

COLLEGE UNDERGRADUATE RITALIN ABUSERS IN SOUTHWESTERN CALIFORNIA: PROTECTIVE AND RISK FACTORS

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During the past five years, a few studies have reported that college students are using stimulants such as Ritalin without a prescription. To date, studies on college Ritalin/Adderall use have been from samples in the eastern or midwestern U.S. This study was designed to examine risk and protective factors associated with Ritalin/Adderall use among a college sample in Southern California. Our findings indicate that 11.2% of students reported past year and over 4% reported past 30 day use of Ritalin/Adderall. In our final analysis, students with lower GPAs, in a fraternity/sorority, not in a committed relationship, and who smoke and use other drugs were more likely to report past year and past 30 day Ritalin/Adderall use. Implications for prevention programming of these findings are discussed.

BACKGROUND

College years have historically been marked by the use of alcohol and heavy drinking behaviors. Alcohol and other drug use are among the top threats to college student health and a leading cause of death in the U.S. (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). Alcohol consumption is highly prevalent among college students as documented through several national population based studies. In addition to heavy alcohol use, during the past five years data have revealed that

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college students are using prescription drugs such as Ritalin (methylphenidate), Adderall (mixed-salts amphetamine), and Dexedrine (D-amphetamine). These drugs are primarily prescribed to treat attention deficit hyperactivity disorder (ADHD). The most recent estimates, based upon the 2003 National Survey of Children's Health (Centers for Disease Control [CDC], 2005) indicate 4.4 million children between the ages of 4 and 17 have a history of ADHD diagnosis with a national prevalence rate of 7.8%. Of those with a diagnosis, 2.5 million (56%) report taking medication for the disorder resulting in a medication rate with a mean of 4.3% ranging from 0.3% to 9.3% (CDC, 2005). Although Adderall is more potent than Ritalin, they both have been found effective in treating ADHD (Pelham et al., 1999). However, as of the late 1990s, 90% of stimulant use for the treatment of ADHD in the U.S. is methylphenidate (Goldman, Genel, Bezman, & Slantetz, 1998). Methylphenidate is classified as a Schedule II substance by the U.S. Drug Enforcement Administration and is considered to have a high potential for abuse and psychological dependence (Woodworth, 2000).

In 2003, 36% of college students reported past year use of an illicit drug; however, this prevalence rate drops to about 18% of college students using any illicit substance when marijuana is excluded (Johnston, O'Malley, Bachman, & Schulenberg, 2004). Published studies indicate that there has been an increase in popularity of the use of Ritalin among college students. The national Monitoring the Future study has collected the annual prevalence of Ritalin use only since 2002. For the two years of data published for 2002 and 2003, between 4.7% and 5.7% of college students have reported past year Ritalin use (Johnston et al., 2004). Table 1 summarizes this research. This table presents the populations, parts of the country, sample and sample size, response rates, and AOD use rates reported. As shown in Table 1, most studies report rates of Ritalin use among college students that are similar to those obtained in the 2003 Monitoring the Future report. For example Teter and colleagues (2005) reported that 8.1% of college undergraduate students reported illicit use of prescription stimulants during their lifetime, and 5.4% reported such use during the past year. Higher rates have been reported by Low and Gendaszek (2002), with 10.3% of college undergraduates surveyed reporting use without a prescription of either Ritalin or Adderall and another 24.0% reporting the use of both substances.

In addition to surveys conducted at individual undergraduate colleges (as seen in Table 1), a national college survey of four-year institutions showed that 6.9% of college students reported nonmedical use of prescription stimulants, with 4.1% reporting past year use and 2.1% reporting past month use (McCabe, Knight, Teter, & Wechsler, 2005). The prevalence rates of use spanned a range from 0% at some colleges to 25% for past year use and 0% to 13% for past month use.

