Addictive Behaviors Reports 19 (2024) 100554

Contents lists available at ScienceDirect

Addictive Behaviors Reports

journal homepage: www.elsevier.com/locate/abrep

The association between discrimination and drinking among sexual minorities: A daily diary study

A. Surace [a,*], D. Operario [b], C.W. Kahler [c]

[a] Public Health Institute, Alcohol Research Group, Emeryville, USA
[b] Department of Behavioral and Social Sciences, Rollins School of Public Health, Atlanta, USA
[c] Center for Alcohol and Addictions Studies, Department of Behavioral and Social Sciences, Brown University School of Public Health, Providence, USA

ARTICLE INFO

Keywords:
Minority Strengths
Minority Stress
Ecological momentary assessment
Alcohol
Intersectionality

ABSTRACT

Background: Among sexual minorities (SMs), experiencing discrimination has been associated with greater substance use at the day-level. However, variations in sample characteristics and measures of day-level discrimination limit the generalizability of findings. Furthermore, it is unknown how positive experiences due to minority identity ("Minority Strengths") may impact the association between experiencing discrimination and same day drinking.

Methods: The present study extends prior research on discrimination and drinking using detailed discrimination measures, Minority Strengths measures, and a gender diverse sample. Participants (N = 61) were majority White (n = 45, 73.8 %) adult (mean age 26.8 years) self-identified SMs (e.g., 44.3 % identified as "gay") who engaged in alcohol use within the past month. Participants completed up to 31 days of daily diary surveys about their experiences and drinking. Recruitment took place in the northeastern U.S. from May to December 2021.

Results: Multilevel model analysis indicated that experiencing discrimination was associated with increased same day drinking among Black, Indigenous, people of color (BIPOC) participants but not among White participants. A significant gender by discrimination interaction indicated that cisgender men drank more the same day they experienced discrimination compared to cisgender women and transgender/non-binary participants. Minority Strengths had no impact on these relationships.

Conclusions: Results highlight that the experience of discrimination and its association with drinking may be influenced by a host of contextual factors that are attached to racial and gender identities. Future research should examine how discrimination in different contexts (e.g., regions) and based on specific identities may be associated with alcohol use.

1. Introduction

Sexual minorities (i.e., those whose sexual identity, orientation, and/or practices differ from the surrounding society, [SMs]) engage in more drinking (Drabble et al., 2020; Fish et al., 2018; Surace et al., 2019) and have higher rates of alcohol use disorders (Fish & Exten, 2020; Skeer et al., 2012; Stall et al., 2001) relative to heterosexual populations. Research suggests that experiencing discrimination (e.g., mistreatment based on perceived differences in characteristics) is associated with higher rates of alcohol-related health issues among SMs.(Cunningham et al., 2009; Hatzenbuehler et al., 2008, 2011; Wray et al., 2016) However, much of this work employs cross-sectional methodologies making it difficult to infer the temporal relationship between discrimination and drinking (i.e., if SMs drink more after experiencing discrimination). The relationship between discrimination and drinking has become clearer through ecological momentary assessment (EMA) methodology use (e.g., Livingston et al., 2017), but this research is scant and has not considered SMs' other identities when examining how SMs respond to discrimination. This is a limitation given that the social forces associated with SMs' gender and race/ethnicity may impact the ways in which SMs respond to discrimination. The present study addresses these limitations by examining associations between discrimination and alcohol use via a daily diary study across gender and racial/ethnic identities.

* Corresponding author at: 6001 Shellmound Street #450, Emeryville, CA 94608, USA.
E-mail address: asurace@arg.org (A. Surace).

https://doi.org/10.1016/j.abrep.2024.100554
Received 9 November 2023; Received in revised form 24 April 2024; Accepted 16 May 2024
Available online 18 May 2024

1.1. The temporal association between discrimination and alcohol use

There has been a surge of research examining the temporal association between discrimination and alcohol use among SMs over the past few years. For example, Livingston et al.(2017) found that experiencing discrimination was associated with greater odds of same day substance use among a sample of gender/sexual minorities, suggesting that substances (e.g., alcohol) may be used to cope with discrimination. Other studies (including those utilizing daily diaries) have found a temporal link between discrimination and drinking (Dyar et al., 2023; Ehlke et al., 2022; Lewis et al., 2021). However, the samples used in these studies consisted mostly of cisgender women, limiting their generalizability to the larger SM community.

To expand this work, we previously examined how perceived sexual orientation discrimination impacted drinking among a sample of SM men (Surace, 2022). We did not find a significant main effect of perceived discrimination on drinking when we examined the whole sample. However, an interaction effect indicated that Black, Indigenous, and people of color (BIPOC) SM men drank less on days they perceived discrimination relative to White SM men. Our results suggest that a temporal relationship between discrimination and substance use may exist among SMs, but this relationship may be influenced by SMs' other identities (e.g., race/ethnicity). This finding is consistent with the Intersectionality framework (Bowleg, 2012).

