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Associations of Lesbian, Gay, Bisexual, Transgender, and Questioning–Inclusive Sex Education With Mental Health Outcomes and School-Based Victimization in U.S. High School Students

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A B S T R A C T

Purpose: Homophobic school climates are related to increased victimization for sexual minority youth (SMY), leading to increased risk of adverse mental health outcomes. Interventions that promote positive school climate may reduce the risk of victimization and adverse mental health outcomes in SMY. This study explored whether lesbian, gay, bisexual, transgender, and questioning (LGBTQ)–inclusive sex education is associated with adverse mental health and school-based victimization in U.S. youth.

Methods: Data analysis of representative data from the 2015 Youth Risk Behavior Survey and the 2014 School Health Profiles was conducted using multilevel logistic models testing whether youth in states with higher proportions of schools teaching LGBTQ-inclusive sex education had lower odds of reporting being bullied in school and experiencing adverse mental health outcomes, including depressive symptoms and suicidality.

Results: After controlling for covariates, protective effects for all youth were found for suicidal thoughts (adjusted odds ratio [AOR]: .91, 95% confidence interval [CI]: .89–.93) and making a suicide plan (AOR: .79; 95% CI: .77–.80). Lesbian and gay youth had lower odds of experiencing bullying in school as the proportion of schools within a state teaching LGBTQ-inclusive sex education increased (AOR: .83; CI: .71–.97). Bisexual youth had significantly lower odds of reporting depressive symptoms (AOR: .92; 95% CI: .87–.98).

Conclusions: Students in states with a greater proportion of LGBTQ-inclusive sex education have lower odds of experiencing school-based victimization and adverse mental health. These findings can be used to guide intervention development at the school and state levels.

IMPLICATIONS AND CONTRIBUTIONS

States where more schools teach lesbian, gay, bisexual, transgender, and questioning–inclusive sex education have youth with lower odds of experiencing bullying in school and lower odds of reporting adverse mental health outcomes. These protective associations are strongest in sexual minority youth.

Mental health problems remain one of the greatest threats to the success and well-being of sexual minority youth (SMY) in the United States. Results from the 2015 Youth Risk Behavior Survey (YRBS) indicate that over 60% of lesbian, gay, and bisexual youth experienced prolonged feelings of hopelessness or sadness in the last year, compared with only a quarter of heterosexual youth [1].

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Rates of suicidality are also alarmingly high, with SMY five times more likely to report attempting suicide than their heterosexual peers [1]. A meta-analysis of the mental health literature found that SMY are significantly more likely to experience depression and have three times the odds of reporting attempting suicide than heterosexual youth [2].

Minority Stress Theory posits that the heightened prevalence of adverse mental health outcomes seen within SMY emerge from prolonged exposure to stigmatization resulting from minority status [3]. For high school age youth, who average 6.8 hours of school each weekday [4], much of the sexuality-based stigmatization they experience is perpetrated by peers on school property. Approximately 58% of lesbian, gay, bisexual, transgender, and questioning (LGBTQ) students reported feeling unsafe at school, with 71% of LGBTQ youth reporting being verbally harassed at school based on their sexual identity [4]. The 2015 YRBS indicated that 12.5% of SMY reported skipping school due to safety concerns compared with 5.6% of heterosexual youth [1]. School-based victimization can have profound effects on the mental and physical health of these youth, with studies showing a significant relationship between school-based victimization and experiencing depression [5–7] and suicidal ideation [6].

A growing body of research suggests that promoting a supportive school climate by introducing Gay/Straight Alliances (GSAs) or antidiscrimination policies can have positive outcomes for SMY. Participation in and the presence of Gay/Straight Alliances or Gender/Sexuality Alliances (GSAs) in a school is associated with higher perceived social support [8] and participation in fewer risky behaviors [9]. However, GSAs may be insufficient in reducing the prevalence of victimization that leads to poor outcomes in SMY: owing to self-selecting participation in GSAs, notions of sexual diversity may not reach those most likely to perpetuate victimization and instead only provide a buffer against negative health and achievement outcomes for SMY [10]. Similarly, school-wide antidiscrimination policies have been linked to lower instances of past-year suicide in SMY [11], but their effectiveness may be diminished if they are not regularly enforced or if students are unaware of the policy [12,13].

