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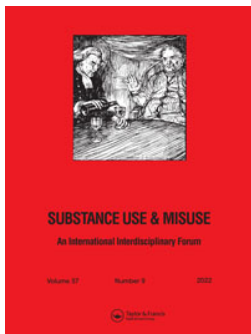
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Everyday Discrimination and Alcohol use among Sexual Minority Adults in a U.S. National Probability Sample

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ABSTRACT

Objective: Limited research assesses how sexual orientation and gender identity and expression (SOGIE)-based discrimination affects alcohol use above and beyond non-SOGIE-related discrimination and how this may differ for sexual minority subgroups. We examined if SOGIE-related discrimination is additive in affecting alcohol use above and beyond non-SOGIE-related discrimination and examined differences in alcohol use, everyday discrimination, and the attribution of discrimination by sex and sexual identity. *Methods*: A national probability sample of sexual minority adults in the United States was used (*N*=1311, female = 56.4%). Bivariate sexual identity and sex-based differences in drinking frequency, heavy episodic drinking (HED), everyday discrimination, and the attribution of discrimination were assessed. Sexual identity and sex-stratified logistic regression models were estimated, where everyday discrimination and the attribution of discrimination predicted drinking frequency and HED. *Results*: Several differences by sex assigned at birth and sexual identity in drinking frequency, HED, everyday discrimination, and the attribution of discrimination were found in bivariate analyses. In logistic regression models, experiencing SOGIE-related in addition to other types of discrimination was associated with higher odds of HED only for gay males. No other associations were found for everyday discrimination or the attribution of discrimination with drinking frequency or HED. *Conclusions*: Findings suggest sex and sexual identity-based differences in everyday discrimination and the attribution of discrimination.

KEYWORDS
Alcohol use; heavy episodic drinking; discrimination; sexual minority people; LGB

Research documents the adverse effects of alcohol consumption on physical and mental health and its social harms (Rehm, 2011; Shield et al., 2005). These findings are especially concerning considering the rise in alcohol use, high-risk drinking, and alcohol use disorders in the past decades among adults in the United States (Grant et al., 2017). Sexual minority people (e.g., lesbian, gay, and bisexual) report particular high rates of alcohol use (Kerridge et al., 2017). Research often reports higher rates of alcohol use among sexual minority people compared to heterosexual people (Corliss et al., 2008), and sexual minority people more often meet criteria for alcohol use disorders across the life course (Fish & Exten, 2020; Krueger et al., 2020; Schuler & Collins, 2020).

Alcohol use among sexual minority people is often explained as a reaction to everyday discrimination related to one's sexual orientation and gender identity or expression (SOGIE), also referred to as minority stress (Hatzenbuehler, 2009; Meyer, 2003). However, research does not often examine SOGIE-related discrimination as an additive stressor contributing to alcohol use above non-SOGIE-related discrimination. Further, studies lack tests of within-group differences in everyday discrimination or alcohol use among sexual minority people. Such research is vital to understand

whether there may be unique experiences across subgroups of sexual minority people that make them more vulnerable to alcohol use. Therefore, we aimed to investigate the role of the attribution of discrimination in alcohol use in a national sample of sexual minority adults.

Discrimination and alcohol use

People may drink alcohol as a coping mechanism for stressors. Following the transactional theory of stress coping (Lazarus & Folkman, 1984), when a situation is appraised as stressful, and efforts are needed to manage or resolve the situation, people may use alcohol to reduce negative and increase positive affect (Biggs et al., 2017; Wills & Hirky, 1996). Discrimination, understood as chronic experiences of unfair treatment (Williams et al., 1997), is an example of such a stressor and is a well-studied predictor of alcohol use (Gilbert & Zemore, 2016).

Following the minority stress framework, sexual minority people may experience SOGIE-related discrimination, which could contribute to or exacerbate alcohol use (Hatzenbuehler, 2009; Meyer, 2003). A literature review found that experiences of SOGIE-related discrimination are associated with

alcohol use among sexual minority people, especially among sexual minority women (Gilbert & Zemore, 2016). Further, sexual minority people who experience SOGIE-related discrimination were more likely to have an alcohol use disorder (McCabe et al., 2019; Slater et al., 2017). For bisexual people, but not lesbian and gay people, SOGIE-related discrimination was associated with exceeding weekly drinking limits (Slater et al., 2017).

Thus, studies have found that SOGIE-related discrimination contributes to alcohol use among sexual minority people. However, from a minority stress point of view, one would expect that SOGIE-related discrimination is additive to non-SOGIE-related experiences of discrimination to affect alcohol use (Slater et al., 2017). Nonetheless, studies often only focus on the isolated effect of SOGIE-related discrimination and not how it affects alcohol use above and beyond non-SOGIE-related discrimination (e.g., Slater et al., 2017). Studying this additive effect would provide a better understanding of how SOGIE-related discrimination contributes to alcohol use among sexual minority people. One recent study found that SOGIE-related discrimination and general life stressors were associated with a higher risk of alcohol use disorder among gay and bisexual men and only general life stressors among bisexual women (Krueger et al., 2020). However, this study focused on general life stressors but not on non-SOGIE-related discrimination.

Differences among sexual minority people

Studies point to differences in alcohol use among sexual minority people based on sex and sexual identity. For example, when compared to heterosexual people of the same sex, especially sexual minority women report higher alcohol use than sexual minority men (Fish et al., 2018; McCabe et al., 2019; Plöderl & Tremblay, 2015; Talley et al., 2016). This might suggest, contrary to the general population (Grant et al., 2017), that among sexual minority people, women evidence similar or higher rates of alcohol use compared to men. Few studies explicitly testing this found mixed results (Fish & Exten, 2020; Kerridge et al., 2017). For sexual identity, literature reviews have identified bisexual people, bisexual women in particular, reporting larger alcohol use disparities than their gay/lesbian peers compared to heterosexual people (Hughes, Wilsnack, & Kantor, 2016; Talley et al., 2016). However, most studies do not test whether there are differences among lesbian/gay and bisexual people in alcohol use. A study that made such a comparison found that people with bisexual behaviors had higher odds of past-year alcohol disorder than participants with same-sex behaviors (Slater, Godette, Huang, Ruan, & Kerridge et al., 2017).

