

Sexual Orientation-Based Discrimination, Excessive Alcohol Use, and Substance Use Disorders Among Sexual Minority Adults

Megan E. Slater, PhD,¹ Dionne Godette, PhD,² Boji Huang, MD, PhD,²
W. June Ruan, MA,² and Bradley T. Kerridge, PhD³

Abstract

Purpose: The purpose of this study was to examine relationships between sexual orientation-based discrimination and excessive alcohol use and substance use disorders and to identify how these relationships differ by sexual identity, sex, race, Hispanic origin, and education among sexual minorities.

Methods: We used logistic regression to analyze associations between discrimination and substance use measures among 1351 gay/lesbian, bisexual, or unsure adults from a nationally representative survey. Differential effects by sexual identity, sex, race, Hispanic origin, and education were assessed using interaction models followed by stratified models.

Results: Discrimination was associated with increased odds of the following: exceeding weekly drinking limits [adjusted odds ratio (aOR) = 1.52, 95% confidence interval (CI): 1.12–2.08] among bisexuals, any substance use disorder (aOR = 2.04, 95% CI: 1.41–2.95) and nicotine use disorder (aOR = 1.52, 95% CI: 1.08–2.14) among Hispanic sexual minorities, and exceeding weekly drinking limits (aOR = 1.56, 95% CI: 1.08–2.26) among those with a high school degree or less.

Conclusion: Sexual orientation-based discrimination was associated with select substance use outcomes, especially among bisexuals, Hispanics, and less educated sexual minority adults, highlighting potential disparities associated with experiencing discrimination.

Keywords: epidemiology, health disparities, minority stress, sexual orientation

Introduction

DESPITE AN OVERALL EXPANSION of social acceptance and legal rights and protections for sexual minorities over the past several decades,¹ the proportion of lesbian, gay, and bisexual (LGB) adults who report experiencing past-year sexual orientation-based discrimination remains at nearly 40%.² As of January 2017, 28 states lacked nondiscrimination laws or policies that prohibit sexual orientation-based discrimination in housing or private sector employment, and 29 states were without nondiscrimination laws or policies that prohibit sexual orientation-based discrimination in public accommodations (e.g., retail stores, rental and service establishments, educational institutions, recreational facilities, and service centers).³

Discriminatory experiences, whether at the institutional or individual level, act as stressors in the lives of those

who encounter them, and there is a well-established relationship between stress and poor mental and physical health outcomes, including outcomes related to problematic substance use.^{4,5} Meyer's minority stress model,^{6,7} along with supporting evidence, suggests that experiencing stress in the form of sexual orientation-based discrimination can contribute to harmful coping mechanisms by mediating the relationship between sexual orientation and negative outcomes such as excessive alcohol use and substance use disorders.^{8,9} Excessive alcohol use and substance use disorders are believed to affect certain groups of sexual minority adults disproportionately,^{10,11} and they have been associated with experiences of sexual orientation-based discrimination in prior studies.^{2,12–16}

In addition, according to Meyer's minority stress model, associations between sexual orientation-based discrimination and substance use outcomes might differ by minority identity (e.g., gay, lesbian, bisexual, Hispanic, and woman).⁶ However,

¹CSR, Incorporated, Arlington, Virginia.

²National Institute on Alcohol Abuse and Alcoholism, Rockville, Maryland.

³Department of Epidemiology, Columbia University Mailman School of Public Health, New York, New York.

evidence of differential effects of these identities (in regards to associations between sexual orientation-based discrimination and substance use outcomes) is scarce.¹⁶ One prior study has observed differential effects by sex: sexual orientation-based discrimination was associated with lifetime substance use disorders for sexual minority males but not females from the 2004 to 2005 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).¹⁵ Weber¹³ investigated potential differential effects of sexual identity (e.g., gay, lesbian, bisexual, and asexual), but found no significant differences in internalized homophobia or exposure to heterosexist events for LGB respondents based on their substance use disorder status.

A recent review highlighted the increased risks of alcohol use and/or alcohol-related problems among lesbian and bisexual women, Black and Hispanic sexual minority women, and sexual minorities with less than a bachelor's degree.¹¹ Therefore, in the current study we sought to expand the limited evidence base by examining associations between sexual orientation-based discrimination and excessive alcohol use and substance use disorders and identifying possible differential effects by sexual identity, sex, race, Hispanic origin, and education among sexual minority adults from a large nationally representative survey, the NESARC-III. We tested the following hypotheses: (1) Frequency of sexual orientation-based discrimination is associated with increased odds of excessive alcohol use and substance use disorders; and (2) associations between discrimination and excessive alcohol use and/or substance use disorders are more apparent among more marginalized groups of sexual minorities.

