

Sexual Violence Among Gender and Sexual Minority College Students: The Risk and Extent of Victimization and Related Health and Educational Outcomes

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Abstract

A multisite survey conducted at eight campuses of a southwestern university system provides the data for the present study, total $N = 17,039$ with 1,869 gender and sexual minority (GSM) students. Sexual violence was measured using the Sexual Experiences Survey (SES), and analysis included both the participant's risk of experiencing sexual violence and the extent (or total count) of sexual violence experienced. This study poses the following research questions: What effects do gender identity and sexual orientation have on the risk and extent of sexual violence among students and, among victims, what is the relationship between gender identity/sexual orientation and mental health (posttraumatic stress disorder [PTSD], depression) and

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academic environment (disengagement and safety) outcomes for university students? Multilevel, random effect hurdle models captured this sequential victimization dynamic. GSM and cisgender heterosexual (CH) female students are predicted to be 2.6 and 3 times, respectively, as likely to experience sexual violence compared with CH male students. In addition, GSM students experiencing sexual violence are also expected to experience a greater number of sexually violent acts (74% more) over their college career compared with victimized CH male students. The models confirm that the risk of victimization increases over time (13% per year for CH male students), but GSM students are expected to experience an additional (10%) increase in risk of victimization per year compared with CH male students. GSM and CH female students are also predicted to be more likely to have PTSD and experience more severe depression symptoms than CH male students. GSM students are expected to experience significantly higher rates of PTSD, worse depressive symptoms, and greater disengagement than CH female students. The discussion explores how institutions of higher education might recognize the resilience of GSM students and consider the protective potential of social and community support when developing programs or interventions for diverse populations.

Keywords

gender and sexual minority, sexual violence, academic and health outcomes, random intercept hurdle models, risk and extent of victimization

Sexual violence at institutions of higher education (IHEs) has been well-documented by a proliferation of sexual assault and sexual misconduct climate surveys in response to the Obama Administration's "It's on Us" campaign (White House Task Force to Protect Students from Sexual Assault [Task Force], 2014; Wood, Sulley, Kammer-Kerwick, Follingstad, et al., 2016). Consistent with earlier studies indicating one in five female students experience sexual violence (Koss, Gidycz, & Wisniewski, 1987; Krebs, Lindquist, Warner, Fisher, & Martin, 2007), recent sexual assault and misconduct prevalence and perception surveys (Wood et al., 2016) display similar findings (Busch-Armendariz, Wood, Sulley, Kammer-Kerwick, et al., 2017a; Cantor et al., 2015).

Historically, research on sexual violence prevalence and interventions has focused on young, heterosexual, White women; less effort has previously been afforded to studying diverse populations, including gender and sexual minority (GSM) students as well as students with disabilities and members of racial and ethnic minorities (Porter & Williams, 2011). However, emerging

research has shown that GSM students are at increased risk of experiencing sexual violence compared with their cisgender heterosexual (CH) peers (Busch-Armendariz et al., 2017a; Cantor et al., 2015; Coulter et al., 2017; Coulter & Rankin, 2017).

Using a minority stress lens (Brooks, 1981; Meyer, 1995; Murchison, Boyd, & Pachankis, 2017; Pearlin, 1975), the current study uses a large general population sample of college students to develop a series of predictive models to build upon past research on the sexual violence victimization of GSM students by, first, deepening current knowledge about risk factors, including both main effects and interactions. Second, as a more novel contribution, this study also addresses the extent of sexual violence among GSM students by analyzing the amount (or count) of sexually violent behaviors endured by victims. Third, the study also explores associated mental health and academic environment outcomes for GSM students and looks at the effect of sexual violence victimization on these outcomes. These three foci are the foundation of our research questions. To address these research questions more completely, the analysis was performed at both an aggregate level that allowed GSM students collectively to be compared with their CH peers and at a deeper, more intersectional, level that allowed, with some power limitations, for comparisons of specific gender identities and sexual orientations. Reviewed literature connects minority stress to sexual violence among GSM students and, although limited extant literature exists, provides background on the impact of sexual violence among GSM students.

Literature Review

Sexual Violence and GSM Students

A review of the emergent research on sexual violence among GSM students relative to their CH peers reveals important overall patterns about sexual violence endured, as well substantial limitations when comparing those studies to each other and to the present study. Among other differences, studies differ by the population sampled, the measure used for sexual violence, and the time-frame over which sexually violent behaviors have been experienced. For example, Coulter et al. (2017) study a general population of students and measure past-year sexual violence and include gender identity and sexual orientation in their models as main effects. They report that, relative to cisgender men, cisgender women and transgender people are 2.47 and 3.93 times, respectively, more likely to experience sexual violence. Furthermore, they report that, compared with heterosexuals, gay/lesbian individuals, bisexual individuals, and individuals who are unsure of their orientation are 1.92, 2.37,

and 1.95 times, respectively, more likely to experience sexual violence. Coulter and Rankin (2017) study a sample of GSM students and measure sexual violence victimization as “ever while on your campus.” They also use main effects for gender identity and sexual orientation. Their models for risk of sexual violence apply to various GSM student identities relative to the risk associated with a White, cisgender, gay man. They report that a cisgender woman and a transgender person are, respectively, 3.03 and 2.18 times more likely to experience sexual violence; Note: the estimate for the risk ratio for a transgender person (2.18) was significant at $p = .09$, and results for race/ethnicity and sexual orientation were not significant. Cantor et al. (2015) study a general population of students with a design similar to Coulter et al. (2017). While they do not develop predictive models for risk of sexual violence using gender identity and sexual orientation as factors, their descriptive statistics indicate that female students and transgender/gender non-conforming students are both more than 4 times as likely to experience sexual violence as male students (see Cantor et al., 2015, p. 118). Although results vary by context, these studies indicate that increased risk of sexual violence can be characterized with relative risk ratios for GSM students that are multiples in the range of 2, 3, or even 4 times higher rather than fractional increases.

