Published in final edited form as:
J Drug Issues. 2008 ; 38(4): 1045–1060.

Nonmedical Use of Prescription Stimulants and Analgesics: Associations with Social and Academic Behaviors among College Students

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Abstract

Nonmedical use of prescription stimulants and analgesics was assessed from personal interviews with a stratified random sample of 1,253 first-year college students aged 17 to 20 attending a large public university (86% response rate). Lifetime and past-year prevalence of nonmedical use of stimulants and/or analgesics was 19.6%$_{wt}$ and 15.5%$_{wt}$, respectively. Nonmedical users had significantly lower grade point averages (GPAs) in high school as compared with nonusers; in college they skipped classes more often, spent more time socializing, and spent less time studying. For example, nonmedical users of both stimulants and analgesics skipped 21% of their college classes whereas nonusers skipped 9%. Controlling for high school GPA and other factors, past-year nonmedical use independently predicted lower college GPA by the end of the first year of college; this effect was partially mediated by skipping more classes. Nonmedical users of prescription drugs comprise a high-risk group for academic problems in college.

Introduction

Nonmedical use of prescription drugs has emerged as a significant public health issue in the U.S. In 2005, 20% of U.S. individuals aged 12 or older had used psychotherapeutic prescription drugs nonmedically at least once in their lifetime (Substance Abuse and Mental Health Services Administration, 2006), representing a substantial increase over the corresponding estimate in 2000 of 14.5% (SAMHSA, 2002). Given that nearly half of past-year users (approximately 7 million individuals) are youth or young adults (12- to 25-year-olds), nonmedical prescription drug use is a growing concern for pediatricians, college campus health professionals, and parents.

Compared to the wealth of information that exists with regard to alcohol consumption patterns, only a few recent descriptive studies have focused on nonmedical prescription drug use among college students (Carroll, McLaughlin, & Blake, 2006; Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005; Low & Gendaszek, 2002; McCabe, Teter, & Boyd, 2006; Teter, McCabe, Boyd, & Guthrie, 2003). Stimulants and analgesics are the two most widely used classes of prescription drugs that are used nonmedically.

Nonmedical Use of Prescription Stimulants

With respect to nonmedical use of prescription stimulants, the Monitoring the Future (MTF) survey estimated that in 2005, 4% of college students had used Ritalin® nonmedically within the past year (Johnston, O'Malley, Bachman, & Schulenberg, 2006). While this estimate is substantial, it likely underestimates the true extent of nonmedical use of

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prescription stimulants because MTF does not inquire about any prescription stimulants other than Ritalin,®1 such as Adderall® and Concerta.® One study using a broader definition of prescription stimulants observed that 25% of college students had used prescription stimulants nonmedically within the past year (McCabe, Knight, Teter, & Wechsler, 2005). Another study found that more than 50% of survey participants knew other students who had used Ritalin® for recreational reasons, and 16% had used it themselves (Babcock & Byrne, 2000).

Nonmedical Use of Prescription Analgesics

Data from the National Survey of Drug Use and Health (NSDUH) indicate that nonmedical use of prescription analgesics is more common among young adults (18- to 25-years-old) than older individuals (12% versus 3% for past year use) (SAMHSA, 2006). The MTF survey reported that 10% of college students had used Vicodin®2 and 2% had used OxyContin® nonmedically within the past year (Johnston et al., 2006). As with prescription stimulants, MTF likely underestimates the true extent of nonmedical use of prescription analgesics because it does not inquire about the full spectrum of prescription analgesics. Among a cross-section of students sampled from 119 four-year colleges in 2001, 12% used prescription analgesics at least once in their lifetime and 7% used in the past year (McCabe, Teter, Boyd, Knight, & Wechsler, 2005).

Correlates of Nonmedical Prescription Drug Use in College Students

Some research has shown that college students use prescription stimulants nonmedically to improve their concentration and focus while studying (Arria & Wish, 2005). Students also report using stimulants to stay awake longer to party or to drink more alcohol during a longer period of time (Hall et al., 2005; Low & Gendaszek, 2002; Prudhomme-White, Becker-Blease, & Grace-Bishop, 2006; Teter et al., 2003). Being White, residing in fraternities or sororities, attending more competitive colleges, and using other illicit drugs have been found to be associated with nonmedical use of prescription analgesics (McCabe, Teter et al., 2005).