Research also suggests sex and sexual identity-based differences in discrimination. Among sexual minority people, men report higher rates of discrimination, although differences are sometimes relatively small (Katz-Wise & Hyde, 2012; Lee, Gamarel, Bryant, Zaller, & Operario, 2016). For sexual identity, bisexual people experience unique forms of SOGIE-related discrimination, referred to as biphobia, from

heterosexual and gay communities (Eisner, 2013). There is ample evidence of biphobia in both heterosexual and gay communities (Macleod, Bauer, Robinson, Mackay, & Ross, 2015; Scherrer, Kazyak, & Schmitz, 2015), although some research found that gay and lesbian people reported more discrimination compared to bisexual men and women (Bostwick et al., 2014).

The present study

We aimed to examine if SOGIE-related discrimination is additive in affecting alcohol use above and beyond non-SOGIE-related discrimination. Further, we aimed to examine differences in alcohol use, everyday discrimination, and the attribution of discrimination by sex and sexual identity. We used a national probability sample of sexual minority adults from the United States. This provides a more detailed understanding of how group differences in alcohol use come about among sexual minority people. We expected that sexual minority women would report similar or higher levels of alcohol use than sexual minority men and that bisexual people would report greater levels of alcohol use than gay and lesbian people. Further, we expected that bisexual people would report more everyday discrimination and attribute discrimination more often to SOGIE than lesbian and gay people. Lastly, we expected that everyday discrimination is positively related to alcohol use and that SOGIE-related discrimination affects alcohol use above and beyond non-SOGIE-related discrimination.

Methods

Participants

Data came from the *Generations Study*, a study of the health and well-being of sexual minority populations in three age cohorts in the United States (Meyer et al., 2020). Cohorts were defined based on significant LGBT-related historical events in the United States during the participants' (early) adolescence, the period of (sexual) identity formation. Examples of historical events are the Stonewall inn riots (oldest cohort), the formation of ACT UP (middle cohort), and the legalization of same-sex marriage (youngest cohort). When recruited, the youngest cohort was 18–25 years old, the second cohort was 34–41 years old, and the oldest cohort was 52–59 years old.

Participants were recruited in a two-phase recruitment procedure. Firstly, participants were recruited through the Gallup Daily Tracking Survey (GDTS) from March 2016 to March 2017, which was extended until March 2018 for Black and Latino participants. The GDTS is a telephone interview of a national probability sample of adults ages 18 and older in the United States. Participants screened as identifying as lesbian, gay, bisexual, or transgender ($N = 12,837$) received follow-up screening questions for eligibility criteria. Participants were eligible for the *Generations Study* if: they identified as lesbian, gay, or bisexual; were in one of the above-mentioned birth cohorts; identified as Black, Latino,

White, or had a mixed race/ethnicity that included one of these racial/ethnic identities; had at least a 6th-grade education; and spoke English. People with other racial/ethnic identities were omitted because low base rates inhibited meaningful statistical analyses. A minimum of a 6th-grade education was chosen because of the self-administer nature of the survey. In total, 3525 participants were eligible for the *Generations Study*.

Secondly, eligible participants were asked to participate in a self-administered online or mailed survey. The baseline survey included 1518 participants (1331 from the original sample, 187 from the oversample of Black and Latino participants). Participants read an information sheet and consented to participation. The study protocol was reviewed by the Gallup IRB, the UCLA IRB, and the IRBs of collaborating institutions through reliance on UCLA IRB. More information can be found elsewhere (Krueger et al., 2020).

For the present study, participants who identified as heterosexual ($n = 11$) and participants who had missing data on alcohol use ($n = 15$) were excluded. Because there were small numbers of other distinct sexual identity groups, participants who did not identify as gay, lesbian, or bisexual were omitted ($n = 181$), yielding a final sample of $N = 1311$. Descriptive statistics are presented in Table 1.

Table 1. Descriptive statistics of a national probability sample of the U.S. Sexual Minority Adults ($N = 1311$).

	N	Weighted percentage	% missing
Drinking frequency			0.0
Drinking less than monthly	566	47.7	
Drinking monthly or more	745	52.4	
Heavy episodic drinking (HED)			0.0
HED less than monthly	1,074	82.0	
HED monthly or more	237	18.0	
Everyday discrimination[a]	9.09	6.56	0.23
Attribution of discrimination			0.23
No discrimination	179	11.4	
Non-SOGIE-related only	691	52.5	
Only SOGIE related	113	8.2	
Non-SOGIE and SOGIE-related	325	27.9	
Sexual identity			0.0
Gay male	516	32.7	
Lesbian female	305	20.9	
Bisexual male	138	10.9	
Bisexual female	352	35.5	
Sex assigned at birth			0.0
Male	654	43.6	
Female	657	56.4	
Non-binary gender identity			0.0
Binary	1,276	97.0	
Non-binary	35	3.0	
Race/ethnicity			0.0
White	819	60.7	
Black/African American	146	13.1	
Hispanic, Latino, or Spanish origin	140	10.7	
Multiracial/ Another race/ethnicity	206	15.5	
Age cohort			0.0
18–25 years	543	59.8	
34–41 years	324	21.3	
52–59 years	444	18.9	
Urbanicity[a,b]	1.72	1.88	1.14
Household income[a]	6.57	2.89	0.76

[a]For continuous variables the mean and standard deviation are given.
[b]Scores smaller than 3 represent urban zip codes and scores higher than three rural zip codes.

Measures

Alcohol use

Drinking frequency and heavy episodic drinking (HED) were assessed. For drinking frequency, participants were asked "How often do you have a drink containing alcohol?" with a 5-point scale ranging from *Never* = 0 to *4 or more times a week* = 4. Drinking frequency was dichotomized so that *Drinking less than monthly* = 0 and *Drinking monthly or more* = 1. For HED, participants were asked "How often do you have six or more drinks on one occasion?" with answer categories ranging from *Never* = 0 to *Daily or almost daily* = 4. HED was dichotomized so that *HED less than monthly* = 0 and *HED monthly or more* = 1.

Everyday discrimination

An adapted version of the Everyday Discrimination Scale (EDS; Williams et al., 1997) was used, which measures chronic experiences of unfair treatment. Participants were asked "In your day-to-day life over the past year, how often did any of the following things happen to you?". Participants were presented nine forms of discrimination (e.g., being harassed, treated with less respect), and response options were recoded such that *Never* = 0, *Rarely* = 1, *Sometimes* = 2, and *Often* = 3. Items were summed so that higher scores reflected more frequently experiencing everyday discrimination (Cronbach's $\alpha = .91$).

