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Associations Between Community-Level LGBTQ-Supportive Factors and Substance Use Among Sexual Minority Adolescents

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Abstract

Purpose: Using representative school-based data and community-level primary data, we investigated how environmental factors (e.g., school and community climate) might be protective against substance use behaviors among a vulnerable population of adolescents.
Methods: We analyzed a sample of 2678 sexual minority adolescents using a combination of student-level data (British Columbia Adolescent Health Survey) and primary community-level data (assessing lesbian, gay, bisexual, transgender, and queer [LGBTQ]-specific community and school environments). Using multilevel logistic regression models, we examined associations between lifetime substance use (alcohol, illegal drugs, marijuana, nonmedical use of prescription drugs, and smoking) and community-level predictors (community and school LGBTQ supportiveness).
Results: Above and beyond student characteristics (e.g., age and years living in Canada), sexual minority adolescents residing in communities with more LGBTQ supports (i.e., more supportive climates) had lower odds of lifetime illegal drug use (for boys and girls), marijuana use (for girls), and smoking (for girls). Specifically, in communities with more frequent LGBTQ events (such as Pride events), the odds of substance use among sexual minority adolescents living in those communities was lower compared with their counterparts living in communities with fewer LGBTQ supports.
Conclusions: The availability of LGBTQ community-level organizations, events, and programs may serve as protective factors for substance use among sexual minority adolescents. In particular, LGBTQ-supportive community factors were negatively associated with substance use, which has important implications for our investment in community programs, laws, and organizations that advance the visibility and rights of LGBTQ people.

Keywords: communities, GSAs, LGBTQ, school policy, SGM

Introduction

A well-established body of literature has documented disparities in substance use for lesbian, gay, and bisexual (LGB)* young people.[1–5] Although substance use in and of itself is not always problematic, research has indicated that harmful substance use behaviors (e.g., drinking heavily) among adolescents have been linked to academic, physical, and social problems.[6] Growing evidence indicates that disparities in substance use behaviors are widening for some sexual minority (e.g., LGB) young people.[7–9] This evidence consistently shows that females are at increased risk for substance use behaviors, sometimes attributed to differing social norms[7–9]; these differences necessitate that scholarship disaggregates analyses by gender.

Oftentimes, these disparities are attributed to minority stress,[10] or the negative stressors resulting from having a socially stigmatized sexual orientation that may occur at every

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*Variation in the LGBTQ/LGB acronym reflects differences in the study sample or resources being referenced.

level of the social ecological model[11] from the intrapersonal (e.g., internalized stigma)[12–14] to the societal (e.g., laws that discriminate against lesbian, gay, bisexual, transgender, and queer [LGBTQ] people) level. Previous research has found that coping mechanisms attenuate the relationship between minority-specific stressors and health outcomes—oftentimes scholars conceptualize this as one of many potential protective factors, such as social support, acceptance, connection with friends, and other relationships.[15,16]

Less frequently have scholars explored the role of proximal community climate (operationalized with specificity to neighborhood environments in this article, as opposed to the state-level or broader climates) and the resources that youth have available to them as they cope with stigma and discrimination.[17,18] In this article, we expand the conceptualization of interpersonal supports to include the presence of community- and school-level supports that might impact substance use behaviors for sexual minority adolescents. This novel focus on proximal climate is an important expansion of state-level measurements (such as state laws) and allows us to understand how local environments and policies might be associated with health behaviors among vulnerable populations.

Scholars have explored risk and protective factors for substance use behaviors among sexual minority populations, but infrequently have studies explicitly considered how protective factors might be related to minority stress and health outcomes. Specifically, studies demonstrate that higher social support is associated with better health and wellbeing among sexual minority youth.[17,19–21] This relationship was documented in a study that examined protective factors for substance use among sexual minority adolescents.[13] Emerging work on community and environmental protective factors for youth has also focused more readily on the mental health vulnerabilities of youth,[18,22,23] although more recent work indicates that fewer LGBTQ-specific community support factors,[24] and increased structural stigma,[25] are associated with sexual orientation-related substance use and disparities in use among youth.[26] This growing body of work has found that the presence of gay–straight alliances (GSAs; now commonly referred to as gender sexuality alliances),[27] involvement in the LGBTQ community,[28] and general community connectedness[29] are relevant for health outcomes among sexual minority populations. However, this research typically relies on existing community data that are not specific to sexual minority experiences.

This study used population-based data and indicators of communities surrounding schools that youth attend to understand how environmental factors (e.g., school and community climate) may be associated with risk for substance use among sexual minority adolescents. We aimed to extend previous research that has focused heavily on the presence of GSAs[27] and other assessments of general community connectedness. In our study, we included climate characteristics such as political climate, community size, population-focused community events, and population-serving organizations. We hypothesized that sexual minority adolescents living in communities and attending schools with more LGBTQ-supportive climates would be less likely to use substances than their peers in less supportive environments.