Integration of LGBTQ-inclusive information and representation into standard curricula, where it is explicitly visible and accessible to all youth, may help overcome the downsides of other strategies such as GSAs or antidiscrimination policies. Toomey, McGuire, and Russell found that students perceived their school as safer if LGBTQ-inclusive education (e.g., receiving information about sexual orientation, learning about LGBTQ history or current events) was present [14]. Qualitative research has also found that students feel that there is less bullying and more LGBTQ inclusivity when LGBTQ history, events, or health issues are discussed in sex education, English, or social science classrooms [15]. LGBTQ students have also reported fewer experiences of victimization based on sexual orientation in schools with a curriculum that teaches about LGBTQ people, history, or events (14.8%) than those without (31.1%) [7]. For those students who reported both a GSA and inclusive curriculum, students perceived more peer supportiveness (75.2%) than schools that only had a GSA (61.0%) [7]. Despite the potential to minimize reported victimization in schools, no studies have looked at whether an LGBTQ-inclusive curriculum exclusively is related to fewer negative mental health outcomes in SMY.

The purpose of this study was to test whether a specific type of LGBTQ-inclusive curricula, LGBTQ-inclusive sex education, is associated with mental health disparities and victimization among SMY. Data concerning the prevalence of LGBTQ-inclusive sex education in schools are currently available through the School Health Profiles (SHPs) conducted biennially through the Center for Disease Control and Prevention, which is representative at the state level. Previous analyses using SHP have found that state-level school climate, including the presence of LGBTQ-inclusive curriculum among other support factors, is associated with reduced suicidal thoughts [16] and alcohol use [17] in SMY. For LGBTQ-inclusive sex education, state-level measures may be important to examine as policies dictating what type of sex education is taught in schools vary from state to state [18]. Thus, absent school-level data, state-level variables may provide a snapshot of the likelihood of schools within a state to have protective school climates and cultures that are influenced by LGBTQ-inclusive sex education and provides additional evidence of sociocultural factors that can influence SMY mental health and experiences of victimization.

Using data from the 2015 YRBS and 2014 SHP, we tested whether the proportion of schools teaching LGBTQ-inclusive sex education in a state was associated with mental health outcomes and bullying victimization in a representative sample of U.S. high school students. Furthermore, we tested whether any associations were significantly different for SMY compared with their heterosexual peers. We hypothesized that any protective associations of LGBTQ-inclusive sex education would be stronger for SMY than heterosexual youth.

Methods

Study design

This study analyzed data from the 2015 state-level YRBS. The YRBS used two-stage, cluster sampling to achieve representativeness for public high school students in grades 9–12 in their respective states. Detailed methodology regarding questionnaire development and sampling design for the state-level YRBS has been previously published [19]. The main predictor, the degree to which a state teaches LGBTQ-inclusive sex education, was operationalized using data from the 2014 SHPs. Sampling strategies used by the SHP result in representative data from health course educators concerning health education in secondary schools, grades 6 through 12, for each state [20]. For all states that completed the SHP in 2014, sample sizes ranged from 66 to 660 teachers, and response rates ranged from 70% to 89%. Detailed methodology for the SHP is published elsewhere [20].

States were included in analyses if they met three criteria: (1) YRBS results were authorized to be publicly released (k=31 states); (2) students in the state reported their sexual identity (k=19 states); and (3) the state agreed to release data from the 2014 SHPs. Eleven states met all three of these criteria: Arizona, Delaware, Florida, Kentucky, Maine, Michigan, New York, North Carolina, South Dakota, West Virginia, and Wyoming. Total YRBS sample sizes for these 11 states ranged from 1,622 to 10,834 students.

