Sexual Orientation and Substance Use Among Adolescents and Young Adults

| Karin L. Brewster, PhD, and Kathryn Harker Tillman, PhD

Increasing evidence points to an association between sexual orientation (SO) and substance use among adolescents and young adults. Population-based research has confirmed earlier studies reporting elevated rates of illicit drug use and problem drinking among youths who reported same-gender attractions or same-gender sexual experiences, or who self-identified as lesbian, gay, or bisexual (LGB).[1–5] Although most quantitative studies lack the measures necessary to elucidate the mechanisms underlying this association, the higher prevalence of substance use among sexual-minority youths typically is understood within the rubric of social stress theory as a manifestation of what has been referred to in research on LGB health as minority stress.[6,7]

Social stress theory conceptualizes the stigma and prejudice associated with a minority status as psychosocial stressors that are activated by experiences of discriminatory treatment, including both major events and everyday discrimination, continual anticipation of negative treatment, and internalization of negative societal attitudes.[8–11] Substantial evidence links discrimination-based stress to compromised psychological health, including substance use disorders, particularly among African Americans.[12–15] SO has received less attention in this context, but relevant findings so far are largely consistent with the findings for racial/ethnic minorities. Compared with heterosexual persons, lesbians and gay men report greater experience of discrimination[16–18] and have a higher incidence of psychosocial disorders.[19–22]

In light of the dearth of formal support systems (e.g., school-based gay–straight alliances, LGB community centers) for youths questioning their sexuality and the difficulty some LGB youths face in revealing themselves to family and friends, this evidence makes minority stress a compelling explanation for the association between SO and substance use. However, extant research provides only

Objectives. We examined interrelationships among the 3 dimensions of sexual orientation—self-identity, sexual attraction, and sexual experience—and their associations with substance use among adolescents and young adults.

Methods. To estimate total and net associations of sexual identity, attraction, and experience with use of tobacco, drugs, and alcohol, we applied logistic regression to cross-sectional data from the National Survey of Family Growth Cycle 6.

Results. We found a lack of concordance among the different dimensions of sexual orientation. More youths reported same-gender sexual attraction and same-gender sexual experiences than identified as lesbian, gay, or bisexual. Estimates of substance use prevalence differed significantly by gender and across dimensions of sexual orientation. Sexual experience was the most consistent predictor of substance use. Women and men with no sexual experience had the lowest odds of all forms of substance use; those reporting sexual experience with partners of both genders had the highest odds.

Conclusions. Our findings indicate that sexual identity was less strongly associated with substance use than sexual experience and attraction were, pointing to the need for more nuanced indicators of sexual orientation in public health studies. (*Am J Public Health.* 2012;102:1168–1176. doi:10.2105/AJPH.2011.300261)

limited insight into which youths are at elevated risk for substance use because of gay-related stress.[23] This shortcoming reflects the paucity of nationally representative data sets containing information on both substance use and SO, as well as a lack of consensus about how to measure SO.[24,25] In the substance use literature, SO has been operationalized variously as sexual self-identity, sexual (or romantic) attraction, and sexual (or romantic) relationships. Although findings are similar across studies regardless of the measures used and the specific population represented, evidence increasingly suggests that these measures—which correspond approximately to the cognitive, affective, and behavioral dimensions of SO—are not interchangeable.[26]

An evaluation of school-based health surveys that included multiple measures of SO found that within each survey, groups defined on the basis of 1 measure of SO overlapped substantially—but were not entirely congruent—with groups defined by other measures.[27] An earlier study of a probability survey of US

adults reported similar divergence across subgroups defined by sexual self-identity, attraction, and behavior.[28] In short, self-identity, attraction, and behavior are not wholly concordant. Not all individuals who have sexual experience with same-gender partners identify as LGB; nor do individuals who acknowledge same-gender attractions or sexual fantasies necessarily act on them.[29–32]

The divergence of the cognitive, affective, and behavioral dimensions of SO raises the possibility that identifying as LGB, recognizing same-gender attractions, or engaging in same-gender sexual behavior need not engender similar levels of distress or be similarly associated with substance use. In this study, we used data for teens and young adults from the National Survey of Family Growth Cycle 6 (NSFG-6) to examine the net associations of identity, attraction, and experience with various forms of substance use. We did not assume that all substance use by young people is motivated by psychological distress. Rather, we assumed that any distress associated with

a sexual-minority status is sufficient to increase the risk of substance use above what is typical at that stage of the life course. Our analyses addressed 3 issues: (1) the alignment of sexual self-identity, attraction, and experience among youths aged 15 to 24 years; (2) the prevalence of substance use across groups defined by sexual self-identity, attraction, and experience; and (3) the net associations of identity, attraction, and experience with substance use.