While nonmedical use of some prescription drugs is known to be associated with polydrug use (Barrett, Darredeau, Bordy, & Pihl, 2005; Herman-Stahl, Krebs, Kroutil, & Heller, 2006; McCabe, Knight et al., 2005; Teter et al., 2003), to our knowledge, no studies exist examining the degree of overlap between nonmedical use of prescription stimulants and analgesics.

In the few studies that have addressed the academic performance of college students who use prescription stimulants and analgesics nonmedically, lower grades have consistently been associated with nonmedical use (McCabe, Knight et al., 2005; McCabe et al., 2006; McCabe, Teter et al., 2005). However, these studies were cross-sectional and designed to identify correlates of nonmedical use, not to distinguish its possible effect on subsequent grades. To our knowledge, no prior studies have examined these relationships longitudinally. Furthermore, prior studies have not controlled for the possible effect of other illicit drug use on grades; therefore, it remains unclear whether the association with lower grades is simply attributable to a greater overall level of substance involvement. For college administrators, parents, and educators, the question of how nonmedical use might actually affect college students' grades is of great interest, especially in light of the current perception that nonmedical use of prescription stimulants will improve academic performance.

[1]The generic names for Ritalin®, Adderall,® and Concerta® are methylphenidate, and methylphenidate extended release, respectively.
[2]The generic names for Vicodin® and OxyContin® are hydrocodone and oxycodone hydrochloride, respectively.

Moreover, no prior research has investigated possible mechanisms by which nonmedical use might result in lowered academic performance (e.g., through study habits).

Purpose of the Study

The present study has three objectives: 1) to estimate the prevalence of nonmedical use of prescription stimulants and analgesics among a class of first-year college students; 2) to determine the association between nonmedical use and social and academic behaviors in college; 3) to develop models predicting college academic performance based on social and academic behaviors and nonmedical use. It is hypothesized that nonmedical users of these two classes of drugs would spend significantly more time socializing and less time studying and skip their classes more frequently than their non-using counterparts, and that these behaviors would result in a decrease in grade point average measured at the end of the first year of college.

Methods

Sample

The sample was derived from a cohort of incoming first-year students who were recruited from one large public university in the mid-Atlantic region for participation in a longitudinal study. Participants were recruited in two stages. First, all incoming first-time, first-year students who were between 17 and 19 years old were eligible to complete a brief screening survey during new student orientation prior to college entry during the summer of 2004 (n=3,401). University records indicate that approximately 90% of incoming students attend orientation; incoming students who did not attend orientation were invited to participate in the screening survey via U.S. mail. The response rate was 89% for the screener survey. Next, a stratified random sample of those respondents was selected for participation in the longitudinal study, beginning with a two-hour, face-to-face interview administered sometime during their first year of college (n=1,253). The interview response rate was 86%. Purposive sampling strategies were employed to obtain a disproportionate number of students who had used illicit drugs during high school, based on their screener responses. The sample was demographically representative of the entire first-year class of students (Arria et al., In press). Respondents received $5 for participating in the screener and $50 for completing the interview. This study was reviewed and approved by the university's Institutional Review Board. Informed consent was obtained for participation in all waves of data collection, and a federal Certificate of Confidentiality was also attained.

Measures

History of Drug Use and Current Drug Use Patterns—During the interview which took place during their first year of college, data were collected on a number of drug use variables, including age of onset of use for tobacco, alcohol, marijuana, hallucinogens, ecstasy, amphetamines or methamphetamine, inhalants, cocaine, and heroin (i.e., “How old were you the first time you used …”). In addition, for nonmedical use of prescription drugs, students were asked the age of onset, the number of occasions they had used the drugs nonmedically in their lifetime, how recently they had used them (“When was the last time you used [drug] nonmedically?”), and the method of administration (“Can you tell me specifically how you took [drug]?”). Nonmedical use of prescription stimulants and analgesics was assessed in separate series of questions. The nonmedical prescription drug questions were adapted from the questions asked in the 2002 NSDUH (SAMHSA, 2003), including an explanation of the definition of nonmedical use and cards showing the names and color photos of various pills. Interviewers explained that nonmedical use involved taking any medication “that was not prescribed for you or that you took only for the experience or feeling they caused,” excluding any over-the-counter medications.