Individuals were excluded from the analyses if they were missing sexual identity or any of the demographic variables (sex, grade, or race). After excluding these individuals from the sample, participants who were missing all the outcome variables were also excluded. Of 51,895 total participants, we retained a final sample of 47,730 (8% missing).

Table 1
Frequency distributions of sexual identity by state, Youth Risk Behavior Survey 2015

State	Heterosexual, n (%)	Gay or lesbian, n (%)	Bisexual, n (%)	Not sure, n (%)
Arizona	2,080 (87.4)	61 (2.7)	166 (7.0)	75 (3.0)
Delaware	2,314 (87.6)	40 (1.8)	180 (6.7)	101 (4.0)
Florida	5,144 (87.6)	126 (2.2)	359 (6.0)	249 (4.2)
Kentucky	2,244 (87.6)	62 (2.8)	140 (6.6)	80 (3.0)
Maine	8,199 (87.4)	208 (2.1)	631 (6.3)	441 (4.2)
Michigan	4,124 (88.0)	128 (2.2)	295 (6.2)	176 (3.6)
New York	8,827 (86.0)	285 (3.0)	831 (6.6)	532 (4.4)
North Carolina	5,076 (88.5)	208 (3.0)	418 (5.7)	229 (2.8)
North Dakota	1,884 (90.5)	35 (1.9)	104 (4.8)	59 (2.8)
West Virginia	1,370 (86.9)	46 (2.9)	106 (6.5)	60 (3.7)
Wyoming	2,069 (88.5)	60 (2.5)	142 (5.1)	108 (3.9)

All percentages are weighted to account for the complex survey design and the sampling strategy.

Measures

Dependent variables

Mental health. To assess depressive symptoms, participants were asked "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" For suicidal thoughts, participants answered the question, "During the past 12 months, did you ever seriously consider attempting suicide?" Whether a participant had made a plan to commit suicide was measured by one item, "During the past 12 months, did you make a plan about how you would attempt suicide?" All mental health outcomes were measured dichotomously as "yes" or "no."

Bullying victimization. To assess experiences of being bullied at school, participants were asked, "During the past 12 months, have you ever been bullied on school property?" Responses to this question were dichotomous.

Independent variables

LGBTQ-inclusive sex education. Lead health educators were asked "Does your school provide curricula or supplementary materials that include HIV, STD, or pregnancy prevention information that is relevant to lesbian, gay, bisexual, transgender, and questioning youth (e.g., curricula or materials that use inclusive language or terminology)?" The proportion of those who answered "yes" to this question was used to generate a continuous variable reflecting the proportion of schools in each state that taught LGBTQ-inclusive sex education from this representative sample of schools. After scaling, a one-unit increase in LGBTQ-inclusive sexual education reflects a 10% increase in the number of schools providing this curriculum within a state.

Sexual identity. Participants were asked to select which sexual identity best described them. Options included heterosexual (straight), gay/lesbian, bisexual, and not sure, and all four categories were retained in analyses. Frequency distributions for each sexual identity by state are presented in Table 1.

State-level covariates. To control for the influence of state-level climate toward LGBTQ individuals, presence of statewide LGBTQ antidiscrimination policies was included. This variable was measured continuously on a scale from −10 to 34 and was obtained from the 2015 State Policy Tallies developed and provided by the Movement Advancement Project, a think-tank tracking LGBTQ equality [21]. State Policy Tallies are calculated based on the presence of antidiscrimination laws in six policy areas (i.e., marriage and relationship recognition, adoption and parenting, nondiscrimination, safe schools, health and safety, and identity documents), as well as the presence of explicitly negative laws that target LGBTQ individuals, such as HIV criminalization laws. For the states included in this analysis, State Policy Tallies ranged from .50 to 21.00. The density of same-sex couples in each state was calculated from the 2014 American Community Survey [22] as a rate per 1,000 coupled households, and median household income of each state was obtained from the 2015 American Community Survey [22].

Demographic covariates. Grade, sex, and race of participants were included as individual-level covariates. Grade was measured categorically and was dummy coded (ninth vs. 10th, 11th, and 12th grades). Sex was measured dichotomously as "female" versus "male." Race was dummy coded as "African-American," "Hispanic," and "other" versus "white."

