EFFECTS OF LGBTQ-INCLUSIVE SEX EDUCATION ON MENTAL HEALTH AND EXPERIENCES OF BULLYING AMONG U.S. HIGH SCHOOL STUDENTS

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ABSTRACT

BACKGROUND: Homophobic school climates are related to increased experiences of homophobic bullying and discrimination for sexual minority youth (SMY), ultimately leading to increased risk of adverse mental health outcomes, including depression and suicidality. The purpose of this project is to determine if LGBTQ-inclusive sex education has protective effects against adverse mental health outcomes and bullying experiences in youth, particularly SMY.

METHODS: This study involved secondary data analysis of representative data from the 2015 Youth Risk Behavior Survey and the 2014 School Health Profiles. Multilevel logistic models were constructed to determine if individuals in states with higher proportions of schools teaching LGBT-inclusive sex education have lower odds of reporting being bullied in school and experiencing adverse mental health outcomes, including depressive symptoms, seriously considering suicide, and making a suicide plan.

RESULTS: Initial analyses indicated that after controlling for demographics and state-level covariates (i.e. presence of LGBTQ anti-discrimination policies, median household income, and population density of same-sex couples), lesbian and gay youth in states with higher proportions of schools teaching LGBT-inclusive sex education had significantly lower odds of experiencing bullying in school (Odds Ratio: 0.83; 95% Confidence Interval: 0.71, 0.97). Bisexual youth had significantly lower odds of reporting depressive symptoms (OR: 0.92; 95% CI: 0.87, 0.98). While interactions were not significant, overall protective effects were significant for suicidal

thoughts (OR: 0.91, 95% CI: 0.89, 0.93) and making a suicide plan (OR: 0.79; 95% CI: 0.77, 0.80).

PUBLIC HEALTH SIGNIFICANCE: This project provides the first quantitative evidence that LGBTQ-inclusive sex education can serve as a mechanism for promoting protective school climates and cultures SMY. It also points to larger socio-cultural influences on SMY mental health and victimization that can guide intervention development at the school-level and state-level.

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ABBREVIATIONS

LGBTQ – Lesbian, gay, bisexual, transgender, and queer

SMY – Sexual minority youth

GSA – Gay/Straight Alliance

YRBS – Youth Risk Behavior Survey

SHP – School Health Profiles

GLSEN - Gay, Lesbian, and Straight Education Network

SS-SSTP - Second Step: Student Success Through Prevention

1.0 INTRODUCTION

Mental health disparities 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.[1] Only a quarter of heterosexual youth reported similar mental distress.[1] 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 conducted in 2011 found that SMY are significantly more likely to experience depression and had three times the odds of reporting attempting suicide than heterosexual youth.[2]

The stark contrast between mental health outcomes in SMY and heterosexual youth has largely been attributed to experiences of homophobic victimization and discrimination. For high school age youth, who average 6.8 hours of school each weekday,[3] much of the homophobic bullying they experience is perpetrated by peers on school property. According to the 2015 National School Climate Survey conducted by the Gay, Lesbian, and Straight Education Network (GLSEN), 58% of lesbian, gay, bisexual, transgender, and queer (LGBTQ) students reported feeling unsafe at school.[4] These feelings of unsafety were justified, with 71% of LGBTQ youth reporting being verbally harassed at school based on their sexual identity.

Additionally, 27% reported being physically harassed and 60% reported being sexually harassed.[4]

While reported rates of bullying have declined since 2001 and perceptions of acceptance of SMY have been on the rise,[4] interventions that seek to improve SMY mental health through shifts in school climate have had mixed effects. Introduction of safe-spaces in schools and the proliferation of Gay/Straight Alliances have provided necessary sources of social support to help SMY cope with victimization and discrimination.[5-10] However, few interventions have been developed to target one source of victimization: heterosexual students' negative perceptions of sexual and gender diversity. By targeting all youth through integration of LGBTQ-inclusive information and representation into standard curriculum within schools, school climate change can lend itself to culture change, ultimately preventing victimization rather than simply providing coping mechanisms.

The purpose of this analysis is to explore whether an LGBTQ-inclusive curriculum is a viable method of reducing mental health disparities and bullying for SMY. First, an overview of mental health disparities, their relationship to victimization and bullying, and current interventions of school climate and culture are explored using Minority Stress Theory as a guiding framework. Multi-level logistic modeling is then used to test whether the proportion of schools that teach LGBTQ-inclusive sex education in a state predicts mental health outcomes and experiences of bullying in a representative sample of high school students. Interaction effects are tested to examine if protective effects are particularly salient for SMY. Finally, implications and recommendations for next steps in research and intervention development are explored.

2.0 BACKGROUND

2.1 MINORITY STRESS THEORY

Minority Stress Theory was first introduced by Ilan Meyer as a framework for understanding mental health disparities among gay men in 1995.[11] Minority Stress Theory posits that the heightened prevalence of adverse mental health outcomes seen within minority populations emerge from prolonged exposure to stigmatization as a result of minority status. For gay men, cultural and social narratives condemning or shaming individuals for diverging from norms of heterosexuality can result in internalized homophobia. Internalized homophobia, which is conceptualized as a sexual minority's own negative beliefs about themselves and their sexuality, can then have a negative effect on one's self-esteem and feelings of self-worth, eventually manifesting as or evolving into mental illness.[11]

A Minority Stress Model was later introduced to reflect the complex relationship that stigma and discrimination share with mental health outcomes in all sexual minorities.[12] For instance, the Minority Stress Model considers the influence of other more general environmental stressors such as socio-economic status or race/ethnicity on mental health outcomes. Minority stressors are also sorted into distal and proximal processes. Distal processes are interpersonal experiences of discrimination and victimization.[12] Cultural and social norms condemning homosexuality influence interpersonal interactions, meaning that a strongly homonegative

culture will likely see greater rates of homophobically motivated victimization of sexual minority individuals. This increased exposure to interpersonal violence from strangers, peers, or family further exacerbates mental health disparities among sexual minority populations. Sexual minorities can also experience various degrees of proximal or internal processes that can lead to poor mental health. Proximal processes can manifest as internalized homophobia, concealment of one's sexual identity from others, and expectation of rejection.[12] The Minority Stress Model also introduces the potential for positive mental health outcomes through the development of coping mechanisms and socially supportive environments.[12] Finally, Meyer acknowledges that the degree of identification with one's sexual identity may contribute to the development of the negative mental health outcomes. For instance, an individual who does not place significant importance on their sexual identify in relation to their own self-concept may not internalize experiences of stigma in the same way as someone who feels personally defined by their sexual identity.

For sexual minority youth, the challenges of confronting one's stigmatized sexual identity may be particularly salient. Adolescence is often regarded as the phase in life where one's self-concept develops and solidifies,[13] where an individual begins to explore their place in the world. As such, adolescents are often prone to social and environmental cues that may impact their personal identity and self-esteem.[14] Sexual minority youth therefore may be more at risk for internalizing experiences of minority stress, especially when they face victimization and discrimination that is specifically motivated by their identity.

2.2 ADOLESCENT MENTAL HEALTH

Results from the 2015 Youth Risk Behavior Survey (YRBS) indicate that depression is a common phenomenon among U.S. adolescents, with almost one third of teens reporting a depressive episode in the past 12 months.[15] Additionally, the 2015 National Survey on Drug Use and Health (NSDUH) found that over 3 million adolescents experienced a major depressive episode characterized by prolonged depressed mood or loss of interest and some of combination of difficulty sleeping, change in appetite, or decreased concentration.[16]

Depression, especially prolonged depression, has serious consequences for physical and socio-behavioral health. Multiple studies have found that adolescents who were depressed early in their youth are more likely to develop reoccurring mental illness.[17] Furthermore, sustained depression from around age 16 until age 26 is significantly associated with greater severity of depressive symptoms, migraine headaches, poor self-related health, and low social support in adulthood.[17] Depression is associated with other co-occurring mental illness, including eating disorders,[18] anxiety,[19] and conduct disorders.[19] Other studies have found links between youth depression and behavioral outcomes including cigarette smoking,[20-22] adolescent[20] and adult[23] alcohol use, and unprotected sex.[24] Early adolescent depression in girls has also been associated with adult obesity.[25]

One of the greatest risks that emerges from youth depression is youth suicide. Suicide is currently the second-leading cause of death among Americans ages 10-24[26] and is the fourth largest source of years of potential life lost before age 65 in the United States.[27] According to the 2015 YRBS, 17.7% of adolescents seriously considered committing suicide in the past year, with 8.6% reporting attempting at least once.[15]

2.3 MENTAL HEALTH AMONG SMY

The risk for depression and suicide are not equal among all adolescents; sexual minority youth may be particularly at risk for developing negative mental health outcomes. In 2015, almost two thirds of SMY reported depressive symptoms in the last year and were three times as likely as heterosexual youth to have seriously considered suicide in the past year and five times as likely to have attempted suicide.[1] Multiple studies have shown that SMY have a unique risk for adverse mental health, including depression,[1,28-30] anxiety,[30] disordered eating,[31,32] substance abuse,[33] and suicidality.[1,34] Mental health disparities in SMY can persist into adulthood,[34] leading to increased co-occurring psychosocial problems, including increased risk of sexually transmitted infections (STIs) and human immunodeficiency virus (HIV),[35-37] drug use,[35,36] and binge drinking.[35]

The risk of negative mental health outcomes varies within specific subgroups of SMY. Preliminary evidence suggests that bisexuals are particularly prone to adverse mental health outcomes,[38] with bisexual girls reporting significantly higher suicidality scores than their lesbian peers.[39] While bisexual boys showed higher suicidality scores than their gay peers in one study looking at mental health differences in a primary care setting, this difference was nonsignificant, but the authors note that results may have been influenced by the small number of bisexual boys in the sample.[39] A longitudinal analysis of SMY found that bisexually-identified youth had significantly higher rates of depression and suicidality than their gay and lesbian peers into young adulthood.[34]

The adult literature also suggests differences in mental health outcomes between sexual minorities. Kerr, Santurri, and Peters found that female bisexual undergraduates had 30% higher odds of considering suicide than lesbian undergraduates.[40] Similarly, more bisexual men (11%) report seriously considering suicide than gay men (6%) within the past year.[41] Differences

among SMY in mental health underscore the importance of not lumping all SMY into a single, homogenous category during data collection and analysis. It also suggests varied underlying causes of mental distress among SMY, indicating that interventions developed to prevent mental illness for gay or lesbian youth may not equally benefit their bisexual peers.

2.4 EXPERIENCES OF VICTIMIZATION

Victimization and bullying of SMY is exceedingly common in U.S. schools. The 2015 National School Climate Survey found that 95.8% of LGBTQ youth heard homophobic remarks made by peers at school, with nearly 60% reporting that they heard these comments frequently or often. Frequent victimization not only has effects on SMY's academic performance, such as missing more days of school or having lower GPAs,[4] but also on mental and physical health outcomes. Sexual minority youth who experience higher levels of victimization in school are more likely to experience depression[4,42,43] and suicide ideation,[43] with these effects especially prominent in sexual minority boys.[43] Furthermore, school victimization during adolescence has been linked to increased risk for STIs and HIV in adulthood,[43] substance abuse,[44] and suicidality.[42,44]

2.5 DIFFERENCES IN VICTIMIZATION AMONG SMY

It is important to note that experiences of victimization are not the same for all sexual minority youth. Bisexual youth are more likely to experience "double discrimination," in which they face

prejudice and bullying from not only heterosexual youth, but also their lesbian and gay peers.[45-47] This can lead to decreased access to social resources that may bolster resilience to developing adverse mental health outcomes associated with experiencing victimization. The experience of double discrimination has emerged as a theory for why bisexual youth generally display worse mental health outcomes than their lesbian and gay peers.[47]

Furthermore, research has indicated that SMY who also display gender non-conforming behavior or traits experience more stigmatization than SMY whose gender identity conforms more to their assigned sex. For instance, Friedman et al. found that gay youth who exhibited fewer masculine traits and behaviors were more likely to have higher suicide risk and that experiences of bullying mediated this relationship.[48] A similar study of Austrian sexual minority adults found that childhood gender non-conforming behavior and experiencing harassment predicted current suicidality, a finding that was not significant for heterosexual controls.[49] Finally, a longitudinal study found that childhood gender non-conformity before the age of 11 was related to increased depressive symptoms in adolescence and early adulthood and that much of this risk was explained by increased experiences of victimization and abuse.[50] While SMY are at an increased risk of victimization as a result of their minority status, gender expression may interact with sexual minority identity to compound this risk. Thus, interventions seeking to reduce victimization in sexual minority youth should not only seek to increase acceptance of sexual diversity, but also challenge traditional gender norms.

