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Patterns of substance use, delinquency, and risk factors among adolescent inhalant users

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Abstract

Background—Despite insidious effects, use of inhalant substances by adolescents remains an understudied phenomenon.

Objective—This research was designed to identify patterns of past year substance use and delinquency among adolescent inhalant users.

Method—The study used a sample of adolescent inhalant users (ages ranged from 12-17 years, n = 7,476) taken from a pooled sample of the 2002 through 2012 National Survey of Drug Use and Health (NSDUH). Three-step latent class analyses were conducted with past year substance use and delinquency behaviors as class indicators. Demographic and social covariates were included in the analyses.

Results—Analyses yielded a six-class solution comprised of classes of users characterized by low substance use/low delinquency, high substance use/low delinquency, low substance use/ fighting, cigarettes/alcohol/marijuana, high substance use/high delinquency, and cigarettes/ alcohol/marijuana/opioids/moderate delinquency.

Conclusions—Findings provide insight into the taxonomy of adolescent inhalant user heterogeneity, and may inform future efforts at detection and prevention of inhalant use by suggesting warning signs of co-occurring externalizing behaviors and possible indications of underlying internalized issues.

Keywords

inhalants; volatile substance misuse; adolescents; latent class analysis; substance abuse

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Although there are adult inhalant users in the United States (Substance Abuse and Mental Health Services Administration, 2011), inhalants are predominantly a "kid drug" (Siegel et al., 2009). Inhalant substances can cause severe problems. Through a variety of physiological mechanisms, some adolescents will die the first time they use an inhalant (Bowen, 2011). Persistent users face organ failure, cancer, death, CNS depression, and cognitive impairment, among other harms (Bowen et al., 1999; Scott and Scott, 2014; Takagi et al., 2011). Despite the dangers associated with inhalant use, it remains an

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understudied phenomenon that has received little attention in the prevention community (Crano et al., 2009).

Recent reviews identified several major correlates of adolescent inhalant use (Garland & Howard, 2012; Garland et al., 2011; Howard et al., 2011; Howard et al., in press). Younger adolescents tend to be at greater risk for inhalant use, with past year initiation and use peaking at age 14 (Nonnemaker et al., 2011). Discontinuation rates are exceptionally high (Crocetti, 2008; Garland et al., 2011). Johnston et al. (2007) found girls more likely to use than boys in 8th and 10th grade, but less likely by 12th grade; African American and Hispanic/Latino adolescents are much less likely to use inhalants than White Americans. Delinquent behaviors are common among adolescent inhalant users (Wu et al., 2004), and co-occurring use of other substances (e.g., cigarettes, alcohol, marijuana, and other drugs) is extremely common (Perron et al., 2008; Wu et al., 2004).

Some studies have attempted to identify subtypes of adolescent inhalant users. Vaughn et al. (2007) examined the relationship between contextual influences and inhalant use and found that approximately one-third used inhalants in response to social influence (e.g., peer pressure). Perron et al. (2008) categorized adolescent inhalant users based on their reasons for initiating inhalant use. Each class appealed to multiple reasons for initiation, including boredom, peer pressure, curiosity, ease of access, and coping. Based on the analysis, one class was identified as "experimental" users, another was grouped as "active" users, and the third set as "coping/high distress" users. Similarly, Garland and Howard (2011) examined inhalant users' motivations for desistence, finding that low frequency inhalant users showed little agreement regarding reasons to quit and had low psychiatric and behavioral dysfunction; high frequency users had several strong reasons to quit, and two intermediate classes displayed moderate agreement with respect to desistence motivations.

To the best of the authors' knowledge, no study has sought to identify subtypes of inhalant users based on patterns of substance use and delinquency, two common and important externalizing behaviors that may be indicative of underlying adolescent problems (Loeber et al., 1999). Vaughn and colleagues (2012) took a similar approach in assembling risk profiles of adolescent nonmedical prescription opioid users. Identifying subgroups of inhalant users provides insight into their heterogeneity, and may help inform prevention, intervention, and treatment efforts. To that end, the present study was designed to identify subtypes of adolescent inhalant users and correlates associated with their patterns of substance use and delinquency.

