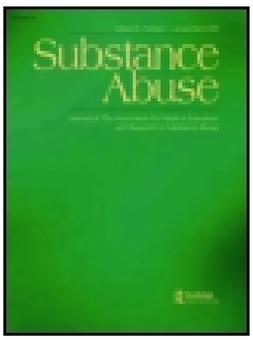

Substance Abuse

ISSN: 0889-7077 (Print) 1547-0164 (Online) Journal homepage: https://www.tandfonline.com/loi/wsub20

Marijuana use, alcohol use, and sexual intercourse among truant adolescents

Hannah R. Graves, Lynn Hernandez, Christopher W. Kahler & Anthony Spirito

To cite this article: Hannah R. Graves, Lynn Hernandez, Christopher W. Kahler & Anthony Spirito (2019): Marijuana use, alcohol use, and sexual intercourse among truant adolescents, Substance Abuse, DOI: 10.1080/08897077.2019.1621237

To link to this article: https://doi.org/10.1080/08897077.2019.1621237

Published online: 17 Jun 2019.

Submit your article to this journal

Article views: 25

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=wsub20

SUBSTANCE ABUSE
https://doi.org/10.1080/08897077.2019.1621237

Taylor & Francis
Taylor & Francis Group

REPORT

Check for updates

Marijuana use, alcohol use, and sexual intercourse among truant adolescents

Hannah R. Graves, ScM[a,b], Lynn Hernandez, Phd[a,b], Christopher W. Kahler, Phd[a,b], and Anthony Spirito, Phd[a,c]

[a]Center for Alcohol and Addiction Studies, Brown University School of Public Health, Providence, Rhode Island, USA; [b]Department of Behavioral and Social Sciences, Brown University School of Public Health, Providence, Rhode Island, USA; [c]Department of Psychiatry and Human Behavior, The Alpert Medical School of Brown University, Providence, Rhode Island, USA

ABSTRACT

Background: Adolescence is a time in development when many initiate problem behaviors, including alcohol use, marijuana use, and sexual intercourse. Although research has shown that these behaviors tend to co-occur, little is known about their daily co-occurrences, particularly among high-risk groups such as truant adolescents. This study investigated the influence of marijuana and alcohol use on the odds of engaging in sexual intercourse on a daily level among a sample of truant adolescents. *Methods:* Daily-level data from 76 at-risk, truant adolescents (46 male, 30 female) between the ages of 13 and 19 years who reported alcohol use, marijuana use, and sexual intercourse over a 90-day retrospective recall period were analyzed. *Results:* General estimating equations analyzing 6840 days and controlling for age, gender, and school days demonstrated that the use of marijuana and/or alcohol on a given day were associated with significantly increased odds of engaging in sexual intercourse on the same day. A significant interaction suggested that marijuana use on a given day increased the odds of engaging in sexual intercourse on that day among occasional marijuana users, yet not among frequent users. Additionally, a significant interaction suggested that frequent alcohol users had higher odds of engaging in sexual intercourse than those who used alcohol less frequently. *Conclusions:* This study suggests that experimenting with marijuana and alcohol increases truant adolescents' odds of also engaging in sexual intercourse. These results bridge the gap in the literature by investigating the daily-level associations and frequency of substance use and sexual intercourse among truant adolescents. This study demonstrates that among truant adolescents, substance use and sexual intercourse do not function independently; therefore, it is important to address the intersection between substance use and sexual behaviors during intervention development if sustained behavioral change is expected.

KEYWORDS
Adolescents; alcohol; cannabis; sexual intercourse; truancy

Introduction

School truancy is defined as a failure to attend and includes behaviors such as skipping classes and unexcused and tardies. School truancy may be a precursor to negative developmental trajectories.[1,2] For instance, in one study, 75% of chronically truant adolescents fail to graduate high school in comparison with only 3% of their counterparts.[3] Further, risk for substance use and early sexual activity are expected to be higher among this population given that truant youth, compared with their nontruant counterparts, spend more time unsupervised, have lower levels of parental monitoring,[4–7] and spend more time with deviant peers,[5,6,8,9] 3 well-supported risk factors for problem behavior.