2.6 SCHOOL CLIMATE VS. SCHOOL CULTURE

On average, youth in the U.S. spend more than 40% of their waking hours during a weekday in school or school-sponsored activities.[3] As such, schools may serve as one of the primary settings where SMY experience homophobic bullying. To fully understand why current interventions are insufficient in reducing school-based victimization and bullying of SMY, it is first important to distinguish between two concepts related to school-based victimization: school climate and school culture.

School climate and school culture refer to different levels of influence (i.e., intrapersonal/interpersonal vs. structural/system-wide). School climate is the perception of safety and belonging a student feels within school.[51] This intrapersonal quality of a school is often informed by the school's culture, which more broadly encompasses the beliefs, norms, and value systems reflected in interpersonal and organizational structures.[51] For instance, an intervention targeting homophobic school climates might focus on improving SMY's perception of safety within their school, such as introducing a Gay/Straight Alliance (GSA) or allowing teachers and staff to hang signs on their doors denoting their classrooms or offices as "safe spaces" for LGBTQ individuals. An intervention targeting school culture, on the other hand, might instead introduce school-wide policies punishing LGBTQ discrimination and harassment. School climate interventions do not necessarily intervene beyond the student level, while negative school culture must more broadly be targeted by effecting change on a school-wide basis.

Several studies have argued that school climate affects mental health outcomes in SMY. However, measures of school climate often combine traditional measures of school climate with school culture, making it difficult to determine climate and culture's individual influences on mental health outcomes and victimization. For instance, Hatzenbuehler, Birkett, Van Wagenen,

and Meyer found that states with more negative school climates had higher rates of suicidal ideation among SMY.[52] However, the researchers operationalized school climate using a variable that included school qualities that could influence both school climate (e.g. percentage of schools with GSAs or safe spaces) and school culture (e.g. percentage of schools that had anti-discrimination policies in place).

Another study found that a positive school climate moderated the effect of sexual identity on mental health outcomes.[53] However, the school climate variable reflected feelings of belonging in reference to adult support within school, rather than peer support. While SMY do experience discrimination from educators in school, it is most often perpetuated by peers.[4] Furthermore, teacher behavior and perceptions can be difficult to classify when it comes to school climate and school culture, given that teachers and staff are a by-product of the organizational structure of the school. More specifically, one way a principal or administrator may guide school culture is by hiring teachers who fit within the school's existing culture. Thus, school culture may be incorrectly classified as school climate if the measure consists of rating one's perception of their education and whether "they are respected and cared about by adults at their school."[53] The results of this study, therefore, may suggest that negative school culture may lead to poor mental health outcomes, with no information about school climate. Without taking into consideration the difference between school climate and school culture, interventions developed to reduce homophobic victimization of SMY may be ineffective.

2.7 EXISTING INTERVENTIONS

Current evidence-based interventions attempting to decrease homophobic bullying in school environments do exist, although their effectiveness is varied. Interventions typically fall into four primary categories: anti-bullying programs, Gay/Straight Alliances, introduction of LGBTQ anti-discrimination policies, and presence of LGBTQ-inclusive curriculum. The degree to which each intervention category has the potential to influence both school climate and culture are explored below.

2.7.1 Anti-Bullying Campaigns.

Anti-bullying campaigns have become a popular school-wide approach to reducing interpersonal violence and harassment within schools. These programs often differ substantially in content and methods of eliciting behavior change. More importantly, few target homophobic bullying specifically and one of the most popular and empirically tested interventions has failed to make gains in preventing homophonic bullying in schools.[54]

One of the most popular anti-bullying interventions for youth is a 15-week program known as *Second Step: Student Success Through Prevention* (SS-SSTP).[55] This program takes place in middle schools and seeks to remove social rewards associated with bullying behaviors, particularly physical violence, by increasing empathy and social and anger management skills. An evaluation of SS-SSTP found that the program was effective in reducing self-reported physical violence in youth; it was not effective in reducing homophobic teasing among students.[54]

Second Step's failure to prevent homophobic bullying is likely a by-product of the fact that homophobic bullying is characteristically different than other types of bullying. For instance, one study found that homophobic bullying in particular caused more mental distress to male youth than being victims of other forms of bullying.[56] This suggests that homophobic bullying is likely connected to cultural narratives about gender conformity and heteronormativity. Thus, SS-SSTP may fail to prevent homophobic bullying because it targets intrapersonal qualities like lack of social skills and anger management while neglecting to tackle topics such as gender non-conformity and sexual diversity and, therefore, leaving both heterosexist school climates and cultures untouched.

Where SS-SSTP fails to address gender and sexual diversity in its anti-bullying campaign, a performative theater program in Ann Arbor, Michigan showed that specifically targeting heterosexism may shift negative attitudes towards LGBTQ youth in heterosexual students and school administrators. Gayrilla Theater involves LGBTQ youth developing scripts and performances that reflect their own experiences of homophobic discrimination and bullying. Youth then travel and perform for local middle and high schools and school boards. This intervention has been shown to increase heterosexual youth's willingness to advocate for LGBTQ youth,[57] student self-efficacy in intervening when witnessing homophobic bullying,[58] and school administrator's deeper understanding of LGBTQ discrimination.[59] Gayrilla Theater has not been evaluated for long-term success in shifting attitudes of heterosexual participants and preventing homophobic bullying.

Like other anti-bullying campaigns, there are some qualities of Gayrilla Theater that may hinder its ability to affect school climate or school culture. Anti-bullying campaigns often involve external performers, speakers, or educators who are not directly members of the school

community they are visiting. Given that some of the most popular anti-bullying campaigns are only one-time assemblies or performances (often due to school time restraints), there is little time for outsiders to establish trust with those they are seeking to educate. As such, students and teachers may not take their lessons or messages seriously, leading to little potential for change in behaviors or perceptions. While Gayrilla Theater does appear to shift initial perceptions in more positive directions for LGBTQ youth, these superficial changes in school climate are likely not durable or have any direct effect on school culture, due both to the group's external relation to the schools at which they perform and the fact that is a short-term intervention. Without influencing school culture, Gayrilla Theater and similar anti-bullying campaigns may be ineffective in preventing homophobic bullying within schools.

2.7.2 Gay/Straight Alliances.

Introducing school groups such as Gay/Straight Alliances has become a viable and increasingly popular method of improving SMY mental health.[4] Research has shown that these school groups provide extensive benefits for SMY. For instance, SMY in schools with GSAs are less likely to smoke, drink alcohol, have sex with casual partners, and attempt suicide than those without GSAs.[8] Additionally, GSAs have been shown to increase access to community support and accepting social networks,[6] as well as predict young adult well-being and college achievement.[10]

Social support and accepting social networks are particularly important for SMY, as they have been shown to buffer the effects of victimization, ultimately reducing the risk of developing adverse mental health outcomes. In a study of Israeli SMY, acceptance from friends was positively associated with self-acceptance, well-being, and disclosure of sexual identity, and negatively associated with adverse mental health outcomes.[38] The effects of supportive social

networks may be even more important to the mental health of male SMY, with a stronger association between social isolation and depressive symptoms found for this population when compared to female SMY.[60]

Nevertheless, the evidence that GSAs prevent homophobic bullying in schools is conflicting. The 2015 National School Climate Survey indicates that there is a 16.3% difference in frequency of SMY that report victimization in schools that have a GSA versus schools that do not.[4] However, one study found that while SMY attending schools with GSAs did have better grades and were less likely to skip school, they did not report any difference in experiencing victimization as compared to SMY attending schools without GSAs.[5] Furthermore, while GSAs decreased the risk for multiple risky health outcomes, researchers were unable to show that GSAs were related to decreased victimization.[8] Thus, GSAs likely serve as a buffer between victimization and adverse mental health, not as a means to prevent it.[10]

The tendency of GSAs to act as a buffer, rather than a preventative tool, for victimization is most likely because GSAs shape school climate for SMY without necessarily improving school culture. One feature of GSAs that limits their potential to impact school culture is the nature of student participation in the groups. Students self-select into participation, with other SMY and heterosexual allies making up the vast majority of members. This leaves those most likely to perpetrate homophobic bullying and violence unexposed to gender and sexual diversity. Furthermore, SMY who are not yet out and exhibit higher degrees of internalized homophobia, and therefore the most in need of social support, may avoid joining GSAs for fear of outing themselves. Of course, schools must have school cultures that have some degree of acceptance for SMY to allow GSA clubs to form in the first place, but this culture may be insufficient to protect SMY from victimization. When combined with broader school-wide anti-discrimination

policies students in schools with GSAs do report fewer instances of discrimination, especially when both have been in place for several years.[7] This suggests that for GSAs to create cultural change, they may need to be paired with structural or organization interventions.

2.7.3 School-Based LGBTQ Anti-Discrimination Policies.

Introduction of LGBTQ anti-discrimination policies within schools and states has been recommended to not only reduce mental health disparities, but to also reduce victimization of SMY and gender non-conforming youth. One study found that anti-bullying policies predicted lower instances of past year suicide attempts in SMY.[61] Additionally, students' perceptions of their schools' anti-discrimination policies have been linked to their perceptions of anti-LGBTQ harassment in schools.[62] Unfortunately, comprehensive anti-discrimination policies are not common, with only 10.2% of LGBTQ youth reporting that their school has a policy inclusive of sexual orientation and gender identity.[4]

When looking at the effectiveness of anti-discrimination policies, a combination of school climate and school culture change seems to be the most effective way of increasing positive perceptions of SMY. A study of youth in Massachusetts found that both heterosexual youth and SMY has greater perceptions of sexual diversity climate within their schools if they had inclusive school policies, training for teachers and staff, and GSAs.[63] In Canada, having a GSA and an anti-discrimination policy in place seemed to produce fewer instances of discrimination among SMY than either one by itself.[7] However, anti-discrimination policies may not be effective if students are not exposed to them or if they are inconsistently enforced. Chesir-Teran and Hughes found that inclusive policies may not affect student perceptions of safety if students are unaware of them.[62] Additionally, Hansen argues that implementing policies that are

widely publicized may provide the best benefit to preventing SMY victimization.[64] Lack of visibility can ultimately underscore the effectiveness of anti-discrimination policies to reduce harassment and bullying, whereas LGBTQ-inclusive programs like GSAs or inclusive curriculum are more likely to be readily recognized by students[63] and therefore might best shape a student's perception of safety in school. This likely explains why policies seem to work better in conjunction with more visible programs that affect school climate simultaneously.

2.7.4 LGBTQ-Inclusive Curricula.

Anti-discrimination policies are most effective when they are highly visible and combined with other programs that also bolster school climate. Thus, anti-discrimination policies without complementary programs and exposure to the specifics of the policies may not be sufficient to address negative school culture. Unlike anti-discrimination policies, adding LGBTQ-inclusive curricula in schools results in all or the majority of students being routinely exposed to sexual and gender diversity. Thus, introducing LGBTQ-inclusive curricula, especially LGBTQ-inclusive sex education, is the only intervention reviewed here that may by itself have the potential to shape both school climate and school culture while maximizing student exposure to LGBTQ-inclusivity.