Methods

Participants and procedures

Adolescent data were drawn from the 2013 British Columbia Adolescent Health Survey (BCAHS), which had a 70% response rate and was collected between February and June 2013. The communities selected for the measurement of overall climate and resources were based on the student data collected in the 2013 BCAHS. Collection of the data measuring community-level LGBTQ resources and events was completed in 2013; newer BCAHS data were collected in 2018. The sample frame included all grade 7–12 classrooms across the province in the 56 participating school districts (out of 59 total districts), stratified by grade and region, from which classrooms were randomly sampled.[30] The participating school districts represented 98.5% of students enrolled in public schools. Pencil-and-paper surveys were administered by public health nurses and nursing students during class time.

The BCAHS sample included 2684 sexual minority students from 274 BC schools, which represents an estimated provincial population of 24,624 students who self-identified on the survey as lesbian, gay, bisexual, mostly homosexual, or mostly heterosexual. This study utilized responses from adolescents with valid responses on the measure that assessed participant sex ($n = 2678$; see measures section; 68% girls). The student-level data were combined with community-level data,[31] which assessed several characteristics of the schools and surrounding community that were geographically within a 30-minute drive-time radius of each school by car or public transit. All study procedures were approved by the ethics boards at The University of British Columbia and the University of Minnesota.

Measures

Sexual orientation. Sexual orientation was measured by a question that has been used on the BCAHS for 20 years, which combined identity labels (completely heterosexual, mostly heterosexual, bisexual, mostly homosexual, and completely homosexual [gay/lesbian]), with sexual attraction by gender of partners; it also included two ''not sure'' options, one indicating questioning one's orientation, and the other that the participant does not have attractions yet. Based on previous analyses with these measures,[32] sexual minority adolescents included those who answered mostly heterosexual, mostly homosexual, bisexual, and gay or lesbian. In this study, adolescents who answered ''mostly homosexual'' were combined with those who identified as lesbian/gay. This measure captures only sexual minority adolescents who are comfortable reporting on a survey that they are not heterosexual—we expect that if Canada was absent of stigma, the proportion of sexual minority adolescents in this study would be greater.

Substance use. In the 2013 BCAHS, students reported whether they had ever had a drink of alcohol other than a few sips (0 = no, 1 = yes), how many times during their lifetime they have used any of the following drugs (cocaine, hallucinogens, ecstasy/MDMA, mushrooms, inhalants, amphetamines, crystal meth, heroin, ketamine, or steroids; 0 = never any drug and 1 = one or more times for any of

the drugs), if they have ever used marijuana (0 = no and 1 = yes), nonmedical use of prescription drugs (0 = never and 1 = one or more times), and if they have ever tried smoking a cigarette, cigar, or cigarillo—even one or two puffs (0 = no and 1 = yes). These variables were used to indicate lifetime prevalence of alcohol use, illegal drug use, marijuana use, nonmedical prescription drug use, and smoking use, respectively.

Community-level LGBTQ resources and events. At the community level, the LGBTQ-Supportive Environments Inventory[31] was used to collect data on several community features surrounding each school, including (a) the presence or absence of LGBTQ events such as Pride events, Transgender Day of Remembrance, Anti-Bullying Day, and Parents, Families, and Friends of Lesbians and Gays (i.e., PFLAG) meetings supporting parents, families, and friends of LGBTQ people. We also catalogued (b) community resources that were LGBTQ supportive under 12 categories, as follows: bars and coffee shops, art activities and groups, advocacy organizations, social meetups, adolescent and young adult health clinics, other health clinics, mental health professionals, domestic violence and sexual assault services, places of worship, housing services, libraries, and travel services.

This Inventory was developed through a process of conducting qualitative interviews, literature reviews, and receiving input from expert LGBTQ health researchers. Specifically, a team of 13 coders utilized an Internet search protocol that was created with input from advisors and explained in a coding manual. Two coders independently coded community resources in each cluster of four to six cities of similar geographic areas. The project director then cleaned the data to reconcile discrepancies in scores. Clusters of cities were defined as areas around each school that one could reach in 30 minutes by car from each school. These clusters were produced using Esri ArcGIS v.10.4.1 (Esri, Redlands, CA). This process has been documented extensively elsewhere.[31]

Resource organizations were included if they met criteria and were found in online searching by at least one coder. LGBTQ inclusiveness of each community resource was coded as follows (1 = on a resource list or user reviews indicate that it is LGBTQ inclusive, but no indication of LGBTQ inclusiveness on their own website; and 2 = explicit indication of LGBTQ inclusiveness on their website). Finally, (c) LGBTQ youth-serving organizations that provided at least one event or service exclusively for LGBTQ youth were recorded. We evaluated each LGBTQ youth-serving organization on several elements, including visibility of LGBTQ-inclusiveness from the street, confidentiality, accessibility through public transit, and regular social events—these were summed to produce a ''total supportiveness score'' of LGBTQ youth-serving organizations.