Methods

The NESARC-III surveyed a nationally representative sample of 36,309 adults in 2012–2013 with an overall response rate of 60.1%.¹⁷ The target population was the civilian noninstitutionalized population in the United States, ages 18 or older. Data were collected in face-to-face computer-assisted interviews conducted in respondents' households. *The Alcohol Use Disorder and Associated Disabilities Interview Schedule—Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) Version (AUDADIS-5)* from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) was used as the diagnostic interview.¹⁸ The research protocol was approved by the institutional review boards (IRBs) of the National Institutes of Health and Westat (contractor for the NESARC-III). This IRB review and approval extends to studies that are conducted by NIAAA and its contractors. Additional details about the NESARC-III design and methods are reported elsewhere.¹⁷

Measures

To assess sexual identity, respondents were shown a pre-printed response card and asked to select the category that best described them. Response options included (1) heterosexual (straight), (2) gay or lesbian, (3) bisexual, or (4) not sure. Respondents who selected gay/lesbian, bisexual, or not sure were included in our analyses. Some evidence has suggested that respondents who indicate that they are unsure about their sexual identity may be at higher risk of mental health problems,^{6,19,20} and respondents who identify as “mostly heterosexual” have the highest rates of substance

use compared to exclusively heterosexual respondents.^{21–23} Inclusion of the “not sure” sexual identity option may have facilitated inclusion of a portion of sexual minorities who are either unsure or “mostly heterosexual” and consistently missing from other studies that use three-category measures of sexual identity (i.e., heterosexual, gay/lesbian, or bisexual).^{24,25} For these reasons, we chose to include respondents who selected “not sure” in our analysis. Results did not differ substantially when the “not sure” group was excluded from analyses.

Sexual orientation-based discrimination was measured using questions derived from the Experiences of Discrimination scales developed by Krieger and Sidney.²⁶ Sexual minority respondents were asked to report how often (on a scale from never=0 to very often=4) during the past 12 months they experienced discrimination because they were assumed to be gay, lesbian, or bisexual in the following scenarios: (1) ability to obtain healthcare or health insurance coverage; (2) healthcare treatment; (3) in public settings such as on the street, in stores, or in restaurants; (4) other situations such as obtaining a job or on the job, getting admitted to a school or training program, in the courts, or by the police; (5) verbal harassment; and (6) physical assault or threats of harm. We summed the six responses to create a continuous measure of discrimination with the range from 0, never experiencing discrimination for all 6 scenarios, to 24, experiencing discrimination very often for all 6 scenarios. Because this measure included 0 values and was highly right-skewed, it was log-transformed (i.e., $\ln(\text{sum} + 1)$) before being entered into regression models. For respondents missing up to two of the six questions ($n=8$), missing values were imputed with the median value (median=0 for all six questions) before summation. For respondents missing three or more of the six discrimination scenario questions ($n=21$), no imputed value was assigned before summation; thus, these respondents were excluded from analyses.

We examined the following dichotomous (yes vs. no) substance use measures (all pertaining to the past 12 months) from the AUDADIS-5:

- heavy episodic drinking—defined as drinking 4 or more drinks (for men ages 65 and older and all women) or 5 or more drinks (for men under age 65) in 2 hours or less at least once per week;
- exceeding daily drinking limits—defined as meeting the following criteria at least once per week: drinking four or more drinks (for men ages 65 and older and all women) or five or more drinks (for men under age 65) in a single day; or the usual or largest ethanol intake of any beverage type exceeded 2.1 ounces of ethanol (i.e., 3.5 standard drinks) (for men ages 65 and older and all women) or exceeded 2.7 ounces of ethanol (i.e., 4.5 standard drinks) (for men under age 65);
- exceeding weekly drinking limits—defined as drinking more than 7 drinks (for men ages 65 and older and all women) or more than 14 drinks (for men under age 65) per week;
- any substance use disorder—defined as meeting the *DSM-5* criteria for an alcohol use disorder, nicotine use disorder, or drug use disorder;
- alcohol use disorder—defined as meeting the *DSM-5* criteria for an alcohol use disorder;

- nicotine use disorder—defined as meeting the *DSM-5* criteria for a nicotine use disorder; and
- drug use disorder—defined as meeting the *DSM-5* criteria for a/an sedative, marijuana, opioid, cocaine, stimulant, hallucinogen, inhalant/solvent, club drug, heroin, or other drug use disorder.