Lifetime use of each type of drug was dichotomized as “ever” versus “never” used. As a measure of overall drug involvement, an index of the total number of drugs ever used (other than prescription stimulants and analgesics) was computed for the following 8 drugs: marijuana, inhalants, cocaine, hallucinogens, amphetamines or methamphetamine, heroin, ecstasy, and prescription tranquilizers (nonmedical). For prescription stimulants and analgesics, past-year use was coded as positive (at least once during the past year) or negative. Method of administration of the stimulants and analgesics was captured by open-ended questions and later coded according to whether the individual had ever administered the substance intranasally (i.e., inhaled versus never inhaled).

Academic and Social Behaviors—To assess the students' behavior related to their academic work, they were asked the number of class sessions they were scheduled to take per week, the number of class sessions they typically skipped per week, and the number of hours per day they spent studying on weekdays (Monday through Thursday) and weekend days (Friday through Sunday). To assess their degree of social interaction, the students were asked how many hours per day they spent going out socially with other people on weekdays and weekend days. Weekly totals were computed for the number of hours spent studying and socializing ([weekday use × 4] + [weekend use × 3]). To standardize the measure of skipping behavior across courseloads of varying intensity, the percent of classes skipped was computed ([number of sessions skipped/number of sessions scheduled] × 100).

Demographic Characteristics and Academic Performance—Data on race, sex, and cumulative grade point average (GPA) from high school and the first year of college were obtained from university administrative datasets. For the present study, race, which was self-reported by students, was dichotomized as White versus non-White. As a proxy for socioeconomic status, mother's highest level of educational attainment was also captured via participant self-report. Approximately half were female (51.4%), 72.4% were White, and 73.5% indicated their mother had attained a 4-year college degree or more. Participants were 17 to 20 years old at the time of the interview.

Current living situation and affiliation with sororities or fraternities were assessed by self-report in the interview. Only 6.8% were living with parents or other relatives, and 7.5% were involved with sororities or fraternities. Although some individuals were interviewed before they had the opportunity to become involved in a sorority or fraternity, this variable was nevertheless deemed useful due to its possible association with drug use and other behaviors of interest in the current study.

Statistical Analysis

Although our sample was purposively selected to overrepresent experienced substance users, the stratified sampling design enabled us to compute case weights based on race, gender, and history of illicit drug use during high school. Thus, case weights yield a weighted sample size that is representative of the entire population of screened first-year students enrolled in the university (N=3,285). In this paper, case weights were only used to compute prevalence; all results are unweighted unless otherwise specified.

Data on past-year nonmedical use of prescription stimulants and/or analgesics were used to create two groups: nonmedical users (n=267 who used either drug at least once in the past year nonmedically) and nonusers (n=985). Nonmedical users were further subdivided into three mutually exclusive groups: 1) Users of prescription stimulants but not prescription analgesics (n=117); 2) Users of prescription analgesics but not prescription stimulants (n=85); and, 3) Users of both types of drugs (n=65). The groups were then compared on a number of characteristics, including continuous variables (age of onset, lifetime frequency

of use, number of other drugs ever used, number of hours spent going out socially on weekdays and weekend days, number of hours spent studying on weekdays and weekend days, percent of classes skipped per week, and GPA in high school and college) and categorical variables (inhalation of the drug, sex, and race). Oneway analysis of variance (ANOVA) and logistic regression were used to identify statistically significant differences between the groups with respect to the continuous and categorical variables, respectively. First, nonusers were compared with all nonmedical users. Next, simple pairwise comparisons of dependent variables between nonusers and the three mutually exclusive groups of nonmedical users were conducted where the overall test statistic was significant ($p<.05$) to determine which specific group differences accounted for the overall difference observed.

The next set of analyses pertain to the regression models that tested the relationship between nonmedical use and college GPA with three hypothesized intervening variables: studying, socializing, and skipping class. College GPA served as the criterion variable in a series of models in which nonmedical use was entered with and without each of the hypothesized intervening variables (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Several additional variables were also included to control for demographics (race, gender, mother's education) and other potentially confounding effects (living with family, sorority/fraternity affiliation). High school GPA was held constant in order to focus the analysis on the more proximal effects of the hypothesized predictors. Although all participants were assessed during their first year of college, time in college was held constant to control for the possibility of confounding effects related to the timing of the interview and was computed as the number of months from the day the student moved into college to their interview date.