School environments. We created a measure of school environments by conducting telephone surveys in 2008 and again in 2014. Specifically, for each school included in the BCAHS, school principals and/or the staff they indicated were asked about their GSAs and school policies. Because the BCAHS is a repeating survey with the same school districts included every 5 years, data included were collected about GSAs and school policies after the prior survey in 2008, and updated in 2014 after the 2013 survey. The number of years of the GSAs' existence and policies prohibiting bullying based on sexual orientation (until 2013, when student data were collected) were ascertained (ranges from 0 to 15 years for GSAs and from 0 to 19 years for school policies). Schools without a GSA or policies prohibiting bullying based on sexual orientation on January 1, 2013 were coded as 0.

General community environments. Two aspects of general community environments were measured as covariates. First, population sizes larger than 100,000 surrounding a school were categorized as large population centers. To identify these population centers, we used Statistics Canada[33] census population estimates based on the school's address and a drive time buffer of 30 minutes. Second, the percentage of votes for the New Democratic Party (NDP) in the 2013 provincial general election was recorded from Elections BC, as a proxy of progressive political climates in the communities surrounding the schools.[34] Third, community alcohol consumption was measured by documenting the number of alcohol sales per 100,000 residents in each community.

Plan of analysis

LGBTQ-related community and school environments were measured by several variables, which were highly correlated with each other (rs > 0.80). Incorporating all variables as separate predictors in regression models might be inefficient and can cause problems with model specification due to multicollinearity.[35] We therefore conducted a principal component analysis (PCA) to create LGBTQ-related environment predictors using the pcaMethods R package.[36] We applied probabilistic PCA, which can handle missingness in the variables by imputation, to reduce the LGBTQ-related community and school variables. The reduced components were determined based on an eigenvalue greater than one. Once we obtained the reduced components from the variables, PCA scores of the components were used as a predictor.

We then constructed multilevel logistic regression models to examine associations between community-level predictors and lifetime substance use, while accounting for dependency/correlation among responses of students from the same school. Associations were evaluated separately for each substance use outcome. The community-level predictors included PCA scores of LGBTQ-supportive community and school environments, the percentage of votes for the NDP in decile, and population size. For each substance use outcome, we first examined the association between the community-level predictors and lifetime substance use without controlling for any student characteristic. We then evaluated each association, controlling for student characteristics, including sexual orientation, age, years of living in Canada, and having moved in the past year.

We also controlled for the level of community alcohol consumption when examining the alcohol use outcome, but not the other substance use outcomes. This covariate was included to reduce the possibility of confounding, given evidence that behavioral norms influence adolescent substance use[37] and community-level consumption may

also be associated with social climate, as the presence of bars was part of the LGBTQ-Supportive Environments Inventory. All of the associations were evaluated separately for boys and girls. The amount of missingness ranged from 1% to 3% and listwise deletion was applied. All models were estimated in Mplus7 using robust maximum likelihood estimator.

Results

Detailed community-level characteristics are shown in Table 1. There were 274 schools included in this study, and a little more than half of the communities included in this study were located in large urban population centers. Table 2 displays student-level characteristics. The majority of our sample identified as girls (68.3%); the average age was the same for boys and girls (M = 15.7). Slightly more boys (38.9%) identified as LGB than girls (36.5%), and the majority of boys (88.7%) and girls (90.0%) had lived in Canada for 6 years or longer.

For LGBTQ-related environments, the probabilistic PCA suggested two components, which explained 83% of total variance (Table 3). The first component showed relatively high loadings to LGBTQ-related community events, LGBTQ-supportive community resources, total inclusiveness score of LGBTQ-supportive community resources, LGBTQ youth-serving organizations, and total supportiveness score of LGBTQ youth-serving organizations (loading range from 0.39 to 0.45). The second component displayed high loadings for the lengths of GSA and policies prohibiting bullying based on sexual orientation in a school (loading range from 0.60 to 0.75). Standard PCA suggested similar results. These two components were named as community LGBTQ supportiveness and school LGBTQ supportiveness, respectively.