TABLE 1
STUDY SUMMARY

Author(s)	Population	Location	Mode	Sample Size	Resp. Rate	Stimulant Use	Alcohol Use	Stimulant Question Wording
Cashin et al. (1998)	College	National	Paper/Pencil	25,411	N/A	N/A	38% (HED)	
Hall et al. (2005)	College	Midwest	Paper/Pencil	381	38%	13.7% (lifetime)	N/A	"I have taken stimulants for nonmedical purposes."
Hingson et al. (2002)	College	National	Interview	6,930	69%	N/A	42% (HED)	
Low & Gendaszek (2002)	College	Northeast	Paper/Pencil	150	93%	24% (12 mos.)	N/A	"Use of adderall, methylphenidate or dextroamphetamine without a prescription."
McCabe & Boyd (2005)	College	Midwest	Web-Based	9,161	43%	5.4% (12 mos)	N/A	"# occasions used stimulant medication not prescribed to you?"
McCabe et al. (2005)	College	National	Paper/Pencil	5,883	73%	N/A	23% (HED, w1) 38% (HED, w2)	
McCabe et al. (2005)	College	National	Paper/Pencil	10,904	52%	4.1% (12 mos.) 2.1% (past mth)	N/A	"How often, if ever, have you used any of the drugs listed below? Do not include anything you used under a doctor's orders."
Teter et al. (2005)	College	Midwest	Web-Based	10,008	47%	5.4% (12 mos.)	N/A	"# occasions used stimulant medication not prescribed to you?"
McCabe et al. (2004)	Middle/High	Midwest	Web-Based	1,723	89%	2.4% (lifetime)	16% (HED)	"Please indicate if you have ever used any of the following drugs not prescribed to you."
Teter et al. (2003)	College	Midwest	Web-Based	2,250	64%	2.5% (12 mos.)	N/A	"Have you ever used Ritalin?"

When examining differences between students who abuse prescription stimulants and those who do not, there are some characteristics that are commonly reported. Males are more likely to report nonmedical use of prescription stimulants than are females (Teter et al., 2005; McCabe et al., 2005; Low & Gendaszek, 2002). In the nationally representative study of undergraduate colleges, 5.8% of males reported past year use compared to 2.9% of females (McCabe et al., 2005).

Racial differences have been identified among those reporting illicit use of nonprescription drugs. White students report higher rates of nonprescription stimulant use than Asian or African-American students (McCabe et al., 2005). Teter, McCabe, Cranford, Boyd, and Guthrie (2003) found significant differences in the illicit use of prescription drugs among White, Asian, and African-American students, but no such differences were found between White and Hispanic students.

Differences have been identified between Greek and non-Greek students for illicit drug use. Those belonging to a fraternity or sorority were more likely to report marijuana use, illicit drug use, and the nonmedical use of prescription stimulants than nonmembers with the difference between Greek members and nonmembers being higher for males compared to females (McCabe et al., 2005; McCabe, Teter, Boyd, in press; Teter et al., 2005). In a recent study, McCabe and associates (2005) also found college students who reported nonmedical use of prescription stimulants had lower grade point averages, and those with a B+ or higher average were about half as likely to report use of these substances compared to those with lower GPAs.

The extant literature on poly substance use among college students indicates that those who report nonmedical use of stimulants also report higher rates of other drug use. College students who use stimulants without a prescription were significantly more likely to report heavy episodic drinking (McCabe et al., 2005; Teter et al., 2003) and marijuana (McCabe et al., 2005; Teter et al., 2003) as well as ecstasy, cocaine, and opiate use (McCabe et al., 2005) than their peers not reporting nonmedical stimulant use. Students who report using medical stimulants without a prescription describe higher rates of substance use related problems than those not reporting nonmedical stimulant use (McCabe et al., 2005; Teter et al., 2003). The abuse potential of prescription stimulants by college students poses an important public health problem to college health professionals and administrators. According to CDC data, in 2003, California had the lowest percentage of children with ADHD treated with medication nationally (CDC, 2005). Thus one might expect college students in California might have lower rates of illicit Ritalin/Adderall use due to lower availability of the drugs. To date, however, there have been no studies examining the use of these substances on samples of college students from the Western U.S. Because the research published on college abuse of nonprescription stimulants has primarily used samples from either midwestern (McCabe et al., in

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press; McCabe et al., 2005; Hall, Irwin, Bowman, Frankenberger, & Jewett, 2005; Teter et al., 2003) or eastern (Hall et al., 2005; Low & Gendaszek, 2002) colleges or universities, this study seeks to fill this gap in the literature and to replicate the findings obtained by these other authors.