1.2. Intersectionality

The Intersectionality framework posits that the societal forces acting on the identities held by individuals shapes behavior: stigma and privilege associated with each identity results in intersecting experiences of discrimination and advantage (Bowleg, 2012). These social forces interact with each other, resulting in unique conditions that dictate the behavioral options available to people. For example, the experiences of an Asian lesbian non-binary person are shaped by forces acting upon their racial/ethnic, sexual, and gender identities. The opportunities and barriers they encounter in life would differ from those of a White heterosexual cisgender man. This results in unique differences in behaviors and health risks. Research shows that the confluence of identities (e.g., BIPOC and LGBT identity) influences health disparities in the US (Shangani et al., 2019).

The Intersectionality literature may help contextualize the findings of research on the temporal associations between discrimination and substance use. All SMs likely experience some social marginalization given culturally hegemonic heterosexuality (Bibbings, 2009; Frank, 1987; Phillips, 1991). However, this marginalization manifests differently depending on SMs identities including variances in rates of police harassment/criminal justice involvement (Crenshaw et al., 2015; Ritchie & Jones-Brown, 2017) which can impact problem alcohol use (Klein & Washington, 2024; Remch et al., 2021). The impact of such marginalization may vary across racial/ethnic and gender identities. As outlined in our previous work (Surace et al., 2022), SMs respond to discrimination differently depending on their racial/ethnic and gender identities. This suggests that to better understand the temporal associations between discrimination and substance use among SMs, researchers need to consider the intersecting identities of SMs.

It is important to emphasize that intersectionality pertains to how both discrimination *and* social privilege influence behavior. Individuals' identities dictate the amount and kind of accessible resources (e.g., economic, social, etc.). For example, identifying as an SM may result in marginalization from mainstream (i.e., heterosexual) society, but also can potentially be a source of strength (Surace et al., 2022). As posited in the Minority Strengths model, individuals can derive strength from their minority identities (e.g., through social support; Perrin et al., 2020) Strengths can be derived from any of a person's identities including SM identity. This model has been understudied, but research suggests that successfully navigating SM identity development and stigmatizing experiences may increase coping skills (Smith, 2017; Wang et al., 2016).

The Intersectionality framework posits that the unique combination of social forces acting upon people's identities dictates their social positioning (Bowleg, 2012). As we saw in our previous work (Surace et al., 2022) this impacted the ways in which SMs utilized strengths associated with their SM identity. However, this research failed to investigate how their other identities (e.g., gender and race/ethnicity) were utilized as a source of strength. For example, an SM who is also a racial minority (e.g., a Black cisgender woman) may find support from other Black women to cope with experiences of discrimination. Research is needed to better understand Minority Strengths through an Intersectionality lens.

1.3. Current study

The goal of this study was to examine if and how experiencing discrimination or Minority Strengths (referred to as "strengths" hereafter) influence daily alcohol use among a sample of SMs. Utilizing daily diaries, we sought to test if experiencing discrimination impacted participants' same day drinking. We also examined if experiencing strengths moderated the relationship between discrimination and drinking. We designed this study to examine if participants' gender and racial/ethnic identities influenced these relationships. We hypothesized that 1) experiencing any (vs. no) discrimination would be associated with more same-day drinking; 2) the effect of discrimination on drinking would be moderated by strengths such that discrimination's association with increased drinking would be reduced on days when strengths were also experienced, and 3) transgender/nonbinary and BIPOC participants would report less drinking on days they experienced discrimination than cisgender/White participants. This final hypothesis is based on the results of our previous work which found that BIPOC SM men were less likely to report alcohol use when experiencing discrimination (Surace et al., 2022).

2. Methods

2.1. Pilot testing

All measures were pilot tested. Pilot procedures mirrored the full study except: 1) pilot participants (N = 12) engaged in the daily diary procedures for two weeks instead of 31 days, and 2) following completion of the pilot participants completed a 60-minute semi-structured interview via Zoom to provide feedback on their participation experience. During these interviews, the first author asked participants for input on how to facilitate survey completion and how to modify wording of items to ensure comprehension. Procedural modifications included adding non-alcohol substance use (e.g., cannabis) measures to the daily diaries and rewording of items for inclusivity (e.g., changing "LGBQ+" to "LGBTQ+"). Study procedures were modified iteratively throughout pilot testing. Pilot data were not included in the current analyses.

2.2. Participants and procedures

Study participants (N = 61) were: 1) individuals 18 + years of age who 2) identified as an SM (e.g., lesbian/gay/bisexual), 3) reported current alcohol use (i.e., 1 + day of drinking per week or 1 day of 5 + drinks in the month before enrollment) and 4) were able to speak and read English.

All procedures were reviewed and approved by the Brown University Institutional Review Board. Participants were recruited from the greater New England area. Recruitment was done exclusively online (posting to Facebook groups [e.g., "Providence Queer Exchange] and online advertisements). Recruitment occurred from June 2021 to December 2021. Participants were screened for eligibility via telephone. Eligible participants were immediately sent an electronic copy of the study consent

form and given an overview of the study's procedures. Once informed consent was obtained, participants were sent a link to the baseline survey. Participants were instructed to complete the baseline survey at their earliest convenience. Participants were reminded of the daily survey procedures and were asked to complete as many of these surveys as possible.

