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Prevalence of Illicit Use and Abuse of Prescription Stimulants, Alcohol, and Other Drugs Among College Students: Relationship with Age at Initiation of Prescription Stimulants

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Abstract

Study Objective—To examine associations between age at initiation of prescription stimulants and illicit use and abuse of prescription stimulants, alcohol, and other drugs among college students in the United States.

Design—Web-based survey of college students.

Setting—A large (full-time undergraduate population > 20,000) university.

Intervention—A Web-based survey was sent to a random sample of 5389 undergraduate college students plus an additional 1530 undergraduate college students of various ethnic backgrounds over a 2-month period.

Measurements and Main Results—Alcohol abuse was assessed by including a modified version of the Cut Down, Annoyance, Guilt, Eye-opener (CAGE) instrument. Drug use–related problems were assessed with a slightly modified version of the Drug Abuse Screening Test, short form (DAST-10). The final sample consisted of 4580 undergraduate students (66% response rate). For the analyses, five subgroups were created based on age at initiation of prescription stimulant use: no prescription stimulant use, grades kindergarten (K)–4, grades 5–8, grades 9–12, and college. Undergraduate students to whom stimulants were prescribed in grades K–4 reported similar rates of alcohol and other drug use compared with that of the group that had no prescription stimulant use. For example, students who started prescription stimulants in grades K–4 were no more likely to report coingestion of alcohol and illicit prescription stimulants (odds ratio [OR] 1.4, 95% confidence interval [CI] 0.2–11.5, NS] than the group that had no prescription stimulant use. However, undergraduate students whose prescription stimulant use began in college had significantly higher rates of alcohol and other drug use. For example, students who started a prescription stimulant in college were almost 4 times as likely (OR 3.7, 95% CI 1.9–7.1, $p < 0.001$) to report at least three positive indicators of drug abuse on the DAST-10 compared with the group that had no prescription stimulant use.

Conclusions—In concordance with results of previous research, these results indicate that initiation of prescription stimulants during childhood is not associated with increased future use of alcohol and other drugs.

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Keywords

prescription stimulants; substance abuse; drug abuse; attention-deficit-hyperactivity disorder; ADHD; young adults; college students

During the past decade, the illicit use of prescription drugs, including prescription stimulants, has become the second most common form of illicit drug use among college students in the United States.[1] National data from 2003 showed that college students aged 19–22 years were more likely to report illicit use of Ritalin (Novartis Pharmaceuticals Corp., East Hanover, NJ) than the same age population not enrolled in college.[1] To further highlight this problem, associations have been found between the illicit use of prescription stimulants and higher rates of cigarette smoking, heavy episodic drinking, marijuana use, and cocaine use among adolescents, young adults,[2, 3] and college students in the United States.[4–7] An association has also been found between the illicit use of prescription stimulants and the age at which an individual reports the initiation of prescription stimulants. For example, results of our previous study found that initiation of prescription stimulant drugs after elementary school is associated with increased risk of illicit use of prescription stimulants during college.[8] However, research is limited regarding the relationship between initiation of prescription stimulants among specific age groups and use and abuse of alcohol and other drugs.

Our primary objective was to investigate illicit use and abuse of prescription stimulants, alcohol, and other drugs based on the age of initiation of prescription stimulants among an undergraduate college student sample in the United States. This study builds on our earlier work[8] by assessing the effect of age at initiation of prescription stimulants on substance abuse as indicated by brief screening instruments and coingestion of alcohol and illicit prescription stimulants.

Methods

Design

A Web-based survey was self-administered by full-time undergraduate students at a large university in the United States over a 2-month period. At that time, the total full-time undergraduate population of the university was 20,138 students (10,339 women, 9799 men). A random sample of 5389 students was drawn from the total student population by using data obtained from the registrar's office. Each student participant was mailed a letter that described the study and invited participation by using a provided URL address and unique password. The invitation included $2.00, and those who participated became eligible for incentives including cash prizes, travel vouchers, field passes to athletic events, and iPods. To maintain an adequate sample size for all ethnic categories, we oversampled an additional 652 Hispanic, 634 African-American, and 244 Asian students. Those who did not respond were reminded by e-mail up to 3 times. We assessed the potential effect of nonresponse by administering a brief telephone survey to 159 nonrespondents and found no significant differences in alcohol and other drug use between respondents and nonrespondents.

