

Sexual Orientation, Adult Connectedness, Substance Use, and Mental Health Outcomes Among Adolescents: Findings From the 2009 New York City Youth Risk Behavior Survey

Kacie S. Seil, MPH, Mayur M. Desai, PhD, MPH, and Megan V. Smith, DrPH

Adolescence is regarded as a period of life characterized by rapid development.¹ It is not uncommon for adolescents to demonstrate substance use and poor mental health outcomes, with lesbian, gay, and bisexual (LGB) adolescents affected to a greater extent. Adolescents who are LGB often experience lower levels of social integration and increased feelings of loneliness than do their heterosexual counterparts.^{2,3} The minority stress theory suggests that minority groups are disadvantaged in a number of ways, and certain stressors that do not have an impact on advantaged groups are burdensome to disadvantaged groups.⁴ Research shows that LGB adolescents are more likely to use substances,^{3,5-17} report suicide ideation, attempt suicide,^{5-7,12,13,18-29} and be exposed to violence and victimization^{3,5,6,12,26,30-33} than are heterosexual adolescents.

Social support networks for LGB adolescents can potentially be used to reduce these risks. Social support is defined as the social bonds, social integration, and primary group relations that an individual has.³⁴ Perceived social support is often linked to mental health status; individuals with more perceived support are less likely to be depressed³⁴ and less likely to attempt suicide.³⁵ Greater perceived social support is also associated with less substance use.³⁶ Social support comes from a wide variety of sources; because adolescents spend such a significant amount of time in school, positive relationships with adults in school may have a large impact on this group, but not much research has focused on this idea.

Newly conceptualized types of social support include school connectedness and natural mentoring relationships.³⁷⁻³⁹ School connectedness has been defined as liking school, feeling safe at school, and having relationships with teachers.³⁹ Studies have found that strong

Objectives. We examined associations between identifying as lesbian, gay, or bisexual (LGB) and lacking a connection with an adult at school on adolescent substance use and mental health outcomes including suicidality.

Methods. We analyzed data from the 2009 New York City Youth Risk Behavior Survey (n=8910). Outcomes of interest included alcohol use, marijuana use, illicit drug use, depressive symptomatology, suicide ideation, and suicide attempt.

Results. The prevalence of each outcome was significantly higher among LGB adolescents than heterosexual adolescents and among those who lacked an adult connection at school than among those who did have such a connection. Even when LGB adolescents had an adult connection at school, their odds of most outcomes were significantly higher than for heterosexual adolescents. Those LGB adolescents who lacked a school adult connection had the poorest outcomes (about 45% reported suicide ideation; 31% suicide attempt).

Conclusions. Adolescents who are LGB, particularly those who lack a connection with school adults, are at high risk for substance use and poorer mental health outcomes. Interventions should focus on boosting social support and improving outcomes for this vulnerable group. (*Am J Public Health.* 2014;104:1950-1956. doi:10.2105/AJPH.2014.302050)

bonding to school is associated with lower prevalence of emotional distress, suicidal thoughts and behaviors, violence, and use of cigarettes, alcohol, and marijuana.^{37,38,40,41} Other factors of school connectedness include having a sense of belonging at school, having good friends at school, being engaged in academics, feeling that discipline is fair and effective, and being involved in extracurricular activities.⁴²

Natural mentoring relationships with adults are another source of social support, defined as naturally occurring ties that are not fostered through formal programs.⁴³ Recent research on the benefits of natural mentoring relationships in schools has demonstrated positive effects on psychological well-being and reductions in problem behaviors and poor health outcomes.⁴³⁻⁵⁰ Students who value teacher approval⁴⁸ and feel that their teachers care about them^{45,49,50} have better outcomes than those who do not have strong natural mentoring relationships. One study found that LGB adolescents were more likely to seek support

from school staff than were heterosexual adolescents.⁵¹ Whether there is a difference in perceived social support is unknown.

We used data from the 2009 New York City Youth Risk Behavior Survey (YRBS) to examine the individual and joint effects of identifying as LGB and lacking a supportive connection with an adult at school on adolescent alcohol and substance use as well as mental health outcomes. The term joint effect refers to whether 2 exposures act dependently on an outcome of interest—specifically, whether their combined influence is more than would be expected if their mechanisms were independent. We hypothesized that LGB adolescents would be more likely to exhibit substance use and have worse mental health outcomes than heterosexual adolescents; similarly, we hypothesized that individuals without a connection to a school adult would be more likely to exhibit substance use and have worse mental health outcomes than those with a connection. We expected that LGB adolescents without a school adult connection

would be much more likely to exhibit substance use and worse mental health outcomes than all other groups. To our knowledge, this is the first time this relationship has been examined.