METHODS

PROCEDURE

A random sample of undergraduate students attending a large public university in the southwestern United States was invited by e-mail to participate in an internet-based survey examining college student achievement, lifestyles, and alcohol and other drug behavior. The e-mail invitation briefly described the survey and included instructions and a unique PIN number (the student's university ID number) code to access the survey. Participants could also link directly to the survey through a link provided in the e-mail invitation. The use of a unique pin code to access the survey ensured that each respondent could only complete the survey once. Students who participated in the survey were entered into a sweepstakes lottery and had the opportunity to win one of 20 prizes ranging in value from \$25 to \$250. The survey was open to participants for approximately three weeks during the spring semester of 2005.

Four days following the receipt of the e-mail invitation, nonresponders and participants who partially completed the survey were sent a reminder e-mail concerning participation in the study. A second and third reminder was sent to nonresponders and partial completers four days following the first and second reminder e-mails, respectively. All potential respondents could request to be removed from future e-mail contacts in order to comply with laws and regulations regarding unsolicited e-mail contacts.

Once participants began the survey, they read a brief introduction and were presented with an online consent form to review. Participants affirmed their consent by selecting "I consent" at the bottom of the online consent form. Following the consent form, participants completed a core set of demographic and college-related items (i.e., last semester GPA, fraternity/sorority membership), as well as questions concerning cigarette use, alcohol use, and illegal and prescription drug use. The San Diego State University Institutional Review Board approved all measures and procedures for this study.

SURVEY PARTICIPANTS

A total of 6,150 undergraduates were invited to participate in an internet survey. Of those invited, approximately 32% completed the survey (1,998 respondents). This response rate is somewhat low; however, the response rates of web-based surveys examining alcohol or other substance use can vary widely. In a recent study

that examined adult alcohol use via web-based, telephone, and U.S. mail survey modes, the authors found a 15.4% response rate to the web-based survey, which was significantly lower than the other survey modes (Link & Mokdad, 2005). In contrast, McCabe and colleagues found a higher response rate for a web-based survey of AOD use with college students compared to a mail survey (McCabe, Boyd, Couper, Crawford, & D'Arcy, 2002).

Because the present analysis focused on Ritalin/Adderall use among typical college-aged students, we selected undergraduate respondents between the ages of 18 and 24 ($n = 1,596$) for inclusion in our final analyses. Females were overrepresented in this sample; thus, we created a case-weight based upon the actual distribution of undergraduate men and women at the university. Nearly 60% of the weighted sample were women and the racial/ethnic breakdown of the sample was reasonably representative of the university: White (62.5%), Hispanic/Latino (19%), Asian/Pacific Islander (14%), African American (2.5%), and multiracial/other (2.5%). The mean age of the sample was 20.2 years ($SD=1.6$). More than one third (38%) of respondents were freshmen.

SURVEY MEASURES

The core demographic items included questions about the respondent's gender, age, race/ethnicity, whether the respondent was in a committed relationship (yes/no), and frequency of religious service attendance (never, 1-6 times a year, 7-11 times a year, once a month, 2-3 times a month, once a week, 2 or more times a week). The college-related measures included the respondent's GPA for the previous semester, type of residence (i.e., residence hall, fraternity/sorority, etc.), and class standing (i.e., freshman, sophomore, etc.).

