



The influence of structural stigma and rejection sensitivity on young sexual minority men's daily tobacco and alcohol use



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ABSTRACT

Stigma occurs at both individual and structural levels, but existing research tends to examine the effect of individual and structural forms of stigma in isolation, rather than considering potential synergistic effects. To address this gap, our study examined whether stigma at the individual level, namely gay-related rejection sensitivity, interacts with structural stigma to predict substance use among young sexual minority men. Sexual minority ($n = 119$) participants completed online measures of our constructs (e.g., rejection sensitivity). Participants currently resided across a broad array of geographic areas (i.e., 24 U.S. states), and had attended high school in 28 states, allowing us to capture sufficient variance in current and past forms of structural stigma, defined as (1) a lack of state-level policies providing equal opportunities for heterosexual and sexual minority individuals and (2) negative state-aggregated attitudes toward sexual minorities. To measure daily substance use, we utilized a daily diary approach, whereby all participants were asked to indicate whether they used tobacco or alcohol on nine consecutive days. Results indicated that structural stigma interacted with rejection sensitivity to predict tobacco and alcohol use, and that this relationship depended on the developmental timing of exposure to structural stigma. In contrast, rejection sensitivity did not mediate the relationship between structural stigma and substance use. These results suggest that psychological predispositions, such as rejection sensitivity, interact with features of the social environment, such as structural stigma, to predict important health behaviors among young sexual minority men. These results add to a growing body of research documenting the multiple levels through which stigma interacts to produce negative health outcomes among sexual minority individuals.

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Introduction

Stigma has traditionally been conceptualized as being transmitted by individuals (Crocker, Major, & Steele, 1998), and multiple lines of evidence indicate that individual forms of stigma contribute to a variety of negative outcomes among members of stigmatized groups (Major, Mendes, & Dovidio, 2013; Major & O'Brien, 2005; Pachankis, 2007). At the same time, recent research suggests that social structures, policies, and institutions can also produce stigma, a process that has been termed “structural stigma” (Link & Phelan, 2001). One operationalization of structural stigma is state policies that differentially target members of stigmatized groups (Corrigan, Markovitz, & Watson, 2004). For example, some state laws deny sexual minority individuals access to the same opportunities

afforded heterosexuals, such as marriage and adoption, thus serving to mark members of this group as less-than-equal (e.g., Eskridge & Spedale, 2006). Researchers have hypothesized that these broader structural forms of stigma are likely fundamental contributors to unequal health outcomes between members of stigmatized and non-stigmatized groups (Link, Yang, Phelan, & Collins, 2004), and a burgeoning line of research has begun to support this hypothesis (e.g., Hatzenbuehler, 2010; Lucachko, Hatzenbuehler, & Keyes, 2013; Miller, Bunn, & Solomon, 2012).

Despite the recognition that stigma occurs at multiple levels, there is a paucity of research that examines relationships between structural and individual-level stigma processes, with some notable exceptions (Gee, 2002). The lack of research results, in part, from the fact that the stigma field typically examines social- and individual-level processes in isolation (Hatzenbuehler, 2009). Combining both levels of stigma in a single study, however, would allow for the possibility of uncovering the individual-level stigma

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processes with which structural stigma interacts to deplete health, as well as of identifying individual-level stigma processes through which structural stigma creates negative health outcomes. The present study, therefore, proposes to examine whether: (1) structural forms of stigma and psychological processes of stigma independently predict negative health outcomes among sexual minority individuals; (2) structural and psychological forms of stigma interact to predict negative health outcomes for sexual minority individuals; and (3) psychological forms of stigma mediate the relationship between structural stigma and health among sexual minorities. This study focuses on daily substance use as its primary health outcome given that sexual minority individuals are at significantly higher risk, compared with heterosexual individuals, of using substances, including tobacco (Gruskin, Greenwood, Matevia, Pollack, & Bye, 2007) and alcohol (Drabble, Midanik, & Trocki, 2005; McCabe, Hughes, Bostwick, West, & Boyd, 2009).

The psychological form of stigma that we focus on in the current study is *rejection sensitivity*, which refers to chronic anxious expectations of rejection enacted to guard against potential threat. Stigma-based rejection sensitivity describes the psychological process through which some individuals learn to anxiously anticipate rejection because of previous experiences with prejudice and discrimination toward their group membership (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002). Despite sometimes representing a functional adaptation to stigmatizing social environments, rejection sensitivity has been associated with negative interpersonal and health outcomes (e.g., Downey, Freitas, Michaelis, & Khouri, 1998; Feinstein, Goldfried, & Davila, 2012). For example, African American college students on predominantly white college campuses who are high in race-based rejection sensitivity have been prospectively shown to exhibit less institutional trust, greater difficulty transitioning to college, and a decline in course grades compared to those who are low in race-based rejection sensitivity (Mendoza-Denton, Purdie, Downey, & Davis, 2002). Similarly, a daily diary approach recently demonstrated that women who were high in gender-based rejection sensitivity and worked in an historically male academic setting were more likely to avoid expressing themselves in response to negative gender-related events than women who indicated lower levels of gender-based rejection sensitivity (London, Downey, Romero-Canyas, Rattan, & Tyson, 2012). The results of this latter study showed that anger and alienation represent at least two costs of such self-silencing. Similarly, among sexual minority men, sexual orientation-based rejection sensitivity predicts ongoing self-silencing (Pachankis, Goldfried, & Ramrattan, 2008) in addition to poorer immune functioning in those with HIV (Cole, Kemeny, & Taylor, 1997).

