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## Substance use behaviors among college students with same-sex and opposite-sex experience: results from a national study

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### Abstract

*Objectives:* This study seeks to describe the population of college students with same-sex sexual experience and determine if these students report more substance use than their peers with only opposite-sex experience. *Methods:* Questionnaires were completed by a national random sample of college students on 119 campuses in 1999. A total of 10,301 sexually active students were categorized as having only opposite-sex, only same-sex, or both-sex partners, and their smoking, binge drinking, and marijuana use behaviors were compared. *Results:* Students who report same-sex sexual experiences comprise 6.1% of respondent. Women with both-sex partners were approximately twice as likely to smoke, binge drink, and use marijuana as women with only opposite-sex partners (OR = 1.41–2.78), but women with only same-sex partners were not at increased risk for these behaviors. Men with both-sex partners were less likely to binge drink (OR = 0.54) than men with only opposite-sex partners. *Conclusions:* Students with same-sex experience are present at every type of college. College women with both-sex partners appear to be an appropriate target for health interventions; outreach to these students and further study of related behaviors are warranted.

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*Keywords:* Substance use; Sexual behavior; Homosexuality

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## 1. Introduction

Gay, lesbian, and bisexual (GLB) adolescents and adults have a host of health concerns at higher rates than their heterosexual counterparts. Mental health issues among GLB adolescents and adults are well documented: They report more depression, mental health counseling, suicidal ideation and attempts, and lower self-esteem than their straight peers (Bradford & Ryan, 1989; Bradford, Ryan, & Rothblum, 1994; D'Augelli & Hershberger, 1993; Garofalo, Wolf, Wissow, Woods, & Goodman, 1999; Gonsiorek, 1988; Remafedi, French, Story, Resnick, & Blum, 1998; Saewyc, Bearinger, Heinz, Blum, & Resnick, 1998; Saunders, Tupac, & MacCulloch, 1988; Trippet, 1994). GLB youth and adults also report significantly higher use of alcohol and other drugs—up to three times as high among GLBs as heterosexuals (AMA Council on Scientific Affairs, 1996; Bradford et al., 1994; Cabaj, 1992; Garofalo, Wolf, Kessel, Palfrey, & DuRant, 1998; McKirnan & Peterson, 1989; National Institute on Drug Abuse, 1991). In addition, GLBs have higher rates of unsafe sexual activity (Garofalo et al., 1998; Lemp & Nieri, 1991) and interpersonal violence (Garofalo et al., 1998; Savin-Williams, 1994) than the general population. GLB youth are also more likely to drop out of school than their peers (Remafedi, 1987a, 1987b).

Researchers on GLB health have used different criteria to identify study populations and draw samples. Laumann, Gagnon, Michael, and Michaels (1994) determined three relevant domains: behavioral (having same-sex sexual experience), desire (having a sexual attraction to members of the same sex), and identity (self-identification as gay, lesbian, or bisexual). Though some recent studies of adolescents use population-based samples (Garofalo et al., 1998, 1999; Remafedi et al., 1998), one of the significant limitations of much of the existing research on the GLB population is its heavy reliance on convenience samples and survey recruitment strategies that necessitate self-identification as gay, lesbian, or bisexual (Rothblum, 1994). Typically, these studies include volunteers recruited through GLB publications, events, support agencies, or STD clinics. This recruitment and sampling strategy may exclude a sizable segment of the population who do engage in same-sex behaviors but are not connected to the GLB community, do not consider themselves gay, lesbian, or bisexual, or are not comfortable claiming that label. These strategies might result in an overrepresentation of GLB participants with the health concerns described above, which may introduce considerable bias into the findings to date.