Attribution of discrimination

Participants who endorsed one or more items on the EDS were asked why they believed they had experienced everyday discrimination. Response options included *age*, *sex*, *being transgender*, *gender expression or appearance*, *race/ethnicity*, *income level or education*, *sexual orientation*, *physical appearance*, *religion/spirituality*, and *disability*. We were interested in the independent effect of SOGIE-related discrimination, coded as discrimination attributed to *sexual orientation*, *gender identity*, or *gender expression*. A variable with four categories was created. The first category included participants that reported no discrimination and was coded as *No discrimination* = 0. The second category included participants who reported discrimination but none of it was SOGIE-related, which was coded as *Non-SOGIE-related only* = 1. Participants in the third category only attributed their experiences with discrimination to SOGIE, which was coded as *Only SOGIE-related* = 2. The last category included participants who reported discrimination and where at least one of the attributions of discrimination was SOGIE-related, which was coded as *Non-SOGIE and SOGIE-related* = 3.

Sex assigned at birth

In the *Generations* survey, participants were asked "What sex were you assigned at birth, on your original birth certificate?", with *Assigned female at birth* = 0 and *Assigned male at birth* = 1. However, 22 participants did not respond to this survey question and had missing data. To address this, the 22 participants with missing data on sex assigned at

birth were assigned a value based on the sex they reported on the GDTS, where participants were asked "I am required to ask, are you male or female?".

Sexual identity

Sexual identity was measured by the item "Which of the following best describes your current sexual orientation?" Response options included *straight/heterosexual, lesbian, gay, bisexual, queer, same-gender-loving,* and *other* (with write-in option; the most common write-in was *pansexual*). We created a sexual identity variable defined by sex to make more detailed comparisons. Categories were *Gay male* = 1, *Lesbian female* = 2, *Bisexual male* = 3, and *Bisexual female* = 4.

Non-binary gender identity

Participants were asked "If you had to choose only one of the following terms, then which best describes your current gender identity?" with answer options *woman, man, transgender woman/male-to-female (MTF), transgender man/female-to-male (FTM),* and *non-binary/genderqueer.* Although no transgender people were included in the study per sample design, some participants were cisgender (i.e., non-transgender) and identified as non-binary/genderqueer. For this analysis *woman* and *man* were coded as *Binary gender identity* = 0 and *non-binary/genderqueer* as *Non-binary gender identity* = 1.

Race/ethnicity

To assess race/ethnicity, participants were asked "Which of the following describes your race/ethnicity? Please mark all that apply". Response options were *Asian/Asian American* = 1, *Black/African American* = 2, *Hispanic, Latino, or Spanish Origin* = 3, *Middle Eastern/North African* = 4, *Native Hawaiian/Pacific Islander* = 5, *White* = 6, and *American Indian or Alaskan Native (write name of enrolled or principal tribe)* = 7. Those who selected more than one race/ethnicity were categorized as "*Multiracial*". After recoding, categories were *White* = 0, *Black/African American* = 1, *Hispanic, Latino, or Spanish Origin* = 2, *Multiracial/another race or ethnicity* = 3. Multiracial and another race or ethnicity were collapsed into one group because of small cell sizes.

Age cohort

The study was designed to include participants from three age cohorts: 18–25 years, 34–41 years, and 52–59 years.

Urbanicity

Using the participants' zip codes, urbanicity scores were calculated using the USDA Rural-Urban Commuting Area coding system (U.S. Department of Agriculture Economic Research Service, 2013). Scores smaller than 3 represent urban zip codes and scores higher than three rural zip codes.

Household income

In the *Generations* survey, participants were asked about their total annual household income before taxes. They had to include income from wages and salaries, money they received from family members living elsewhere, farming, and all other sources. Answer categories ranged from *Under $720* = 1 to *$240,000 and over* = 12.

Analytical approach

Firstly, *t*-tests, analyses of variance (ANOVA), and Chi-square tests were conducted to estimate differences in drinking frequency, HED, everyday discrimination, and the attribution of discrimination for sex assigned at birth and sexual identity. Next, stepwise logistic regression analyses were conducted. The effect of everyday discrimination on drinking frequency and HED was first estimated. Then, the effect of the attribution of discrimination on drinking frequency and HED was estimated to assess the additional effect of SOGIE-related discrimination. To do so, the *non-SOGIE-related only* category was recoded as the reference category in order to directly compare it to the *non-SOGIE and SOGIE-related* category. Models were stratified by sex and sexual identity. All models adjusted for non-binary gender identity, race/ethnicity, age cohort, urbanicity, and household income. Sampling weights were applied to provide representative estimates. Analyses were conducted in STATA 17 (StataCorp, 2021). In both the bivariate (*t*-tests, ANOVA, and Chi-square tests) and multivariate (logistic regression) analyses, we adjusted for multiple testing using the classical false discovery rate (FDR) method (Benjamini & Hochberg, 1995).

Missing data analyses (see Table 1 for rates of missingness) suggested that data were missing at random (MAR). To address missing data, 25 imputed datasets were estimated using chained equations in STATA (StataCorp, 2021).

Results

Bivariate analyses

Table 2 displays sex and sexual identity-based differences in drinking frequency, HED, everyday discrimination, and the attribution of discrimination. Only significant differences are discussed. Females (49.2%) reported a significant lower drinking frequency than males (56.5%) and females (*M* = 9.95, *SD* = 6.27) reported significantly more everyday discrimination than males (*M* = 7.97, *SD* = 6.71). For the attribution of discrimination, females (9.05%) were significantly less likely than males (14.4%) to report no discrimination, females (58.8%) were more likely to report non-SOGIE-related discrimination than males (44.4%), and females (4.4%) were less likely to report only SOGIE-related discrimination than males (13.2%).

For sexual identity, bisexual males (30.1%) reported significantly higher rates of HED than gay males (17.7%), lesbian females (16.2%), and bisexual females (15.6%). Further, bisexual females (*M* = 10.84. *SD* = 5.78) reported significantly higher rates of everyday discrimination than gay males (*M* = 7.58. *SD* = 6.78) and lesbian females (*M* = 8.45. *SD* = 6.72). For the attribution of discrimination, bisexual females (7.0%) were significantly less likely to

Table 2. Weighted bivariate analyses for sex assigned at birth and sexual identity with hazardous drinking, everyday discrimination, and the attribution of discrimination.

