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Alcohol, Prescription Drug Misuse, Sexual Violence, and Dating Violence Among High School Youth

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Abstract

Purpose: Sexual violence (SV), teen dating violence (TDV), and substance use are significant public health concerns among U.S. adolescents. This study examined whether latent classes of baseline alcohol and prescription drug misuse longitudinally predict SV and TDV victimization and perpetration (i.e., verbal, relational, physical/threatening, and sexual) 1 year later.

Methods: Students from six Midwestern high schools (n = 1,875; grades 9 11) completed surveys across two consecutive spring semesters. Latent class analysis was used to identify classes of individuals according to four substance use variables. A latent class regression and a manual three-step auxiliary approach were used to assess concurrent and distal relationships between identified classes and SV and TDV victimization and perpetration.

Results: Three classes of substance use were identified: low/no use (41% of sample), alcohol only use (45%), and alcohol and prescription drug misuse (APD) (14%). Youth in the APD class experienced greater SV and TDV victimization and perpetration than the alcohol only class at baseline. At Time 2 (one year later), youth in the baseline APD class experienced significantly higher SV and TDV victimization and perpetration outcomes than youth in the alcohol only class with the exception of sexual and physical TDV perpetration.

Conclusions: The misuse of both alcohol and prescription drugs emerged as a significant risk factor for later SV and TDV among adolescents. As such, it would be beneficial if future research continued to assess the nature of these associations and incorporate prescription drug use and misuse into heath education, substance use, and violence prevention programs.

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Supplementary Data

Supplementary data related to this article can be found at doi:10.1016/j.jadohealth.2018.05.024.

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Keywords

Substance use; Adolescents; Teen dating violence; Sexual violence

Adolescent sexual violence (SV) and teen dating violence (TDV) are significant public health concerns in the United States [1,2]. SV includes nonconsensual completed/attempted vaginal, oral or anal penetration, unwanted sexual contact, and noncontact acts such as verbal sexual harassment, committed by any perpetrator [3]. SV from peers are extremely common among adolescents with 56% of females and 40% of males in 7th–12th grades reporting victimization (e.g., unwanted sexual comments or touch) [4]. Physical, sexual, or psychological TDV within a dating/romantic relationship is also common. The 2015 Youth Risk Behavior Survey found among the 68.6% of students (grades 9 12) nationwide who dated or went out with someone during the 12 months before the survey, 9.6% had been physically hurt on purpose (e.g., hit) by their dating partner, and 10.6% had been forced to do sexual things they did not want to do. More female students reported physical TDV and sexual TDV victimization (11.7%, 15.6%) than male students (7.4%, 5.4%) [1].

Adolescent substance use is also common. In 2015, 63.2% of students (grades 6–12) reported any lifetime alcohol use and 32.8% reported current alcohol use (i.e., at least one drink of alcohol in the past 30 days) [1]. Further, 17.7% of students engaged in binge drinking (i.e., five or more alcohol drinks within a few hours) in the previous 30 days and 16.8% used prescription drugs (e.g., Vicodin, OxyContin, and Ritalin) without a doctor's prescription at least once during their lifetime [1].

Some literature conceptualizes SV/TDV as a risk factor for substance use [5–7]. Consistent with self-medication theory, victims of SV/TDV often report using substances to cope with negative affect after victimization, and adolescent victims are more likely to engage in unhealthy behaviors, such as using tobacco, alcohol, and marijuana [7–15]. Additionally, substance use has been conceptualized as a risk factor for SV/TDV as the use of substances can exacerbate feelings of anger and escalate minor conflicts [16]. Recent studies indicated that physical TDV perpetration increased at time points when alcohol and illicit drug use were elevated [17] and using alcohol and illicit drugs predicted physical TDV a year later, controlling for prior TDV [17].

Yet, existing studies often fail to consider how different substance use co-occurs within individuals to predict SV/TDV. Problem-behavior theory suggests that engaging in one problem behavior increases the likelihood of engaging in other problem behaviors [18]. This is a result of the interplay of three systems: the personality system (e.g., values, expectations), the perceived-environment system (e.g. parental monitoring, peer approval), and the behavior system, which interact to either activate or inhibit engagement in problem behaviors. The balance between activations and inhibitions across all systems determines an adolescent's proneness for problem behaviors. Accordingly, problem-behavior theory may account for the potential overlap of the problem behaviors such as substance use and violence. However, more information on the co-occurrence of prescription drug misuse specifically with other problem behaviors like alcohol use and violence involvement is warranted since it is on the rise among American adults [19] and a cause for concern for

adolescents. For example, from 2007 to 2009, 12.9% of US high school seniors reported lifetime nonmedical use of prescription drugs (NMUPD); 49.9% of those who reported NMUPD also reported binge drinking 2 weeks prior to NMUPD [20].