Theories of stigma-based rejection sensitivity suggest that rejection sensitivity is formed in early interpersonal contexts, for example in the context of prejudice or exclusion by others because of one's racial group membership (Mendoza-Denton et al., 2002) or in the context of parental rejection of one's identity in the case of stigmatized sexual orientations (Pachankis et al., 2008). However, not all stigmatized individuals are rejection sensitive, and for those who are rejection sensitive, not all contexts evoke anxious expectations of rejection. Indeed, for stigmatized individuals who possess a high degree of rejection sensitivity, whether they will anxiously expect rejection at any given time depends on the possibility of rejection embedded in their social environment. As Mendoza-Denton et al. (2002) note, "anxious rejection expectations are activated only in those situations in which rejection is possible, meaning applicable as well as personally salient" (p. 897). As such, the tendency to anxiously perceive rejection, and therefore to engage in unhealthy coping responses, is expected to occur only

in potentially threatening environments among those who are predisposed to rejection sensitivity because of past experiences with stigma (e.g., social exclusion, parental rejection). However, this possibility has not been empirically established, as rejection sensitivity has been solely examined in the context of individual- or interpersonal-level factors, such as internalized homophobia and parental rejection of one's sexual orientation (Pachankis et al., 2008). The present study addresses this gap in the literature by examining the possibility that structural stigma moderates rejection sensitivity's negative impact on an important health outcome, namely substance use. Specifically, we explore whether rejection sensitivity increases the likelihood that structural stigma contributes to substance use in sexual minority men.

While the timing of environmental influences is important to health (e.g., Bronfenbrenner & Evans, 2000; Pollitt, Rose, & Kaufman, 2005), most examinations of structural stigma's impact on health examine stigma exposure at one point in time (e.g., Hatzenbuehler, Keyes, & Hasin, 2009). It could be argued that sexual minorities' exposure to structural stigma at one point in the life course (e.g., during adolescence, when feelings of same-sex attraction are first experienced) might have different effects on health than exposure to structural stigma at another point in the life course (e.g., during young adulthood, when a sexual minority identity is being formed), as has been shown in research regarding the influence of exposure to adverse socioeconomic conditions on health (Claussen, Smith, & Thelle, 2003). We therefore measure structural stigma in participants' current environments and also in their past environments in order to determine whether the developmental timing of structural stigma affects health.

Further, rejection sensitivity may uniquely interact with structural stigma exposure at various points in development to influence health outcomes. Sensitivity to possible rejection becomes particularly salient during adolescence (Gunnar, Wewerka, Frenn, Long, & Griggs, 2009; Westenberg, Drewes, Goedhart, Siebelink, & Treffers, 2004), and rejection during this time predicts mental health problems across the lifespan (Lev-Wiesel, Nuttman-Shwartz, & Sternberg, 2006). Adolescents who become aware of a stigmatized personal status during this developmental period and who are particularly sensitive to rejection of their stigma may be particularly likely to develop unhealthy coping strategies to fend off expected rejection in potentially threatening contexts (Downey, Bonica, & Rincon, 1999). In this way, rejection sensitivity might serve to make some stigmatized individuals particularly vulnerable to the negative effects of structural stigma depending on when they encounter structural stigma at various points in development. Including an objective measure of structural stigma in two contexts at two different points in time (i.e., high school and college) allows us to investigate whether rejection sensitivity heightens the influence that structural stigma exposure during adolescence and early adulthood might have on young sexual minority men's substance use.

In addition to modifying the relationship between structural stigma and health, individual forms of stigma may represent mechanisms through which structural forms of stigma contribute to adverse health outcomes. Consistent with this idea, it is plausible that individuals who live in highly stigmatizing environments are more likely to develop sensitivity to status-based rejection, which in turn would increase risk for negative health outcomes, including substance use. In this case, structural stigma would be causally related to greater rejection sensitivity, and would explain *why* structural stigma is related to poor health. This is in contrast to a moderation model, in which structural stigma interacts with rejection sensitivity to predict poor health.

In summary, based on previous conceptualizations of rejection sensitivity (Mendoza-Denton et al., 2002; Pachankis et al., 2008),

we hypothesize that stigma-related rejection sensitivity will predict young sexual minority men's daily tobacco and alcohol use, important health outcomes with established disparities by sexual orientation. In addition, we make three novel hypotheses about the relationship between rejection sensitivity, an individual-level stigma process, and structural forms of stigma. First, we propose that rejection sensitivity will be particularly likely to predict tobacco and alcohol use in the context of structural stigma, operationalized as state-aggregated attitudes toward sexual minority individuals, the presence of state-level policies negatively affecting sexual minority individuals, and the absence of protective policies. Second, we suggest that developmental timing of exposure to structural stigma matters for whether rejection sensitivity harms the health of sexual minority men. In particular, we hypothesize that because rejection sensitivity takes hold in adolescence (Gunnar et al., 2009; Westenberg et al., 2004), and predicts adverse health consequences from that point forward (Lev-Wiesel et al., 2006), rejection sensitivity will interact more strongly with structural stigma in one's past (i.e., high school) environment than with structural stigma encountered later in development (i.e., in college) to predict tobacco and alcohol use. Third, we hypothesize that rejection sensitivity will mediate the relationship between structural stigma and tobacco and alcohol use.

Method

Participants

After receiving Institutional Review Board approval, we recruited sexual minority men under the age of 29 who were enrolled as full-time students at large public and private universities across four U.S. regions (i.e., Northeast, South, Midwest, West), thereby providing adequate variation in structural stigma surrounding sexual minorities. To recruit sexual minority participants, we sent email announcements to the listservs of the lesbian, gay, bisexual, and transgender (LGBT) student groups on these campuses.