Statistical analysis

All analyses were completed using SAS version 9.3 (SAS Institute Inc., Cary, NC) with sampling weights and appropriate survey procedures to account for the complex survey design. Logistic regression models were used to examine associations between sexual orientation-based discrimination and substance use measures (separate model for each substance use measure). To identify differential effects by sexual identity, sex, race, Hispanic origin, and education, interactions were first assessed using multiple logistic regression with interaction terms. When an interaction term was statistically significant ($P < 0.05$), we conducted stratified multiple logistic regression models to describe differential effects. In this study, we presented stratified results for sexual identity, Hispanic origin, and education, but not for sex or race. All models controlled for age, sex, and race. When appropriate, models also controlled for sexual identity, Hispanic origin, and education. Respondents with missing data on discrimination or outcome variables were excluded from relevant models. The statistical significance level was set at $P < 0.05$.

Results

Approximately 3.3% (weighted percentage; unweighted sample size = 1351 out of 36,309 total respondents) of the NESARC-III population identified as gay/lesbian ($n = 586$), bisexual ($n = 566$), or unsure ($n = 199$) and were included in our analyses. Table 1 presents selected characteristics of these sexual minority adults by sexual identity. Similar to samples of sexual minority adults from other nationally representative surveys,^{27,28} over half were female (56.7%), 66% were between the ages of 18 and 44 years, 85% were non-Hispanic, and 63.5% had completed at least some college. As previously reported for the NESARC-III population,²⁹ males were more likely than females to report a gay/lesbian identity (58% male vs. 42% female), while females were more likely than males to identify as bisexual (71% female vs. 29% male) or unsure (61% female vs. 39% male). Among gay/lesbian respondents, only 28% had a high school degree or less education, whereas 52% of unsure respondents had a high school degree or less. Nearly half of all respondents (47%) reported any substance use disorder in the past 12 months, including 45% of gay/lesbian respondents, 52% of bisexual respondents, and 40% of unsure respondents. Nearly 50% of gay/lesbian, 23% of bisexual, and 13% of unsure respondents reported experiencing sexual orientation-based discrimination in the past 12 months.

Among sexual minority adults, higher frequency of sexual orientation-based discrimination was associated with greater odds of any substance use disorder [adjusted odds ratio (aOR) = 1.23, 95% confidence interval (CI): 1.05–1.44] and alcohol use disorder (aOR = 1.29, 95% CI: 1.06–1.57) (Table 2). There were no indications of differential effects by sex or race, as all interaction terms for these two covari-

ates failed to reach statistical significance; thus, results were aggregated across sex and race in this article.

A significant interaction effect was observed between sexual identity and sexual orientation-based discrimination for the outcome of exceeding weekly drinking limits (interaction $P = 0.033$) (Table 3). When stratified by sexual identity, discrimination was associated with increased odds of exceeding weekly drinking limits among bisexual adults only (aOR = 1.52, 95% CI: 1.12–2.08). Significant interaction effects were also noted between Hispanic origin and sexual orientation-based discrimination for any substance use disorder (interaction $P = 0.028$) and nicotine use disorder (interaction $P = 0.024$). In stratified models, sexual orientation-based discrimination was associated with increased odds of any substance use disorder (aOR = 2.04, 95% CI: 1.41–2.95) and nicotine use disorder (aOR = 1.52, 95% CI: 1.08–2.14) among Hispanic sexual minority adults. Estimates did not change substantially with the inclusion of Hispanic origin-based discrimination (measured among Hispanic respondents only using the same methodology as was used for sexual orientation-based discrimination, data not shown), which was, therefore, not retained in the final models. Finally, there was a significant interaction effect between education and sexual orientation-based discrimination for exceeding weekly drinking limits (interaction $P = 0.038$). When stratified by level of education, discrimination was associated with increased odds of exceeding weekly drinking limits (aOR = 1.56, 95% CI: 1.08–2.26) among sexual minority adults with a high school degree or less.