Several studies demonstrate that substance use and sexual behaviors during adolescence often co-occur, and school truancy seems to increase the presence of these behaviors during adolescence. However, few studies have examined the co-occurrence between alcohol use, marijuana use, and sexual intercourse, and even fewer have explored daily patterns of this co-occurrence. Thus, the aim of the current study was to examine (1) the daily co-occurrence of alcohol and marijuana use among a sample of truant adolescents and (2) whether the use of alcohol and/or marijuana increased the odds of engaging in sexual intercourse on a given day.

Methods

Participants and procedure

The sample included 76 adolescents (30 female) with a mean age of 15.79 years (see Table 1 for demographics). Participants were recruited between September 2010 and April 2013 as part of a pilot randomized controlled trial that examined the preliminary efficacy of an adolescent and parent motivational enhancement intervention for truant adolescents' engaging in marijuana use and related problem behaviors.[10] This study was reviewed and approved by the university's institutional review board, and only baseline

CONTACT Hannah Graves Hannah_Graves@Brown.edu Center for Alcohol and Addiction Studies, Brown University School of Public Health, Box G-BH, Providence, RI 02912, USA.
This article has been republished with minor changes. These changes do not impact the academic content of the article.
© 2019 Taylor & Francis Group, LLC

Table 1. Participant characteristics and frequencies of problem behaviors.

	Participant characteristics ($n = 76$)		Daily frequencies (days = 6840)	
Variable	*n*	%	Days	%[a]
Age				
13–14 years	13	17.11		
15–16 years	41	53.95		
17–19 years	22	28.95		
Sex				
Male	46	60.53		
Female	30	39.47		
Race/ethnicity				
White (non-Hispanic)	34	44.74		
White (Hispanic)	11	14.47		
Black (non-Hispanic)	12	15.79		
Black (Hispanic)	5	6.58		
Multiracial (non-Hispanic)	7	9.21		
Multiracial (Hispanic)	9	11.84		
Year in school				
7th–8th	4	5.26		
9th	23	30.26		
10th	21	27.63		
11th	13	17.11		
12th	15	19.74		
Truancy				
Unexcused absences	58	76.32		
Skipped classes	32	42.11		
Tardies	54	71.05		
Substance use				
Marijuana use	76	100.00	3135	45.83
Alcohol use	63	82.89	517	7.56
Heavy drinking (5 or more standard drinks)	43	56.58	269	3.93
Sexual intercourse				
Vaginal and/or anal intercourse	49	64.47	405	5.92
Co-occurring problem behaviors				
Marijuana and alcohol use	63	82.89	349	5.10
Alcohol and sexual intercourse	43	56.58	66	0.96
Marijuana and sexual intercourse	49	64.47	246	3.60
Alcohol, marijuana, and sexual intercourse	43	56.58	55	0.80

Note. Data were collected from the demographic questionnaire and the Timeline Follow-Back.
[a]Daily percentages are based on 6840 total days analyzed.

data collected prior to randomization and intervention delivery were used for the current study.

Participants were recruited from the community, including local high schools and family and truancy courts, as well as through advertisements or referrals. To be eligible to participate, adolescents must have (1) been between the ages of 13 and 19 years; (2) been living at home with a parent/legal guardian; (3) used marijuana at least 3 times in the past 90 days; and (4) engaged in school truancy in the past school year, defined as skipping classes, unexcused absences, unexcused tardies, and/or involvement in truancy court, a family court program designed to reduce truancy rates by monitoring attendance, academic performance, and behavioral issues.

Once parental consent and adolescent assent/consent were obtained, a research assistant administered a baseline assessment to the adolescent, which took about 30 to 40 minutes.

Measures

Timeline Follow-Back (TLFB).[11,12] Alcohol use, marijuana use, truancy, and sexual intercourse were assessed using the TLFB's calendar format, with temporal cues (i.e., holidays and special occasions) to assist in recall of days when adolescents engaged in these behaviors. Alcohol use was recorded as the number of standard drinks adolescents consumed on each day. Marijuana use was recorded as yes or no on each day, as has been done in previous studies due to difficulty assessing quantity of use per occasion.[13,14] The TLFB tracked the number of sexual intercourse instances per day, and whether it was unprotected or protected. Finally, truancy was recorded as yes or no on each day.