Participants indicated their sexual orientation in response to the item "What best describes your identity?" choosing from the following response options: gay; bisexual, but mostly gay; bisexual, equally gay and heterosexual; bisexual, but mostly heterosexual; heterosexual; queer; uncertain, don't know for sure. Sexual minority participants included 112 who identified as "gay" and 18 who identified as "bisexual, but mostly gay," five who identified as "queer," and one who identified as "bisexual equally gay and heterosexual." We omitted one participant who indicated being "bisexual, mostly heterosexual." Because two additional participants recruited through LGBT groups indicated being heterosexual, but completed the measures specific to sexual minority individuals (i.e., the gay-related rejection sensitivity measure), the validity of their responses is questionable; we therefore omitted them from all analyses. Participant demographics are displayed in Table 1.

Procedure

After participants contacted the project coordinator expressing interest in the study, a research assistant reviewed the study protocol with them by telephone, including the fact that the study required participation over 10 consecutive days, and then directed them to the online website containing the consent form. After receipt of consent, the research assistant emailed the weblink for the first day's forms which contained all demographic and background assessments, including questions ascertaining the states in which participants attended high school and college and the rejection sensitivity measure. Each participant was told that he would also receive a link each evening for the next nine days

Table 1
Characteristics of study participants ($N = 119$).

Variable	<i>n</i>	%
Age		
18–19	42	35.29
20–21	42	35.29
22–25	35	29.41
Race/ethnicity		
Black/African American	7	5.5
White/Caucasian	85	70.9
Latino/Hispanic	10	7.9
Asian	8	7.9
Native American	3	2.4
Pacific Islander	1	0.8
Caribbean	1	1.6
Mixed Race	4	3.1
Year in school		
Freshman	14	11.86
Sophomore	29	24.58
Junior	20	16.95
Senior	37	31.36
Masters	10	8.47
Doctoral	8	6.78
Region of current residence		
Northeast	34	30.09
Midwest	37	32.74
South	26	23.01
West	14	12.39
Relationship status		
In a relationship	53	44.54
Single	66	55.46
Parental income		
<\$50,000	36	33.96
>\$50,000	70	66.04

Note. Some percentages do not total 100% due to missing responses.

assessing various aspects of his day, which he was to complete before going to bed each night. For the analyses conducted here, the only daily measure we utilized is substance use. We collected entries over the course of nine days, rather than a standard seven-day week, to ensure a sufficient number of weekend entries when substance use may be more likely. A research assistant reviewed the online data entries each morning to determine whether each participant completed the previous night's measures and contacted those participants who did not complete that night's measures. Upon completion of the study, each participant received \$5 for each completed day plus a \$10 bonus for completing all days. Because daily substance use assessments were nested within each participant and because participants were nested within states, data are organized into three levels with daily substance use assessments as level one, individual-level factors (e.g., demographics) at level two, and state-level factors (e.g., structural stigma in one's current environment) at level three.

Level 3 (state level) measures

Structural stigma. Given the fact that self-report measures of stigma and prejudice are potentially confounded with psychological health outcomes (Meyer, 2003), we created an objective measure of structural stigma embedded in each participant's environment by combining 1) the sum of the presence of five state policies affecting sexual minority individuals in the state of residence and 2) the mean of eight questions regarding attitudes toward policies affecting gays and lesbians in that state. We describe these measures below.

We summed the number of policies protecting LGB individuals out of five relevant policies, for each of the U.S. states in the years 2005 and 2009, using publicly available information (Human Rights Campaign, 2010). We chose these two years to represent the years during which the average participant was in high school and in

college, respectively. These policies were constitutional amendments banning same-sex marriage (presence of measure = 1), sexual orientation employment nondiscrimination laws (absence of law = 1), statutes recognizing sexual orientation as a protected category in hate crimes reporting (absence of statute = 1), non-discrimination law extending to students and/or a statute banning bullying based explicitly on sexual orientation (absence of law or statute = 1), and statutes restricting same-sex couples from adopting or make it difficult for non-married couples to adopt (presence of statute = 1). Previous studies have shown that similar measures of state policies are associated with mental health outcomes in LGB adults (Hatzenbuehler, Keyes, et al., 2009; Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010a, 2010b).

We used information from Lax and Philips (2009) to estimate the public opinion toward sexual minorities in each U.S. state. Lax and Philips (2009) aggregated responses from 41 national polls from the Roper Center's iPol archive, dating from 1999 to 2008. These polls, which were random national samples conducted by various organizations (e.g., Gallup, Pew), yielded approximately 80,000 responses. Policy-specific opinions were collected for the following areas: gay adoption, hate crimes, health benefits, discrimination in jobs and housing, marriage, sodomy, and civil unions (e.g., "Do you think there should be adoption rights for gay and lesbian couples?"). Authors provided a mean value for these opinions by state. Given that these data were aggregated across 1999–2008, we utilized the same state-aggregated attitude score for both high school and college.

We coded state policies as a continuous variable such that the higher the number of stigmatizing policies and the lower the number of protective policies, the higher the level of structural stigma. Similarly, we coded the public opinion values such that more negative attitudes toward gays and lesbians indicated higher levels of structural stigma. Given that the relationship between these two scales was strong, $r(22) = 0.80$, $p < 0.001$, we combined them into one index representing structural stigma by summing the z -transformed score of each scale.