Results

Prevalence of Nonmedical Use of Prescription Stimulants and Analgesics

Table 1 presents the weighted prevalence of lifetime and past-year nonmedical use of prescription stimulants and analgesics. Four out of five students (80.4%$_{wt}$) had never used either drug in their lifetime. Adding the rows corresponding to “stimulants only” and “both”, it can be seen that prescription stimulants were used nonmedically by 13.3%$_{wt}$ of all first-year students at least once in their lives, and by 10.8%$_{wt}$ in the past year. Similarly, the corresponding estimates for analgesics are 11.7%$_{wt}$ and 8.1%$_{wt}$. These three mutually exclusive groups of past-year nonmedical users are compared in subsequent analyses.

Comparison of Patterns of Drug Use

Table 2 compares the three mutually-exclusive groups of nonmedical users on age of onset, lifetime frequency of use, route of administration and other drug use. Compared with stimulant-only users, nonmedical users of both stimulants and analgesics had an earlier age of onset of drug use (17.3 versus 16.9), a greater likelihood of inhalation (4.3% versus 13.9%) and a greater number of other drugs used (1.5 versus 3.4). The only significant difference observed between analgesic-only users with users of both drugs was the number of other drugs used (2.2 versus 3.4). Not surprisingly, “nonusers” used the fewest number of other illicit drugs (0.8), significantly less than each of the three groups of nonmedical users.

Comparison of Academic and Social Behaviors

Table 3 presents descriptive data comparing nonusers and nonmedical users of prescription drugs with respect to academic performance and social and academic behaviors. Demographic comparisons are not presented because users and nonusers were largely similar, with the exception that Whites were significantly overrepresented among

nonmedical users (81.0% versus 70.2%). Nonetheless, demographic characteristics were held constant in subsequent regression models.

High school and college GPA were both significantly lower among all nonmedical users as compared to nonusers. However, when the three mutually exclusive groups of users were compared to each other, no significant differences in high school or first year cumulative college GPA were observed. It is interesting to note that high school GPA of the stimulant-and-analgesic group was relatively high and closest to that of the nonusers (3.76 versus 3.86). By contrast, the stimulant-and-analgesic group earned the lowest mean college GPA and was significantly different from nonusers (2.61 versus 2.96).

Interestingly, nonmedical users and nonusers were similar with respect to the number of class sessions they were scheduled to attend per week (mean=13.8, *SD*=2.7), and therefore these data are not shown in the table. Aside from that one exception, with respect to other social and academic behaviors, every comparison between nonmedical users and nonusers was statistically signficant, for weekdays, weekend days, and weekly totals. On average, compared with nonusers, nonmedical users spent less time studying (mean 17.2 versus 19.7 hours per week), more time going out socially (29.4 versus 24.8 hours per week), and skipped a greater percentage of their classes on a weekly basis (16.0% versus 9.4%).

The three groups of nonmedical users were similar with respect to time studying and socializing. However, substantial differences were observed in the percent of classes skipped, with the analgesic-only group having the lowest average (12.6%) and the stimulant-and-analgesic group skipping the highest percentage of classes (20.9%).

College Academic Performance

Because the three groups of nonmedical users were not significantly different from each other with respect to GPA, studying or socializing, all past-year nonmedical users were grouped together for the multiple regression analysis predicting college GPA. Prior to conducting the analysis, the three hypothesized intervening effects were tested to determine their bivariate relationships with college GPA. Time spent studying was positively related to GPA (r=.09, p=.001), and the percentage of classes skipped was negatively related to GPA (r=−.23, p<.0001; data not shown in a table). Therefore, study hours and skipping class were included in the multiple regression analysis. Time spent going out socially was not significantly related to GPA (r<.001, p=.98), and was therefore not subjected to further testing. Table 4 displays the results of the regression analysis predicting college GPA.