Students' responses remained confidential and unavailable to faculty or staff members. A hosted secure Web site running under the secure sockets layer protocol was used to ensure that all responses were securely transmitted between the respondent's browser and the server. A third-party research firm, not affiliated with the university, was involved to set up the survey and to store and maintain data. All participants were informed of the precautions that were implemented to maintain confidentiality. Students were aware of the purpose of this study and that participation was voluntary. The institutional review board at the host university approved the study's protocol, and informed consent was provided online by all student participants.

Additional information regarding the design and details pertaining to the Web-based approach used in this study are reported elsewhere.[9]

Measures

The survey was designed by a multidisciplinary team of clinician-researchers with backgrounds in pharmacy, social work, nursing, and psychology. It was developed to examine a broad range of alcohol and other drug use behaviors among college students. Some of these behaviors are described in more detail below.

Demographic measures included sex, age, race-ethnicity, fraternity or sorority affiliation, annual family income, and type of high or secondary school.

Age at initiation of prescription use of stimulants was assessed by asking the question, “Based on a doctor’s prescription, when did you first start using each prescription drug?” “Stimulants (e.g., Ritalin, Dexedrine, Adderall, Concerta, and methylphenidate)” was specified as one of seven prescription drug categories. The response scale was as follows: grades kindergarten (K)–4, grades 5–6, grades 7–8, grades 9–10, grades 11–12, college, and rather not say. Responses were collapsed into four categories of prescription use: grades K–4, grades 5–8, grades 9–12, and college. For purposes of analysis, these four categories were compared with those who were never prescribed stimulants.

Past-month illicit use of prescription stimulants was assessed with the question, “On how many occasions in the past 30 days have you used the following types of drugs, not prescribed to you?” “Stimulant medications (e.g., Ritalin, Dexedrine, Adderall, Concerta, and methylphenidate)” was provided as one of four categories.

Past-month use of marijuana was assessed with the question, “On how many occasions in the past 30 days have you used the following types of drugs? Do not include drugs used under a doctor’s prescription.” “Marijuana or hashish” was among the eight choices provided.

Past-month use of illicit drugs other than marijuana was assessed with the question, “On how many occasions in the past 30 days have you used the following types of drugs? Do not include drugs used under a doctor’s prescription.” There were separate items for each of the following seven drugs: cocaine, lysergic acid diethylamide (LSD), other psychedelics, crystal methamphetamine, heroin, inhalants, and ecstasy. An index was created by summing use of any of these seven drugs.

Past-month illicit use of prescription drugs (other than prescription stimulants) was assessed with the question, “On how many occasions in the past 30 days have you used the following types of drugs, not prescribed to you?” There were separate items for each of the following three classes of prescription drugs: sleeping agent (e.g., Ambien, Halcion, Restoril, temazepam, triazolam); sedative or anxiety drug (e.g., Ativan, Xanax, Valium, Klonopin, diazepam, lorazepam); pain reliever (i.e., opioids such as Vicodin, OxyContin, Tylenol No. 3 with codeine, Percocet, Darvocet, morphine, hydrocodone, oxycodone). An index was created by summing use of any of these three classes of prescription drugs.

The response scale used for each of the above items was as follows: no occasions, 1–2 occasions, 3–5 occasions, 6–9 occasions, 10–19 occasions, 20–39 occasions, 40 or more occasions. For purposes of analysis, responses to each item were collapsed into two categories: use on at least one occasion and no use.

Past year coingestion of alcohol and illicit prescription stimulants was assessed with the question, “In the past 12 months, how many days have you used prescription stimulant

medication (e.g., Ritalin, Dexedrine, Adderall, Concerta, methylphenidate), not prescribed to you by a doctor at the same time you were drinking alcohol?" Respondents were asked to enter the number of days in a text box. For purposes of analysis, responses were collapsed into two categories: use on at least one occasion and no use.