Participants currently lived in 24 different U.S. states and the District of Columbia. There was a mean of 5.28 ($SD = 7.01$) participants per state. Students were enrolled at one of 41 schools. Each state was represented by 1.64 schools ($SD = 1.04$). Participants attended high school in 28 different U.S. states and the District of Columbia. The range on the measure of 2005 state-level structural stigma was -2.09 to 3.84 . The range on the measure of 2009 state-level structural stigma was -2.63 to 3.43 . Approximately one-third (33.1%) of participants reported attending college in a different state from the one in which they attended high school, providing a sufficient basis from which to separately examine the influence of past state versus current state in our models.

State-level covariates. Given the potential of these variables to confound associations between structural stigma and substance use, we controlled for median household income and population density in each participant's current state in models examining associations with current structural stigma. Similarly, in analyses involving past structural stigma, we controlled for median household income and population density in the state the participant attended high school at the time of high school attendance. We included median household income and population density because individuals living in counties and states with lower median household income and smaller population density were more likely to oppose same-sex marriage in ballot initiatives between 2000 and 2008 (McVeigh & Diaz, 2009). Information on median household income and population density was obtained from the 2000 U.S. Census. Both state-level covariates were related to our measure of structural stigma, with higher income states, $r(22) = -0.77$,

$p < 0.001$, and denser states, $r(22) = -0.57$, $p < 0.001$, having lower levels of structural stigma.

Level 2 (Person level) measures

Person-level covariates. Participants indicated their age, ethnicity, and parents' income (dichotomized as \$50,000 or more versus less than \$50,000 annually).

Gay-related rejection sensitivity. Sexual minority participants completed a self-report measure of gay-related rejection sensitivity (Pachankis et al., 2008). The scale assesses the anxious likelihood of expecting rejection because of one's sexual orientation across 14 ambiguously rejecting vignettes (e.g., being seated in the back of a restaurant with your same-sex partner; receiving a wedding invitation that excludes your same-sex partner). For each situation, participants indicated both the degree to which they would be anxious about the event happening because of their sexual orientation (1 = *very unconcerned*, 6 = *very concerned*) and the degree to which they would expect to be rejected in that situation as a result of their sexual orientation (1 = *very unlikely*, 6 = *very likely*). Each item therefore generated two responses on a 6-point scale, both of which were multiplied before being combined into a mean score of all 14 items, consistent with published scoring instructions (Pachankis et al., 2008). Cronbach's α was 0.86 in the current sample.

This scale was created and validated using a process that was similar to the one used to create and validate the race-based (Mendoza-Denton et al., 2002) and gender-based (London et al., 2012) rejection sensitivity scales. The developers of the gay-related rejection sensitivity scale conducted interviews with sexual minority men in order to generate ambiguous vignettes, such that some participants would be particularly likely to perceive sexual orientation related rejection, whereas others would not perceive rejection, consistent with rejection sensitivity theory (Mendoza-Denton et al., 2002). Rejection sensitivity as captured in this scale is only moderately related to perceived discrimination, suggesting that it measures a unique construct beyond simple perceptions of rejecting environments (Pachankis et al., 2008). The wide variance found in participants' response to this scale with both college student (e.g., Pachankis & Goldfried, 2010) and adult (Feinstein et al., 2012) samples suggests that some participants are more rejection sensitive than others.

Level 1 (within-Persons level) measures

Substance use. Participants indicated whether or not they had smoked cigarettes or used alcohol each day they were in the study. We created binary variables that distinguished any use of tobacco or alcohol (=1) from non-use (=0) on each day.

Analytic strategy

Smoking and drinking were examined in separate models, each involving three levels of nested data (i.e., days nested within person and persons nested within state). Several analytic approaches are available that might capture the three-level structure of these data, including generalized estimating equations (GEE) and other methods that utilize the marginal probability; however, such approaches assume that missing outcome data are missing completely at random (MCAR) (Hardin & Hilbe, 2003; Muthén & Muthén, 2010a). These analyses were conducted under missing at random assumptions utilizing modeling procedures in Mplus (Muthén & Muthén, 2010b). These procedures offer the option of utilizing full-information maximum likelihood (FIML) estimation to impute missing outcome data, which has been found superior to a

range of other methods of handling data under missing at random assumptions (Enders & Bandalos, 2001) and is at least as robust as multiple imputation strategies in the presence of non-random missingness (Newman, 2003).

Three-level models were therefore specified within Mplus utilizing a combination of two-level modeling and latent growth curve modeling (LGCM) procedures. In these models, repeated observation of the lowest-level variable is specified using a growth factor. Namely, the log-odds of substance use on each of the nine days was regressed on a single latent factor consistent with a random intercept model (Snijders & Bosker, 2012). Additional growth factors modeling linear or quadratic trajectories, for example, were omitted, because the nine-day assessment period was not considered as representing a developmentally meaningful period of time, but instead is treated as a cross-sectional view of individual behavior at the time around the assessment period. The use of LGCM to model repeated observations has been described in detail elsewhere (Duncan, Duncan, & Strycker, 2006; Muthén & Muthén, 2010b; Snijders & Bosker, 2012). Specification of covariance constraints at level 1 is not possible in multilevel models with dichotomous outcomes because the residual variances of dichotomous outcomes are fixed (Muthén & Muthén, 2010a). The autocorrelation of days within person is captured in the residual variance of the latent factor.