Generally speaking, LGBTQ-inclusive sex education requires educators to share information relevant to LGBTQ students. This information can include definitions of sexuality and gender and explorations of the diversity within those concepts, incorporating positive examples of LGBTQ individuals and relationships, emphasizing protection for sex acts relevant for all identities (including anal and oral sex), and combatting negative stereotypes and myths about sexual and gender minorities.[65] This approach to sex education often challenges not only

heterosexism by providing representation of LGBTQ individuals and relationships, but emphases consent and healthy relationships and avoids language or stereotypes than may strengthen traditional gender norms.

In the U.S., only 5.7% of students sampled for the 2015 National School Climate Survey reported learning about positive representations of LGBTQ individuals in their health course.[4] Additionally, the Guttmacher Institute reports that, as of March 2017, only 13 states require sex education to include information about sexual orientation in sex education courses; six of these states (Alabama, Arizona, Oklahoma, South Carolina, Texas, and Utah) require that explicitly negative information about sexual orientation be presented.[66] Despite the low occurrence of LGBTQ-inclusive sex education, the general public overwhelming supports the inclusion of sexual orientation in sex education courses.[67] More importantly, a pilot cluster-randomized trial has shown LGBTQ-inclusive sex education to be effective in increasing sexual health knowledge[68] and, after a year follow-up, able to predict whether a student was exhibiting safer sex practices, such as carrying a condom at the time of follow-up.[69]

Only one evaluation of an intervention has attempted to measure the ability of LGBTQ-inclusive information presented in a health class context to shape heterosexual students' perceptions of LGBTQ peers. RainbowYOUTH, an advocacy group for SMY in Australia, evaluated their Sexuality Diversity Workshop for students ages 12-15.[70] Presented during a health class, students in 10 classrooms were asked whether they believed the program would be effective in reducing bullying in their school, what their school was like for their sexual minority peers, and their perception of their sexual minority peers. After the workshop, three quarters of the students believed the workshop could reduce bullying and a significant increase in perceptions of their sexual minority peers was found. However, like Gayrilla Theater, no follow-

up was done to see if bullying decreased or if change in attitudes were sustained over time. No control group or randomization was used, further limiting the interpretation and generalizability of results.

Nevertheless, LGBTQ-inclusive sex education has a unique potential to shape school climate. In fact, Toomey, McGuire, and Russell found that students perceived their school as safer if LGBT-inclusive education was present at their school.[71] LGBTQ students also report fewer experiences of victimization based on sexual orientation in schools with inclusive curriculum (14.8%) than students who do not (31.1%).[4] These students also reported fewer instances of victimization than students whose schools had a GSA (14.8% vs. 20.1%).[4] There are multiple reasons why this might be the case. Unlike GSAs, changes to standard curriculum change are not self-selective; every student is exposed to the material (with individual difference in information retention, of course). Thus, youth who are engaging in bullying behavior will still be exposed to information concerning sexual and gender diversity. Furthermore, students who have not yet disclosed or who are questioning their sexual identity are exposed to valuable information concerning sexual risks that they may have not received otherwise. Increases in exposure to LGBTQ-inclusive information and representation may also lead to increased feelings of safety and belonging among both out and undisclosed SMY.

LGBTQ-inclusive sex education disrupts traditional narratives of heterosexuality and gender norms, thereby giving it the potential to reshape school norms and culture that rely on these narratives. School-based sex education, which has traditionally emphasized waiting until marriage before having sex (an only recently relevant strategy for SMY) and is often segregated by biological sex, is one of the most obvious sources of information concerning sexuality and gender norms presented in schools. By introducing LGBTQ-inclusive information into sex

education courses, schools can begin to shift to new cultural norms surrounding sexual and gender diversity by normalizing examples of such. This is also assisted by the fact that students over multiple class sessions and consecutive years of students are exposed to the information, essentially providing long-term booster sessions. Unlike anti-bullying campaigns, LGBTQ-inclusive sex education could also be taught by an educator already integrated into the school community, potentially increasing student trust and interest in the information presented. Knowledge of the school community also ensures that information presented can be tailored to the specific needs of the class and school, another disadvantage of external anti-bullying campaigns. Thus, by gradually shifting school culture by introducing LGBTQ-inclusive sex education, self-sustained reductions in homophobic bullying can occur, ultimately decreasing mental health disparities.

2.8 THE CURRENT STUDY

While LGBTQ-inclusive sex education has been evaluated for its efficacy in promoting sexual health knowledge and safer sex practices,[68,69] no study to date has examined the effect of LGBTQ-inclusive sex education on school climate and culture. Data concerning the prevalence of LGBTQ-inclusive sex education in schools is currently only available at the state-level, through the School Health Profiles conducted biennially through the Center for Disease Control and Prevention (CDC). Previous analyses using the School Health Profiles have found that state-level school climate is associated with reduced suicidal thoughts in SMY.[52] For LGBTQ-inclusive sex education, particularly, state-level measures may be important to examine, in lieu of school-level analyses, given that school-level curriculum changes are often made at the state-

level. Thus, state-level variables may provide a snapshot of the likelihood of schools within a state to have protective school climates and culture 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. These state-level analyses are also less influenced by student self-report of school climate and culture than school-level analyses and, because of multi-site data collection and probability sampling, provide more generalizable findings.

The current study seeks to provide initial evidence of the potential for LGBTQ-inclusive sex education to reduce mental health disparities and victimization of SMY in schools. This cross-sectional study will examine whether the proportion of schools teaching LGBTQ-inclusive sex education in a state predicts mental health outcomes and experiences of bullying in a representative sample of U.S. high school students. Furthermore, it will examine whether any effects found are significantly different for SMY compared to their heterosexual peers. Using multi-level logistic models, the following hypotheses will be tested:

***H1*:** States with a higher proportion of schools teaching LGBT-inclusive sex education will have more positive mental health outcomes for all youth;

***H2*:** States with a higher proportion of schools teaching LGBT-inclusive sex education will have lower experiences of bullying for all youth;

***H3*:** The protective effects of LGBT-inclusive sex education on mental health outcomes will be strongest for sexual minority youth;

H4: The protective effects of LGBT-inclusive sex education on experiences of bullying will be strongest for sexual minority youth.

3.0 METHODS

3.1 DATA SOURCES

The current study analyzes data from the 2015 YRBS conducted biennially through the CDC. The YRBS includes national, state, and urban school district surveys. Using complex sampling and survey designs, it is representative of high school students at their respective sampling level. To reflect interest in state-level associations, this study uses data from the YRBS state surveys. These surveys utilize 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.[72]

States were included in analyses if they met three criteria: 1) their YRBS results were authorized to be publicly released by the CDC (n=31 states); 2) students in the state reported their sexual identity (n=19 states); and 3) the state agreed to release data from the 2014 School Health Profiles. 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 sample sizes for states ranged from 1,622 to 10,834 students.

The main predictor, the degree to which a state taught LGBT-inclusive sex education, was operationalized using data from the 2014 School Health Profiles (SHP). Surveys are sent to

the lead health educator in selected schools biennially by the CDC. Sampling strategies employed by the SHP result in representative data concerning health education for each state. For all states who completed the SHP in 2014, sample sizes ranged from 66-660 and response rates ranged from 70-89%. Detailed methodology for the SHP is published elsewhere.[73]

3.2 MEASURES

Four dependent measures were included in this study, three measuring mental health outcomes and one measuring bullying experiences at school.

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 following 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" and coded as "Yes"=1, "No"=0.

Bullying experiences. 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 ("Yes" or "No") and coded identically to mental health outcomes.

LGBT-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 extent to which LGBT-inclusive sex education was taught in schools in each state. This percentage ranged from 16.2-57.1 ($\bar{x}$=34.4, sd=13.9).

Sexual identity. While the YRBS also collects information regarding the sex of sexual contacts, sexual identity was selected as the predictor of interest. This decision was made based on the assumption that identity, rather than sexual partners, was more likely to be related to experiencing stigma or discrimination. Furthermore, utilizing sexual behavior data would limit the sample size, as not all youth will have reported engaging in sexual experiences in high school. Participants were asked to select which sexual identity best described them. Options included heterosexual (straight), gay or lesbian, bisexual, and not sure, and all four categories were retained in analyses. Overall, 86.5% of the sample identified as heterosexual, 2.5% identified as gay or lesbian, 6.7% identified as bisexual, and 4.2% reported being unsure of their sexual identity. Frequency distributions for each sexual identity by state are presented in Table 1.

Table 1. Frequency distributions of sexual identity by state, YRBS 2015

State	*Heterosexual # (%)*	*Gay or Lesbian # (%)*	*Bisexual # (%)*	*Not Sure # (%)*
Arizona	2080 (87.3)	61 (2.6)	166 (7.0)	75 (3.2)
Delaware	2314 (87.8)	40 (1.5)	180 (6.8)	101 (3.8)
Florida	5144 (87.5)	126 (2.1)	359 (6.1)	249 (4.2)
Kentucky	2244 (88.8)	62 (2.5)	140 (5.5)	80 (3.2)
Maine	8199 (86.5)	208 (2.2)	631 (6.7)	441 (4.7)
Michigan	4124 (87.3)	128 (2.7)	295 (6.3)	176 (3.7)
New York	8827 (84.3)	285 (2.7)	831 (7.9)	532 (5.1)
North Carolina	5076 (85.6)	208 (3.5)	418 (7.1)	229 (3.9)
North Dakota	1884 (90.5)	35 (1.7)	104 (5.0)	59 (2.8)
West Virginia	1370 (86.6)	46 (2.9)	106 (6.7)	60 (3.8)
Wyoming	2069 (87.0)	60 (2.5)	142 (6.0)	108 (4.5)

State-level covariates. To control for the influence of political climate towards LGBT individuals, presence of LGBT anti-discrimination 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 promoting LGBT equality.[74] State Policy Tallies are calculated based on the presence of anti-discrimination laws in six policy areas (i.e. marriage and relationship recognition, adoption and parenting, non-discrimination, safe schools, health and safety, and identity documents), as well as the presence of explicitly negative laws that target LGBT individuals, such as HIV criminalization laws. For the states included in this analysis, State Policy Tallies ranged from 0.50-21.00. The density of same-sex couples in each state was calculated from the 2014 American Community Survey as a rate per 1000 coupled households. This was calculated by taking the total number of same-sex couples in the state divided by the total coupled households in the state (i.e. the sum of married opposite sex couples, unmarried opposite sex couples, and same-sex couples). Finally, median household income of each state was obtained from the 2015 American Community Survey.

Demographic covariates. Grade, sex, and race of participants were included as individual-level covariates. Grade was measured categorically and was dummy coded as "9th grade," "10th grade," "11th grade," and "12th grade," with "9th grade" as the reference group. Sex was measured dichotomously as "Male" or "Female," with "Female" as the reference group. Race was dummy coded as "African American," "Hispanic," and "Other" with "White" as the reference group.

3.3 ANALYTIC APPROACH

Due to the complex sampling frame, it is recommended that data from the YRBS is analyzed using complex survey weights. However, many statistical tests conducted in Stata v.14.2 accounting for multi-level data structure have limitations on the use of complex survey weighting. Three primary methods of data analysis were considered for this study in order to produce models that accounted for the multi-level data structure, while also preserving the influence of the complex survey design. The simplest model used multiple logistic regression with the suggested survey weighting applied as recommended by the YRBS Data Analysis Manual provided by the CDC.[75] However, this model would not allow for the examination of variability among states, a crucial aspect of the research question. The second model involved ignoring some or all survey weighting, giving preference for the multi-level structure. However, not accounting for any weighting could result in poor estimation of standard errors. Finally, researchers have suggested manually computing and applying design effects for each variable when analyzing YRBS data and then averaging these design effects to develop a "root design effect" that would be applied to each sample (i.e. to each state's observations). This root design effect can then be used as a single weight to be used with multi-level commands.