Method

Study Overview

Data were pooled from the 2002 through 2012 National Survey of Drug Use and Health (NSDUH), each a representative cross-sectional sample of noninstitutionalized civilians collected annually. The NSDUH is a primary source of information on illicit drug use prevalence in the United States (Substance Abuse and Mental Health Services Administration, 2013). Data collected by the NSDUH are amenable to pooling, to create increased sample size and provide more precise estimates of population values. Response

rates ranged from approximately 74-79%. The survey uses multistage area probability designs with stratification along demographic factors. Post-stratification population weights adjust for nonresponse and coverage. To be included, participants must be at least 12 years old and live in community dwellings. Data are collected through computer-assisted personal interviewing and audio self-interviewing (ACASI) methods. Specific information about the design and procedures is available elsewhere (Substance Abuse and Mental Health Services Administration, 2013).

Sample

The combined data from the 2002-2012 samples was 614,579 cases. This aggregated sample made use of the maximum number of NSDUH datasets appropriate for pooling, given differences in the weights and design prior to 2002. Pooling datasets afforded substantially more sensitivity to small differences that otherwise might go unnoticed. Narrowing the sample to 12-17 year olds reduced the sample to 199,750; further narrowing to only those who indicated past year inhalant use resulted in an unweighted sample of 7,476 respondents (see Table 1 for descriptive statistics).

Measures

Demographic variables—Sex, race, age, household income, and parental status were included as demographic variables. Race was coded as White, Black, Hispanic/Latino, and Other. Income was broken into four categories: less than $20,000, $20,000-$49,999, $50,000-$74,999, and $75,000+. Family household status, computed from adolescents' responses to questions about household composition, was coded as dual parent, single-parent, or neither-parent.

Past year substance use—Adolescents reported most recent use of each of a variety of substances, including cigarettes, alcohol, marijuana, inhalants, cocaine, heroin, hallucinogens, and nonmedical prescription opioid, stimulant, sedative, and tranquilizer use. Those indicating use of a substance over the past 12 months were coded as past year users. Others were coded as non-past year users.

Delinquent behaviors—Delinquent behaviors were assessed with items that queried the number of times respondents carried a handgun over the past 12 months, sold illegal drugs, stole or tried to steal anything worth more than $50, attacked someone with intent to seriously hurt them, got into a serious fight at school or work, and took part in group fights. Items were coded as having occurred or not in the past year.

Attitudes towards risk—Adolescents' attitudes toward risky behaviors were assessed with items that asked the respondents how often they got a kick out of doing things that were a little dangerous, and how often they liked to test themselves by doing something a little risky ($r = .64$). Responses were made on four-point Likert scales ranging from *Never* to *Always*.

Grades—Adolescents reported grades they received in the last semester or grading period completed. Responses were made on a four-point scale ranging from "A" to "D or less than D."

Descriptive norms of peer substance use—Respondents' perceptions of peer substance use were assessed with four items (α = .84), which asked how many students in their grade smoked, used marijuana, drank alcohol, or got drunk at least once per week. Responses were made on four-point Likert scales ranging from *None of them* to *All of them*.

Parental attitudes towards substance use—Adolescents' perceptions of their parents' attitudes towards substance misuse were measured by four items (α = .85), which asked how their parents would feel about their smoking one or more packs of cigarettes per day, trying marijuana, using marijuana monthly, and drinking daily. Responses were made on a three-point Likert scales ranging from *Neither approve nor disapprove* to *Strongly disapprove*.

Perceptions of friends' attitudes towards substance use—Adolescents' perceptions of their close friends' attitudes towards substance use were measured with four items (α = .90). Question content and coding were identical to that of the parents' attitude scale, but from the perspective of adolescents' close friends rather than their parents.

Own attitudes towards substance use—As with the previous scale, adolescents' own attitudes towards substance use in general was assessed with four items (α = .89). Respondents were asked how they felt about someone their age smoking one or more packs of cigarettes per day, trying marijuana, using marijuana monthly, and drinking daily.

Parental involvement—Parental involvement was assessed by seven items (α = .70). Adolescents were asked how often in the past year parents: checked if their homework was done, helped with their homework, made them do chores, limited their television watching, limited time out with friends on school nights, told them they did a good job, and told them they were proud of them for something. Adolescents responded using four-point Likert scales ranging from *Never* to *Always*.