Alcohol abuse was assessed by including a modified version of the Cut Down, Annoyance, Guilt, Eye-opener (CAGE) instrument, a standard, four-item, brief alcoholism screening instrument.[10] Respondents were asked how many times in the past year they had experienced each of the four CAGE criteria: C, "Felt that you should *cut down* on your drinking"; A, "Been *annoyed* by people criticizing your drinking"; G, "Felt *guilt* or remorse after drinking"; and E, "Had a drink first thing in the morning as an *eye-opener* or to get rid of a hangover." If a student indicated that they had experienced two or more of these criteria in the past year, this was considered a positive screening test result, denoting suspected alcohol abuse.[11, 12] If a student had experienced none or only one of the four criteria, they were assigned a negative test result.

Drug use–related problems were assessed with a slightly modified version of the Drug Abuse Screening Test, short form (DAST-10), which is a self-report instrument that can be used in both clinical and nonclinical settings to screen for abuse of and dependence on a wide variety of substances other than alcohol.[13] The DAST was originally adapted from the Michigan Alcoholism Screening Test, or MAST, which focuses primarily on alcohol, and the two scales are very similar. Furthermore, the original 28-item version, the more recent 20-item version, and the 10-item version of the DAST are highly correlated, with a correlation coefficient of $r = 0.99$ for the 28-item version and the 20-item version, and $r = 0.97$ for the 20-item version and the 10-item version.[13, 14] We used a cutoff point score of 3 to identify students with potential drug abuse problems. A cutoff point of 2 has been shown to achieve an appropriate balance between sensitivity and specificity[14, 15]; therefore, a cutoff point of 3 is a more conservative approach that should help avoid false-positive findings.

Data Analysis

Prevalence rates were derived by dividing the number of students reporting an outcome behavior by the total number of responses to that question. Bivariate associations between student characteristics and outcome prevalence rates were tested by using χ^2 analyses. Multiple logistic regression analyses were conducted to examine the associations between student characteristics and the dichotomous drug use outcomes after statistically controlling for other background characteristics (e.g., sex, affiliation with fraternity or sorority, race-ethnicity, family income, and type of secondary or high school). Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) are provided. All statistical analyses were performed with use of SPSS 13.0 statistical software (SPSS Inc., Chicago, IL).

Results

Sample

The overall response rate for this study was 66%, and the final sample included 4580 undergraduate students (3639 from the random sample and 941 from the oversample). Unweighted sex and racial distribution of the random sample was 54% women and 46% men; and 67% Caucasian, 12% Asian, 6% African-American, 4% Hispanic, and 10% from other ethnic categories. The total university population consisted of 51% women, 49% men, 65% Caucasian, 14% Asian, 6% African-American, 4% Hispanic, and 11% from other ethnic categories. The mean ± SD age of students in the sample was 20 ± 2.0 years. A sample weight variable was created to account for oversampling of racial minorities, and data were weighted for analyses of the overall sample to increase the representativeness of our results. The weight variable was centered (normalized) to ensure that sample size remained the same after

weighting. As a result, our sample closely resembled the overall student population with regard to demographic characteristics.

We created five subgroups of users based on age at initiation of prescription stimulant use: no prescription stimulant use (4266 students), grades K–4 (36), grades 5–8 (26), grades 9–12 (62), and college (73); some students preferred not to answer this particular question. Demographic characteristics differed across the five subgroups of prescription stimulant use (Table 1).

Past-Month Illicit Use of Prescription Stimulants

Bivariate analyses (Table 2) showed that approximately 2% of students who reported no previous use of prescription stimulants responded that they had illicitly used a stimulant in the past month, as opposed to students who began prescription stimulant use in grades 9–12 (8.2%) and college (22.7%). Results from multiple logistic regression analyses (Table 3) indicated that the odds of illicit use of prescription stimulants (use vs no use) was 13 times higher among those who started use of prescription stimulants in college compared with students who were never prescribed a stimulant. No statistically significant differences were noted between the group that had no prescription stimulant use and the grades 9–12, grades 5–8, and grades K–4 groups in the odds of illicit use of prescription stimulants.