METHODS

The NSFG-6, fielded in 2002 in the United States by the National Center for Health Statistics, relied on a multistage sample design with stratification by geographic location and demographic characteristics to identify qualifying households. Respondents were chosen randomly from within selected households and were notified of their selection in person and in writing. Participation was voluntary and confidential.

Female interviewers used computer-assisted personal interviewing to conduct in-person interviews in respondents' homes. Sensitive questions, including those addressing SO and substance use, were asked at the end of the interview via audio computer-assisted self-interviewing. Response rates were 80% for females (n=7643) and 78% for males (n=4928). Levels of missing data on sexuality-related items were negligible, and response patterns were comparable to earlier surveys with similar items.[33] The complete weighted sample is representative of individuals aged 15 through 44 years in the household population of the United States.[34] Additional details on the NSFG-6 are available elsewhere (http://www.cdc.gov/nchs/data/nsfg/UserGuide_2002NSFG.pdf).

These analyses are based on the 2513 females and 2059 males aged 15 to 24 years in the NSFG-6 data set, an age range that captures the ages of primary sexual development and the period during which youths are negotiating the transition to adulthood and establishing strategies for coping with stress. To ensure that respondents were at a similar stage of the life course developmentally, we excluded the 541 ever-married respondents. Excluding an additional 68 respondents with incomplete data

yielded a final working sample of 2062 females and 1901 males.

Measures

Sexual orientation. We defined sexual orientation as consisting of sexual experience, sexual identity, and sexual attraction. Sexual experience was a 4-category set of dummy variables distinguishing persons reporting sexual experience exclusively with opposite-gender partners from those reporting sexual experiences with female and male partners, those reporting exclusively same-gender partners, and those reporting no partnered sexual experience. For males, sexual experience was defined as oral-penile contact, anal-penile contact, or vaginal-penile intercourse. For females, sexual experience included vaginal-penile intercourse, oral- or anal-genital contact with a male partner, or any sexual experience with a female partner. Sexual identity was a 3-category set of binary variables differentiating those who identified as heterosexual from those identifying as lesbian, gay, or bisexual, and those describing themselves as uncertain or something else. For sexual attraction, a 3-category set of binary variables differentiated among individuals reporting exclusively opposite-gender attractions, individuals reporting any same-gender attractions, and individuals reporting uncertainty about their attractions.

Substance use. All respondents were asked about marijuana use, use of other drugs, and binge drinking. Females were also asked about cigarette smoking. Cigarette smoking was coded 1 if the female respondent had smoked at least once monthly during the 12 months before the interview and at least 100 cigarettes over her lifetime. Marijuana use and other drug use (powder cocaine, crack, or injection drugs) were coded 1 for any consumption in the preceding 12 months. Binge drinking was coded 1 if the respondent reported consuming 5 or more drinks within "a couple of hours" on at least 1 occasion within the preceding 12 months.

Analysis

We based our evaluation of congruence in individuals' responses to questions about sexual identity, attraction, and experience on design-weighted, 2-way proportionate distributions,

supplemented by Cramér's V, an indicator of correlation strength. We also used design-weighted proportionate distributions to describe the prevalence of cigarette smoking, marijuana use, other drug use, and binge drinking across these dimensions of SO. We used logistic regressions to estimate odds of substance use predicted by each dimension of SO and net odds of substance use controlling for all 3 dimensions simultaneously. We adjusted all odds ratios for age (using years and years squared) and race/ethnicity (White non-Hispanics, Black non-Hispanics, non-Hispanics of other races, and Hispanics of any race). Because same-gender sexual experience was measured differently for females and males, and because same-gender sexuality remains more stigmatized for males, analyses were gender-specific. To adjust coefficient estimates for the sampling design, we used the *svy* commands in Stata SE version 9 (StataCorp LP, College Station, TX).[35]

RESULTS

Table 1 presents overall distributions of females and males across categories of identity, attraction, and experience; 2-way distributions of the SO dimensions; and correlation matrices displaying bivariate correlation coefficients for the 3 dimensions of SO. Female respondents were less likely than were male respondents to identify as heterosexual (86% vs 90%), less likely to report exclusively opposite-gender sexual attraction (82% vs 93%), and more likely to report sexual experience with same-gender partners (13% vs 5%). Cramér's V tests indicated significant and moderately strong bivariate correlations between identity, attraction, and experience for both female and male respondents (0.35–0.38 and 0.36–0.41, respectively).