Data Analysis

The central research question concerns the patterns of past year substance use and delinquency among adolescent inhalant users. As others have demonstrated (e.g., Collins and Lanza, 2010; Vaughn et al., 2012), latent class analysis (Lazarsfeld and Henry, 1968) is an efficient method of discerning such patterns. Pursuant to Nylund et al.'s (2007) recommendations, the number of classes derived from the latent class analyses was determined through a balance of parsimony, model interpretability, and a variety of statistical criteria, including the Akaike information criterion (AIC; Akaike, 1987), Bayesian information criterion (BIC; Schwartz, 1978), sample-size adjusted BIC (ABIC; Sclove, 1987), and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT; Lo et al., 2001). Because entropy values can fluctuate by chance simply as a function of adding latent classes to the model (Collins and Lanza, 2010), entropy was not used as a model selection criterion.

More in-depth information about latent class analysis can be found elsewhere (Collins and Lanza, 2010; Hagenaars and McCutcheon, 2002; Magidson and Vermunt, 2004).

Latent class analysis is often used to examine associations of non-indicator observed variables with latent class membership. Using a classic classify-analyze approach, cases are assigned membership to a latent class based upon probabilities, class membership is saved as a variable, and then other variables are used to predict class membership using logistic regression. As Collins and Lanza (2010) explained, however, this approach treats latent class membership as a manifest variable, ignoring uncertainty of classification, and thus possibly resulting in erroneous outcomes. To account for classification uncertainty properly, the standard approach was altered to estimate and predict latent class membership and covariate associations simultaneously using a logistic framework in a single step. Vermunt (2010) noted several drawbacks to the single step approach: most notably, the inclusion of covariates in the measurement model influences class formation, potentially changing the number of classes formed. Asparouhov and Muthén (2013) noted that this also changes the meaning of the classes since they are based not solely on the indicators, but also the included covariates.

To remedy the issue, Vermunt (2010) suggested a three-step approach, which is adopted in the present analysis. In this method, 1) the latent class model is estimated using the indicators alone, 2) classification and uncertainty are computed, and 3) indicators, covariates, and classification uncertainty are used to estimate class membership and covariate association -- an analyze, classify, analyze approach. Detailed information on this approach can be found in Vermunt (2010) and Asparouhov and Muthén (2013).

For each of the five constructed scales, items were averaged into a single composite score. Items were coded so that higher values represented greater quantity (descriptive norms of peer substance use, parental involvement) or more positive attitudes (towards substance use). Most variables had little to no missing data (0-2%), with the exceptions of grades (10.4%) and descriptive norms (7.5%). Missingness on these variables can largely be attributed to adolescents who were not asked questions about grades or schoolmates because they did not attend school in the past year. Generalization is restricted accordingly. Because the NSDUH uses a complex multistage cluster design, analyses were conducted using Mplus 7.11 (Muthén and Muthén, 1998-2012). Adjusted person-level weights (computed by dividing the original weights by eleven – one for each year pooled; United States Department of Health and Human Services, 2013) were applied in the analyses.

Results

The initial set of latent class analyses were conducted on the full subsample of adolescents 12-17 years old who acknowledged past year inhalant use. Seven models were fitted to the data. For all models, criterion indices continued to show improvement, albeit progressively less was evident in the latter models (Table 2). The LMR-LRT statistic remained significant until the seventh model, suggesting the six-class solution may be the best choice. Examining response probabilities across each solution revealed meaningful distinctions with the addition of each class, with the one- to three-class models primarily distinguishing among

different levels of substance use (mostly cigarettes, alcohol, and marijuana), and the four-, five-, and six-class models additionally distinguishing on delinquent behaviors. Though not a selection criterion, entropy values were reasonable for all models, suggesting potential utility to the right audience (Table 2).