Two types of daily surveys were used for this study: daily diary and evening surveys. Only daily diary data were included in the present analysis due to lack of alcohol data in evening surveys. Starting one day post-baseline, all participants received daily diaries at 8:00 AM EST daily for 31 days. Participants had until noon to complete these surveys. The daily diaries recorded daily drinking, strengths, and discrimination experiences over the previous 24 h. All surveys were administered via Qualtrics survey software.

Participants were compensated via Amazon gift cards. Participants could earn up to a maximum compensation of $100 for their participation ($20 upon completion of the baseline survey, $1 per daily diary/evening survey completed, plus a $20 bonus for completing $\geq$ 90 % of daily diary/evening surveys).

2.3. Baseline surveys

This survey included measures of relevant covariates including demographic information. These data were self-reported via text entry (e.g., age) or response options (e.g., education). Baseline alcohol use was assessed via the Daily Drinking Questionnaire (Collins et al., 1985) and problems associated with drinking via the Alcohol Use Disorders Identification Test (AUDIT; Reinert & Allen, 2002; Saunders et al., 1993). These measures have been used previously in SM research and have demonstrated consistent reliability and validity (Fairlie et al., 2018; Horváth et al., 2023).

2.4. Daily measures

2.4.1. Alcohol use

Daily alcohol use was measured via the daily diaries. Participants were asked how many standard alcoholic drinks (i.e., 16 oz. beer, 5 oz. wine, or 1–1.5 oz. "shot" of liquor) they consumed over the past 24 h (i.e., since the previous day's daily diary survey).

2.4.2. Discrimination

Discrimination experiences were measured via daily diaries. Participants were shown a list of discrimination experiences including those used by Livingston et al (e.g., being "Threatened or harassed"; 2017). Additional measures derived from the pilot included items like "overheard someone saying something discriminating/offensive". Participants in the present study were asked to select all events which they had experienced since the previous day's daily diary. Participants could also select "Other" and write in any other discrimination experiences they may have had. If participants did not experience discrimination the previous day, they had the option of selecting "Not applicable- none of these have happened since the last survey." For each endorsed experience, participants were asked follow-up questions regarding what identity[s] the experience related to (e.g., sexual identity; race/ethnicity).

2.4.3. Minority strengths

Strengths experiences were measured via daily diaries. Participants were shown a list of experiences derived from our previous qualitative work (Surace et al., 2022) and pilot testing (e.g., "My identity gave me an advantage in some way"). Participants selected each experience that happened to them since the previous day's daily diary. Participants also had the option to select "Other" and write in any other experiences not listed. If participants did not encounter any such experiences since the previous day, they had the option of selecting "Not applicable- none of these have happened since the last survey." For each endorsed experience, participants were asked follow-up questions regarding what identity[s] the experience related to (e.g., sexual identity; race/ethnicity).

2.5. Data analysis

2.5.1. Data preparation

All data preparation and analyses were conducted in STATA version 17. Categorical variables were dummy coded with centered variables as described by Kraemer and Blasey (2004). For example, discrimination experiences each day were coded as either.5 (any) or −.5 (none), strengths each day were coded as either.5 (any) or −.5 (none), and race was coded as either.5 (White) or −.5 (BIPOC). Gender was coded in two centered dummy variables. In the first centered dummy variable cisgender men were coded as .67 and cisgender women and transgender/non-binary participants were coded as −.33 (referent). In the second centered dummy variable transgender/non-binary participants were coded as .67 and cisgender men and women were coded as −.33 (referent). We used this coding schema because traditional dummy coding (e.g., 0 vs. 1) results in the simple effects of moderators only being interpretable for the referent group (e.g., cisgender women). When center coding is used, the coefficient for effects of discrimination on drinking are interpretable across all gender identities as the average effect (Kraemer & Blasey, 2004) allowing examination of both interactions and main effects simultaneously.

2.5.2. Model construction

We utilized multilevel models to examine how discrimination and strengths influenced drinking. In our models, daily observations were nested within participants (level-1 random effects) with inferences about differences between participants being the fixed effects of interest (level-2). The Level 1 model included parameters for within subject factors which could impact an individual's drinking including time (study day), and experiences of discrimination and strengths. Level 1 of the models included the interaction between strengths and discrimination to test the hypothesis that strengths would moderate the association between discrimination and drinking. Level 2 of the models included parameters for between subjects' factors like race/ethnicity, gender, and adjustments for individuals' average baseline drinking. Finally, the models also contained cross-level interactions to explore how individual's experiences may have varied across identities.

We created our models iteratively- first we began by examining main effects and within level interactions and then added cross-level interactions. Then we tested how experiencing both discrimination and strengths impacted day-level drinking. Next, we examined the association between participants' gender, discrimination, and strengths. In model four we tested how gender and race/ethnicity interacted together to impact drinking at the day-level. The final models did not include between-person variables for discrimination and strengths because during model construction these were not significant. Models were run including AUDIT score as a covariate but given lack of significant effects and model fit considerations, we removed this covariate.

3. Results

Participant demographics are reported in Table 1.