While some evidence indicates that adolescent alcohol and prescription drug misuse co-occur, less is known about how this cooccurrence predicts SV/TDV perpetration and victimization. Emerging research among young adults has pointed to prescription opioid misuse as a potential risk factor for SV victimization, as the victim may be incapacitated at the time of victimization or exchanging drugs for sex which increases SV risk [21]. For TDV, Parker et al. used cross-sectional latent class analysis (LCA) to classify adolescents based on their alcohol, tobacco, marijuana, and prescription drug use [13]. Adolescents who experienced physical or verbal TDV victimization were more likely to be in one of the three polysubstance use classes.

The current study extends Parker et al.'s work [13] by treating substance use as a potential risk factor for both SV and TDV victimization and perpetration, and examining how latent classes of baseline substance use (alcohol use and prescription drugs such as Ritalin, Oxycontin, or Vicodin) *longitudinally* predict SV and TDV perpetration and victimization 1 year later (Time 2). Drawing from problem-behavior theory, we hypothesized that (1) at least two distinct classes of alcohol and prescription drug use would emerge from the data; (2) those with high levels of both alcohol and prescription drug use would exhibit high rates of TDV and SV perpetration and victimization concurrently (H2; baseline), and 1 year later (H3; distal outcome).

Method

Participants

Participants were 1,875 students (grades 9 11) sampled from six Midwestern public high schools during 2012 – 2013. Participants were followed longitudinally and surveyed two consecutive spring semesters across a 1-year period. A 92% retention rate was achieved across the two waves. Participants were 14 – 18 years old (M*age* = 15.8, SD = 1.03) at baseline, and half were female (50.8%; n = 953). Race/ethnicity was: 44.3% (n = 830) African-American, 29.1% (n = 546) white, 7.2% (n = 135) Hispanic, and 16.5% (n = 311) multi-race (Table 1).

Procedures

University Institutional Review Board and the school district approved use of a passive parental consent procedure. Parents returned the information letter only if they withdrew their child from the study. An assent script was read to students, who could opt out of the survey or skip questions. Participation rates at Time 1 and 2 were 93% and 95%, respectively. Two researchers answered student questions during survey administration. Students were given resources for TDV, SV, or substance abuse. Substance use was measured at Time 1 and TDV/SV were measured at Times 1 and 2.

Measures

Substance use.—Four items assessed alcohol/drug use: *lifetime alcohol use* (ever drank alcohol), *current alcohol use* (alcohol use in past month), *current problematic drinking* (drank five or more drinks in one sitting in the past month), and *lifetime* nonmedical misuse of prescription drugs ("to get high"; Ritalin, Oxycontin, or Vicodin). Response options ranged from 0 "*Never*" to 4 "*Ten or more times*." Because item responses were not normally distributed, each substance use item was dichotomized as 0 "*Never*" or 1 "*One or more times*."

TDV.—TDV was assessed with 50 items from the *Conflict in Adolescent Dating Relationships Inventory* [22] comprising four subscales: sexual (four items), physical/threatening (eight items), relational (three items), and verbal (10 items) victimization and perpetration in the past year. Students reported on behaviors that happened with anyone they ever dated. Example items include "*I tried to turn her/his friends against him/her*" (relational), "*I insulted him/her with put downs*" (verbal), "*I threatened to hurt him/her*" (physical/threatening), and "*I forced him/her to have sex when he/she didn't want to*" (sexual). Response options ranged from 0 "*Never*", to 3 "*Often*." Internal consistency was good to adequate across all subscales in this study: physical/threatening victimization (α = .88)/perpetration (α = .89), sexual victimization (α = .75)/ perpetration (α = .74), relational victimization (α = .79)/perpetration (α = .80), and verbal victimization (α = .87)/ perpetration (α = .85). Confirmatory factor analyses (CFAs) for both victimization (*CFI* = .961, *TLI* = .956, *RMSEA* = .033) and perpetration (*CFI* = .970, *TLI* = .967, *RMSEA* = .022) resulted in excellent model fit for this sample. Only daters completed this measure, which represented 80% of the sample (n = 1,512).