Minority Stress and Sexual Violence

GSM students often experience chronic stressors because of the rigidity of dominant heteronormative culture (Brooks, 1981; Pearlin, 1975). Minority stressors, as conceptualized by Meyer (1995), in regard to gay men specifically, consist of internalized homophobia, perceived stigma, discrimination, and violence; the same stressors, especially internalized homophobia, have been associated with increased risk of unwanted sexual experiences and coercion in Lesbian, Gay, Bisexual, and Queer (LGBQ) undergraduate students (Murchison et al., 2017).

As discussed, across the lifespan, GSM individuals experience sexual violence and abuse at higher rates than CHs. In addition, these victimization experiences are associated with higher rates of mental health issues and substance abuse (Banyard et al., 2017; Friedman et al., 2011; Warren, Smalley, & Barefoot, 2016). GSM students experience additional chronic stressors, including heterosexist harassment and negative attitudes (Rankin, Weber, Blumenfeld, & Frazer, 2010; Silverschanz, Cortina, Konik, & Magley, 2008). Risk of sexual violence victimization may also be connected to attitudes toward GSM students on campus. Coulter and Rankin (2017) found that increased levels of perceived inclusion of GSM students on campus corresponded to lower rates of sexual violence victimization.

Individuals with multiple minority status, such as lesbian women of color or bisexual people with disabilities, may experience increased and unique forms of stress from stigma, prejudice, and discrimination directed at their intersecting identities (Balsam, Molina, Beadnell, Simoni, & Walters, 2011). Intersecting marginalized identities (especially gender identity, race/ethnicity, and sexual orientation) are a potential risk factor for elevated rates of peer harassment and bullying in addition to greater life stressors and trauma (Balsam et al., 2015; Hightow-Weidman et al., 2011; Poteat, Aragon, Espelage, & Koenig, 2009). For example, Coulter et al. (2017) found that Black transgender students experienced the highest rates of sexual violence among students in their sample.

Impact of Sexual Violence among Gender and Sexual Minorities

Little research addresses the impact of sexual violence on GSM student populations, but studies among general community populations provide some insights and help frame the research questions for the present study of college students. This literature suggests that, compared with their heterosexual peers, GSM students experience more negative reactions when disclosing experiences of sexual violence (Jackson, Valentine, Woodward, & Pantalone, 2017), have less access to resources tailored to their identity (Richardson, Armstrong, Hines, & Palm Reed, 2015; Todahl, Linville, Bustin, Wheeler, & Gau, 2009), and ultimately experience more severe mental health impacts (Sigurvinsdottir & Ullman, 2015). More specific to GSM students, in a community sample, compared with heterosexual women, Sigurvinsdottir and Ullman (2015) show that bisexual and lesbian women experienced elevated rates of posttraumatic stress disorder (PTSD) following sexual violence victimization; bisexual women also experienced significantly more depression symptoms than heterosexual women. Sigurvinsdottir and Ullman (2016) continued the 2015 study with a 3-year cohort design to examine how the effects of PTSD and depression persist over time among female survivors of sexual violence, finding that both PTSD and depression were significantly higher for bisexual women than heterosexual women. While both groups showed a decline in PTSD symptoms over time, the gap between bisexual and heterosexual women persisted over the 3-year study period.

Although research on outcomes specifically among GSM students is also limited, in general population studies of students, survivors of sexual violence often face disruptions to their academic careers. Carey, Norris, Durney, Shepardson, and Carey (2018) look at the health consequences of sexual violence among first-year female college students while controlling for pre-college sexual violence and baseline mental health, showing that sexual violence during the first semester was associated with clinically significant levels of

anxiety and depression. The mental health consequences of victimization may also lead to academic disengagement, lower Grade Point Average (GPA), and increased dropout risk (Baker et al., 2016; Halstead, Williams, Gonzalez-Guarda, 2017; Jordan, Combs, & Smith, 2014). Victimization may also strain students' relationships with their IHE's in other ways, including feeling less safe on campus and perceiving a more hostile campus climate (Cortina, Swan, Fitzgerald, & Waldo, 1998; Wilcox, Jordan, & Pritchard, 2007).

The Current Study

A growing body of evidence addresses the effects of sexual orientation and gender identity on one's risk of and recovery from sexual violence, though few studies address the intersections of gender and sexual orientation on students' risk for sexual violence and post-assault mental health and academic outcomes. The current study adds depth to what is known about risk factors, both main effects and interactions for gender identity and sexual orientation. In addition, as a more novel contribution, this study also addresses the amount (or count) of sexually violent behaviors endured by victims (referred to as extent). Last, the study also explores a gap in extant literature by examining mental health and academic outcomes for GSM students and the effect of sexual violence victimization on these outcomes. This study contributes to these gaps by assessing differences between GSM students and their CH peers, as well as differences within a diverse group of GSM students. Formally, this study poses the following research questions:

Research Question 1 (RQ1): What effects do gender identity and sexual orientation have on the risk of sexual violence for students?

Research Question 2 (RQ2): What effects do gender identity and sexual orientation have on the extent of victimization for victims of sexual violence?

Research Question 3 (RQ3): Among victims of sexual violence, what is the relationship among gender identity/sexual orientation and mental health (PTSD, depression) and academic environment (disengagement and safety) outcomes?

Method

Procedure and Participants

Data were drawn from a larger research study conducted across a university system in the Southwest United States about students' sexual harassment and

sexual violence victimization experiences, perceptions of campus climate, mental health, and academic outcomes. The larger study used a modified version of the ARC3 survey that combined reliable and valid measures for intimate and interpersonal violence, including sexual violence (Swartout, Flack, Cook, Olson, & White, 2018). Busch-Armendariz, et al. (2017a, 2017b) and Wood, Hoefner, Kammer-Kerwick, et al. (2018) describe the study methodology while reporting findings about sexual harassment endured by students. Either a representative random sample or census sample (for smaller campuses) was drawn from the lists of students provided by the registrar from each of the eight universities that received the survey. The study was reviewed and approved by a primary institutional review board with reciprocal agreements with all other participating institutions.