	Drinking frequency[a]			HED[a]			Everyday discrimination		Attribution of discrimination[a]				
	Less than monthly*	Monthly or more	p	Less than monthly	Monthly or more	p	M (SD)	p	No discrimination	Non-SOGIE-related only	Only SOGIE-related	Non-SOGIE and SOGIE-related	p
Sex assigned at birth			.03			.05		<.001					<.001
Male	43.5	56.5		79.2	21.8		7.97 (6.71)		14.4[a]	44.4 [a]	13.2[a]	28.0	
Female	50.8	49.2		84.2	15.8		9.95 (6.27)		9.05[a]	58.8 [a]	4.4[a]	27.8	
Sexual identity			.17			.01		<.001					<.001
Gay male	44.3	55.7		82.3[a]	17.7		7.58 (6.78)[a]		14.0[b]	39.7[bc]	16.3[bcd]	30.0	
Lesbian female	51.7	48.3		83.8[b]	16.2		8.45 (6.72)[b]		12.5	47.5[d]	8.9[be]	31.2	
Bisexual male	41.0	59.0		69.8[abc]	30.1		9.16 (6.26)		15.5	58.3[b]	4.3[c]	21.9	
Bisexual female	50.4	49.6		84.4[c]	15.6		10.84 (5.78)[ab]		7.0 [b]	65.5 [cd]	1.7[de]	25.8	

Notes: HED, Heavy episodic drinking.

Within each column, values with the same superscript indicate a significant difference. Thus, for means superscripts indicate significant mean differences between two groups and for weighted percentages superscripts indicate significant differences in likelihood between two groups. For sexual identity multiple comparisons were made. Therefore, the FDR method was used to control for multiple testing. For each outcome, the p values of all significance tests were ordered from smallest to largest. A result was statistically significant if for the ith-ordered p-value $p(i) \leq \alpha \times i/m$, where α was set at .05, i is the ranking in the order of p values, and m is the total number of tests conducted for a specific outcome.

*Weighted percentages are given.

report no discrimination than gay males (14.0%). Bisexual females (65.5%) were more likely to report non-SOGIE-related discrimination than gay males (39.7%) and lesbian females (47.5%), as were bisexual males (58.3%) compared to gay males. Lastly, bisexual females (1.7%) were less likely to report only-SOGIE-related discrimination than gay males (16.3%) and lesbian females (8.9%), as were lesbian females and bisexual males (4.3%) compared to gay males.

Discrimination and alcohol use

Table 3 displays logistic regression analyses of everyday discrimination and the attribution of discrimination with drinking frequency and HED for males. We first focused on gay males' drinking frequency, but we found no significant associations of everyday discrimination or the attribution of discrimination with drinking frequency. Concerning HED, gay males who reported non-SOGIE and SOGIE-related discrimination had higher odds of HED than gay males that reported non-SOGIE-related discrimination only (OR = 2.64; 95% CI [1.35,5.18]. No other significant effects were found. For bisexual males, no significant effect of everyday discrimination or the attribution of discrimination was found for both drinking frequency and HED.

Table 4 displays logistic regression analyses of everyday discrimination and the attribution of discrimination with drinking frequency and HED for females. Among lesbian females, no significant effect of everyday discrimination or the attribution of discrimination was found for drinking frequency or HED. Lesbian females with a higher annual household income had a higher drinking frequency (OR = 1.19; 95% CI [1.06,1.33]; see Model 1). Among bisexual females, no significant effect of everyday discrimination or the attribution of discrimination was found for drinking frequency or HED.

Discussion

This study aimed to assess how SOGIE-related discrimination is additive in affecting both drinking frequency and HED above and beyond non-SOGIE-related discrimination and to assess differences in drinking frequency and HED, everyday discrimination, and the attribution of discrimination by sex and sexual identity.

Contrary to our expectations, sexual minority females reported lower rates of drinking frequency than sexual minority males and no differences in HED were found. These findings suggest that sexual minority females are an at-risk group for alcohol use when compared to heterosexual females but not necessarily when compared to sexual minority males. Although studies directly testing sex patterns in alcohol use among sexual minority people have been mixed (Fish & Exten, 2020; Gillespie & Blackwell, 2009). Further, we found no sexual identity-based differences in drinking frequency. Bisexual males reported higher rates of HED than gay males, lesbian females, and bisexual females. These findings are noteworthy as the previous studies pointed especially to bisexual females as reporting larger disparities in alcohol use relative to their gay/lesbian peers when compared to heterosexual people (Hughes, Wilsnack, & Kantor, 2016; Talley et al., 2016), as well when directly compared to gay/lesbian people (Slater et al., 2017). This might suggest that bisexual people are especially an at-risk group for alcohol use when compared to heterosexual people but not necessarily when compared to lesbian or gay people. This implies that the alcohol use among sexual minority people is relatively high among all sexual identity subgroups and that policy should focus on reducing alcohol use among all sexual minority people at large, while also taking into account the needs of each subgroup.

Focusing on discrimination, in bivariate analyses, females reported more everyday discrimination than males. Females were more likely to report non-SOGIE-related

Table 3. Logistic regression analyses with everyday discrimination and the attribution of discrimination predicting drinking frequency and hazardous drinking among sexual minority males.