Data analysis

All analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC). First, frequency of truancy, alcohol use, marijuana use, and sexual intercourse across the 90-day period were examined. Second, generalized estimating equations (GEEs) with a logit link function were conducted to test the hypothesis that alcohol and marijuana use (both dichotomized) on a given day would be associated with increased odds of engaging in sexual intercourse on that day. A model examining whether both use of alcohol and use of marijuana on a given day were associated with increased odds of engaging in sexual intercourse on that day was also evaluated. An autoregressive correlation structure was used for all models, as it provided superior fit for most. All models

Table 2. Generalized estimating equations for marijuana and alcohol use predicting sexual intercourse.

Variable	*B*	SE *B*	OR (95% CI)	*P*
Main effects				
Frequency of sexual intercourse	0.10	0.01	1.11 (1.09, 1.12)	<.0001
Frequency of marijuana use	−0.01	0.003	0.99 (0.99, 0.998)	.01
Frequency of alcohol use	0.01	0.01	1.01 (0.99, 1.04)	.22
Time-varying marijuana use	0.60	0.19	1.81 (1.24, 2.66)	.002
Time-varying alcohol use	0.96	0.35	2.62 (1.33, 5.17)	.01
Time	0.004	0.01	1.00 (0.99, 1.02)	.54
Interaction effects				
Frequency of marijuana use	−0.001	0.003	0.999 (0.99, 1.01)	.78
Frequency of alcohol use	0.03	0.01	1.03 (1.01, 1.06)	.01
Time-varying marijuana use	1.03	0.27	2.80 (1.65, 4.76)	.0001
Time-varying alcohol use	1.82	0.39	6.19 (2.89, 13.26)	<.0001
Frequency of marijuana use by time-varying marijuana use	−0.01	0.004	0.99 (0.98, 0.998)	.01
Frequency of alcohol use by time-varying alcohol use	−0.06	0.02	0.94 (0.90, 0.98)	.01
Time	0.004	0.01	1.00 (0.99, 1.02)	.49

Note. Data were collected from the Timeline Follow-Back, and the model controlled for adolescent age, gender, and school days. Time was coded as day on which the use occurred during the 90-day period, ranging from 1 to 90.

controlled for age, biological gender, and school days versus non-school days.

Models also included percent days of alcohol use, marijuana use, and sexual intercourse as covariates to control for between-subject differences in absolute levels of problem behavior engagement. These models allowed us to isolate more clearly the effect of substance use on a given day. Interactions between marijuana use on a given day and frequency of marijuana use, as well as the interaction between alcohol use on a given day and the frequency of alcohol use during the 90-day period, were also tested. Significant interactions were interpreted according to procedures established by Aiken and West.[15]

Results

Frequencies of problem behaviors occurring in the 6840 days analyzed in this study are summarized at the bottom of Table 1. Analyses examining the co-occurrence of substance use and sexual intercourse revealed that (1) use of marijuana and alcohol co-occurred on the same day in 82.89% of participants; (2) marijuana and sexual intercourse co-occurred on the same day in 64.47% of adolescents; and (3) alcohol co-occurred with sexual intercourse in 56.58% of adolescents. Occurrence of all 3 behaviors on the same day also occurred in 56.58% of adolescents. Additionally, unprotected sexual intercourse occurred among 39.47% of adolescents.

Marijuana use, alcohol use, and sexual intercourse

Preliminary GEE models with age, gender, and school days predicting each of the problem behavior variables revealed that age significantly predicted sexual intercourse (odds ratio [OR] = 1.52, $P < .001$) and unprotected sexual intercourse (OR = 1.63, $P = .002$). Additionally, non-school days significantly predicted sexual intercourse (OR = 1.37, $P = .03$), unprotected sexual intercourse (OR = 1.52, $P = .0485$), alcohol use (OR = 2.45, $P < .0001$), and marijuana use (OR = 1.18, $P = .0498$). All other models were nonsignificant.

Follow-up GEE models were conducted to investigate the interactions between frequency and use of alcohol and marijuana on a given day (see Table 2). The main effect model demonstrated that alcohol use significantly increased the odds of engaging in sexual intercourse on the same day, OR = 2.62, $P = .01$. There was a significant interaction between frequency of alcohol use in the 90-day period and alcohol use on a given day, $P = .01$, indicating that the association between alcohol use and sex on a given day was moderated by how often one drank during the 90-day period. Among those who used alcohol occasionally (1 standard deviation below the mean), alcohol use on a given day was associated with almost 7 times higher odds of also engaging in sexual intercourse on the same day, $B = 1.91$, SE = 0.41, OR = 6.76, 95% confidence interval (CI): [3.02, 15.13], $P < .0001$. Among frequent alcohol users (1 standard deviation above the mean), alcohol use on a given day was associated with 2 times higher odds of engaging in sexual intercourse on the same day, $B = 0.80$, SE = 0.32, OR = 2.23, 95% CI: [1.19, 4.21], $P = .01$.

