



Sexual and Gender Minority Youth Alcohol Use: Within-Group Differences in Associations with Internalized Stigma and Victimization

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Abstract

Sexual and gender minority (SGM) youth are more likely to use alcohol than their heterosexual cisgender peers. At the same time, SGM youth experience sexuality- and gender identity-specific stressors known to exacerbate negative health outcomes. Though scholars have established a link between minority stressors (e.g., internalized stigma and victimization) and increased alcohol use for SGM youth as a whole, there is little indication of whether internalized stigma and victimization are more strongly associated with alcohol use for specific groups of SGM youth. A United States sample of 11,811 racially and geographically diverse 13–17 year old SGM youth was used to employ a series of gender-stratified multivariable regression models to examine the association among internalized stigma, victimization, and alcohol-related behaviors, and whether they differed for specific groups of sexual minority youth. Sexual orientation moderated several associations between sexual minority stressors (i.e., victimization and stigma) and youth's alcohol use (i.e., recent use and heavy episodic drinking) across models stratified by gender (i.e., male, female, and non-binary). For example, bisexual boys had stronger associations between SGM-specific victimization and alcohol use frequency and heavy episodic drinking relative to gay boys; conversely, victimization and alcohol use frequency were more weakly associated among bisexual girls relative to lesbian/gay girls. Pansexual girls showed weaker associations between internalized stigma and alcohol use frequency compared to lesbian/gay girls. This paper demonstrates who among SGM youth are more likely to engage in alcohol-related behaviors as a function of differential forms of SGM-related victimization and stigma. These findings can inform substance use interventions that are tailored to youth of diverse sexual orientations and gender identities.

Keywords Sexual gender minority · Internalized stigma · Bisexual health · Heavy episodic drinking

Introduction

Although rates of adolescent alcohol use have declined in recent years, there remain significant disparities and

concerns for elevated use and misuse among vulnerable populations (Day et al. 2017). Contemporary scholarship has documented that sexual (e.g., gay, lesbian, bisexual) and gender (e.g., transgender, non-binary) minority (SGM) youth are at a disproportionate risk for alcohol use compared to their heterosexual and cisgender counterparts (Bos et al. 2016; Day et al. 2017; Eisenberg et al. 2017; Fish et al. 2016; Fish and Baams 2018; Reisner et al. 2014; Watson et al. 2019a). At the same time, subgroups among SGM youth have been found to use alcohol at different levels; for example, bisexual youth show uniquely high risk for alcohol use and misuse (Marshal et al. 2008; Talley et al. 2014) and sexual orientation disparities in substance use are more consistently identified and robust among girls/women relative to boys/men (Hughes et al. 2016).

Specific to gender minority youth, disparities in alcohol use and misuse are not as consistent. In a systematic review

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on alcohol use among transgender people, Gilbert et al. (2018) noted that the prevalence of binge drinking across studies ranged from 7–61%. However, studies are mixed on whether rates statistically differ between transgender and cisgender subgroups. Two recent studies documented gender identity disparities in alcohol use among youth: In a population-based sample of young people Day and colleges (2017) found past 30-day heavy episodic drinking use was three times higher among transgender (26.96%) compared to non-transgender (8.57%) youth. Similarly, Eisenberg et al. (2017) found a higher prevalence of past 30-day alcohol use among transgender and gender non-conforming youth (23.4%) compared to their cisgender (17.1%) counterparts. However, Coulter et al. (2015) found that past 2-week heavy episodic drinking did not statistically differ between non-transgender-identified males (40.9%) and transgender-identified (27.4%) participants. In Gilbert et al. (2018) systematic review, only one study investigated subgroup differences in substance use among transgender people: In that study, Smalley et al. (2016) found no differences in alcohol use or heavy episodic drinking among transgender men, transgender women, and genderqueer/non-binary individuals.

Given that heavy alcohol use is associated with numerous negative health outcomes across the lifespan (Pitkänen et al. 2008), it is important to document how different SGM-specific risk factors contribute to alcohol use and whether the impact of these risk factors differ among specific subgroups of SGM youth (e.g., by gender, sexual orientation). Previous scholarship has been mixed on identifying differences in alcohol use among transgender and non-binary subgroups, and it has been limited in testing differential mechanisms of alcohol use among SGM youth. As such, this paper investigated how two risk factors—internalized stigma and victimization specific to SGM status—were related to recent alcohol use and heavy episodic drinking among a large, diverse sample of SGM adolescents.

Diverse SGM Youth, Well-being, and Alcohol Use

Evidence supports that some SGM subgroups are at heightened risk for alcohol use. For example, bisexual girls (Kaestle and Ivory 2012) report disproportionate symptoms of depression and suicidality in comparison to other sexual and gender minority subgroups (Taliaferro et al. 2018). Recent trend studies have found that despite general population declines in underage alcohol use, bisexual youth demonstrate consistently elevated rates of use (Fish et al. 2016). Beyond examining distinct risk between lesbian/gay and bisexual youth, the majority of SGM health scholarship has not been able to consider the unique health experiences of more “emergent” sexual orientation identity groups among contemporary SGM youth (e.g., pansexual, queer,

asexual; see Watson et al. 2019b). Despite the recognition that emergent identities represent a substantial proportion of the SGM youth population, there remains limited scholarship on the health profiles of youth who endorse these emergent identity labels. Because preliminary evidence suggests that subgroups of SGM youth experience stigma and SGM-specific victimization in different ways, there is an urgent need to study not only how subgroups of SGM youth differ in their health, but also the factors that contribute to it.

Victimization and Alcohol Use

Many SGM individuals experience unique forms of chronic stress as a result of harassment, discrimination, violence, and victimization—also referred to as minority stressors (Meyer 2003). This stress oftentimes manifests as problematic externalizing behaviors or unhealthy coping strategies, such as excessive alcohol use. Preliminary evidence indicates that alcohol use is pronounced among SGM youth who are victimized (Marshal et al. 2008). For example, lesbian, gay, bisexual, and queer (LGBQ) youth who experience high levels of victimization also report higher mean levels of alcohol use compared to highly victimized heterosexual youth (Birkett et al. 2009; Bontempo and D’Augelli 2002). Experiences with school-based victimization have also been shown to mediate sexual orientation differences in high-intensity binge drinking among girls (Fish et al. 2018).

At the same time, research has been slow to uncover the degree to which the link between victimization experiences and alcohol use may vary for different subpopulation among SGM youth. Furthermore, the body of research that investigates this process among SGM young people has largely focuses on general victimization—that is, bullying non-specific to sexual orientation or gender identity. Yet, evidence suggests that bias-based harassment, relative to general harassment, is a stronger predictor of substance use among sexual minority youth (Russell et al. 2012). Research that investigates the unique stressors that drive substance use for specific subgroups of SGM youth could be particularly helpful for the development of prevention and intervention strategies tailored for and intentional in reaching these youth. Thus, there is an urgent need to understand how identity-based victimization—a modifiable risk factor—is associated with adolescent alcohol use, and if this process differs for youth on the basis of their own sexual and gender identities.

Internalized Stigma and Alcohol Use

The majority of research documenting links between minority stress and alcohol use among SGM youth focuses on

distal stressors (e.g., enacted stigma such as bias-based victimization; Goldbach et al. 2014; Feinstein et al. 2019; Phillips et al. 2017; Pollitt et al. 2018). However, the minority stress model (Meyer 2003) posits that proximal stressors should also relate to negative health outcomes, including problematic alcohol use. Importantly, internalized stigma is a proximal stressor implicated in SGM health disparities, including substance use, and this internal aspect of stigma may be particularly pronounced among youth as they grapple with understanding their sexuality and gender identity or expression. In a study of adults, greater internalized stigma was associated with more frequent alcohol use among sexual minority women, but not men (Amadio and Chung 2004). Perhaps these gender-based differences can be attributed to differential mechanisms by which minority stressors impact alcohol use, but few studies are able to examine this. In another study, Baiocco et al. (2010) surveyed 119 gay and lesbian youth and found that those who had higher levels of internalized stigma were more likely to report more frequent incidences of binge and heavy drinking. Unfortunately, there are few studies that explore the association between internalized stigma and alcohol use, and even fewer that assess how internalized stigma may represent a unique but concomitant pathway towards alcohol use relative to other forms of minority stress (e.g., victimization, bullying). Considering that minority stress theory implicates both enacted and proximal stressors in relation to health risks such as problematic alcohol use—and that adolescence is a critical yet vulnerable time for youth to explore and assert their SGM identities (Russell and Fish 2019)—it is important to understand how internalized stress and SGM-specific victimization each uniquely contributes to alcohol use among SGM youth. Furthermore, given that some SGM subgroups such as bisexual and pansexual youth can face stigma against their identities from others within the broader SGM community, it is important to consider whether internalized stigma is more strongly associated with alcohol use for some SGM youth relative to others.