Analytic approach

Analyses were conducted in Stata v. 14.2 using individual-level weighting to account for the complex survey design of

Table 2
Frequencies and descriptive statistics for sexual identity and level 2 covariates by outcomes, Youth Risk Behavior Survey 2015

Level 1 covariates	Depressive symptoms, n (%)	Suicidal thoughts, n (%)	Suicide plan, n (%)	Been bullied, n (%)
Sexual identity				
Heterosexual	10,413 (24.6)	5,107 (12.1)	3,575 (10.6)	6,874 (16.8)
Gay or lesbian	534 (53.8)	369 (36.7)	257 (30.3)	328 (34.6)
Bisexual	1,917 (62.8)	1,400 (44.6)	941 (39.3)	1,006 (34.2)
Not sure	852 (48.1)	550 (30.4)	361 (24.9)	519 (31.2)
Number of participants	47,226	47,221	37,513	45,037
Level 2 covariates	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
LGBTQ-inclusive sex education	34.5 (13.9)	34.5 (13.9)	28.5 (8.6)	35.4 (13.6)
Same-sex couples population density	13.4 (4.1)	13.4 (4.1)	12.7 (4.3)	13.4 (4.2)
Median household income	51806.3 (5696.2)	51806.3 (5696.2)	49837.3 (4736.6)	51887.6 (5832.0)
LGBT antidiscrimination	10.5 (8.3)	10.5 (8.3)	8.2 (7.8)	10.8 (8.3)
Number of states	11	11	10	10

Percentages are weighted to account for survey design.
LGBTQ = lesbian, gay, bisexual, transgender, and questioning; SD = standard deviation.

the YRBS [23]. Owing to the unavailability of outcome data, New York was excluded from analyses examining making a suicide plan, and Arizona was excluded from experiences of bullying on school property. To check for variation among states on dependent variables, unconditional models were fit with random intercepts for states using multilevel logistic models fit using generalized linear latent and mixed models [24]. Next, the main predictors (proportion of schools that taught LGBTQ-inclusive sex education and sexual identity) and individual-level covariates were added to each model. State-level covariates (anti-discrimination policies, median income, and density of same-sex couples) were then introduced in the model. The final models retained random intercepts for schools with the inclusion of cross-level interactions between proportion of schools that taught LGBTQ-inclusive sex education and sexual identity, while controlling for individual- and state-level covariates. These final models provided evidence for whether LGBTQ-inclusive sex education modifies the relationship between sexual identity and mental health and bullying victimization. Missing data were handled using listwise deletion. The University of Pittsburgh Institutional Review Board deemed the present study exempt.

Results

Descriptive analyses indicated that the sample was 55.4% white, 17.2% African-American, 19.8% Hispanic, and 7.6% other races. Participants were spread out fairly evenly among different grade levels, with 27.5% of youth in ninth grade, 25.9% in 10th grade, 23.8% in 11th grade, and 22.8% in 12th grade. Overall, 87.4% of the sample identified as heterosexual, 2.6% identified as gay or lesbian, 6.3% identified as bisexual, and 3.7% reported being unsure of their sexual identity.

Table 2 shows descriptive statistics for participants by depressive symptoms, suicidal thoughts, making a plan to commit suicide, and experiencing bullying on school property, as well as state-level covariates. Bisexual youth reported the highest frequency of past-year depressive symptoms (62.8%), suicidal thoughts (44.6%), and making a suicide plan (39.3%). Gay/lesbian youth reported the highest frequency of bullying victimization on school property (34.2%). The percentage of schools teaching LGBTQ-inclusive sex education ranged from 16.2% to 57.1% (mean=34.4, standard deviation=13.9).