Several measures of alcohol consumption were included in the survey. We calculated the number of drinks a respondent reported consuming per occasion using a set of questions concerning past month (28 days) alcohol consumption. Participants were asked to indicate (1) how many days they consumed at least one drink of beer, wine, or liquor during the past four weeks; (2) the number of days (when they did drink) they consumed one or more drinks during the past four weeks; (3) the number of days (when they drank more than one drink) they consumed three or more drinks during the past four weeks; (4) the number of days (when they drank more than three drinks) they consumed six or more drinks during the past four weeks; and (5) the maximum number of drinks they consumed on any one day during the past four weeks. We computed a measure of drinks per occasion (DPO) for each respondent (see Clapp et al., 2003) based upon the Consumption Model Analysis Program developed by Gruenwald and Nephew (1994). Participants were further asked to report the highest number of drinks they consumed during the past two

weeks as a measure of heavy episodic drinking. Participants who indicated on the survey that they were not sure whether they had consumed alcohol during the past 12 months ($n=56$) were coded as not having a heavy episodic drinking occasion in the past two weeks and were given a value of zero for the DPO measure.

In addition to the alcohol use question, the survey queried participants' smoking status which was categorized as follows: never smoker (never smoked a cigarette, not even a puff in his or her lifetime), experimenter (smoked at least 1 but less than 100 cigarettes in his or her lifetime and reported smoking in the past 30 days), and current smoker (smoked more than 100 cigarettes in his or her lifetime and reported smoking in the past 30 days).

Additionally, the survey included the use of illegal drugs (marijuana, cocaine, and ecstasy) and the use of prescription drugs (Ritalin/Adderall as one question, with additional questions for Soma and Oxycontin) without a prescription during the past 12 months and past 30 days. The specific questions in the survey were as follows: "On how many occasions in the past 12 months have you used the following: Adderall and/or Ritalin without a prescription?" and "on how many occasions in the past 30 days have you used the following: Adderall and/or Ritalin without a prescription?" For past year and past 30-day use, participants could select the following frequency of use categories: never, 1-2 occasions, 3-5 occasions, 6-9 occasions, 10-19 occasions, 20-39 occasions, and 40 or more occasions.

DATA ANALYSIS

We examined the bivariate relationships between Ritalin/Adderall use and participant demographics, college-related variables, cigarette use, alcohol use, and illegal and prescription drug use. Past year and past 30 day use of Ritalin/Adderall without a prescription served as the dependent variables for our analyses. Because of the low reports of frequent Ritalin/Adderall use in our sample, we dichotomized these measures into "used" and "none used" categories. Additionally, we collapsed our original five race/ethnicity categories into "White" and "non-White" because of very small rates of Ritalin/Adderall use among non-White respondents. We then collapsed across the categories of the religious service attendance variable into an "attendance" and "no attendance" dichotomous response. The three items measuring the use of marijuana, cocaine, and ecstasy and the two items measuring Soma and Oxycontin use without a prescription were combined into two separate measures: (1) illegal drug use and (2) the use of prescription drugs without a prescription. Respondents reporting the use of one or more illegal substances or one or more prescription drugs in the past year or in the past 30 days were coded as having used one or more substances ("used" vs. "none used").

Variables with a significant bivariate relationship to Ritalin/Adderall use were included in logistic regression analyses separately modeling past year and past 30 day use. Variables were entered simultaneously into these models. Cases with missing data on any of the variables included in the study were deleted listwise from the multivariate analyses. We weighted the bivariate and multivariate analyses to account for the overrepresentation of women in the sample.

RESULTS

BIVARIATE ANALYSES

Bivariate associations between past year and past 30 day Ritalin/Adderall use and participant demographics, college-related variables, cigarette use, alcohol use, and drug use are presented in Tables 2 and 3. As observed in Table 2, both past year and past month Ritalin/Adderall use were significantly correlated with a participant's age, last semester GPA, drinks per occasion and maximum number of drinks in the past two weeks. As expected, alcohol consumption was positively related to the use of Ritalin/Adderall. In contrast, respondent age and GPA were negatively related to use.