Table 4 displays the results of multilevel logistic regression models (associations between community-level predictors and substance use) with and without the adjustment for student characteristics. For lifetime substance use variables, without adjustment for student characteristics, community LGBTQ supportiveness was related to lower odds of lifetime illegal drug use for boys and girls, lower odds of lifetime marijuana use for boys and girls, and lower odds of lifetime smoking for boys and girls. On the contrary, school LGBTQ supportiveness was associated with higher odds of lifetime marijuana use for boys. A progressive political climate was associated with higher odds of lifetime marijuana use for girls. Lifetime nonmedical use of prescription drugs was not significantly associated with any of the school or community characteristics. Last, for boys, living in large population centers was associated with lower odds of lifetime alcohol use.

Table 1. Descriptive Statistics for School and Community Characteristics

School and community characteristics	N *(%) or mean (SD)*	*Range*
Number of communities/schools	274	—
Average LGBTQ-related community events in a community	10.8 (9.0)	1–30
Average LGBTQ-supportive community resources in a community	111.4 (152.3)	1–496
Total inclusiveness score of LGBTQ-supportive community resources in a community	181.3 (242.2)	0–791
Average LGBTQ youth-serving organizations in a community	4.9 (5.4)	0–19
Total supportiveness score of LGBTQ youth-serving organizations in a community	24.4 (20.1)	0–70
Length (No. of years) of GSA until 2013 in a school	2.7 (3.9)	1–15
Length (No. of years) of school policy prohibiting bullying based on sexual orientation until 2013 in a school	3.7 (3.9)	1–16
Percent of valid votes cast for the NDP in a community	39.8 (9.6)	9–87
Community is a large urban population center		
No	122 (44.5%)	0–1
Yes	152 (55.5%)	0–1

GSA, gay–straight alliance; LGBTQ, lesbian, gay, bisexual, transgender, and queer; NDP, New Democratic Party; SD, standard deviation.

Table 2. Descriptive Statistics for Student characteristics from the 2013 British Columbia Adolescent Health Survey ($N = 2678$)

	N *(%) or mean (SD)*	
Student characteristics	*Boys*	*Girls*
No. of students	849 (31.7%)	1829 (68.3%)
Age (years)	15.73 (1.38)	15.71 (1.43)
Sexual orientation		
Lesbian/gay	149 (17.5%)	108 (5.9%)
Bisexual	181 (21.3%)	560 (30.6%)
Mostly heterosexual	519 (61.1%)	1161 (63.5%)
Years of living in Canada		
6 Years or more	744 (88.7%)	1603 (90.0%)
5 Years or less	95 (11.3%)	179 (10.0%)
Moving history in the past year		
Moved zero times	656 (78.0%)	1255 (69.1%)
Moved one or more times	185 (22.0%)	560 (30.9%)
Alcohol use in lifetime		
No	325 (39.0%)	536 (29.5%)
Yes	509 (61.0%)	1280 (70.5%)
Illegal drug use in lifetime		
No	594 (72.4%)	1182 (66.1%)
Yes	226 (27.6%)	606 (33.9%)
Marijuana use in lifetime		
No	508 (60.4%)	945 (52.0%)
Yes	333 (39.6%)	872 (48.0%)
Nonmedical use of prescription drugs		
No	685 (83.5%)	1377 (77.1%)
Yes	135 (16.5%)	409 (22.9%)
Smoking in lifetime		
No	570 (67.5%)	1071 (59.2%)
Yes	274 (32.5%)	737 (40.8%)

Six participants from the larger sample ($N = 2684$) did not report their sex assigned at birth and so are excluded from analytic models.

Table 3. Results of Principal Component Analysis for LGBTQ-Related Environments, Using 2013 British Columbia Adolescent Health Survey Data ($N=2678$)

	Community LGBTQ supportiveness Loadings	*School LGBTQ supportiveness Loadings*
Number of LGBTQ-related community events in a community	0.39	−0.13
Number of LGBTQ-supportive community resources in a community	0.45	−0.14
Total inclusiveness score of LGBTQ-supportive community resources in a community	0.41	−0.15
Number of LGBTQ youth-serving organizations in a community	0.44	−0.09
Total supportiveness score of LGBTQ youth-serving organizations in a community	0.45	−0.09
Length (No. of years) of GSA until 2013 in a school	0.23	0.60
Length (No. of years) of school policy prohibiting bullying based on sexual orientation until 2013 in a school	0.15	0.75

Table 4. Results of Multilevel Logistic Regression Models Estimating Associations Between the Community-Level Predictors and Lifetime Substance Use Among British Columbia Adolescent Health Survey Sexual Minority Adolescents ($N=2678$)