Past-Month Use of Marijuana

Bivariate analyses (Table 2) showed that a greater percentage of students who started prescription stimulant use in high school (45.8%) and college (50.5%) used marijuana within the past month than did students who started prescription stimulant use in grades K–4 (10.9%), grades 5–8 (21.4%), and those who had never been prescribed stimulants (19.1%). Results from multiple logistic regression analysis (Table 3) indicate that the odds of past-month marijuana use was almost 3 times higher among the grades 9–12 initiators and were more than 3 times higher in college initiators when compared with the group that had no prescription stimulant use. No statistically significant differences were noted between the group that had no prescription stimulant use and the grades K–4 and grades 5–8 groups in the odds of past-month marijuana use.

Past-Month Use of Illicit Drugs Other Than Marijuana

The bivariate analyses (Table 2) demonstrated that approximately 12.1% of students who started a prescription stimulant in college reported use of other illicit drugs including cocaine, crystal methamphetamine, heroin, inhalants, ecstasy, LSD, and other psychedelics in the past month. This percentage was higher than those of the other groups. Multiple logistic regression analyses (Table 3) indicated that the odds of using an illicit drug other than marijuana within the past month were almost 5 times higher among college prescription stimulant initiators and more than 3 times higher among grades 9–12 initiators when compared with the group that had no prescription stimulant use. No statistically significant differences were noted between the group that had no prescription stimulant use and the grades K–4 and grades 5–8 groups in the odds of past month use of illicit drugs (other than marijuana).

Past-Month Illicit Use of Prescription Drugs Other Than Prescription Stimulants

Results from bivariate analyses (Table 2) indicated that approximately 20% of students who started a prescription stimulant in college also illicitly used a prescription drug such as an opioid analgesic, a sedative or tranquilizer, or a sleeping agent. Also, about 14% of high school initiators reported past-month illicit use of other prescription drugs. Both high school and college initiators had higher rates of illicit use of other prescription drugs compared with the other groups. Multiple logistic regression analyses (Table 3) showed that the odds of past-month illicit use of prescription drugs was more than 6 times higher in the college initiation of

prescription stimulant group compared with the group that had no prescription stimulant use. Further, the odds of illicit prescription drug use were almost 7 times higher for the grades 9–12 initiation group compared with the group that had no prescription stimulant use. No statistically significant differences were noted between the group that had no prescription stimulant use and the grades K–4 and grades 5–8 groups in the odds of past-month illicit use of prescription drugs other than stimulants.

Past-Year Coingestion of Alcohol and Illicit Prescription Stimulants

Bivariate results (Table 2) indicated that 2.6% of the college students who had no previous use of a prescription stimulant reported past-year coingestion of alcohol with an illicit prescription stimulant. The prevalence rates of students reporting coingestion of alcohol with a stimulant who started a prescription stimulant in either grades K–4 or grades 5–8 were similar to that of the group that had no prescription stimulant use. Higher prevalence rates were found among the grades 9–12 and college initiation groups. Results from multiple logistic regression analyses (Table 3) showed that initiation in grades 9–12 increased the odds of coingestion of alcohol with a stimulant by a factor of 3.7. Further, those who reported initiation of prescription stimulant use in college were almost 10 times more likely to report coingestion of alcohol and illicit prescription stimulants. Once again, no statistically significant differences were noted between the group that had no prescription stimulant use and the grades K–4 and grades 5–8 groups in the odds of past-month coingestion of alcohol and illicit prescription stimulants.

Alcohol Abuse

Students who started a prescription stimulant in grades 5–8, grades 9–12, and college had higher rates of alcohol abuse indicators compared with those rates for students who started prescription stimulant use in grades K–4 and those who reported no prescription stimulant use (Table 2). Consistent with these bivariate findings, the results from multiple logistic regression analyses (Table 3) indicated that the odds of screening positive for possible alcohol abuse in college were higher among students who started prescription stimulant use in grades 5–8, grades 9–12, and college compared with the group that had no prescription stimulant use. No statistically significant difference was noted between the grades K–4 group and the group that had no prescription stimulant use in the odds of alcohol abuse indicators.

Drug Use–Related Problems

Bivariate results (Table 2) showed that the age of initiation of prescription stimulants was associated with reporting three or more drug use–related problems based on the DAST-10 questionnaire. After controlling for student demographics, multiple logistic regression analyses (Table 3) revealed a significant increase in the odds of drug abuse in college (OR 3.7) and grades 9–12 (OR 3.6) initiators as compared with students who were never prescribed a stimulant. In contrast, those students who started prescription stimulants in grades K–4 or grades 5–8 did not differ significantly from the group that had no prescription stimulant use in the odds of drug use–related problems.