SV.—SV was measured using an abbreviated version of a modified sexual harassment scale [2]. Both scales included six items and asked about other students at school. Example items include "*Forced you to do something sexual when you did not want to*" (victimization), and "*Physically intimidated them in a sexual way*" (perpetration). Response options ranged from 0 "Never," to 4 "7 or more times." Reliability in this sample was adequate for both victimization (α = .77) and perpetration (α = .71). Confirmatory factor analyses for both victimization (*CFI* = .976, *TLI* = .960, *RMSEA* = .038) and perpetration (*CFI* = .989, *TLI* = .979, *RMSEA* = .028) resulted in excellent model fit for this sample.

Analytic plan

We utilized LCA in Mplus version 7.4 [23] to address our first hypothesis. LCA is a technique that identifies groups of individuals within a sample using observed categorical data (in this study, alcohol/drug use variables). We fit models ranging from one to five classes and examined fit statistics to determine if the additional class improved model fit. We used negative two log likelihood (−2LL), Akaike Information Criteria, Bayesian Information Criteria, the sample size adjusted Bayesian Information Criteria, the Lo-Mendell-Rubin adjusted likelihood ratio test, and the bootstrapped likelihood ratio test to assess model fit.

To address our second and third hypotheses, we assessed *concurrent* associations (i.e., how does TDV/SV differ across class membership at Time 1) and *distal outcomes* (i.e., how does

TDV/SV at Time 2 differ across baseline class membership, controlling for Time 1). To assess concurrent associations, we extended our LCA model using latent class regression (multinominal logistic regression), which allows for examination of the direct relationship between SV/TDV with substance use profiles. To assess distal outcomes, we used the manual three-step auxiliary BCH approach [24] which uses a pseudo-class Wald chi-square test to assess mean differences between classes. This approach fixes the parameters of latent classes to ensure that the measurement of classes is not influenced by covariates.

All models controlled for sex (female reference), race/ethnicity (nonwhite =1), and age (centered on grand mean). Missing data ranged from 4% to 25% across the two waves. *Mplus* adjusts for missing data using a maximum likelihood estimator under the assumption that data are missing at random and uses all data available for each participant. We examined missing patterns by our covariates for all variables used in our models. Individuals who identified as female (x^2 = 9.34, df = 1, p =.002), nonwhite (x^2 = 8.09, df = 1, p = .002), and had higher SES (x^2 = 49.84, df = 1, p = .001) had more missing data on the sexual violence outcomes compared to their counterparts. Because females, individuals identifying as nonwhite, and individuals with higher family SES had more missing data, we included biological sex, SES, and race/ethnicity in our covariance matrix to aid in accounting for the missing data patterns when using the maximum likelihood estimator. Due to the moderate amount of missing data, coupled with the large sample size, and adjusting for potential bias due to missingness on various demographic and individual variables, we believe the data are missing at random.

Results

At time 1, approximately 34% of youth reported SV victimization and 7% reported SV perpetration. Among those who dated, 11% reported sexual, 25% reported physical/threatening, 12% reported relational, and 80% reported verbal TDV victimization, and 22% reported sexual, 18% reported physical/threatening, 9% reported relational, and 56% reported verbal TDV perpetration. Victimization and perpetration were significantly correlated across all TDV subscales at both time points (r = .34–.76). Approximately 59% of youth reported lifetime alcohol use, ¡20% reported current alcohol use, 10% reported current binge drinking, and 5% reported prescription drug misuse (Table 1).

Substance use LCA

Model fit indices for the LCA are presented in Table 2 and were used to test hypothesis one. Based on model fit indices and substantive analysis of the plotted profiles, we chose the three-class solution. Figure 1 presents the item probability plot of endorsing the four alcohol/drug use items across the three-class solution at Time 1. The resulting classes were labeled: low/no use, alcohol only, and alcohol and prescription drug misuse (APD). The low/no use class represented 41% (n = 772) of the sample; endorsement of items in this class were near zero (range = .007 – .000) for all items. The alcohol only class represented 45% (n = 908) of the sample; youth in this class had the highest probability of endorsing lifetime alcohol use (1.00), moderate current alcohol use (.26), and low current binge drinking (.01), while endorsement of the prescription drug misuse item was low (.03). The APD class

represented 14% (n = 195) of the sample; youth in this class had slightly lower (though comparable) alcohol use and substantively higher endorsement of prescription drug misuse (.37) compared to the low/no use and alcohol only classes.