Health behaviors of college students, in general, have been well studied in the past decade, and findings from national random samples have suggested substantial cause for concern (Centers for Disease Control and Prevention, 1997; Gledhill-Hoyt, Lee, Strote, & Wechsler, 2000; Rigotti, Lee, & Wechsler, 2000; Sax, 1997; Wechsler, Dowdall, Davenport, & Castillo, 1995; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler, Lee, Kuo, & Lee, 2000; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998). While the overall smoking rate among adults has decreased steadily over the past several decades, the prevalence of current (i.e., past 30 days) smoking among college students has risen recently (Centers for Disease Control and Prevention, 1997, 2000a; Rigotti et al., 2000; Sax, 1997; Wechsler, Rigotti, et al., 1998). This is true despite the fact that smoking is much less common among college-educated

adults than among those with less education (Pamuk, Makuc, Heck, Reuben, & Lochner, 1998). Excessive alcohol use is also problematic among college students. A recent study found that 44% of students reported binge drinking, and 23% engaged in this behavior frequently (Wechsler et al., 2000). Alcohol use was associated with a variety of other problems, including missing classes, having unprotected sex, driving while intoxicated, and generally “doing something you regret” (Wechsler, Dowdall, et al., 1998). Almost half of college students reported ever using marijuana, and 16% reported recent use (Gledhill-Hoyt et al., 2000), which is comparable to recent use among young adults 18–25 years of age (including both college students and nonstudents; Centers for Disease Control and Prevention, 1997, 2000a).

By contrast, very few studies have focused on GLB college students. The many studies of sexual behavior using college samples are typically too small to include a large enough number of GLB students to make valid comparisons to straight students. The large national studies of college students have not included the questions on sexual orientation or same-sex behaviors necessary to identify groups for comparison. This study utilizes a large, nationally representative random sample of college students, and data were collected for a study unrelated to sexuality. This sample, therefore, is likely to be more representative of students with same-sex experience than has been reported on previously. In addition, this research uses the criterion of lifetime experience of same-sex sexual activity to define the GLB subgroup. We theorize that this is appropriate for this study, as individuals who have same-sex sexual contact but do not self-identify as lesbian, gay, or bisexual may be less comfortable with their sexuality than those who are openly gay, and may be particularly susceptible to subtle and internalized homophobia. They may, therefore, be at elevated risk of negative health outcomes. The goals of this paper are to (1) describe the population of college students with same-sex sexual experience, and (2) determine if college students with same-sex sexual experience report more substance use than their peers with only opposite-sex experience.

## **2. Methods**

### *2.1. Population, setting, and data collection*

The data for this research were gathered as part of the 1999 College Alcohol Study (CAS), which used a nested random sampling strategy to survey students at American colleges and universities. One hundred ninety-five institutions were randomly selected from a list of accredited 4-year colleges provided by the American Council on Education. The sample was selected using probability proportionate to the size of undergraduate enrollment at each institution. One hundred forty colleges (72%) participated in the first survey (in 1993). The main reason for colleges' nonparticipation was the administrators' inability to provide student contact information within the time parameters of the study. Twenty-one participating colleges were dropped from the 1999 CAS data set due to three major reasons: they were unable to provide a random sample in time for one of three surveys, failed to meet minimal

response rate criteria, or chose not to participate. Additional details of the setting and sampling strategy are provided elsewhere (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler et al., 2000).

The 119 participating colleges are representative of US institutions of higher learning. They are located in 39 states. Two-thirds is composed of public institutions and the remainder are private. Forty-four percent of colleges sampled, enroll more than 10,000 students, 23% enroll 5001–10,000 students, and 34% enroll 5000 or fewer students. Approximately two-thirds is in an urban or suburban location and one-third is in a rural or small town setting. Fifteen percent have a religious affiliation, and 5% enroll only women.

Administrators at each participating college provided a random sample of 225 full-time undergraduate students. Self-administered 20-page questionnaires were mailed directly to students in February 1999. Reminder postcards and surveys were also sent. Participation was voluntary, anonymous, and encouraged by a cash incentive. The response rate was 60% overall, but varied among the participating colleges (range = 49–83%). Three of four students (74%) reported ever having sexual intercourse. Of these, 630 students (including 435 females and 195 males) reported ever having a same-sex sexual partner. Data collection is described in greater detail elsewhere (Rigotti et al., 2000; Wechsler et al., 2000).