As found in Table 3, respondent gender and race (White vs. non-White) were significantly associated with past year and past month Ritalin/Adderall use. Participants belonging to a Greek organization or living in a Greek house were significantly more likely to report past year and past 30 day use compared to respondents who are not involved in Greek organizations or who reside in other types of residential environments (i.e., residence halls, off-campus housing). A participant's class standing was significantly associated with past year and past month Ritalin/Adderall use with seniors reporting the lowest percentage of use. College freshmen and sophomores were much more likely to report Ritalin/Adderall use.

TABLE 2
CORRELATION RESULTS BETWEEN UNDERGRADUATE STUDENT CHARACTERISTICS AND PAST YEAR
AND PAST 30 DAY RITALIN/ADDERALL USE

Variable ^a	(1)	(2)	(3)	(4)	(5)	(6)
(1) Age	1.00	.198***	.011	.063*	-.073**	-.070**
(2) GPA		1.00	-.100***	-.090**	-.131**	-.116**
(3) DPO			1.00	.807***	.280***	.180***
(4) Max drinks (2 wks)				1.00	.281***	.179***
(5) Ritalin (past year)					1.00	.605***
(6) Ritalin (past 30 days)						1.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^aPoint-biserial correlation coefficients shown for correlations between dichotomous and continuous variables.

Pearson correlation coefficients shown for correlations between continuous measures.

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TABLE 3
BIVARIATE RESULTS EXAMINING THE ASSOCIATION BETWEEN UNDERGRADUATE STUDENT
CHARACTERISTICS AND PAST YEAR/PAST 30 DAY RITALIN/ADDERALL USE

Variable	Past Year Use			Past 30 day Use		
	Percent	95% CI	Chi-Square	Percent	95% CI	Chi-Square
Total	11.20	9.76-12.85		4.15	3.27-5.24	
Gender						
Male	14.39	11.87-17.33		5.97	4.37-8.10	
Female	9.11	7.46-12.47	$\chi^2 = 10.73$ **	2.95	2.06-4.23	$\chi^2 = 8.68$ **
Race						
White	14.50	12.44-16.84		5.32	4.08-6.91	
Non-White	6.05	4.4-9.02	$\chi^2 = 26.33$ ***	2.24	1.32-3.78	$\chi^2 = 8.73$ **
Class Standing						
Freshman	12.76	10.35-15.63		5.49	3.94-7.60	
Sophomore	13.00	10.11-16.57		4.52	2.91-6.98	
Junior	10.88	7.66-15.23		3.55	1.89-6.58	
Senior	6.15	3.97-9.43	$\chi^2 = 10.68$ *	1.55	6.07-7.66	$\chi^2 = 8.27$ *
Residence Type						
On campus	14.51	11.88-17.61		6.25	4.54-8.54	
Fraternity/Sorority	53.89	39.50-67.65		17.49	9.00-31.26	
Off campus	7.35	5.87-10.08	$\chi^2 = 102.04$ ***	2.32	1.55-3.48	$\chi^2 = 33.88$ ***
Fraternity/Sorority						
No	7.35	6.09-8.85		2.56	1.85-3.54	
Yes	36.63	30.45-43.29	$\chi^2 = 158.37$ ***	14.81	10.61-20.29	$\chi^2 = 67.50$ ***
Committed Relationship						
No	12.87	10.80-15.26		5.51	4.17-7.25	
Yes	9.04	7.13-11.41	$\chi^2 = 5.69$ *	2.36	1.46-3.79	$\chi^2 = 9.63$ **
Religious Attendance						
Never attends	12.47	9.71-15.87		5.78	3.95-8.36	
Attends	10.95	9.50-13.19	$\chi^2 = 0.77$	3.62	2.68-5.14	$\chi^2 = 3.61$
Smoker Status						
Never smoked	3.86	2.69-5.51		0.84	0.39-1.80	
Experimenter	14.78	12.20-17.79		5.73	4.15-7.86	
Smoker	27.64	21.58-34.65	$\chi^2 = 97.48$ ***	12.44	8.33-18.17	$\chi^2 = 54.25$ ***
Illegal Drug Use (12 mos.)						
None used	2.36	1.56-3.55		0.94	0.82-1.67	
Used	23.15	20.12-26.46	$\chi^2 = 170.45$ ***	12.85	10.00-16.35	$\chi^2 = 111.63$ ***
Prescription Drug Use (12 mos.)						
None used	6.69	5.49-8.13		3.22	2.44-4.24	
Used	40.46	34.11-47.14	$\chi^2 = 212.94$ ***	19.34	12.55-28.60	$\chi^2 = 53.30$ ***