As shown in the first model, individuals who used stimulants and/or analgesics nonmedically in the past year earned significantly lower GPAs than nonusers during their first year of college (b=−.146, *SE*=.043), even controlling for high school GPA, demographics, time in college, and other factors. In the second model, studying emerges as an independent predictor of GPA (.005, .002), as does skipping class in the third model (−.009, .001). Interestingly, although nonmedical use remains statistically significant in all models tested, the effect of nonmedical use is reduced substantially (i.e., by more than one standard error) by the inclusion of skipping class (−.092, .043). By contrast, the effect of nonmedical use remains essentially unchanged with the inclusion of studying (−.135, .043). These results are consistent with the conditions necessary to demonstrate an intervening (mediating) effect (MacKinnon et al., 2002) for skipping class but not for study hours, and thereby suggest the possibility that the effect of nonmedical use on GPA is partially mediated by skipping more classes.

In the fourth model testing all three predictors together, studying becomes non-significant, possibly due to a high degree of covariance with skipping class (r=.30, p<.0001, data not

shown). These results imply that the effects of studying and skipping class may be explained by an underlying third factor, such as motivation or attitude toward academics.

Post-hoc analyses revealed that the observed effects of nonmedical use on GPA remained marginally significant (p=.06) when controlling for the number of other illicit drugs used in the past year. Additionally, both types of nonmedical use had significant effects on GPA in separate models; however, analgesics had a stronger overall effect than stimulants on GPA, and the mediating effect of skipping class was more definitive for stimulants than for analgesics.

Discussion

A substantial proportion of college students in this study have used prescription analgesics and/or stimulants nonmedically in their lifetime (19.6%$_{wt}$) and in the past year (15.6%$_{wt}$). Given that prescription drugs are used nonmedically by more college students than any other illicit drug after marijuana and that they are associated with polydrug use, campus health professionals and administrators should address the widespread availability and perceived safety that make them particularly enticing to college students. Prescription drugs may be perceived as less harmful than “street drugs” because they have medically sanctioned uses (Friedman, 2006), and some research has already pointed toward the perception among college students that prescription stimulants are safe (Low & Gendaszek, 2002). These perceptions are compounded by the messages of tacit approval conveyed in the popular media for the use of “smart drugs” (Richardson, 2006; Ross, 2006).

To our knowledge, this is the first longitudinal study examining the mechanism by which nonmedical use of prescription drugs among college students might result in lowered GPA. In our sample, the social and academic behaviors of nonmedical users were significantly different from those of nonusers: they studied less, socialized more, and skipped more of their classes. Not surprisingly, they also earned lower GPAs, on average, by the end of their first year of college, even controlling for high school grades and other factors.

Consistent with our hypothesis, nonmedical use of prescription drugs has a detrimental effect on GPA, and appears to be partially mediated by skipping class. Furthermore, our post-hoc analyses indicated that the observed effect of nonmedical use on skipping class and subsequent lowered GPA was independent of other illicit drug involvement, suggesting that more than a general deviance factor is explaining this relationship. In contrast to skipping class, we did not find evidence that decreases in studying time or increases in socializing time were mechanisms by which nonmedical use affected GPA (even though decreased study time independently predicted lower GPA).

One possible interpretation of these findings is that students who engage in nonmedical use of prescription stimulants could be using these drugs in a compensatory fashion to “catch-up” with their studying because of the classes they missed as a result of drinking more or socializing more during the week. Rather than a group preoccupied with achieving academically, the general picture that emerges is that these students, because of the greater time they spend socializing, are seeking a way to make their few study hours more efficient through the use of prescription stimulants. For these students, prescription stimulants may be perceived as instrumental in helping them stay afloat academically while sustaining their partying lifestyle.

The present findings call into question this line of reasoning by students. First, as obvious as it may seem, this study demonstrated that skipping class has a major negative effect on GPA. Second, the data suggest that college students cannot circumvent the negative effects of skipping class on their GPA by using prescription stimulants as a study aid. Overall,

college students do not improve their grades by using prescription stimulants nonmedically. Rather, their grades appear to suffer, perhaps because of their poorer academic habits and greater overall drug involvement.

From the present study, nonmedical use of analgesics is also related to decreases in GPA. Because analgesics are not used for the compensatory purposes described above, this effect might be more closely related to an overall deviance factor, similar to other drug use. Alternatively, the adverse effect on GPA could be related to the physiological effects of analgesics. Nevertheless, this finding draws attention to an important, measurable consequence (i.e., college grades) of nonmedical use, one which might serve as a proxy for a more generalized decrease in overall functioning and success.