The former two methods were compared first to determine if carrying out the latter model, which was deemed a more complex and less parsimonious method, was necessary to produce the best fitting model. Sensitivity analysis was conducted comparing the logistic models with CDC-recommended design adjustment and the multi-level models using Generalized Linear Latent and Mixed Models (GLLAMM) for Stata v.14.2 with level-1 weighting. Results indicated, that for each outcome, differences between odds ratios and p-values for all predictors and covariates were negligible. Due to the primary focus on exploring state differences among

outcome variables in this study, the multi-level structure was given precedence. Furthermore, the results of the sensitivity analysis indicated that individual-level weighting was sufficient and, therefore, manually applying design effects was an unnecessary step for producing optimal models.

All analyses were conducted in Stata v. 14.2. Descriptive statistics for sexual orientation and individual- and state-level covariates are depicted by outcomes in Table 2 and were conducted using cross-tabulations. Multi-level logistic models were fit separately for all outcome variables, depressive symptoms, using GLLAMM for Stata. To check for variation among states on outcomes, the unconditional model was fit with random intercepts for states. Models were then fit with the main predictors (proportion of schools that taught LGBT-inclusive sex education and sexual identity) and individual-level covariates. State-level covariates (anti-discrimination policies, median income, and density of same-sex couples) were then introduced in the model. For the final model, sexual identity was initially introduced as a random slope. However, due to the computational complexity of random slopes models and low power from a small number of level 2 groups (n=10-11 states), these models failed to converge. The final models retained random intercepts for schools with the inclusion of cross-level interactions between proportion of schools that taught LGBT-inclusive sex education and sexual identity, while controlling for individual and state-level covariates. These final models provided evidence for whether LGBT-inclusive sex education modifies the relationship between sexual identity and mental health and experiences of bullying. Due to the availability of outcome data, New York is excluded from analyses examining making a suicide plan, and Arizona is excluded from experiences of bullying on school property. Missing data was handled using listwise deletion, and all tests were conducted with a significance level of 0.05.

4.0 RESULTS

Descriptive analyses indicated that the sample was 50.6% White, 16.0% African American, 21.4% Hispanic, and 11.9% other races. The sample was predominantly female (51.2%). Participants were spread out fairly evenly among different grade levels, with 28.0% of youth in 9th grade, 26.1% in 10th grade, 25,1% in 11th grade, and 20.8% in 12th grade.

Bisexual youth reported the highest frequency of depressive symptoms (61.5%), suicidal thoughts (45.3%), making a suicide plan (40.2%), and experiencing bullying on school property (34.4%). Gay or lesbian youth reported more depressive symptoms (49.2%), suicidal thoughts (34.7%), making a suicide plan (31.0%), and experiencing bullying (32.2%) than unsure and heterosexual students. Heterosexual youth reported the lowest frequency of all outcomes. 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.

Table 2. Frequencies and descriptive statistics for level-1 and level-2 covariates by outcomes, YRBS 2015

	Depressive Symptoms	*Suicidal Thoughts*	*Suicide Plan*	*Been Bullied*
Total (# of States)	50,962 (11)	50,958 (11)	40,326 (10)	48,519 (10)
Variable	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Sexual Identity				
Heterosexual	10,883 (25.4)	5,382 (12.6)	3,736 (11.0)	7,203 (17.6)
Gay or Lesbian	587 (49.2)	411 (34.7)	287 (31.0)	362 (32.2)
Bisexual	2,010 (61.5)	1,486 (45.3)	992 (40.2)	1,073 (34.4)
Not Sure	931 (45.7)	606 (29.9)	393 (25.8)	585 (29.8)

Table 2 Continued

Race/ethnicity				
White	6,975 (27.7)	3,974 (15.8)	3,026 (13.2)	5,451 (22.3)
African American	2,096 (26.9)	1,086 (13.9)	662 (12.0)	1,057 (13.6)
Hispanic	3,522 (33.5)	1,753 (16.7)	1,019 (15.5)	1,553 (16.9)
Other	1,812 (30.9)	1,062 (18.2)	746 (18.0)	1,113 (20.0)
Sex				
Male	9,867 (37.9)	5,268 (20.2)	3,564 (17.4)	5,576 (22.6)
Female	4,930 (20.1)	2,821 (11.5)	2,018 (10.3)	3,871 (16.5)
Grade				
9th	4,002 (28.4)	2,378 (16.7)	1,697 (14.7)	2,268 (24.0)
10th	3,969 (30.2)	2,185 (16.6)	1,570 (14.9)	2,576 (20.8)
11th	3,751 (29.7)	1,954 (15.4)	1,333 (13.3)	2,057 (17.2)
12th	3,011 (28.8)	1,532 (14.6)	946 (12.3)	1,501 (15.0)
	x-bar (sd)	**x-bar (sd)**	**x-bar (sd)**	**x-bar (sd)**
LGBTQ-Inc. Sex Ed	34.5 (13.9)	34.5 (13.9)	28.5 (8.6)	35.4 (13.6)
Same-Sex Pop. Den.	13.4 (4.1)	13.4 (4.1)	12.7 (4.3)	13.4 (4.2)
Median HH Income	51,806.3 (5,696.2)	51,806.3 (5,696.2)	49,837.3 (4736.6)	51,887.6 (5,832.0)
Anti-Discrimination	10.5 (8.3)	10.5 (8.3)	8.2 (7.8)	10.8 (8.3)

Tables 3-6 depict odds ratios and 95% confidence intervals for all multi-level logistic models for each outcome. Odds ratios for LGBTQ-inclusive sex education represent a 10% change in the proportion of schools in a state teaching LGBTQ-inclusive sex education for all outcomes. Results are presented below by outcome: depressive symptoms, suicidal thoughts, making a suicide plan, and experiencing bullying on school property in the last year.

4.1 DEPRESSIVE SYMPTOMS

For depressive symptoms, the unconditional model indicated that significant differences among states were present (Variance Component [VC]=0.05, Wald's Z=2.98, p<0.01), supporting use of multi-level models. All odds ratios and corresponding confidence intervals for each model for depressive symptoms are presented in Table 3. The first model included the proportion of

schools that taught LGBTQ-inclusive sex education in a state and all demographic variables. After controlling for grade, race, sex, and sexual identity, states with higher proportions of schools teaching LGBTQ-inclusive sex education had significantly lower odds of reporting depressive symptoms in the last 12 months (Odds Ratio [OR]=0.93, 95% Confidence Interval [CI]=0.92,0.93). Compared to their heterosexual peers, gay and lesbian youth (OR=3.68, CI=2.76,4.89), bisexual youth (OR=4.22, CI=3.53,5.05), and unsure youth (OR=2.66, CI=2.49,2.83) had higher odds of depressive symptoms. Youth in 10th grade were significantly more likely to report depressive symptoms than those in 9th grade (OR=1.09, CI=1.03,1.15). Differences among 11th and 12th grade and 9th grade were not significant. Male youth had lower odds of depressive symptoms than female youth (OR=0.44, CI=0.41,0.48). Hispanic/Latino youth had significantly higher odds of reporting depressive symptoms than White youth (OR=1.25, CI=1.07, 1.45). There were no significant differences in depressive symptoms between African American and Other youth when compared to White youth.

Table 3. Associations between LGBTQ-inclusive sex education and depressive symptoms, YRBS 2015

Variable	*Model 1*	*Model 2*	*Model 3*
Level-1 Covariates			
Sexual Identity			
Heterosexual (Ref)	1.00	1.00	1.00
Gay or Lesbian	3.68 (2.76,4.89)	3.67 (2.76,4.89)	3.65 (1.85,7.22)
Bisexual	4.22 (3.53,5.05)	4.23 (3.53,5.06)	5.58 (3.95,7.87)
Not Sure	2.66 (2.49,2.83)	2.66 (2.50,2.84)	2.58 (2.10,3.17)
Grade			
9th Grade (Ref)	1.00	1.00	1.00
10th Grade	1.09 (1.03,1.15)	1.09 (1.03,1.15)	1.01 (1.03,1.15)
11th Grade	1.14 (1.00,1.30)	1.14 (1.00,1.30)	1.14 (1.00,1.30)
12th Grade	1.07 (0.93,1.24)	1.07 (0.93,1.24)	1.07 (0.93,1.24)
Sex			
Female (Ref)	1.00	1.00	1.00
Male	0.44 (0.41,0.48)	0.44 (0.41,0.48)	0.44 (0.41,0.48)
Race/Ethnicity			
White (Ref)	1.00	1.00	1.00

Table 3 Continued

African American	1.00 (0.90,1.11)	1.00 (0.90,1.11)	1.00 (0.90,1.11)
Hispanic	1.25 (1.07,1.45)	1.26 (1.07,1.47)	1.26 (1.08,1.48)
Other	1.05 (0.94,1.21)	1.05 (0.96,1.17)	1.05 (0.94,1.17)
Level-2 Covariates			
LGBT-Inclusive Sex Ed	0.93 (0.92,0.93)	0.86 (0.85,0.88)	0.90 (0.89,0.91)
Same-Sex Couples		0.97 (0.96,0.98)	0.96 (0.96,0.97)
Anti-Discrimination		1.02 (1.01,1.02)	1.02 (1.02,1.03)
Median Income		1.08 (1.05,1.10)	1.08 (1.06,1.10)
Cross-Level Interactions			
Gay or Lesbian X Sex Ed			1.00 (0.89,1.13)
Bisexual X Sex Ed			0.92 (0.87,0.98)
Not sure X Sex Ed			1.01 (0.97,1.05)

The second model introduced state-level covariates. States with higher proportions of schools teaching LGBTQ-inclusive sex education remained significantly associated with lower odds of depressive symptoms after controlling for covariates (OR=0.86, CI=0.85,0.88). Density of same-sex couples (OR=0.97, CI=0.96,0.98) was significantly related to lower odds of reporting depressive symptoms. Median household income (OR=1.08, CI=1.05,1.10) and having more inclusive LGBTQ anti-discrimination policies (OR=1.02, CI=1.01,1.02) were associated with higher odds of reporting depressive symptoms.

The final model added the cross-level interaction between sexual identity and proportion of schools teaching LGBTQ-inclusive sex education in the state. An interaction effect was found for bisexual youth, indicating bisexual youth have significantly lower odds of reporting depressive symptoms than heterosexual youth in states with higher proportions of schools teaching LGBTQ-inclusive sex education (OR=0.92, CI=0.87,0.98). Figure 1 depicts the direction and nature of the interaction effect by sexual identity. Interaction effects for gay and lesbian youth and unsure youth were not significant.