For all mental health outcomes, the unconditional model indicated the presence of significant variation among states (depressive symptoms: variance component [VC] = .05, $p < .01$; suicidal thoughts: VC=.01, $p < .001$; suicide plan: VC = .05, $p<.001$), supporting the use of multilevel models. Students living in states with higher proportions of schools teaching LGBTQ-inclusive sex education had significantly lower odds of depressive symptoms after controlling for covariates (adjusted odds ratio [AOR]=.86; 95% confidence interval [CI]=.85–.88). Adjusted odds ratios and confidence intervals for outcomes are depicted in Table 3. The final model added the cross-level interaction between sexual identity and the proportion of schools teaching LGBTQ-inclusive sex education in the state. An interaction effect was found for bisexual youth, indicating that the disparity between bisexual and heterosexual youth reporting depressive symptoms decreased more in states with higher proportions of schools teaching LGBTQ-inclusive sex education (AOR = .92; 95% CI=.87–.98).

After controlling for state-level covariates, the proportion of schools teaching LGBTQ-inclusive sex education in a state was significantly related to lower odds of suicidal thoughts (AOR=.91; 95% CI=.89–.93) and making a suicide plan (AOR=.79; 95% CI=.77–.80). No interaction effects were found between sexual identity and the proportion of schools teaching LGBTQ-inclusive sex education for suicidal thoughts and making a suicide plan.

After introducing state-level covariates, LGBTQ-inclusive sex education was not a significant predictor of experiencing bullying at school (AOR=1.01; 95% CI=.98–1.05). An interaction effect was found in the final model, with gay and lesbian youth having a significantly greater reduction in the odds of experiencing bullying in the last year than heterosexual youth in states with a higher proportion of schools teaching LGBTQ-inclusive sex education (AOR=.83; 95% CI=.71–.97).

Discussion

This study tested whether LGBTQ-inclusive sex education is associated with reduced adverse mental health outcomes and bullying victimization in U.S. high school students. We found that LGBTQ-inclusive sex education is related to lower reports of adverse mental health among all youth and experiences of bullying among SMY subgroups.

Protective associations of LGBTQ-inclusive sex education were found for depressive symptoms, suicidal thoughts, and making a suicide plan for all youth. Notably, there was a 20% reduction in reported suicide plans for every 10% increase in schools teaching LGBTQ-inclusive sex education in a state. This finding supports past research indicating that inclusive school climates have positive implications for heterosexual youth as well as SMY [9,25,26].

A significant interaction effect was found for bisexual youth and depressive symptoms, such that with every 10% increase in the proportion of schools teaching LGBTQ-inclusive sex education in a state, the disparity in depressive symptoms between bisexual and heterosexual youth decreased. Notably, bisexual youth are at an increased risk for adverse mental health outcomes compared with both their heterosexual and gay/lesbian peers [27–29]. It is possible that LGBTQ-inclusive sex education programs influence not only heterosexual peers' perceptions of sexual diversity but also gay/lesbian peers' perceptions of sexual diversity, thereby reducing the double discrimination that bisexual youth often face [30]. The exact mechanisms that produce additional mental health disparities between bisexual youth and their lesbian and gay peers are understudied [30].

There was also a significant interaction effect for gay/lesbian youth, such that a 10% increase in the proportion of schools teaching LGBTQ-inclusive sex education in a state was associated with significantly lower odds of gay/lesbian youth experiencing bullying on school property compared with heterosexual youth. The question measuring bullying on school property used by the YRBS was not specific to homophobic bullying. For instance, the question did not specify whether a student experienced bullying due to being a sexual minority or perceived as a sexual minority. We would expect to see LGBTQ-inclusive sex education be associated with a reduction in homophobic bullying, not necessarily all bullying, which may have diluted the findings through use of a general bullying victimization measure. Future research should take care to specify the type of bullying being perpetuated, particularly when looking at bullying motivated by aspects of identity.