A total of 1456 daily diary entries were analyzed. On average, participants completed daily diaries on 23.6 out of 31 study days ($SD = 9.4$, Range = 1–31). Participants completed evening surveys on 21.5 out of 31 study days ($SD = 9.0$ Range = 2–31). Participants reported experiencing discrimination and strengths on 442 (30.4 %) and 1101 (75.6 %) days respectively. Participants drank an average of 3.8 standard drinks ($SD = 2.7$) per drinking day. See supplemental table A for a breakdown of daily diary data.

Exploratory multi-level logistic regression analyses showed that likelihood of experiencing discrimination/strengths varied between

Table 1
Participant demographics.

Characteristics	Total ($N = 61$) *Mean* (*SD*) or *n* (%)	BIPOC (*n* = 16) *Mean* (*SD*) or *n* (%)	White ($n = 45$) *Mean* (*SD*) or *n* (%)	*T* or χ^2	*p*
Age (Range: 18 – 54)	26.8 (7.6)	25.3(7.2)	27.1 (7.9)	.02	.98
Gender					
Cisgender Female	27(44.3 %)	7(43.8 %)	8(17.8 %)	4.3	.12
Cisgender Male	15(25 %)	5(31.3 %)	22(48.9 %)		
Transgender/Non-binary	19(31 %)	4(25.0 %)	15(33.3 %)		
Sexual Identity					
Homosexual/Gay/ Lesbian	22(44.3 %)	8(50.0 %)	14(31.1 %)	3.6	.61
Bisexual	17(27.9 %)	3(18.8 %)	14(31.1 %)		
Queer	12(19.7 %)	2(12.5 %)	10(22.2 %)		
Asexual	1(1.6 %)	0	1(2.2 %)		
Pansexual	8(13.1 %)	3(18.8 %)	5(11.1 %)		
Panromantic	1(1.6 %)	0	1(2.2 %)		
Ethnicity (Hispanic or Latine)	5(8.2 %)	4(25.0 %)	1(2.2 %)	8.1	>.00
Race					
White	45(73.8 %)	0	45(100 %)	61.0	>.00
Black or African American	9(14.8 %)	9(56.3 %)	0		
Asian	1(1.6 %)	1(6.3 %)	0		
American Indian/Alaska Native	2(3.3 %)	2(12.5 %)	0		
Multiracial	4(6.6 %)	4(25 %)	0		
College degree	34(55.7 %)	5(31.3 %)	29(64.4 %)	5.3	.02
Low income[1]	31(49.2 %)	8(50 %)	22(48.9 %)	.01	.94
Unemployed	13 (21.3)	4(25.0 %)	9(20.0 %)	.2	.68
AUDIT score	11.1 (8.7)	19.2(10.4)	8.2(5.7)	−5.2	.00
Avg. # total EMA days completed	25.6 (9.6)	27.3(9.1)	24.9 (9.8)	−.85	.40

participants. On average BIPOC transgender/nonbinary participants were less likely to report any discrimination compared to cisgender men and women participants (see Supplementary Table B). Additionally, BIPOC cisgender men were significantly less likely to experience strengths compared to cisgender women and transgender/nonbinary participants (see Supplementary Table C).

3.1. Multilevel models

Results of model one indicated that experiencing discrimination was associated with reduced number of drinks consumed on that day, but experiencing strengths and discrimination on the same day was associated with consuming more drinks (see Table 2). This interaction indicates the extent to which the effect of discrimination is weakened in the presence of strengths. Model one also indicated that BIPOC participants drank more compared to White participants. The intra-class correlation (ICC) for model one was 0.20.

Results of model two indicated that BIPOC participants drank more relative to White participants, experiencing discrimination did not impact this association (see Table 3). The ICC for model two was 0.20.

Model three indicated that cisgender men were predicted to have a 53% higher expected number of drinks on days they experienced discrimination relative to cisgender women and transgender/gender nonbinary participants. Experiencing strengths did not moderate this relationship (see Table 4). The ICC for model three was 0.22.

Model four demonstrated that gender and race/ethnicity interacted

Table 2
Model 1: results of mixed effects multi-level models predicting number of standard drinks consumed daily.

	Number of Standard drinks *IRR*	*SE*	*95 % CI*	*p*
Within Participant				
Study Day (0 to 31)	**.99**	**.00**	**.99–1.00**	**>.01**
Time-varying Discrimination				
Any	**.53**	**.16**	**.30—.95**	**.03**
None	Ref	Ref	Ref	Ref
Time-varying Minority Strengths				
Any	1.02	.10	.84–1.23	.85
None	Ref	Ref	Ref	Ref
Discrimination*Strengths	**1.87**	**.57**	**1.03–3.41**	**.04**
Between Participant				
Baseline drinking	**1.44**	**.12**	**1.23–1.69**	**>.01**
Race/ Ethnicity				
BIPOC	**2.57**	**.86**	**1.34–4.95**	**.01**
White	Ref	Ref	Ref	Ref
Gender				
Cisgender men	.77	.30	.36–1.63	.49
Transgender/nonbinary	.80	.28	.40–1.60	.53
Cisgender women	Ref	Ref	Ref	Ref

*Level 1 models included only an intercept term to account for clustering of data within participants.
**Discrimination and minority strengths experiences were dummy coded in this model to demonstrate the impact of each experience in the absence of the other.
***Dichotomous variables were effect coded as.5 or −.5. All referent groups were coded −.5.
****Gender was effects coded; cisgender men were coded as.33 when cisgender women and transgender/non-binary participants were the referral group (coded as −.67). When examining transgender/non-binary participants (.33) relative to cisgender women and men (−.67) the coding schema was reversed.
*****Values in bold represent $p < .05$.