## 2.2. Measures

The main measure of sexual partnerships for this study was based on self-reports of behavior and not on self-identification as gay, lesbian, or bisexual. The survey item read “If you have ever been sexually active, has it been with . . . (a) I have not been sexually active, (b) Opposite sex partner(s), (c) Same sex partner(s), or (d) Both opposite and same sex partners.”

Health behaviors assessed in this study include tobacco, alcohol, and marijuana use. Tobacco and marijuana use were measured separately with the item “How often, if ever, have you used any of the drugs listed below?” and responses included (a) Never used, (b) Used but not in the past 12 months, (c) Used but not in the past 30 days, and (d) Used in the past 30 days. Binge alcohol drinking was measured according to the gender-specific 5/4 binge drinking definition (Wechsler, Dowdall, Davenport, & Rimm, 1995) as “In the last two weeks, how many times have you had 4 (or 5) drinks in a row?” (for females or males, respectively), and responses were ordinal, ranging from 0 to 10 or more times. *Abstainers* had consumed no alcohol in the past year, and *non-binge drinkers* had consumed alcohol in the past year but had not binged in the previous 2 weeks. Among those students who reported binge drinking in the past 2 weeks, *occasional binge drinkers* reported one or two episodes of binge drinking, while *frequent binge drinkers* reported three or more episodes. Additional variables previously shown to be associated with substance use were also included, specifically three college life variables (membership in a fraternity or sorority, participation in college athletics, and on- or off-campus residence) and major demographic variables (sex, age, race, Hispanic ethnicity, and marital status).

### 2.3. Analysis

Of the 14,138 students responding to the survey, 3591 (25%) non-sexually active students were excluded from analysis, as were an additional 246 (2%) who were missing data on other key variables. The remaining 10,301 students were included in this study. Analyses were conducted separately for males ( $n=4091$ ) and females ( $n=6210$ ) based on prior research demonstrating some differences between the sexes in the health behaviors of interest. The current version of SAS was used for statistical analyses (SAS Institute, Cary, NC).

Differences in the prevalence of health behaviors were indicated by proportions, and tests of significance were carried out using chi-square analysis. Logistic regression was used with dichotomous behavioral outcomes (past 30-day smoking, occasional or frequent binge drinking, and past 30-day marijuana use vs. not). Comparisons were made between students reporting only same-sex or both-sex contacts (separately) and students with only opposite-sex partners. Odds ratios are reported with 95% confidence intervals. Multivariate models included demographic and college life variables defined above in order to control for confounding, as each was associated with the outcome of interest in bivariate logistic regression. The generalized estimating equation (GEE) was used to fit the final regression models in order to make more robust inferences given the clustered sampling design (Zeger, Liang, & Albert, 1988), and these results are reported here.

## 3. Results

### 3.1. Characteristics of the sample

Characteristics of the student sample are presented in Table 1. The sample includes more female students than male students, due in part to the inclusion of six institutions for women only. Three-quarters of respondents were in the traditional college age group of 18–22 years old and the majority were white, non-Hispanic. Ten percent were married. Less than half of the respondents (40%) lived on-campus, 13% was member of a fraternity or sorority, and 15% were involved in intercollegiate athletics. Almost three-quarters (74%) of college students report being sexually experienced. Ninety-four percent of these students report that sexual experiences have been exclusively with opposite-sex partners, and 6% report sexual experiences with members of own their sex (including approximately 4% reporting both-sex partners and 2% reporting only same-sex partners). One percent of total participants did not respond to the sexual activity item.