Discussion

The results of this study revealed that experiencing sexual orientation-based discrimination more frequently may be associated with increased odds of excessive alcohol use and substance use disorders in sexual minority adults, especially among bisexuals, Hispanics, and those with a high school degree or less. These findings provide additional support for the assertion from Meyer's minority stress model that discrimination can contribute to the risk of substance use problems in sexual minority adults.^{6,7} While our hypotheses regarding associations among more marginalized groups of sexual minorities were generally supported by our results for sexual identity, Hispanic origin, and education, the results for sex and race did not align with our hypotheses. Further work is needed in this area to confirm the replicability of these findings.

Our results implied that bisexual adults and sexual minority adults with less education, in particular, may be more likely to exceed weekly drinking limits in the presence of sexual orientation-based discrimination. Therefore, these two sexual minority subgroups may serve as suitable target groups for efforts to prevent or mitigate this specific behavior (i.e., exceeding weekly drinking limits). It has been suggested that bisexuals face additional minority stress due to marginality from both the straight and gay communities and may experience internalized biphobia (in addition to internalized homophobia) as a result of this dual marginalization.^{13,30} Relationships between these internalizations and excessive alcohol use deserve further attention in future studies. Sexual minorities with less education may similarly be exposed to more negative life events and chronic stressors

TABLE 1. SELECTED CHARACTERISTICS OF SEXUAL MINORITY ADULTS, BY SEXUAL IDENTITY, NATIONAL EPIDEMIOLOGIC SURVEY ON ALCOHOL AND RELATED CONDITIONS-III, 2012–2013

Characteristic	Gay/lesbian (n = 586)			Bisexual (n = 566)			Unsure ^a (n = 199)		
	N	Weighted%	Weighted SE	N	Weighted%	Weighted SE	N	Weighted%	Weighted SE
Age (years)									
18–24	110	18.3	1.78	171	36.3	2.64	43	26.5	3.69
25–44	238	39.0	2.58	266	42.6	2.44	64	27.4	3.61
45–64	200	34.9	2.25	106	17.9	1.69	60	30.2	3.36
≥65	38	7.8	1.37	23	3.2	0.77	32	15.9	3.23
Sex									
Male	321	58.2	2.30	144	28.8	2.35	69	38.8	3.44
Female	265	41.8	2.30	422	71.2	2.35	130	61.2	3.44
Race ^b									
White	427	80.4	1.86	366	75.7	2.21	127	73.7	3.16
Black	123	13.9	1.63	157	16.1	1.70	51	13.9	1.72
Asian	8	1.4 ^c	0.42	9	1.8 ^c	0.74	12	8.4	2.74
Native Hawaiian/ Pacific Islander	7	0.7 ^c	0.29	3	0.3 ^c	0.16	0	0.0 ^c	—
American Indian/ Alaska Native	9	1.1 ^c	0.38	12	2.4	0.83	6	3.2 ^c	1.56
Mixed	12	2.6	0.74	19	3.7	0.81	3	1.0 ^c	0.55
Hispanic origin									
Hispanic	115	15.4	1.57	101	13.7	1.48	39	17.3	1.81
Non-Hispanic	471	84.6	1.57	465	86.3	1.48	160	82.7	1.81
Education									
High school degree or less	160	28.1	1.96	230	40.0	2.40	103	51.5	3.93
Some college or more	426	71.9	1.96	336	60.0	2.40	96	48.5	3.93
Substance use disorders (past 12 months)									
Any	269	45.1	2.48	296	51.7	2.90	79	40.2	3.64
None	317	54.9	2.48	270	48.3	2.90	120	59.8	3.64
Alcohol	159	25.9	1.63	168	30.2	2.20	51	25.3	3.09
Nicotine	170	28.9	2.39	216	37.6	2.59	55	31.2	3.56
Drug	47	7.4	1.29	62	11.0	1.60	23	10.7	2.27
Sexual orientation-based discrimination (past 12 months)									
Any	287	49.1	2.36	132	23.2	2.20	31	12.6	2.94
None	295	50.2	2.37	427	75.4	2.27	158	80.7	3.14
Missing	4	0.7 ^c	0.38	7	1.4 ^c	0.66	10	6.6	1.89

^aIncludes respondents who answered “not sure” when asked to select the category that best described them from a list of the following options: (1) heterosexual (straight), (2) gay or lesbian, (3) bisexual, or (4) not sure.

