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Alcohol, Tobacco, and Marijuana Use during the Initial Transition to College

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Abstract

Objectives: This study aimed to better examine substance use among college students during the acute period of transition between high school and college.

Methods: One week before coming to campus, participants completed an online survey assessing their alcohol, tobacco, and marijuana use. Next, beginning on the first Friday of the semester, they completed a 10-day experience sampling (ES) protocol, receiving one app-based survey each morning assessing recent substance use.

Results: Among students who used any tobacco product prior to college, 70% or more reported alcohol use during ES. Among previous marijuana users, 85.7% reported alcohol use during ES. Baseline alcohol and tobacco use were not associated with subsequent marijuana use.

Conclusions: Substance use prevention should target the transition to college.

Keywords

substance use; college students

The substance use of college students is a well-documented health concern. Estimates are that 1,825 college students die each year from alcohol-related accidents, around 600,000 are injured as a result of alcohol use, and 97,000 are the victims of an alcohol-related rape or sexual assault.¹ One large study of college freshmen found that around 20% of males and 10% of females were consuming alcohol at levels that were twice the binge threshold.²

Beyond alcohol, cigarette smoking generally begins during adolescence or young adulthood and remains the leading preventable cause of morbidity and mortality in the U.S.³ Although cigarette smoking is more prevalent among those without (vs. with) a college education,

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attending college nevertheless creates a window of vulnerability: smokers with a college education often report that they initiated or progressed in their smoking during college.⁴ There has also been a recent rise in the use of other tobacco products—especially hookah and e-cigarettes—among college students.⁵ Finally, marijuana use among college students is currently higher than it has been in decades, with ever-use around 51% and past-30-day use around 22%.⁶ Yet it is likely that much of this use began while students were still in high school, as 37% of U.S. 12th graders report using marijuana within the past year.⁷

Exacerbating the health and academic impact of college students' alcohol, tobacco, and marijuana use is the fact that there is often a strong association among the behaviors. For example, past research has determined a strong positive relationship between college students' alcohol and tobacco use.⁸ In one recent study, 75% of the cigarette smokers examined were also heavy drinkers.⁹ In terms of marijuana use, cluster analyses indicate that most students who use marijuana also use tobacco and alcohol—although many students using tobacco and/or alcohol do not use marijuana.¹⁰

Given the concerns about college student substance use, numerous studies have examined use during the transition period from high school to college. The vast majority of these studies focus on use during the entire freshmen year or the first semester; limited research specifically looks at the substance use of college freshmen immediately following their arrival to campus. Nevertheless, students entering the freedom of a college environment are immediately vulnerable to substance use. Thus, given the apparent vulnerability of students during their first few weeks of college, examining substance use during this acute period is critical for better understanding how health-risk behaviors transpire.

The purpose of the current study was to better examine the substance use of college students during their transition between high school and college. The current study was well-designed to capture this transition period. Specifically, the methodology comprised a baseline survey that assessed the behaviors of incoming freshmen students prior to their arrival on campus, followed by an experience sampling (ES) procedure that conducted daily assessments of substance use during some of their first days on campus. This ES procedure, which allowed for frequent collection of data as students went about their lives, was implemented in order to increase external validity and reduce recall error. Our first hypothesis was that, during the college transition, we would see associations among the use of various products (eg, the use of alcohol before college would be associated with the use of tobacco at the start of college). Given the substantial evidence that past behavior is frequently the best predictor of future behavior,²⁰ our second hypothesis was that, during the college transition, past use of a product would strongly predict subsequent use of that same product (eg, use of alcohol before college would be associated with the use of alcohol at the start of college)..

METHODS

Participants and Recruitment

The present study drew participants from a larger parent study that was following a randomly-selected cohort of college students (student email addresses were provided by the

University's Registrar Office). At the time of their enrollment into this larger parent study, all participants were incoming college freshmen at a large Midwestern University. The subset of participants for the current study was selected based on the characteristics and behaviors reported in their cohort surveys. Specifically, a random sample of never-tobacco users, ever-tobacco users, and susceptible users (ie, those who indicated an interest in using tobacco in the future), stratified on gender, were contacted at the start of the autumn 2017 semester and invited to enroll in an additional study about the day-to-day health behaviors of college students. An additional eligibility requirement was that participants needed to own a smartphone; no students were found to be ineligible based on this criterion. Eighty-one students enrolled in the ES protocol (described below). Data were excluded from those who completed less than 50% of their assigned ES surveys ($n = 11$), yielding a sample of 70 students for analyses.

Procedures

For the main cohort project, participants completed an online survey assessing various health-related attitudes and behaviors as well as demographic characteristics. The link to complete this survey was emailed to participants one week before campus move-in day (and 9 days before the start of the autumn semester) in order to establish students' behaviors prior to their arrival on campus.