Table 3
Model 2: results of mixed effects multi-level models predicting number of standard drinks consumed daily by race/ethnicity.

	Number of Standard drinks *IRR*	*SE*	*95 % CI*	*p*
Within Participant				
Study Day (0 to 31)	**.99**	**.00**	**.99–1.00**	**>.01**
Time-varying Discrimination				
Any	**.73**	**.11**	**.54—.98**	**.04**
None	Ref	Ref	Ref	Ref
Time-varying Minority Strengths				
Any	1.33	.21	.98–1.82	.07
None	Ref	Ref	Ref	Ref
Discrimination*Strengths	**1.73**	**.54**	**.94–3.18**	**.08**
Between Participant				
Baseline drinking	**1.43**	**.10**	**1.24–1.65**	**>.01**
Race/ Ethnicity				
BIPOC	**2.61**	**.87**	**1.36–5.00**	**>.01**
White	Ref	Ref	Ref	Ref
Cross-level Interactions				
Discrimination*Race/Ethnicity	**1.31**	**.20**	**.98–1.76**	**.07**

*Level 1 models included only an intercept term to account for clustering of data within participants.
**Dichotomous variables were effect coded as.5 or −.5. All referent groups were coded −.5.
***Gender was effects coded; cisgender men were coded as.33 when cisgender women and transgender/non-binary participants were the referral group (coded as −.67). When examining transgender/non-binary participants (.33) relative to cisgender women and men (−.67) the coding schema was reversed.
****Values in bold represent $p < .05$.

Table 4
Model 3: results of mixed effects multi-level models predicting number of standard drinks consumed daily by gender.

	Number of Standard drinks			
	IRR	*SE*	*95 % CI*	*p*
Within Participant				
Study Day (0 to 31)	**.99**	**.00**	**.99–1.00**	**.01**
Time-varying Discrimination				
Any	.78	.12	.57–1.06	.12
None	Ref	Ref	Ref	Ref
Time-varying Minority Strengths				
Any	1.31	.21	.96–1.79	.09
None	Ref	Ref	Ref	Ref
Discrimination*Strengths	**1.80**	**.56**	**.98–3.31**	**.06**
Between Participant				
Baseline drinking	**1.50**	**.13**	**1.27–1.77**	**>.01**
Gender				
Cisgender men	.99	.41	.45–2.21	.98
Transgender/nonbinary	.84	.32	.40–1.76	.64
Cisgender women	Ref	Ref	Ref	Ref
Cross-level Interactions				
Discrimination*Gender (Cisgender men)	**1.53**	**.27**	**1.08–2.17**	**.02**
Discrimination*Gender (Transgender/ nonbinary)	.90	.18	.64–1.33	.61

*Level 1 models included only an intercept term to account for clustering of data within participants.
**Dichotomous variables were effect coded as.5 or −.5. All referent groups were coded −.5.
***Gender was effects coded; cisgender men were coded as.33 when cisgender women and transgender/non-binary participants were the referral group (coded as −.67). When examining transgender/non-binary participants (.33) relative to cisgender women and men (−.67) the coding schema was reversed.
****Values in bold represent $p < .05$.

Table 5
Model 4: results of mixed effects multi-level models predicting number of standard drinks consumed daily by race and gender.

	Number of Standard drinks			
	IRR	*SE*	*95 % CI*	*p*
Within Participant				
Study Day (0 to 31)	**.99**	**>.00**	**.99–1.00**	**>.01**
Time-varying Discrimination				
Any	.82	.13	.60–1.19	.21
None	Ref	Ref	Ref	Ref
Time-varying Minority Strengths				
Any	1.23	.20	.89–1.69	.20
None	Ref	Ref	Ref	Ref
Discrimination*Strengths	**1.67**	**.52**	**.91–3.09**	**.10**
Between Participant				
Baseline drinking	**1.35**	**.10**	**1.16–1.56**	**>.01**
Race/ Ethnicity				
BIPOC	**2.71**	**.84**	**1.47–4.99**	**>.01**
White	Ref	Ref	Ref	Ref
Gender				
Cisgender men	.70	.26	.34–1.44	.33
Transgender/nonbinary	.60	.24	.28–1.31	.20
Cisgender women	Ref	Ref	Ref	Ref
Cross-level Interactions				
Discrimination*Race/Ethnicity	**1.56**	**.27**	**1.11–2.19**	**.01**
Discrimination*Gender (Cisgender men)	**1.94**	**.39**	**1.32–2.90**	**>.01**
Discrimination*Gender (Transgender/ nonbinary)	1.18	.26	.76–1.82	.46
Race/Ethnicity *Gender (Cisgender men)	**.12**	**.09**	**.03–.52**	**>.01**
Race/Ethnicity *Gender (Transgender/ nonbinary)	.35	.27	.08–1.60	.18