Current Study

Despite well-documented sexual orientation and gender identity disparities in alcohol use, scholars remain uninformed as to how different minority stressors relate to alcohol use for diverse groups of SGM youth. In this study, a large, national dataset ($N = 11,811$) was utilized to explore *a*) gender-stratified association among internalized stigma, victimization, frequency of recent alcohol use, and frequency of heavy episodic drinking and *b*) potential differences in the strength of these associations by sexual orientation. Given previous research noting differences in alcohol use by gender

and sexual orientation (e.g., Kaestle and Ivory 2012), it was hypothesized that direct, positive effects would be found among internalized stigma, SGM-specific victimization, and alcohol use, but that the magnitudes would differ by specific sexual identity. For example, it was hypothesized that bisexual youth would report elevated rates of alcohol use and heavy episodic drinking given the previous studies that highlight more robust sexual orientation disparities for this group, relative to lesbian/gay youth.

Methods

Study Design, Participant Recruitment, and Data Cleaning Procedures

Data are from the *LGBTQ National Teen Survey*. Responses were collected anonymously through Qualtrics between April and December 2017. Participants were eligible if they identified as a sexual and/or gender minority, were 13–17 years of age, and lived in the United States. The Human Rights Campaign (HRC) assisted in recruiting a sample via their social media networks (e.g., Facebook and Twitter), community-based organizations, and word-of-mouth. Informed assent was received from adolescents through the online Study Information sheet. Researchers were granted a waiver of parental consent by the University of Connecticut Institutional Review Board. Participants were compensated for their time with free HRC wristbands and entry into a drawing for Amazon.com gift cards. More information regarding the study design can be found elsewhere (Puhl et al. 2019; Watson et al. 2019b).

In the data cleaning procedure, duplicate responses were eliminated by examining survey responses with identical unique identifiers provided by Qualtrics.com (in which one survey response originated from the same Qualtrics unique ID as another). When it was apparent that the same participant began a survey which they later terminated, and then started a new survey, the more complete survey for data analysis was used. To ensure data quality, suspicious entries were deleted (such as participants who entered expletives in all open-ended response boxes, $n = 79$). The survey was designed to prevent bots from completing the survey; in addition, a post-hoc sensitivity analysis for mischievous responders (Robinson-Cimpian 2014) was conducted after excluding suspicious responses manually. On average, adolescents spent 28 min taking the online survey.

Sample

In the current study, a subsample ($N = 11,811$) of the larger project was used. Adolescents who completed at least 50%

of the full survey items and were not missing responses on all variables of interest were included. Respondents were from all 50 states across the United States. Many youth were White (65%), followed by multiracial (13%), and Latino (10%). Approximately 18% of adolescents resided in the Northeast, 23% in the Midwest, 36% in the South, and 21% in the West. Overall, the most common sexual orientation identity label endorsed by adolescents was lesbian/gay (37%). See Table 1 for full sample demographics.

Measures

Gender identity

One check-all-that-applies item asked whether participants were male, female, transgender boy, transgender girl, non-binary, genderqueer, or another identity not listed. A gender identity variable was created to stratify our analytic models. Three categories—boys, girls, and non-binary youth—were

Table 1 Demographic characteristics of sample

	Girls (Total <i>N</i> = 5286) <i>N</i> (%)	Boys (Total <i>N</i> = 3329) <i>N</i> (%)	Non-binary (Total <i>N</i> = 2910) <i>N</i> (%)
Sexual orientation			
Lesbian/gay	1669 (31.6%)	2023 (60.8%)	726 (24.9%)
Bisexual	2514 (47.6%)	888 (26.7%)	661 (22.7%)
Pansexual	583 (11.0%)	312 (9.4%)	750 (25.8%)
Asexual	224 (4.2%)	–	268 (9.2%)
Queer	162 (3.1%)	–	283 (9.7%)
Questioning	134 (2.5%)	–	100 (3.4%)
Another identity	–	–	122 (4.2%)
Straight	–	106 (3.2%)	–
Race or ethnicity			
White	3469 (65.7%)	2162 (65.0%)	1958 (67.4%)
Biracial or multiracial	667 (12.6)	409 (12.3%)	459 (15.8%)
Hispanic or Latino	548 (10.4%)	392 (11.8%)	237 (8.2%)
Black	274 (5.2%)	159 (4.8%)	88 (3.0%)
Asian	218 (4.1%)	133 (4.0%)	94 (3.2%)
Another identity	84 (1.6%)	55 (1.7%)	54 (1.9%)
Native American	18 (0.3%)	17 (0.5%)	15 (0.5%)
Region			
South	2010 (38.0%)	1161 (34.9%)	1046 (35.9%)
Midwest	1233 (23.3%)	828 (24.9%)	659 (22.6%)
West	1115 (21.1%)	745 (22.4%)	647 (22.2%)
Northeast	928 (17.6%)	595 (17.9%)	558 (19.2%)
Parent education			
Less than high school or GED	133 (2.5%)	145 (4.4%)	64 (2.2%)
High school or GED	573 (10.9%)	491 (14.8%)	345 (11.9%)
Vocational/technical school	148 (2.8%)	129 (3.9%)	88 (3.0%)
Some college	650 (12.3%)	431 (13.0%)	432 (14.9%)
College graduate	1867 (35.4%)	1127 (33.9%)	973 (33.5%)
Postgraduate degree or higher	1680 (31.9%)	841 (25.3%)	827 (28.4%)
Do not know	192 (3.6%)	136 (4.1%)	163 (5.6%)
Does not apply	29 (0.6%)	26 (0.8%)	11 (0.4%)
Gender identity			
Cisgender	5178 (98%)	2517 (75.6%)	–
Transgender	108 (2.0%)	812 (24.4%)	–

Some sexual orientation cell frequencies are not displayed because subgroups were only included only when there were 100+ participants in that subgroup, disaggregated by gender

constructed using the original check-all-that-applies item and an item that asked youth whether they were assigned male or female at birth. For the purposes of this paper, the models for “girls” included cisgender and transgender girls. Models run among “boys” included cisgender and transgender boys. Participants who checked “non-binary” or “genderqueer,” either solely or in combination with other identities, were included in the group of “non-binary” youth.

Alcohol use and heavy episodic drinking frequency

Alcohol use frequency was measured with items from the 2015 YRBS survey (Kann et al. 2016), which asked, “During the past 30 days, on how many days did you have at least one drink of alcohol?” Response options ranged from 0 (0 days) to 6 (all 30 days). Heavy episodic drinking frequency was assessed by asking, “During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?” Response options ranged from 0 (0 days) to 6 (all 30 days).

Internalized stigma

Internalized stigma was assessed using four items adapted from an internalized homophobia scale (see Shidlo 1994). These four items included, “Whenever I think a lot about being LGBTQ, I feel critical of myself”, “I am proud to be a part of the LGBTQ community”, “Whenever I think a lot about being LGBTQ, I feel depressed”, and “I wish I were not LGBTQ.” Response options were 0 (strongly disagree), 1 (disagree), 2 (agree), and 3 (strongly agree). Items were averaged to create a mean score, where higher scores reflect stronger internalized stigma ($\alpha = 0.91$).

Victimization

SGM-specific victimization was measured as an average of two items. Participants were asked, “In your lifetime, how often have any of the following things happened to you because of your sexual orientation identity or because people think you are lesbian, gay, bisexual, transgender, or queer...”; two questions following this stem asked whether participants experienced “verbal insults” or “threats of physical violence.” Response options for both questions ranged from 0 (never) to 3 (3 or more times). Higher average scores indicate more victimization.

Sexual orientation

Participants were asked, “How do you describe your sexual identity?” Participants chose one option from the following: “gay or lesbian”, “bisexual”, “straight, that is, not gay”, or “something else”. Participant who chose “something else”,

were prompted to choose additional options that included “pansexual”, “asexual”, “queer”, or “another sexual orientation.”

Outness

The degree to which youth were out to people in their life (i.e., to whom they had disclosed their sexual orientation) was measured using an adapted version of the Outness Inventory (see Mohr and Fassinger 2000). To produce a general measure of outness, 12 items were averaged that assessed participants’ level of identity disclosure to individuals in a variety of social contexts. Questions began with the phrase, “For each of the following groups, how many people currently do you think know of your sexual orientation? If you don’t have any people like this in your life, please select N/A.” The 12 groups included family members/parents, siblings, grandparents/extended family, LGBTQ friends, non-LGBTQ friends, classmates at school, co-workers, teachers and adults at school, athletic coaches, religious community, new acquaintances, and doctors/health care providers. For each of these social contexts, adolescents could respond with the following options: 0 (none), 1 (a few), 2 (some), 3 (most), and 4 (all). When an adolescent responded “N/A” their value was set to missing for that item.