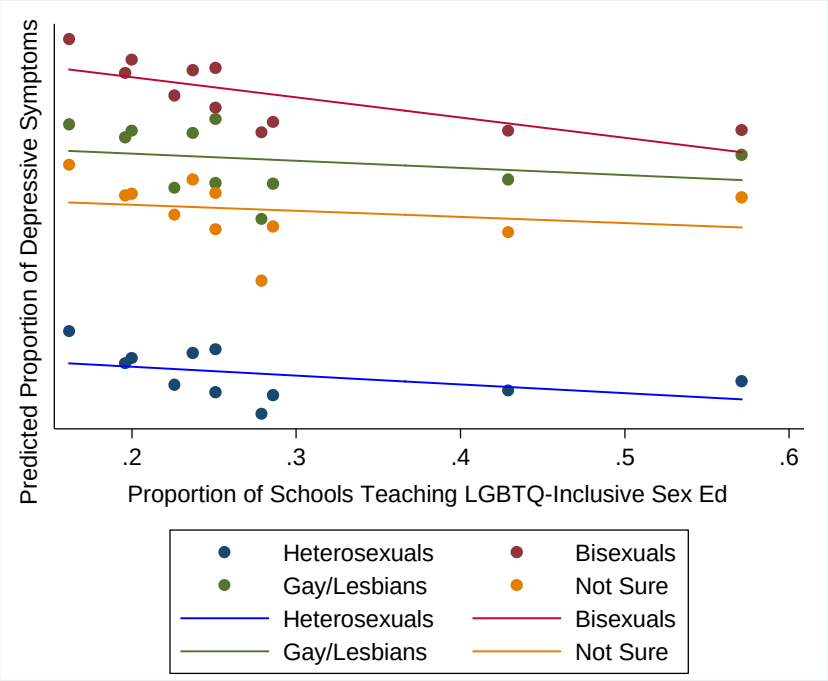

Figure 1. Relationship between the proportion of school teaching LGBTQ-Inclusive sex education and depressive symptom by sexual identity, YRBS 2015

4.2 SUICIDAL THOUGHTS

The unconditional model for suicidal thoughts was significant (VC=0.01, Wald's *Z*=5.88, *p*<0.001), indicating state differences on this outcome. In the first model, the proportion of schools that teach LGBTQ-inclusive sex education was related to significantly lower odds of students reporting suicidal thoughts in the last 12 months (OR=0.95, CI=0.94, 0.96) (Table 4). Gay and lesbian (OR=4.27, CI=3.31,5.52), bisexual (OR=5.06, CI=4.77,5.36), and unsure youth (OR=2.92, CI=2.48,3.44) had significantly higher odds of suicidal thoughts than their heterosexual peers. African American youth (OR=0.78, CI=0.71,0.85), youth in 12th grade (OR=0.81, CI=0.73,0.90), and males (OR=0.56, CI=0.53,0.60) were less likely to report suicidal thoughts than youth in White youth, youth in 9th grade, and females, respectively.

The proportion of schools teaching LGBTQ-inclusive sex education in a state was significantly related to lower odds of suicidal thoughts after controlling for state-level covariates (OR=0.91, CI=0.89,0.93). Density of same-sex couples (OR=0.95, CI=0.95,0.95) and median household income (OR=1.16, CI=1.13,1.20) significantly predicted suicidal thoughts; however, presence of LGBTQ anti-discrimination laws was not significant. In the final model, no interaction effects were found.

Table 4. Associations between LGBTQ-inclusive sex education and suicidal thoughts, YRBS 2015

Variable	*Model 1*	*Model 2*	*Model 3*
Level-1 Covariates			
Sexual Identity			
Heterosexual (Ref)	1.00	1.00	1.00
Gay or Lesbian	4.27 (3.31,5.52)	4.28 (3.31,5.54)	4.35 (2.45,7.73)
Bisexual	5.06 (4.77,5.36)	5.04 (4.75,5.35)	4.90 (4.15,5.78)
Not Sure	2.92 (2.48,3.44)	2.92 (2.49,3.42)	3.30 (2.24,4.85)
Grade			
9th Grade (Ref)	1.00	1.00	1.00
10th Grade	0.99 (0.93,1.04)	0.98 (0.93,1.04)	0.99 (0.93,1.05)
11th Grade	0.94 (0.79,1.12)	0.94 (0.79,1.12)	0.94 (0.79,1.12)
12th Grade	0.81 (0.73,0.90)	0.81 (0.72,0.90)	0.81 (0.72,0.90)
Sex			
Female (Ref)	1.00	1.00	1.00
Male	0.56 (0.53, 0.60)	0.56 (0.53,0.60)	0.56 (0.53,0.60)
Race/Ethnicity			
White (Ref)	1.00	1.00	1.00
African American	0.77 (0.71,0.83)	0.78 (0.71,0.85)	0.78 (0.71,0.85)
Hispanic	1.05 (0.93,1.17)	1.05 (0.93,1.17)	1.04 (0.93,1.17)
Other	1.02 (0.93,1.12)	1.02 (0.94,1.12)	1.02 (0.93,1.12)
Level-2 Covariates			
LGBT-Inclusive Sex Ed	0.95 (0.94,0.96)	0.91 (0.89,0.93)	0.96 (0.94,0.97)
Same-Sex Couples		0.95 (0.95,0.95)	0.97 (0.97,0.98)
Anti-Discrimination		1.01 (1.00,1.02)	1.00 (1.00,1.01)
Median Income		1.16 (1.13,1.20)	1.11 (1.10,1.13)
Cross-Level Interactions			
Gay or Lesbian X Sex Ed			0.99 (0.90,1.09)
Bisexual X Sex Ed			1.01 (0.98,1.04)
Not sure X Sex Ed			0.96 (0.90,1.03)

4.3 SUICIDE PLANS

There was significant variation among states for making a suicide plan (VC=0.05, Wald's Z=5.51, p<0.001). The proportion of schools in a state that taught LGBTQ-inclusive sex education was related to significantly lower odds of making a serious plan to commit suicide in the last 12 months after controlling for demographics (OR=0.91, CI=0.89,0.93). Sexual identity was related to planning to commit suicide with gay and lesbian (OR=3.75, CI=2.94,4.78), bisexual (OR=4.85, CI=4.44,5.30), and unsure youth (OR=2.65, CI=2.33,3.00) having significantly higher odds than heterosexual youth. Youth in 12th grade were significantly less likely to report making a suicide plan than youth in 9th grade (OR=0.67, CI=0.63,0.72), and males had lower odds than females (OR=0.62, CI=0.55,0.69). There was no significant differences by race for making a suicide plan.

For the second model, LGBTQ-inclusive sex education was significant after controlling for state-level covariates (OR=0.79, CI=0.77,0.80). Density of same-sex couples was inversely related to making a suicide plan (OR=0.96, CI=0.94,0.97). Median household income (OR=1.18, CI=1.13,1.23) and presence of LGBTQ anti-discrimination policies (OR=1.02, CI=1.01,1.02) were related to higher odds of making a suicide plan in youth. Model 3 showed no significant interaction effects between the proportion of schools teaching LGBTQ-inclusive sex education and sexual identity.

Table 5. Associations between LGBTQ-inclusive sex education and making a suicide plan, YRBS 2015

Variable	*Model 1*	*Model 2*	*Model 3*
Level-1 Covariates			
Sexual Identity			
Heterosexual (Ref)	1.00	1.00	1.00
Gay or Lesbian	3.75 (2.94,4.78)	3.76 (2.94,4.80)	2.10 (0.62, 7.18)
Bisexual	4.85 (4.44,5.30)	4.87 (4.45,5.34)	3.92 (2.31,6.69)

Table 5 Continued

Not Sure	2.65 (2.33,3.00)	2.66 (2.33,3.03)	2.98 (1.32,6.70)
Grade			
9th Grade (Ref)	1.00	1.00	1.00
10th Grade	1.07 (0.94,1.22)	1.08 (0.94,1.23)	1.07 (0.94,1.23)
11th Grade	0.83 (0.68,1.01)	0.83 (0.68,0.73)	0.83 (0.68,1.01)
12th Grade	0.67 (0.63,0.72)	0.68 (0.63,0.73)	0.68 (0.63,0.73)
Sex			
Female (Ref)	1.00	1.00	1.00
Male	0.62 (0.55,0.69)	0.62 (0.55,0.69)	0.62 (0.56,0.69)
Race/Ethnicity			
White (Ref)	1.00	1.00	1.00
African American	0.89 (0.67,1.19)	0.88 (0.65,1.19)	0.88 (0.65,1.19)
Hispanic	1.18 (0.99,1.40)	1.23 (0.99,1.54)	1.24 (0.99,1.54)
Other	1.06 (0.82,1.38)	1.07 (0.82,1.40)	1.07 (0.83,1.40)
Level-2 Covariates			
LGBT-Inclusive Sex Ed	0.76 (0.69,0.83)	0.79 (0.77,0.80)	0.77 (0.75,0.79)
Same-Sex Couples		0.96 (0.94,0.97)	0.96 (0.93,0.97)
Anti-Discrimination		1.02 (1.01,1.02)	1.02 (1.01,1.02)
Median Income		1.18 (1.13,1.23)	1.18 (1.13,1.23)
Cross-Level Interactions			
Gay or Lesbian X Sex Ed			1.27 (0.81,1.98)
Bisexual X Sex Ed			1.09 (0.90,1.32)
Not sure X Sex Ed			0.96 (0.72,1.27)

4.4 EXPERIENCES OF BULLYING

The unconditional model showed a significant difference in experiencing bullying on school property in the last year (VC=0.20, Wald's Z=3.11, p=0.002). In the lower order model, states with higher proportions of schools teaching LGBTQ-inclusive sex education did not show a statistically significant relationship to having been bullied at school in the last 12 months (OR=1.01, CI=1.00,1.01) (Table 6). Sexual minority youth were more likely to report experiencing bullying at school in the last year as compared to their heterosexual peers, with gay

and lesbian youth experiencing the highest odds (OR=2.88, CI=1.80,4.62). All grades were significantly less likely to report experiencing bullying than youth in 9th grade, and male youth (OR=0.73, CI=0.67,0.79) were significantly less likely to report being bullied than female youth. African American (OR=0.51, CI=0.43,0.62), Hispanic (OR=0.70, CI=0.62,0.80), and Other (OR=0.77, CI=0.66,0.90) had significantly lower odds of reporting bullying at school than White youth.

Table 6. Associations between LGBTQ-inclusive sex education and experiencing bullying on school property, YRBS 2015

Variable	*Model 1*	*Model 2*	*Model 3*
Level-1 Covariates			
Sexual Identity			
Heterosexual (Ref)	1.00	1.00	1.00
Gay or Lesbian	2.88 (1.80,4.62)	2.88 (1.79,4.62)	5.67 (2.34,13.79)
Bisexual	2.44 (1.98,2.99)	2.43 (1.98,2.99)	2.95 (1.99,4.38)
Not Sure	2.10 (1.62,2.71)	2.09 (1.62,2.71)	2.34 (1.15,4.76)
Grade			
9th Grade (Ref)	1.00	1.00	1.00
10th Grade	0.82 (0.71,0.96)	0.82 (0.71,0.96)	0.82 (0.71,0.96)
11th Grade	0.68 (0.57,0.81)	0.68 (0.57,0.81)	0.68 (0.57,0.81)
12th Grade	0.57 (0.48,0.67)	0.57 (0.48,0.67)	0.57 (0.48,0.67)
Sex			
Female (Ref)	1.00	1.00	1.00
Male	0.73 (0.67,0.79)	0.73 (0.67,0.79)	0.73 (0.67,0.79)
Race/Ethnicity			
White (Ref)	1.00	1.00	1.00
African American	0.51 (0.43,0.62)	0.52 (0.43,0.63)	0.52 (0.43,0.63)
Hispanic	0.70 (0.62,0.80)	0.71 (0.61,0.81)	0.72 (0.64,0.82)
Other	0.77 (0.66,0.90)	0.78 (0.66,0.91)	0.77 (0.66,0.91)
Level-2 Covariates			
LGBT-Inclusive Sex Ed	1.01 (1.00,1.01)	1.01 (0.98,1.05)	1.04 (1.02,1.07)
Same-Sex Couples		0.93 (0.91,0.94)	0.94 (0.93,0.95)
Anti-Discrimination		1.01 (1.00,1.02)	1.01 (1.01,1.02)
Median Income		1.29 (1.23,1.35)	1.21 (1.15,1.28)
Cross-Level Interactions			
Gay or Lesbian X Sex Ed			0.83 (0.71,0.97)
Bisexual X Sex Ed			0.95 (0.88,1.01)
Not sure X Sex Ed			0.97 (0.85,1.10)

After introducing state-level covariates, LGBTQ-inclusive sex education was not a significant predictor of experiencing bullying at school (OR=1.01, CI=0.98,1.05). Participants in states with a higher density of same-sex couples had lower odds of reporting bullying at school (OR=0.91, CI=0.91,0.94). Median income was significantly related to higher odds of bullying (OR=1.29, CI=1.23,1.35), and states that had more protective LGBTQ policies were not related to higher odds of reported bullying (OR=1.01, CI=1.00,1.02). After controlling for individual and state-level covariates, an interaction effect was found in the final model, with gay and lesbian youth having significantly lower odds of experiencing bullying in the last year than heterosexual youth in states with a higher proportion of schools teaching LGBTQ-inclusive sex education (OR=0.83, CI=0.71,0.97). Figure 2 illustrates the direction and nature of the interaction effect by sexual identity.