Fixed effects were calculated for explanatory variables. The application of latent variable multilevel modeling procedures to logistic regression presents challenges in parameter interpretation (Duncan et al., 2006; Larsen & Merlo, 2005; Muthén & Asparouhov, 2002; Snijders & Bosker, 2012). GEE models and other procedures that model the marginal mean or cumulative logit of repeated variables permit interpretation of Level 2 and 3 exponentiated regression coefficients as the proportion of change in the average odds of the outcome (Agresti, 2013). Where GEE models predict the log-transformed marginal odds, latent intercept models predict the intercept of the log-transformed odds of the outcome on each day during the observation period (Muthén & Asparouhov, 2002). Within this process, the residual variance of the level 1 dichotomous outcome is fixed. As a consequence, the residual variance at higher levels increases with the introduction of fixed effects and regression coefficients increase in a corresponding proportion (Snijders & Bosker, 2012). The result is that, unlike in GEE models, Level 2 and 3 regression coefficients cannot be directly interpreted in terms of their effects on the “average odds” following exponentiation in a manner similar to single-level models (Hedeker, 2007; Larsen & Merlo, 2005; Muthén & Muthén, 2010a). While alternative methods have been suggested for presenting Level 2 and 3 coefficients in multilevel logistic models (Larsen & Merlo, 2005), these have not been extended to three-level models. Thus, similar to Brown, Catalano, Fleming, Haggerty, and Abbott's (2005) handling of categorical data in growth models, we present only the unstandardized regression coefficients (B's). These can be used to evaluate the significance of associations, but should not be interpreted in their exponentiated form.

Analyses proceeded in three steps. First, we examined main effect relationships between structural stigma (current and past), rejection sensitivity, and substance use. Second, we examined the interaction between current structural stigma and rejection sensitivity as well as the interaction between past structural stigma and rejection sensitivity in their respective models. Third, we explored whether rejection sensitivity mediated the relationship between structural stigma and substance use outcomes.

Results

Data were examined for missingness. A total of 21 (17.6%) participants had at least one day of missing data for smoking and 21

(17.6%) were missing at least one day of data for drinking. Additionally, six participants were missing data related to rejection sensitivity. Where possible, missing data were imputed using full-information maximum likelihood estimation, which is robust even in the presence of modest levels of non-random missingness (Enders & Bandalos, 2001). An additional 13 (10.9%) of participants were missing data related to parental income, a covariate in the analyses. The use of full-information maximum likelihood estimation (FIML) to accommodate missing data on this variable resulted in problems with model identification. As a result, missing covariate data were imputed using a regression approach whereby parental income was estimated using participants' race.

For our primary predictor, current state-level structural stigma, nine participants were missing data and were dropped from all analyses. Seven of these participants lived in the District of Columbia, for which no state-aggregated attitude information was available, and two participants did not indicate the state in which they were currently living. Eight additional participants were missing data related to past state-level structural stigma for analogous reasons and these individuals were also omitted from the planned analyses.

Final models were therefore based upon a sample of 119 sexual minority men. This dataset included 1035 completed daily entries with 96.63% of sexual minority participants submitting at least seven daily entries. Participant demographics are displayed in Table 1. Variables were examined for violations of assumptions of normality and all were within tolerable limits.

Substance use frequency

Participants indicated relatively moderate levels of substance use across the study: 82.4% of participants did not report any smoking on any day, 34.5% did not report any drinking on any day. 52.38% of all smokers ($n = 11$) reported smoking on fewer than half of their days in the study, and 69.23% of all drinkers ($n = 54$) reported drinking on fewer than half of their days in the study. Seven (33.3%) participants who smoked did so on 10–25% of their study days, 4 (19.05%) smokers smoked on 26–50% of their study days, 5 (23.81%) smoked on 51–75% of their study days, and 5 (23.81%) smokers reported smoking on 76–100% of study days. Thirty-nine (50.00%) participants who drank did so on 10–25% of their study days, 15 (19.23%) drinkers drank on 26–50% of their study days, 15 (19.23%) drank on 51–75% of their study days, and 7 (8.97%) drinkers reported drinking on 76–100% of study days.

Structural stigma, rejection sensitivity, and substance use: main effects

Smoking. Table 2 contains results of models examining current and past structural stigma in the prediction of smoking behavior. Results suggest that current ($B = 2.83$, $p < 0.01$), but not past ($p > 0.05$), exposure to structural stigma is associated with increased smoking. Rejection sensitivity was positively associated with smoking behavior in models of both current ($B = 1.59$, $p < 0.01$) and past ($B = 1.88$, $p < 0.01$) structural stigma.

Alcohol Use. Table 3 contains results of models examining current and past structural stigma in the prediction of alcohol use. Neither current nor past structural stigma was significantly associated with alcohol use. Similarly, rejection sensitivity was not significantly associated with alcohol use in main effects models.

Rejection sensitivity: interactions with past structural stigma

In order to better understand the relationship between past structural stigma and rejection sensitivity, we calculated models

Table 2

Higher amounts of smoking among rejection-sensitive individuals and individuals living in high structural stigma states.

