs of youth with comorbidity, treating psychiatric and substance use disorders simultaneously.

The Surgeon General has called for effective community outreach and culturally sensitive treatment plans to reduce barriers to mental health services among underserved and minority populations (US Department of Health and Human Services, 2001). By increasing enrollment and retention of delinquent youth in appropriate substance abuse treatment, community programs could reduce criminal recidivism (Substance Abuse and Mental Health Services Administration, 1998) and reduce the substantial long-term cost of substance abuse and criminal activity to our nation's youth and to society (Cohen, 1998).

Acknowledgments

We are indebted to Ann Hohmann, Ph.D., Kimberly Hoagwood, Ph.D., and Heather Ringeisen, Ph.D., for invaluable advice. We also thank Jacques Normand, Ph.D., Helen Cesari, M.S., Richard Needle, Ph.D., Grayson Norquist, M.D., Delores Parron, Ph.D., Celia Fisher, Ph.D., Mark Reinecke, Ph.D., and our reviewers for their thoughtful comments.

We thank all project staff, especially Amy Lansing, Ph.D., for supervising the data collection, Amy Mericle, Ph.D., for preparing the data, and Laura Coats, editor and research assistant. We also greatly appreciate the cooperation of everyone working in the Cook County systems, especially David Lux, our project liaison. Without Cook County's cooperation, this study would not have been possible. Finally, we thank the participants for their time and willingness to participate.

FUNDING This work was supported by National Institute of Mental Health grants R01MH54197 and R01MH59463 (Division of Services & Intervention Research and Center for Mental Health Research on AIDS), and grant 1999-JE-FX-1001 from the Office of Juvenile Justice and Delinquency Prevention.

Major funding was also provided by the National Institute on Drug Abuse, the Substance Abuse and Mental Health Services Administration (Center for Mental Health Services, Center for Substance Abuse Prevention, Center for Substance Abuse Treatment), the Centers for Disease Control and Prevention (National Center on Injury Prevention & Control and National Center for HIV, STD & TB Prevention), the National Institute on Alcohol Abuse and Alcoholism, the NIH Office of Research on Women's Health, the NIH Center on Minority Health and Health Disparities, the NIH Office on Rare Diseases, The William T. Grant Foundation, and The Robert Wood Johnson Foundation. Additional funds were provided by The John D. and Catherine T. MacArthur Foundation, The Open Society Institute and The Chicago Community Trust. We thank all our agencies for their collaborative spirit and steadfast support.

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(N = 1143)^a ^a Percentages do not total to 100% due to rounding

Figure 1.
Prevalence of Single and Multiple Substance Use Disorders Among Male Detainees

(N = 631)^a

No Substance Use
Disorder
55.02%

^a Percentages do not total to 100% due to rounding

Figure 2.
Prevalence of Single and Multiple Substance Use Disorders Among Female Detainees

Table 1

Prevalence of substance use disorder categories by sex and race/ethnicity^a

Substance Use Disorder ^c	Males (N=1141) ^b						Females (N=631)					
	N	African American (N=563) %	Non-Hispanic white (N=203) %	Hispanic (N=375) %	Protected tests of Race/ethnicity ^d		N	African American (N=417) %	non-Hispanic white (N=86) %	Hispanic (N=128) %	Protected tests of Race/ethnicity ^d	
					F value	p value					F value	p value
Group 1	581	51.41	37.79	44.77	Reference Group ^d	-----	340	58.55	38.53	49.82	Reference Group ^d	-----
Group 2	53	3.56	6.22	9.24	2.81	0.06	25	3.37	4.59	5.25	1.20	0.30
Group 3	243	24.15	23.33	22.01	0.68	0.50	113	20.40	13.76	12.90	0.49	0.61
Group 4	194	20.40	11.62	17.87	0.44	0.64	110	16.71	22.48	16.43	2.49	0.08
Group 5	70	0.48	21.04	6.11	17.35	0.00	43	0.96	20.64	15.61	18.19	0.00
Total ^e	1141	100.00	100.00	100.00			631	99.99	100.00	100.01		
	</											

^aEach cell is weighted to reflect the demographic characteristics of the detention center; all categories are mutually exclusive.

^b2 participants of “other” race/ethnicity, both male, were excluded.

^c**Group 1** = no disorder, **Group 2** = alcohol use disorder only, **Group 3** = marijuana use disorder only, **Group 4** = both alcohol and marijuana use disorders, and **Group 5** = other illicit drug use disorders whether or not alcohol or marijuana use disorders are also present.

^dTests of race/ethnicity compare African Americans, non-Hispanic whites and Hispanics in Groups 2 through 5 to Group 1 (no disorder). All tests of race/ethnicity are within sex.

^eTotal percents do not all sum to 100% due to rounding

Table 2

Prevalence of substance use disorder categories by sex and age^a

Substance Use Disorder ^b	Males (N=1143)						Females (N=631)					
	N	10–13 yrs (N=313)	14–15 yrs (N=348)	16+ yrs (N=482)	F-tests of age ^c p value	Protected tests of age	N	10–13 yrs (N=55)	14–15 yrs (N=340)	16+ yrs (N=236)	F-tests of age ^c p value	Protected tests of age
		%	%	%	F value			%	%	%	F value	
Group 1	583	72.58	49.67	45.80	Reference		340	69.46	54.98	51.54	Reference	
Group 2	53	2.37	2.68	6.62	Group ^c	-----	25	5.22	3.00	4.69	Group ^c	-----
Group 3	243	14.59	24.72	24.43	5.56	16+>10–13	113	12.52	17.82	20.81	0.63	0.53
Group 4	194	9.63	20.38	20.48	10.98	16+>10–13; 14–15 >10–13	110	6.79	18.71	17.64	1.66	0.19
Group 5	70	0.84	2.55	2.66	12.55	16+>10–13; 14–15 >10–13	43	6.01	5.49	5.31	2.58	0.08
Total ^d	1143	100.01	100.00	99.99	8.45	16+>10–13; 14–15>10–13	631	100.00	100.00	99.99	0.04	0.96

^aEach cell is weighted to reflect the population of the detention center; al categories are mutually exclusive.

^b**Group 1** = no disorder, **Group 2** = alcohol use disorder only, **Group 3** = marijuana use disorder only, **Group 4** = both alcohol and marijuana use disorders, and **Group 5** = other illicit drug use disorders whether or not alcohol or marijuana use disorders are also present.

^cTests of race/ethnicity compare African Americans, non-Hispanic whites and Hispanics in Groups 2 through 5 to Group 1 (no disorder) All tests of race/ethnicity are within sex.

^dTotal percents do not all sum to 100% due to rounding