^bAsian, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and Mixed were collapsed into one category in all models that controlled for race.

^cEstimates derived from fewer than 10 respondents are considered unreliable.

N, unweighted sample size; SE, standard error.

compared to those with higher levels of education.³¹ The combined impact of minority stress and other stressors on health is thought to be exacerbated for those with less education and lower socioeconomic status because they are more vulnerable psychologically and physically due to deficiencies in their resources for resilience and a limited capacity to replenish resources for coping with stressful life events, a concept known as the reserve capacity model.^{31,32}

Findings from this study also suggested that Hispanic sexual minority adults may be more vulnerable to misusing nicotine or other substances in the presence of sexual orientation-based discrimination. Recently, Ortiz et al.³³ observed that Latino sexual minorities were at increased risk, although nonsignificantly, of smoking compared to other sexual minorities in all of their models; however, they noted an absence of work done to identify reasons for

these differences in smoking patterns among sexual minorities. Hispanic sexual minorities face additional types of discrimination based on their Hispanic heritage, but our results did not indicate that Hispanic origin-based discrimination, as measured in this study, had any influence on or could account for observed associations for sexual orientation-based discrimination. Insufficient sample size precluded further analysis of the intersection between Hispanic origin-based and sexual orientation-based discrimination among Hispanic sexual minorities.

Additional research is needed to gain a clearer understanding of the sources of stress (including internalized homophobia and biphobia and different sources of discrimination such as sex/gender-based discrimination) experienced by bisexual, Hispanic, and less educated sexual minorities and how these stressors interact to affect substance use behaviors

TABLE 2. ASSOCIATIONS BETWEEN SEXUAL ORIENTATION-BASED DISCRIMINATION AND EXCESSIVE ALCOHOL USE AND SUBSTANCE USE DISORDERS AMONG SEXUAL MINORITY ADULTS, PAST 12 MONTHS

	Heavy episodic drinking (n = 1298)		Exceeding daily drinking limits (n = 1330)		Exceeding weekly drinking limits (n = 1326)		Any substance use disorder (n = 1330)		Alcohol use disorder (n = 1330)		Nicotine use disorder (n = 1330)		Drug use disorder (n = 1330)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Sexual orientation-based discrimination	1.20	0.91–1.57	1.22	0.95–1.58	1.19	0.96–1.49	1.23	1.05–1.44	1.29	1.06–1.57	1.05	0.89–1.24	1.16	0.90–1.50
Age	0.99	0.97–1.00	0.99	0.98–1.00	1.00	0.99–1.01	0.97	0.96–0.98	0.96	0.95–0.97	0.98	0.97–0.99	0.96	0.94–0.97
Sex														
Male	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Female	1.45	0.82–2.57	0.91	0.61–1.36	0.98	0.67–1.45	0.83	0.60–1.16	0.75	0.50–1.12	0.81	0.59–1.11	0.99	0.52–1.91
Sexual identity														
Gay/Lesbian	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Bisexual	0.72	0.42–1.25	0.88	0.60–1.30	0.91	0.64–1.31	1.15	0.81–1.63	1.16	0.86–1.56	1.28	0.91–1.81	1.25	0.71–2.18
Unsure	0.71	0.30–1.70	1.03	0.54–1.97	0.71	0.37–1.37	0.97	0.62–1.50	1.38	0.85–2.25	1.14	0.69–1.86	1.75	0.79–3.88
Race														
White	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Black	2.09	1.28–3.42	1.80	1.22–2.65	2.13	1.53–2.95	1.13	0.81–1.56	1.42	1.01–2.00	0.94	0.67–1.32	1.62	1.01–2.60
Other	1.10	0.50–2.41	0.88	0.45–1.74	1.07	0.54–2.11	1.04	0.65–1.68	1.04	0.61–1.78	0.83	0.48–1.45	1.05	0.48–2.30
Hispanic origin														
Non-Hispanic	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Hispanic	2.02	1.17–3.49	1.19	0.77–1.84	1.48	0.98–2.23	0.66	0.47–0.92	0.96	0.67–1.39	0.43	0.29–0.63	1.14	0.68–1.91
Education														
Some college or more	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
High school degree or less	1.67	1.02–2.76	1.10	0.76–1.60	0.80	0.54–1.17	1.51	1.10–2.08	0.80	0.54–1.20	2.31	1.70–3.13	1.07	0.66–1.75

Significant findings at $P < 0.05$ are in bold.
aOR, adjusted odds ratio; CI, confidence interval.