Table 2 shows characteristics of respondents in each sex-partner group. Women were more likely to report both-sex partners than men, though similar proportions reported only same-sex or only opposite-sex partners ( $\chi^2=57.3$ ,  $P<.001$ ). Some other differences in demographic and college life variables were evident across groups. Women with both- or same-sex experience were more likely to be older students ( $\chi^2=28.1$ ,  $P<.001$ ) and live off-campus ( $\chi^2=8.8$ ,  $P<.05$ ), and were less likely to belong to sororities ( $\chi^2=11.4$ ,  $P<.01$ ) than women with only opposite-sex experiences. Men with same-sex experience were more likely to be

Table 1  
 Characteristics of sexually active student sample (percent)

Characteristic	Total ( <i>N</i> = 10,301)	Females ( <i>n</i> = 6210)	Males ( <i>n</i> = 4091)
Sex	100	61	39
Age 22 or younger	75	77	73
Racial identification			
White	80	80	80
Black	6	7	6
Asian/Pacific islander	6	6	6
Native American Indian/other	8	7	8
Hispanic origin (yes)	7	7	7
Married	10	11	8
On-campus housing	40	41	39
Fraternity/sorority member	13	13	16
College athlete	15	10	22
Sex partners			
Opposite sex only	94	93	95
Both opposite and same sex	4	5	2
Same sex only	2	2	3

nonwhite than those with opposite-sex experience ( $\chi^2 = 7.7$ ,  $P < .05$ ). All of the demographic and college life variables shown in Table 2 were included as covariates in multivariate analyses.

Though approximately 6% of sexually active respondents reported having same-sex or both-sex sexual partners, this percentage ranged from 0% to 19% by college, and the

Table 2  
 Characteristics of students by sex-partner group, percent, and chi-square statistics

<i>n</i> Percent	Opposite sex only		Both opposite and same sex		Same sex only		$\chi^2$	
	Females	Males	Females	Males	Females	Males	Females	Males
	5775	3896	301	83	134	112		
	93	95	5	2	2	3	57.3***	
Age 22 or younger	78%	74%	69%	66%	63%	66%	28.1***	5.1~
Race (white)	80	80	80	78	72	70	4.6~	7.7*
Hispanic (yes)	7	8	9	11	10	6	4.4	1.5
Married	11	8	9	4	16	5	4.3	3.3
On-campus housing	41	39	35	38	31	41	8.8*	0.2
Fraternity/sorority member (yes)	13	16	7	17	10	13	11.4**	1.1
College athlete (yes)	10	22	11	18	15	14	3.6	4.7~

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

~  $P < .10$ .

distribution was approximately symmetric. The proportion reporting same-sex behavior differed only slightly according to certain college characteristics, as calculated using the GEE to account for clustering of students by college. Results are shown in Table 3. Significant differences existed among universities in different regions of the US, and according to urban/rural location. Colleges in the west had a higher proportion of students reporting same-sex behavior, on average, than schools in other regions ( $z$  scores ranged from  $-1.63$  to  $-2.91$ ,  $.001 \leq P \leq .10$ ). Schools in urban and suburban settings also had a slightly higher proportion of students reporting same-sex experience, on average, than schools in rural or small town locations ( $z = -2.07$ ,  $P < .05$ ). Other differences by school characteristics were not significant at the .05 level. It is important to note that the variations shown in Table 3 are fairly minor, and that roughly 5–8% of students report same-sex behavior at all types of American colleges and universities.

Table 3  
Respondents reporting same-sex experience, by college characteristic

College characteristic	<i>n</i>	Percent reporting same-sex partner	<i>z</i> score
Total	119	6.1	
Commuter school <sup>a</sup>	18	6.5	0.55
Not commuter school	101	6.1	–
Competitive <sup>b</sup>	42	6.3	–
Not competitive	27	6.1	–0.33
Very competitive	30	6.1	–0.20
Highly competitive	19	5.8	–0.42
Small: < 5000 undergraduates	43	6.3	–
Medium: 5001–10,000 undergraduates	27	6.1	–0.30
Large: > 10,001 undergraduates	49	6.1	–0.32
Public	78	6.1	–0.19
Private	41	6.2	–
Northeast	32	6.4	–1.63 <sup>~</sup>
South	34	5.6	–2.43 <sup>*</sup>
North Central	34	5.2	–2.91 <sup>**</sup>
West	19	8.2	–
No religious affiliation	101	6.2	1.43
Protestant	10	6.6	1.31
Roman Catholic	8	4.7	–
Rural/small town	34	5.3	–2.07 <sup>*</sup>
Suburban/urban	85	6.5	–
Women only	6	6.9	–
Coeducational	113	6.1	–0.39

\*  $P < .05$ .