Ethnoracial identity

One check-all-that-applies item asked participants, “How would you describe yourself?” Response options were, “White, non-Hispanic”, “Non-Latino Black or African American”, “American Indian or Alaska Native”, “Asian or Pacific Islander”, “Latino, Hispanic, or Mexican-American”, and “Something else”. When participants checked more than one box, they were categorized as “Multiracial.”

Parental education

Parental education was measured by the highest value from one of two items that stated, “Please indicate the highest level of education that your first [second] parent/primary caregiver.” Response options were, “Less than high school or GED”, “High school or GED”, “Vocational/Technical School (2 years)”, “Some college”, “College graduate”, and “Postgraduate degree or higher.” These values were recoded to less than high school, high school, some college (including some college and vocational/technical school), and college graduate or more (including college graduate and postgraduate degree or higher).

Age

Participants reported their current age in years.

Region

Participants' region of residence was measured by coding their response to "What state do you live in" to one of four options: "Northeast", "Midwest", "South", and "West."

Analytic Plan

A series of gender-stratified multivariable regression models were conducted to test whether the strength of the association between minority stressors—internalized stigma and SGM-specific victimization—and alcohol use differed for specific groups of sexual minority youth using Mplus 8.3 (Muthén and Muthén 2019). Given the predominant focus on lesbian/gay individuals in the extant literature, they served as the referent group in their respective gender-stratified models. Among boys, the specific groups compared included lesbian/gay, bisexual, straight, and pansexual boys. Among girls, the specific groups compared included lesbian/gay, bisexual, queer, pansexual, asexual, and questioning girls. Among non-binary youth, the specific groups compared were lesbian/gay, bisexual, queer, pansexual, asexual, questioning, and youth who chose a different identity not listed. These differences in the specific sexual orientation groups being compared existed because of the different proportions of boys, girls, and non-binary youth in the sample and the sample sizes of specific sexual orientation identities within each of these gender identity groups.

As preliminary analyses, a MANOVA was conducted to consider sexual orientation-based differences on the two minority stress indicators, SGM-specific victimization and internalized stigma, among girls, boys, and non-binary youth. Follow-up ANOVAs and post-hoc comparisons with Bonferroni adjustments were also conducted to identify statistically significant differences between specific sexual orientation groups.

Next, two linear regression models were tested for each dependent variable (frequency of recent alcohol use and heavy episodic drinking) to assess their association with internalized stigma and SGM-specific victimization. Following this, interactions effects were estimated in four total models, two for each dependent variable of alcohol use. One model considered sexual orientation \times SGM-specific victimization interactions in predicting frequency of alcohol use and another model considered these interactions in predicting heavy episodic drinking. Two final models were comprised of one wherein sexual orientation \times internalized stigma interactions were considered in predicting frequency of alcohol use and one wherein these interactions were considered in predicting heavy episodic drinking. In order to reduce any potential effects of multicollinearity, standardized scores were used for the main effects of

internalized stigma and SGM-specific victimization in the models that included their interaction with sexual orientation. When testing the models with the sexual orientation \times SGM-specific victimization interactions, internalized stigma was retained as a covariate; likewise, SGM-specific victimization was retained as a covariate when testing the models with the sexual orientation \times internalized stigma interactions. Follow-up simple slopes analyses were conducted for the specific groups of sexual minority youth for whom there was a significant interaction in order to probe the significant interaction effects. All models, including follow-up simple slopes analyses, adjusted for race/ethnicity, age, highest parental education, region, and whether youth identified as transgender. Participants who indicated "do not know" or did not respond to the parent education items were recoded as missing. All missing data were handled through multiple imputation in Mplus.

Results

Group Differences on Minority Stressors

Mean level differences in victimization and internalized stigma disaggregated by both sexual and gender identity were explored and presented in Table 2. The MANOVA for sexual orientation differences on SGM-specific victimization and internalized stigma was significant among girls, Wilks' $\Lambda = 0.97$, $F(10, 8848) = 15.39$, $p < 0.001$, $\eta_p^2 = 0.02$. Follow-up ANOVAs indicated that sexual orientation differences were significant for both SGM-specific victimization, $F(5, 4425) = 19.67$, $p < 0.001$, $\eta_p^2 = 0.02$, and internalized stigma, $F(5, 4425) = 8.88$, $p < 0.001$, $\eta_p^2 = 0.01$. Bonferroni post-hoc comparisons showed that lesbian girls reported higher SGM-specific victimization than bisexual ($p < 0.001$, $d = 0.26$), queer ($p < 0.001$, $d = 0.33$), asexual ($p < 0.001$, $d = 0.50$), and questioning ($p < 0.001$, $d = 0.50$) girls; and pansexual girls reported higher SGM-specific victimization than bisexual ($p = 0.03$, $d = 0.15$), queer ($p < 0.02$, $d = 0.32$), asexual ($p < 0.001$, $d = 0.38$), and questioning ($p = 0.01$, $d = 0.38$) girls. Bonferroni post-hoc comparisons also showed that questioning girls reported higher internalized stigma than lesbian ($p < 0.001$, $d = 0.41$), bisexual ($p = 0.01$, $d = 0.33$), queer ($p < 0.01$, $d = 0.49$) and pansexual ($p < 0.001$, $d = 0.54$) girls; asexual girls reported higher internalized stigma than lesbian ($p = 0.03$, $d = 0.23$) and pansexual ($p < 0.001$, $d = 0.36$) girls; and bisexual girls reported higher internalized stigma than pansexual girls ($p < 0.001$, $d = 0.22$).

The MANOVA for sexual orientation differences on SGM-specific victimization and internalized stigma was significant among boys, Wilks' $\Lambda = 0.97$, $F(6, 5570) = 14.47$, $p < 0.001$, $\eta_p^2 = 0.02$. Follow-up ANOVAs indicated

Table 2 Average levels of reported minority stressors (Mean/Standard Deviation)

	Lesbian/gay	Bisexual	Pansexual	Asexual	Queer	Questioning	Straight	Another ID
Female								
Victimization	2.03 (1.78)	1.57 (1.70)	1.84 (1.88)	1.20 (1.54)	1.30 (1.52)	1.19 (1.58)	–	–
Internalized stigma	0.72 (0.64)	0.78 (0.61)	0.65 (0.61)	0.86 (0.58)	0.69 (0.54)	0.99 (0.66)	–	–
Male								
Victimization	2.76 (1.93)	2.47 (1.94)	3.42 (2.75)	–	–	–	2.67 (1.75)	–
Internalized stigma	0.89 (0.71)	1.03 (0.71)	0.87 (0.61)	–	–	–	1.17 (0.71)	–
Non-binary								
Victimization	2.92 (1.94)	2.67 (1.87)	2.89 (1.92)	2.39 (1.99)	2.76 (1.87)	2.36 (1.92)	–	2.89 (1.87)
Internalized stigma	0.81 (0.64)	0.91 (0.64)	0.78 (0.62)	0.89 (0.66)	0.81 (0.57)	0.99 (0.64)	–	0.82 (0.61)

Values represent means and standard deviations (in parentheses)

that sexual orientation differences were significant for both SGM-specific victimization, $F(3, 2786) = 15.24, p < 0.001, \eta_p^2 = 0.02$, and internalized stigma, $F(3, 2786) = 10.98, p < 0.001, \eta_p^2 = 0.01$. Bonferroni post-hoc comparisons showed that pansexual boys reported higher SGM-specific victimization than lesbian/gay ($p < 0.001, d = 0.33$) bisexual ($p < 0.001, d = 0.47$) or straight ($p < 0.01, d = 0.40$) boys; and lesbian/gay boys reported higher SGM-specific victimization than bisexual boys ($p < 0.01, d = 0.14$). Bonferroni post-hoc comparisons also showed that bisexual boys reported higher internalized stigma than lesbian/gay ($p < 0.001, d = 0.20$) and pansexual ($p < 0.01, d = 0.24$) boys; and straight boys reported higher internalized stigma than lesbian/gay ($p = 0.001, d = 0.39$) and pansexual ($p < 0.01, d = 0.45$) boys.