Table 3
Associations between lesbian, gay, bisexual, transgender, and questioning–inclusive sex education and adverse mental health outcomes and experiences of bullying in schools, Youth Risk Behavior Survey 2015

	Depressive symptoms, AOR (95% CI)			Suicidal thoughts, AOR (95% CI)	
	Model 1	Model 2	Model 3	Model 1	Model 2
Level 1 covariates					
Sexual identity					
Heterosexual (ref)	1.00	1.00	1.00	1.00	1.00
Gay/lesbian	**3.68 (2.76–4.89)**	**3.67 (2.76–4.89)**	**3.65 (1.85–7.22)**	**4.27 (3.31–5.52)**	**4.28 (3.31–5.54)**
Bisexual	**4.22 (3.53–5.05)**	**4.23 (3.53–5.06)**	**5.58 (3.95–7.87)**	**5.06 (4.77–5.36)**	**5.04 (4.75–5.35)**
Not sure	**2.66 (2.49–2.83)**	**2.66 (2.50–2.84)**	**2.58 (2.10–3.17)**	**2.92 (2.48–3.44)**	**2.92 (2.49–3.42)**
Grade					
9th grade (ref)	1.00	1.00	1.00	1.00	1.00
10th grade	**1.09 (1.03–1.15)**	**1.09 (1.03–1.15)**	**1.09 (1.03–1.15)**	.99 (.93–1.04)	.98 (.93–1.04)
11th grade	1.14 (1.00–1.30)	1.14 (1.00–1.30)	1.14 (1.00–1.30)	.94 (.79–1.12)	.94 (.79–1.12)
12th grade	1.07 (.93–1.24)	1.07 (.93–1.24)	1.07 (.93–1.24)	**.81 (.73–.90)**	**.81 (.72–.90)**
Sex					
Female (ref)	1.00	1.00	1.00	1.00	1.00
Male	**.44 (.41–.48)**	**.44 (.41–.48)**	**.44 (.41–.48)**	**.56 (.53–.60)**	**.56 (.53–.60)**
Race/ethnicity					
White (ref)	1.00	1.00	1.00	1.00	1.00
African-American	1.00 (.90–1.11)	1.00 (.90–1.11)	1.00 (.90–1.11)	**.77 (.71–.83)**	**.78 (.71–.85)**
Hispanic	**1.25 (1.07–1.45)**	**1.26 (1.07–1.47)**	**1.26 (1.08–1.48)**	1.05 (.93–1.17)	1.05 (.93–1.17)
Other	1.05 (.94–1.21)	1.05 (.96–1.17)	1.05 (.94–1.17)	1.02 (.93–1.12)	1.02 (.94–1.12)
Level 2 covariates					
LGBTQ-inclusive sex education	**.93 (.92–.93)**	**.86 (.85–.88)**	**.90 (.89–.91)**	**.95 (.94–.96)**	**.91 (.89–.93)**
Same-sex couples		**.97 (.96–.98)**	**.96 (.96–.97)**		**.95 (.95–.95)**
Antidiscrimination		**1.02 (1.01–1.02)**	**1.02 (1.02–1.03)**		1.01 (1.00–1.02)
Median income		**1.08 (1.05–1.10)**	**1.08 (1.06–1.10)**		**1.16 (1.13–1.20)**
Cross-level interactions					
Gay/lesbian × sex education			1.00 (.89–1.13)		
Bisexual × sex education			**.92 (.87–.98)**		
Not sure × sex education			1.01 (.97–1.05)		

Boldface indicates statistical significance ($p<.05$).
AOR = adjusted odds ratio; CI = confidence interval; LGBTQ = lesbian, gay, bisexual, transgender, and questioning; ref = referent.

In all models, a higher population density of same-sex couples in a state was significantly related to fewer adverse mental health outcomes and bullying victimization in youth. Past research has suggested that population density of same-sex couples in a state is related to lower instances of mood and anxiety disorders in sexual minority adults [31]. While this association has not been examined for youth, higher density of same-sex couples may indicate a normative shift in the perception of sexual minority relationships in a state and, similar to LGBTQ-inclusive sex education, may increase the likelihood that youth are exposed to representations of sexual minority individuals and same-sex relationships. These findings suggest the importance of examining and controlling for sociocultural factors on state climate and culture when examining youth mental health.