\*\*  $P < .01$ .

<sup>~</sup> $P < .10$ .

<sup>a</sup> Commuter schools were defined as schools with  $\geq 90\%$  of students living off-campus.

<sup>b</sup> Competitiveness is based on ACT and SAT scores and percentage of applicants accepted, as reported in Barron's Profiles of American Colleges (1996).

### 3.2. Smoking behavior

Findings for substance use behaviors are shown in Tables 4 and 5. Table 4 shows the distribution of each behavior by sex-partner group. Table 5 shows the results of multivariate logistic regression predicting the odds of each health behavior for each sex-partner group, controlling for demographic and college life variables.

Approximately 40% of respondents reported that they had never smoked a cigarette, while about one-third reported that they had smoked in the past 30 days. These proportions varied little between females and males, and are comparable to findings from previous national studies of college students (Centers for Disease Control and Prevention, 1997; Rigotti et al., 2000; Sax, 1997; Wechsler, Rigotti, et al., 1998). Thirty-two women (0.5%) and 27 men (0.7%) did not respond to the smoking item.

Chi-square analysis shows significant differences in cigarette smoking behavior among women with opposite-, both-, and same-sex partners but not for men (Table 4). Among women, those with both-sex partners were more likely to report recent cigarette smoking and less likely to report never smoking cigarettes than their peers with either exclusively opposite- or same-sex experience ( $\chi^2 = 63.8$ ,  $P < .001$ ).

Table 4  
Proportion reporting each health behavior, by sex-partner group

Health behavior	Opposite sex		Both sex		Same sex		$\chi^2$	
	Females	Males	Females	Males	Females	Males	Females	Males
<i>Cigarette smoking</i>								
Never used	40	40	20	35	45	46	63.7***	6.15
Not in 12 months	16	16	14	13	11	10		
Not in 30 days	11	11	15	13	11	9		
Used in past 30 days	34	33	51	39	33	36		
<i>Binge drinking</i>								
Abstainer	11	12	8	15	17	19	14.13 *	11.38~
Non-binge drinker	43	29	39	38	44	31		
Occasional binge drinker	21	27	27	24	18	27		
Frequent binge drinker	25	32	27	23	20	23		
<i>Marijuana use</i>								
Never used	46	42	14	31	52	55	141.28***	14.89 *
Not in 12 months	24	22	31	22	26	13		
Not in 30 days	14	13	20	19	11	13		
Used in past 30 days	16	23	35	28	11	19		

Totals may not sum to 100% due to rounding off.

\*  $P < .05$ .

\*\*\*  $P < .001$ .

~  $P < .10$ .

Table 5

OR for correlates of current smoking, occasional or frequent binge drinking, and current marijuana use among sexually active college students