*Level 1 models included only an intercept term to account for clustering of data within participants.
**Dichotomous variables were effect coded as.5 or −.5. All referent groups were coded −.5.
***Gender was effects coded; cisgender men were coded as.33 when cisgender women and transgender/non-binary participants were the referral group (coded as −.67). When examining transgender/non-binary participants (.33) relative to cisgender women and men (−.67) the coding schema was reversed.
****Values in bold represent $p < .05$.

together to impact alcohol use at the day-level. Model four included participants' gender, race/ethnicity, experiences of discrimination and strengths, and cross-level interactions. There was a significant interaction between day-level discrimination and race/ethnicity suggesting that BIPOC participants who experienced discrimination were predicted to have a 56 % higher number of drinks per day relative to White participants. In addition, there was a significant gender by discrimination interaction, suggesting that cisgender men who experienced discrimination were predicted to have 94 % higher number of standard drinks relative to cisgender women and transgender/nonbinary participants. Finally, there was a significant interaction between race and gender, suggesting that BIPOC cisgender men were predicted to drink about 88% fewer standard drinks per day than White cisgender women and transgender/nonbinary participants (see Table 5). The ICC for model four was 0.18.

3.2. Power analysis

We conducted a post-hoc power analysis to determine our power to detect hypothesized effects. Analyses specified multilevel logistic regressions with an interaction term using an effective sample size adjusted for the design effect deff=(1+(t-1)• ρρ), where ρρ > 0 is the ICC (Snijders, 2005) and t is the number of observations per participant. We determined that since participants reported at least 23 days' worth of data (t = 23), our total sample size was 23*61 = 1403. Assuming a large ICC = 0.15(Hox et al., 2017) we had an effective sample size of 1403/(1 + 22*0.15) = 407 and a power of 85% to detect a statistical significant interaction with OR = 1.5.

4. Discussion

To our knowledge this is the first daily diary study to use an Intersectional lens when examining the effect of discrimination on alcohol use. Our results indicate that discrimination was associated with drinking differently among SMs based on their racial/ethnic and gender identities. BIPOC participants reported more drinking the same day they experienced discrimination relative to White participants. Cisgender men drank more the same day they experienced discrimination relative to cisgender women and transgender/non-binary participants. Strengths experiences alone were not associated with day-level drinking, but participants who experienced discrimination and strengths on the same day drank more. Consistent with an Intersectionality framework, these results suggest discrimination may differentially impact SMs according to their other identities.

The current work adds to the literature on the association between discrimination and drinking among SMs. Past research has found an association between discrimination and day-level changes in drinking among SMs (Dyar et al., 2023; Ehlke et al., 2022; Livingston et al., 2017). However, much of this research has not examined how these associations may vary *between* SMs. By recruiting cisgender men and women, and transgender/non-binary participants we could examine how gender may impact the association between discrimination and drinking. Additionally, previous studies have not examined the between subjects' effects of participants' race/ethnicity when examining day-level associations between discrimination and drinking. The present research offers insights into how the intersecting identities of SMs may influence behavior.

The limitations of the present research (see below) hamper our ability to draw inferences about the association between discrimination and day-level drinking among SMs. Nevertheless, the different ways members of the SM community respond to discrimination may explain our results. For example, BIPOC SM men may react to discrimination by

self-isolating and therefore drink less because they are not socializing with peers (e.g., in gay bars). Alternatively, BIPOC SM women may rely on peers for social support and thus engage in alcohol use as part of this socialization. A recent meta-analysis suggests that positive affect is more predictive of same-day alcohol use than negative affect (Dora et al., 2022). Based on this work, however, it is unclear if this association varies across populations. For example, among SM women discrimination experiences may act as a catalyst for socialization (e.g., for social support) which increases positive affect which may result in alcohol use. This is speculative- future research is needed to investigate this phenomenon.

4.1. Limitations

The current research has limitations which must be considered when interpreting our findings. First, our sample included 16 BIPOC and 19 transgender/nonbinary individuals. This is problematic as it resulted in two of the cells used for our gender by race/ethnicity interaction having five or fewer cases. This inadequate sampling of racial/ethnic and gender minorities limits our ability to draw conclusions about these populations and make inferences on the moderating effects detected. We acknowledge this limitation but posit that our work still offers evidence that the intersecting social forces tied to SMs identities may impact their alcohol use. Second, when we conducted this research there were no validated EMA scales for discrimination and strengths. Therefore, the reliability/validity of these measures are unknown. However, utilization of community members' feedback during pilot testing was used to ensure ecological validity. Third, using daily diaries resulted in participants retrospectively reporting both drinking and discrimination each day limiting our ability to distinguish the temporality of events. It would have been preferrable to have monitored behaviors precisely when they occurred, but daily diaries have been shown to be an effective EMA methodology that are less prone to inaccuracies than other retrospective methods (Stone et al., 2007). Finally, social distancing due to the COVID-19 pandemic may have impacted participants' drinking (e.g., drinking less due to not going to gay bars/clubs). At the time of recruitment public health authorities continued to emphasize minimizing unnecessary social interaction (Here's Where New England States Stand on Masks After CDC Released New Guidelines, 2021) but restrictions on social gatherings were waning.