It is important to implement and evaluate LGBTQ-inclusive sex education in U.S. high schools. A previous cluster-randomized controlled trial found that LGBTQ-inclusive sex education increased student knowledge and safe sex practices in California schools [32,33], but this study did not measure or report on outcomes related to heterosexual students' perceptions and attitudes toward sexual diversity or outcomes related to SMY's feelings of safety. Including these measures can provide information about the impact LGBTQ-inclusive sex education may have on shaping bullying and school climate and help support existing research that suggests youth feel safer when LGBTQ curriculum is presented in schools [14,15]. Furthermore, measuring perceptions of internalized homophobia and perceived school safety before and after the introduction of LGBTQ-inclusive sex education can provide insight into whether LGBTQ-inclusive sex education can influence internal stressors that are related to mental well-being in SMY according to the Minority Stress Model.

Limitations and strengths

While this study provides a novel approach to conceptualizing the benefits of LGBTQ-inclusive sex education, it is not without limitations. We were unable to control for school-level factors or measure the impact of a specific school's sex education curriculum on students attending that school. However, significant state differences in the effect of teaching LGBTQ-inclusive sex education on SMY mental health and bullying victimization lends additional support for previous studies, asserting that larger sociocultural contextual factors play a role in the health and well-being of SMY [16,17,31]. The proportion of schools teaching LGBTQ-inclusive sex education is likely not randomly distributed and is related to other sociocultural contextual factors within a state and state-level policies. This study controlled for three state-level variables that could influence the proportion of schools with inclusive sex education (population density of same-sex couples, median household income, and the presence of inclusive antidiscrimination policies). Owing to a small number of states (10–11 states per model), there was low statistical power for state-level covariates. In addition, we were unable to account for the proportion of schools with GSAs in the state due to collinearity (r=.93) with the proportion of LGBTQ-inclusive sex education. As such, we recommend conducting studies at the school level to help disentangle

Table 3
Continued

Suicidal thoughts, AOR (95% CI)	Suicide plan, AOR (95% CI)			Been bullied, AOR (95% CI)		
Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
1.00	1.00	1.00	1.00	1.00	1.00	1.00
4.35 (2.45–7.73)	**3.75 (2.94–4.78)**	**3.76 (2.94–4.80)**	2.10 (.62–7.18)	**2.88 (1.80–4.62)**	**2.88 (1.79–4.62)**	**5.67 (2.34–13.79)**
4.90 (4.15–5.78)	**4.85 (4.44–5.30)**	**4.87 (4.45–5.34)**	**3.92 (2.31–6.69)**	**2.44 (1.98–2.99)**	**2.43 (1.98–2.99)**	**2.95 (1.99–4.38)**
3.30 (2.24–4.85)	**2.65 (2.33–3.00)**	**2.66 (2.33–3.03)**	**2.98 (1.32–6.70)**	**2.10 (1.62–2.71)**	**2.09 (1.62–2.71)**	**2.34 (1.15–4.76)**
1.00	1.00	1.00	1.00	1.00	1.00	1.00
.99 (.93–1.05)	1.07 (.94–1.22)	1.08 (.94–1.23)	1.07 (.94–1.23)	**.82 (.71–.96)**	**.82 (.71–.96)**	**.82 (.71–.96)**
.94 (.79–1.12)	.83 (.68–1.01)	.83 (.68–1.01)	.83 (.68–1.01)	**.68 (.57–.81)**	**.68 (.57–.81)**	**.68 (.57–.81)**
.81 (.72–.90)	**.67 (.63–.72)**	**.68 (.63–.73)**	**.68 (.63–.73)**	**.57 (.48–.67)**	**.57 (.48–.67)**	**.57 (.48–.67)**
1.00	1.00	1.00	1.00	1.00	1.00	1.00
.56 (.53–.60)	**.62 (.55–.69)**	**.62 (.55–.69)**	**.62 (.56–.69)**	**.73 (.67–.79)**	**.73 (.67–.79)**	**.73 (.67–.79)**
1.00	1.00	1.00	1.00	1.00	1.00	1.00
.78 (.71–.85)	.89 (.67–1.19)	.88 (.65–1.19)	.88 (.65–1.19)	**.51 (.43–.62)**	**.52 (.43–.63)**	**.52 (.43–.63)**
1.04 (.93–1.17)	1.18 (.99–1.40)	1.23 (.99–1.54)	1.24 (.99–1.54)	**.70 (.62–.80)**	**.71 (.61–.81)**	**.72 (.64–.82)**
1.02 (.93–1.12)	1.06 (.82–1.38)	1.07 (.82–1.40)	1.07 (.83–1.40)	**.77 (.66–.90)**	**.78 (.66–.91)**	**.77 (.66–.91)**
.96 (.94–.97)	**.76 (.69–.83)**	**.79 (.77–.80)**	**.77 (.75–.79)**	1.01 (1.00–1.01)	1.01 (.98–1.05)	**1.04 (1.02–1.07)**
.97 (.97–.98)		**.96 (.94–.97)**	**.96 (.93–.97)**		**.93 (.91–.94)**	**.94 (.93–.95)**
1.00 (1.00–1.01)		**1.02 (1.01–1.02)**	**1.02 (1.01–1.02)**		1.01 (1.00–1.02)	**1.01 (1.01–1.02)**
1.11 (1.10–1.13)		**1.18 (1.13–1.23)**	**1.18 (1.13–1.23)**		**1.29 (1.23–1.35)**	**1.21 (1.15–1.28)**
.99 (.90–1.09)			1.27 (.81–1.98)			**.83 (.71–.97)**
1.01 (.98–1.04)			1.09 (.90–1.32)			.95 (.88–1.01)
.96 (.90–1.03)			.96 (.72–1.27)			.97 (.85–1.10)