The MANOVA for sexual orientation differences on SGM-specific victimization and internalized stigma was significant among non-binary youth, Wilks' $\Lambda = 0.98, F(12, 5054) = 3.85, p < 0.001, \eta_p^2 = 0.01$. Follow-up ANOVAs indicated that sexual orientation differences were significant for both SGM-specific victimization, $F(6, 2528) = 3.66, p = 0.001, \eta_p^2 = 0.01$, and internalized stigma, $F(6, 2528) = 3.47, p < 0.001, \eta_p^2 = 0.01$. Bonferroni post-hoc comparisons showed that lesbian/gay non-binary youth reported higher SGM-specific victimization than asexual youth ($p < 0.01, d = 0.27$), and pansexual non-binary youth reported higher SGM-specific victimization than asexual youth ($p = 0.01, d = 0.26$). Bonferroni post-hoc comparisons also showed that bisexual non-binary youth reported higher internalized stigma than pansexual non-binary youth ($p = 0.01, d = 0.20$).

Minority Stress, Youth Characteristics, and Recent Alcohol Use

With regards to our hypothesis on the associations between minority stress and alcohol use, the results among girls (Table 3) indicated that both internalized stigma and SGM-

specific victimization were positively and uniquely related to the frequency of alcohol use and heavy episodic drinking. Notably, among girls, bisexual youth reported more frequent alcohol use, but not heavy episodic drinking, relative to lesbian/gay girls. Asexual girls reported less frequent heavy episodic drinking than lesbian/gay girls. There were no transgender identity-based differences in frequency of alcohol use or heavy episodic drinking among girls.

Similarly, for boys, SGM-specific victimization and internalized stigma were positively and uniquely related to the frequency of alcohol use and heavy episodic drinking (Table 4). However, there were no specific sexual orientation-based differences or transgender identity-based differences in frequency of alcohol use or heavy episodic drinking among boys.

Among non-binary youth, only SGM-specific victimization was positively associated with recent alcohol use and heavy episodic drinking (Table 5). No sexual orientation differences in alcohol use were found among non-binary youth.

Sexual Orientation as a Moderator of the Minority Stress-Alcohol Use Link

Consistent with the hypothesis that the minority stress-alcohol use link associations would differ by sexual identity, results showed that, among girls, the association between SGM-specific victimization and frequency of alcohol use varied significantly by sexual identity (Table 6). The moderation effect was significant for bisexual and queer girls. Follow-up simple slopes analyses revealed that the association between SGM-specific victimization and frequency of alcohol use was stronger in magnitude for lesbian/gay girls ($b = 0.09, SE = 0.02, \beta = 0.17, p < 0.001$) than for bisexual girls ($b = 0.04, SE = 0.02, \beta = 0.06, p = 0.05$), and was not statistically significant for queer girls ($b = -0.08, SE = 0.06, \beta = -0.14, p = 0.17$). Similarly, the association between internalized stigma and frequency of

Table 3 Multivariable regression models testing the main effects of victimization and internalized stigma among girls

	Recent alcohol use			Heavy episodic drinking		
	b (95% CI)	SE	β	b (95% CI)	SE	β
Victimization	0.06 (0.04, 0.08)	0.01	0.11***	0.04 (0.02, 0.05)	0.01	0.10***
Internalized stigma	0.08 (0.02, 0.15)	0.03	0.05*	0.06 (0.01, 0.12)	0.02	0.05*
Bisexual	0.16 (0.07, 0.25)	0.05	0.08***	0.04 (-0.02, 0.11)	0.03	0.03
Queer	-0.04 (-0.25, 0.18)	0.11	-0.01	0.003 (-0.15, 0.15)	0.08	0.001
Pansexual	0.01 (-0.13, 0.14)	0.07	0.002	-0.04 (-0.13, 0.06)	0.05	-0.02
Asexual	-0.23 (-0.46, 0.002)	0.12	-0.04*	-0.18 (-0.34, -0.02)	0.08	-0.04*
Questioning	-0.14 (-0.44, 0.16)	0.15	-0.02	-0.09 (-0.29, 0.12)	0.11	-0.02
Transgender	0.03 (-0.23, 0.29)	0.13	0.01	0.13 (-0.05, 0.31)	0.09	0.03
Black	-0.32 (-0.49, -0.15)	0.09	-0.07***	-0.19 (-0.31, -0.07)	0.06	-0.06**
Asian	-0.17 (-0.39, 0.05)	0.11	-0.03	0.03 (-0.12, 0.19)	0.08	0.01
Hispanic/Latino	0.02 (-0.10, 0.15)	0.07	0.01	0.02 (-0.07, 0.10)	0.05	0.01
Native American	-0.24 (-0.83, 0.34)	0.30	-0.02	-0.09 (-0.50, 0.31)	0.21	-0.01
Multiracial	0.02 (-0.09, 0.14)	0.06	0.01	0.04 (-0.04, 0.12)	0.04	0.02
Another racial/ethnic identity	-0.14 (-0.45, 0.17)	0.16	-0.02	0.07 (-0.14, 0.29)	0.11	0.01
Age	0.15 (0.11, 0.18)	0.02	0.17***	0.08 (0.06, 0.10)	0.01	0.14***
Parent education	-0.01 (-0.06, 0.04)	0.03	-0.01	-0.05 (-0.08, -0.01)	0.02	-0.05**
Midwestern U.S.	-0.14 (-0.26, -0.02)	0.06	-0.06*	-0.02 (-0.10, 0.07)	0.04	-0.01
Southern U.S.	-0.10 (-0.21, 0.01)	0.05	-0.05	-0.04 (-0.11, 0.04)	0.04	-0.03
Western U.S.	-0.08 (-0.20, 0.04)	0.06	-0.03	0.004 (-0.08, 0.09)	0.04	0.002
Outness	0.05 (-0.003, 0.09)	0.02	0.04	0.03 (-0.01, 0.06)	0.02	0.04

Lesbian girls assigned at birth represent the referent group for sexual orientation-based comparisons, White girls assigned at birth represent the referent group for racial/ethnic-based comparisons, and girls residing in the Northeast U.S. represent the referent group for geographic comparisons; 95% CI = 95% Confidence Intervals; $R^2 = 0.061$ for recent drinking and 0.046 for heavy episodic drinking. Model fit statistics for recent alcohol use model: Akaike (AIC) = 7426.50, Bayesian (BIC) = 7555.88; model fit statistics for heavy episodic drinking model: AIC = 5518.85, BIC = 5648.24

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

alcohol use varied significantly by sexual orientation (Table 5). The moderation effect was significant for pansexual girls, with follow-up simple slopes analyses revealing that the association was significant for lesbian/gay girls ($b = 0.19$, $SE = 0.06$, $\beta = 0.13$, $p = .001$) but not for pansexual girls ($b = -0.10$, $SE = 0.09$, $\beta = -0.08$, $p = 0.25$). There were no sexual orientation differences in the association between SGM-specific victimization and heavy episodic drinking, or between internalized stigma and heavy episodic drinking among girls.

Among boys, the association between SGM-specific victimization and frequency of alcohol use also varied significantly by sexual orientation but with different patterns from those for girls (Table 5). The moderation effect was significant for bisexual boys, with follow-up simple slopes analyses revealing that the association was significant for bisexual boys ($b = 0.08$, $SE = 0.03$, $\beta = 0.16$, $p = 0.001$) but not significant for lesbian/gay boys ($b = 0.02$, $SE = 0.02$, $\beta = 0.05$, $p = 0.19$). There was a comparable pattern for the association between SGM-specific victimization and heavy episodic drinking, wherein the moderation

effect was significant for bisexual boys (Table 5). Follow-up simple slopes analyses revealed that the association was significant for bisexual boys ($b = 0.07$, $SE = 0.02$, $\beta = 0.20$, $p < 0.001$) but not significant for lesbian/gay boys ($b = 0.02$, $SE = 0.01$, $\beta = 0.05$, $p = 0.12$). There were no sexual orientation differences in the association between internalized stigma and frequency of alcohol use or heavy episodic drinking among boys.

Among non-binary youth, no significant sexual orientation differences were identified in the association between SGM-specific victimization and frequency of alcohol use or heavy episodic drinking. Likewise, no sexual orientation differences in the association between internalized stigma and frequency of alcohol use or heavy episodic drinking were identified.