	Model 1		Model 2	
	B	95% CI	B	95% CI
Past structural stigma				
(High School) State-Level Covariates				
Median Income	−1.07	(−2.65, 0.51)	−1.12	(−2.73, 0.50)
Population density	0.35	(−0.87, 1.57)	0.34	(−0.81, 1.48)
Past Structural Stigma	0.37	(−1.17, 1.91)	0.3	(−1.40, 2.00)
Individual-Level Covariates				
Age	−0.68	(−2.11, 0.75)	−0.67	(−2.11, 0.78)
Race (ref = non-white)	−2.67*	(−5.21, −0.13)	−2.81*	(−5.46, −0.15)
Parental Income (ref = <\$50,000)	3.35**	(0.82, 5.87)	3.37**	(0.83, 5.91)
Rejection Sensitivity	1.88**	(0.65, 3.10)	1.85**	(0.57, 3.14)
Rejection Sensitivity × Past Structural Stigma	—	—	0.22	(−0.94, 1.38)
Current structural stigma				
(Current) State-Level Covariates				
Median Income	0.63	(−0.27, 1.53)	0.78	(−0.16, 1.72)
Population density	0.73*	(0.12, 1.34)	0.91**	(0.40, 1.42)
Current Structural Stigma	2.83**	(1.27, 4.38)	2.84**	(0.99, 4.70)
Individual-Level Covariates				
Age	−0.34	(−1.38, 0.71)	−0.26	(−1.30, 0.78)
Race (ref = non-white)	−2.31 ^a	(−4.78, 0.17)	−2.39 ^a	(−4.83, 0.05)
Parental Income (ref = < \$50,000)	3.27*	(0.74, 5.79)	3.13*	(0.41, 5.85)
Rejection Sensitivity	1.59**	(0.48, 2.70)	1.18**	(0.35, 2.27)
Rejection Sensitivity × Current Structural Stigma	—	—	0.90 ^a	(−0.16, 1.95)

* $p \leq 0.05$, ** $p \leq 0.01$, ^a $p < 0.10$.

Note. Due to issues related to the interpretability of odds ratios in multi-level models of bivariate outcomes, only unstandardized regression coefficients are presented here.

that included an interaction term between these two variables. These interaction terms were modeled as fixed effects on the individual-level. Their significance was evaluated by examining the p -value of the associated coefficient.

Smoking. As shown in Table 2, the rejection sensitivity × past structural stigma interaction term was non-significant, indicating that the association between past structural stigma and smoking was constant across varying levels of rejection sensitivity.

Alcohol Use. In contrast, there was a significant interaction between past structural stigma and rejection sensitivity (Table 3). These results indicated that rejection sensitivity was more strongly associated with alcohol use among individuals who experienced higher levels of structural stigma during high school.

Rejection sensitivity: interactions with current structural stigma

Smoking. Higher levels of current structural stigma marginally increased the strength of the association between rejection sensitivity and smoking (Table 2). The statistical significance of this interaction term ($p = 0.09$) should be understood in the context of the relatively small sample size relative to model complexity.

Alcohol Use. As shown in Table 3, the rejection sensitivity × past structural stigma interaction term was non-significant; thus, the association between current structural stigma and drinking was constant across varying levels of rejection sensitivity.

Mediation

In order to test our mediation model linking structural support to daily substance use, we first examined the relationship between state-level structural stigma and the hypothesized person-level mediator (i.e., rejection sensitivity). Bivariate associations between rejection sensitivity and structural stigma (current and past)

Table 3

Higher amounts of alcohol use among rejection-sensitive individuals from high structural stigma states.

	Model 1		Model 2	
	B	95% CI	B	95% CI
Past structural stigma				
(High School) State-Level Covariates				
Median Income	−0.26	(−0.75, 0.23)	−0.28	(−0.78, 0.22)
Population density	−0.23	(−0.70, 0.25)	−0.08	(−0.54, 0.37)
Past Structural Stigma	−0.15	(−0.58, 0.29)	−0.12	(−0.51, 0.26)
Individual-Level Covariates				
Age	0.76**	(0.34, 1.17)	0.76**	(0.36, 1.16)
Race (ref = non-white)	0.36	(−0.35, 1.07)	0.25	(−0.39, 0.90)
Parental Income (ref = <\$50,000)	0.58*	(0.03, 1.13)	0.59*	(0.07, 1.11)
Rejection Sensitivity	0.06	(−0.39, 0.50)	0.003	(−0.41, 0.41)
Rejection Sensitivity × Past Structural Stigma	—	—	0.46*	(0.01, 0.90)
Current structural stigma				
(Current) State-Level Covariates				
Median Income	−0.03	(−0.38, 0.32)	−0.004	(−0.34, 0.33)
Population density	0.09	(−0.11, 0.28)	0.10	(−0.07, 0.27)
Current Structural Stigma	0.004	(−0.30, 0.31)	0.01	(−0.27, 0.28)
Individual-Level Covariates				
Age	0.79**	(0.43, 1.16)	0.81**	(0.47, 1.14)
Race (ref = non-white)	0.34	(−0.42, 1.10)	0.32	(−0.45, 1.09)
Parental Income (ref = <\$50,000)	0.48	(−0.11, 1.07)	0.44	(−0.11, 0.99)
Rejection Sensitivity	0.07	(−0.44, 0.57)	0.03	(−0.48, 0.54)
Rejection Sensitivity × Current Structural Stigma	—	—	0.23	(−0.26, 0.71)

* $p \leq 0.05$, ** $p \leq 0.01$.

Note. Due to issues related to the interpretability of odds ratios in multi-level models of bivariate outcomes, only unstandardized regression coefficients are presented here.

were evaluated. Rejection sensitivity was not significantly associated with either current (Pearson's $r = 0.16$, $p = 0.09$) or past (Pearson's $r = 0.10$, $p = 0.27$) structural stigma. The strength of these associations was unchanged in models that accounted for the nesting of individuals within state. In the absence of a direct effect between structural stigma and rejection sensitivity, no additional exploration of potential mediation was undertaken.