*p < 0.05, **p < 0.01, ***p < 0.001
 CI = Confidence Interval

Being in a committed relationship was significantly associated with less past year and past 30 day use compared to students who were single; however, religious service attendance was not associated with past year or past month use for these substances. Both smokers and individuals experimenting with tobacco reported

significantly higher rates of Ritalin/Adderall use in the past year and past month compared to nonsmokers. The past use of one or more illegal drugs or one or more prescription drugs was also significantly associated with past year and past month use of Ritalin/Adderall.

MULTIVARIATE LOGISTIC REGRESSION MODELING PAST YEAR USE

The adjusted odds ratios reported in Table 4 represent the odds of reporting past year use of Ritalin or Adderall controlling for all the other variables in the model. As shown in Table 4, respondents with higher past semester GPAs were less likely to report using Ritalin or Adderall in the past 12 months than individuals with lower GPAs. Although a participant's gender, race, age, and class standing was associated with 12 month prevalence in the bivariate analyses, these factors were not significant in the logistic regression after controlling for the other covariates. Being a member of a Greek organization and residing in a fraternity or sorority were both risk factors associated with past year use of Ritalin or Adderall. Specifically, members of fraternities and sororities were nearly seven times more likely to report Ritalin/Adderall use in the past 12 months compared to nonmembers. Compared to respondents living on campus, those who reported residing at a fraternity or sorority were 4.5 times more likely to report having used these drugs without a prescription in the past 12 months. Being in a committed relationship reduced a respondent's likelihood of reporting Ritalin or Adderall use by over 40%. Smokers and respondents experimenting with cigarettes were more likely to report the use of these prescription drugs than nonsmokers. Consuming more alcoholic drinks per occasion was associated with greater likelihood of past year use, but a similar relationship was not observed for past two week heavy episodic drinking. Participants reporting the use of illegal or prescription drugs were 5.4 and 3.2 times more likely, respectively, to report the use of these substances in the past 12 months than those reporting no use.

MULTIVARIATE LOGISTIC REGRESSION MODELING PAST 30 DAY USE

As observed in Table 4, respondent gender, race, age, class standing, and residence type were not significantly associated with 30-day use in the logistic regression model. Participants with a higher past semester GPA and in a committed relationship were less likely to report past 30 day use. Similar to the results from the past year use model, members of Greek organizations were almost six times more likely to report Ritalin/Adderall than nonmembers. Neither measure of alcohol use significantly predicted Ritalin/Adderall use in this model. Only tobacco experimenters were more likely to report using Ritalin/Adderall in the past 30 days relative to those who had never smoked. The use of one or more illegal substances and the use of

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TABLE 4
RESULTS OF MULTIPLE LOGISTIC REGRESSION ANALYSES FOR PAST YEAR/PAST 30 DAY
RITALIN/ADDERALL USE