Discussion

Minority stressors have been implicated in the elevated rates of alcohol use observed among SGM youth. However, the

Table 4 Multivariable regression models testing the main effects of victimization and internalized stigma among boys

	Recent alcohol use			Heavy episodic drinking		
	b (95% CI)	SE	β	b (95% CI)	SE	β
Victimization	0.04 (0.02, 0.07)	0.01	0.09***	0.04 (0.02, 0.06)	0.01	0.10***
Internalized stigma	0.08 (0.01, 0.16)	0.04	0.06*	0.09 (0.03, 0.14)	0.03	0.08**
Bisexual	0.03 (−0.09, 0.15)	0.06	0.01	0.03 (−0.06, 0.11)	0.04	0.02
Straight	−0.14 (−0.60, 0.31)	0.23	−0.03	0.11 (−0.21, 0.44)	0.17	0.03
Pansexual	0.12 (−0.08, 0.32)	0.10	0.03	0.08 (−0.06, 0.22)	0.07	0.03
Transgender	−0.11 (−0.25, 0.03)	0.07	−0.05	−0.09 (−0.19, 0.02)	0.05	−0.05
Black	−0.07 (−0.33, 0.19)	0.13	−0.01	−0.13 (−0.31, 0.06)	0.09	−0.03
Asian	−0.11 (−0.38, 0.16)	0.14	−0.02	−0.12 (−0.31, 0.07)	0.10	−0.03
Hispanic/Latino	−0.18 (−0.34, −0.02)	0.08	−0.06*	−0.14 (−0.25, −0.02)	0.06	−0.06*
Native American	0.74 (0.11, 1.38)	0.32	0.05*	0.04 (−0.42, 0.49)	0.23	0.004
Multiracial	−0.12 (−0.27, 0.03)	0.08	−0.04	−0.08 (−0.19, 0.02)	0.05	−0.04
Another racial/ethnic identity	−0.14 (−0.50, 0.21)	0.18	−0.02	−0.14 (−0.39, 0.12)	0.13	−0.03
Age	0.09 (0.04, 0.13)	0.02	0.09***	0.07 (0.04, 0.11)	0.02	0.11***
Parent education	0.004 (−0.05, 0.06)	0.03	0.003	−0.01 (−0.05, 0.03)	0.02	−0.01
Midwestern U.S.	−0.03 (−0.18, 0.12)	0.08	−0.01	0.02 (−0.09, 0.13)	0.05	0.01
Southern U.S.	−0.10 (−0.24, 0.04)	0.07	−0.05	−0.07 (−0.17, 0.03)	0.05	−0.05
Western U.S.	−0.04 (−0.19, 0.12)	0.08	−0.02	0.03 (−0.08, 0.14)	0.06	0.02
Outness	0.03 (−0.02, 0.08)	0.03	0.04	0.02 (−0.02, 0.06)	0.02	0.04

Gay boys assigned at birth represent the referent group for sexual orientation-based comparisons, White boys assigned at birth represent the referent group for racial/ethnic-based comparisons, and boys residing in the Northeast U.S. represent the referent group for geographic comparisons; 95% CI = 95% Confidence Intervals; $R^2 = 0.036$ for recent drinking and 0.043 for heavy episodic drinking. Model fit statistics for recent alcohol use model: Akaike (AIC) = 5064.64, Bayesian (BIC) = 5174.04; model fit statistics for heavy episodic drinking model: AIC = 3895.43, BIC = 4004.87

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

focus on the minority stress-alcohol link is overwhelmingly focused on enacted forms of stigma (e.g., discrimination, victimization) and largely ignores the impact of more proximal forms of stigma, such as internalized homophobia and transphobia. This limitation was addressed here by assessing two concomitant pathways through which SGM youth may be prompted to use alcohol—SGM-related victimization and internalized stigma. Also, these findings were extended by assessing how these stressors and their associations with alcohol use may systematically vary across different groups of SGM youth on the basis of their gender and sexual identity. Findings point to subgroup differences in their experience of minority stressors and their association with alcohol use during adolescence.

Findings from this study show within-group differences among SGM youth in their alcohol use based on their specific sexual orientation identities and gender identities. For instance, bisexual girls reported more frequent alcohol use compared to lesbian/gay girls, but bisexual boys and non-binary youth did not differ from their lesbian/gay counterparts in their frequency of alcohol use. Further, asexual girls reported lower levels of recent alcohol use and heavy episodic drinking than lesbian/gay girls. While a

handful of studies have found disparities in bisexual alcohol use as compared to heterosexual counterparts (e.g., Fish et al. 2016), this study is unique in that it is one of the few to compare alcohol experiences among bisexual youth to their lesbian/gay counterparts. These findings highlight the importance of considering youth's specific sexual orientation identities and gender identities as well as distinguishing between frequency of alcohol use and heavy episodic drinking for a clearer understanding of disparities. It may be that there are distinct experiences that place certain groups of SGM youth—on the basis of gender and sexual identity—at risk for alcohol use, such as community involvement, levels of SGM-specific acceptance, or family experiences (e.g., Ryan et al. 2010). At the same time, these experiences may not be the same as those which encourage SGM youth to engage in heavy episodic use of alcohol. Future research should attend to these differences given that the short- and long-term consequences vary depending on the degree to which adolescence engage in alcohol use (White and Hingson 2013).

In support of minority stress theory (Meyer 2003), both internalized stigma and victimization were associated with alcohol use and heavy episodic drinking frequency for boys

Table 5 Multivariable regression models testing the main effects of victimization and internalized stigma among non-binary youth

	Recent alcohol use			Heavy episodic drinking		
	b (95% CI)	SE	β	b (95% CI)	SE	β
Victimization	0.08 (0.05, 0.11)	0.01	0.16***	0.05 (0.03, 0.07)	0.01	0.14***
Internalized stigma	0.07 (-0.01, 0.15)	0.04	0.05	0.05 (-0.01, 0.11)	0.03	0.05
Bisexual	0.02 (-0.12, 0.15)	0.07	0.01	0.05 (-0.04, 0.15)	0.05	0.04
Queer	0.09 (-0.08, 0.27)	0.09	0.03	0.06 (-0.07, 0.18)	0.06	0.03
Pansexual	-0.002 (-0.13, 0.13)	0.07	-0.001	0.03 (-0.07, 0.12)	0.05	0.02
Asexual	-0.06 (-0.27, 0.15)	0.11	-0.02	0.03 (-0.12, 0.17)	0.07	0.01
Questioning	-0.16 (-0.45, 0.15)	0.15	-0.03	-0.001 (-0.21, 0.21)	0.11	0.000
Another sexual orientation identity	-0.21 (-0.44, 0.01)	0.12	-0.05	-0.05 (-0.21, 0.10)	0.08	-0.02
Black	0.000 (-0.30, 0.30)	0.15	0.000	-0.04 (-0.24, 0.17)	0.11	-0.01
Asian	0.003 (-0.27, 0.28)	0.14	0.001	-0.09 (-0.28, 0.10)	0.10	-0.02
Hispanic/Latino	-0.01 (-0.18, 0.16)	0.09	-0.003	0.08 (-0.04, 0.19)	0.06	0.03
Native American	-0.07 (-0.72, 0.57)	0.33	-0.01	-0.01 (-0.45, 0.44)	0.23	-0.001
Multiracial	-0.11 (-0.23, 0.02)	0.06	-0.04	-0.05 (-0.13, 0.04)	0.04	-0.03
Another racial identity	-0.32 (-0.70, 0.05)	0.19	-0.04	-0.10 (-0.36, 0.16)	0.13	-0.02
Age	0.05 (0.01, 0.08)	0.02	0.06*	0.01 (-0.02, 0.03)	0.01	0.01
Parent education	-0.01 (-0.07, 0.05)	0.03	-0.01	-0.04 (-0.05, 0.04)	0.02	-0.01
Midwestern U.S.	-0.06 (-0.21, 0.09)	0.08	-0.03*	0.07 (-0.04, 0.17)	0.05	0.04
Southern U.S.	-0.12 (-0.26, 0.02)	0.07	-0.06	0.01 (-0.09, 0.10)	0.05	0.01
Western U.S.	-0.05 (-0.19, 0.10)	0.08	-0.02	0.06 (-0.05, 0.16)	0.05	0.04
Outness	0.02 (-0.04, 0.08)	0.03	0.02	0.02 (-0.02, 0.06)	0.02	0.03

Lesbian/gay youth represent the referent group for sexual orientation-based comparisons, White youth represent the referent group for racial/ethnic-based comparisons, and youth residing in the Northeast U.S. represent the referent group for geographic comparisons; 95% CI = 95% Confidence Intervals; $R^2 = 0.061$ for recent drinking and 0.046 for heavy episodic drinking. Model fit statistics for recent alcohol use model: Akaike (AIC) = 3954.11, Bayesian (BIC) = 4070.59; model fit statistics for heavy episodic drinking model: AIC = 2852.50, BIC = 2968.94

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

and girls. However, only SGM-specific victimization was associated with alcohol use and heavy episodic drinking frequency among non-binary youth. These findings extend current understandings of the minority stress-alcohol use link by illustrating several pathways towards alcohol use and that these associations vary by gender identity. Similar to previous studies and reviews (see Day et al. 2017; Goldbach et al. 2014), victimization was associated with SGM youth alcohol use. This literature is extended here by a focus on more proximal minority stressors (internalized stigma), which are often not captured in studies assessing alcohol use among SGM youth. These findings are important in that the strategies to combat enacted stigma (e.g., anti-bullying policies, Hatzenbuehler et al. 2015) would not necessarily address internalized forms of stigma, which may be better addressed through youth programs in schools (e.g., gender sexuality alliances and/or LGBTQ-community centers).