	Description	Cigarette smoking				Binge drinking				Marijuana use			
		Females		Males		Females		Males		Females		Males	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sex group	Opposite-sex partners	1.00		1.00		1.00		1.00		1.00		1.00	
	Both-sex partners	<b>2.06</b>	1.63–2.60	1.19	0.76–1.85	<b>1.41</b>	1.08–1.85	<b>0.54</b>	0.34–0.85	<b>2.78</b>	2.17–3.56	1.26	0.79–2.00
	Same-sex partners	1.22	0.79–1.88	1.07	0.67–1.71	0.98	0.61–1.55	0.67	0.43–1.06	0.82	0.48–1.43	0.79	0.47–1.33
Age group	<23 years old	1.00		1.00		1.00		1.00		1.00		1.00	
	23+ years old	<b>0.80</b>	0.67–0.95	<b>0.81</b>	0.67–0.96	<b>0.58</b>	0.49–0.68	<b>0.57</b>	0.49–0.66	<b>0.68</b>	0.53–0.86	<b>0.68</b>	0.55–0.85
Race	Nonwhite	1.00		1.00		1.00		1.00		1.00		1.00	
	White	<b>1.89</b>	1.61–2.21	<b>1.49</b>	1.18–1.86	<b>2.96</b>	2.51–3.51	<b>2.93</b>	2.34–3.65	<b>1.61</b>	1.30–2.00	<b>1.50</b>	1.17–1.91
Hispanic	Non-Hispanic	1.00		1.00		1.00		1.00		1.00		1.00	
	Hispanic	1.05	0.79–1.39	0.93	0.68–1.27	<b>1.64</b>	1.26–2.13	<b>1.63</b>	1.15–2.31	1.05	0.76–1.45	0.90	0.59–1.37
Marital status	Single	1.00		1.00		1.00		1.00		1.00		1.00	
	Married	<b>0.42</b>	0.33–0.54	<b>0.37</b>	0.26–0.54	<b>0.26</b>	0.20–0.33	<b>0.19</b>	0.13–0.27	<b>0.37</b>	0.26–0.52	<b>0.22</b>	0.13–0.39
Housing	On-campus	1.00		1.00		1.00		1.00		1.00		1.00	
	Off-campus	<b>1.17</b>	1.02–1.35	1.04	0.90–1.20	1.14	0.98–1.32	1.11	0.94–1.32	0.93	0.78–1.10	0.93	0.78–1.10
Greek member	No	1.00		1.00		1.00		1.00		1.00		1.00	
	Yes	1.17	0.96–1.42	<b>1.36</b>	1.13–1.64	<b>1.81</b>	1.49–2.19	<b>2.88</b>	2.32–3.58	0.86	0.68–1.09	1.12	0.90–1.40
Athlete	No	1.00		1.00		1.00		1.00		1.00		1.00	
	Yes	<b>0.71</b>	0.57–0.89	<b>0.63</b>	0.53–0.75	<b>1.44</b>	1.19–1.75	1.08	0.87–1.34	0.83	0.66–1.05	<b>0.80</b>	0.64–0.99

ORs that are significant at the .05 level are shown in boldface.

Among women, sex-partner group retained its relationship to smoking behavior after multiple controls: those with both same- and opposite-sex partners had odds of smoking that were twice as great as their peers with only opposite-sex partners (OR = 2.06; Table 5). Sex-partner group and smoking behavior were not significantly related for men in this sample.

### 3.3. Binge drinking

Binge drinking is defined in this study as having four or more drinks (for women) and five or more drinks (for men) on a single occasion in the 2 weeks prior to the survey. A minority of students reported abstaining from all alcohol use in the past year (12%). Forty-three percent of women and 29% of men reported using alcohol in the past year, but not bingeing (by the 5/4 definition) in the 2 weeks prior to the survey. Twenty-one percent of female students and 27% of male students reported binge drinking once or twice in the past 2 weeks (occasional binge drinkers), and 25% of women and 31% of men report binge drinking three or more times in the past 2 weeks (frequent binge drinkers). Alcohol use data were missing for 3% of male and female respondents.

As with smoking, there appears to be a relationship between sex-partner group and drinking behavior among women and marginally among men (Table 4). Though all three groups of women reported similar rates of frequent binge drinking, women with both-sex partners were more likely to report occasional bingeing than their peers and less likely to report abstaining from alcohol altogether or a non-binge drinking pattern ( $\chi^2 = 14.13$ ,  $P < .05$ ).

After controlling for demographic and college life variables, women with both-sex partners maintained elevated odds of binge drinking compared to women with only opposite-sex partners (OR = 1.41; Table 5). Among men, a history of same-sex or both-sex experience was associated with a *lower* likelihood of binge drinking after adjusting for control variables; this achieved statistical significance for men with both-sex partners. These men were almost half as likely to report bingeing than their peers with only opposite-sex partners (OR = 0.54).