METHODS

Data for this study came from the 2009 New York City YRBS, which included a total of 11 887 respondents from 105 public high schools. The school response rate was 95%, and the student response rate was 83%, leading to an overall response rate of 79%. The survey is the product of a continuing partnership between the New York City Department of Health and Mental Hygiene, the New York City Department of Education, and the Centers for Disease Control and Prevention. The New York City YRBS is part of the Centers for Disease Control and Prevention's national Youth Risk Behavior Surveillance System. Since 1997, the YRBS survey has been conducted every other year with the goal of examining various health risk behaviors among New York City adolescents. The survey is anonymous and self-administered, and the results are representative of New York City public high school students from grades 9 through 12. The data set is available for public use on the Department of Health and Mental Hygiene Web site.⁵²

The 2009 YRBS used a stratified, 2-stage cluster sample aimed at creating a representative sample of public high-school students throughout the 5 New York City boroughs. In stage 1, the schools were randomly selected with probability proportional to school enrollment. In stage 2, classrooms in a specific period or class were listed in a classroom-level sampling frame and were then selected randomly for each school. After data collection, the responses were weighted to adjust for nonresponse and varying probabilities of selection.

Measures

The primary independent variables of interest reflected students' sexual orientation and perceived connection with an adult at school. Sexual orientation was classified with the following question: "Which of the following best describes you?" The response choices were heterosexual or straight, gay or lesbian, bisexual, and not sure. We compared lesbian, gay,

bisexual, and not sure individuals with heterosexual or straight individuals. Presence of a connection with an adult at school was assessed with the following question: "Do you agree or disagree that you feel connected to at least one teacher or other adult in this school you can talk to if you have a problem?" The response choices were strongly agree, agree, not sure, disagree, and strongly disagree. Respondents were classified as having a connection (agree or strongly agree), not having a connection (disagree or strongly disagree), or being not sure.

We used a number of substance use and mental health outcomes as dependent variables. Current drinking was defined as having at least 1 drink of alcohol during the past 30 days. Marijuana use was defined as having used marijuana at least once during the past 30 days. Other illicit drug use was coded as use of any of the following at some point in one's lifetime: prescription drugs without a prescription, cocaine, heroin, methamphetamine, ecstasy, or injected illegal drugs. Depressive symptomatology was defined as feeling so sad or hopeless almost every day for 2 weeks or more in a row that one stopped doing some usual activities in the past 12 months. The question is not diagnostic in nature, but it is a validated measurement in that it approximates the Patient Health Questionnaire-2 (PHQ-2), which has demonstrated strong construct and criterion validity.⁵³ Suicide ideation was defined as seriously considering a suicide attempt in the past 12 months. Suicide attempt as defined as attempting suicide at least once during the past 12 months.

Sociodemographic characteristics included students' sex, grade in school, and race/ethnicity. Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, Hispanic, Asian, or other. In addition, a poverty variable was created based on the percentage of students in a school who qualified for free or reduced-cost school lunch. "Low" poverty was defined as having between 0% and 49% of students eligible for free or reduced-cost lunches. "Medium" poverty was defined as having between 50% and 69% student eligibility. "High" poverty was defined as having between 70% and 79% student eligibility. "Very high" poverty was defined as having between 80% and 100% student eligibility.

Poverty group cutoffs were created by dividing the sampled schools into 4 groups with an approximately equal number in each, resulting in a distribution of observations in the data set close to a quartile distribution. Quartile cutoffs were rounded to the nearest whole number, resulting in a less-even distribution of observations in each quartile. Eligibility for free or reduced-cost lunch is based on the federal poverty level (130% and 185% of poverty, respectively).⁵⁴ Because federal poverty level does not account for the higher cost of living in New York City relative to other areas of the country, both free and reduced-cost lunch eligibility were used for this proxy measure to better represent the level of poverty among public school students.

Data Analysis

The analyses proceeded in 4 steps. First, we used descriptive statistics to summarize the sample characteristics, including the overall proportion of students who reported being heterosexual or LGB and having, lacking, or not being sure about an adult connection at school. In addition, we conducted bivariate analyses examining how sexual orientation and adult connectedness varied by sex, grade, race/ethnicity, and poverty status by using the χ^2 test. Second, we used χ^2 testing to examine the unadjusted associations between both sexual orientation and adult connectedness and the outcome variables. Third, to examine the joint effect of our independent variables of interest, we created a 6-level variable combining sexual orientation and adult connectedness: heterosexual with adult connection, heterosexual not sure of adult connection, heterosexual without adult connection, LGB with adult connection, LGB not sure of adult connection, and LGB without adult connection. We used χ^2 testing to determine whether the prevalence of alcohol and substance use and mental health outcomes differed by this 6-level variable. Fourth, we used logistic regression to calculate odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between the cross-classified sexual orientation–adult connection variable and each of the outcome variables.

We chose heterosexual with adult connection to be the referent group, as it was hypothesized to have the lowest prevalence across all outcomes of interest. Multivariable

logistic regression analyses controlled for the sociodemographic characteristics of the sample and we used these to evaluate interactions between sexual orientation and adult connectedness for each of the outcomes. Multiplicative interaction occurs when the product of individual effects is larger or smaller than their combined effects.⁵⁵ This type of interaction would indicate whether the effect of sexual orientation differs for those with or without an adult connection. To examine potential multiplicative interaction, we ran a logistic regression model including the individual independent variables and interaction terms combining both variables. We performed all analyses with SAS version 9.2 (SAS Institute, Cary, NC) and

SUDAAN version 11.0.0 (RTI International, Research Triangle Park, NC) to account for the weighting and complex survey design.