Moreover, associations between minority stressors and alcohol use varied based on youth's specific sexual

orientations and gender identities. For example, the association between SGM-specific victimization and alcohol use frequency was weaker for bisexual girls than for lesbian/gay girls. In contrast, the associations between SGM-specific victimization and alcohol use frequency and heavy episodic drinking were stronger for bisexual boys relative to lesbian/gay boys. Although bisexual boys reported lower SGM-specific victimization than other groups, they may have perceived fewer supportive outlets within heterosexual cis-gender or SGM communities, which might account for their concomitant higher reported levels of internalized stigma than lesbian/gay and pansexual boys. Consequently, the SGM-specific victimization which they did experience may have had stronger implications for their alcohol use as a means to cope. Bisexual girls also reported lower SGM-specific victimization than lesbian/gay girls, but the association between SGM-specific victimization and alcohol use was weaker for them than for lesbian/gay girls. Other studies suggest that bisexual girls are most susceptible to general forms of victimization, and that these experiences

Table 6 Multivariable regression models testing the interaction among victimization, internalized stigma, and sexual orientation, stratified by gender

	Recent alcohol use			Heavy episodic drinking		
	b (95% CI)	SE	β	b (95% CI)	SE	β
<i>Girls</i>						
Victimization \times sexual orientation						
Victimization \times bisexual	-0.11 (-0.21, -0.02)	0.05	-0.07*	-0.01 (-0.08, 0.06)	0.04	-0.01
Victimization \times queer	-0.31 (-0.59, 0.04)	0.14	-0.05*	-0.16 (-0.35, 0.03)	0.10	-0.04
Victimization \times pansexual	-0.11 (-0.25, 0.03)	-0.07	-0.03	-0.08 (-0.18, 0.02)	0.05	-0.04
Victimization \times asexual	0.11 (-0.15, 0.37)	0.14	0.02	-0.07 (-0.25, 0.12)	0.10	-0.02
Victimization \times questioning	-0.30 (-0.63, 0.03)	0.17	-0.04	-0.12 (-0.35, 0.12)	0.12	-0.02
Internalized stigma \times sexual orientation						
Stigma \times bisexual	-0.06 (-0.15, 0.03)	0.05	-0.04	-0.01 (-0.08, 0.05)	0.03	-0.01
Stigma \times queer	-0.18 (-0.42, 0.07)	0.13	-0.03	-0.06 (-0.23, 0.11)	0.09	-0.01
Stigma \times pansexual	-0.16 (-0.30, -0.02)	0.07	-0.05*	-0.05 (-0.15, 0.05)	0.05	-0.02
Stigma \times asexual	-0.09 (-0.33, 0.14)	0.12	-0.02	-0.09 (-0.25, 0.08)	0.08	-0.02
Stigma \times questioning	-0.11 (-0.42, 0.19)	0.16	-0.02	-0.02 (-0.24, 0.19)	0.11	-0.004
<i>Boys</i>						
Victimization \times sexual orientation						
Victimization \times bisexual	0.12 (0.01, 0.23)	0.06	0.06*	0.11 (0.03, 0.19)	0.04	0.08**
Victimization \times straight	-0.04 (-0.43, 0.36)	0.20	-0.01	0.05 (-0.23, 0.33)	0.14	0.01
Victimization \times pansexual	0.09 (-0.09, 0.27)	0.09	0.03	0.11 (-0.02, 0.24)	0.07	0.05
Internalized stigma \times sexual orientation						
Stigma \times bisexual	0.06 (-0.05, 0.16)	0.05	0.03	0.05 (-0.02, 0.13)	0.04	0.04
Stigma \times straight	-0.02 (-0.43, 0.40)	0.21	-0.004	0.03 (-0.27, 0.33)	0.15	0.01
Stigma \times pansexual	-0.03 (-0.20, 0.15)	0.09	-0.01	0.05 (-0.08, 0.18)	0.06	0.02
<i>Non-binary youth</i>						
Victimization \times sexual orientation						
Victimization \times bisexual	-0.02 (-0.16, 0.12)	0.07	-0.01	-0.07 (-0.17, 0.03)	0.05	-0.05
Victimization \times queer	0.10 (-0.08, 0.28)	0.09	0.04	0.02 (-0.11, 0.15)	0.06	0.01
Victimization \times pansexual	-0.05 (-0.19, 0.08)	0.07	-0.03	-0.03 (-0.13, 0.07)	0.05	-0.03
Victimization \times asexual	0.16 (-0.05, 0.36)	0.11	0.05	0.11 (-0.03, 0.26)	0.07	0.05
Victimization \times questioning	0.29 (-0.01, 0.58)	0.15	0.05	0.02 (-0.19, 0.22)	0.11	0.004
Victimization \times other sexual orientation	0.01 (-0.24, 0.25)	0.13	0.001	-0.03 (-0.20, 0.14)	0.09	-0.01
Internalized stigma \times sexual orientation						
Stigma \times bisexual	0.02 (-0.17, 0.12)	0.08	-0.01	-0.02 (-0.13, 0.08)	0.05	-0.02
Stigma \times queer	-0.08 (-0.12, 0.29)	0.10	0.02	-0.04 (-0.19, 0.09)	0.07	-0.05
Stigma \times pansexual	-0.11 (-0.25, 0.03)	0.07	-0.06	-0.04 (-0.14, 0.06)	0.05	-0.03
Stigma \times asexual	0.08 (-0.12, 0.29)	0.10	0.02	0.06 (-0.09, 0.20)	0.07	0.02
Stigma \times questioning	0.23 (-0.09, 0.54)	0.16	0.04	0.09 (-0.13, 0.31)	0.11	0.02
Stigma \times other sexual orientation	-0.24 (-0.49, 0.01)	0.13	-0.05*	-0.12 (-0.29, 0.06)	0.09	-0.04

Models are adjusted for age, race/ethnicity, geographic region, and degree of outness about sexual orientation and gender identity. Female lesbian/gay youth represent the referent group for sexual orientation-based comparisons; 95% CI = 95% Confidence Intervals; Male gay youth represent the referent group for sexual orientation-based comparisons. Gay/lesbian non-binary youth represent the referent group for sexual orientation-based comparisons. Model fit statistics: female victimization and recent alcohol use model: (Akaike (AIC) = 7424.98, Bayesian (BIC) = 7583.77); female victimization and heavy episodic drinking model: (AIC = 5525.07, BIC = 5683.86); female stigma and recent alcohol use model: (AIC = 7430.32, BIC = 7589.12); female stigma and heavy episodic drinking model: (AIC = 5526.98, BIC = 5685.77); male victimization and recent alcohol use model: (AIC = 5066.06, BIC = 5191.87); male victimization and heavy episodic drinking model: (AIC = 3839.35, BIC = 4019.20); male stigma and recent alcohol use model: (AIC = 5070.28, BIC = 5196.08); male stigma and heavy episodic drinking model: (AIC = 3900.51, BIC = 4026.36); non-binary victimization and recent alcohol use model: (AIC = 3960.55, BIC = 4108.79); non-binary victimization and heavy episodic drinking model: (AIC = 2860.85, BIC = 3009.06); non-binary stigma and recent alcohol use model: (AIC = 3954.95, BIC = 4103.19); non-binary stigma and heavy episodic drinking model: (AIC = 2861.13, BIC = 3009.33)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

mediate sexual orientation differences in heavy alcohol use for this group (Fish et al. 2018). It may be that bisexual girls were less likely to attribute their victimization to their sexual minority status, as assessed in this study, and that other more salient factors therefore accounted for more frequency of alcohol use.