Discussion

This study represents a novel examination of the relationship between structural stigma and an important psychological process potentially implicated in sexual minority men's health, namely rejection sensitivity. Specifically, we examined the interaction between exposure to structural stigma, in the form of state-level policies and state-aggregated attitudes toward sexual minority individuals, at two time points in development, and rejection sensitivity, a key stigma process at the individual-level (London et al., 2012; Mendoza-Denton et al., 2002; Pachankis et al., 2008). By simultaneously capturing structural stigma in participants' current and past social environments, as well as their rejection sensitivity, we were able to examine the joint influence of these factors in compromising the health of young sexual minority men. Our primary outcomes were tobacco and alcohol use, health-risk behaviors that disproportionately affect sexual minority men beginning in early development (Marshall et al., 2008). In this study, we utilized experience sampling methodology to capture daily tobacco and alcohol use across nine days of participants' lives.

We first examined main effect relationships between structural and psychological forms of stigma on substance use among sexual minority men. Consistent with previous studies (Hatzenbuehler, Jun, Corliss, & Austin, 2013; Hatzenbuehler, Wierenga, & Keyes, 2011), we found that structural stigma predicted daily tobacco

use among sexual minority participants, such that the more stigmatizing policies (e.g., banning same-sex marriage) and more negative attitudes (e.g., against same-sex marriage) toward sexual minority individuals in the U.S. states in which participants were currently living, the higher the likelihood of smoking among sexual minority participants living in those states. This effect occurred after controlling for individual (e.g., parents' income, age) and structural (e.g., median household income, population density) covariates. However, structural stigma in the state in which one attended high school did not predict tobacco use. We also found that rejection sensitivity, or the degree to which sexual minority participants anxiously expect and perceive rejection from others in relatively ambiguous situations because of their sexual orientation, predicted the likelihood of smoking.

In the second set of analyses, we examined synergistic relationships between structural stigma and rejection sensitivity in predicting tobacco and alcohol use. In partial support of our hypothesis that rejection sensitivity would interact more strongly with structural stigma in one's past environment than with structural stigma in one's current environment to predict substance use, we found that rejection sensitivity interacted with past structural stigma to predict higher rates of alcohol use (but not smoking). In contrast with study hypotheses, we found that the interaction between *current* structural stigma and rejection sensitivity showed a marginally significant effect in predicting higher rates of smoking. While rejection sensitivity has been hypothesized to interact with the social environment (London et al., 2012; Mendoza-Denton et al., 2002), this is the first study to our knowledge to empirically investigate whether this interaction predicts health outcomes. Anxious expectations of rejection are formed in interpersonal contexts marked by prejudice and discrimination over the course of early development (e.g., Pachankis et al., 2008). Rejection-sensitive gay men who live in social contexts that confirm expectations of rejection through laws, policies, and negative attitudes affecting sexual minorities may be particularly likely to experience stress. The results of this study suggest that substance use may serve as one way to cope with these joint forms of stress, including both structural stigma and psychological expectations of stigma.

The fact that rejection sensitivity interacts with current structural stigma to predict smoking, but with past structural stigma to predict alcohol use, may be a function of the unique addiction profile for these two substances and the distinct functions that each of these substances serve across developmental contexts. While this study did not collect data regarding substance use initiation, the possibility that rejection-sensitive young gay and bisexual men might have initiated alcohol use before tobacco use as a way to cope with perceived rejection may explain our finding that rejection sensitivity heightened the influence of past exposure to structural stigma on alcohol use while it marginally heightened the influence of college exposure to structural stigma on tobacco use. For rejection-sensitive young sexual minority men, the timing of exposure to structural stigma seems to be important in determining whether tobacco or alcohol is used, a possibility that should be confirmed in future studies.

Finally, in the third set of analyses, we examined whether a psychological form of stigma (i.e., rejection sensitivity) mediated the relationship between structural stigma and substance use. While rejection sensitivity was significantly related to daily tobacco use, it was not significantly predicted by our measure of structural stigma. Consequently, rejection sensitivity did not function as a statistically significant mediator through which structural stigma predicted substance use. However, given the significant relationship between rejection sensitivity and tobacco use, future studies using larger samples of sexual minority individuals might wish to further examine the potential mediating role of rejection sensitivity

in explaining adverse health outcomes. Future studies might also utilize a prospective design capable of capturing changes in rejection sensitivity that both follow changes in structural stigma and precede changes in health outcomes. It is also possible that individual-level stigma-related processes not measured here might serve as important moderators or mediators of the relationship between structural stigma and health-related outcomes. For example, the degree to which one conceals a personal stigma (e.g., Pachankis, 2007) and the relative prominence of one's stigmatized identity in the context of one's overall identity (e.g., Quinn & Chaudoir, 2009) may be shaped by structural stigma or may interact with structural stigma to deplete health. Future research, therefore, might examine how structural stigma impacts or interacts with these important individual-level aspects of stigma to compromise health for sexual minority individuals.