4.2. Conclusion

The current study builds upon previous research demonstrating a temporal association between discrimination and alcohol use among SMs by utilizing the Intersectionality framework. Given our results and those of previous studies, we posit that discrimination could play a role in alcohol use and resultant health disparities among SM community members. How discrimination impacts drinking, however, may vary across individuals based on the social forces acting upon their identities. Future research with larger samples is needed to more accurately examine how differences across gender and racial/ethnic identities may result in different drinking behaviors compared to those with a single marginalized identity (e.g., White cisgender SM men). It is also necessary for future research to examine how discrimination in different contexts (e.g., regions) and based on specific identities may be associated with alcohol use.

CRediT authorship contribution statement

A. Surace: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **D. Operario:** Supervision, Writing – review & editing. **C.W. Kahler:** Conceptualization, Methodology, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgments

This work was supported by the Alcohol Research Center on HIV (ARCH; P01 AA019072, PI: C.W. Kahler) and the Alcohol Research Group (ARG; T32AA007240, PI: W. C. Kerr).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.abrep.2024.100554.

References

Bibbings, L. S. (2009). *The heterostate: Hegemonic heterosexuality and state power. In State Power Crime* (pp. 35–48). SAGE Publications Ltd..

Bowleg, L. (2012). The problem with the phrase women and minorities: Intersectionality—an important theoretical framework for public health. *American Journal of Public Health, 102*(7), 1267–1273.

Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology, 53*(2), 189.

Crenshaw, K. W., Ritchie, A. J., Anspach, R., Gilmer, R., & Harris, L. (2015). Say her name: Resisting police brutality against black women.

Cunningham, R. M., Bernstein, S. L., Walton, M., Broderick, K., Vaca, F. E., Woolard, R., Bernstein, E., Blow, F., & D'Onofrio, G. (2009). Alcohol, tobacco, and other drugs: future directions for screening and intervention in the emergency department. *Acad Emerg Med, 16*(11), 1078-1088. https://doi.org/ACEM552 [pii] 10.1111/j.1553-2712.2009.00552.x.

Dora, J., Piccirillo, M., Foster, K. T., Arbeau, K., Armeli, S., Auriacombe, M., Bartholow, B. D., Beltz, A., Blumenstock, S., & Bold, K. (2022). The daily association between affect and alcohol use: A meta-analysis of individual participant data.

Drabble, L. A., Mericle, A. A., Karriker-Jaffe, K. J., & Trocki, K. F. (2020). Harmful drinking, tobacco, and marijuana use in the 2000–2015 National Alcohol Surveys: Examining differential trends by sexual identity. *Substance Abuse*, 1–12.

Dyar, C., Lee, C. M., Rhew, I. C., & Kaysen, D. (2023). Sexual minority stress and substance use: An investigation of when and under what circumstances minority stress predicts alcohol and cannabis use at the event-level. *Journal of Psychopathology and Clinical Science, 132*(4), 475.

Ehlke, S. J., Kelley, M. L., Lewis, R. J., & Braitman, A. L. (2022). The role of alcohol demand on daily microaggressions and alcohol use among emerging adult bisexual+ women. *Psychology of Addictive Behaviors, 36*(2), 209.

Fairlie, A. M., Feinstein, B. A., Lee, C. M., & Kaysen, D. (2018). Subgroups of young sexual minority women based on drinking locations and companions and links with alcohol consequences, drinking motives, and LGBTQ-related constructs. *Journal of Studies on Alcohol and Drugs, 79*(5), 741–750.

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.

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, 113*(4), 749–758.

Frank, B. (1987). Hegemonic heterosexual masculinity. *Studies in Political Economy, 24*(1), 159–170.

Hatzenbuehler, M. L., Corbin, W. R., & Fromme, K. (2008). Trajectories and determinants of alcohol use among LGB young adults and their heterosexual peers: Results from a prospective study. *Developmental Psychology, 44*(1), 81.

Hatzenbuehler, M. L., Corbin, W. R., & Fromme, K. (2011). Discrimination and alcohol-related problems among college students: A prospective examination of mediating effects. *Drug & Alcohol Dependence, 115*(3), 213–220.

Here's Where New England States Stand on Masks After CDC Released New Guidelines. (2021). https://www.necn.com/news/coronavirus/heres-where-new-england-states-stand-on-masks-after-cdc-released-new-guidelines/2455812/.

Horváth, Z., Nagy, L., Koós, M., Kraus, S. W., Demetrovics, Z., Potenza, M. N., Ballester-Arnal, R., Batthyány, D., Bergeron, S., & Billieux, J. (2023). Psychometric properties of the Alcohol Use Disorders Identification Test (AUDIT) across cross-cultural subgroups, genders, and sexual orientations: Findings from the International Sex Survey (ISS). *Comprehensive Psychiatry, 127*, Article 152427.