The six-class solution was settled upon (Figure 1). Class 6 (31.8% of the sample) was characterized by low probabilities of substance use and low probabilities of delinquent behaviors. Class 5 (23.4%) consisted of inhalant-using adolescents likely to smoke cigarettes, consume alcohol, and use marijuana, but who otherwise exhibited low substance use and delinquency. Class 4 (10.1%) was characterized by high probabilities of substance use and low delinquency. Class 3 (17.5%) consisted of adolescents who tended to acknowledge past year fights (both alone and in groups), but otherwise had low probabilities of substance use and delinquency. Adolescents in Class 2 (11.7%) had high probabilities of cigarette, alcohol, and marijuana use, moderately high nonmedical use of prescription opioids, and moderate levels of delinquency. Class 1 (5.6%) was comprised of adolescents high in both substance use and delinquency.

On the third step of the latent class analysis, covariate demographic and social variables predicted class membership within a logistic framework. Class 6 (low substance use/low delinquency) was used as the reference category. A number of associations emerged from the analyses (Table 3). Compared to low substance use/low delinquency inhalant users of Class 6, those in Class 1 (high substance use/high delinquency) were more likely to be older, to have low family income (less than $20,000/year), live in non-dual parent households, to enjoy doing dangerous things and test themselves by doing risky things, have lower grades, and perceive that a greater proportion of their peers misused substances, to view their parents as less involved and more permissive towards substance use, to perceive their friends' attitudes towards substance use as much more lenient, and to hold more lenient attitudes towards substance use themselves.

Compared to adolescents in Class 6, those in Class 2 (high cig/alc/mj/opioids, moderate delinquency) were more likely to be male and to come from a single parent household, less likely to be Black, more likely to fall into lower family income brackets, enjoy doing dangerous things and to test themselves with risky things, to have lower grades, perceive a greater proportion of their peers used substances, to perceive their parents as more permissive towards substance use and less involved in their lives, to perceive friends as more permissive towards substance use, and to hold more lenient attitudes towards substance use themselves. Adolescents in Class 3 (who primarily had issues with fighting) were more likely to be male, younger than those in Class 6, more likely to come from lower income families (< $20,000 or $20,000-$49,999), like to test themselves with risky things, have lower grades, perceive a greater proportion of their friends used substances, and have less involved parents whom they perceived as holding more lenient attitudes towards substance use.

Adolescents in Class 4 (high substance use/low delinquency) were more likely to be female and older, less likely to be a racial minority, more likely to come from a household with only one or no parents around, to enjoy testing themselves by doing dangerous things, have lower

grades, to perceive a greater proportion of their friends misused substances, perceived their parents and friends to hold more permissive attitudes towards substance use, and to hold more permissive attitudes towards substance use themselves. Adolescent in Class 5, characterized by use of cigarettes, alcohol, and marijuana, were more likely to be older than those in Class 6, to come from low income families (<$20,000/year), to be less likely to be Black, more likely to come from a single parent household, to enjoy doing dangerous things, to have lower grades, to perceive a greater proportion of their peers use substances, to perceive their parents and friends as having more lenient attitudes towards substance use, and to hold more lenient attitudes towards substance use themselves.

Discussion

Identifying behavioral patterns of inhalant users may be important in identifying possible motives for inhalant use. The present study used latent class analysis to discern patterns of substance use and delinquency among adolescent inhalant users. Similar approaches have been taken with other substances, such as with nonmedical use of opioids (Vaughn et al., 2012). Because the size of the full unweighted sample facilitated detection of smaller classes, its use allowed us to identify behavior patterns of inhalant users that might otherwise have gone undetected. Class 3 consisted of inhalant users who had a high probability of getting into both individual and group fights, but who otherwise had a low probability of other substance use or delinquency issues. The covariate analysis suggested these adolescents were among the youngest in the sample, thus identifying a sizeable subgroup of inhalant users and a potentially important warning sign. The co-occurrence of this externalizing behavior might be indicative of a common underlying issue that must be addressed, though the research was not set up to identify what that issue might be. To secure a better idea of what might be driving their inhalant use and thus take action before the behavior manifests itself, future studies might consider whether in combative situations young inhalant users are aggressors, defenders, or both.

Notable gender differences also emerged in the analysis. Females were less likely to fall into Class 2 (high cigarette, alcohol, marijuana, moderate opioids/moderate delinquency) or Class 3 (low substance use/fighters) than Class 6, but were much more likely to fall into Class 4 (high substance use/low delinquency). Odds of female membership did not differ significantly between Class 6 and 1 (high substance use/high delinquency) or Class 6 and 5 (cigarette, alcohol, marijuana users, low probability of other substances/delinquency). Possibly, there are two distinct types of female inhalant users which differ in terms of (high or low) delinquency.