Ultimately, there may be different socialization processes among bisexual boys and girls for coping in response to SGM-specific victimization, and other specific factors may be more closely related to their alcohol use (e.g., biphobia or erasure of bisexuality within SGM and heterosexual cisgender communities). The current findings point to the need to consider specific subgroups within the broader SGM community. Furthermore, they emphasize the need to identify not only mean differences on minority stressors or health risks among SGM youth, but also differences in how minority stressors may elevate health risks for specific subgroups. To this end, future studies should continue to disentangle how specific minority stressors may place specific subgroups of SGM youth at greater risk for elevated alcohol use and heavy episodic drinking.

The inclusion of non-binary youth is a strong contribution of this project. Despite emerging evidence pointing to clear differences in risk for poor health across transgender youth on the basis of gender identity (see Toomey et al. 2018), there have been few studies that seek to understand variability in health and risk among gender minority youth on the basis of both gender identity and sexual identity (IOM 2011). Still, fewer projects assess how multiple mechanisms of health risk may vary on the basis of gender identity and the intersection of gender identity and sexual identity. Ultimately, our results urge more research in this area, particularly as it will inform strategies for prevention and health promotion among gender minority youth.

This study expands on previous research that has documented links between SGM-specific victimization and alcohol use for SGM youth, but with various limitations. Instead of collapsing of SGM identities and focusing only on traditional sexual orientation identity labels (e.g., gay, lesbian, bisexual) and relying on a regional sample limited in generalizability, a large national United States sample of diverse SGM youth was utilized. By way of this paper, the extant body of literature was expanded to provide a more nuanced understanding of how diversity in gender and sexual identity shape experiences associated with alcohol use. Additionally, this study focused on an understudied group of adolescents (non-binary youth), and measured both recent alcohol use and heavy episodic drinking.

Despite these strengths, there are limitations to note. First, the data reflect a non-probability sample of youth, thus these findings are not directly generalizable to all SGM youth in the United States. Data are cross-sectional, and therefore statements related to the temporal nature of these

associations cannot be made. Although the timing of these measures reflects the hypothesized associations between minority stress (lifetime measures) and alcohol use (measured in the past 30-days), and recent experimental research has established a temporal link between minority stress and alcohol use among sexual minority young people (Mereish and Miranda 2019), longitudinal and daily diary studies would provide a more precise estimate of the extent to which minority stress contributes to alcohol use and heavy episodic drinking for SGM youth. The decision to use the YRBS measure of heavy episodic drinking in this study precluded the ability to gather a more precise measurement of H heavy episodic drinking ED among girls and boys—The National Institutes of Alcohol Abuse and Alcoholism has identified heavy episodic drinking for women as consumption of 4 drinks, and heavy episodic drinking for men as 5 drinks, in the span of 2 h (National Institutes of Alcohol Abuse and Alcoholism 2019). Additionally, a different number of boys, girls, and transgender youth responded to the survey—which limited the ability to consider all of the subgroups of sexual minority youth for all gender groups and to compare them to one another. The measures of victimization also combined sexual- and gender-based victimization, preventing the ability to disentangle the unique contribution of each to alcohol use. Future research should look at this with greater specificity. Although interactions with SGM-specific victimization and stigma were documented in their own respective models, it was not possible to consider interaction terms for victimization and stigma simultaneously, given the number of interaction terms this would have required in a single model and with the present dataset. It would be useful to consider potential multiplicative effects between stressors in predicting health risks and whether this may be evident for some SGM youth more so than for others. Last, although the effect sizes of internalized stigma and SGM-specific victimization on alcohol experiences were small, they remained the strongest associations next to age. This is important because age is commonly a robust predictor of alcohol use during adolescence and in addition to stigma and victimization, a key predictor in the statistical models presented here. The smaller effect sizes found suggests that the story of alcohol use among SGM youth may be more complex than either the typical sociodemographic characteristics and minority stress mechanisms typically used to assess and predict alcohol differences among SGM youth.

These findings have implications for stakeholders invested in bettering the health and well-being of SGM populations. Considering the diversity of sexual orientations, it is necessary to identify and approach the treatment of subgroups at most risk of alcohol use and heavy episodic drinking. This study provides evidence that alcohol use behaviors, and their relation to internalized stigma and

SGM-specific victimization, differ as a function of sexual identity and gender. Researchers and practitioners invested in addressing minority stressors should be aware that both SGM-specific victimization and internalized stigma are independently related to alcohol use behaviors and should continue to explore differential but simultaneous pathways through which minority stress impacts alcohol use for this diverse population. Last, from these results, stakeholders should be sure to universally address internalized stigma as a common contributor to alcohol use, while they may want to inquire with greater nuance how victimization may relate to substance use for specific subgroups and develop more tailored materials around that.

Conclusion

This study sought to explore how minority stressors (i.e., victimization and internalized stigma) were differentially related to recent alcohol use and heavy episodic drinking for diverse groups of SGM youth. Multivariable regression models illustrated that while alcohol use was higher among bisexual girls as compared to their lesbian/gay counterparts, this elevated frequency was not explained by victimization and internalized stigma in the same way that it was for these youth's counterparts. Among boys, no differences in alcohol experiences emerged by sexual orientation, but both internalized stigma and victimization were positively related to recent alcohol use and heavy episodic drinking. These findings point to the importance of not only reducing experiences of SGM-specific victimization among SGM adolescents, but also promoting programs and policies that aim to mitigate internalized stigma. These strategies would represent large-scale efforts to curb sexual orientation disparities in alcohol use, which continues to be a critical public health concern. This research warrants a continued focus on the contributing factors to alcohol disparities of vulnerable, young individuals—particular during adolescence.

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manuscript; T.R. drafted portions of the manuscript, interpreted results, and critically reviewed multiple versions. All authors read and approved the final manuscript.

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Data Sharing and Declaration This manuscript's data will not be deposited.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. All study procedures were approved by the University of Connecticut IRB board, protocol H16-322.

Informed Consent Informed assent was obtained from all youth participants included in the study. A waiver of parental consent was obtained from the IRB related to this study.

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References

- Amadio, D. M., & Chung, Y. B. (2004). Internalized homophobia and substance use among lesbian, gay, and bisexual persons. *Journal of Gay & Lesbian Social Services, 17*, 83–101. https://doi.org/10.1300/J041v17n01_06.
- Baiocco, R., D'Alessio, M., & Laghi, F. (2010). Binge drinking among gay, and lesbian youths: The role of internalized sexual stigma, self-disclosure, and individuals' sense of connectedness to the gay community. *Addictive Behaviors, 35*, 896–899. <https://doi.org/10.1016/j.addbeh.2010.06.004>.
- Birkett, M., Espelage, D. L., & Koenig, B. (2009). LGB and questioning students in schools: The moderating effects of homophobic bullying and school climate on negative outcomes. *Journal of Youth and Adolescence, 38*, 989–1000. <https://doi.org/10.1007/s10964-008-9389-1>.
- Bontempo, D. E., & D'Augelli, A. R. (2002). Effects of at-school victimization and sexual orientation on lesbian, gay, or bisexual youths' health risk behavior. *Journal of Adolescent Health, 30*, 364–374. [https://doi.org/10.1016/S1054-139X\(01\)00415-3](https://doi.org/10.1016/S1054-139X(01)00415-3).
- Bos, H., van Beusekom, G., & Sandfort, T. (2016). Drinking motives, alcohol use, and sexual attraction in youth. *Journal of Sex Research, 53*(3), 309–312.
- Coulter, R. W., Blosnich, J. R., Bukowski, L. A., Herrick, A. L., Siconolfi, D. E., & Stall, R. D. (2015). Differences in alcohol use