Variable	Past Year Use (N = 1184)		Past 30 day Use (N = 1173)	
	AOR	95% CI	AOR	95% CI
Gender				
Male	1.00		1.00	
Female	0.79	0.48-1.30	1.02	0.48-2.20
Race				
White	1.00		1.00	
Non-White	1.05	0.61-1.80	0.58	0.25-1.32
Age	0.87	0.56-1.35	0.65	0.31-1.35
Last Semester GPA	0.52	0.34-0.81 **	0.51	0.26-0.99 *
Class Standing				
Senior	1.00		1.00	
Junior	1.08	0.37-3.16	0.71	0.11-4.48
Sophomore	1.75	0.45-6.75	0.82	0.09-7.33
Freshman	1.04	0.21-5.22	0.52	0.04-6.64
Residence Type				
On campus	1.00		1.00	
Fraternity/Sorority	4.50	1.60-12.68 **	2.33	0.58-9.37
Off campus	0.85	0.47-1.54	0.76	0.30-1.94
Fraternity/Sorority				
No	1.00		1.00	
Yes	6.98	4.04-12.05 ***	5.75	2.58-12.79 ***
Committed Relationship				
No	1.00		1.00	
Yes	0.59	0.36-0.95 *	0.36	0.16-0.83 *
Smoker Status				
Never smoked	1.00		1.00	
Experimenter	2.24	1.18-4.25 *	3.72	1.18-12.37 *
Smoker	3.05	1.39-6.69 **	3.67	0.95-14.17
Drinks per Occasion	1.12	1.02-1.24 *	1.13	0.96-1.33
Max Drinks (2 weeks)	0.99	0.94-1.05	0.95	0.86-1.04
Illegal Drug Use (30-day)				
None used	1.00		1.00	
Used	5.38	2.71-10.70 ***	7.03	1.81-27.25 **
Prescription Drug Use (30-day)				
None used	1.00		1.00	
Used	3.17	1.84-5.45 ***	4.76	2.02-11.24 ***

*p < 0.05, **p < 0.01, ***p < 0.001

AOR = Adjusted Odds Ratio, CI = Confidence Interval

one or more other prescription drugs were associated with a greater likelihood of using Ritalin/Adderall in the past month.

DISCUSSION

Ritalin is the most widely prescribed stimulant medication for ADHD in this country (Goldman et al., 1998). Over half of college students who are prescribed such medication report that they are approached to divert their medication through selling, sharing, or giving it away (McCabe et al., in press). This study focused on the risk and protective factors associated with nonprescription use of Ritalin/Adderall at a university in southern California. Overall, California has the lowest percentage of youth with ADHD being treated with such medications in the country (CDC, 2005). Our research supported some of the prior findings, failed to support others, and we found some unique associations not reported in prior research.

Contrary to expectation, this sample of college students reported higher rates of past year Ritalin/Adderall use compared to national data. We found that 11.2% of our sample reported past year use compared to a national rate of about 4.7% for past year use (Johnston, O'Malley, Bachman, & Schulenberg, 2005). It is possible the high rate of use observed in our sample could be attributed to an overrepresentation of students who use other substances. Compared to results from the most recent Monitoring of the Future survey of college students between the ages of 19 and 22 (Johnston et al., 2005), the respondents to our survey reported higher rates of past month marijuana use (26.2% vs. 18.9%), but similar rates of past-month smoking (22.3% vs. 24.3%) and lower rates of recent heavy episodic drinking (defined as five or more drinks on any one occasion) in the past two weeks (36.9 vs. 41.7%) were observed for this sample. The rate for heavy episodic drinking in this sample is lower than the rate (44.4%) reported by Wechsler and Kuo (2003) using nationally representative data from the College Alcohol Study. Thus, this sample does not appear to be predisposed to higher rates of other substance abuse.

Whether the overall population estimates of Ritalin/Adderall are anomalous, the main focus of the present study was to examine the correlates of Ritalin/Adderall use as opposed to documenting population use estimates. Here our findings support some of the prior research published on college use of prescription stimulants. Prior research has reported an association between Ritalin use and other drug use (Teter et al., 2003). The research reported here did find those reporting both past year and past month illegal drug use were more likely to report Ritalin/Adderall use. Additionally, our data support the previous finding (McCabe et al., 2005) that students with lower GPAs are more likely to use Ritalin/Adderall. Unlike illicit drug use, students reporting a higher rate of drinks per occasion or two week heavy

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drinking were not more likely to report abusing Ritalin in the past 30 days compared to lighter drinkers.