Discussion

Our main objective while conducting this research was to assess the associations between age at initiation of prescription stimulant drugs and illicit use and abuse of prescription stimulants, alcohol, and other drugs. Results showed that the age at which a person reports being prescribed a stimulant drug was significantly associated with use and abuse of other substances during college. In particular, one of the most important findings of this study was that students who had been prescribed a stimulant in elementary school (grades K–4) reported similar rates of substance use as those who were never prescribed a stimulant drug. These results are in concordance with those of previous research, which showed that starting a prescription

stimulant drug during childhood does not appear to increase the risk of future substance use disorders.[8, 16–18] Conversely, students who started prescription use of a stimulant drug in college were significantly more likely than students who were never prescribed a stimulant to report alcohol and other drug use. These results are similar to those of our earlier work, which found that college students who started prescription stimulants after elementary school were 2–7 times more likely than nonusers to report past-year illicit use of prescription stimulants, marijuana, cocaine, and other illicit drugs.[8]

When we examined the coingestion of alcohol and illicit prescription stimulants as a function of initiation of prescribed use of stimulants and screened for alcohol- and drug-related problems, we found similar results. Students who started use of prescription stimulants in either high school or college were found to have significantly higher prevalence rates of past-year coingestion of alcohol and prescription stimulants and to meet two or more past-year CAGE criteria, as well as three or more DAST-10 criteria.

Reasons for the increased illicit use of prescription stimulants, alcohol, and other drugs among those prescribed a stimulant drug in college are unclear. Perhaps the students who started prescription stimulants in college were previously untreated and were therefore at greater risk for developing drug use problems. Alternatively, the motives for students who misuse prescription stimulants may provide some insight into this phenomenon. For example, results from one study showed that most students who used prescription stimulants illicitly did so in order to improve concentration, help study, and increase alertness.[19] It may be that students are obtaining prescription stimulants for reasons other than treatment. Clearly, more research is needed to answer this important question.

Limitations

Several limitations should be noted while reviewing the results of this study. Nonresponse may have introduced some bias in this study. To examine the possibility of nonresponse bias, we conducted a telephone follow-up survey of 159 randomly selected nonrespondents. Most notably, no differences occurred in prevalence rates of alcohol use, cigarette smoking, and other problem health behaviors between respondents and nonrespondents. Also, the manner of data collection was a self-administered Web-based survey at a single public university. Although it was a large university, the results may not generalize to other populations. The extent to which these findings characterize other colleges and universities is an important question for future research.

This survey asked participants to remember when they were first prescribed a stimulant. Some students may not be able to recall exactly when they began taking a drug, especially if it was at a young age. However, if a child receives a diagnosis of attention-deficit–hyperactivity disorder (ADHD), this behavioral problem could have a strong impact on the child's personal and social relationships.[20] Stimulant drugs have a positive response rate of 70–90% for reducing symptoms such as hyperactivity, impulsivity, and inattentiveness[20]; therefore, it is likely that a child would remember changes that had a strong influence on his or her life. It should be noted that we do not have information regarding duration of stimulant treatment or drug adherence and are therefore unable to comment on how these variables may affect our outcomes.

Another limitation to this study is our lack of information regarding a diagnosis of ADHD. Although we cannot make any assertions regarding individuals who may have experienced poor outcomes due to untreated ADHD, questions that address initiation of prescription stimulants, as described in our methods, give examples only of stimulant drugs used to treat ADHD. Furthermore, our current results are comparable to those of our previous study that used a similar survey methodology, but specified stimulant drugs for ADHD in questions

regarding medical and illicit use.[8] Finally, previous research has shown that most stimulants are prescribed to treat ADHD as compared to any other indication.[20]

This study included participants who started prescription stimulants at several ages (e.g., grades K–4, grades 5–8, grades 9–12, and college). However, our sample consisted of college students, and we do not have data on students who began a stimulant drug before college age, but did not attend college. It would be beneficial if a prospective trial was conducted to follow all children given a stimulant drug at different ages of initiation in order to examine subsequent alcohol and other drug use behaviors, regardless of whether or not they attended college.