RESULTS

The final analytic sample included 8910 adolescents who responded to both the sexual orientation question and the school adult connection question (75%). Response rates for the sexual orientation and school adult connection questions were 90% and 76%, respectively. Sensitivity analyses demonstrated that the analytic sample had a similar distribution of sex, grade level, race/ethnicity, and poverty level as the total sample. Characteristics of the

analytic sample are summarized in Table 1. The majority of students were female (56%), Black or Hispanic (65%), and in a school in which at least 50% of students qualified for free or reduced-cost lunch (67%). Overall, 11% of adolescents reported being LGB (or unsure of sexuality), and 21% reported having no connection with an adult at school.

As the results in Table 1 show, the proportion of students identifying as LGB was significantly higher among females and among those in higher-poverty schools ($P < .001$ for both comparisons). With respect to race/ethnicity, LGB identification ranged from 5% among Asians to 15% among Hispanics ($P < .001$). As with LGB status, female students

TABLE 1—Description of the Sample: Youth Risk Behavior Survey, New York City, 2009

Characteristic	Total, No. (%) ^a	Heterosexual, No. (%)	LGB, No. (%)	P	With Connection, ^b No. (%)	Not Sure of Connection, ^b No. (%)	Without Connection, ^b No. (%)	P
Overall	8910 (100.0)	7882 (89.2)	1028 (10.8)	...	5395 (58.7)	1681 (20.5)	1834 (20.9)	...
Sex				< .001				.021
Male	3913 (44.5)	3600 (92.0)	313 (8.0)		2421 (60.3)	748 (20.8)	744 (18.8)	
Female	4994 (55.5)	4279 (87.0)	715 (13.0)		2973 (57.3)	933 (20.2)	1088 (22.5)	
Grade level				.342				< .001
9	2152 (28.9)	1886 (90.0)	266 (10.0)		1175 (52.1)	495 (24.0)	482 (23.9)	
10	2389 (27.9)	2097 (88.0)	292 (12.0)		1373 (55.1)	456 (22.0)	560 (22.9)	
11	2369 (22.5)	2114 (90.2)	255 (9.8)		1474 (63.0)	416 (18.1)	479 (18.9)	
12	1914 (20.7)	1718 (89.5)	196 (10.5)		1323 (68.0)	301 (16.3)	290 (15.7)	
Race/ethnicity				< .001				< .001
White	1218 (16.5)	1137 (91.8)	81 (8.2)		806 (64.5)	202 (17.2)	210 (18.3)	
Black	2243 (31.5)	1997 (89.4)	246 (10.6)		1346 (59.7)	392 (17.8)	505 (22.5)	
Hispanic	3657 (33.2)	3124 (85.4)	533 (14.6)		2244 (58.0)	684 (20.9)	729 (21.1)	
Asian	992 (17.9)	933 (94.6)	59 (5.4)		532 (53.4)	256 (26.2)	204 (20.4)	
Other	444 (0.8)	385 (86.7)	59 (13.3)		254 (56.5)	75 (17.2)	115 (26.3)	
Poverty measure ^c				< .001				.698
Low	2973 (32.8)	2713 (92.0)	260 (8.0)		1780 (58.1)	589 (21.5)	604 (20.5)	
Medium	2046 (27.2)	1827 (90.1)	219 (9.9)		1244 (58.2)	392 (21.0)	410 (20.8)	
High	1369 (16.0)	1177 (86.0)	192 (14.0)		850 (60.7)	241 (19.8)	278 (19.4)	
Very high	2522 (24.0)	2165 (86.5)	357 (13.5)		1521 (58.6)	459 (19.0)	542 (22.4)	
Sexual orientation				...				.182
Heterosexual	7882 (89.2)	...	...		4751 (58.5)	1520 (20.8)	1611 (20.7)	
LGB	1028 (10.8)	...	...		644 (59.8)	161 (17.8)	223 (22.4)	
Adult connection ^b				.182				...
With connection	5395 (58.7)	4751 (89.0)	644 (11.0)		...	...	...
Not sure of connection	1681 (20.5)	1520 (90.6)	161 (9.4)		...	...	...
Without connection	1834 (20.9)	1611 (88.4)	223 (11.6)		...	...	...

Note. LGB = lesbian, gay, or bisexual. All sample sizes are unweighted, and all percentages are weighted.

^aNumbers may not sum to total because of missing data, and percentages may not sum to 100% because of rounding.

^bPresence of a perceived connection with an adult at school.

^cThe poverty measure was based on the proportion of students in the school who qualified for free or reduced-cost lunch: low (0%–49%), medium (50%–69%), high (70%–79%), or very high (80%–100%).

were significantly more likely than male students to report lacking a school adult connection (23% vs 19%, respectively; $P = .021$). In addition, lacking an adult connection was inversely associated with grade level ($P < .001$). There was no significant association between LGB status and presence of an adult connection at school.