Concurrent outcomes

To address hypothesis two, we used multinomial logistic regression to examine how SV/TDV differed by latent class membership at Time 1 (Table 3). Because we were interested in how prescription drug misuse in addition to alcohol may be associated with increases in victimization or perpetration, we set the alcohol only group as the reference. Results were consistent across nearly all victimization and perpetration variables. Specifically, for a unit increase in experiencing SV victimization and perpetration, we expected a 10% and 16% increase, respectively, in the odds of being in the APD class compared to the alcohol only class. Results were robust across subtypes of TDV victimization and perpetration (except relational TDV victimization) with youth higher in both victimization and perpetration more likely to be in the APD class compared to the alcohol only class (OR range = 1.10 – 1.46).[1]

Distal outcomes

Our third hypothesis examined whether SV/TDV at Time 2 varied across classes at baseline (Table 4). Below we present the chi-square comparison for mean level SV and TDV between classes. When a chi-square comparison is significant, results are parallel to the "Significant Differences" column in Table 4. For example, at Time 2, significant differences existed between youth in the APD and alcohol only classes for SV victimization ($x^2 = 7.94(1)$, $p = .01$) and perpetration ($x^2 = 12.0(1)$, $p = .01$). These chi-square values are akin to the Time 2 victimization and perpetration results which denote 1 (APD) > 2 (alcohol only). Interestingly, no differences were observed between the alcohol only and low/no use groups for SV perpetration ($x^2 = .689(1)$, $p = .40$). Youth in the APD class experienced significantly higher TDV victimization means compared to youth in the alcohol only class: physical/threatening ($x^2 = 5.76(1)$, $p = .02$), relational ($x^2 = 6.28(1)$, $p = .01$), verbal ($x^2 = 11.3(1)$, $p < .001$), and except for sexual TDV ($x^2 = 1.22(1)$, $p = .27$). Mean scores for the APD class were significantly higher across all TDV victimization outcomes compared to the low/no use class. Results varied slightly when assessing distal outcomes for TDV perpetration. Specifically, no significant differences existed between the APD class on sexual ($x^2 = 1.40(1)$, $p = .23$) or physical/threatening ($x^2 = 2.96(1)$, $p = .10$) perpetration compared to the alcohol use only class. However, youth in the APD class were more likely to engage in relational ($x^2 = 6.19(1)$, $p = .01$) and verbal ($x^2 = 5.80(1)$, $p < .001$) TDV perpetration compared to youth in the alcohol only class. Youth in the APD class were significantly higher on all TDV perpetration outcomes compared to the low/no use class.

[1]See supplemental materials for proportion of individuals within each class endorsing both concurrent and distal SV/TDV outcomes. Multi-group models were estimated to assess for sex differences. None were found, thus we include the more parsimonious model.

Discussion

This study adds to the growing literature on the complex relationship between SV/TDV and substance use, and the contribution of co-occurring alcohol and prescription drug misuse in understanding this association. Three latent classes of substance use emerged: low/no use; alcohol only use; and APD. As expected, misuse of prescription drugs was part of a combined APD class in which adolescents reported a history of using alcohol and misusing prescription drugs. As hypothesized, adolescents in this class were significantly more likely to experience SV/TDV victimization and perpetration compared to those in the alcohol only class. Prescription drug misuse combined with alcohol use was a significant risk factor for SV/TDV. That is, looking longitudinally, those in the APD class were more likely to perpetrate SV as well as relational and verbal TDV and report more experiences of physical/threatening, relational, and verbal TDV victimization compared to those in the alcohol only class 1 year later.