Cross-tabulations revealed less concordance in the dimensions of SO for females than for males. Compared with their male peers, heterosexually identified females were more likely to acknowledge same-gender sexual attraction (4% vs 11%) and sexual experience (2% vs 7%). A higher proportion of females with exclusively opposite-gender sexual experience reported same-gender attractions than did males with exclusively opposite-gender experience (10% vs 4%), and women reporting

TABLE 1—Weighted Distribution of and Bivariate Correlations Between Sexual Identity, Sexual Attraction, and Sexual Experience Among Youths Aged 15–24 Years: National Survey of Family Growth, United States, 2002

Characteristic	Sexual Identity			Sexual Attraction			Gender of Sexual Partners[a]			
	Heterosexual	Unsure/Other	LGB	Opposite Gender	Not Sure	Any Same Gender	Opposite Gender	Both	Same Gender	None
Females										
Overall proportion	0.86	0.08	0.06	0.82	0.01	0.17	0.62	0.12	0.01	0.25
By sexual identity										
Heterosexual				0.89	0.00	0.11	0.65	0.07	0.00	0.28
Unsure/other				0.74	0.08	0.19	0.49	0.15	0.04	0.32
Lesbian or bisexual				0.11	0.02	0.87	0.19	0.66	0.09	0.05
By sexual attraction										
Opposite gender only	0.92	0.07	0.01				0.66	0.04	0.00	0.30
Not sure	0.30	0.57	0.13				0.37	0.23	0.07	0.33
Any same gender	0.59	0.09	0.33				0.39	0.48	0.04	0.09
By sexual partners										
Opposite gender only	0.92	0.06	0.02	0.89	0.01	0.10				
Both genders	0.54	0.10	0.36	0.28	0.02	0.70				
Same gender only	0.18	0.29	0.53	0.29	0.07	0.64				
None	0.90	0.09	0.01	0.93	0.01	0.05				
Unweighted no.	1793	142	127	1692	23	347	1290	243	23	506
Bivariate correlations[b]										
Sexual identity		1.00			0.37			0.35		
Sexual attraction					1.00			0.38		
Sexual partners								1.00		
Males										
Overall proportion	0.90	0.06	0.04	0.93	0.01	0.07	0.70	0.04	0.01	0.25
By sexual identity										
Heterosexual				0.96	0.00	0.04	0.71	0.02	0.00	0.26
Unsure/other				0.77	0.07	0.16	0.51	0.09	0.02	0.38
Gay or bisexual				0.11	0.02	0.87	0.33	0.36	0.16	0.15
By sexual attraction										
Opposite gender only	0.95	0.05	0.00				0.70	0.01	0.00	0.28
Not sure	0.51	0.44	0.06				0.42	0.02	0.06	0.50
Any same gender	0.47	0.13	0.40				0.44	0.34	0.11	0.11
By sexual partners										
Opposite gender only	0.94	0.04	0.02	0.95	0.01	0.04				
Both genders	0.54	0.12	0.34	0.43	0.00	0.56				
Same gender only	0.18	0.11	0.71	0.12	0.05	0.83				
None	0.90	0.08	0.02	0.95	0.02	0.03				
Unweighted no.	1716	105	80	1748	17	136	1301	81	21	498
Bivariate correlations[b]										
Sexual identity		1.00			0.41			0.36		
Sexual attraction					1.00			0.37		
Sexual partners								1.00		

Note. LGB = lesbian, gay, or bisexual. Design weighted to represent the national population of youths aged 15–24 years in 2002. Weighted distributions may not total 1.00 because of rounding.
[a]Sexual experience includes vaginal, oral, or anal sexual contact.
[b]Cramér's V. All correlations significant at $P < .001$.

same-gender attraction were more likely to identify as heterosexual (59% vs 47%).