The prevalence of each outcome variable was substantially higher among LGB adolescents than among heterosexual adolescents (Table 2). Nearly half of LGB students reported current alcohol use (45%) and depressive symptomatology in the past 12 months (49%), compared with 30% and 26%, respectively, of heterosexuals ($P < .001$ for both comparisons). Among those identifying as LGB, one quarter reported current use of marijuana (27%) and lifetime use of another illicit drug (26%)—more than double the rates found in their heterosexual counterparts ($P < .001$ for both comparisons). Rates of both suicidal ideation (37% vs 11%; $P < .001$) and suicide attempt (26% vs 7%; $P < .001$) in the past 12 months were more than 3 times higher among LGB students than among heterosexual students.

Although the magnitudes of the differences were smaller, a similar pattern of association was found between adult connectedness and the outcome variables (Table 2). Adolescents who reported lacking an adult connection at school were significantly more likely to report alcohol and substance use, depressive symptoms, and suicide ideation and behavior than were those who did have such a connection ($P < .01$ for all comparisons).

Adjusted associations between the cross-classified sexual orientation–adult connection variable and substance use and mental health outcomes are presented in Table 3. The results reveal several consistent patterns across the outcomes. First, both heterosexual and LGB adolescents had a higher prevalence of substance use and poor mental health outcomes when they reported no school adult connection. Second, even when LGB students had an adult connection at school, they were more likely to report substance use and suicidal ideation and behavior than were heterosexual students without an adult connection. Third, adolescents who both were LGB and lacked a school adult connection had the poorest outcomes across all outcome variables, with rates in this vulnerable group ranging from 31% for suicide attempt to 57% for depressive symptomatology in the past 12 months. Across the outcomes of interest, the adjusted odds of a particular outcome were approximately 3.1 to 6.7 times higher in LGB adolescents without an adult connection than in the referent group of heterosexual adolescents with an adult connection. All associations between the 6-level risk variable and the outcomes were significant at a P level of less than .001. Finally, there was no significant interaction between sexual orientation and adult connectedness on the multiplicative scale.

DISCUSSION

Using data from the 2009 New York City YRBS, we examined the individual and joint effects of identifying as LGB and lacking

a connection with an adult at school on alcohol and substance use as well as suicidal ideation and behavior. We found that the prevalence of each outcome was significantly higher among LGB adolescents than among heterosexual adolescents and among those who lacked an adult connection at school compared with those who did have such a connection. In addition, even when LGB students had an adult connection at school, they were more likely to engage in substance use or exhibit poor mental health outcomes than were heterosexual students without an adult connection. Moreover, adolescents who both were LGB and lacked a school adult connection were most likely to use substances or have poor mental health outcomes, including suicidality. Our findings highlight a high-risk group that would benefit greatly if targeted in a public health intervention: adolescents who identify as LGB and do not have a connection with an adult at school. At the very least, school staff should be aware of this high-risk group and offer outreach accordingly. Tests did not indicate multiplicative interaction between sexual orientation and adult connectedness, suggesting that their effects are independent of one another.

In our analysis, it is important to consider exactly what the adult connection variable represents. It does not measure instrumental or tangible support; rather, it is perceived support specific to adults in a school setting. As such, it does not necessarily mean that a student has sought support from a school adult. Instead, it suggests that adolescents perceive they have an adult at school to go to if they feel the need.

TABLE 2—Unadjusted Associations of Sexual Orientation and Adult Connectedness With Risk Behaviors: Youth Risk Behavior Survey, New York City, 2009

Risk Behaviors	Overall (n = 8910), No. (%)	Heterosexual (n = 7882), No. (%)	LGB (n = 1028), No. (%)	P	With Connection ^a (n = 5395), No. (%)	Not Sure of Connection ^a (n = 1681), No. (%)	Without Connection ^a (n = 1834), No. (%)	P
Alcohol use (past 30 d)	2789 (31.6)	2353 (30.0)	436 (45.3)	< .001	1680 (31.1)	467 (27.8)	642 (36.7)	.002
Marijuana use (past 30 d)	1345 (14.1)	1071 (12.6)	274 (27.4)	< .001	815 (13.9)	200 (10.4)	330 (18.3)	< .001
Illicit drug use ^b (lifetime)	1099 (12.1)	826 (10.4)	273 (25.5)	< .001	613 (11.2)	186 (11.2)	300 (15.2)	.003
Depressive symptoms (past 12 mo)	2571 (28.4)	2077 (26.0)	494 (48.5)	< .001	1541 (28.0)	411 (24.0)	619 (33.7)	.002
Suicide ideation (past 12 mo)	1247 (14.0)	909 (11.3)	338 (36.6)	< .001	698 (12.1)	209 (13.4)	340 (20.0)	< .001
Suicide attempt (past 12 mo)	736 (9.2)	512 (7.3)	224 (26.2)	< .001	409 (7.9)	115 (8.1)	212 (14.2)	< .001

Note. LGB = lesbian, gay, or bisexual. All sample sizes are unweighted, and all percentages are weighted.

^aPresence of a perceived connection with an adult at school.