The misuse of prescription drugs in addition to alcohol may be associated with SV/TDV because these types of drugs tend to be used within adolescent peer and romantic relationships [25]. Further, because prescription drug misuse is less prevalent than alcohol use among adolescents [26], it may be more likely to occur within relationships characterized by other behaviors that have a negative impact on health, such as alcohol use, SV, and TDV. This is consistent with problem behavior theory which posits that health risk behaviors overlap [27]. It could also be that use of substances by one or both dating partners exacerbates feelings of anger and can lead to escalation of minor conflicts which results in increased fighting [16,28]. However, it is not immediately clear why APD predicted more relational and verbal TDV perpetration over time but not sexual or physical/threatening TDV perpetration when compared to alcohol only use, especially given that APD was an important predictor of SV not directly linked to dating relationships. It could be that some prescription drugs increase risk for certain types of violence when one is acutely under the influence, which we did not study here. This finding could also be explained by the low rates of sexual and physical TDV compared to other forms of TDV and the rates of SV among peers outside of a dating relationship.

This study found APD was a risk factor for some forms of SV/TDV victimization and perpetration longitudinally. Previous qualitative work may elucidate our findings, in which some youth with a history of violent dating relationships reported using substances at the start of the relationship to build confidence, during the relationship to manage violence, and afterward to cope with the break-up [28]. Substance use may be an outgrowth of the depression that often accompanies victimization [9], but it may also be used at the start of a dating relationship before violence begins, and/or during a violent relationship [15].

Several limitations should be noted. First, the sample was drawn from 1 Midwestern community which limits its generaliz-ability. Second, the substance use measures asked about different timeframes (lifetime vs. past month) and did not utilize the typical definition of binge drinking for women (e.g., four or more drinks). Third, although missingness was accounted for in analyses, missing data ranged from 4% to 25% across the two waves of data and may influence results if not truly missing at random. Finally, this study examined TDV

without information about the context of youths' dating relationships in which the violence occurred. Future research should examine how substance use varies as a function of other features of the relationship (e.g., length of relationship and presence of psychological aggression) as well as how perpetration and victimization overlap within dating couples.

Despite limitations, findings have implications for prevention of adolescent substance use, TDV, and SV. Findings suggest that prevention efforts would benefit from starting young, ideally before high school, and considering both the overlap of these problems and their association over time. While previous literature demonstrates the co-occurrence of substance use and SV/TDV victimization and perpetration in high school, the current study's findings found partial support for previous research done in this area and also showed that high school APD can predict SV/TDV victimization and perpetration 1 year later. This study suggests that any effort to prevent SV/TDV by addressing substance use and its impact on violence among adolescents would be wise to address both alcohol and prescription drug misuse, and particularly their use together.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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IMPLICATIONS AND CONTRIBUTION

Extends *cross-sectional* work with adolescents by treating substance use as a risk factor for both SV and TDV and by examining alcohol and prescription drug misuse *longitudinally* to predict these behaviors. Future research should assess the nature of these associations and prevention programs should incorporate prescription drug misuse messaging.