Furthermore, although the sample size was sufficient to examine differences between nonusers and several groups based on age at initiation, we were unable to examine differences between early versus late initiators with use of multivariate analysis because of the small numbers of respondents within each stratified group. Future research should consider recruiting adequate numbers to allow for comparisons of substance abuse outcomes between early versus late initiators.

Finally, embedding the CAGE and DAST-10 into our survey is another aspect that should be considered while evaluating our results. Previous research has shown that use of the CAGE in adolescent populations is not recommended due to insufficient sensitivity in young patients.[12] The adolescent population in that study was aged 14–18 years; therefore, this may not pertain to our results as our population included mainly those aged 18–24 years. In addition, sensitivity is lower for the CAGE than for other alcohol screening options, but it does have higher specificity.[11, 12] Regarding the DAST-10, we used a cutoff score of 3 or greater to determine significant differences in terms of drug abuse indicators, which is a more conservative measure than has been used previously. Different studies have shown a cutoff point of 2 to be appropriate for both sensitivity and specificity; however, these studies were conducted in psychiatric populations.[14, 15] Our results for the CAGE and DAST-10 should be interpreted with caution, but it is important to note that the results of the CAGE and DAST-10 are complementary to the other alcohol and drug use outcomes that were included in the study, including measures of prescription drug abuse.

Conclusion

Despite the above limitations, this study builds on previous work by examining the association between age at initiation of prescription stimulants and several measures of substance use. By including screening measures for alcohol abuse (CAGE) and drug abuse (DAST-10), we were able to move beyond assessing whether or not students had ever engaged in various substance use behaviors (which could range from experimental use to dependence) to indicators of potential abuse. Screening for substance abuse among these students may be more informative in terms of assessing adverse consequences of drug use.

Students whose use of prescription stimulants started in college were at a significantly increased risk for alcohol and other drug use as compared with students with no previous use of a prescription stimulant. Conversely, students whose use of a prescription stimulant started in grades K–4 did not show any differences in alcohol or other drug use as compared with students with no previous prescription stimulant use. Longitudinal research on the characteristics and trajectories of prescription stimulant use will enhance our understanding of the implications of these drugs for subsequent substance use.

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Table 1

Selected Demographics Across Different Subgroups of Respondents

Characteristic	Total Student Sample (n = 4580)	No Prescription Stimulant Use(n = 4266)	Age at Initiation of Prescription Stimulants			
			Grades K–4 (n = 36)	Grades 5–8 (n = 26)	Grades 9–12 (n = 62)	College (n = 73)
Sex						
Male	49.7	49.0	85.0	84.6	58.8	48.9
Female	50.3	51.0	15.0	15.4	41.2	51.1
Race-ethnicity						
Caucasian	65.1	65.2	73.8	68.6	65.2	71.5
African-American	6.9	7.1	1.3	0.0	5.8	5.6
Asian	13.1	13.3	8.7	11.6	4.9	8.3
Hispanic	4.5	4.4	2.0	5.9	8.3	7.6
Other	10.3	10.0	14.2	13.9	15.8	7.0
Fraternity-sorority status						
Nonmember	86.7	87.4	96.4	90.2	71.2	62.3
Member	13.3	12.6	3.6	9.8	28.8	37.7
Annual family income ($)						
< 50,000	12.4	12.8	15.3	22.0	4.7	10.3
50,000–99,000	22.9	23.3	10.3	16.4	14.8	21.3
100,000–149,000	17.9	18.2	17.2	20.0	18.7	11.1
150,000–250,000	11.7	11.8	7.2	10.0	9.3	14.2
> 250,000	9.1	8.4	19.0	8.0	30.3	21.3
Don’t know or refused	25.8	25.8	31.1	23.2	22.1	21.8
Type of high or secondary school						
Public	81.4	81.6	84.6	69.2	71.9	84.4
Private religious	11.1	11.1	15.4	16.4	11.5	7.5
Other private	6.4	6.2	0.0	9.3	16.6	8.0
Home school	1.1	1.1	0.0	5.0	0.0	0.0

Data are percentages. Sample sizes and percentages are based on weighted data.