TABLE 3. ASSOCIATIONS BETWEEN SEXUAL ORIENTATION-BASED DISCRIMINATION AND EXCESSIVE ALCOHOL USE AND SUBSTANCE USE DISORDERS AMONG SEXUAL MINORITY ADULTS, BY SEXUAL IDENTITY, HISPANIC ORIGIN, AND EDUCATION LEVEL, PAST 12 MONTHS

Substance use measures by respondent characteristics	Interaction P	Stratified aORs and 95% CIs					
		aOR	95% CI	aOR	95% CI	aOR	95% CI
By sexual identity		Gay/lesbian ^a (n = 580)		Bisexual ^a (n = 557)		Unsure ^a (n = 189)	
Exceeding weekly drinking limits	0.033	0.97	0.72–1.30	1.52	1.12–2.08	1.86	0.80–4.33
By Hispanic origin		Non-Hispanic ^b (n = 1078)		Hispanic ^b (n = 252)			
Any substance use disorder	0.028	1.12	0.92–1.37	2.04	1.41–2.95		
Nicotine use disorder	0.024	0.98	0.80–1.19	1.52	1.08–2.14		
By education		Some college or more ^c (n = 846)		High school degree or less ^c (n = 480)			
Exceeding weekly drinking limits	0.038	1.02	0.80–1.31	1.56	1.08–2.26		

Significant findings at $P < 0.05$ are in bold.

^aORs are adjusted for age, sex, race, Hispanic origin, and education.

^bORs are adjusted for age, sex, race, sexual identity, and education.

^cORs are adjusted for age, sex, race, sexual identity, and Hispanic origin.

and overall health. For example, Drazdowski et al.³⁴ concluded that racism did not contribute to illicit drug use beyond that which was associated with sexual orientation-based discrimination, whereas McCabe et al.² found that sexual orientation-related discrimination was associated with greater odds of substance use disorders when combined with race- and/or gender-based discrimination. Furthermore, the type of discrimination assessed in this study was relatively overt and did not include more subtle forms of discrimination (e.g., microaggressions) or certain aspects of structural oppression (e.g., residential segregation and socioeconomic status by ethnicity). These additional forms of discrimination were not examined in our study due to lack of measurement or inadequate sample size, but should be considered in future studies. Importantly, residential segregation has been shown to affect physical and mental health (including substance use) and access to healthcare through its associated concentration of poverty, lack of resources, and exposure to environmental risk factors.^{35,36}

A key strength of this study was its sample size. The NESARC-III contains the largest U.S. national probability sample of sexual minority adults to date, allowing us to perform several stratified analyses. Obtaining sufficiently large and representative samples is one of the main challenges faced in studies of sexual minority populations, and many researchers have been forced to pool samples or subgroups together to ensure sufficient sample sizes for analysis.³⁷

Limitations

Limitations of this study should be noted. This study cannot establish causality because of the cross-sectional nature of the data. In addition, small subgroup sizes precluded further analysis of intersecting sexual orientation-based and Hispanic origin-based discrimination among Hispanic sexual minorities and led to relatively large standard errors (i.e., wide CIs). These sample size limitations, along with the exclusion of microaggressions

and other subtle forms of discrimination, may also partially account for null results, including the null interaction results for sex and race and the lack of change observed when Hispanic origin-based discrimination was included in the models. Future larger studies with oversampling of sexual minorities and broader definitions of discrimination are warranted to overcome many of the limitations currently faced in this line of research. Because the NESARC-III asked about a respondent's sex but not about their gender identity, the null interaction results for sex might also be explained by the conflation of sex and gender by respondents. Flentje et al.³⁸ recently noted that sexual identity and gender identity are rarely reported in the substance use literature and offered recommendations for future investigators on measuring and reporting these variables. Such considerations will be especially important for those attempting to include transgender respondents, a small and understudied population that faces disproportionately higher risks of discrimination, violent victimization, and mental health issues.³⁹