Students were emailed invitations to participate in an anonymous online survey with four follow-up reminders. The survey was open for 5 weeks in fall 2015 and administered via the Qualtrics (2016) platform. Participants were eligible for an incentive drawing. Eligibility criteria included being currently enrolled as a student (undergraduate or graduate/professional) and being at least 18 years of age. Full information about the methods, measures, survey paths, and response rates can be found in the study's methodology report (Busch-Armendariz et al., 2017b). Across all campuses, 186,790 students were invited to participate and 26,417 completed the survey, for a response rate of 14.1%. Three different survey paths were created to reduce length and decrease survey fatigue. Participants were randomized to the different paths, resulting in a sample of 17,406 participants who were asked questions about sexual violence. Furthermore, cases were included in the present study if they fell between ages 18 and 64 years and if time at institution fell between 1 and 10 years (Time at institution was the difference between the year that the student took the survey and the year of the student's enrollment). These additional criteria produced a final sample of 16,764 participants who answered questions about sexual violence.

Table 1 summarizes demographic and victimization descriptive statistics. Overall, the majority of participants identified as heterosexual, female, and Hispanic or Latinx. For male participants, the largest nonheterosexual segment was gay, whereas the largest nonheterosexual segment for female participants was bisexual/pansexual. The modal sexual orientation among sexual minority students (including, transgender female, transgender male, gender queer, gender-nonconforming, intersex, two-Spirit, and other gender identities) was bisexual/pansexual (26%). The sample included both undergraduate (74%) and graduate/professional (26%) students. Across all participants, the mean age at first enrollment was 22.2 years (median = 19 years, $SD = 7.70$

Table 1. Demographic Characteristics and Sexual Violence Victimization Prevalence.

Variable	Total Sample Proportions		SV Victimization Prevalence	
	%	N	%	N
Total	100.0	16,764	15.8	2,644
Status				
Undergrad	73.6	12,344	17.9	2,205
Grad/professional	26.4	4,420	9.9	439
Race/ethnicity				
White or Caucasian non-Hispanic	33.8	5,664	17.5	992
Hispanic/Latinx	36.7	6,152	15.2	934
Black or African American	5.0	838	14.4	121
Asian	15.5	2,599	11.0	285
Multi	6.8	1,142	20.5	234
Additional races	2.2	369	21.1	78
Gender/sexual orientation				
Cisgender heterosexual male	31.7	5,314	7.6	403
Cisgender heterosexual female	57.0	9,549	18.8	1,798
Gender/sexual minority	11.3	1,901	23.3	443
Gender				
Male	35.3	5,912	8.9	526
Female	63.7	10,679	19.5	2,078
Transgender/gender-nonconforming	1.0	173	23.1	40
Sexual orientation				
Heterosexual	89.2	14,958	14.8	2,214
Gay/lesbian	3.2	539	20.6	111
Bisexual/pansexual	4.9	816	28.7	234
Asexuality spectrum	1.2	207	15.5	32
Additional sexual orientations	1.5	244	21.7	53

Note. Additional races refer to American Indian, Alaskan Native, and Pacific Islander identities. SV = sexual violence.

years). Participants had spent an average of 2.31 years (at the time of the survey) at their specific university (median = 2 years, $SD = 1.48$ years).

Dependent Measures

The dependent measures used in the current study are described below, including their origin, scoring used, and the alpha achieved in this study.

Sexual victimization. Sexual violence victimization was measured using a modified version of the Sexual Experiences Survey–Short Form Version (SES-SFV; Koss et al., 2007). The frequency of sexual violence behaviors was calculated using the sum of all items, where 3+ times was quantified as 3 times ($\alpha = .941$; Koss et al., 2007). Victimization was defined using behaviorally specific questions about experiences of unwanted sexual touching, attempted rape, and rape due to coercion, incapacitation, threat of force, and force.

Mental health outcomes. PTSD was assessed using the Primary Care PTSD (PC-PTSD) screen (Prins et al., 2003). The PC-PTSD is a four-item measure using a binary yes/no response. Per guidelines, students who endorsed any three items are considered to have probable PTSD ($\alpha = .799$; U.S. Department of Veterans Affairs, 2018). Depression symptoms were assessed using the 10-item short form of the Center for Epidemiologic Studies Depression (CESD-10) scale (Andresen, Malmgren, Carter, & Patrick, 1994). Each item has response options in the range 0 (*rarely or none of the time*) through 3 (*all of the time*). Example items include “I was bothered by things that usually don’t bother me” and “I felt that everything I did was an effort.” Two items are reverse coded (“I was hopeful about the future” and “I was happy”) so that increased frequency corresponds to a lower value. Scores were generated using the sum of all items. Per guidelines, scores greater than or equal to 10 are considered to indicate significant depressive symptoms ($\alpha = .830$; Zhang et al., 2012).

Academic environment outcomes. Academic disengagement was assessed using a modified five-item instrument adapted from Ramos’ (2000) eight-item school avoidance instrument that was influenced by Hanisch and Hulin’s (1990) measure of job withdrawal (Administrator Researcher Campus Climate Consortium [ARC3], 2016; Huerta, Cortina, Pang, Torges, & Magley, 2006; Silverschanz et al., 2008). The average of all items was totaled into an academic disengagement score; the higher the average, the greater the disengagement ($\alpha = .642$; the low reliability is comparable with that seen in similar studies [ARC3, 2016]). Feelings of safety in the campus environment were assessed using a modified eight-item instrument based on Furlong (1996). The average of all items was totaled into a general safety score; the higher the average, the greater sense of safety ($\alpha = .843$).