Marijuana use increased the odds of engaging in sexual intercourse on the same day by almost 2-fold, OR = 1.81, $P = .002$. There was a significant interaction between the frequency of individual marijuana use during the 90-day period and marijuana use on a given day, $P = .01$. Among occasional marijuana users (1 standard deviation below the mean), marijuana use on a given day was associated with two and a half times higher odds of engaging in sexual intercourse on the same day, $B = 0.91$, SE = 0.24, OR = 2.49, 95% CI: [1.57, 3.96], $P = .0001$. However, among those who used marijuana frequently (1 standard deviation above the mean), marijuana use on a given day was not significantly predictive of also engaging in sexual intercourse on the same day, $B = 0.08$, SE = 0.24, OR = 1.09, 95% CI: [0.68, 1.75], $P = .73$. The association of these variables in the interaction model remained constant over the 90-day period, $P = .49$.

Analyses were also conducted excluding participants who were not sexually active in the 90-day period. Results among the sexually active sample were stronger, yet in the same direction as those reported above. However, due to the relatively low number of participants ($n = 49$, 4410 observations) who were included in this model, we only focus on results for the overall sample.

Table 3. Generalized estimating equations for marijuana and alcohol use predicting unprotected sexual intercourse.

Variable	*B*	SE *B*	OR (95% CI)	*P*
Main effects				
Frequency of sexual intercourse	0.11	0.01	1.11 (1.09, 1.13)	<.0001
Frequency of marijuana use	−0.02	0.01	0.98 (0.96, 0.99)	<.0001
Frequency of alcohol use	0.05	0.03	1.05 (0.98, 1.12)	.15
Marijuana use on a given day	0.72	0.28	2.06 (1.19, 3.58)	.01
Alcohol use on a given day	0.60	0.42	1.82 (0.80, 4.12)	.15
Time	0.001	0.01	1.00 (0.98, 1.02)	.96

Note. Data were collected from the Timeline Follow-Back, and the model controlled for adolescent age, gender, and school days. Time was coded as day on which the use occurred during the 90-day period, ranging from 1 to 90.

Analyses were also conducted examining the odds of engaging in unprotected sexual intercourse on a given day. Unlike the results for any sexual intercourse, alcohol use did not predict unprotected sex on a given day ($P = .15$), nor did alcohol use frequency during the 90-day period ($P = .15$). However, marijuana use on a given day significantly increased the odds of engaging in unprotected sexual intercourse on the same day, $B = 0.72$, SE = 0.28, OR = 2.05, 95% CI: [1.19, 3.58], $P = .01$. Yet, frequency of individual marijuana use during the 90-day period significantly decreased the odds of engaging in unprotected sexual intercourse on the same day, OR = 0.98, $P < .0001$. Results remained constant over the 90-day period, $P = .96$ (see Table 3). Moreover, there were no interactions between frequency of use in the 90-day period and use on a given day for either alcohol or marijuana.

Discussion

The majority of truant participants, about 8 out of 10, reported they used both marijuana and alcohol. Further, marijuana and sexual intercourse co-occurred in about two thirds of adolescents, and alcohol co-occurred with sexual intercourse in a little over half of the adolescents. Occurrence of all 3 behaviors on the same day also occurred in about half of the adolescents. Interestingly, the results also indicated that these behaviors seem to occur over the weekend rather than on days when adolescents were truant from school. Results supported all of the substance use hypotheses, indicating that both alcohol and marijuana significantly increase the odds of engaging in sexual intercourse on the same day. However, analyses revealed that these associations varied by frequency of use.

Our analysis indicated that only marijuana use significantly increased the odds of engaging in unprotected sexual intercourse on the same day. However, it is important to note that our results may have been influenced by the number of adolescents who reported engaging in drinking versus marijuana use, and the even smaller number who reported engaging in unprotected sexual intercourse ($n = 30$, 178 observations).