Nonnemaker et al. (2011) found a select few income-related differences in which adolescents from the most financially well-off families were less likely to use inhalants, though they offered no explanations. To the extent that family income affects entertainment options, one possibility may be that boredom contributes to adolescent substance misuse (Perron et al., 2008), in which case it is not entirely surprising that substance use might be higher among lower income adolescent inhalant users. That said, it is surprising that this remains the case with Class 3, given that they were, on average, younger, since younger adolescents tend to have less easy access to other substances.

Findings related to parental status only partially supported prior research that suggested having two parents in a household functioned as a protective factor. It should be noted, however, that prior research has commonly examined the protective factor of parental status against any substance use (e.g., Hemovich and Crano, 2009; Siegel et al., 2009), not against use of additional substances by current inhalant users as this study examined. The present findings suggest that parental status is not a clear protective factor against use of additional substances by current inhalant users. There was a protective association with the high substance use/low delinquency users of Class 4 and the high substance use/high delinquency users of Class 1, in which coming from single parent or parent-absent households was associated with greater odds of class membership, but the results were less consistent across other classes. Inhalant users from single parent households were at elevated risk for classification as cigarette, alcohol, and marijuana users, who also had either moderate probabilities of opioid use and delinquency, or low probabilities of other substance use and delinquency.

Parental involvement may play a greater role in protecting against substance use compared to parental status, possibly because greater involvement makes it more difficult to engage in negative behaviors undetected, or because adolescents are less likely to feel a need to engage in negative behaviors (Hemovich et al., 2011). Siegel et al. (2009) obtained comments from adolescent inhalant users and nonusers that suggested use functioned as a parental relations tool when adolescents felt neglected. Parental involvement also was negatively related to membership in Classes 1 and 2, both of which were marked by higher levels of substance use and at least moderate delinquency, and Class 3, the low substance use/fighter class. These results may serve a protective function against substance use and delinquency that other studies have found (Hawkins et al., 1992; Lac and Crano, 2009; Ramirez et al., 2004).

Better grades were negatively associated with classification in Classes 1-5 relative to Class 6 (low substance use/low delinquency), in line with many studies that have found similar associations between externalizing behaviors (e.g., substance use, delinquency) and positive outcomes (e.g., higher grades). However, because grades themselves are unlikely to be a causal force in drug use (Siegel et al., 2014), their covariance with substance use and delinquency probably is conditioned on one or more causal variables (e.g., parenting styles; Cohen and Rice, 1997).

Attitudes produced the most consistent associations with class membership. Compared to the low substance use/low delinquency inhalant users, those in every class with notably higher substance use (i.e., all but the low substance use/fighter class) had higher perceptions of lenient parent, friend, and self-attitudes towards substance use (Miller et al., 2013). These results support the established link between attitudes towards substance and actual use (e.g., Crano et al., 2008).

To enhance certainty, longitudinal data would have been preferable; with a cross-sectional sample, we cannot determine whether or not some adolescents shift across classes in a predictable manner over time, or whether they persist in unusual subgroups whose patterns remain stable. Replication of these analyses, with other cross-sectional data and with a

longitudinal extension (via latent transition analysis) would enable a clearer identification of behavioral patterns, potentially providing further useful preventive information.

Beyond the cross-sectional nature of the data, it should be noted that results may not generalize to groups not included in the NSDUH sampling frame (e.g., homeless, military, etc.). It also is possible that adolescents' responses were affected by social desirability or faulty memory, though prior research suggests the general validity of these self-reports, given the nature of their collection (Richter and Johnson, 2001; Smith et al., 1995).

Despite limitations, this study had several strengths. First, the NSDUH provides a representative sample of the U.S. population in general. The NSDUH used ACASI and pill cards to minimize the effects of social desirability or faulty memory effects (Harrison and Hughes, 1997). Pooling datasets across years produced a large sample enabling identification of stable estimates.