Independent Variables

Several independent variables were included in the analyses that included demographic and environmental factors. Demographic questions were

adapted from the Johns Hopkins “It’s on Us” survey (Campbell et al., 2017). Demographic questions included sexual orientation (“*What is your sexual orientation?*”), gender (“*What is your current gender identity?*”), and race/ethnicity (“*Describe your race/ethnicity. Please check all that apply.*”). Students were presented with sexual orientation response options: gay, lesbian, bisexual, asexual, heterosexual/straight, queer, or a sexual orientation not listed (which included an open-ended response). Sexual orientation responses were aggregated into five categories to improve statistical power: heterosexual ($n = 14,958$), gay/lesbian ($n = 539$), bisexual/pansexual ($n = 816$), asexuality spectrum ($n = 207$), and additional sexual orientations ($n = 224$). Additional sexual orientations included students responding with “queer” or an open-ended response not already accounted for by the previous categories. Students were presented with several response options for gender identity including the following: female, male, transgender female, transgender male, gender queer, gender-nonconforming, intersex, two-Spirit, or other (which included an open-ended response). Gender was aggregated into three categories also to improve statistical power: female ($n = 10,679$), male ($n = 5,912$), and transgender/gender-nonconforming (TGGN; $n = 173$).

Environmental and exposure factors were controlled for in the study and included the items of student status (undergraduate or graduate student), age at time of survey, and years since enrolling in their current program at the academic institution.

Data Analysis Strategy

Descriptive and bivariate analyses were conducted using SPSS 25.0. Hurdle models were used to answer the first two research questions. Hurdle models partition a process into a sequence of two stages; the first stage is viewed as part of the process that generates the first occurrence of an event of interest (the hurdle) and the second generates the reoccurrences of the event. Specifically, such models include both a binary logistic regression for the hurdle and a count-based regression for reoccurrences once the hurdle is crossed (Fournier et al., 2012; Mullahy, 1986; Zeileis, Kleibler, & Jackman, 2008). The two-stage approach of hurdle models has been used by the authors to improve understanding of the likelihood (or risk) of experiencing violence (RQ1) and the rate (or extent) of sexually violent acts endured by victims (RQ2; Wood et al., 2018). Due to the multiple sites involved in this study, victimization was modeled using random intercept mixed hurdle models. All models were run in R with the glmmADMB package 0.8.33.

In the present study, to answer RQ1, the risk portion of the hurdle models was fit with a logit link function and binomial distribution. To answer RQ2,

the extent portion of the models was fit using a negative binomial distribution to account for over dispersion. To answer RQ3, PTSD, depression, academic disengagement, and feelings of safety were analyzed using random intercept mixed models, also fit with glmmADMB. PTSD was measured using a threshold and modeled with a logit link function and binomial distribution. Depression and both academic outcomes were measured as scores and were modeled using an identity link and Gaussian distribution. Random intercepts were included in all model specifications to account for campus differences.

To answer the research questions, each model was tested separately in two steps: time at institution, age at first enrollment, student status, and race/ethnicity were entered as covariates/controls in the first step, and gender and sexual orientation were added in the second step. The improvement of the models with the addition of gender and sexual orientation was assessed with the reduction in Akaike information criterion (AIC). Separate models were run at aggregate and detailed levels to maximize insights for gender and sexual orientation. The aggregate models utilize a single, three-category variable to represent gender/sexual orientation (CH male [CHM], CH female [CHF], and GSM), whereas the detailed models specify gender and sexual orientation as main effects and their interactions. The results for the risk and PTSD models are presented as adjusted odds ratios (AORs), the results for the extent models are presented as adjusted rate ratios (ARR), and results for all other models are presented using the estimated model coefficients (B). In addition to the model coefficients, weighted expected marginal means were calculated for all models to assess select comparisons while averaging across controls and other factors. Specifically, post hoc pairwise comparisons were conducted within each model to compare model predictions between gender/sexual orientation groups not immediately discernable from the model coefficients, for example, to compare victimization risk and extent for GSM students to that for CHF students. Similar expected marginal means were calculated for the outcome models with the additional comparison of victimized versus not victimized students. For brevity, results from post hoc comparisons are commented on in the text if significant at .05 with an appropriate Bonferroni-adjustment for the number of paired comparisons.

Results

Model fit was improved across the runs from the intercept-only model to the baseline with controls to the models that included factors for gender and sexual orientation. Table 2 displays the reduction in AIC achieved across the model runs as information was added; all AIC reductions are significant improvements in fit with $p < .001$.

Table 2. Model Fitting Summary (Δ AIC).

	Baseline	Aggregate	Detailed
SV risk	-536.2	-493.9	-505.8
SV extent	-46.8	-13.2	-22.6
PTSD	-47.6	-414.7	-421.2
Depression	-362.0	-691.4	-774.2
Disengage	-2,448.0	-369.8	-361.8
Safety	-118.4	-901.4	-982.8

Note. SV = sexual violence; PTSD = posttraumatic stress disorder; AIC: Akaike information criterion.

Tables 3 and 4 display results, respectively, for the aggregated gender/sexual orientation models and the detailed gender/sexual orientation models. The estimated marginal outcomes (probabilities, counts, and means) are commented on in the narrative if their Bonferroni-adjusted significance $< .05$. In each table, results are organized into columns to address RQ1 (risk of victimization), RQ2 (extent of victimization), and RQ3 (health and academic outcomes).