	Girls		*Boys*	
	Unadjusted models OR (95% CI)	*Adjusted models (for student characteristics) OR (95% CI)*	*Unadjusted models OR (95% CI)*	*Adjusted models (for student characteristics) OR (95% CI)*
Lifetime alcohol use				
LGBTQ-related environments				
Community LGBTQ supportiveness	0.95 (0.80–1.14)	0.96 (0.80–1.16)	1.06 (0.86–1.32)	1.06 (0.84–1.34)
School LGBTQ supportiveness	1.03 (0.91–1.16)	0.99 (0.87–1.13)	1.17 (0.95–1.39)	1.15 (0.96–1.38)
General environments				
Percent of NDP votes	1.06 (0.93–1.21)	1.05 (0.92–1.19)	0.90 (0.75–1.09)	0.88 (0.72–1.08)
Large population center	0.83 (0.58–1.18)	0.83 (0.58–1.19)	0.50 (0.31–0.81)*	0.49 (0.29–0.82)*
Lifetime illegal drug use				
LGBTQ-related environments				
Community LGBTQ supportiveness	0.92 (0.86–0.98)*	0.92 (0.86–0.99)*	0.87 (0.77–0.98)*	0.88 (0.78–0.99)*
School LGBTQ supportiveness	1.05 (0.94–1.17)	1.04 (0.94–1.16)	0.98 (0.85–1.14)	0.96 (0.83–1.12)
General environments				
Percent of NDP votes	0.98 (0.87–1.10)	0.99 (0.88–1.11)	1.09 (0.90–1.32)	1.08 (0.90–1.30)
Large population center	0.94 (0.69–1.27)	0.99 (0.73–1.36)	1.28 (0.77–2.14)	1.32 (0.79–2.19)
Lifetime marijuana use				
LGBTQ-related environments				
Community LGBTQ supportiveness	0.80 (0.74–0.87)**	0.82 (0.75–0.89)**	0.89 (0.80–0.99)*	0.92 (0.82–1.04)
School LGBTQ supportiveness	1.05 (0.95–1.16)	1.02 (0.92–1.13)	1.17 (1.01–1.36)*	1.14 (0.99–1.32)
General environments				
Percent of NDP votes	1.19 (1.05–1.36)*	1.20 (1.05, 1.37)*	1.04 (0.84–1.27)	1.02 (0.82–1.26)
Large population center	0.99 (0.71–1.40)	1.04 (0.74–1.47)	0.72 (0.44–1.18)	0.71 (0.42–1.19)
Lifetime nonmedical use of prescription drugs				
LGBTQ-related environments				
Community LGBTQ supportiveness	0.93 (0.86–1.00)	0.94 (0.87–1.02)	0.91 (0.80–1.03)	0.92 (0.81–1.04)
School LGBTQ supportiveness	0.98 (0.88–1.09)	0.98 (0.88–1.09)	0.95 (0.81–1.12)	0.94 (0.80–1.11)
General environments				
Percent of NDP votes	0.91 (0.80–1.03)	0.93 (0.82–1.05)	1.25 (0.96–1.62)	1.23 (0.97–1.55)
Large population center	0.95 (0.70–1.29)	1.01 (0.74–1.37)	1.49 (0.86–2.57)	1.55 (0.89–2.72)
Lifetime smoking				
LGBTQ-related environments				
Community LGBTQ supportiveness	0.87 (0.81–0.94)**	0.88 (0.81–0.96)*	0.90 (0.81–0.99)*	0.91 (0.82–1.00)
School LGBTQ supportiveness	1.09 (0.98–1.20)	1.07 (0.96–1.19)	1.06 (0.93–1.22)	1.05 (0.91–1.20)
General environments				
Percent of NDP votes	0.97 (0.87–1.09)	0.98 (0.87–1.10)	1.07 (0.91–1.25)	1.04 (0.88–1.24)
Large population center	0.92 (0.66–1.30)	0.98 (0.69–1.39)	0.81 (0.53–1.26)	0.81 (0.51–1.29)

*<0.05; ** <0.001.
CI, confidence interval; OR, odds ratio.

After adjustment for student characteristics, community LGBTQ supportiveness was associated with lower odds of lifetime illegal drug use for boys and girls, lower odds of lifetime marijuana use for girls only, and lower odds of lifetime smoking for girls only. After adjusting for student characteristics, the association between school LGBTQ supportiveness and higher odds of lifetime marijuana use for boys was no longer significant. For general environments, large population size was related to lower odds of lifetime alcohol use for boys. A progressive political climate was related to higher odds of lifetime marijuana use for girls. Lifetime nonmedical use of prescription drugs was not significantly associated with any predictor.