Table 1 also shows marked differences in sexual experience by sexual identity and gender. Just 5% of LGB-identified females reported no sexual partners, and 66% reported experience with both male and female partners. LGB-identified males were less likely than were their female peers to report sexual experience with partners of both genders (36%) and were more likely to be sexually inexperienced (15%). Comparable proportions of heterosexually identified females and males were sexually inexperienced (28% and 26%, respectively), and females and males who reported being unsure of their sexual identities were the most likely to be sexually inexperienced (32% and 38%, respectively).

Table 2 describes the prevalence of cigarette smoking, illicit drug use, and binge drinking among females and males, both across and within groups defined by each dimension of SO. Nearly half (47%) of female respondents reported at least 1 episode of binge drinking; fewer reported smoking cigarettes or marijuana (23% and 31%, respectively), and use of other drugs was uncommon (5%). LGB-identified females had significantly higher rates of all forms of substance use than did their heterosexual and uncertain peers, as did females who reported sexual partners of both genders. Sexually inexperienced females reported significantly lower levels of all forms of substance use. Compared with females who reported exclusively heterosexual attraction, those who reported any same-gender attraction or who were uncertain about their sexual attractions had higher substance use rates.

Overall, substance use rates were higher among males. Nearly two fifths (38%) reported smoking marijuana, more than half (58%) reported 1 or more episodes of binge drinking, and 10% reported other drug use. Prevalence of binge drinking and other drug use was higher among male respondents who self-identified as gay or bisexual. As among females, males who reported sexual partners of both genders had higher substance use rates than did their peers with exclusively same-gender or opposite-gender partners, and males reporting no sexual partners had the lowest substance use rates. Male respondents

who reported any same-gender attraction were also more likely than were their peers to report use of marijuana and other drugs. Differences in binge drinking by sexual attraction attained borderline significance.

Tables 3 and 4 present, for females and males respectively, the estimated odds of substance use adjusted for age, age squared, and race/ethnicity, by each dimension of SO, first considered singly (model 1) and then while controlling for the other 2 dimensions (model 2). Results in model 1 of Table 3 show that females who identified as lesbian or bisexual, who reported at least some same-gender attraction, or who reported sexual activity with partners of both genders had significantly higher odds of all forms of substance use. Females who reported exclusively same-gender sexual activity were no more likely to report substance use than were those with exclusively opposite-gender partners. With only 1 exception, females who reported no sexual partners had lower odds of substance use than did other females. There were no differences in the odds of binge drinking between females with no sexual experience and those who reported only same-gender partners.

Results in model 1 of Table 4 show a less consistent pattern of association between substance use and SO among male respondents. Males who identified as gay or bisexual or who reported any same-gender sexual attraction had higher odds of other drug use—but not of marijuana use or binge drinking—than did those who identified as heterosexual or who reported exclusively opposite-gender sexual attraction. Males who were unsure about their sexual attractions had lower odds of marijuana use and other drug use than did their peers with same-gender attractions, and those who expressed uncertainty about their identity had lower odds of other drug use than gay or bisexual males. Sexual experience was the most consistent predictor of substance use for males. Males with no sexual partners had significantly lower odds of all forms of substance use than did males with any sexual partners, regardless of the partners' gender. Males with exclusively male sexual partners did not have higher odds of substance use than did those with exclusively female partners, but males with partners of both genders had higher

odds of other drug use than did those with exclusively female partners.

When the different dimensions of SO were considered simultaneously (model 2 of Tables 3 and 4), the picture of substance use risk changed substantially. Sexual identity was not associated with any of the substance use outcomes among females or males once sexual experience and sexual attraction were taken into account. Among females, same-gender sexual attraction predicted higher odds of marijuana use and binge drinking, net of sexual experience and identity. Among males, same-gender sexual attraction predicted higher odds of other drug use but not of marijuana use or binge drinking, and uncertainty about sexual attractions was not associated with substance use once the other dimensions of SO were taken into account.

Sexual experience remained a significant predictor of substance use among both females and males, reflecting the substantially lower odds of substance use among those reporting no sexual partners and, for females, the substantially higher odds of substance use by those reporting sexual partners of both genders. Notably, the odds of substance use were no higher for females or males reporting exclusively same-gender sexual partners than for their peers reporting exclusively opposite-gender partners.