Risk Effects—Research Question 1

At the aggregate level (Table 3), gender/sexual orientation emerged as a significant predictor of sexual victimization risk: compared with CHMs, CHF students (AORs = 2.64, $p < .001$) and GSM students (AORs = 2.97, $p < .001$) experienced significantly higher risk of victimization. GSM students' risk for victimization significantly increased the more time they spent at their institution (AOR = 1.10, $p = .046$). Post hoc comparisons of the odds ratio for the expected marginal probability of victimization indicate that GSM students are more likely to be victimized than CHFs (AOR = 1.20, $p = .004$). In the detailed models (Table 4), gender emerged as a significant predictor of sexual victimization risk: compared with males, females (AOR = 2.80, $p < .001$) and TGGN (AOR = 3.36, $p = .018$) students are at significantly greater risk of experiencing sexual victimization. Sexual orientation also emerged as a significant risk factor: students who identified as gay/lesbian (AOR = 3.23, $p < .001$), bisexual/pansexual (AOR = 2.91, $p < .001$), or an additional sexual orientation (AOR = 3.86, $p < .001$) experienced significantly higher risk of victimization compared with CHM participants. Post hoc comparisons with detailed risk mode did not show significantly different levels of risk of sexual violence for TGGN students compared with CHFs. Post hoc comparisons

Table 3. Aggregate Victimization and Outcome Models.

	RQ1		RQ2		RQ3							
	SV Risk		SV Extent		PTSD		Depression		Disengage		Safety	
	AOR	SE	ARR	SE	AOR	SE	B	SE	B	SE	B	SE
Intercept	0.31***	0.15	0.26*	0.59	0.15***	0.11	9.31***	0.20	0.88***	0.02	2.75***	0.05
Age	0.94***	0.01	1.04***	0.01	1.00	0.00	-0.07***	0.01	-0.01***	0.00	-0.01***	0.00
Time	1.13***	0.03	1.05	0.06	0.99	0.03	0.09	0.05	0.04***	0.00	0.00	0.01
Status												
Grad/professional	0.88	0.07	0.55***	0.13	0.81***	0.06	-0.57***	0.11	-0.21***	0.01	0.05***	0.01
Race/ethnicity												
Hispanic/Latinx	0.82**	0.06	0.99	0.09	0.89*	0.06	-0.14	0.12	0.03**	0.01	-0.05***	0.01
Black	0.85	0.11	0.87	0.20	0.84	0.10	-0.27	0.20	0.04**	0.02	-0.12***	0.02
Asian	0.59***	0.08	0.65**	0.13	1.01	0.07	0.20	0.13	0.05***	0.01	-0.12***	0.01
Multi	1.06	0.09	0.89	0.15	1.13	0.08	0.35	0.18	0.05**	0.01	-0.06**	0.02
Other	1.20	0.14	1.30	0.25	1.33*	0.13	0.66*	0.29	0.04	0.02	-0.08**	0.03
Gender/sexual orientation (SO)												
CHF	2.64***	0.08	1.25	0.16	1.24**	0.07	0.70***	0.12	-0.05***	0.01	-0.29***	0.01

(continued)

Table 3. (continued)

	RQ1			RQ2			RQ3							
	SV Risk			SV Extent			PTSD		Depression		Disengage		Safety	
	AOR	SE		ARR	SE		AOR	SE	B	SE	B	SE	B	SE
Gender/sexual minority	2.97***	0.10		1.74**	0.20		1.97***	0.09	2.51***	0.20	0.03	0.02	-0.23***	0.02
Gender/SO x Time														
CHF x Time	1.04	0.03		1.08	0.07		1.04	0.03	-0.12*	0.06	0.00	0.01	0.01	0.01
GSM x Time	1.10*	0.05		1.06	0.09		0.98	0.04	0.05	0.10	0.01	0.01	-0.01	0.01
Victimization														
Victim							2.24***	0.13	1.75***	0.28	0.18***	0.02	-0.07*	0.03
Gender/SO x Victimization														
CHF x Victim							1.02	0.14	0.09	0.32	-0.02	0.03	0.03	0.03
GSM x Victim							1.24	0.17	0.92*	0.41	0.00	0.03	-0.04	0.04

Note. Additional races refer to American Indian, Alaskan Native, and Pacific Islander identities. RQ = Research question; SV = sexual violence; PTSD = posttraumatic stress disorder; AOR = adjusted odds ratios; ARR = adjusted rate ratios; GSM = gender and sexual minority; CHF = cisgender and heterosexual female.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4. Detailed Victimization and Outcome Models.

	RQ1		RQ2		RQ3							
	SV Risk		SV Extent		PTSD		Depression		Disengage		Safety	
	AOR	SE	ARR	SE	AOR	SE	B	SE	B	SE	B	SE
Intercept	0.29 ^{***}	0.15	0.31 ^{**}	0.45	0.14 ^{***}	0.11	9.34 ^{***}	0.19	0.88 ^{***}	0.02	2.75 ^{***}	0.05
Age	0.94 ^{***}	0.01	1.03 ^{***}	0.01	1.01	0.00	-0.07 ^{***}	0.01	-0.01 ^{***}	0.00	-0.01 ^{***}	0.00
Time	1.17 ^{***}	0.01	1.12 ^{***}	0.03	1.01	0.01	0.03	0.03	0.04 ^{***}	0.00	0.01 ^{**}	0.00
Status												
Grad/professional	0.88	0.07	0.58 ^{***}	0.13	0.81 ^{***}	0.06	-0.57 ^{***}	0.11	-0.21 ^{***}	0.01	0.05 ^{***}	0.01
Race/ethnicity												
Hispanic/Latinx	0.82 ^{**}	0.06	1.00	0.09	0.89	0.06	-0.11	0.12	0.03 ^{**}	0.01	-0.08 ^{**}	0.03
Black	0.85	0.11	0.90	0.19	0.85	0.10	-0.25	0.20	0.04 ^{**}	0.02	-0.05 ^{***}	0.01
Asian	0.60 ^{***}	0.08	0.66 ^{**}	0.13	1.02	0.07	0.23	0.13	0.05 ^{***}	0.01	-0.12 ^{***}	0.02
Multi	1.08	0.09	0.86	0.15	1.13	0.08	0.32	0.18	0.05 ^{**}	0.01	-0.11 ^{***}	0.01
Other	1.19	0.14	1.41	0.25	1.34 [*]	0.13	0.69 [*]	0.29	0.04	0.02	-0.06 ^{**}	0.02
Victimization												
Victim					2.24 ^{***}	0.12	1.66 ^{***}	0.26	0.19 ^{***}	0.02	-0.08 [*]	0.03
Gender												
Female	2.80 ^{***}	0.06	1.42 ^{**}	0.11	1.29 ^{***}	0.05	0.54 ^{***}	0.10	-0.05 ^{***}	0.01	-0.28 ^{***}	0.01
TGGN	3.36 [*]	0.51	0.28	0.84	1.35	0.52	1.38	1.12	-0.07	0.09	-0.17	0.11
Sexual orientation (SO)												
Gay/lesbian	3.23 ^{***}	0.15	0.73	0.25	1.94 ^{***}	0.15	1.76 ^{***}	0.34	0.04	0.03	-0.10 ^{**}	0.03
Bisexual/pansexual	2.91 ^{***}	0.21	0.94	0.36	1.21	0.23	2.61 ^{***}	0.45	0.09 [*]	0.04	0.02	0.05
Asexual	0.90	0.61	3.13	1.2	1.69	0.37	2.00 [*]	0.80	-0.02	0.07	-0.13	0.08