^bOther illicit drug use was coded as use of any of the following at some point in one's lifetime: prescription drugs without a prescription, cocaine, heroin, methamphetamine, ecstasy, or injected illegal drugs.

TABLE 3—Joint Effect of Sexual Orientation and Adult Connectedness on Risk Behaviors: Youth Risk Behavior Survey, New York City, 2009

Risk Behavior and Group ^a	Overall (n = 8910), No. (%)	P	Adjusted ^b OR (95% CI)
Alcohol use (past 30 d)			
		< .001	
Heterosexual with connection (Ref)	1410 (29.7)		1.00
Heterosexual not sure of connection	406 (26.8)		1.00 (0.79, 1.28)
Heterosexual without connection	537 (34.4)		1.44 (1.22, 1.69)
LGB with connection	270 (43.3)		1.70 (1.33, 2.17)
LGB not sure of connection	61 (38.6)		1.58 (1.01, 2.47)
LGB without connection	105 (55.7)		3.08 (2.04, 4.65)
Marijuana use (past 30 d)			
		< .001	
Heterosexual with connection (Ref)	649 (12.3)		1.00
Heterosexual not sure of connection	166 (9.7)		0.86 (0.66, 1.13)
Heterosexual without connection	256 (16.1)		1.56 (1.25, 1.95)
LGB with connection	166 (27.1)		2.79 (2.13, 3.66)
LGB not sure of connection	34 (18.0)		1.79 (1.10, 2.92)
LGB without connection	74 (36.1)		4.89 (3.21, 7.44)
Illicit drug use^c (lifetime)			
		< .001	
Heterosexual with connection (Ref)	462 (9.7)		1.00
Heterosexual not sure of connection	142 (10.0)		1.03 (0.81, 1.30)
Heterosexual without connection	222 (13.0)		1.45 (1.18, 1.79)
LGB with connection	151 (23.7)		3.11 (2.35, 4.13)
LGB not sure of connection	44 (23.0)		3.02 (2.10, 4.35)
LGB without connection	78 (32.2)		4.98 (3.56, 6.96)
Depressive symptoms (past 12 mo)			
		< .001	
Heterosexual with connection (Ref)	1239 (25.8)		1.00
Heterosexual not sure of connection	346 (21.9)		0.80 (0.68, 0.95)
Heterosexual without connection	492 (30.6)		1.26 (1.08, 1.47)
LGB with connection	302 (46.5)		2.26 (1.75, 2.92)
LGB not sure of connection	65 (44.7)		2.14 (1.40, 3.29)
LGB without connection	127 (57.0)		3.29 (2.09, 5.18)
Suicide ideation (past 12 mo)			
		< .001	
Heterosexual with connection (Ref)	501 (9.5)		1.00
Heterosexual not sure of connection	157 (10.8)		1.14 (0.82, 1.59)
Heterosexual without connection	251 (17.0)		1.89 (1.50, 2.39)
LGB with connection	197 (32.8)		4.30 (3.22, 5.75)
LGB not sure of connection	52 (39.7)		5.73 (3.77, 8.71)
LGB without connection	89 (44.7)		6.71 (4.74, 9.52)
Suicide attempt (past 12 mo)			
		< .001	
Heterosexual with connection (Ref)	272 (5.9)		1.00
Heterosexual not sure of connection	84 (6.4)		1.06 (0.81, 1.39)
Heterosexual without connection	156 (12.1)		2.11 (1.67, 2.67)
LGB with connection	137 (24.7)		4.81 (3.56, 6.51)
LGB not sure of connection	31 (25.2)		4.78 (2.70, 8.47)
LGB without connection	56 (31.1)		6.25 (4.16, 9.38)

Note. CI = confidence interval; LGB = lesbian, gay, or bisexual; OR = odds ratio. All sample sizes are unweighted and all percentages are weighted.

^aConnection = presence of a perceived connection with an adult at school.

^bAdjusted for sex, grade level, race/ethnicity, and poverty level.

^cOther illicit drug use was coded as use of any of the following at some point in one's lifetime: prescription drugs without a prescription, cocaine, heroin, methamphetamine, ecstasy, or injected illegal drugs.

Turner and Lewis Brown argue that perceived support, in comparison with other forms of social support (e.g., instrumental), is perhaps the strongest protective factor against depression and distress.³⁴ Our findings support this notion for a variety of other health outcomes as well.

Limitations and Strengths

Limitations of the study should be acknowledged. First, our data come from a cross-sectional survey. Therefore, we cannot reach any conclusions regarding temporality and definitive causality. Second, in light of the highly personal and potentially stigmatizing nature of the questions examined, it is unknown to what extent students answered truthfully. Response bias (specifically, social desirability bias) may be an issue, though all YRBS data were collected anonymously. Third, findings cannot be applied to adolescents who do not regularly attend public school. Fourth, traditional clinical measures (e.g., depressive symptoms) are self-reported in this study—not diagnostic. Fifth, students did not have the option to identify as transgendered on the survey.