K = kindergarten.

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Table 2

Bivariate Results for Prevalence of Illicit Use and Abuse of Prescription Stimulants, Alcohol, and Other Drugs as a Function of Age at Initiation of Prescription Stimulants

Variable	No Prescription Stimulant Use (n = 4266)	Age at Initiation of Prescription Stimulants			
		Grades K–4 (n = 36)	Grades 5–8 (n = 26)	Grades 9–12 (n = 62)	College (n = 73)
Past-month illicit use of prescription stimulants	1.8	3.6	5.6	8.2	22.7
Past-month marijuana use	19.1	10.9	21.4	45.8	50.5
Past-month use of illicit drugs other than marijuana[a]	2.2	3.6	5.0	7.2	12.1
Past-month illicit use of prescription drugs[b]	3.0	3.1	10.0	14.3	19.9
Past-year coingestion of alcohol and illicit prescription stimulants	2.6	3.6	5.0	12.6	23.3
Past-year CAGE (score ≥ 2)	19.3	24.1	38.5	36.0	37.6
Past-year DAST-10 (score ≥ 3)	8.7	21.0	20.0	30.3	31.0

Data are percentages. Sample sizes and percentages are based on weighted data.

K = kindergarten; CAGE = Cut Down, Annoyance, Guilt, Eye-opener; DAST-10 = Drug Abuse Screening Test, short form.

[a] Refers to use of any of the following illicit drugs: cocaine, LSD, other psychedelics, crystal methamphetamine, heroin, inhalants, and ecstasy.

[b] Refers to illicit use of opioid analgesics, sedatives or anxiolytics, or sleeping agents.

Table 3

Multivariate Results for Relationships Between Age at Initiation of Prescription Stimulants and Illicit Use and Abuse of Prescription Stimulants, Alcohol, and Other Drugs

Variable	Age at Initiation of Prescription Stimulants			
	Grades K–4	Grades 5–8	Grades 9–12	College
Past-month illicit use of prescription stimulants	2.9 (0.4–24.0)	3.8 (0.6–23.9)	3.7 (0.9–14.2)	13.0 (5.3–32.2)[a]
Past-month marijuana use	0.4 (0.1–1.9)	1.6 (0.5–5.1)	2.8 (1.6–4.7)[b]	3.2 (1.7–6.1)[a]
Past-month use of illicit drugs other than marijuana[c]	1.4 (0.2–11.4)	2.1 (0.3–16.6)	3.2 (1.0–9.6)[b]	4.8 (1.9–12.3)[a]
Past-month illicit use of prescription drugs[d]	1.0 (0.1–8.0)	4.6 (0.9–22.2)	6.9 (2.6–13.9)[a]	6.4 (2.9–14.1)[a]
Past-year coingestion of alcohol and illicit prescription stimulants	1.4 (0.2–11.5)	2.1 (0.2–18.5)	3.7 (1.5–9.3)[e]	9.7 (4.7–19.5)[a]
Past-year CAGE (score ≥ 2)	1.5 (0.6–3.5)	2.8 (1.1–6.9)[b]	1.9 (1.1–3.5)[b]	2.0 (1.2–3.5)[e]
Past-year DAST–10 (score ≥ 3)	2.8 (0.9–8.0)	3.1 (0.9–10.3)	3.6 (1.8–7.3)[a]	3.7 (1.9–7.1)[a]

Data are odds ratios (95% confidence intervals).

K = kindergarten; CAGE = Cut Down, Annoyance, Guilt, Eye-opener; DAST-10 = Drug Abuse Screening Test, short form.

The group that had no prescription stimulant use was used as the reference group; results were adjusted by controlling for demographics (sex, fraternity or sorority affiliation, race-ethnicity, family income, and type of secondary or high school).

[a] $p < 0.001$.

[b] $p < 0.05$.

[c] Refers to use of any of the following illicit drugs: cocaine, LSD, other psychedelics, crystal methamphetamine, heroin, inhalants, and ecstasy.

[d] Refers to illicit use of opioid analgesics, sedatives or anxiolytics, or sleeping agents.

[e] $p < 0.01$.