The findings of this study must be seen in light of several limitations. First, although academic data were derived from administrative datasets, our findings rely heavily on self-reported data of illicit drug use, and while we have no indication that underreporting occurred, the possibility of social desirability bias cannot be ruled out. Second, because all participants were sampled from one university, results may not be generalizable to institutions located in other regions of the country or small private colleges. Furthermore, we used past-year drug use as a dichotomous predictor of academic performance, rather than using a more graduated measure of drug involvement (e.g., frequency of use). However, this limitation is mitigated by the low overall variability observed in the frequency of nonmedical use in our sample. Lastly, our models to predict academic performance, while comprehensive, did not contain other possible covariates which might influence GPA, such as academic major, goal orientation, and alcohol consumption.

If replicated, the present findings may have important implications for prevention. First, to reduce the availability of prescription drugs for nonmedical use, physicians should be encouraged to educate their patients about the risks of nonmedical use—especially for patients who are either college students or parents of college students—and provide clear guidance for how to prevent their medications from being diverted. These types of one-on-one educational interventions may be particularly effective in correcting parents' misperceptions that nonmedical use of prescription stimulants is a safe way for their children to cope with the demands of college life. Moreover, given what is already known about the association between prescription drugs and use of other illicit drugs (Barrett, Darredeau, Bordy, & Pihl, 2005; Herman-Stahl, Krebs, Kroutil, & Heller, 2006; McCabe, Knight et al., 2005; Teter et al., 2003), parents and providers should regard nonmedical use of prescription stimulants or analgesics as a warning sign for more serious drug involvement. Within campus communities, social marketing strategies may be helpful in correcting students' misperceptions that nonmedical use will help them achieve better grades. Armed with information about the adverse academic consequences of nonmedical use, such as from the present study, campus administrators should consider reaching out to parents and students with educational messages aimed at discouraging nonmedical use, and college health providers should routinely screen students for nonmedical use, especially when students are struggling academically.

Although many promising avenues for prevention are apparent, more research is needed to better inform prevention strategies, especially regarding the underlying factors that promote nonmedical use. One intriguing possibility is that undiagnosed or untreated attention deficit hyperactivity disorder (ADHD) may be a contributing factor in some cases of nonmedical use of stimulants, especially if students derive a performance benefit—whether real or perceived—from using the drugs. Future studies should perform clinical assessments of ADHD among nonmedical users of prescription stimulants to determine the extent of undiagnosed and untreated ADHD in this population. Moreover, to clarify the findings from

the present study, future studies should explore the relationship between more fine-grained measures of drug use and academic outcomes. In particular, it would be interesting to know whether prescription drugs, when used concurrently or simultaneously with alcohol and other drugs, are associated with an even greater risk for academic performance problems than what was observed in this study. Researchers should also consider additional factors with a possible influence on GPA which were not accounted for in this study, such as academic major and attitudes such as goal-orientation. Future studies with this cohort will determine whether the reasons for nonmedical use (e.g., studying, partying, relaxation) have any bearing on academic performance.

Finally, there is an urgent need for research to fill critical gaps in our understanding of the long-term psychosocial and physical consequences of nonmedical prescription drug use. Longitudinal investigations of college students such as our study will provide a unique opportunity to gain understanding of these issues. Future research with this cohort will shed light on the extent to which nonmedical drug use patterns continue throughout college and whether they lead to longer-term consequences such as continued risk of academic underachievement, dropout, drug dependence, and perhaps subsequent reliance on stimulants in occupational settings later in life.

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Table 1

Lifetime and past-year prevalence of nonmedical use of prescription stimulants and analgesics, among first-year college students.

Nonmedical Use	Lifetime Prevalence		Past-Year Prevalence	
	n	$\%_{wt}$[1]	*n*	$\%_{wt}$[1]
Neither drug	916	**80.4**	985	**84.5**
Stimulants only	127	**7.9**	117	**7.5**
Analgesics only	106	**6.3**	85	**4.8**
Both drugs	104	**5.4**	65	**3.3**

[1]Frequencies were weighted to represent the general population of N_{Wt}=3,285 first-year students, based on a sample of n=1,253 students.

Table 2

Patterns of nonmedical use of prescription stimulants and/or analgesics, by other nonmedical use.