Our findings did reveal that both experimental smokers and regular smokers were more likely to report past year Ritalin use compared to nonsmokers; however, only experimenters had a greater likelihood of reporting past 30 day use relative to nonsmokers. The association of smoking and nonprescription stimulant use has not been studied elsewhere. One may speculate that the stimulant effects of nicotine may function within the same behavioral context as Ritalin/Adderall for some students. Perhaps they use both substances to cope with an academic stress or as a late-night study aid. Future research should explore the functional use of both substances.

Similar to other studies, our research also found that students who belonged to a fraternity or sorority did report higher rates of Ritalin use (McCabe et al., 2005; McCabe, in press). In fact, a member was almost seven times more likely to report past year Ritalin use compared to nonmembers. Furthermore, fraternity/sorority members were nearly six times more likely to report Ritalin use during the past month compared to nonmembers. Additionally, this study also examined the association of being in a committed relationship and Ritalin use. This association has not been examined in other research and is unique to this area of inquiry. Specifically, we found that those in a committed relationship were half as likely to report past year as well as past 30 day Ritalin use. Whether the relationship itself is protective or if it is an indicator of a predispositional protective factor is unclear from these data and is an area for future research.

Our results differed in significant ways, however, from results reported from other college studies. Our results did not identify significant differences in the past year or past month prevalence of use between males and females, while prior research has shown that males are significantly more likely to report nonprescription stimulant use than females (Teter et al., 2005; Teter et al., 2003; Low & Gendaszek, 2002). Unlike prior research (Teter et al., 2005; McCabe et al., 2005) we did not find differential use of Ritalin/Adderall between White and non-White students.

STRENGTH/LIMITATIONS

This study replicates other single campus epidemiological assessments of Ritalin/Adderall use. The study had a large sample but with a low response rate of 32%, these data should be viewed with caution. A major strength of the study is our geographic setting. To date, no studies have examined this issue with a west coast sample of college students. Further studies separating the abuse of Ritalin and Adderall may also yield interesting findings. Additionally, in this study, we did not ask respondents in our sample to provide reasons for using these drugs, and it is possible the context and reasons for the nonmedical use of these substances may

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differ from region to region. In a sample of Midwestern college students, the top reasons listed by respondents for the use of these drugs were linked to academic motives (i.e., better concentration, increased alertness) and feeling a "high" (Teter et al., 2005).

IMPLICATIONS

Although preliminary, our data suggest that Ritalin/Adderall use is widespread enough to warrant further examination and the development of targeted intervention programs. The adjusted odds ratios for Greek membership are alarming and this population represents a logical starting point for future interventions. To date, there are no prevention strategies proven effective for prescription medication abuse in this population. Understanding that students living in high density Greek housing are particularly at risk for such abuse points to interventions that focus on social access to the drugs, as well as normatively permissive environments. Campus health centers that may be the source of prescriptions for Ritalin/Adderall should be aware of the likelihood that students may be tempted or pressured to share their medications with their peers. The research also points to the need for individual campuses to assess their own prevalence for such abuse. In spite of a generally lower drinking rate, this campus demonstrated a substantially higher rate of Ritalin/Adderall use than rates reported in prior investigations. Thus, variability between campuses may be high, and the need to initiate prevention programs may similarly vary.

Future research is also needed to further examine the reasons students use these drugs without prescriptions. Our finding that not being in a committed relationship relates to use, for instance, needs to be better explained. Motivations, expectancies, and outcomes—both positive and negative—are all areas for future research.

ACKNOWLEDGMENTS

This study was funded in part by a grant from NIAAA U01 AA014738 (James Lange, PI).

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