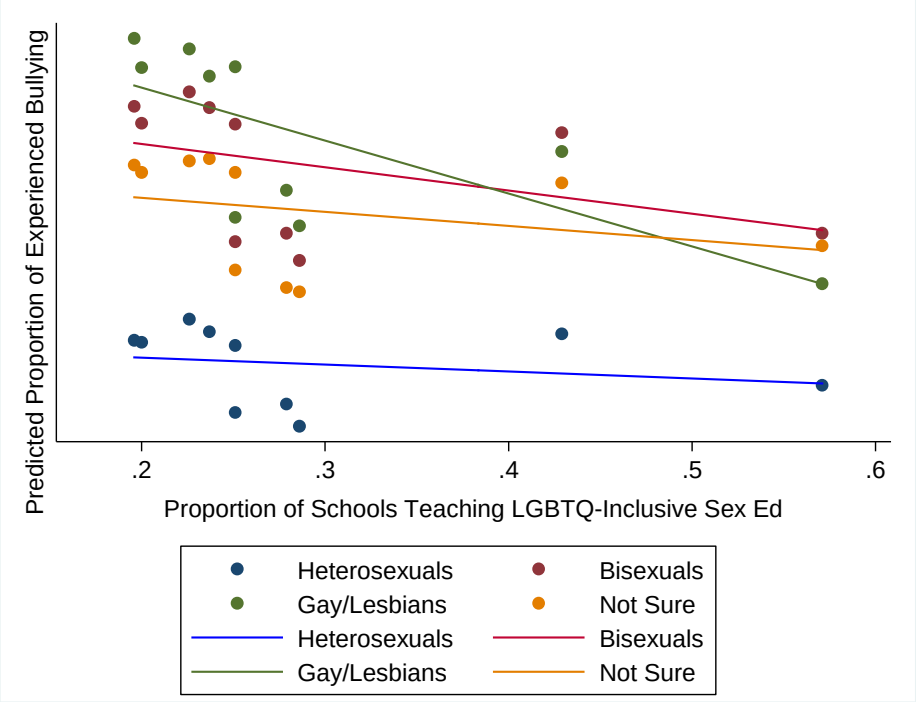

Figure 2. Relationship between proportion of schools teaching LGBTQ-inclusive sex education in a state and experiencing bullying on school property by sexual identity, YRBS 2015

5.0 DISCUSSION

This study sought to evaluate the potential for LGBTQ-inclusive sex education to serve as a tool to bolster positive school climates and culture and reduce adverse mental health outcomes and reports of being bullied on school property. We found that LGBTQ-inclusive sex education is related to lower instances of adverse mental health and experiences of bullying, with some of these effects varying for specific SMY subgroups.

5.1 MENTAL HEALTH OUTCOMES: DEPRESSIVE SYMPTOMS AND SUICIDALITY

Results were aligned with the first hypothesis of this study, indicating that states with a higher proportion of schools teaching LGBTQ-inclusive sex education had lower adverse mental health outcomes for all youth. However, the second hypothesis, predicting that these effects would be particularly salient for SMY, was only partially supported. A significant interaction effect was found for bisexual youth and depressive symptoms, such that with every 10% increase in the number of schools teaching LGBTQ-inclusive sex education in a state, the disparity in depressive symptoms between bisexual youth and heterosexual decreased. Furthermore, as the proportion of LGBTQ-inclusive sex education increases in a state, the disparities between bisexual youth and gay and lesbian youth also appear to decrease (Figure 1).

The fact that LGBTQ-inclusive sex education may provide particular benefits for bisexual youth is encouraging. This study and previous studies indicate that bisexual youth are at an increased risk for adverse mental health outcomes compared to their heterosexual and lesbian and gay peers.[34,38,39] It is unclear why LGBTQ-inclusive sex education may be especially protective for bisexual youth. It is possible that LGBTQ-inclusive sex education programs not only increase positive perceptions of SMY peers in heterosexual peers, but also in gay and lesbian peers, thereby reducing the double discrimination that bisexual youth often face.[47] Yet, the exact mechanisms that produce additional mental health disparities between bisexual youth and their lesbian and gay peers are understudied.[47]

Additionally, some preliminary research has indicated that bisexual youth do not make up a large portion of GSA participants compared to lesbian and gay youth.[10] Thus, in schools that have GSAs, bisexual youth may not be participating and therefore not receiving the buffering effects that these groups often provide to lesbian and gay youth.[7,8,10] Instead, LGBTQ-inclusive sex education may uniquely reach this group in a way that other programs that affect school climate may not, thereby giving them an added benefit of exposure to inclusive information. More research should be directed towards understanding how discrimination in school impacts bisexual youth, thereby providing more context on why LGBTQ-inclusive sex education may be particularly beneficial to this group.

Overall protective effects of LGBTQ-inclusive sex education were found for both suicidal thoughts and making a suicide plan for all youth. Notably, there was over a 20% significant reduction in reported suicide plans for every 10% increase in schools teaching LGBTQ-inclusive sex education in a state. However, no significant interaction effects were found for SMY compared to heterosexual youth. It is possible that inclusive school climate and

culture may have positive implications for heterosexual youth as well as SMY. For instance, one Canadian study found that heterosexual boys were less likely to experience suicide ideation and attempt suicide in schools that had established anti-discrimination policies and GSAs.[7] This may suggest that schools that introduce programs and policies that influence both school climate and school culture may see a reduction in toxic masculinity (i.e., harmful narratives and norms that promote rigid gender roles and homonegativity).[76] Because of homophobic bullying's ties to gender roles and norms,[48-50] boys who identify as heterosexual but exhibit gender non-conforming behavior may experience similar homophobic victimization as their sexual minority peers. Thus, schools that have positive school climates and cultures for SMY may also be protective for heterosexual youth, particularly boys. The YRBS did not include questions on gender expression, making it impossible to test any hypotheses related to gender non-conformity in this study. We did not test three-way interactions between sex, sexual identity, and LGBTQ-inclusive sex education due to concerns about low power from a relatively small sample of states. Future studies should consider the effects that gender expression and sexual identity have on experiencing homophobic victimization and how LGBTQ-inclusive sex education may be able to mitigate these effects on suicide risk.

5.2 EXPERIENCES OF BULLYING

The second set of hypotheses focused on LGBTQ-inclusive sex education and its association with experiencing bullying on school property in the last year. First, the proportion of schools teaching LGBTQ-inclusive sex education in a state was not associated with lower odds of reporting being bullied on school property. There was a significant interaction effect for gay and

lesbian youth, such that a 10% increase in the number of schools teaching LGBTQ-inclusive sex education in a state was associated with significantly lower odds of gay and lesbian youth experiencing bullying on school property. Additionally, both bisexual and unsure youth trended lower than heterosexual youth in reported bullying, but failed to reach significance at the $p<0.05$ level.

The protective benefits for gay and lesbian youth supports existing evidence that improving both school climate and school culture can reduce victimization and discrimination that SMY face in schools.[7] However, despite significant decreases in depressive symptoms, bisexual youth did not report significantly lower experiences of bullying than heterosexual peers. The odds ratio for bisexual youth was in the hypothesized direction and approached significance (p=0.11), and it may be possible that the exclusion of Arizona (n= 2,582) for reported bullying experiences and not depressive symptoms, may have influenced these results. Arizona had the second highest proportion of bisexual youth reporting depressive symptoms (68.9%) among the 11 states included in the model. Thus, important information about the effects LGBTQ-inclusive sex education on bullying experiences of bisexual youth may have been lost due to this source of missing data. It is also possible that LGBTQ-inclusive sex education may not change school culture related to biphobia. Qualitative research centering on bisexual women has indicated that biphobia and homophobia are distinct constructs that can manifest differently.[45,46] For instance, bisexuals often experience discrimination related to perceived promiscuity, unfaithfulness, or indecisiveness, which are not necessarily common elements of homophobia.[47] Thus, LGBTQ-inclusive sex education may not affect experiences of double discrimination for bisexual youth, but instead only provide the perception of belonging and safety that programs like GSAs provide for lesbian and gay youth through exposure to and representation of sexual diversity. While

results for depressive symptoms may suggest that LGBTQ-inclusive sex education can provide protective mental health benefits for bisexual youth, interventions that specifically target biphobic school culture may help promote bullying prevention specifically for bisexual youth.

The proportion of schools teaching LGBTQ-inclusive sex education in a state failed to reduce bullying for all youth. The question measuring bullying on school property in the YRBS was not specific to any particular type of bullying nor its motivation. For instance, the question did not specify whether a student experienced bullying due to being gay or perceived as gay. Additionally, the term "bullied" was not specified or defined; therefore, there was no distinction between experiencing physical violence, verbal insults, harassment, or microaggressions. Because of the different degrees of bullying that youth experience and different motivation behind it, heterosexual students may have perceived the question differently than SMY. Thus, the absence of a significant effect may have been influenced by measurement error, and all results related to experiencing bullying on school property should be interpreted with caution.

5.3 INFLUENCE OF SOCIO-CONTEXTUAL FACTORS

In all models, a higher population density of same-sex couples in a state was significantly related to fewer adverse mental health outcomes and experiences of bullying 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, but not heterosexual adults.[77] This effect has not been examined for youth. Nevertheless, 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

representation of sexual minority individuals and same-sex relationships. These findings suggest the importance of sociocultural factors on the state climate and culture for youth mental health.

Median household income and the presence of anti-discrimination policies were found to have significant associations with outcomes as well; however, these associations were not in the expected directions. Median household income was associated with increases in negative mental health outcomes ranging from an 8-18% increase in odds for every $10,000 increase in the median household income in a state. Previous multi-level studies of neighborhoods have shown conflicting evidence on the effect of median household income on health and mental health of individuals, especially when studies do not control for individual contextual factors, such as socio-economic status (SES), income, and educational attainment.[78] Because the YRBS does not contain individual measures of student SES, we could not control for these effects. As such, it is possible that the effects of state median household income, which is even more distally located than one's neighborhood, would become insignificant if other proximal measures of SES were included in the model.

More complexing is the significant increase in depressive symptoms, making a suicide plan, and experiencing bullying seen for states with more inclusive anti-discrimination policies. Effects were considerably small, with increases in outcomes ranging from 1-2% in the odds for every 1 unit increase in the scale score for anti-discrimination policies. This small effect, while significant, may not be especially applicable if more states were included in the analyses. The full range of possible scores for the measure was -10 to 34, while the range for this sample was only 0.5 to 21. Thus, explicitly negative policies (scores < 0) were not reflected in this score, giving an incomplete picture of the full range of anti-discrimination policies and their effect on mental health and bullying outcomes.

5.4 LIMITATIONS AND STRENGTHS

While this study provides a novel approach to conceptualizing the benefits of LGBTQ-inclusive sex education, it is not without limitations. The YRBS data collection procedure does not identify individual schools or classrooms, making it impossible to control for school-level factors or clustering or measure the impact of a specific school's sex education curriculum. We were also unable to measure the quality of LGBTQ-inclusive sex education. The School Health Profiles only reflect whether some degree of LGBTQ-inclusiveness is taught in health education courses, but it is impossible to separate schools that teach one lesson on gender and sexuality versus schools that may incorporate LGBTQ-inclusive language and scenarios across multiple sexual health topics and class periods. As such, the results of this study should not be interpreted as conclusive evidence that any one LGBTQ-inclusive sex education program will reduce bullying or improve SMY mental health. Instead, results should be used as guiding rationale and preliminary evidence for the development, implementation, and evaluation of LGBTQ-inclusive sex education programs as tools to improve school climates and culture. It is also notable to recognize the contribution to mental health and bullying prevention that state-level variables provide. Significant state differences in the effect of teaching LGBTQ-inclusive sex education on SMY mental health and experiences of victimization lends additional support for previous studies asserting that larger sociocultural contextual factors play a role in the health and well-being of sexual minorities.[52,77] Therefore, examining only school-level effects of LGBTQ-inclusive sex education may ignore or minimize the importance of supportive sociocultural environments.