Discussion

In this study, we combined survey responses from the BCAHS (a provincially representative dataset) with primary community- and school-level data to demonstrate that sexual minority adolescents who live in communities with higher levels of LGBTQ-supportive climates generally report lower odds of lifetime substance use than their peers living in communities with lower levels of LGBTQ-supportive climates. We extended previous research by Hatzenbuehler et al.[22–24] in that we combined primary data, collected from the communities where children lived and attended school, to highlight the nuances of LGBTQ-specific community support and their relations with substance use.

In addition, we focused on a variety of contexts, including, but not limited to, school GSAs, which have been widely explored in the contemporary literature. Although a growing body of scholarship has demonstrated the protective effect of interpersonal relationships, such as family[17,20] and friends,[21,38] for better health outcomes among sexual minority youth, less research has examined how community-level protective factors might be related to health outcomes. We expect that future studies focused on both interpersonal supports as well as community supportiveness (whether general or specific to LGBTQ identities) will continue to confirm the utility and importance of family relationships for better outcomes among all adolescents and, in particular, sexual minority adolescents. Because our research questions were specific to the community context (which has not been well studied to date), interpersonal factors, while demonstrated to be influential by previous research, were outside the scope of this article. The finding that LGBTQ-supportive community factors were significantly linked to lower odds of lifetime illegal drug use (for boys and girls), marijuana use (for girls), and smoking (for girls) has important implications for our investment in community programs, laws, and organizations that advance the visibility and rights of sexual minority people.

It is notable that we found community factors, above and beyond school and demographic factors, were associated with lower substance use. This complements past research that has found strong associations between school-related climate and contexts and health,[16,23,39] and suggests that safe and supportive climates are associated with positive outcomes for sexual minority youth.[12,23] School and community supportiveness were unrelated to alcohol use in our study: perhaps alcohol use is more normative among adolescents, compared to illicit drug use, and therefore, these relatively diffuse social factors do not have a significant impact on alcohol use.[40]

The increased odds of marijuana use among sexual minority girls in communities with more progressive political environments—which contradicted our hypothesized direction of relationship—warrants some consideration. Although political environments are complex and may have different implications for health behaviors within different contexts (e.g., within working class families, across diverse geographies), our findings are a starting point that provides an impetus to further explore how political environments may play a role in the health of sexual minority youth.

Given that more proximal influences are typically found to be stronger in influencing behavioral outcomes, it was surprising that there was only one significant finding for the effects of school LGBTQ supportiveness on substance use outcomes before controlling for student characteristics: lifetime marijuana use for boys. Perhaps future precision in measurement can elucidate other patterns in the role of school LGBTQ supportiveness in substance use. Previous research has linked supportive school environments (such as those with anti-bullying policies, established GSAs, and teachers who are supportive of LGBTQ identities) to better health outcomes for sexual minority adolescents,[23,27,41] but did not examine community factors simultaneously. Future research should continue to focus on identifying aspects of the school environment (especially specific to LGBTQ identity and issues) that are related to better experiences and health behaviors for sexual minority adolescents, with attention to additional characteristics of the social context.

Limitations

Despite the strengths in combining a provincially representative dataset of adolescents with community-level data to better understand how community factors are related to substance use among sexual minority adolescents, there were a number of limitations to our project. First, without multiple measures of minority stressors, we were unable to test directly whether our measured protective factors buffered the relationship between minority stress and substance use. Second, our sample can only generalize to communities that have similar characteristics to those in Western Canada. Third, our data are from 2013—studies such as this should be updated as political climates can change quickly and unexpectedly. Fourth, the BCAHS survey did not measure gender identity and so we are unable to examine differences by gender.

Future studies should examine potential LGBTQ community supportiveness and substance use differences with greater attention to diverse gender identities and other sexual identities, given that in a recent study, scholars found that a substantial portion of their national sample of sexual and gender minority adolescents identified as pansexual ($n = 2256$, 13.2% of the sample) and asexual ($n = 725$, 4.2% of the sample).[42] Emerging evidence suggests that health experiences may differ for these ''emerging'' subgroups of sexual minority individuals—the BCAHS survey did not measure these identities. Thus, future research should measure the growing diversity of sexual orientations.

Last, although we measured novel community factors that we found to be uniquely associated with substance use outcomes among sexual minority adolescents, there are other

factors that should be explored in the future—for example, knowing other sexual minority individuals in the community might provide an environment in which sexual minority adolescents feel safe to disclose their orientations, which could in turn be protective against engaging in substance use. In addition, we were unable to capture the complexities of progressive community climates when defining this concept through voting behaviors. We acknowledge that a vote for a certain party may be in line with or contradict the party's stance on LGBTQ issues, and our operationalization of this issue must be interpreted in light of the complexity that exists between voters and their political party of preference. Taken together, in the future, scholars should consider other and more nuanced community-level variables, such as legal prosecutions in relationship to illicit drug use, which would add more nuance and rigor to the investigation of alcohol and drug use patterns.