This study also had a number of strengths. In the 2009 New York City YRBS data set, nearly 9000 students responded to the sexual orientation and school adult connection questions. The sample size was very large, which gave our study substantial power. In addition, the analysis provides valuable information on a racially and ethnically diverse population.

Conclusions

Previous work on natural mentoring relationships suggests that they help to reduce prevalence of adolescent substance use and poor mental health outcomes. Focusing on these relationships as they exist in the school setting is important as adolescents spend a large portion of their days in school. It is an ideal setting in which to have a positive impact on health. Adults in the school system, whether they are teachers, guidance counselors, coaches, or other staff, have the power to affect the behaviors of adolescents, even by indirect methods. Public health interventions aimed at improving school climate for LGB adolescents (e.g., Gay–Straight Alliance) could

have wide-ranging benefits, including reduction of stigmatization and bullying and promotion of adult–student interactions and student engagement.^{22,31,33,56–61}

In summary, the data demonstrate the impact of identifying as LGB and lacking a connection with a school adult on outcomes related to substance use and mental health outcomes, including suicidality. The prevalence of each outcome was substantially higher among LGB adolescents than heterosexual adolescents. In addition, LGB adolescents without a school adult connection were about 3 to 6.5 times as likely to experience the outcomes of interest as heterosexual adolescents with a school adult connection. Our findings confirm the importance of social support in decreasing prevalence of substance use as well as promoting mental health. Perceived social support from adults in the school seems to have positive effects for all adolescents. To better assess the impacts of adolescents' social context, we would recommend that the YRBS include additional variables on social networks and school climate. More research should be conducted to determine how to best foster natural mentoring relationships between students and school adults, focusing on the LGB population in particular. The small act of making school staff more aware of their influence in students' lives may make a large difference in the health and safety of adolescents. ■

About the Authors

Kacie S. Seil and Mayur M. Desai are with Yale School of Public Health, Department of Chronic Disease Epidemiology, New Haven, CT. Megan V. Smith is with Yale School of Medicine, Department of Psychiatry, New Haven.

Correspondence should be sent to Megan V. Smith, DrPH, MPH, 300 George St, New Haven, CT 06511 (e-mail: megan.smith@yale.edu). Reprints can be ordered at <http://www.ajph.org> by clicking the "Reprints" link.

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Contributors

K. S. Seil originated the study question, led data analysis, and wrote the majority of the article. M. M. Desai offered analytic guidance and support as well as assistance in editing the article. M. V. Smith provided content expertise and helped edit the article.

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Human Participant Protection

Institutional review board approval was not necessary for this study because the data set is available for public use on the New York City Department of Health and Mental Hygiene Web site. All participation in the Youth Risk Behavior Survey is anonymous.