While proportion of schools teaching LGBTQ-inclusive sex education in a state may create more supportive sociocultural environments, it can also be a by-product of existing

supportive state environments. As such, it is assumed that the proportion of schools teaching LGBTQ-inclusive sex education is not a randomly distributed variable and is likely related to other sociocultural contextual factors within a state. This study controlled for three state-level variables that could influence this proportion of schools, such as the population density of same-sex couples, median household income, and the presence of inclusive anti-discrimination policies. Moreover, it is possible that some confounders were not included in the model. For instance, because school curriculum is often determined at the state-level, models would ideally control for state policies outlining sex education policy, with reference to LGBTQ-inclusivity. Unfortunately, most states in this particular sample have no explicitly positive or negative policies on sex education.[66] As such, this limited variability in LGBTQ-inclusive sex education policy makes it difficult to examine and control for the effect of state policy. Nevertheless, future studies should explore the relationship between different state-level factors in the health and well-being of SMY.

Due to a small number of states (ranging 10-11 states per model), there was low statistical power for state-level covariates. Although interactions effects were not found for making a suicide plan or seriously considering suicide, small effect sizes may have simply been undetectable based on the small number of states included in the analyses. The rarity of suicidality outcomes in general may have also impacted power to detect differences among smaller subgroups like sexual minority youth. To improve power at the state level, more states for the YRBS and School Health Profiles should elect to release their data and include measures of sexual identity in their YRBS surveys. This would provide not only more statistical power to detect differences, but also enhance the variability of outcomes and LGBTQ-inclusive sex education data. While this study did include both traditionally liberal and conservative states,

added variability in the proportion of LGBTQ-inclusive sex education taught in each state would provide a better understanding of its influence on mental health and bullying outcomes country-wide.

There are some limitations to YRBS data collection that must be considered. For instance, the YRBS does not include varied responses on gender identity, and therefore did make it possible to examine the experiences of transgender youth. Furthermore, because data collection occurs in public schools, these results are not applicable to homeless youth, students in private or religious schools, and homeschooled youth. It is important to note that these data are cross-sectional and therefore do not provide any information about the temporal relationship between LGBTQ-inclusive sex education and developing adverse mental health outcomes and experiencing bullying in school. Nevertheless, this study provides evidence in support of employing experimental methods that could more adequately test causality and temporal relationships between exposure to inclusive education and mental health and bullying outcomes. For instance, employing cluster-randomized controlled trials with adequate follow-up, like those used to test the effectiveness of LGBTQ-inclusive sex education in promoting sexual health knowledge compared to traditional comprehensive sex education,[68,69] may serve as a feasible choice for demonstrating school-level effects on school climate and culture.

Despite these limitations, this study utilized a large, representative sample from the YRBS and School Health Profiles. Thus, results can be assumed to reflect the typical experiences of U.S. public high school students within the states included in analyses. Furthermore, the statistical methodology used to test associations accounted for state differences and controlled for important contextual factors, like the presence of state-wide anti-discrimination policies, that may have confounded results. Multi-level logistic modeling also accounts for clustering within

states and produces more accurate estimation 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. Finally, past research has also failed to differentiate between exposures that affect school climate and those that affect school culture.[52,53] We explicitly recognized the unique contributions that LGBTQ-inclusive sex education could make to both school climate and school culture. While this study did not test the relationship between mental health outcomes and experiencing bullying in SMY, it did find that LGBTQ-inclusive sex education can independently affect both outcomes, therefore providing preliminary evidence in its ability to drive both school climate and school culture change.

5.5 PUBLIC HEALTH IMPLICATIONS AND NEXT STEPS

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,[68,69] but this study failed to measure or report on outcomes related to heterosexual student's perceptions and attitudes towards gender and sexuality diversity and their non-heterosexual peers. Including these measures can provide individual-level information about the impact LGBTQ-inclusive sex education may have on shaping bullying and school culture. Furthermore, measuring perceptions of internalized homophobia and perceived school safety before and after the introduction of LGBTQ-inclusive sex education in SMY can provide insight into whether LGBTQ-inclusive sex education can shape school climate for SMY.

Future research and intervention development should focus on the unique experiences of bisexual youth in schools. We found that bisexual youth may experience some positive change in school climate as a result of LGBTQ-inclusive sex education, but that LGBTQ-inclusive sex education may not affect their school culture. Understanding how to better address the needs of bisexual youth is crucial, as these youth have significantly worse mental health outcomes in youth and adulthood compared to both heterosexual and gay and lesbian peers.[34,38,39] It is possible LGBTQ-inclusive sex education in schools fail to address bisexuality within standard curricula. With bisexual erasure (i.e. the tendency to invalidate or ignore the existence of bisexuality[79]) so prevalent within heteronormative and LGBTQ culture,[45,46] it is important for LGBTQ-inclusive sex education to address negative stereotypes and health concerns related specifically to bisexual youth. Future interventions revolving around LGBTQ-inclusive sex education should ensure that this information is present.

While this study used Minority Stress Theory as a guiding framework, looking specifically at negative mental health outcomes, future studies may want to frame the benefits of LGBTQ-inclusive sex education within a syndemics framework. Syndemics can be defined as "a set of mutually reinforcing epidemics that together lower the overall health profile of a population more than each epidemic by itself might be expected to do."[80] Experiences of discrimination and victimization increase SMY's risks for other adverse health outcomes, such as STI and HIV risk, substance abuse, and intimate partner violence.[35-37] These risks interact with each other, creating worse overall health over the life course.[80] The intertwined nature of these adverse health outcomes can create a cycle of risk, such that interventions that target only one aspect of health in SMY, such as substance abuse, may not have a lasting impact if they fail to also target discrimination. Continued exposure to discrimination may make an individual more

likely to relapse or develop risky behaviors later in life. Because of LGBTQ-inclusive sex education's potential for targeting the underlying risk of facing discrimination and developing adverse mental health, future research may want to test its ability to impact other health outcomes and the cycles of risk that contribute to and produce syndemics in SMY.

Finally, 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. For instance, Texas, Utah, South Carolina, and Alabama all have state-wide policies in place that require schools to only teach negative information related to homosexuality, such as harmful stereotypes regarding HIV/AIDS risk and arguments that homosexuality is unnatural or immoral.[66] 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. However, public opinion polls[67] and studies of parent's perceptions[81] have indicated that the vast majority of Americans support including sexual identity in school-based sex education classes. While challenges do exist, public support and evidence that federally inclusive policies like marriage equality can positively impact SMY mental health[82] suggest that there is potential for LGBTQ-inclusive sex education to become part of standard curricula in many regions of the country.

6.0 CONCLUSION

The results of this study provide novel evidence that LGBTQ-inclusive sex education affects adverse mental health outcomes and experiences of bullying in U.S. public high schools. While evaluation at the school-level is still needed to provide evidence of a direct link between LGBTQ-inclusive sex education and adverse mental health outcomes and bullying prevention, this study illustrates the potential positive impact that interventions targeting both homophobic school climate and school culture may have for all youth.

BIBLIOGRAPHY

1. Kann L, Olsen E, 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.* 2016 65(9):1-202.
2. Marshal MP, Dietz LJ, Friedman MS, et al. Suicidality and depression disparities between sexual minority and heterosexual youth: A meta-analytic review. *Journal of Adolescent Health.* 2011;49(2):115-123.
3. A Day in the Life. *America's Adolescents* 2016; https://www.hhs.gov/ash/oah/adolescent-health-topics/americas-adolescents/day.html. Accessed March 16, 2017.
4. Kosciw JG, Greytak EA, Giga NM, Villenas C, Danischewski DJ. *The 2015 National School Climate Survey: The Experiences of Lesbian, Gay, Bisexual, Transgender, and Queer Youth in Our Nation's Schools.* www.glsen.org: GLSEN; 2016 2016.
5. Walls NE, Kane SB, Wisneski H. Gay—Straight alliances and school experiences of sexual minority youth. *Youth & Society.* 2010;41(3):307-332.
6. St. John A, Travers R, Munro L, Liboro R, Schneider M, Greig CL. The success of Gay–Straight Alliances in Waterloo Region, Ontario: A confluence of political and social factors. *Journal of LGBT Youth.* 2014;11(2):150-170.
7. Saewyc EM, Konishi C, Rose HA, Homma Y. School-based strategies to reduce suicidal ideation, suicide attempts, and discrimination among sexual minority and heterosexual adolescents in Western Canada. *International Journal of Child, Youth & Family Studies.* 2014;5(1):89.
8. Poteat VP, Sinclair KO, DiGiovanni CD, Koenig BW, Russell ST. Gay–straight alliances are associated with student health: A multischool comparison of LGBTQ and heterosexual youth. *Journal of Research on Adolescence.* 2013;23(2):319-330.
9. Heck NC, Flentje A, Cochran BN. Offsetting risks: High school gay-straight alliances and lesbian, gay, bisexual, and transgender (LGBT) youth. *School Psychology Quarterly.* 2011;26(2):161.
10. Toomey RB, Ryan C, Diaz RM, Russell ST. High school gay–straight alliances (GSAs) and young adult well-being: An examination of GSA presence, participation, and perceived effectiveness. *Applied Developmental Science.* 2011;15(4):175-185.
11. Meyer IH. Minority stress and mental health in gay men. *Journal of Health and Social Behavior.* 1995:38-56.
12. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin.* 2003;129(5):674.
13. Crain RM. The influence of age, race, and gender on child and adolescent multidimensional self-concept. In: Bracken BA, ed. *Handbook of self-concept:*

Developmental, social, and clinical considerations Oxford, England: John Wiley & Sons; 1996: 395-420.
14. Hay I, Ashman AF. The development of adolescents' emotional stability and general self-concept: The interplay of parents, peers, and gender. *International Journal of Disability, Development and Education.* 2003;50(1):77-91.
15. Kann L, McManus T, Harris WA, et al. *Youth Risk Behavior Surveillance — United States, 2015.* 2016.
16. Bose J, Hedden SL, Lipari RN, Park-Lee E, Porter JD, Pemberton MR. *Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health.* 2016.
17. Naicker K, Galambos NL, Zeng Y, Senthilselvan A, Colman I. Social, demographic, and health outcomes in the 10 years following adolescent depression. *Journal of Adolescent Health.* 2013;52(5):533-538.
18. Herpertz-Dahlmann B, Dempfle A, Konrad K, Klasen F, Ravens-Sieberer U, group Bs. Eating disorder symptoms do not just disappear: The implications of adolescent eating-disordered behaviour for body weight and mental health in young adulthood. *European Child & Adolescent Psychiatry.* 2015;24(6):675-684.
19. Avenevoli S, Swendsen J, He J-P, Burstein M, Merikangas KR. Major depression in the National Comorbidity Survey–Adolescent Supplement: prevalence, correlates, and treatment. *Journal of the American Academy of Child & Adolescent Psychiatry.* 2015;54(1):37-44. e32.
20. Fergusson DM, Woodward LJ. Mental health, educational, and social role outcomes of adolescents with depression. *Archives of General Psychiatry.* 2002;59(3):225-231.
21. Mayfield Arnold E, Greco E, Desmond K, Rotheram-Borus MJ. When life is a drag: Depressive symptoms associated with early adolescent smoking. *Vulnerable Children and Youth Studies.* 2014;9(1):1-9.
22. Dierker L, Rose J, Selya A, Piasecki TM, Hedeker D, Mermelstein R. Depression and nicotine dependence from adolescence to young adulthood. *Addictive Behaviors.* 2015;41:124-128.
23. Brière FN, Rohde P, Seeley JR, Klein D, Lewinsohn PM. Comorbidity between major depression and alcohol use disorder from adolescence to adulthood. *Comprehensive Psychiatry.* 2014;55(3):526-533.
24. Shrier LA, Harris SK, Sternberg M, Beardslee WR. Associations of depression, self-esteem, and substance use with sexual risk among adolescents. *Preventive Medicine.* 2001;33(3):179-189.
25. Richardson LP, Davis R, Poulton R, et al. A longitudinal evaluation of adolescent depression and adult obesity. *Archives of Pediatrics & Adolescent Medicine.* 2003;157(8):739-745.
26. Centers for Disease Control and Prevention (CDC). Web-based Injury Statistics Query and Reporting System (WISQARS). In: National Center for Injury Prevention and Control, 2014.
27. Years of Potential Life Lost (YPLL) Before Age 65. In: National Center for Injury Prevention and Control; 2015.
28. Almeida J, Johnson RM, Corliss HL, Molnar BE, Azrael D. Emotional distress among LGBT youth: The influence of perceived discrimination based on sexual orientation. *Journal of Youth and Adolescence.* 2009;38(7):1001-1014.