(continued)

Table 4. (continued)

	RQ1		RQ2		RQ3		RQ3		Safety			
	SV Risk		SV Extent		PTSD		Depression		Disengage			
	AOR	SE	ARR	SE	AOR	SE	B	SE	B	SE		
Add. SO	3.86 ^{***}	0.34	1.87	0.59	0.83	0.41	0.23	0.76	0.04	0.06	-0.20 ^{***}	0.08
Gender x Sexual orientation												
Female x Gay/lesbian	0.24 ^{***}	0.26	1.34	0.46	0.66	0.23	-0.23	0.51	0.00	0.04	0.16 ^{**}	0.05
Female x Bi/pan	0.59 [*]	0.23	1.67	0.39	1.45	0.24	-0.16	0.50	0.02	0.04	-0.01	0.05
Female x Asexual	0.96	0.65	0.45	1.27	0.65	0.43	-0.18	0.94	0.01	0.08	0.03	0.10
Female x Add. SO	0.32 ^{**}	0.40	0.46	0.69	1.98	0.44	1.85 [*]	0.87	0.08	0.07	0.05	0.09
TGGN x Gay/lesbian	0.48	0.67	14.67 [*]	1.10	1.97	0.65	1.68	1.51	0.00	0.12	-0.18	0.15
TGGN x Bi/pan	0.36	0.65	16.70 [*]	1.10	1.41	0.64	1.25	1.43	0.12	0.12	-0.22	0.14
TGGN x Asexual	0.63	0.93	10.51	1.76	2.58	0.73	5.15 ^{**}	1.67	0.29 [*]	0.14	0.04	0.17
TGGN x Add. SO	0.17 [*]	0.73	7.89	1.27	2.52	0.73	4.24 ^{**}	1.57	0.13	0.13	-0.14	0.16
Gender x Victimization												
Female x Victim					1.02	0.13	0.22	0.29	-0.02	0.02	0.04	0.03
TGGN x Victim					0.99	0.42	1.12	1.05	-0.01	0.09	0.02	0.11
Sexual orientation x Victimization												
Gay/lesbian x Victim					1.12	0.25	0.43	0.61	0.00	0.05	0.01	0.06
Bisexual/pansexual x Victim					1.12	0.18	0.41	0.44	0.01	0.04	-0.05	0.05
Asexual x Victim					1.83	0.43	1.87	1.06	0.05	0.09	-0.19	0.11
Add. SO x Victim					1.39	0.35	1.31	0.87	-0.02	0.07	-0.11	0.09

Note. Additional races refer to American Indian, Alaskan Native, and Pacific Islander identities. RQ = Research question; SV = sexual violence; PTSD = posttraumatic stress disorder; AOR = adjusted odds ratios; ARR = adjusted rate ratios; TGGN = transgender/gender-nonconforming.

* $p < .05$. ** $p < .01$. *** $p < .001$.

with the detailed risk model for sexual orientation revealed that bisexual/pansexual students have greater risk of sexual violence than gay/lesbian students (AOR = 1.60, $p = .022$).

Extent Effects—Research Question 2

Gender and sexual orientation emerged as significant factors in both the aggregate and detailed models predicting the number of sexually violent behaviors experienced. In the aggregate model (Table 3), GSM students experienced greater extent of victimization than CHM students (ARR = 1.74, $p = .007$). It is worth noting that, while not significant at 0.05, the estimates for CHF students were consistent with those for GSM students (ARR = 1.25). Post hoc comparisons of the expected number of sexually violent behaviors experienced indicate that GSM students are expected to experience more of such behaviors than CHFs (ARR = 1.35, $p = .007$). In the detailed model (Table 4), female students experienced more sexually violent acts than male students (ARR = 1.42, $p = .001$). Sexual orientation did not produce any significant main effects; however, TGGN gay/lesbian (ARR = 14.67, $p = .014$) and TGGN bisexual/pansexual (ARR = 16.70, $p = .010$) participants experienced significantly elevated extent of victimization compared with CHM students. Post hoc comparisons with detailed extent model did not predict significantly different expected numbers of sexual violent behaviors for TGGN student compared with female students or between various minority sexual orientations.