	Drinking frequency								HED							
	Gay males				Bisexual males				Gay males				Bisexual males			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Everyday discrimination	0.97	[0.93, 1.02]			1.01	[0.95, 1.09]			0.99	[0.94, 1.04]			1.00	[0.94, 1.07]		
Attribution of discrimination (Ref=Non-SOGIE-related only)																
Non-SOGIE and SOGIE-related			1.33	[0.77, 2.30]			0.75	[0.26, 2.14]			**2.64**	[1.35, 5.18]			0.88	[0.28, 2.81]
Only SOGIE-related			1.50	[0.79, 2.85]			1.50	[0.19, 12.20]			2.22	[0.97, 5.09]			0.39	[0.02, 6.57]
No discrimination			1.17	[0.59, 2.32]			0.69	[0.19, 2.50]			1.79	[0.76, 4.22]			0.61	[0.19, 2.00]
Non-binary gender identity (Ref=Binary)																
Non-binary	0.35	[0.07, 1.84]	0.27	[0.05, 1.50]	0.46	[0.11, 1.89]	0.47	[0.12, 1.92]	0.17	[0.02, 1.75]	0.13	[0.01, 1.47]	0.68	[0.15, 2.99]	0.65	[0.14, 3.02]
Race/ethnicity (Ref=White)																
Black/African American	0.74	[0.35, 1.58]	0.65	[0.31, 1.33]	0.25	[0.04, 1.79]	0.26	[0.04, 1.87]	0.58	[0.20, 1.70]	0.53	[0.18, 1.61]	3.85	[0.58, 25.74]	3.20	[0.51, 19.98]
Hispanic, Latino, or Spanish origin	0.85	[0.44, 1.66]	0.79	[0.44, 1.52]	2.34	[0.47, 11.71]	2.29	[0.42, 12.58]	1.14	[0.52, 2.53]	0.95	[0.42, 2.18]	0.77	[0.11, 5.53]	0.78	[0.12, 5.20]
Multiracial/another race/ethnicity	1.01	[0.49, 2.05]	0.98	[0.47, 2.03]	0.95	[0.33, 2.74]	0.95	[0.34, 2.70]	1.19	[0.55, 2.59]	1.09	[0.50, 2.38]	0.40	[0.11, 1.46]	0.38	[0.10, 1.44]
Age cohort (Ref = 18–25 years)																
34–41 years	1.33	[0.73, 2.42]	1.39	[0.76, 2.52]	3.30	[0.89, 12.18]	3.00	[0.73, 12.23]	0.65	[0.34, 1.26]	0.69	[0.36, 1.33]	2.12	[0.61, 7.35]	2.55	[0.76, 8.52]
52–59 years	1.30	[0.76, 2.23]	1.41	[0.83, 2.41]	1.36	[0.43, 4.28]	1.34	[0.42, 4.25]	0.45	[0.22, 0.91]	0.46	[0.22, 0.96]	1.04	[0.33, 3.29]	1.12	[0.36, 3.51]
Urbanicity	0.96	[0.84, 1.10]	0.95	[0.83, 1.09]	0.86	[0.71, 1.05]	0.88	[0.72, 1.07]	0.96	[0.74, 1.23]	0.94	[0.74, 1.19]	0.93	[0.75, 1.16]	0.94	[0.76, 1.17]
Household income	1.08	[0.99, 1.18]	1.10	[1.00, 1.20]	1.06	[0.89, 1.26]	1.06	[0.89, 1.25]	1.06	[0.94, 1.18]	1.08	[0.96, 1.20]	0.94	[0.78, 1.14]	0.94	[0.77, 1.13]

Note: OR, Odds ratio; CI, Confidence interval; HED, Heavy episodic drinking; and Ref, Reference group.
The FDR method was used to control for multiple testing. For each model, the p values of all significance tests were ordered from smallest to largest. A result was statistically significant if for the ith ordered p value $p(i) \le \alpha \times i/m$, where α was set at .05, i is the ranking in the order of p values, and m is the total number of tests conducted in a specific model. Bold numbers indicate significance at the $p < .05$ level.

Table 4. Logistic regression analyses with everyday discrimination and the attribution of discrimination predicting drinking frequency and hazardous drinking among sexual minority females.

	Drinking frequency								HED							
	Lesbian females				Bisexual females				Lesbian females				Bisexual females			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Everyday discrimination	1.05	[0.99, 1.10]			1.00	[0.96, 1.04]			1.04	[0.95, 1.13]			1.04	[0.99, 1.10]		
Attribution of discrimination (Ref=Non-SOGIE-related only)																
Non-SOGIE and SOGIE-related			0.99	[0.48, 2.05]			0.66	[0.35, 1.26]			0.98	[0.38, 2.55]			0.82	[0.36, 1.84]
Only SOGIE-related			2.55	[0.79, 8.27]			–	–			3.84	[1.13, 13.09]			–	–
No discrimination			0.82	[0.36, 1.90]			0.80	[0.33, 1.94]			2.19	[0.64, 7.48]			0.13	[0.01, 1.21]
Non-binary gender identity (Ref=Binary)																
Non-binary	0.31	[0.07, 1.32]	0.30	[0.06, 1.43]	0.43	[0.09, 2.04]	0.45	[0.09, 2.23]	0.37	[0.03, 4.50]	0.38	[0.03, 5.07]	–	–	–	–
Race/ethnicity (Ref=White)																
Black/African American	1.10	[0.46, 2.63]	1.27	[0.53, 3.02]	0.76	[0.35, 1.66]	0.75	[0.33, 1.69]	2.03	[0.73, 5.68]	2.45	[0.91, 6.56]	1.01	[0.38, 2.70]	1.12	[0.42, 2.98]
Hispanic, Latino, or Spanish origin	0.83	[0.30, 2.33]	0.93	[0.33, 2.59]	0.93	[0.39, 2.24]	0.86	[0.36, 2.02]	3.91	[1.20, 12.73]	4.90	[1.48, 16.22]	1.72	[0.52, 5.69]	1.58	[0.48, 5.23]
Multiracial/Another race/ethnicity	1.04	[0.41, 2.69]	1.21	[0.47, 3.11]	0.89	[0.46, 1.73]	0.93	[0.48, 1.80]	2.84	[0.96, 8.42]	3.75	[1.31, 10.77]	1.42	[0.61, 3.30]	1.36	[0.59, 3.14]
Age cohort (Ref = 18–25 years)																
34–41 years	1.31	[0.58, 2.94]	1.40	[0.61, 3.17]	2.09	[1.16, 3.76]	2.13	[1.17, 3.87]	1.69	[0.65, 4.39]	2.05	[0.74, 5.70]	1.10	[0.51, 2.36]	1.09	[0.50, 2.38]
52–59 years	1.30	[0.64, 2.65]	1.31	[0.65, 2.65]	1.11	[0.50, 2.47]	1.14	[0.51, 2.55]	0.90	[0.36, 2.25]	0.90	[0.34, 2.35]	1.82	[0.52, 6.32]	1.72	[0.51, 5.79]
Urbanicity	0.91	[0.79, 1.05]	0.91	[0.79, 1.05]	1.10	[0.94, 1.28]	1.09	[0.94, 1.26]	1.05	[0.87, 1.26]	1.04	[0.88, 1.23]	1.15	[0.99, 1.34]	1.16	[0.98, 1.38]
Household income	**1.19**	[1.06, 1.33]	1.16	[1.04, 1.30]	1.00	[0.90, 1.10]	0.98	[0.89, 1.08]	0.92	[0.78, 1.09]	0.90	[0.77, 1.05]	0.91	[0.78, 1.05]	0.88	[0.75, 1.02]