DISCUSSION

We examined the concordance among the cognitive, affective, and behavioral dimensions of SO, and the associations of each dimension with multiple forms of substance use, in a national sample of youths aged 15 through 24 years. With respect to the components of SO, results confirmed for youths what researchers have previously observed for adults and for school-based samples: sexual attraction and experience do not align neatly with self-reported identity.[27,28] Gender-specific bivariate correlations between sexual self-identity and both sexual attraction and sexual experiences were moderate in strength, ranging from 0.35 to 0.41, as were correlations between attraction and experience. Proportionate distributions illustrate the patterns underlying this lack of alignment. One third of males and one fifth of females who self-identified as LGB had exclusively opposite-gender sexual experience,

TABLE 2—Prevalence of Substance Use by Sexual Identity, Sexual Attraction, and Sexual Experience Among Youths Aged 15–24 Years: National Survey of Family Growth, United States, 2002

	Tobacco	P	Marijuana	P	Cocaine, Crack, or Injection Drugs	P	Alcohol[a]	P
			Females					
Overall proportion[b]	0.23		0.31		0.05		0.47	
By sexual identity								
Heterosexual	0.22		0.29		0.04		0.47	
Unsure/other	0.21		0.31		0.06		0.41	
Lesbian or bisexual	0.44		0.52		0.20		0.64	
Design-based F[c]	$11.51_{(2329)}$	≤.001	$7.87_{(2317)}$	≤.001	$18.96_{(2293)}$	≤.001	$4.57_{(2326)}$	≤.05
By sexual attraction								
Opposite-gender only	0.20		0.26		0.03		0.44	
Not sure	0.35		0.31		0.09		0.57	
Any same-gender	0.37		0.53		0.13		0.65	
Design-based F[c]	$16.44_{(2322)}$	≤.001	$29.79_{(2328)}$	≤.001	$19.81_{(2327)}$	≤.001	$24.30_{(2330)}$	≤.001
By sexual partners[d]								
Opposite-gender only	0.26		0.35		0.05		0.57	
Both sexes	0.52		0.59		0.19		0.70	
Same-gender only	0.14		0.43		0.00		0.34	
None	0.04		0.08		0.00		0.19	
Design-based F[c]	$56.48_{(3480)}$	≤.001	$61.99_{(3481)}$	≤.001	$30.62_{(3463)}$	≤.001	$60.26_{(3489)}$	≤.001
Unweighted no.	2062		2062		2062		2062	
			Males					
Overall proportion[b]	NA		0.38		0.10		0.58	
By sexual identity	NA							
Heterosexual			0.39		0.10		0.60	
Unsure/other			0.31		0.05		0.51	
Gay or bisexual			0.41		0.21		0.67	
Design-based F[c]			$0.67_{(2325)}$	0.51	$5.28_{(2326)}$	≤.01	$5.04_{(2328)}$	≤.01
By sexual attraction	NA							
Opposite-gender only			0.38		0.09		0.57	
Not sure			0.13		0.02		0.48	
Any same-gender			0.47		0.23		0.69	
Design-based F[b]			$3.72_{(2281)}$	≤.05	$15.24_{(1206)}$	≤.001	$2.71_{(2315)}$	≤.10
By sexual partners[c]	NA							
Opposite-gender only			.47		0.12		0.70	
Both sexes			.57		0.24		0.76	
Same-gender only			.52		0.11		0.72	
None			.14		0.01		0.24	
Design-based F[c]			$39.66_{(3468)}$	≤.001	$15.46_{(3433)}$	≤.001	$82.57_{(3456)}$	≤.001
Unweighted no.	1901		1901		1901		1901	

Note. NA = data not available. Table presents substance use in 12 months preceding interview.
[a]Defined as ≥5 drinks within "a couple of hours" on ≥1 occasion in the past 12 months.
[b]All estimates design-weighted to represent the national population.
[c]Degrees of freedom rounded to whole numbers.
[d]Sexual experience includes vaginal, oral, or anal sexual contact.

whereas nearly half of males and almost 60% of females reporting at least some same-gender sexual attraction self-identified as heterosexual.

Of particular note is the substantial variation across categories of identity and attraction in the proportion reporting no sexual partners.