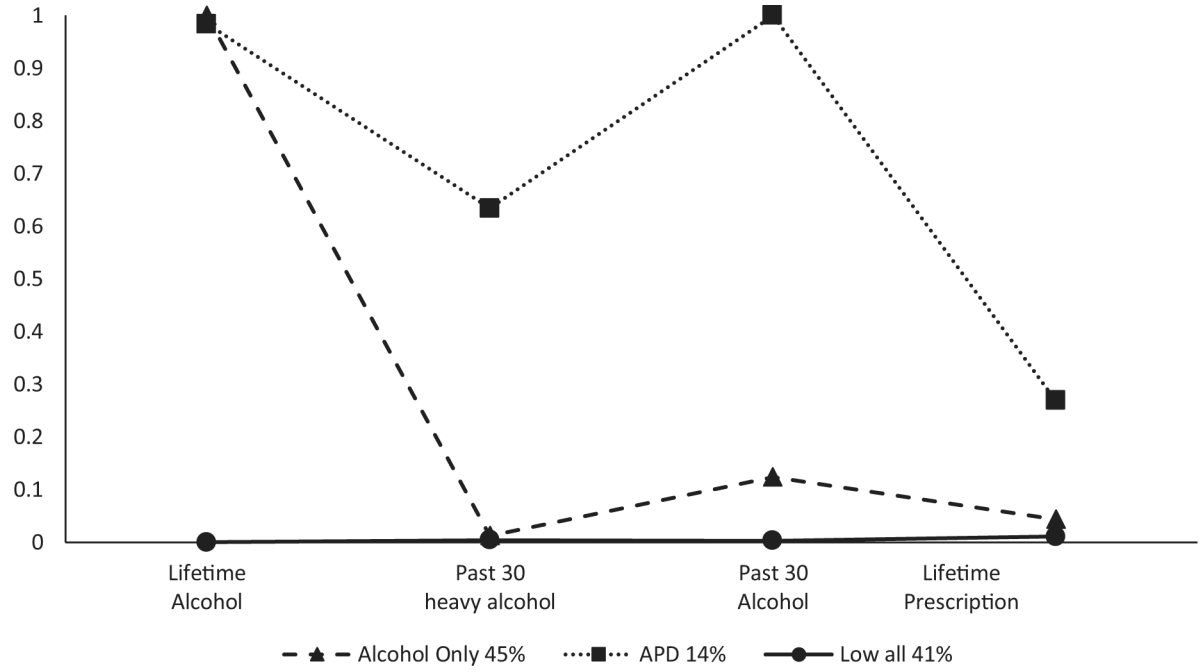

Figure 1.

Probabilities of Time 1 alcohol and prescription drug use item endorsement by class. Note: APD = alcohol and prescription drug use at Time 1.

Table 1.

Baseline characteristics

Variable	Mean (SD) or n%N = 1,875	Male n = 910	Female n = 965	χ^2	*t test*	*p*
Demographics						
Age	15.8(1.03)	15.9(1.04)	15.8(1.03)		1.72	.09
Female n(%)	953 (50.8)					
African-American n(%)	830(44.3)	384 (47.9)	446(51.6)	2.42		.12
White n(%)	546(29.1)	279 (35.0)	267 (30.9)	3.16		.08
Multi-race n(%)	311 (16.5)	154(16.9)	157(16.4)	.047		.83
Hispanic n(%)	135(7.2)	60 (7.5)	75 (8.7)	.738		.39
Asian/Pacific Islander n(%)	53 (2.8)	28 (3.5)	25 (2.9)	.515		.47
Alcohol and prescription use n(%)						
Life time alcohol use	1,093 (58.7)	511 (56.2)	582 (61.1)	4.52		.03
Current alcohol use	365(19.5)	221 (24.3)	233 (24.4)	.001		.98
Current binge drinking	177(9.5)	120(13.2)	107(11.2)	1.27		.26
Prescription drug misuse	90 (4.8)	52 (5.6)	38 (4.0)	.102		.75
Sexual violence victimization and perpetration						
Victimization	1.33 (2.13)	1.05(2.22)	1.57 (2.43)		−4.18	<.001
Perpetration	.371 (1.24)	.540(1.81)	.211 (.854)		4.32	<.001
Teen dating violence victimization*						
Sexual	.452(1.04)	.317(1.11)	.616(1.27)		−4.39	<.001
Physical/threatening	1.67(1.37)	.760(1.51)	.689(1.62)		.794	.43
Relational	.491 (1.03)	.689(1.62)	.536(1.26)		.675	.50
Verbal	5.35 (5.03)	4.92 (5.38)	6.27(6.01)		−4.16	<.001
Teen dating violence perpetration*						
Sexual	.184 (.602)	.252 (.820)	.132 (.527)		3.07	<.001
Physical/threatening	.500(1.17)	.210 (.718)	.802(1.70)		−7.88	<.001
Relational	.491 (1.03)	.147 (.644)	.189 (.670)		−1.14	.26
Verbal	3.77 (4.25)	2.66 (3.94)	5.21 (5.38)		−9.44	<.001

* Teen dating violence is among youth who reported dating (n = 1,512).

Table 2.

Model fit indices for latent class analysis

No. classes	−2 LL	AIC	BIC	aBIC	Entropy	LRT	*p*	BLRT	*p*
1 class	6870.17	6880.17	6907.85	6891.97					
2 class	5746.07	5768.07	5828.97	5794.02	0.914	1124.10	0.001	1099.78	0.001
3 class	**5245.02**	**5273.02**	**5350.53**	**5306.05**	**0.943**	**30.80**	**0.001**	**30.01**	**0.001**
4 class	5579.07	5625.07	5752.40	5679.33	0.954	45.46	0.001	45.46	0.001
5 class	5575.05	5633.05	5793.61	5701.48	0.898	4.01	0.131	3.93	0.137

Note: −2LL = negative 2 log likelihood; AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; aBIC = sample size adjusted Bayesian Information Criteria; BLRT = Bootstrapped log-likelihood ratio test; LMR = Lo-Mendell-Rubin test. Bold text is the solution selected.