Notes: OR, odds ratio; CI, confidence interval; Ref, reference group.
The FDR method was used to control for multiple testing. For each model, the p values of all significance tests were ordered from smallest to largest. A result was statistically significant if for the ith-ordered p-value $p(i) \le \alpha \times i/m$, where α was set at .05, i is the ranking in the order of p values, and m is the total number of tests conducted in a specific model.
Bold numbers indicate significance at the $p < .05$ level.

discrimination than males and were less likely to report SOGIE-related discrimination than males. These higher rates of everyday discrimination and discrimination attributed to non-SOGIE among females might be related to the intersection of marginalized identities: being a sexual minority *and* a woman makes one dually vulnerable to distinct and overlapping forms of stigma (e.g., homophobia and sexism; Bostwick et al., 2010). Further, bisexual females reported higher rates of everyday discrimination than gay males and lesbian females. Concerning the attribution of discrimination, bisexual females reported more discrimination attributed to non-SOGIE than gay males and lesbian females, as were bisexual males compared to gay males. For only-SOGIE-related discrimination, lesbian females, bisexual males, and bisexual females were less likely to report discrimination attributed to only SOGIE than gay males. Additionally, bisexual females reported less only-SOGIE-related discrimination than lesbian females. Given that bisexual people may experience more everyday discrimination, yet less SOGIE-related discrimination, our results may point to the role of everyday discrimination in response to non-normative gender or sexuality expressions, even among sexual minorities.

Contrary to expectations, sex and sexual identity-stratified analyses suggested few associations between everyday discrimination, the attribution of discrimination, drinking frequency, and HED. Only among gay males we found that those who reported discrimination attributed to non-SOGIE and SOGIE had higher odds of HED than those who reported discrimination attributed to only non-SOGIE. This was in line with our hypotheses that SOGIE-related discrimination affects alcohol use above and beyond non-SOGIE-related discrimination. That this was found specifically for HED and might reflect that experiencing discrimination illicit heavier alcohol use among gay males, which might be an avenue for further research.

Finding few associations of discrimination and the attribution of discrimination with alcohol use points to the importance of other mechanisms to explain alcohol use among sexual minority people. Other mechanisms from the minority stress framework could explain alcohol use. Whereas discrimination is a more objective and external minority stressor, several proximal minority stressors, understood as subjective and internal, may be associated with alcohol use by sexual minority people, namely the expectation of rejection, concealment, and internalized stigma (Meyer, 2003). A recent meta-analysis found a small negative correlation between concealment and alcohol use (Pachankis et al., 2020) and another meta-analysis found a small correlation between internalized homophobia and alcohol use (Huynh et al., 2022). Thus, proximal minority stressors may not be likely mechanisms for explaining alcohol use.

Several mechanisms besides those related to minority stress bear further study. For example, alcohol use expectancies are different among sexual minority populations and might explain their higher alcohol use (Green & Feinstein, 2012). A recent review has pointed to perceived substance use norms as a reliable predictor of sexual minority people's

substance use (Boyle et al., 2020). Further, studies among sexual minority women found that alcohol expectancies were strong predictors of alcohol abuse (Fish & Hughes, 2018) and that women with greater normative expectations of alcohol use drank more alcohol (Lee et al., 2016). Alternatively, drinking alcohol primarily as a coping mechanism could also explain some of the current study's null findings. A study found that the extent one drinks to cope, rather than one's exposure to discrimination, was related to problematic drinking in sexual minorities (Hatzenbuehler et al., 2011). A different mechanism that could explain alcohol use among sexual minority people is community connectedness or community participation. On the one hand, greater community connectedness can be a protective factor as it might offer people support and buffer against the negative effect of discrimination (Meyer, 2003). On the other hand, community connectedness and participation were associated with higher alcohol use where differences by sexual identity have been identified (Demant et al., 2018; Feinstein et al., 2017). Thus, the future research should take a broader look at how stigma, individual and community alcohol expectancies, and coping styles independently and together affect alcohol use among sexual minority people, as well as community connectedness.

Using a national probability sample could also have led to the unexpected findings in the current study. Sexual minority participants from non-probability samples report more negative reactions to their sexual orientation than participants in probability samples (Kuyper et al., 2016). It could thus be that participants in our sample had less severe experiences with discrimination than those in non-probability samples and, in turn, relied less on alcohol use as a coping response. Further, we assessed monthly drinking frequency and HED, which might not accurately capture the experiences of people who use alcohol to cope with everyday discrimination and resulted in the current null findings. Although the previous research also assessed, for instance, monthly HED (Dawson et al., 2015).

Taken together, our findings from a national probability sample identify distinct sexual identity differences in everyday discrimination and the attribution of discrimination. Findings also highlighted the need to study other mechanisms in addition to everyday discrimination that drive alcohol use among sexual minority people. Policymakers and program providers would benefit from knowing how other mechanisms may also drive alcohol use among sexual minority people.

Limitations and future directions

Firstly, participants with diverse sexual identities (i.e., queer, same-gender-loving) were omitted from current analyses because of their small numbers. To better understand associations between discrimination and alcohol use for distinct identity subgroups, we strongly encourage future research to study the associations of discrimination and hazardous drinking among people who do not identify with typical sexual identity labels. Secondly, although the study uses a probability sample of sexual minority people, participants

were only eligible for inclusion if they identified as either Black, Latino, or White or if they fell into three specific age cohorts. Findings can, therefore, only be generalized to these groups. Future research is needed to replicate the findings presented here and expand this work to reflect more racial/ethnic and age diversity. Thirdly, our study is cross-sectional and unable to tease apart the degree to which discrimination causally contributes to alcohol use. Recent experimental work among a sample of sexual minority heavy drinkers suggested that exposure to stigma activates alcohol cravings, offering support for potential causal pathways from discrimination to hazardous drinking (Mereish & Miranda, 2019). Longitudinal work is needed to understand better how lifetime and everyday experiences with discrimination—SOGIE or otherwise—influence alcohol use across the life course. Lastly, although we measured HED, a measure of high-risk alcohol use, research on alcohol use among sexual minority people should incorporate other measures of high-risk alcohol use such as heavy alcohol use and criterion for DSM-5 alcohol abuse and how these are predicted by everyday discrimination and the attribution of discrimination.