Despite the small sample size in the current study and the limitations in collecting recall data, there are important implications that can inform future directions. With discussions regarding the legalization of marijuana use on the rise, the results of this study highlight the importance of future research distinguishing between risks among those who use occasionally versus those who use frequently. More importantly, as has been shown before,[5] the results demonstrate that problem behaviors do not occur independently and highlight the importance of examining the underlying role other problem behaviors play in sustaining the problem behavior of concern. These findings also suggest that truant adolescents exhibiting any one of these problem behaviors may be at an increased risk for escalating and engaging in the other problem behaviors. Although our study was not able to examine the temporal ordering of the problem behaviors on a given day, such analysis would be important for the development of prevention programs. Alternatively, examining whether targeting any one of these behaviors in a preventative intervention with truant adolescents reduces the occurrence of other related behaviors is also worth exploring in future studies.

Author contributions

Ms. Graves' and Dr. Hernandez's contributions include research conception and design, data collection, analyses, interpretation of the results, writing, and revision. Dr. Kahler's contributions include supervision of analyses, interpretation of the results, and writing. Dr. Spirito's contributions to the work include research conception and design, supervision of data collection, interpretation of the results, writing, and revision.

Funding

This work was supported by the National Institute on Drug Abuse (R34 DA029871), National Institute on Alcohol Abuse and Alcoholism (K01 AA021081), and National Institute on Alcohol Abuse and Alcoholism (P01 AA019072). The funding organizations had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

References

[1] Garry EM. Truancy: first step to a lifetime of problems. *OJJDP: Juvenile Justice Bulletin*. 1996:1–7.
[2] Baker ML, Sigmon JN, Nugent ME. Truancy reduction: keeping students in school. *Bulletin of the OJJDP*. 2001:1–15.
[3] Barry AE, Chaney B, Chaney JD. The impact of truant and alcohol-related behavior on educational aspirations: a study of US high school seniors. *J Sch Health*. 2011;81(8):485–492.
[4] Henry KL. Who's skipping school: characteristics of truants in 8th and 10th grade. *J Sch Health*. 2007;77(1):29–35.

[5] Henry KL, Thornberry KL. Truancy and escalation of substance use during adolescence. *J Stud Alcohol Drugs.* 2010;71(1): 115–124.
[6] Henry KL, Thornberry TP, Huizinga DH. A discrete-time survival analysis of the relationship between truancy and the onset of marijuana use. *J Stud Alcohol Drugs.* 2009;70(1):5–15.
[7] Maynard BR, Salas-Wright CP, Vaughn MG, Peters KE. Who are truant youth? Examining distinctive profiles of truant youth using latent profile analysis. *J Youth Adolescence.* 2012;41(12): 1671–1648.
[8] Somers CL, Gizzi TJ. Predicting adolescents' risky behaviors: the influence of future orientatin, school involvement, and school attachment. *Adolesc Fam Health.* 2001;2(1):3–11.
[9] Houck CD, Hadley W, Tolou-Shams M, Brown L. Truancy is associated with sexual risk among early adolescents. *J Dev Behav Pediatr.* 2012;33(9):728–731.
[10] Spirito A, Hernandez L, Cancilliere MK, et al. Parent and adolescent motivational enhancement intervention for substance-using, truant adolescents: a pilot randomized trial. *J Clin Child Adolesc Psychol.* 2017;47(Suppl. 1):1–13.
[11] Sobell LC, Sobell MB. Timeline Follow-back: a technique for assessing self-reported ethanol consumption. In: Allen J, Litten RZ, eds. *Measuring Alcohol Consumption: Psychosocial and Biological Methods* Totowa, NJ: Humana Press; 1992:41–72.
[12] Sobell LC, Sobell MB. *Alcohol Timeline Followback (TLFB) Users' Manual.* Toronto: Addiction Research Foundation; 1996.
[13] Shrier LA, Walls C, Lops C, Kendalla AD, Blood EA. Substance use, sexual intercourse, and condom nonuse among depressed adolescents and young adults. *J Adolesc Health.* 2012;50(3): 264–270.
[14] Hendershot CS, Magnan RE, Bryan AD. Associations of marijuana use and sex-related marijuana expectancies with HIV/STD risk behavior in high-risk adolescents. *Psychol Addict Behav.* 2010;24(3):404–414.
[15] Aiken LS, West SG. *Multiple Regression: Testing and Interpreting Interactions.* Newbury Park: Sage; 1991.