References

- Steinberg L. A social neuroscience perspective on adolescent risk-taking. *Dev Rev*. 2008;28(1):78–106.
- Hegna K, Rossow I. What's love got to do with it? Substance use and social integration for young people categorized by same-sex experience and attractions. *J Drug Issues*. 2007;37(2):229–255.
- Button DM, O'Connell DJ, Gealt R. Sexual minority youth victimization and social support: the intersection of sexuality, gender, race, and victimization. *J Homosex*. 2012;59(1):18–43.
- Meyer IH. Identity, stress, and resilience in lesbians, gay men, and bisexuals of color. *Couns Psychol*. 2010;38(3):442–454.
- Faulkner AH, Cranston K. Correlates of same-sex sexual behavior in a random sample of Massachusetts high school students. *Am J Public Health*. 1998;88(2):262–266.
- Robin L, Brener ND, Donahue SF, Hack T, Hale K, Goodenow C. Associations between health risk behaviors and opposite-, same-, and both-sex sexual partners in representative samples of Vermont and Massachusetts high school students. *Arch Pediatr Adolesc Med*. 2002;156(4):349–355.
- Garofalo R, Wolf RC, Kessel S, Palfrey J, DuRant RH. The association between health risk behaviors and sexual orientation among a school-based sample of adolescents. *Pediatrics*. 1998;101(5):895–902.
- Marshal MP, Friedman MS, Stall R, et al. Sexual orientation and adolescent substance use: a meta-analysis and methodological review. *Addiction*. 2008;103(4):546–556.
- Brewster KL, Tillman KH. Sexual orientation and substance use among adolescents and young adults. *Am J Public Health*. 2012;102(6):1168–1176.
- Corliss HL, Rosario M, Wypij D, Fisher LB, Austin SB. Sexual orientation disparities in longitudinal alcohol use patterns among adolescents: findings from the Growing Up Today Study. *Arch Pediatr Adolesc Med*. 2008;162(11):1071–1078.
- Baiocco R, D'Alessio M, Laghi F. Binge drinking among gay, and lesbian youths: the role of internalized sexual stigma, self-disclosure, and individuals' sense of connectedness to the gay community. *Addict Behav*. 2010;35(10):896–899.
- Shields JP, Whitaker K, Glassman J, Franks HM, Howard K. Impact of victimization on risk of suicide among lesbian, gay, and bisexual high school students in San Francisco. *J Adolesc Health*. 2012;50(4):418–420.
- Needham BL, Austin EL. Sexual orientation, parental support, and health during the transition to young adulthood. *J Youth Adolesc*. 2010;39(10):1189–1198.
- Kecojevic A, Wong CF, Schrager SM, et al. Initiation into prescription drug misuse: differences between lesbian, gay, bisexual, transgender (LGBT) and heterosexual high-risk young adults in Los Angeles and New York. *Addict Behav*. 2012;37(11):1289–1293.
- Newcomb ME, Birkett M, Corliss HL, Mustanski B. Sexual orientation, gender, and racial differences in illicit drug use in a sample of US high school students. *Am J Public Health*. 2014;104(2):304–310.
- Rosario M, Corliss HL, Everett BG, et al. Sexual orientation disparities in cancer-related risk behaviors of tobacco, alcohol, sexual behaviors, and diet and physical activity: pooled Youth Risk Behavior Surveys. *Am J Public Health*. 2014;104(2):245–254.
- Talley AE, Hughes TL, Aranda F, Birkett M, Marshal MP. Exploring alcohol-use behaviors among heterosexual and sexual minority adolescents: intersections with sex, age, and race/ethnicity. *Am J Public Health*. 2014;104(2):295–303.
- Silenzio VM, Pena JB, Duberstein PR, Cerel J, Knox KL. Sexual orientation and risk factors for suicidal ideation and suicide attempts among adolescents and young adults. *Am J Public Health*. 2007;97(11):2017–2019.
- Borowsky IW, Ireland M, Resnick MD. Adolescent suicide attempts: risks and protectors. *Pediatrics*. 2001;107(3):485–493.
- Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: evidence from a national study. *Am J Public Health*. 2001;91(8):1276–1281.
- Mustanski BS, Garofalo R, Emerson EM. Mental health disorders, psychological distress, and suicidality in a diverse sample of lesbian, gay, bisexual, and transgender youths. *Am J Public Health*. 2010;100(12):2426–2432.
- Hatzenbuehler ML. The social environment and suicide attempts in lesbian, gay, and bisexual youth. *Pediatrics*. 2011;127(5):896–903.
- Liu RT, Mustanski B. Suicidal ideation and self-harm in lesbian, gay, bisexual, and transgender youth. *Am J Prev Med*. 2012;42(3):221–228.
- Zhao Y, Montoro R, Igartua K, Thombs BD. Suicidal ideation and attempt among adolescents reporting "unsure" sexual identity or heterosexual identity plus same-sex attraction or behavior: forgotten groups? *J Am Acad Child Adolesc Psychiatry*. 2010;49(2):104–113.
- Almeida J, Johnson RM, Corliss HL, Molnar BE, Azrael D. Emotional distress among LGBT youth: the influence of perceived discrimination based on sexual orientation. *J Youth Adolesc*. 2009;38(7):1001–1014.
- Duncan DT, Hatzenbuehler ML. Lesbian, gay, bisexual, and transgender hate crimes and suicidality among a population-based sample of sexual-minority adolescents in Boston. *Am J Public Health*. 2014;104(2):272–278.
- Hatzenbuehler ML, Birkett M, Van Wagenen A, Meyer IH. Protective school climates and reduced risk for suicide ideation in sexual minority youths. *Am J Public Health*. 2014;104(2):279–286.
- Mustanski B, Andrews R, Herrick A, Stall R, Schnarrs PW. A syndemic of psychosocial health disparities and associations with risk for attempting suicide among young sexual minority men. *Am J Public Health*. 2014;104(2):287–294.
- Stone DM, Luo F, Ouyang L, Lippy C, Hertz MF, Crosby AE. Sexual orientation and suicide ideation, plans, attempts, and medically serious attempts: evidence from local Youth Risk Behavior Surveys, 2001–2009. *Am J Public Health*. 2014;104(2):262–271.