Implications

Sexual minority youth continue to use substances at higher rates than their heterosexual counterparts.[1–5] Strategies at all levels of the social ecological model appear to be only one part of the solution. Our findings contribute to a growing body of literature that points to the importance of community context for sexual minority youth substance use and provides a unique and important strategy for curtailing sexual orientation-related disparities in substance use. Given that community supports were associated with lower odds of lifetime illegal drug use (for boys and girls), marijuana use (for girls), and smoking (for girls)—above and beyond school climate—it is important for researchers, policy makers, and program providers to understand what community resources are most important for sexual minority youth. For example, advocating for Pride Parades and LGBTQ-related events in our communities may create spaces that are associated with lower substance use among sexual minority adolescents. Advocating for LGBTQ-specific community organizations, events, and places of worship can offer new avenues for improved health among sexual minority youth.

Conclusion

This study extends the current body of knowledge that examines and explains differences in substance use behaviors among sexual minority adolescents to include environmental factors (e.g., school and community climate). Specifically, we found that more frequent and supportive LGBTQ-specific community resources were negatively related to some substance use behaviors, particularly for girls. Essentially, a variety of community resources (e.g., LGBTQ youth-serving organizations, LGBTQ-inclusive community climates/resources, and LGBTQ events such as Pride) may create a climate of greater acceptance and supportiveness that is associated with lower odds of substance use. Building on these findings, future research should unpack which of these resources are most strongly related to sexual minority adolescent health.

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Disclaimer

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References

1. Kann L, Olsen EO, McManus T, et al.: Sexual identity, sex of sexual contacts, and health-related behaviors among students in grades 9–12—United States and selected sites, 2015. MMWR Surveill Summ 2016;65:1–202.
2. Marshal MP, Friedman MS, Stall R, et al.: Sexual orientation and adolescent substance use: A meta-analysis and methodological review. Addiction 2008;103:546–556.
3. Talley AE, Hughes TL, Aranda F, et al.: Exploring alcohol-use behaviors among heterosexual and sexual minority adolescents: Intersections with sex, age, and race/ethnicity. Am J Public Health 2014;104:295–303.
4. Plöderl M, Tremblay P: Mental health of sexual minorities. A systematic review. Int Rev Psychiatry 2015;27:367–385.
5. Day JK, Fish JN, Perez-Brumer A, et al.: Transgender youth substance use disparities: Results from a population-based sample. J Adolesc Health 2017;61:729–735.
6. No authors: The scope of the problem. Alcohol Res Health 2004;28:111–120.
7. Fish JN, Watson RJ, Porta CM, et al.: Are alcohol-related disparities between sexual minority and heterosexual youth decreasing? Addiction 2017;112:1931–1941.
8. Watson R, Lewis N, Fish JN, Goodenow C: Sexual minority youth continue to smoke cigarettes earlier and more often than heterosexual peers: Findings from population-based data. Drug Alcohol Depend 2018;184:64–70.
9. Fish JN, Watson RJ, Gahagan J, et al.: Smoking behaviours among heterosexual and sexual minority youth? Findings from 15 years of provincially representative data. Drug Alcohol Rev 2019;38:101–110.
10. Meyer IH: Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. Psychol Bull 2003;129:674–697.
11. Bronfenbrenner U, Morris PA: The bioecological model of human development. In: *Handbook of Child Psychology, Volume I. Theoretical Models of Human Development*.