- and alcohol-related problems between transgender and non-transgender-identified young adults. *Drug and Alcohol Dependence*, 154, 251–259. <https://doi.org/10.1016/j.drugalcdep.2015.07.006>.
- Day, J. K., Fish, J. N., Perez-Brumer, A., Hatzenbuehler, M. L., & Russell, S. T. (2017). Transgender youth substance use disparities: results from a population-based sample. *Journal of Adolescent Health*, 61, 729–735. <https://doi.org/10.1016/j.jadohealth.2017.06.024>.
- Eisenberg, M. E., Gower, A. L., McMorris, B. J., Rider, G. N., Shea, G., & Coleman, E. (2017). Risk and protective factors in the lives of transgender/gender nonconforming adolescents. *Journal of Adolescent Health*, 61, 521–526. <https://doi.org/10.1016/j.jadohealth.2017.04.014>.
- Feinstein, B. A., Turner, B. C., Beach, L. B., Korpak, A. K., & Phillips, G. (2019). Racial/ethnic differences in mental health, substance use, and bullying victimization among self-identified bisexual high school-aged youth. *LGBT Health*, Online Early View. <https://doi.org/10.1089/lgbt.2018.0229>.
- Fish, J. N., & Baams, L. (2018). Trends in alcohol-related disparities between heterosexual and sexual minority youth from 2007 to 2015: Findings from the Youth Risk Behavior Survey. *LGBT Health*, 5, 359–367. <https://doi.org/10.1089/lgbt.2017.0212>.
- Fish, J. N., Schulenberg, J. E., & Russell, S. T. (2018). Sexual minority youth report high-intensity binge drinking: the critical role of school victimization. *Journal of Adolescent Health*, 64, 186–193. <https://doi.org/10.1016/j.jadohealth.2018.07.005>.
- Fish, J. N., Watson, R. J., Porta, C., Russell, S. T., & Saewyc, E. (2016). Are alcohol-related disparities between sexual minority and heterosexual youth decreasing? *Addiction*, 112, 1931–1941. <https://doi.org/10.1111/add.13896>.
- Gilbert, P. A., Pass, L. E., Keuroghlian, A. S., Greenfield, T. K., & Reisner, S. L. (2018). Alcohol research with transgender populations: a systematic review and recommendations to strengthen future studies. *Drug and Alcohol Dependence*, 186, 138–146. <https://doi.org/10.1016/j.drugalcdep.2018.01.016>.
- Goldbach, J. T., Tanner-Smith, E. E., Bagwell, M., & Dunlap, S. (2014). Minority stress and substance use in sexual minority adolescents: a meta-analysis. *Prevention Science*, 15, 350–363. <https://doi.org/10.1007/s11221-013-0393-7>.
- Hatzenbuehler, M. L., Schwab-Reese, L., Ranapurwala, S. I., Hertz, M. F., & Ramirez, M. R. (2015). Associations between antibullying policies and bullying in 25 states. *JAMA Pediatrics*, 169, e152411–e152411. <https://doi.org/10.1001/jamapediatrics.2015.2411>.
- Hughes, T. L., Wilsnack, S. C., & Kantor, L. W. (2016). The influence of gender and sexual orientation on alcohol use and alcohol-related problems: toward a global perspective. *Alcohol Research*, 38, 121–132.
- Institute of Medicine (IOM). (2011). *The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding*. Washington (DC): National Academies Press.
- Kaestle, C. E., & Ivory, A. H. (2012). A forgotten sexuality: Content analysis of bisexuality in the medical literature over two decades. *Journal of Bisexuality*, 12, 35–48. <https://doi.org/10.1080/15299716.2012.645701>.
- Kann, L., Olsen, E. O., & McManus, T. (2016). Sexual identity, sex of sexual contacts, and health-related behaviors among students in grades 9–12—United States and selected sites, 2015. *MMWR Surveillance Summary*, 65, 1–202.
- Marshal, M. P., Friedman, M. S., Stall, R., King, K. M., Miles, J., & Gold, M. A. et al. (2008). Sexual orientation and adolescent substance use: A meta-analysis and methodological review. *Addiction*, 103, 546–556. <https://doi.org/10.1111/j.1360-0443.2008.02149.x>.
- Mereish, E. H., & Miranda, R. (2019). Exposure to stigma elicits negative affect and alcohol craving among young adult sexual minority heavy drinkers. *Alcoholism: Clinical and Experimental Research*, 43, 1263–1272.
- Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychological Bulletin*, 129, 674–697. <https://doi.org/10.1037/0033-2909.129.5.674>.
- Mohr, J., & Fassinger, R. (2000). Measuring dimensions of lesbian and gay male experience. *Measurement and Evaluation in Counseling and Development*, 33(2), 66–90.
- Muthén, L. K., & Muthén, B. (2019). *Mplus. The comprehensive modelling program for applied researchers: user's guide*, 5. http://www.statmodel.com/virg_nov_course.shtml.
- National Institutes of Alcohol Abuse and Alcoholism. (2019). *Drinking levels defined*. National Institutes of Alcohol Abuse and Alcoholism. <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking>.
- Phillips, II, E., Wang, T. W., Husten, C. G., Corey, C. G., Apalberg, B. J., Jamal, A., & King, B. A. (2017). Tobacco product use among adults—United States, 2015. *MMWR. Morbidity and Mortality Weekly Report*, 66, 1209–1215. <https://doi.org/10.15585/mmwr.mm6644a2>.
- Pitkänen, T., Kokko, K., Lyyra, A. L., & Pulkkinen, L. (2008). A developmental approach to alcohol drinking behaviour in adulthood: a follow-up study from age 8 to age 42. *Addiction*, 103, 48–68. <https://doi.org/10.1111/j.1360-0443.2008.02176.x>.
- Pollitt, A. M., Mallory, A. B., & Fish, J. N. (2018). Homophobic bullying and sexual minority youth alcohol use: Do sex and race/ethnicity matter? *LGBT Health*, 5, 412–420. <https://doi.org/10.1089/lgbt.2018.0031>.
- Puhl, R. M., Himmelstein, M., & Watson, R. J. (2019). Weight-based victimization among sexual and gender minority adolescents: Findings from a diverse national sample. *Pediatric Obesity*, 14, e12514. <https://doi.org/10.1111/ijpo.12514>.
- Reisner, S. L., White, J. M., Bradford, J. B., & Mimiaga, M. J. (2014). Transgender health disparities: comparing full cohort and nested matched-pair study designs in a community health center. *LGBT Health*, 1, 177–184. <https://doi.org/10.1089/lgbt.2014.0009>.
- Robinson-Cimpian, J. P. (2014). Inaccurate estimation of disparities due to mischievous responders: several suggestions to assess conclusions. *Educational Researcher*, 43, 171–185. <https://doi.org/10.3102/0013189X14534297>.
- Russell, S. T., & Fish, J. N. (2019). Sexual minority youth, social change, and health: a developmental collision. *Research in Human Development*, 16, 5–20. <https://doi.org/10.1080/15427609.2018.1537772>.
- Russell, S. T., Sinclair, K. O., Poteat, V. P., & Koenig, B. W. (2012). Adolescent health and harassment based on discriminatory bias. *American Journal of Public Health*, 102, 493–495. <https://doi.org/10.2105/AJPH.2011.300430>.
- Ryan, C., Russell, S. T., Huebner, D., Diaz, R., & Sanchez, J. (2010). Family acceptance in adolescence and the health of LGBT young adults. *Journal of Child and Adolescent Psychiatric Nursing*, 23, 205–213. <https://doi.org/10.1111/j.1744-6171.2010.00246.x>.
- Shidlo, A In B. Greene, G. M. Herek, (Eds) (1994). Internalized homophobia: Conceptual and empirical issues in measurement. Psychological perspectives on lesbian and gay issues, Vol. 1. Lesbian and gay psychology: Theory, research, and clinical applications. (pp. 176–205). Thousand Oaks, CA: US: Sage Publications, Inc. <https://doi.org/10.4135/9781483326757.n10>.
- Smalley, K. B., Warren, J. C., & Barefoot, K. N. (2016). Differences in health risk behaviors across understudied LGBT subgroups. *Health Psychology*, 35, 103–114. <https://doi.org/10.1037/hea0000231>.

- Taliaferro, L. A., Gloppen, K. M., Muehlenkamp, J. J., & Eisenberg, M. E. (2018). Depression and suicidality among bisexual youth: a nationally representative sample. *Journal of LGBT Youth, 15*, 16–31. <https://doi.org/10.1080/19361653.2017.1395306>.
- Talley, A. E., Hughes, T. L., Aranda, F., Birkett, M., & Marshal, M. P. (2014). Exploring alcohol-use behaviors among heterosexual and sexual minority adolescents: intersections with sex, age, and race/ethnicity. *American Journal of Public Health, 104*, 295–303. <https://doi.org/10.2105/AJPH.2013.301627>.
- Toomey, R. B., Syvertsen, A. K., & Shramko, M. (2018). Transgender adolescent suicide behavior. *Pediatrics, 142*, e20174218. <https://doi.org/10.1542/peds.2017-4218>.
- Watson, R. J., Veale, J. F., Gordon, A. R., Clark, B. A., & Saewyc, E. M. (2019a). Risk and protective factors for transgender youths' substance use. *Preventive Medicine Reports, 15*, 100905. <https://doi.org/10.1016/j.pmedr.2019.100905>.
- Watson R.J., Wheldon, C.W., & Puhl, R.M. (2019b) Evidence of diverse identities in a large national sample of sexual and gender minority adolescents. *Journal of Research on Adolescence, Online Early View*, 1–12. (in press). <https://doi.org/10.1111/jora.12488>.
- White, A., & Hingson, R. (2013). The burden of alcohol use: excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews, 35*, 201–218.
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