For the ES portion of the study, students first completed a group-based, in-person training session that obtained written informed consent for the ES study and explained how to use the ES app. The app, PiLR EMA (MEI Research, Edina, MN, USA), was refined specifically for this study and was downloaded for free by students onto their own smartphones. The compensation structure was also explained during this training session: Participants received \$40 for enrolling in the ES study and an additional \$2.00 for every completed survey.

The subsequent ES reporting period began on the first Friday morning of the academic semester and ended 10 days later on a Sunday. During this period, participants were prompted to complete one brief survey each morning, in response to a phone prompt (similar to a text message notification) that alerted them at a random time between 10am and noon when a new survey was available. The surveys were available for a 2-hour window; surveys not completed within that window were counted as missing. After completion of the ES portion of the study, students met with research staff to receive compensation (which was contingent on the number of surveys completed).

Measures

The baseline survey assessed alcohol use with the following question: "During the past 30 days, on how many days did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?" Responses to this item were dichotomized to reflect any vs. no past-30-day use. For tobacco, ever-use and past-30-day use (*yes, no*) were assessed for the following items: cigarettes, cigars, cigarillos, hookah, e-cigarettes, and smokeless tobacco. Participants likewise reported ever- and past-30-day use of marijuana. Age, gender, and race/ethnicity were also assessed at baseline.

For the ES surveys, participants were asked each morning “Did you have any of the following yesterday or last night?” Response options included restaurant food, as well alcohol, marijuana, and the same tobacco products assessed at baseline. In the interest of keeping the ES surveys extremely brief (and thereby increase response rates), multi-item scales were not used. So that the focus of the survey was not wholly on substance use, participants were also asked questions about where they had gone (eg, the library, a dining hall), how many hours they had slept the night before, and whether they had missed any classes.

Analyses

We first ran descriptive analyses to characterize the sample and examine the prevalence of students’ substance use at baseline (i.e., immediately prior to college) and during the ES period (i.e., during the first few weeks of college). Next, to assess cross-product use, we determined the prevalence of substance use during the ES period among those who had reported the use of various substances at baseline. Finally, we conducted univariate and multivariable logistic regressions to test whether the use of alcohol, marijuana, and tobacco at baseline could predict substance use during the ES period.

RESULTS

Sample Characteristics

The average age for this college freshmen sample was 18.6 years (SD = 1.0). The sample was 54% female, 79% non-Hispanic White, 11% Asian, 4% non-Hispanic Black, 4% mixed race/ethnicity, and <2% other race/ethnicity.

Alcohol was the most commonly-reported substance, with 54% of students reporting past-30-day use at baseline and 43% reporting use during the 10-day ES period (see Table 1). Marijuana was also a commonly-used substance, with 31% of students reporting ever-use at baseline and 9% reporting use during the ES period. Cigarettes and cigars/cigarillos were likewise commonly-reported products at baseline, yet no students reported use during the ES period.

Does Previous Behavior Predict Early College Use?

Table 2 provides some evidence of cross-product use between tobacco and alcohol. Specifically, among the students who reported past-30-day use of a tobacco product at baseline, 70% or more reported use of alcohol during the ES period. The same finding did not appear between tobacco and marijuana use, or between alcohol and marijuana use. For example, among the 38 participants who reported past-30-day alcohol use at baseline, only 5 (13%) reported marijuana during the ES period. Yet whereas previous alcohol use did not appear to be associated with marijuana use during the ES period, there was some evidence of the reverse relationship: among previous marijuana users, the majority (85.7%) reported alcohol use during the ES period. Importantly, 13.8% of students who reported no use of any products at baseline reported alcohol use during the ES period.

Table 2 also provides some indication that past use of a product is associated with subsequent use of that same product. In particular, among those who reported past-30-day use of alcohol at baseline, 65.8% reported alcohol use during the ES period. Similarly, among those who reported past-30-day use of marijuana at baseline, 43% used marijuana during the ES period.

Only alcohol and marijuana were used with enough frequency during the ES period to use as dependent variables in inferential statistics. Univariate logistic regressions showed that several factors assessed at baseline were predictive of alcohol and marijuana use during the ES period. However, when these factors were included in multivariable logistic regressions that also controlled for age, gender, and race/ethnicity, only one factor remained significant in each model: A lack of past-30-day alcohol use predicted a lower likelihood of ES alcohol use (OR = 0.08, 95% CI, 0.017–0.398, $p = .002$) and a lack of past-30-day marijuana use predicted a lower likelihood of ES marijuana use (OR = 0.3, 95% CI, 0.003–0.379, $p = .006$).

DISCUSSION

This study examined the alcohol, tobacco, and marijuana use that occurs during the transition period at college. Consistent with our first hypothesis, we found a strong relation between alcohol and tobacco use. Specifically, among the students who had recently used a tobacco product prior to college, 70% or more reported use of alcohol during the ES period. In support of our second hypothesis, we found that previous use of one substance was associated with the subsequent use of that substance during the ES period. Specifically, previous use of alcohol prior to college had a significant impact on alcohol use within the first few weeks on campus. Additionally, previous marijuana use also had a significant impact on marijuana use within the first few weeks on campus. Nearly 14% of students who reported no use of any products at baseline reported alcohol use during the ES period. Overall, these findings are consistent with theory arguing that the greater freedom of college encourages substance use behaviors.^{11,12}

We did not observe any cigarette use during the ES period. As intermittent cigarette use is common among college students,²¹ it is possible that our 10-day ES period was not long enough to capture students' smoking behavior. It is also important to note that this study was conducted at University with a tobacco-free campus policy. Thus, the low rate of students' tobacco use once on campus may reflect the policy's success at shaping tobacco-related social norms.