Early identification of at-risk adolescents is a critical step toward ameliorating inhalant use among youth. Since inhalants can kill on first use, some will not have a chance to stop, making prevention all the more crucial. In conjunction with other research examining who these adolescents are, and why they begin, persist, or stop using, this research may enhance our chances of knowing who needs help, and how to provide it.

Glossary

Inhalants	Also characterized as volatile substances, inhalants are defined by the NSDUH dataset to encompass a variety of liquids, sprays, and gases that people sniff or inhale to get high. Examples include, but are not limited to, gasoline, glue, spray paint, and correction fluid.
Inhalant user	An individual who has used inhalants at least one time in a defined period.

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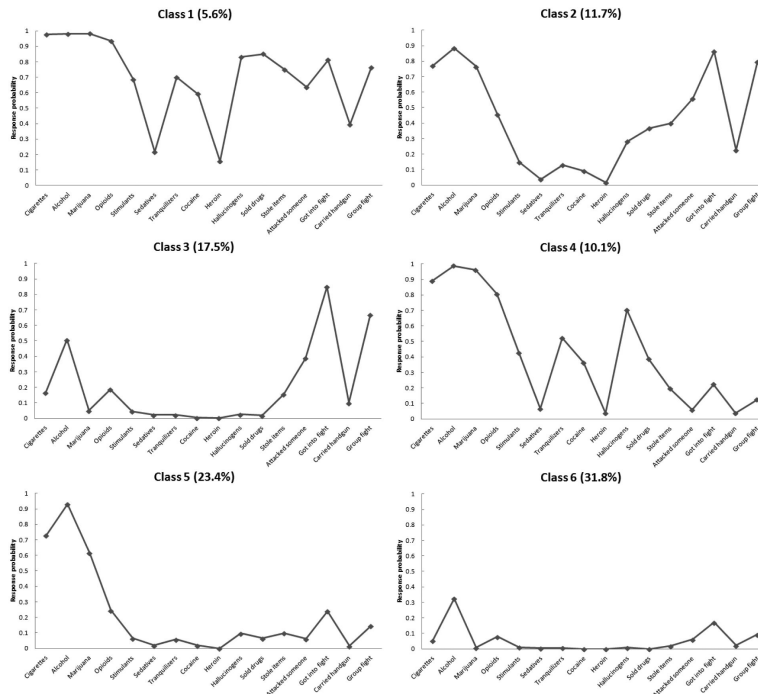
Figure 1.
Six class solution for the subsample of adolescent inhalant users (12-17 years old).

Table 1

Descriptive statistics for the full 12-17 year old subsample of past year inhalant users (n = 7,476).

Female		53.0%
Age	12	11.5%
	13	17.7%
	14	19.9%
	15	19.5%
	16	17.0%
	17	14.4%
Race	White/Caucasian	64.9%
	Black/African American	9.2%
	Hispanic/Latino	16.5%
	Other	9.4%
Family Income	<$20,000/year	17.4%
	$20,000-$49,999	34.7%
	$50,000-$74,999	19.0%
	$75,000+	28.9%
Parental status	Dual parent household	64.5%
	Single parent household	30.9%
	Neither parent present	4.6%
Enjoyed doing dangerous things (range: 1-4)		M = 2.88 [95% CI: 2.86-2.90]
Tested self by doing risky things (range: 1-4)		M = 2.75 [95% CI: 2.73-2.78]
Grades (range: 1-4)		M = 2.65 [95% CI: 2.62-2.68]
Descriptive norms (range: 1-4)		M = 2.34 [95% CI: 2.32-2.35]
Parental attitudes towards drugs (range: 1-3)		M = 1.25 [95% CI: 1.24-1.27]
Friends' attitudes towards drugs (range: 1-3)		M = 1.95 [95% CI: 1.93-1.98]
Own attitudes towards drugs (range: 1-3)		M = 1.92 [95% CI: 1.89-1.95]
Parental involvement (range: 1-4)		M = 2.83 [95% CI: 2.81-2.85]

Note: Percentages, means, and confidence intervals reflect weighted estimates.

Table 2

Fit indices and entropy for latent class analyses using the full 12-17 year old subsample of past year inhalant users (rounded to the nearest integer).