Hox, J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis*. Techniques and applications. Routledge.

Klein, H., & Washington, T. A. (2024). The relationship of anti-transgender discrimination, harassment, and violence to binge drinking among transgender adults. *Substance Use & Misuse, 59*(4), 583–590.

Kraemer, H. C., & Blasey, C. M. (2004). Centring in regression analyses: A strategy to prevent errors in statistical inference. *Int J Methods Psychiatr Res, 13*(3), 141–151. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15297898.

Lewis, R. J., Romano, K. A., Ehlke, S. J., Lau-Barraco, C., Sandoval, C. M., Glenn, D. J., & Heron, K. E. (2021). Minority stress and alcohol use in sexual minority women's daily lives. *Experimental and Clinical Psychopharmacology, 29*(5), 501.

Livingston, N. A., Flentje, A., Heck, N. C., Szalda-Petree, A., & Cochran, B. N. (2017). Ecological momentary assessment of daily discrimination experiences and nicotine, alcohol, and drug use among sexual and gender minority individuals. *Journal of Consulting and Clinical Psychology, 85*(12), 1131.

Perrin, P. B., Sutter, M. E., Trujillo, M. A., Henry, R. S., & Pugh, M., Jr (2020). The minority strengths model: Development and initial path analytic validation in racially/ethnically diverse LGBTQ individuals. *Journal of Clinical Psychology, 76*(1), 118–136.

Phillips, S. R. (1991). The hegemony of heterosexuality: A study of introductory texts. *Teaching Sociology*, 454–463.

Reinert, D. F., & Allen, J. P. (2002). The alcohol use disorders identification test (AUDIT): A review of recent research. *Alcoholism: Clinical and Experimental Research, 26*(2), 272–279.

Remch, M., Duncan, D. T., Geller, A., Turpin, R., Dyer, T., Scheidell, J. D., Cleland, C. M., Kaufman, J. S., Brewer, R., & Hucks-Ortiz, C. (2021). Police harassment and psychosocial vulnerability, distress, and depressive symptoms among black men who have sex with men in the US: Longitudinal analysis of HPTN 061. *SSM-Population Health, 13*, Article 100753.

Ritchie, A. J., & Jones-Brown, D. (2017). Policing race, gender, and sex: A review of law enforcement policies. *Women & Criminal Justice, 27*(1), 21–50.

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption. *II. Addiction, 88*, 791–804.

Shangani, S., Gamarel, K. E., Ogunbajo, A., Cai, J., & Operario, D. (2019). Intersectional minority stress disparities among sexual minority adults in the USA: The role of race/ethnicity and socioeconomic status. *Culture, health & sexuality*, 1–15.

Skeer, M. R., Mimiaga, M. J., Mayer, K. H., O'Cleirigh, C., Covahey, C., & Safren, S. A. (2012). Patterns of substance use among a large urban cohort of HIV-infected men who have sex with men in primary care. *AIDS Behav, 16*(3), 676–689. https://doi.org/10.1007/s10461-011-9880-7

Smith, N. G. (2017). Resilience Across the Life Span: Adulthood. *Trauma, Resilience, and Health Promotion in LGBT Patients*, 75–88.

Snijders, T. A. (2005). Power and sample size in multilevel modeling. *Encyclopedia of Statistics in Behavioral Science, 3*(157), 1573.

Stall, R., Paul, J. P., Greenwood, G., Pollack, L. M., Bein, E., Crosby, G. M., Mills, T. C., Binson, D., Coates, T. J., & Catania, J. A. (2001). Alcohol use, drug use and alcohol-related problems among men who have sex with men: The Urban Men's Health Study. *Addiction, 96*(11), 1589–1601.

Stone, A., Shiffman, S., Atienza, A., & Nebeling, L. (2007). *The science of real-time data capture: Self-reports in health research*. Oxford University Press.

Surace, A., Kahler, C. W., & Wray, T. B. (2022). The association between sexual orientation discrimination and drinking among men who have sex with men: Results from an ecological momentary assessment study. *Psychology of Sexual Orientation and Gender Diversity*.

Surace, A., Kang, A., Kahler, C. W., & Operario, D. (2022). "I'm gay with an asterisk": how intersecting identities influence LGBT strengths. *Journal of Homosexuality*, 1–21.

Surace, A., Riordan, B., & Winter, T. (2019). Do New Zealand sexual minorities engage in more hazardous drinking than non-sexual minorities?(vol 38, pg 519, 2019). *Drug and Alcohol Review, 38*(6), 725.

Wang, K., Rendina, H. J., & Pachankis, J. E. (2016). Looking on the bright side of stigma: How stress-related growth facilitates adaptive coping among gay and bisexual men. *Journal of Gay & Lesbian Mental Health, 20*(4), 363–375.

Wray, T. B., Pantalone, D. W., Kahler, C. W., Monti, P. M., & Mayer, K. H. (2016). The role of discrimination in alcohol-related problems in samples of heavy drinking HIV-negative and positive men who have sex with men (MSM). *Drug Alcohol Depend, 166*, 226–234. https://doi.org/10.1016/j.drugalcdep.2016.07.017