Conclusion

The present findings suggest sex and sexual identity-based differences in everyday discrimination, the attribution of discrimination, and drinking frequency and HED. Only among gay men exposure to additional SOGIE-related stressors raised the odds of HED. At large, findings point to the importance of studying additional facets of the minority stress process and other potential mechanisms to better understand and intervene to reduce the elevated risk of alcohol use among sexual minority people.

Disclosure statement

The authors declare that they have no conflict of interest. The authors alone are responsible for the content and writing of the article.

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References

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological) 57*(1), 289–300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

Biggs, A., Brought, P., & Drummond, S. (2017). Lazurus and Folkman's psychological stress and coping theory. In C. L. Cooper & J. Campbell Quick (Eds.), *The Handbook of stress and health: A guide to research and practice* (pp. 351–364). Wiley Blackwell.

Bostwick, W. B., Boyd, C. J., Hughes, T. L., & Mcabe, Sean. Esteban. (2010). Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the united states. *American Journal of Public Health, 100*(3), 468–475. https://doi.org/10.2105/AJPH.2008.152942

Bostwick, W. B., Boyd, C. J., Hughes, T. L., West, B., & McCabe, S. E. (2014). Discrimination and mental health among lesbian, gay, and bisexual adults in the United States. *The American Journal of orthopsychiatry 84*(1), 35–45. https://doi.org/10.1037/h0098851

Boyle, S. C., LaBrie, J. W., & Omoto, A. M. (2020). Normative substance use antecedents among sexual minorities: A scoping review and synthesis. *Psychology of Sexual Orientation and Gender diversity 7*(2), 117–131. https://doi.org/10.1037/sgd0000373

Corliss, H. L., Rosario, M., Wypij, D., Fisher, L. B., & Austin, S. B. (2008). Sexual orientation disparities in longitudinal alcohol use patterns among adolescents: findings from the growing up today study. *Archives of Pediatrics & Adolescent medicine 162*(11), 1071–1078. https://doi.org/10.1001/archpedi.162.11.1071

Dawson, D. A., Goldstein, R. B., Saha, T. D., & Grant, B. F. (2015). Changes in alcohol consumption: United States, 2001-2002 to 2012-2013. *Drug and Alcohol dependence 148*, 56–61. https://doi.org/10.1016/j.drugalcdep.2014.12.016

Demant, D., Hides, L., White, K. M., & Kavanagh, D. J. (2018). Effects of participation in and connectedness to the LGBT community on substance use involvement of sexual minority young people. *Addictive Behaviors 81*, 167–174. https://doi.org/10.1016/j.addbeh.2018.01.028

Eisner, S. (2013). *Bi: Notes for a bisexual revolution*. Seal Press.

Feinstein, B. A., Dyar, C., & London, B. (2017). Are outness and community involvement risk or protective factors for alcohol and drug abuse among sexual minority women? *Archives of Sexual Behavior 46*(5), 1411–1423. https://doi.org/10.1007/s10508-016-0790-7

Fish, J. N., & Exten, C. (2020). Sexual orientation differences in alcohol use disorder across the adult life course. *American Journal of Preventive Medicine 59*(3), 428–436. https://doi.org/10.1016/j.amepre.2020.04.012

Fish, J. N., & Hughes, T. L. (2018). Alcohol expectancies, heavy drinking, and indicators of alcohol use disorders in a community-based sample of lesbian and bisexual women. *LGBT Health 5*(2), 105–111. https://doi.org/10.1089/lgbt.2017.0145

Fish, J. N., Hughes, T. L., & Russell, S. T. (2018). Sexual identity differences in high-intensity binge drinking: Findings from a US national sample. *Addiction (Abingdon, England) 113*(4), 749–758. https://doi.org/10.1111/add.14041

Gilbert, P. A., & Zemore, S. E. (2016). Discrimination and drinking: A systematic review of the evidence. *Social Science & Medicine (1982) 161*, 178–194. https://doi.org/10.1016/j.socscimed.2016.06.009

Gillespie, W., & Blackwell, R. L. (2009). Substance use patterns and consequences among lesbians, gays, and bisexuals. *Journal of Gay & Lesbian Social Services 21*(1), 90–108. https://doi.org/10.1080/10538720802490758

Grant, B. F., Chou, S. P., Saha, T. D., Pickering, R. P., Kerridge, B. T., Ruan, W. J., Huang, B., Jung, J., Zhang, H., Fan, A., & Hasin, D. S. (2017). Prevalence of 12-month alcohol use, high-risk drinking, and DSM-IV alcohol use disorder in the United States, 2001-2002 to 2012-2013: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *JAMA Psychiatry 74*(9), 911–923. https://doi.org/10.1001/jamapsychiatry.2017.2161

Green, K. E., & Feinstein, B. A. (2012). Substance use in lesbian, gay, and bisexual populations: An update on empirical research and implications for treatment. *Psychology of Addictive Behaviors: journal of the Society of Psychologists in Addictive Behaviors 26*(2), 265–278. https://doi.org/10.1037/a0025424

Hatzenbuehler, M. L. (2009). How does sexual minority stigma "get under the skin"? A psychological mediation framework. *Psychological Bulletin 135*(5), 707–730. https://doi.org/10.1037/a0016441

Hatzenbuehler, M. L., Corbin, W. R., & Fromme, K. (2011). Discrimination and alcohol-related problems among college students: A prospective examination of mediating effects. *Drug and Alcohol*

Dependence 115(3), 213–220. https://doi.org/10.1016/j.drugalc-dep.2010.11.002

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: Current Reviews, 38*(1), 121–132.