Conclusion

Our results highlight the need to address sexual orientation-based discrimination as a source of stress that may contribute to the risk of excessive alcohol use and substance use disorders among sexual minorities in general and Hispanic, bisexual, and less educated sexual minorities, in particular. Future studies could benefit from including standardized measures of additional types of discrimination (e.g., sex/gender) and other sources of stress and coping strategies to gain a more complete picture of the mechanisms involved in observed associations and how these mechanisms may differ between subgroups. Findings from this and subsequent studies might inform substance use prevention and treatment strategies among sexual minority populations, as well as decisions regarding policies or laws designed to prevent sexual orientation-based discrimination in healthcare, employment, housing, education, and other public

accommodations. Considering that fewer than 10% of substance abuse treatment programs provided tailored services for sexual minorities and none considered culturally sensitive treatments for Hispanic sexual minorities as of November 2004,⁴⁰ the development of culturally competent prevention and treatment programs is an important future direction.

Acknowledgments

The authors thank I-Jen P. Castle (CSR, Incorporated) for providing insights and Hunter Barrat (CSR, Incorporated) for editorial assistance in the preparation of the article. This article is based on a study conducted for the Alcohol Epidemiologic Data System project funded by the National Institute on Alcohol Abuse and Alcoholism through contract No. HHSN275201300016C to CSR, Incorporated.

Author Disclosure Statement

No competing financial interests exist.

References

- Kite ME, Bryant-Lees KB: Historical and contemporary attitudes toward homosexuality. *Teach Psychol* 2016;43:164–170.
- McCabe SE, Bostwick WB, Hughes TL, et al.: The relationship between discrimination and substance use disorders among lesbian, gay, and bisexual adults in the United States. *Am J Public Health* 2010;100:1946–1952.
- Human Rights Campaign: State Maps of Laws & Policies. 2017. Available at www.hrc.org/state_maps Accessed January 3, 2017.
- Thoits PA: Stress and health: Major findings and policy implications. *J Health Soc Behav* 2010;51:S41–S53.
- Pearlin LI, Schieman S, Fazio EM, Meersman SC: Stress, health, and the life course: Some conceptual perspectives. *J Health Soc Behav* 2005;46:205–219.
- Meyer IH: Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychol Bull* 2003;129:674–697.
- Meyer IH: Minority stress and mental health in gay men. *J Health Soc Behav* 1995;36:38–56.
- Mays VM, Cochran SD: Mental health correlates of perceived discrimination among lesbian, gay, and bisexual adults in the United States. *Am J Public Health* 2001;91:1869–1876.
- Richman LS, Lattanner MR: Self-regulatory processes underlying structural stigma and health. *Soc Sci Med* 2014;103:94–100.
- Green KE, Feinstein BA: Substance use in lesbian, gay, and bisexual populations: An update on empirical research and implications for treatment. *Psychol Addict Behav* 2012;26:265–278.
- Hughes TL, Wilsnack SC, Kantor LW: The influence of gender and sexual orientation on alcohol use and alcohol-related problems: Toward a global perspective. *Alcohol Res* 2016;38:121–132.
- Stall R, Paul JP, Greenwood G, et al.: Alcohol use, drug use and alcohol-related problems among men who have sex with men: The Urban Men's Health Study. *Addiction* 2001;96:1589–1601.
- Weber G: Using to numb the pain: Substance use and abuse among lesbian, gay, and bisexual individuals. *J Ment Health Couns* 2008;30:31–48.
- Wilson SM, Gilmore AK, Rhew IC, et al.: Minority stress is longitudinally associated with alcohol-related problems among sexual minority women. *Addict Behav* 2016;61:80–83.
- Lee JH, Gamarel KE, Bryant KJ, et al.: Discrimination, mental health, and substance use disorders among sexual minority populations. *LGBT Health* 2016;3:258–265.
- Gilbert PA, Zemore SE: Discrimination and drinking: A systematic review of the evidence. *Soc Sci Med* 2016;161:178–194.
- Grant BF, Chu A, Sigman R, et al.: *National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III): Source and Accuracy Statement*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 2014.
- Grant BF, Goldstein RB, Chou SP, et al.: *The Alcohol Use Disorder and Associated Disabilities Interview Schedule—Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition Version (AUDADIS-5)*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 2011.
- Bostwick WB, Boyd CJ, Hughes TL, McCabe SE: Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the United States. *Am J Public Health* 2010;100:468–475.
- Herek GM, Garnets LD: Sexual orientation and mental health. *Annu Rev Clin Psychol* 2007;3:353–375.
- McCabe SE, Hughes TL, Bostwick W, et al.: Measurement of sexual identity in surveys: Implications for substance abuse research. *Arch Sex Behav* 2012;41:649–657.
- Kuyper L, Bos H: Mostly heterosexual and lesbian/gay young adults: Differences in mental health and substance use and the role of minority stress. *J Sex Res* 2016;53:731–741.
- Hughes TL, Wilsnack SC, Kristjanson AF: Substance use and related problems among U.S. women who identify as mostly heterosexual. *BMC Public Health* 2015;15:803.
- Korchmaros JD, Powell C, Stevens S: Chasing sexual orientation: A comparison of commonly used single-indicator measures of sexual orientation. *J Homosex* 2013;60:596–614.
- Vrangalova Z, Savin-Williams RC: Mostly heterosexual and mostly gay/lesbian: Evidence for new sexual orientation identities. *Arch Sex Behav* 2012;41:85–101.
- Krieger N, Sidney S: Prevalence and health implications of anti-gay discrimination: A study of Black and White women and men in the CARDIA cohort. *Coronary Artery Risk Development in Young Adults*. *Int J Health Serv* 1997;27:157–176.
- Egan PJ, Edelman MS, Sherrill K: *Findings from the Hunter College Poll of Lesbians, Gays, and Bisexuals: New Discoveries about Identity, Political Attitudes, and Civic Engagement*. New York, NY: Hunter College, The City University of New York, 2008.
- Gates GJ: *LGBT Demographics: Comparisons Among Population-Based Surveys*. Los Angeles, CA: The Williams Institute, UCLA School of Law, 2014.
- Kerridge BT, Pickering RP, Saha TD, et al.: Prevalence, sociodemographic correlates and DSM-5 substance use disorders and other psychiatric disorders among sexual minorities in the United States. *Drug Alcohol Depend* 2017;170:82–92.
- Brewster ME, Moradi B, Deblaere C, Velez BL: Navigating the borderlands: The roles of minority stressors, bicultural self-efficacy, and cognitive flexibility in the mental health of bisexual individuals. *J Couns Psychol* 2013;60:543–556.
- McGarrity LA: Socioeconomic status as context for minority stress and health disparities among lesbian, gay, and