The results of this study have implications for both individual and structural intervention strategies to reduce substance use among young sexual minority men. Structural interventions that reduce stigma through state-level laws and policies that afford sexual minority individuals the same opportunities as heterosexual individuals, such as same-sex marriage and protections against employment discrimination, can potentially alleviate health problems at their source for large segments of the sexual minority population (Hatzenbuehler, 2010). The existence of such laws and policies can communicate a sense of belonging and safety and thereby reduce unhealthy coping behaviors, such as tobacco and alcohol use. While not specifically examined in this study, school (Russell, Muraco, Subramaniam, & Laub, 2009), workplace (Waldo, 1999), and family (Ryan, 2010) interventions can also be employed to facilitate environments that are conducive to the health of sexual minority individuals. In this way, structural interventions can reduce or mitigate the disproportionate stress experienced by sexual minorities, thereby eliminating an established social determinant of substance use in this population (Meyer, Schwartz, & Frost, 2008), while bypassing the ethical problem of placing the onus of health improvement on stigmatized populations (Link & Phelan, 2001). However, barring the protracted implementation of structural changes, individuals who are particularly likely to anxiously expect rejection directed toward their sexual orientation may benefit from psychosocial interventions that promote resilience against stigma through building supportive relationships, critically appraising the threat present in various environments, and building self-efficacy for coping with the stressful consequences of stigma (e.g., Pachankis, 2013). The developmental timing of the delivery of such interventions may be important to consider and may vary according to the particular substance or other health outcome being targeted for intervention.

Our study has several limitations. Given our use of a non-probability sample, the generalizability of our findings is limited. The present study should be replicated with a larger and more representative sample of sexual minority men in order to determine how wider representation of age, education, or socioeconomic groups would influence the results found here. Only 21 participants in the current sample smoked over the nine days of the study. Although the daily diary design increases power, the small sample size potentially reduced our power to detect significant effects in smoking prediction models, particularly in testing interactions between structural stigma and rejection sensitivity. Further, given that this study is part of a larger study on young sexual minority men's health, we were unable to test our hypotheses in a sample of sexual minority women, who are also at disproportionate risk of problematic substance use (Green & Feinstein, 2012). While non-probability sampling is suited to establishing preliminary evidence for the relationships among novel variables, it nonetheless invites several caveats to the

interpretation of findings (Meyer & Wilson, 2009). As we recruited from college campus groups, our sampling approach may have disproportionately captured individuals who were particularly aware of social issues and active in efforts to impact those issues. Because our participants were enrolled to receive listserv messages from their campus LGBT group, our sample may under-represent the experiences of rejection sensitivity or substance use among sexual minority young men who have not disclosed their sexual orientation or for whom this identity is less salient or less likely to motivate group membership around this identity. However, previous research does not find a relationship between rejection sensitivity and sexual orientation comfort and disclosure (e.g., Pachankis et al., 2008). Additionally, the relatively wide variance in the measure of rejection sensitivity found in the present study matches the variance of this measure in non-college samples (e.g., Feinstein et al., 2012). Thus, while it is possible that by only sampling relatively open and active students from college campuses we may have captured a restricted range of rejection sensitivity, in light of previous findings regarding the construct's lack of significant relationship with sexual orientation comfort and disclosure and the relatively wide variance found here, this possibility is somewhat attenuated. Although the study participants were currently living in 24 states, providing adequate variation in exposure to structural stigma, the scale for current structural stigma only ranged from -2.63 to 3.43 . Restricted variability in these measures, nonetheless, would likely contribute to reduced statistical power and therefore overly conservative estimates of the relationships examined in this study. Further, given the cross-sectional nature of this study, we cannot rule out the possibility that young men with different substance use proclivities differentially selected into current environments to produce the findings observed here. Evidence for differential mobility by health status among young sexual minority men is needed in order to specifically weigh its possible implications for our findings.

Finally, our measure of structural stigma was operationalized at the state level. In many respects, this is an appropriate level of analysis, given that social policies that differentially target gays and lesbians are largely (though not exclusively) made at the state level. However, more proximal forms of structural stigma also exist, which might similarly influence sexual minority individuals' substance use. For example, students on college campuses that offer more protections for sexual minority students (e.g., university-wide equal-opportunity policies that explicitly mention students' sexual orientation as protected) and more resources for this population (e.g., sexual minority student organizations) are more likely to report using condoms than participants on less supportive campuses (Eisenberg, 2002). Women on campuses with more supportive resources for sexual minority individuals are less likely to smoke, although men on these campuses are more likely to binge drink (Eisenberg & Wechsler, 2003). Because our dataset contained a small number of schools within each state, we were not able to nest our analyses within school within state. However, by measuring broad, state-level stigma and sufficient cases of more proximal forms of structural stigma, such as campus environment, nested within it, future research would be able to examine the relative influence that each contextual level exerts on substance use and other health-risk behaviors.

The results of this study suggest that by incorporating measures of psychosocial phenomena into epidemiologic datasets with sufficient variability across structural-level factors, evidence of important health processes can be uncovered. While our sampling approach likely over-represents the experiences of socially active young gay men and does not rule out differential mobility of participants by health status, this study confirms previous findings showing that structural stigma predicts adverse health outcomes

among sexual minority young adults (Hatzenbuehler, Keyes, et al., 2009; Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009; Hatzenbuehler et al., 2010) and provides preliminary evidence that rejection sensitivity serves as a relevant psychological process that may exacerbate the negative health impact of structural stigma. Still, population-based studies with larger samples and even more variability in structural stigma are needed to further examine this finding and to test the possibility that other variables might serve as important processes with which the social environment interacts to predict health disparities between sexual minority and majority individuals. Such work represents a natural extension of previous population-based studies in which structural stigma has consistently demonstrated robust associations with health outcomes among sexual minority individuals (e.g., Hatzenbuehler, 2011; Hatzenbuehler et al., 2010a, 2010b; Hatzenbuehler, Pachankis, & Wolff, 2012). By uncovering psychosocial mechanisms with which structural stigma interacts to impact health, this next generation of research possesses great promise for strengthening health-related theory and practice applied to stigmatized populations.

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