For example, between 26% and 38% of youths who self-identified as heterosexual or uncertain reported no sexual partners, compared with

TABLE 3—Adjusted Odds of Substance Use Among Females Aged 15–24 Years: National Survey of Family Growth, United States, 2002

SO Dimensions	Model 1, AOR (95% CI)	Model 2, AOR (95% CI)
Tobacco		
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Lesbian or bisexual	3.35 (2.08, 5.39)[a]	1.44 (0.74, 2.81)
Uncertain	1.48 (0.87, 2.52)[b]	1.17 (0.67, 2.03)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	2.06 (1.55, 2.73)[a]	0.92 (0.65, 1.31)
Uncertain	2.50 (0.76, 8.19)	1.81 (0.46, 7.07)
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	0.59 (0.16, 2.22)	0.46 (0.10, 2.10)
Both genders	2.97 (2.12, 4.16)[a,c]	2.71 (1.82, 4.04)[a,c]
None	0.12 (0.07, 0.22)[a,c,d]	0.12 (0.07, 0.22)[a,d]
Marijuana		
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Lesbian or bisexual	2.68 (1.57, 4.55)[a]	0.74 (0.38, 1.44)
Uncertain	1.29 (0.79, 2.10)[b]	1.00 (0.57, 1.74)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	2.98 (2.22, 4.01)[a]	1.95 (1.32, 2.88)[a]
Uncertain	1.35 (0.43, 4.17)	1.23 (0.38, 3.93)
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	1.23 (0.44, 3.48)	0.97 (0.32, 2.99)
Both genders	2.58 (1.86, 3.58)[a]	1.93 (1.32, 2.81)[a]
None	0.12 (0.08, 0.18)[a,c,d]	0.12 (0.08, 0.18)[a,c,d]
Other drugs		
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Lesbian or bisexual	6.88 (3.22, 14.72)[a]	2.10 (0.81, 5.45)
Uncertain	1.64 (0.74, 3.63)[b]	1.19 (0.43, 3.30)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	4.17 (2.51, 6.91)[a]	1.51 (0.78, 2.90)
Uncertain	2.72 (0.45, 16.56)	1.47 (0.21, 10.14)
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	_[e]	_[e]
Both genders	4.88 (2.81, 8.46)[a]	2.79 (1.59, 4.91)[a]
None	0.07 (0.02, 0.29)[a,d]	0.08 (0.02, 0.31)[a,d]

Continued

just 5% of lesbian and bisexual females and 15% of gay and bisexual males. This finding suggests that sexual-minority youths engage in relatively higher levels of sexual experimentation before self-identifying as LGB.

Descriptive analyses also suggest that sexual-minority youths engage in substance use more often, consistent with previous studies.[1-5] Tobacco use, illicit drug use, and binge drinking were significantly more prevalent among females who self-identified as lesbian or bisexual, who reported same-gender sexual attraction, or who reported same-gender sexual contact. Illicit drug use and binge drinking also were more common among males who identified as gay or bisexual or who reported same-gender attractions or sexual experiences, although not all of the differences attained statistical significance. Overall, these findings are broadly consistent with the minority stress hypothesis.

Our findings with respect to the net associations between substance use and the cognitive, affective, and behavioral components of SO suggest a different situation, however. The minority stress perspective explicitly links identity to distress, positing that any sense of community or affinity gained by acknowledging an LGB identity can be offset by social stigma, prejudice, and discrimination.[21] This perspective suggests a higher prevalence of substance use among LGB-identified persons, net of associations between substance use and same-gender attraction or sexual experience. Yet, we found that self-identifying as LGB was not associated with higher odds of any substance use once sexual attraction and experience were considered. This finding provides support for developmental-stage theories of identity formation, which posit that youths who are comfortable disclosing an LGB identity have worked through distress associated with becoming aware of their same-gender sexual attractions and having initial same-gender sexual experiences.[31,36]

Other findings provide further support for developmental-stage perspectives. Among female respondents, sexual experience—particularly experience with partners of both genders—had strong net associations with most forms of substance use. With identity and attraction controlled, the odds of using tobacco, marijuana, and other illicit drugs were 2 to 3 times higher for females reporting sexual

TABLE 3—Continued

	Binge drinking	
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Lesbian or bisexual	2.24 (1.36, 3.69)[a]	1.02 (0.58, 1.80)
Uncertain	1.14 (0.70, 1.86)	0.94 (0.57, 1.54)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	2.18 (1.63, 2.90)[a]	1.57 (1.06, 2.33)[a]
Uncertain	2.23 (0.81, 6.11)	2.42 (1.01, 5.82)[a]
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	0.51 (0.17, 1.51)	0.36 (0.12, 1.05)
Both genders	1.77 (1.20, 2.62)[a,c]	1.33 (0.81, 2.21)[c]
None	0.21 (0.15, 0.29)[a,d]	0.21 (0.15, 0.30)[a,d]