Outcomes—Research Question 3

Health outcomes: PTSD and depression. In the aggregate and detailed models (see Tables 3 and 4), CHF and GSM students were significantly more likely to experience PTSD and have more depressive symptoms than CHM students. Specifically, in the aggregate models, CHF and GSM students (Table 3) were significantly more likely to experience PTSD (CHF AOR = 1.24, $p = .001$; GSM AOR = 1.97, $p < .001$) and had more depressive symptoms than CHM students (CHF $b = 0.70$, $p < .001$; GSM $b = 2.51$, $p < .001$). In addition, independent of gender identity and sexual orientation, sexual violence victimization increased the likelihood of experiencing PTSD (AOR = 2.24, $p < .001$) and depressive symptoms ($b = 1.75$, $p < .001$). For GSM students, in particular, victimization further increased depression symptoms ($b = 0.92$, $p = .025$). Post hoc comparisons, separately among victims and non-victims, indicate that GSM students are more likely to experience PTSD symptoms and have more depressive symptoms than CHF students

(non-victims, PTSD AOR = 1.49, $p < .001$; victims PTSD AOR = 1.82, $p < .001$; non-victims, depression estimate = 2.03, $p < .001$; victims depression estimate = 2.85, $p < .001$).

The effect of victimization in the detailed models was similar for PTSD (AOR = 2.24, $p < .001$) and depressive symptoms ($b = 1.66$, $p < .001$). However, in the detailed models (Table 4), female (but not TGGN) students were significantly more likely to have PTSD than male students (AOR = 1.29, $p < .001$) and have more depressive symptoms than male students ($b = 0.54$, $p < .001$). It is worth noting that, though not significant at 0.05, the estimates for TGGN students were consistent with those for female students (PTSD AOR = 1.35 and depressive symptoms $b = 1.38$). Gay/lesbian students were significantly more likely to have PTSD than CH students (AOR = 1.94, $p < .001$). Likewise, gay/lesbian ($b = 1.76$, $p < .001$), bisexual/pansexual ($b = 2.61$, $p < .001$), and asexual students ($b = 2.00$, $p = .012$) reported significantly more depressive symptoms. No significant post hoc comparisons for the detailed models emerged.

Academic environment outcomes: Safety and disengagement. At the aggregate level (Table 3), sexual violence victimization was associated with higher disengagement ($b = 0.18$, $p < .001$) and lower feelings of safety ($b = -0.07$, $p = .016$). Furthermore, CHF and GSM students reported feeling significantly less safe on campus (CHF $b = -0.29$, $p < .001$, GSM $b = -0.23$, $p < .001$) than CHM students; however, only CHF students reported significantly higher academic disengagement ($b = -0.05$, $p < .001$). Post hoc comparisons, separately among victims and non-victims, indicate that GSM students are expected to be more disengaged than CHF students (non-victims, disengagement estimate = 0.09, $p < .001$; victims disengagement estimate = 0.11, $p < .001$). Post hoc comparisons for perceptions of safety among victims and non-victims were not significantly different for GSM students compared with CHF students.

In the detailed models (Table 4), sexual violence victimization was associated with higher disengagement ($b = 0.19$, $p < .001$) and lower feelings of safety ($b = -0.08$, $p < .05$). Furthermore, female students reported feeling significantly less safe on campus ($b = -0.28$, $p < .001$) and having less academic disengagement ($b = -0.05$, $p < .001$) than male students. Gay/lesbian students reported feeling significantly less safe on campus ($b = -0.10$, $p = .004$) than CH students. This sexual orientation effect was moderated by an interaction with gender (Table 4), such that female gay/lesbian students reported feeling safer on campus than CHM students ($b = 0.16$, $p = .002$). Bisexual/pansexual students reported significantly more academic disengagement compared with CH students ($b = 0.09$, $p = .020$). Additional sexual

orientation students reported feeling significantly less safe on campus ($b = -0.20$, $p = .009$). No significant post hoc comparisons emerged for the detailed models.

Discussion

The minority stress model (Meyer, 1995; Murchison et al., 2017) frames the current study to examine the risk and extent of sexual violence among GSM students relative to their CHM and CHF peers at eight institutions within a university system. Consistent with prior literature (see Baker et al., 2016; Coulter et al., 2017; Sigurvinsdottir & Ullman, 2015), model results indicate that GSM and CHF students are expected to experience high rates of sexual violence (they are 3.0 and 2.6 times as likely, respectively, to experience sexual violence compared with CHM students). In addition, GSM students are more likely to be victimized than CHFs (AOR = 1.20, $p = .004$). Although direct comparisons are impossible due to differences in study designs and sampling specifics, the current study corroborates that risk ratios for GSM and CH students are multiples of the risk of sexual violence among CHM students. Furthermore, the current study expands prior literature with information about the extent of violence endured by victims. Namely, GSM students experiencing sexual violence are also expected to experience a greater number of sexually violent acts over their college career compared with victimized CHM students (74% more). GSM students are also expected to experience more sexually violent behaviors than CHFs (ARR = 1.35, $p = .007$). Note that the estimated rate of experiencing sexually violent acts for victimized CHF students was also positive ($b = 1.25$) but statistically indistinguishable from the rate for victimized CHM students ($p = .158$).

As expected, the risk of victimization increased over time (13% per year for CHM students), but there was also a significant moderating effect of time at institution, where GSM students are predicted to experience an additional (10%) increase in risk of victimization per year the longer they attended their institution compared with CHM students. It is noteworthy that the predicted increase in risk over time for CHF students, while also positive (4%), was not significantly different than the baseline increase in risk predicted over time for CHM students ($p = .26$). Although the effect of being a graduate or professional student compared with being an undergraduate was not significant, age at enrollment was significant, showing a protective effect for risk of victimization (6% reduction) paired with an increase in extent (4%), if victimized. When adjusted for graduate/professional status, as mentioned, risk is not predicted to change significantly, but the rate of experiencing sexually violent

behaviors, if victimized, decreases significantly (a 45% reduction compared with undergraduates).