- bisexual individuals. *Psychol Sex Orientat Gen Divers* 2014;1:383–397.
32. Gallo L: The reserve capacity model as a framework for understanding psychosocial factors in health disparities. *Appl Psychol Health Well-Being* 2009;1:62–72.
 33. Ortiz KS, Duncan DT, Blosnich JR, et al.: Smoking among sexual minorities: Are there racial differences? *Nicotine Tob Res* 2015;17:1362–1368.
 34. Drazdowski TK, Perrin P, Trujillo, M, et al.: Structural equation modeling of the effects of racism, LGBTQ discrimination, and internalized oppression on illicit drug use in LGBTQ people of color. *Drug Alcohol Depend* 2016; 159:255–262.
 35. Frank R, Bjornstrom E: A tale of two cities: Residential context and risky behavior among adolescents in Los Angeles and Chicago. *Health Place* 2011;17:67–77.
 36. Viruell-Fuentes EA, Miranda PY, Abdulrahim S: More than culture: Structural racism, intersectionality theory, and immigrant health. *Soc Sci Med* 2012;75:2099–2106.
 37. Institute of Medicine (U.S.) Committee on Lesbian, Gay, Bisexual, and Transgender Health Issues and Research Gaps and Opportunities: *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*. Washington, DC: National Academies Press, 2011.
 38. Flentje A, Bacca CL, Cochran BN: Missing data in substance abuse research? Researchers' reporting practices of sexual orientation and gender identity. *Drug Alcohol Depend* 2015;147:280–284.
 39. McKay B: Lesbian, gay, bisexual, and transgender health issues, disparities, and information resources. *Med Ref Serv Q* 2011;30:393–401.
 40. Cochran BN, Peavy KM, Robohm JS: Do specialized services exist for LGBT individuals seeking treatment for substance misuse? A study of available treatment programs. *Subst Use Misuse* 2007;42:161–176.

Address correspondence to:
Megan E. Slater, PhD
CSR, Incorporated
4250 Fairfax Dr., Suite 500
Arlington, VA 22203

E-mail: mslater@csrincorporated.com