Huynh, K. D., Murgo, M. A. J., & Lee, D. L. (2022). Internalized heterosexism and substance use: A meta-analysis. *The Counseling Psychologist*, . https://doi.org/10.1177/00110000221086910

Katz-Wise, S. L., & Hyde, J. S. (2012). Victimization experiences of lesbian, gay, and bisexual individuals: A meta-analysis. *Journal of Sex Research, 49*(2–3), 142–167. https://doi.org/10.1080/00224499.2011.637247

Kerridge, B. T., Pickering, R. P., Saha, T. D., Ruan, W. J., Chou, S. P., Zhang, H., Jung, J., & Hasin, D. S. (2017). Prevalence, sociodemographic correlates and DSM-5 substance use disorders and other psychiatric disorders among sexual minorities in the United States. *Drug and Alcohol Dependence 176*, 139–148. https://doi.org/10.1016/j.physbeh.2017.03.040

Krueger, E. A., Fish, J. N., & Upchurch, D. M. (2020). Sexual orientation disparities in substance use: Investigating social stress mechanisms in a national sample. *American Journal of Preventive medicine 58*(1), 59–68. https://doi.org/10.1016/j.amepre.2019.08.034

Krueger, E. A., Lin, A., Kittle, K. R., & Meyer, I. H. (2020). Generations - A study of the life and health of LGB people in a changing society (Methodology and technical notes, Gallup Quantitative Survey). Los Angeles, CA: The Williams Institute. Retrieved from: http://www.generationsstudy.com/s/Generations-Quantitative-Survey-Methods-v20_copy.pdf

Kuyper, L., Fernee, H., & Keuzenkamp, S. (2016). A comparative analysis of a community and general sample of lesbian, gay, and bisexual individuals. *Archives of Sexual Behavior 45*(3), 683–693. https://doi.org/10.1007/s10508-014-0457-1

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Lee, C. M., Blayney, J., Rhew, I. C., Lewis, M. A., & Kaysen, D. (2016). College status, perceived drinking norms, and alcohol use among sexual minority women. *Psychology of Sexual Orientation and Gender Diversity 3*(1), 104–112. https://doi.org/10.1037/sgd0000142

Lee, J. H., Gamarel, K. E., Bryant, K. J., Zaller, N. D., & Operario, D. (2016). Discrimination, mental health, and substance use disorders among sexual minority populations. *LGBT Health, 3*(4), 258–265. https://doi.org/10.1089/lgbt.2015.0135

Macleod, M. A., Bauer, G. R., Robinson, M., Mackay, J., & Ross, L. E. (2015). Biphobia and anxiety among bisexuals in Ontario, Canada. *Journal of Gay & Lesbian Mental Health, 19*(3), 217–243. https://doi.org/10.1080/19359705.2014.1003121

McCabe, S. E., Hughes, T. L., West, B. T., Veliz, P., & Boyd, C. J. (2019). DSM-5 alcohol use disorder severity as a function of sexual orientation discrimination: A national study. *Alcoholism, Clinical and Experimental Research 43*(3), 497–508. https://doi.org/10.1111/acer.13960

Mereish, E. H., & Miranda, R. (2019). Exposure to stigma elicits negative affect and alcohol craving among young adult sexual mi-nority heavy drinkers. *Alcoholism, Clinical and Experimental Research 43*(6), 1263–1272. https://doi.org/10.1111/acer.14055

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin 129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674

Meyer, I. H., Marken, S., Russell, S. T., Frost, D. M., & Wilson, B. D. M. (2020). An innovative approach to the design of a national probability sample of sexual minority adults. *LGBT Health 7*(2), 101–108. https://doi.org/10.1089/lgbt.2019.0145

Pachankis, J. E., Mahon, C. P., Jackson, S. D., Fetzner, B. K., & Bränström, R. (2020). Sexual orientation concealment and mental health: A conceptual and meta-analytic review. *Psychological Bulletin 146*(10), 831–871. https://doi.org/10.1037/bul0000271

Plöderl, M., & Tremblay, P. (2015). Mental health of sexual minorities. A systematic review. *International Review of Psychiatry (Abingdon, England) 27*(5), 367–385. https://doi.org/10.3109/09540261.2015.1083949

Rehm, J. (2011). The risk associated with alcohol use and alcoholism. *Alcohol Research & Health: The Journal of the National Institute on Alcohol Abuse and Alcoholism 34*(2), 135–143.

Scherrer, K. S., Kazyak, E., & Schmitz, R. (2015). Getting "bi" in the family: Bisexual people's disclosure experiences. *Journal of Marriage and Family, 77*(3), 680–696. https://doi.org/10.1111/jomf.12190

Schuler, M. S., & Collins, R. L. (2020). Sexual minority substance use disparities: Bisexual women at elevated risk relative to other sexual minority groups. *Drug and Alcohol dependence 206*, 107755. https://doi.org/10.1016/j.drugalcdep.2019.107755

Shield, K. D., Monteiro, M., Roerecke, M., Smith, B., & Rehm, J. (2015). Alcohol consumption and burden of disease in the Americas: implications for alcohol policy. *Pan American Journal of Public Health* [*Revista Panamericana de Salud Publica*] *18*(4/5), 241–248. https://doi.org/10.1590/s1020-49892005000900003

Slater, M. E., Godette, D., Huang, B., Ruan, W. J., & Kerridge, B. T. (2017). Sexual orientation-based discrimination, excessive alcohol use, and substance use disorders among sexual minority adults. *LGBT health 4*(5), 337–344. https://doi.org/10.1089/lgbt.2016.0117

StataCorp. (2021). *Stata Statistical Software: Release 17*. StataCorp LLC.

Talley, A. E., Gilbert, P. A., Mitchell, J., Goldbach, J., Marshall, B. D. L., & Kaysen, D. (2016). Addressing gaps on risk and resilience factors for alcohol use outcomes in sexual and gender minority populations. *Drug and Alcohol Review 35*(4), 484–493. https://doi.org/10.1111/dar.12387

U.S. Department of Agriculture Economic Research Service. (2013). *Rural–Urban Commuting Area Codes*.

Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *Journal of Health Psychology 2*(3), 335–351. https://doi.org/10.1177/135910539700200305

Wills, T. A., & Hirky, A. E. (1996). Coping and substance abuse: A theoretical model and review of the evidence. In M. Zeidner & N. S. Endler (Eds.), *Handbook of coping: Theory research, and applications* (pp. 279–302). John Wiley & Sons.