Study limitations include the small sample size; although we were adequately powered to analyze findings pertaining to alcohol and marijuana, the number of participants reporting certain behaviors (eg, smokeless tobacco use) was too low for conducting inferential statistics. Likewise, the incidence of less-prevalent behaviors (eg, hookah and e-cigarette use) would likely have been captured with a larger sample, or with a longer ES period (comparing a 30-day baseline period to a 10-day ES period is challenging). Future studies should consider drawing on the present ES design while using larger samples and more

frequent assessments, in order to answer valuable questions about the risk and protective factors involved with substance use and cross-product use.

Despite these limitations, this study is among the few to examine substance use in the acute transition period between high school and college. This study was also strengthened by its design, which included an assessment prior to students' entry into college, as well as ES during the first few days on campus. ES in particular provided a unique advantage to data collection, as it allowed for close-to-real-time data collection during freshmen's first days on campus. With larger samples, this design could be used to better assess risk and protective factors for substance use during entry into college. Likewise, the method could be harnessed for intervention development and assessment.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

The transition period between high school and college is a unique time period, which appears to have a significant impact on health behaviors in college.^{2,15-17} Our findings suggest that previous substance use prior to the arrival at college has an impact on the continued participation of that behavior once in college. This outcome is a concern given the immediate negative health and academic outcomes of substance use, as well as the increased likelihood of addiction that comes with repeated use. The cross-product use evidenced within the sample present a further concern, as previous research suggests that the use of several substances (eg, both tobacco and marijuana use) can have additive negative health effects.²² Overall, the results of this study have several implications for practice and policy:

- Our findings underscore the importance of preventive interventions among college students as well as health policies to reduce the risks-conducive factors of the college environment. Although some programs show promise,^{23,24} more evidence-based approaches to campus substance use prevention are needed and require better dissemination. This will be particularly important for addressing binge drinking among college students—a health objective identified in Healthy People 2020.²⁵
- The present results provide some support for the effectiveness of tobacco-free campus policies, an outcome which is likewise targeted by Healthy People 2020. Specifically, one objective of Healthy People 2020 is for all 50 states and D.C. to establish laws prohibiting smoking on college campuses.²⁵ This is an area greatly in need of improvement, as only four states currently prohibit smoking on public college campuses, and only one extends the law to private colleges.²⁶
- As e-cigarettes continue gaining popularity with young people,²⁷ researchers and public health practitioners will need to enhance their efforts at monitoring and enforcing campus tobacco-free policies.

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Table 1.

Prevalence of Use: Percent of students reporting ever- and past-30-day substance use at baseline (pre-college) and during the experience sampling (ES) period (within the first month of college).

Substance	Ever-Use at Baseline	Past-30-Day Use at Baseline	Any Use During ES
Alcohol	-	54.3%	42.9%
Cigarette	20.0%	14.3%	0.0%
Marijuana	31.4%	10.0%	8.6%
Cigars or Cigarillos	15.7%	5.7%	0.0%
Hookah	11.4%	1.4%	0.0%
E-Cigarettes	10.0%	2.9%	1.4%
Smokeless Tobacco	5.7%	1.4%	0.0%

Note: Ever-use of alcohol was not assessed at baseline.

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Table 2.

Percent of students reporting use during the experience sampling (ES) period among those reporting past-30-day use of a substance baseline. Odds ratios were not calculated for all associations due to low sample sizes.

Baseline Past-30-Day Use	Any Use During ES	
	Alcohol	Marijuana
Alcohol (n = 38)	65.8%	13.2%
Cigarette (n = 10)	70.0%	10.0%
Marijuana (n = 7)	85.7%	42.9%
Cigars or Cigarillos (n = 4)	100.0%	0.0%
Hookah (n = 1)	100.0%	0.0%
E-Cigarettes (n = 2)	100.0%	0.0%
Smokeless Tobacco (n = 1)	100.0%	0.0%
Both Alcohol and Any Tobacco (n=11)	90.0%	0.0%
Both Marijuana and Any Tobacco (N=4)	100.0%	0.0%
Both Marijuana and Alcohol (n=7)	85.7%	42.9%
Alcohol, Tobacco, and Marijuana (n=4)	100.0%	0.0%
No Alcohol (n = 32)	15.6%	3.1%
No Marijuana (n = 63)	38.1%	4.8%
No Tobacco (n = 56)	33.9%	8.9%
No products (n = 29)	13.8%	0.0%

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