30. Berlan ED, Corliss HL, Field AE, Goodman E, Austin SB. Sexual orientation and bullying among adolescents in the growing up today study. *J Adolesc Health*. 2010;46(4):366–371.
31. Toomey RB, Ryan C, Diaz RM, Card NA, Russell ST. Gender-nonconforming lesbian, gay, bisexual, and transgender youth: school victimization and young adult psychosocial adjustment. *Dev Psychol*. 2010;46(6):1580–1589.
32. Russell ST, Ryan C, Toomey RB, Diaz RM, Sanchez J. Lesbian, gay, bisexual, and transgender adolescent school victimization: implications for young adult health and adjustment. *J Sch Health*. 2011;81(5):223–230.
33. Birkett M, Espelage DL, Koenig B. LGB and questioning students in schools: the moderating effects of homophobic bullying and school climate on negative outcomes. *J Youth Adolesc*. 2009;38(7):989–1000.
34. Turner RJ, Lewis Brown R. Social support and mental health. In: Scheid T, Brown T, eds. *A Handbook for the Study of Mental Health: Social Contexts, Theories, and Systems*. New York, NY: Cambridge University Press; 2009:200–213.
35. Holma KM, Melartin TK, Haukka J, Holma IA, Sokero TP, Isometsa ET. Incidence and predictors of suicide attempts in DSM-IV major depressive disorder: a five-year prospective study. *Am J Psychiatry*. 2010;167(7):801–808.
36. Lifrak PD, McKay JR, Rostain A, Alterman AI, O'Brien CP. Relationship of perceived competencies, perceived social support, and gender to substance use in young adolescents. *J Am Acad Child Adolesc Psychiatry*. 1997;36(7):933–940.
37. Guo J, Hawkins JD, Hill KG, Abbott RD. Childhood and adolescent predictors of alcohol abuse and dependence in young adulthood. *J Stud Alcohol*. 2001;62(6):754–762.
38. Andersen A, Holstein BE, Due P. School-related risk factors for drunkenness among adolescents: risk factors differ between socio-economic groups. *Eur J Public Health*. 2007;17(1):27–32.
39. Saewyc EM, Homma Y, Skay CL, Bearinger LH, Resnick MD, Reis E. Protective factors in the lives of bisexual adolescents in North America. *Am J Public Health*. 2009;99(1):110–117.
40. Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm: findings from the National Longitudinal Study on Adolescent Health. *JAMA*. 1997;278(10):823–832.
41. Coker JK, Borders LD. An analysis of environmental and social factors affecting adolescent problem drinking. *J Couns Dev*. 2001;79:200–208.
42. Blum R. *School Connectedness: Improving the Lives of Students*. Baltimore, MD: Johns Hopkins Bloomberg School of Public Health; 2005.
43. DuBois DL, Silverthorn N. Natural mentoring relationships and adolescent health: evidence from a national study. *Am J Public Health*. 2005;95(3):518–524.
44. Black DS, Grenard JL, Sussman S, Rohrbach LA. The influence of school-based natural mentoring relationships on school attachment and subsequent adolescent risk behaviors. *Health Educ Res*. 2010;25(5):892–902.
45. Suldo SM, Mihalas S, Powell H, French R. Ecological predictors of substance use in middle school students. *Sch Psychol Q*. 2008;23(3):373–388.
46. Zimmerman MA, Bingenheimer JB, Notaro PC. Natural mentors and adolescent resiliency: a study with urban youth. *Am J Community Psychol*. 2002;30(2):221–243.
47. Beier SR, Rosenfeld WD, Spitalny KC, Zansky SM, Bontempo AN. The potential role of an adult mentor in influencing high-risk behaviors in adolescents. *Arch Pediatr Adolesc Med*. 2000;154(4):327–331.
48. Gaffney LR, Thorpe K, Young R, Collett R, Occhipinti S. Social skills, expectancies, and drinking in adolescents. *Addict Behav*. 1998;23(5):587–599.
49. McNeely C, Falci C. School connectedness and the transition into and out of health-risk behavior among adolescents: a comparison of social belonging and teacher support. *J Sch Health*. 2004;74(7):284–292.
50. Guilamo-Ramos V, Jaccard J, Turrissi R, Johansson M. Parental and school correlates of binge drinking among middle school students. *Am J Public Health*. 2005;95(5):894–899.
51. Rivers I, Noret N. Well-being among same-sex- and opposite-sex-attracted youth at school. *School Psych Rev*. 2008;37(2):174–187.
52. New York City Department of Health and Mental Hygiene, New York City Department of Education. Youth Risk Behavior Survey 2009. Available at: <http://www.nyc.gov/html/doh/html/epirsv/epirsv-youthriskbehavior.shtml>. Accessed September 1, 2011.
53. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41(11):1284–1292.
54. The 2009 HHS poverty guidelines. *Federal Register*. 2009;74(14):4199–4201.
55. Knol MJ, VanderWeele TJ, Groenwold RH, Klungel OH, Rovers MM, Grobbee DE. Estimating measures of interaction on an additive scale for preventive exposures. *Eur J Epidemiol*. 2011;26(6):433–438.
56. Ruglis J, Freudenberg N. Toward a healthy high schools movement: strategies for mobilizing public health for educational reform. *Am J Public Health*. 2010;100(9):1565–1571.
57. Bird JD, Kuhns L, Garofalo R. The impact of role models on health outcomes for lesbian, gay, bisexual, and transgender youth. *J Adolesc Health*. 2012;50(4):353–357.
58. McGuire JK, Anderson CR, Toomey RB, Russell ST. School climate for transgender youth: a mixed method investigation of student experiences and school responses. *J Youth Adolesc*. 2010;39(10):1175–1188.
59. Kosciw JG, Greytak EA, Diaz EM. Who, what, where, when, and why: demographic and ecological factors contributing to hostile school climate for lesbian, gay, bisexual, and transgender youth. *J Youth Adolesc*. 2009;38(7):976–988.
60. Chesir-Teran D, Hughes D. Heterosexism in high school and victimization among lesbian, gay, bisexual, and questioning students. *J Youth Adolesc*. 2009;38(7):963–975.
61. Voelker R. Community a factor in suicide attempts by lesbian, gay, and bisexual teens. *JAMA*. 2011;305(19):1951.