the independent effects of GSAs and LGBTQ-inclusive sex education or other inclusive curricula. While this study did include both traditionally liberal and conservative states, including additional states could add variability in the proportion of LGBTQ-inclusive sex education taught in each state and may provide a better understanding of its influence on mental health and bullying outcomes country wide. In line with prior research [34], we found no significant interactions between gender and sexual identity for the three mental health outcomes. Nevertheless, future research should consider gender differences in the effect that LGBTQ-inclusive sex education has on mental health outcomes in youth.

Despite limitations, this study utilized a large, representative sample from the YRBS and SHP. Results, therefore, reflect the typical experiences of U.S. public high school students within the states included in analyses. The statistical methodology used to test associations accounted for state differences and controlled for important contextual factors, such as the presence of statewide antidiscrimination policies, to account for confounding. Multilevel logistic modeling also accounts for clustering within states and produces more accurate estimations of standard errors than multiple logistic regression. This sensitivity to the potential dependence among participants within their respective states produces more robust results than traditional multiple logistic regression models.

It is important to note that certain policy barriers may affect the ability of schools within certain states and regions within the U.S. to implement LGBTQ-inclusive sex education in their schools. As of October 2018, Texas, Oklahoma, Arizona, South Carolina, and Alabama all have some form of statewide policy in place that require schools to teach negative information related to homosexuality, such as harmful stereotypes regarding HIV/AIDS risk and arguments that homosexuality is unnatural or immoral [18]. In these states, youth may be at even more risk of mental health disparities and victimization, but without political action, interventions that can improve their health may be out of reach at the school level. While challenges do exist, public support [35] and evidence that federally inclusive policies such as marriage equality can positively impact SMY mental health [36] suggest that there is potential for LGBTQ-inclusive sex education to become part of standard curricula in many regions of the country.

In conclusion, the results of this study provide novel evidence that LGBTQ-inclusive sex education is associated with positive mental health outcomes and fewer reports of bullying victimization in both SMY and heterosexual youth in U.S. public high schools. Furthermore, the results of this study support the need for school-level analyses and evaluation of individual LGBTQ-inclusive sex education programs. This study highlights the importance of examining the impact of sociocultural factors on SMY mental health and bullying victimization.

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