Note. AOR = adjusted odds ratio; CI = confidence interval; SO = sexual orientation. Model 1 shows the estimated odds of substance use by each dimension of SO considered singly. Model 2 shows the estimated odds of substance use by each dimension of SO while controlling for the other 2 dimensions. All AORs adjusted for respondent's age, age squared, race/ethnicity, and design effects. AORs in model 2 for each outcome also adjusted for behavior, attraction, and identity.
[a]Differs from the reference category at *P* < .05.
[b]Differs from lesbian/bisexual at *P* < .05.
[c]Differs from those with exclusively same-gender partners at *P* < .05.
[d]Differs from those with partners of both genders at *P* < .05.
[e]So few women with exclusively same-gender sexual experience reported other drug use in the past 12 months that AORs could not be estimated for this group; 23 women were dropped from this analysis as a result.

partners of both genders than for their peers with only opposite-gender partners. We also found that same-gender sexual attraction was associated with higher net odds of marijuana use and binge drinking. Although our cross-sectional data do not allow us to tease out the causal mechanisms underlying these associations, net associations of substance use with "behavioral bisexuality"[37] and same-gender sexual attraction are consistent with stage theories that portray the "coming out" process as a period of emotional distress that manifests in greater substance use.

We cannot rule out the possibility, however, that the independent association between substance use and sexual experience with partners of both genders reflects greater willingness among females who engage in binge drinking and illicit substance use to experiment sexually. Our findings may reflect what some observers have called a "bisexual chic" culture that glamorizes same-gender sexual contact among females.[38,39] Regardless of the direction of the association between drug use and sexual experience, our findings for females underscore the importance of identifying the individual, peer,

and family factors that foster healthy sexual development and promote competence and self-confidence.[40]

Among males, sexual experience with partners of both genders was not associated with substance use in our final models, and same-gender attraction was associated only with higher odds of using cocaine and other drugs. Thus, not only are our results for males inconsistent with minority stress theory; they also provide little support for other perspectives. Although the results for males were robust to different model specifications, our confidence in them is undermined by the admittedly small sample of sexual-minority males. The proportions of males identifying as gay or bisexual and reporting same-gender attractions or sexual experience in the NSFG-6 data are consistent with other surveys,[34] but the actual numbers afford limited statistical power in a multivariate context. Elucidating the interrelationships among the dimensions of SO, including additive and moderating effects, and the association of SO with health-risk behaviors—a stated goal of Healthy People 2010—will require more detailed information on the affective, behavioral, and

cognitive dimensions of SO, as well as over-samples of sexual minorities.

Other limitations of this study stem from its reliance on cross-sectional data. The substance-use measures pertained to the year preceding the interview, identity and attraction were assessed at interview, and the sexual-behavior items were retrospective. Moreover, the NSFG-6 lacked information on the frequency of substance use and the context in which it occurred. Thus, we were unable to discern whether a minority sexual identity or same-gender attractions precipitated (or increased) substance use or whether substance use encouraged engagement in same-gender sexual behavior. Longitudinal studies provide support for both directions: Whitbeck et al.[41] observed that substance use increased the likelihood of (heterosexual) sexual engagement, and Russell et al.[5] reported that same-gender romantic attractions and relationships increased the likelihood of substance use.

Additionally, the behavioral measures may have led us to overestimate the prevalence of same-gender experience among women and to underestimate it among men. Female respondents were asked only a single item about same-gender sexual experience, leaving our estimates dependent upon respondents' interpretations of what constitutes sexual experience. By contrast, the items about male sexual experiences were quite specific, but they pertained only to behaviors linked to sexually transmitted infections. Thus, our estimates do not include nonrisky behaviors such as kissing or mutual masturbation.