29. Galliher RV, Rostosky SS, Hughes HK. School belonging, self-esteem, and depressive symptoms in adolescents: An examination of sex, sexual attraction status, and urbanicity. *Journal of Youth and Adolescence.* 2004;33(3):235-245.
30. Hatzenbuehler ML, McLaughlin KA, Nolen-Hoeksema S. Emotion regulation and internalizing symptoms in a longitudinal study of sexual minority and heterosexual adolescents. *Journal of Child Psychology and Psychiatry.* 2008;49(12):1270-1278.
31. Austin SB, Nelson LA, Birkett MA, Calzo JP, Everett B. Eating disorder symptoms and obesity at the intersections of gender, ethnicity, and sexual orientation in US high school students. *American Journal of Public Health.* 2013;103(2):e16-e22.
32. Austin SB, Ziyadeh NJ, Corliss HL, et al. Sexual orientation disparities in purging and binge eating from early to late adolescence. *Journal of Adolescent Health.* 2009;45(3):238-245.
33. 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.
34. Marshal MP, Dermody SS, Cheong J, et al. Trajectories of depressive symptoms and suicidality among heterosexual and sexual minority youth. *Journal of Youth and Adolescence.* 2013;42(8):1243-1256.
35. Mustanski B, Garofalo R, Herrick A, Donenberg G. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: Preliminary evidence of a syndemic in need of attention. *Annals of Behavioral Medicine.* 2007;34(1):37.
36. Parsons JT, Grov C, Golub SA. Sexual compulsivity, co-occurring psychosocial health problems, and HIV risk among gay and bisexual men: further evidence of a syndemic. *American Journal of Public Health.* 2012;102(1):156-162.
37. Stall R, Mills TC, Williamson J, et al. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *American Journal of Public Health.* 2003;93(6):939-942.
38. Shilo G, Savaya R. Effects of family and friend support on LGB youths' mental health and sexual orientation milestones. *Family Relations.* 2011;60(3):318-330.
39. Shearer A, Herres J, Kodish T, et al. Differences in mental health symptoms across lesbian, gay, bisexual, and questioning youth in primary care settings. *Journal of Adolescent Health.* 2016;59(1):38-43.
40. Kerr DL, Santurri L, Peters P. A comparison of lesbian, bisexual, and heterosexual college undergraduate women on selected mental health issues. *Journal of American College Health.* 2013;61(4):185-194.
41. Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. *American Journal of Public Health.* 2010;100(10):1953-1960.
42. Burton CM, Marshal MP, Chisolm DJ, Sucato GS, Friedman MS. Sexual minority-related victimization as a mediator of mental health disparities in sexual minority youth: A longitudinal analysis. *Journal of Youth and Adolescence.* 2013;42(3):394-402.
43. 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. *Journal of School Health.* 2011;81(5):223-230.

44. Bontempo DE, d'Augelli AR. Effects of at-school victimization and sexual orientation on lesbian, gay, or bisexual youths' health risk behavior. *Journal of Adolescent Health.* 2002;30(5):364-374.
45. Hayfield N, Clarke V, Halliwell E. Bisexual women's understandings of social marginalisation:'The heterosexuals don't understand us but nor do the lesbians'. *Feminism & Psychology.* 2014;24(3):352-372.
46. Wandrey RL, Mosack KE, Moore EM. Coming out to family and friends as bisexually identified young adult women: A discussion of homophobia, biphobia, and heteronormativity. *Journal of Bisexuality.* 2015;15(2):204-229.
47. Friedman MR, Dodge B, Schick V, et al. From bias to bisexual health disparities: Attitudes toward bisexual men and women in the United States. *LGBT Health.* 2014;1(4):309-318.
48. Friedman MS, Koeske GF, Silvestre AJ, Korr WS, Sites EW. The impact of gender-role nonconforming behavior, bullying, and social support on suicidality among gay male youth. *Journal of Adolescent Health.* 2006;38(5):621-623.
49. Plöderl M, Fartacek R. Childhood gender nonconformity and harassment as predictors of suicidality among gay, lesbian, bisexual, and heterosexual Austrians. *Archives of Sexual Behavior.* 2009;38(3):400-410.
50. Roberts AL, Rosario M, Slopen N, Calzo JP, Austin SB. Childhood gender nonconformity, bullying victimization, and depressive symptoms across adolescence and early adulthood: An 11-year longitudinal study. *Journal of the American Academy of Child & Adolescent Psychiatry.* 2013;52(2):143-152.
51. Payne E, Smith M. LGBTQ kids, school safety, and missing the big picture: How the dominant bullying discourse prevents school professionals from thinking about systemic marginalization or... Why we need to rethink LGBTQ bullying. *QED: A Journal in GLBTQ Worldmaking.* 2013(1):1-36.
52. Hatzenbuehler ML, Birkett M, Van Wagenen A, Meyer IH. Protective school climates and reduced risk for suicide ideation in sexual minority youths. *American Journal of Public Health.* 2014;104(2).
53. Birkett M, Espelage DL, Koenig B. LGB and questioning students in schools: The moderating effects of homophobic bullying and school climate on negative outcomes. *Journal of Youth and Adolescence.* 2009;38(7):989-1000.
54. Espelage DL, Low S, Polanin JR, Brown EC. The impact of a middle school program to reduce aggression, victimization, and sexual violence. *Journal of Adolescent Health.* 2013;53(2):180-186.
55. Committee of Children. Second Step middle school complete review of research. 2008.
56. Swearer SM, Turner RK, Givens JE, Pollack WS. "You're so gay!": Do different forms of bullying matter for adolescent males? *School Psychology Review.* 2008;37(2):160.
57. Wernick LJ, Kulick A, Dessel AB, Graham LF. Theater and dialogue to increase youth's intentions to advocate for LGBTQQ people. *Research on Social Work Practice.* 2016;26(2):189-202.
58. Wernick LJ, Dessel AB, Kulick A, Graham LF. LGBTQQ youth creating change: Developing allies against bullying through performance and dialogue. *Children and Youth Services Review.* 2013;35(9):1576-1586.

59. Wernick LJ, Woodford MR, Kulick A. LGBTQQ youth using participatory action research and theater to effect change: Moving adult decision-makers to create youth-centered change. *Journal of Community Practice.* 2014;22(1-2):47-66.
60. Hatzenbuehler ML, McLaughlin KA, Xuan Z. Social networks and risk for depressive symptoms in a national sample of sexual minority youth. *Social Science & Medicine.* 2012;75(7):1184-1191.
61. Goodenow C, Szalacha L, Westheimer K. School support groups, other school factors, and the safety of sexual minority adolescents. *Psychology in the Schools.* 2006;43(5):573-589.
62. Chesir-Teran D, Hughes D. Heterosexism in high school and victimization among lesbian, gay, bisexual, and questioning students. *Journal of Youth and Adolescence.* 2009;38(7):963-975.
63. Szalacha LA. Safer sexual diversity climates: Lessons learned from an evaluation of Massachusetts safe schools program for gay and lesbian students. *American Journal of Education.* 2003;110(1):58-88.
64. Hansen AL. School-based support for GLBT students: A review of three levels of research. *Psychology in the Schools.* 2007;44(8):839-848.
65. Human Rights Campaign. *A Call To Action: LGBTQ Youth Need Inclusive Sex Education.* Accessed from: http://www.advocatesforyouth.org/storage/advfy/documents/a%20call%20to%20action%20lgbtq%20youth%20need%20inclusive%20sex%20education%20final.pdf
66. Guttmacher Insititute. Sex and HIV Education. *State Laws and Policies.* 2017. https://www.guttmacher.org/state-policy/explore/sex-and-hiv-education.
67. Sexuality Education Information Council of the United States. On Our Side: Public Support for Comprehensive Sexuality Education. *SEICUS Fact Sheet.* 2010. Accessed from: http://www.siecus.org/_data/global/images/Public%20Support%20Fact%20Sheet-SIECUS-10.07.pdf.
68. Constantine NA, Jerman P, Berglas NF, Angulo-Olaiz F, Chou C-P, Rohrbach LA. Short-term effects of a rights-based sexuality education curriculum for high-school students: A cluster-randomized trial. *BMC Public Health.* 2015;15(1):293.
69. Rohrbach LA, Berglas NF, Jerman P, Angulo-Olaiz F, Chou C-P, Constantine NA. A rights-based sexuality education curriculum for adolescents: 1-year outcomes from a cluster-randomized trial. *Journal of Adolescent Health.* 2015;57(4):399-406.
70. Lucassen MF, Burford J. Educating for diversity: An evaluation of a sexuality diversity workshop to address secondary school bullying. *Australasian Psychiatry.* 2015;23(5):544-549.
71. Toomey RB, McGuire JK, Russell ST. Heteronormativity, school climates, and perceived safety for gender nonconforming peers. *Journal of Adolescence.* 2012;35(1):187-196.
72. Brener ND, Kann L, Shanklin S, et al. Methodology of the Youth Risk Behavior Surveillance System — 2013. *MMWR.* 2013;62(1).
73. Dernissie Z, Brener ND, McManus T, Shanklin SL, Hawkins J, Kann L. *School Health Profiles 2014: Characteristics of Health Programs Among Secondary Schools.* Center for Disease Control and Prevention;2014.
74. State Policy Tally Frequently Asked Questions. 2016; Accessed from: http://lgbtmap.org/state-policy-tally-faq.

75. Centers for Disease Control and Prevention. Software for Analysis of YRBS Data. Centers for Disease Control and Prevention; 2016.
76. Kupers TA. Toxic masculinity as a barrier to mental health treatment in prison. *Journal of Clinical Psychology.* 2005;61(6):713-724.
77. Hatzenbuehler ML, Keyes KM, McLaughlin KA. The protective effects of social/contextual factors on psychiatric morbidity in LGB populations. *International Journal of Epidemiology.* 2011;40(4):1071-1080.
78. Pickett KE, Pearl M. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: A critical review. *Journal of Epidemiology and Community Health.* 2001;55(2):111-122.
79. Erasure of bisexuality. Accessed from: http://www.glaad.org/bisexual/bierasure Accessed March 25, 2017.
80. Stall R, Friedman M, Catania JA. Interacting epidemics and gay men's health: a theory of syndemic production among urban gay men. *Unequal Opportunity: Health Disparities Affecting Gay and Bisexual Men in the United States.*2008:251-274.
81. Ito KE, Gizlice Z, Owen-O'Dowd J, Foust E, Leone PA, Miller WC. Parent opinion of sexuality education in a state with mandated abstinence education: Does policy match parental preference? *Journal of Adolescent Health.* 2006;39(5):634-641.
82. Raifman J, Moscoe E, Austin SB, McConnell M. Difference-in-differences analysis of the association between state same-sex marriage policies and adolescent suicide attempts. *JAMA Pediatrics.* 2017.