Number of classes	AIC	BIC	ABIC	LMR-LRT	Entropy
1	108184	108295	108244	N/A	N/A
2	94006	94234	94129	<.001	.845
3	91487	91833	91674	<.001	.795
4	89549	90013	89800	<.001	.780
5	88749	89330	89063	<.001	.774
6	88262	88961	88640	.022	.742
7	87946	88762	88387	.180	.757

Table 3

Odds ratios of demographic and attitudinal correlates predicting latent class membership (versus Class 6) for the full adolescent subsample ($n = 6,587$)

Predictor		Class 1	Class 2	Class 3	Class 4	Class 5
Female		.79 [..51-1.25]	.58 [.40-.85]**	.60 [.42-.85]**	1.98 [1.42-2.76]***	1.19 [.90-1.58]
Age		1.74 [1.40-2.17]***	1.10 [.93-1.29]	.65 [.57-.73]***	2.59 [2.20-3.05]***	1.47 [1.32-1.63]***
Income	Less than $20,000	3.59 [1.59-8.11]**	4.36 [2.22-8.55]***	2.68 [1.52-4.74]***	1.47 [.72-3.02]	2.34 [1.35-4.05]**
	$20,000-$49,999	1.37 [.78-2.40]	1.66 [1.04-2.63]*	1.75 [1.15-2.68]*	1.04 [.64-1.70]	1.29 [.84-1.81]
	$50,000-$74,999	1.51 [.80-2.84]	1.11 [.65-1.90]	1.31 [.85-2.02]	1.25 [.82-1.92]	1.01 [.69-1.49]
Race	Hispanic/Latino	.95 [.47-1.93]	1.50 [.92-2.44]	1.04 [.65-1.67]	.48 [.25-.94]*	.72 [.48-1.08]
	Black	N/A	.32 [.16-.64]***	1.37 [.85-2.23]	.11 [.03-.37]***	.24 [.14-.40]***
	Other	1.20 [.43-3.33]	.70 [.31-1.56]	.87 [.44-1.71]	.30 [.10-.86]*	.52 [.26-1.04]
Parental status Single parent		1.89 [1.04-3.41]*	1.67 [1.04-2.68]*	1.33 [.95-1.88]	2.53 [1.54-4.16]***	1.47 [1.02-2.11]*
	Neither parent	3.69 [1.32-10.30]*	2.34 [.92-5.98]	1.40 [.53-3.71]	3.48 [1.42-8.56]**	2.02 [.87-4.70]
Enjoyed doing dangerous things		3.24 [2.38-4.42]***	1.87 [1.43-2.43]***	1.24 [.96-1.60]	2.85 [2.13-3.81]***	1.62 [1.28-2.05]***
Tested self by doing risky things		2.16 [1.58-2.96]***	1.86 [1.34-2.56]***	2.02 [1.58-2.58]***	.93 [.66-1.29]	1.15 [.93-1.42]
Grades		.37 [.29-.48]***	.44 [.35-.55]***	.61 [.51-.73]***	.60 [.49-.74]***	.64 [.55-.74]***
Descriptive norms		9.77 [5.59-17.07]***	6.83 [4.24-11.03]***	2.43 [1.62-3.64]***	2.83 [1.82-4.41]***	2.44 [1.75-3.40]***
Parental attitudes towards drugs		7.76 [4.13-14.59]***	5.43 [2.93-10.07]***	2.78 [1.17-6.62]*	5.13 [2.74-9.61]***	2.41 [1.39-4.19]**
Friends' attitudes towards drugs		3.44 [2.08-5.71]***	2.30 [1.56-3.40]***	1.26 [.93-1.69]	2.43 [1.68-3.52]***	2.10 [1.56-2.85]***
Own attitudes towards drugs		2.45 [1.60-3.74]***	1.49 [1.06-2.10]*	1.04 [.76-1.42]	3.35 [2.29-4.90]***	1.55 [1.19-2.02]***
Parental involvement		.67 [.45-.99]*	.69 [.52-.92]*	.68 [.51-.90]**	1.13 [.79-1.61]	.97 [.75-1.26]

Note: The reference group for sex = male, income = $75k+, race = White, parental status = dual parent household, and for class = 6 (low substance use, low delinquency). All odds ratios and *p*-values reflect weighted estimates.

*
$p < .05$,

**
$p < .01$,

***
$p < .001$