Prescription Stimulant Users	**Stimulants Only *n*=117 *M(SE)***	**Stimulants and Analgesics *n*=65 *M(SE)***
Age of onset (stimulants)	17.3 (.2)[a]	16.9 (.2)[a]
Lifetime frequency of use	16.8 (3.7)	22.6 (5.1)
Ever inhaled (%)	4.3[a]	13.9[a]
Number of other drugs ever used	1.5 (.1)[abc]	3.4 (.1)[ad]
Prescription Analgesic Users	Analgesics Only *n*=85 *M(SE)*	Stimulants and Analgesics *n*=65 *M(SE)*
Age of onset (analgesics)	17.1 (.2)	17.2 (.2)
Lifetime frequency of use	8.9 (5.7)	14.3 (6.8)
Ever inhaled (%)	8.2	15.4
Number of other drugs ever used	2.2 (.1)[bef]	3.4 (.1)[e]
Nonusers		
Number of other drugs ever used	0.8 (.1)[cdf]	

[abc] Groups that share the same superscript are significantly different ($p<.05$), as determined in simple pairwise comparisons of least squares means. All comparisons control for the effects of race, sex, and mother's education. For the number of other drugs used, the same result is reported twice for the stimulantsand-analgesics group, to assist the reader in interpreting comparisons; however, all comparisons were performed in one regression model.

Table 3

Comparison of academic and social behaviors among past-year nonmedical users of prescription stimulants and/or analgesics and nonusers.

	Nonusers *n*=985 *M(SE)*	All Nonmedical Users *n*=267 *M(SE)*	Nonmedical Users		
			Stimulants Only *n*=117 *M(SE)*	Analgesics Only *n*=85 *M(SE)*	Stimulants and Analgesics *n*=65 *M(SE)*
Academic Performance					
High school GPA	3.86 (.03)[abc]	3.71 (.03)[a]	3.67 (.05)[b]	3.73 (.05)[c]	3.76 (.06)
College GPA	2.96 (.04)[acd]	2.74 (.05)[a]	2.82 (.07)	2.71 (.08)[c]	2.61 (.09)[d]
Studying					
Weekdays (hours/day)	2.9 (.1)[a]	2.6 (.1)[a]	2.6 (.2)	2.6 (.2)	2.7 (.2)
Weekends (hours/day)	2.7 (.1)[a]	2.3 (.1)[a]	2.3 (.2)	2.3 (.2)	2.1 (.3)
Total (hours/week)	19.7 (.6)[a]	17.2 (.8)[a]	17.2 (1.1)	17.2 (1.2)	17.1 (1.4)
Socializing					
Weekdays (hours/day)	2.3 (.1)[acd]	3.0 (.1)[a]	2.7 (.2)	3.2 (.2)[c]	3.0 (.3)[d]
Weekends (hours/day)	5.2 (.1)[acd]	5.9 (.2)[a]	5.7 (.3)	6.0 (.3)[c]	6.0 (.3)[d]
Total (hours/week)	24.8 (.7)[abcd]	29.4 (1.0)[a]	28.0 (1.3)[b]	30.6 (1.5)[c]	30.2 (1.7)[d]
Percent of Classes Skipped	9.4 (.8)[bd]	16.0 (1.15)[a]	16.1 (1.5)[b]	12.6 (1.6)[g]	20.9 (2.0)[cg]

abcdefg Groups that share the same superscript are significantly different ($p<.05$), as determined in simple pairwise comparisons of least squares means. Skipping class is computed as the proportion of class sessions skipped in a typical week (100 × number skipped / total number of classes scheduled per week). All comparisons control for the effects of race, sex, and mother's education.

Table 4

Results of multiple linear regression models predicting college GPA.

	Model 1		Model 2		Model 3		Model 4	
	b (SE)	***t***	***b (SE)***	***t***	***b (SE)***	***t***	***b (SE)***	***t***
Nonmedical use, past year	−.146 (.043)	−3.38***	−.135 (.043)	−3.11**	−.092 (.043)	−2.13*	−.089 (.043)	−2.07*
Hours studying/week			.005 (.002)	2.46*			.002 (.002)	.95
Percent of classes skipped					−.009 (.001)	−6.48***	−.008 (.001)	−6.02***

All models control for the effects of race, gender, mother's education, high school GPA, fraternity/sorority affiliation, living with family, and time in college.

*$p<.05$

**$p<.01$

***$p<.001$