### 3.4. Marijuana use

Slightly more than half (56%) of all respondents reported that they smoked marijuana, and approximately one-fifth reported using marijuana in the 30 days prior to the survey. These figures were similar for male and female students. Marijuana use data were missing for 0.4% of female and 0.5% of male respondents. Marijuana use distributions were significantly different among the three sex-partner groups for both men and women (Table 4). Thirty-five percent of women with both-sex partners reported recent use, which was twice the proportion of women with opposite-sex partners and three times the proportion of those with only same-sex partners ( $\chi^2 = 141.28$ ,  $P < .001$ ). This pattern was similar among men, but not as pronounced: Men with both-sex partners were the most likely to have used marijuana and those with only same-sex partners were least likely to report this behavior ( $\chi^2 = 14.89$ ,  $P < .05$ ).

This association was maintained among women after controlling for demographic and college life variables. Women with both-sex partners had odds of recent marijuana use almost

three times the odds for women with only opposite-sex partners, after controlling for demographic and college life factors (OR=2.78; [Table 5](#)). Sex-partner group was not significantly related to recent marijuana use among men in multivariate analysis.

#### **4. Discussion**

The major finding of this study is that college women with both male and female sexual partners have approximately 1 1/2–3 times the odds of smoking, binge drinking, and marijuana use compared to college women with only opposite-sex partners. This association does not hold for women with only same-sex partners. This finding has important implications for future research on women with same-sex experience: Women with both-sex partners should be considered separately from women with only female partners, as the unique characteristics of each group may be obscured when they are analyzed together.

Several interpretations of this relationship seem plausible. First, both substance use behaviors and both-sex partner experiences may be part of a larger behavioral pattern or psychological characteristic and not reflective of sexual orientation per se. If this subgroup of women has an openness or tendency towards new or risky behaviors, this trait may be the precursor to both sexual experimentation and substance use. Previous findings that women with both-sex partners tend to have a higher number of recent sexual partners also support this interpretation ([Eisenberg, 2001](#)). A second possibility relates to the social context in which these women live. The 4% of sexually active college women who have both-sex partners may be marginalized from both their straight and their lesbian peers, and may use substances as a means of coping with this social stress.

Findings on substance use behaviors are comparable to previous research on college students ([Centers for Disease Control and Prevention, 1997](#); [Johnston, O'Malley, & Bachman, 2000](#)). Prevalence of each behavior is slightly higher than in other studies, but this is likely due to the restriction of the sample to sexually active students, who have been shown to engage in high-risk behaviors more than their non-sexually active counterparts ([Rigotti et al., 2000](#); [Wechsler, Dowdall, Davenport, & Castillo, 1995](#)).

Results from this study also indicate that findings from previous literature on the health issues of GLB adolescents and adults may not apply to college populations. Rather than finding significantly higher rates of substance use among students with same-sex experience, a history of same-sex partners does not necessarily confer significantly greater risk and may even be protective in some cases. This discrepancy could be due to the different sampling methods; the GLB-targeted sampling in prior literature may have produced biased estimates of the behaviors discussed here. A second possibility is that these behaviors and relationships are indeed particular to college students and a product of the college experience. The similar rates of tobacco, alcohol, and marijuana use among all sex-partner groups (except women with both-sex partners) may reflect the emphasis on substance use or “partying” as a means of socializing for college students ([O'Hare, 1990](#)). Students with same-sex experience may use these substances due to the social and

behavioral norms on their campus, rather than any reason related to their sexual experience (such as a means of coping with a stressful homophobic environment). Alternatively, the finding that men with both- and same-sex partners are less likely to report binge drinking may be due in part to their exclusion from more “mainstream” social activities in which substance use is common.