When sexual violence occurs, so do elevated mental health and academic challenges, with GSM students experiencing more deleterious health outcomes than CHF students, who in turn experienced more deleterious health outcomes than CHM students. GSM and CHF students were more likely to have PTSD symptoms and experience more severe depression symptoms than CHM students. GSM students experienced significantly higher rates of PTSD symptoms, worse depressive symptoms, and greater disengagement than CHF students. In addition, GSM student status moderated the relation between sexual victimization and number of depressive symptoms reported, with GSM victims experiencing more depression symptoms above and beyond their CH peers. As previously discussed, higher rates of depressive symptoms among GSM students compared with CH peers has been heavily documented regardless of sexual victimization.

The detailed models suggested similar trends in victimization and outcomes among particular diverse sexual orientations and gender identities as the aggregate models, though many of these findings did not rise to the level of statistical significance. Gender significantly moderated effects of sexual orientation on both victimization and the outcomes. The interaction of gender and sexual orientation lowered the relative risk of victimization for female gay/lesbian and bisexual/pansexual students. Likewise, transgender/gender non-conforming, gay/lesbian, and bisexual/pansexual students experienced a greater extent of sexually violent acts. Overall, the patterns of findings at both the aggregate and detailed levels suggest future research is needed to further understand the impact of stress conditions and characteristics that might impact differential experiences among minorities.

Implications

The finding that more time at the IHE increased risk for experiencing sexual violence differently for GSM students highlights the importance of different temporal patterns in victimization based on gender identity and sexual orientation. For example, a student's risk of victimization or, if victimized, their victimization trajectory may increase or decrease at different stages of their gender/sexual identity development, especially when examining the unique developmental milestones faced by GSM students (e.g., family rejection, transitioning, and discovery of community). Minority stress, such as internalized homophobia, has been found to be associated with increased risk of experiencing sexual violence (Murchison et al., 2017). Consistent with the conceptualization of minority stress theory, minorities' responses to

exposures of “structural stressors” will vary widely (Brooks, 1981, p. 76); however, negative responses such as internalized homophobia or transphobia and isolation can be mitigated by a sense of GSM community. In fact, a sense of GSM community has been shown to serve as a protective factor for sexual assault in general populations (Murchison et al., 2017). More research is needed to understand if these patterns extend to GSM student populations and how different GSM identities may affect trajectories of victimization. In addition, regardless of victimization history, GSM students may have complicated and difficult relationships with their IHEs. Beyond their impact on sexual violence, socio-environmental factors such as homophobia and transphobia at IHEs, as well as childhood bullying and maltreatment among GSM students, often result in lower social and academic integration, which in turn decreases academic success and increases risk of dropping out (Duncan, 2000; Hammig & Jozkowski, 2013; Harper & Quaye, 2009; Woodford & Kulick, 2014). Campus sexual violence resources can inadvertently perpetuate heteronormative bias and discourse (e.g., implementing curricula that only address heterosexual relationships), further alienating GSM students (Worthen & Wallace, 2017). GSM students, however, display resilience in the face of these obstacles. When their environments include social support from mentors and peers, this can encourage academic persistence and protect against some of the effects of pervasive institutional discrimination (Alessi, Sapiro, Kahn, & Craig, 2017; Fine, 2016; Schmidt, Miles, & Welsh, 2011).

Limitations

First, this is a study of students at IHEs. Experiences endured and consequent impacts among other populations may be different. In addition, because this study uses a cross-sectional, regression-based design, it is not possible to determine causation or establish temporal order, and thus, we therefore cannot definitively conclude that experiences of sexual victimization precipitated differences in PTSD and depression symptomology, academic engagement, and feelings of safety. Although this article draws on minority stress theory to discuss findings, the overarching study used an ecological framework (see Busch-Armendariz et al., 2017a, 2017b and Wood et al., 2018). Future research should attempt to explore beyond correlational outcomes and consider using minority stress theory as a guiding framework where instruments for measuring internalized homophobia and transphobia are included in the survey. This study also leaves several gaps with respect to understanding diverse populations. Disability, intersex status, class, religion, citizenship status, and other important factors were not available for analysis. Furthermore, sample sizes for several smaller groups of GSM students did

not allow for adequate statistical power for all analyses, limiting the ability to draw conclusions about the intersection of gender, sexual orientation, and race with sexual violence. Future research should explore these topics through targeted sampling with methods and analyses committed to an intersectional approach (see Else-Quest & Hyde, 2016). Notably, an analytic approach that includes a comprehensive assessment of the many intersecting identities in specific populations would amplify the lived experiences within a community (de Heer & Jones, 2017; Porter & Williams, 2011). Furthermore, additional health and educational outcomes should be considered to better illuminate their interaction with other adverse symptoms and sexual violence, for example, changes in resilience and decisions to change program of study after experiencing sexual violence. Last, the present analysis only just begins to address the complexities of age at enrollment, undergraduate versus graduate/professional student status, and time in the program of study. Future research might address the varying contexts associated with different programs of study at different life stages. Wood et al. (2018), in a related study of sexual harassment, included a status factor with a level for nontraditional student as means of beginning to examine these complexities. That factor was not included in the present study due to the focus in our research questions on gender identities and sexual orientation.

Conclusion

GSM students are at increased risk for sexual violence and increased risk for experiencing subsequent sexual violence compared with their CH peers. Furthermore, results indicate that GSM students who experience sexual violence victimization report more mental health problems and negative academic outcomes. These factors contribute to, and may arise from, the ongoing marginalization of GSM students. Previous research has examined the role of social and environmental stressors, such as stigma, heterosexism, and harassment, on GSM students' mental health and well-being (Woodford, Kulick, & Atteberry, 2015). IHE-based interventions aimed at reducing victimization must also address barriers for GSM students, such as underlying sociocultural and environmental factors that increase vulnerability and harm. IHE's must recognize the strength and resilience of GSM students and consider the protective potential of social and community support when developing programs or interventions for diverse populations. Continued research in this area can further illuminate the academic and health impacts of GSM students that have experienced sexual and other forms of victimization. Culturally competent interventions and effective community mobilization at IHEs are

essential to advancing practice and scholarship on violence among GSM students and CH students alike.

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