Edited by Lerner RM. Hoboken, NJ: John Wiley & Sons, Inc., 2006, pp 793–828.
12. 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;38:989–1000.
13. Goldbach JT, Tanner-Smith EE, Bagwell M, Dunlap S: Minority stress and substance use in sexual minority adolescents: A meta-analysis. Prev Sci 2014;15:350–363.
14. 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;104:245–254.
15. Eisenberg ME, Resnick MD: Suicidality among gay, lesbian and bisexual youth: The role of protective factors. J Adolesc Health 2006;39:662–668.
16. Poteat VP, Mereish EH, DiGiovanni CD, Koenig BW: The effects of general and homophobic victimization on adolescents' psychosocial and educational concerns: The importance of intersecting identities and parent support. J Couns Psychol 2011;58:597–609.
17. Snapp SD, Watson RJ, Russell ST, et al.: Social support networks for LGBT young adults: Low cost strategies for positive adjustment. Fam Relat 2015;64:420–430.
18. Hatzenbuehler ML: The social environment and suicide attempts in lesbian, gay, and bisexual youth. Pediatrics 2011; 127:896–903.
19. Needham BL, Austin EL: Sexual orientation, parental support, and health during the transition to young adulthood. J Youth Adolesc 2010;39:1189–1198.
20. Ryan C, Russell ST, Huebner D, et al.: Family acceptance in adolescence and the health of LGBT young adults. J Child Adolesc Psychiatr Nurs 2010;23:205–213.
21. Watson RJ, Grossman AH, Russell ST: Sources of social support and mental health among LGB youth. Youth Soc 2019;51:30–48.
22. Hatzenbuehler ML, Keyes KM: Inclusive anti-bullying policies and reduced risk of suicide attempts in lesbian and gay youth. J Adolesc Health 2013;53:S21–S26.
23. 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; 104:279–286.
24. Duncan DT, Hatzenbuehler ML, Johnson RM: Neighborhood-level LGBT hate crimes and current illicit drug use among sexual minority youth. Drug Alcohol Depend 2014;135:65–70.
25. Hatzenbuehler ML, Jun HJ, Corliss HL, Austin SB: Structural stigma and cigarette smoking in a prospective cohort study of sexual minority and heterosexual youth. Ann Behav Med 2014;47:48–56.
26. Eisenberg ME, Erickson DJ, Gower AL, et al.: Supportive community resources are associated with lower risk of substance use among lesbian, gay, bisexual, and questioning adolescents in Minnesota. J Youth Adolesc 2019. [Epub ahead of print]; DOI: 10.1007/s10964-019-01100-4.
27. Poteat VP, Sinclair KO, DiGiovanni CD, et al.: Gay–straight alliances are associated with student health: A multischool comparison of LGBTQ and heterosexual youth. J Res Adolesc 2013;23:319–330.
28. LeBeau RT, Jellison WA: Why get involved? Exploring gay and bisexual men's experience of the gay community. J Homosex 2009;56:56–76.
29. Frost DM, Meyer IH: Measuring community connectedness among diverse sexual minority populations. J Sex Res 2012; 49:36–49.
30. Saewyc EM, Stewart D, Green R: Methodology for the 2013 BC Adolescent Health Survey [fact sheet]. Vancouver, BC: McCreary Centre Society, 2014. Available at www.mcs.bc.ca/pdf/AHSV_methodology.pdf Accessed October 15, 2019.
31. Gower AL, Saewyc EM, Corliss HL, et al.: The LGBTQ Supportive Environments Inventory: Methods for quantifying supportive environments for LGBTQ youth. J Gay Lesbian Soc Serv 2019;31:314–331.
32. Saewyc EM, Bauer GR, Skay CL, et al.: Measuring sexual orientation in adolescent health surveys: Evaluation of eight school-based surveys. J Adolesc Health 2004;35: 345.e1–345.e15.
33. Statistics Canada: Dictionary, census of population, 2016: Population Centre (POPCTR). 2016. Available at www12.statcan.gc.ca/census-recensement/2016/ref/dict/geo049a-eng.cfm Accessed December 5, 2018.
34. Elections BC: 2013 Voting results by voting area. 2013. Available at http://elections.bc.ca/resources/voting-results/provincial-general-elections-results/2013-ge-results Accessed December 5, 2018.
35. Jolliffe I: Principal component analysis. In: *International Encyclopedia of Statistical Science*. Edited by Lovric M. Berlin Heidelberg: Springer, 2011, pp 1094–1096.
36. Stacklies W, Redestig H, Scholz M, et al.: pcaMethods—A bioconductor package providing PCA methods for incomplete data. Bioinformatics 2007;23:1164–1167.
37. Eisenberg ME, Toumbourou JW, Catalano RF, Hemphill SA: Social norms in the development of adolescent substance use: A longitudinal analysis of the International Youth Development Study. J Youth Adolesc 2014;43: 1486–1497.
38. Shilo G, Savaya R: Mental health of lesbian, gay, and bisexual youth and young adults: Differential effects of age, gender, religiosity, and sexual orientation. J Res Adolesc 2012; 22:310–325.
39. Poteat VP, Espelage DL: Predicting psychosocial consequences of homophobic victimization in middle school students. J Early Adolesc 2007;27:175–191.
40. Leatherdale ST, Hammond D, Ahmed R: Alcohol, marijuana, and tobacco use patterns among youth in Canada. Cancer Causes Control 2008;19:361–369.
41. Blake SM, Ledsky R, Lehman T, et al.: Preventing sexual risk behaviors among gay, lesbian, and bisexual adolescents: The benefits of gay-sensitive HIV instruction in schools. Am J Public Health 2001;91:940–946.
42. Watson RJ, Wheldon CW, Puhl RM: Evidence of diverse identities in a large national sample of sexual and gender minority adolescents. J Res Adolesc 2019. [Epub ahead of print]; DOI: 10.1111/jora.12488.

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