Table 3.

Multinomial logistic regression model: odds of being in the APD or low/no use class compared to the alcohol only class

Variable	Alcohol & prescription AOR [95% CI]	Low/no use AOR [95% CI]
Sexual violence		
Victimization	**1.10 [1.02,1.15]**	**.868 [.818, .921]** *
Perpetration	**1.16 [1.05,1.27]** *	**.768 [.742, .954]** *
Teen dating violence: victimization		
Sexual	**1.33 [1.14,1.54]** *	**.809 [.711, .921]** *
Physical/threat	**1.29 [1.14,1.45]** *	**.796 [.718, .884]** *
Relational	1.00 [.889,1.13]	**.790 [.704, .887]**
Verbal	**1.10 [1.06,1.15]** *	**.937 [.9.16, .958]** *
Teen dating violence: perpetration		
Sexual	**1.46 [1.19,1.78]** *	**.756 [.590, .968]**
Physical/threat	**1.30 [1.12,1.50]** *	**.806 [.732, .887]** *
Relational	**1.31 [1.04,1.72]**	.804 [.645,1.00]
Verbal	**1.10 [1.05,1.16]** *	**.898 [.870, .927]** *

Note: all models controlled for sex, race, and age (not shown for clarity). Above, all odds ratios are in reference to the alcohol only class.

Bold indicates the confidence interval does not cover 1.

* indicates estimate was robust to a Bonferonni adjustment.

Table 4.

Mean (SE) differences and distal outcomes for sexual violence and teen dating violence by class[a]

Variable	Alcohol & prescription (1)	Alcohol only (2)	Low/no use (3)	Sig differences
Sexual violence				
Time 2				
Victimization	1.78 (.18)	1.23 (.08)	.852 (.06)	1 > 2,1 > 3*, 2 > 3*
Perpetration	.750 (.09)	.375 (.05)	.319 (.05)	1 > 2*, 1 > 3
Teen dating violence victimization				
Time 2				
Sexual	.640 (.09)	.531 (.05)	.401 (.04)	1 > 3,2 > 3*
Physical/threat	1.00 (.10)	.719 (.06)	.467 (.04)	1 > 2*, 1 > 3*, 2 > 3*
Relational	1.26 (.26)	.566 (.05)	.372 (.04)	1 > 2,1 > 3*, 2 > 3*
Verbal	7.70 (.44)	6.41 (.23)	4.07 (.18)	1 > 2*, 1 > 3*, 2 > 3*
Teen dating violence perpetration				
Time 2				
Sexual	.646 (.20)	.291 (.04)	.164 (.02)	1 > 3,2 > 3*
Physical/threat	.712 (.09)	.537 (.05)	.279 (.04)	1 > 3*, 2 >3*
Relational	.360 (.05)	.205 (.03)	.122 (.02)	1 > 2*, 1 > 3*, 2 > 3
Verbal	5.70 (.39)	4.67 (.19)	2.65 (.14)	1 > *2,1 > 3*,2 > 3*

Note: All models controlled for age, sex, race, and grade. Sig Differences = Equality tests of means across classes using the manual 3-step BCH procedure, posterior probability chi-square tests.

1 = Alcohol & prescription drug; 2 = Alcohol only; 3 = Low all.

To interpret the "significant differences" column one simply uses the class numeric labels (1, 2, and 3) to understand which class was significantly higher than another class. For example, 1 > 2 = APD is significantly higher than the Alcohol Only class, 1 > 3 indicates the APD class is significantly higher than the Low/No Use class, and 2 > 3 represents a situation where the Alcohol Only class is significantly higher than the Low/No Use class. The **absence** of a comparison indicates that no significant differences existed between those classes. Thus, in the column that would have "1 > 2, 1 > 3" this indicates that no differences were found between the Alcohol Only Class (2) and the Low/No use Class (3).

[a]Substance use was assessed at Time 1.

*indicates estimate was robust to a Bonferonni adjustment.