Despite these limitations, our findings shed needed light on the relationship between SO and substance use, suggesting the importance of a more nuanced understanding of SO—one that recognizes that its behavioral, affective, and cognitive dimensions are neither interchangeable nor equally indicative of gay-related stress. Furthermore, the association of substance use with same-gender attraction and behavioral bisexuality, although not entirely consistent across substance types and genders, underscores the importance of research efforts to identify factors that enhance confidence and self-competence. We end by noting that the failure of sexual identity to predict substance use suggests that intervention programs targeted specifically to LGB-identified youths

TABLE 4—Adjusted Odds of Substance Use Among Males Aged 15–24 Years: National Survey of Family Growth, United States, 2002

SO Dimensions	Model 1 AOR (95% CI)	Model 2 AOR (95% CI)
Marijuana		
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Gay or bisexual	1.06 (0.61, 1.86)	0.68 (0.34, 1.36)
Uncertain	0.89 (0.54, 1.46)	0.95 (0.55, 1.66)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	1.40 (0.88, 2.24)	1.12 (0.64, 1.97)
Uncertain	0.28 (0.09, 0.90)[a,e]	0.40 (0.12, 1.38)
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	1.29 (0.49, 3.34)	1.60 (0.49, 5.17)
Both genders	1.56 (0.82, 2.96)	1.67 (0.83, 3.34)
None	0.18 (0.12, 0.26)[a,c,d]	0.18 (0.12, 0.26)[a,c,d]
Other drugs		
Sexual identity		
Heterosexual (Ref)	1.00	1.00
Gay or bisexual	2.70 (1.26, 5.81)[a]	1.26 (0.43, 3.71)
Uncertain	0.57 (0.20, 1.60)[b]	0.49 (0.18, 1.38)
Sexual attraction		
Opposite gender only (Ref)	1.00	1.00
Same or both genders	2.88 (1.55, 5.36)[a]	2.32 (1.06, 5.11)[a]
Uncertain	0.34 (0.06, 2.07)[e]	0.54 (0.08, 3.66)
Sexual experience		
Opposite gender only (Ref)	1.00	1.00
Same gender only	1.07 (0.14, 7.84)	0.48 (0.04, 5.96)
Both genders	2.27 (1.03, 5.01)[a]	1.33 (0.56, 3.15)
None	0.06 (0.02, 0.22)[a,c,d]	0.06 (0.02, 0.22)[a,d]
Binge drinking		
Sexual identity		
Heterosexual (ref)	1.00	1.00
Gay or bisexual	1.34 (0.71, 2.50)	0.96 (0.43, 2.14)
Uncertain	0.61 (0.35, 1.06)	0.62 (0.32, 1.19)
Sexual attraction		
Opposite gender only (ref)	1.00	1.00
Same or both genders	1.46 (0.91, 2.33)	1.03 (0.51, 2.07)
Uncertain	0.72 (0.15, 3.46)	1.42 (0.40, 4.98)
Sexual experience		
Opposite gender only (ref)	1.00	1.00
Same gender only	1.42 (0.56, 3.61)	1.42 (0.47, 4.28)
Both genders	1.44 (0.63, 3.29)	1.51 (0.54, 4.25)
None	0.15 (0.11, 0.20)[a,c,d]	0.15 (0.11, 0.20)[a,c,d]

Note. SO = sexual orientation; AOR = adjusted odds ratio; CI = confidence interval. Model 1 shows the estimated odds of substance use by each dimension of SO considered singly. Model 2 shows the estimated odds of substance use by each dimension of SO while controlling for the other 2 dimensions. All AORs adjusted for respondent's age, age squared, race/ethnicity, and design effects. AORs in model 2 for each outcome also adjusted for behavior, attraction, and identity.
[a]Differs from reference category at *P* < .05.
[b]Differs from gay/bisexual at *P* < .05.
[c]Differs from those with exclusively same-gender partners at *P* < .05.
[d]Differs from those with partners of both genders at *P* < .05.
[e]Differs from those reporting at least some same-gender attraction at *P* < .05

may not be inclusive of all sexual-minority youths. Instead, intervention programs that are specifically inclusive of different sexualities and that emphasize mutual respect and self-competence may be more appropriate—and, ultimately, more effective. ■

About the Authors
Karin L. Brewster and Kathryn Harker Tillman are with the Center for Demography and Population Health and the Department of Sociology, Florida State University, Tallahassee.

Correspondence should be sent to Karin L. Brewster, PhD, Center for Demography and Population Health, 113 Collegiate Loop, 601 Bellamy, Tallahassee, FL 32306-2240 (e-mail: karin.brewster@fsu.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

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Contributors
K.L. Brewster originated the study, conducted the data analysis, and led the writing of the article. K.H. Tillman contributed to the conceptualization, writing, and editing of the article.

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