Survey data carry several limitations that must be considered in interpretation of these findings. First, because all data described here are based on students’ self-reported behaviors, it is possible that social desirability colored responses. However, a number of studies have demonstrated the validity of self-reports of substance use (Caraballo, Giovino, Penchacek, & Mowery, 1998; Frier, Bell, & Ellickson, 1991; Harrell, 1997; Midanik, 1988). In addition, the anonymity of student responses was made clear during data collection, which is recommended to minimize under- and misreporting of sensitive information, such as sexual behavior (Aday, 1996). Furthermore, rates of substance use found here are similar to those found in other national samples of college students (Centers for Disease Control and Prevention, 1997; Johnston et al., 2000). The use of survey data also raises a concern about nonresponse bias. Two strategies were used to detect this bias. First, the correlation of colleges’ response rates and substance use rates was calculated and found to be non-significant. Second, a subsample of nonrespondents completed brief surveys regarding their substance use; their rates of use were not significantly different from respondents to the original survey. Items regarding sexual behavior are also unlikely to be related to non-response, as the primary focus of the survey was alcohol use.

The measure of “sexual activity” used without definition in this survey may raise concerns about misinterpretation and possible misclassification. Sex-partner group was not defined by experience with sexual intercourse or any other particular sexual act, but on the respondents’ own understanding of their past sexual activity with same- or opposite-sex partners. Prior research has demonstrated that college students hold divergent opinions about what behaviors constitute “having sex” (Sanders & Reinisch, 1999); however, the measure used here is useful and appropriate for this study even in light of such concerns. Because no specific sexual act is theorized to be related to the outcomes of interest (as would be the case if the outcome were a sexually transmitted infection), classification based on the general phrase “sexual activity” is acceptable for these analyses.

The measure of lifetime sex-partner experience used here has not been validated previously, and any type of testing of self-reports against actual behavior raises serious logistic, as well as ethical, concerns. However, prior studies of adult sexual behavior have found a similar proportion of the population reporting same-sex experiences, which lends credibility to these findings (Diamond, 1993; Laumann et al., 1994). In addition, given that the measure of sex-partner group includes only lifetime experience, the “both-sex” group likely includes respondents who have had a one-time same-sex experience, as well as those for whom this is a primary sexual behavior. The “both-sex” group therefore is likely to include students with both minimal and extensive same-sex experience, who may not share the same risk profile for substance use behaviors. This potential blurring of groups may bias results towards the null, suggesting that the true behavioral differences among groups may be even more pronounced than what is reported here.

Finally, because the data were cross-sectional, it is impossible to infer a causal relationship between sex-partner group and the behaviors discussed here. Several hypotheses exist regarding the nature of these associations, which take into consideration some of the psychosocial characteristics of the individuals and their social environments. It may be that campus social norms predict substance use for all types of students; that a separate psychological trait is associated with sexual and substance use behaviors; or that the social climate towards GLB students may lead some students to substance use as a means of coping with a hostile environment, or conversely, may protect some from use by excluding them from more mainstream social circles in the college setting.

In spite of the above limitations, these findings have several implications for research and practice. First, students with same-sex experience are present at every type of college and university. This implies that every school ought to consider the needs of these students and allocate resources for their physical, emotional, and social health needs as they would for other minority populations on campus. In terms of college-based health education, women with both-sex partners appear to be an appropriate target for intervention. It may be important for GLB student organizations to do explicit outreach to bisexual women, both to include them in a potentially supportive social network and to provide educational programs on substance use prevention. Women's Studies programs or other academic centers that may serve many women with same-sex experience may also include a focus on this topic through curricular or extracurricular programs.

Second, these findings suggest that patterns of substance use may be considerably different in the college context than at other phases of life. This may be different for college students according to their sex-partner group: Among straight students, substance use appears to be much higher during the college years than in later adulthood ([Centers for Disease Control and Prevention, 2000b](#)). However, the equivalently high levels of substance use among those with same-sex experience may not taper off in adulthood, as suggested by prior literature. Additional research is needed to follow young people with same-sex experience into their adulthood to investigate developments in their health behaviors. Research is also needed to identify aspects of college life or the university social environment that are particularly conducive to these behaviors. Finally, women with both-sex partners require additional study to determine what personal characteristics, patterns of same-sex partnership, and social factors may contribute to this association with substance use.

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