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The Impact of Minority Stress on Mental Health and Substance Use Among Sexual Minority Women

Keren Lehavot and Jane M. Simoni

University of Washington

Abstract

Objective—We examined the direct and indirect impact of minority stress on mental health and substance use among sexual minority women.

Method—A combination of snowball and targeted sampling strategies was used to recruit lesbian and bisexual women ($N = 1,381$) for a cross-sectional, online survey. Participants (M age = 33.54 years; 74% White) completed a questionnaire assessing gender expression, minority stressors (i.e., victimization, internalized homophobia, and concealment), social–psychological resources (i.e., social support, spirituality), and health-related outcomes. We used structural equation modeling to test associations among these factors, with gender expression as an antecedent and social–psychological resources as a mediator between minority stress and health.

Results—The final model demonstrated acceptable fit, $\chi^2(79) = 414.00, p < .05$, *confirmatory fit index* = .93, *Tucker–Lewis index* = .91, *standardized root-mean-square residual* = .05, *root-mean-square error of approximation* = .06, accounting for significant portions of the variance in mental health problems (56%) and substance use (14%), as well as the mediator social–psychological resources (24%). Beyond indirect effects of minority stress on health outcomes, direct links emerged between victimization and substance use and between internalized homophobia and substance use.

Conclusions—Findings indicate a significant impact of minority stressors and social–psychological resources on mental health and substance use among sexual minority women. The results improve understanding of the distinct role of various minority stressors and their mechanisms on health outcomes. Health care professionals should assess for minority stress and coping resources and refer for evidence-based psychosocial treatments.

Keywords

lesbian; bisexual; minority stress; health

An estimated 2.3 million women in the United States describe themselves as lesbian (O’Hanlon, 1995), and between 1%–4% of all women may be sexual minorities on the basis of either behavior or self-defined identity (Sell, Wells, & Wypij, 1995). Sexual minority

women (SMW) are at risk for health disparities and are a medically underserved population (U.S. Department of Health and Human Services, 2000a, 2000b). Unfortunately, the great stigma associated with sexual minority identity has precluded the development of an adequate scientific base from which to design effective interventions targeting health risks for this group (e.g., Solarz, 1999). Moreover, women have been underrepresented in the study of sexual identity (Chung & Katayama, 1996). Thus, we need relevant data based on sound theory and methodologically rigorous research to identify subgroups of SMW at greatest risk, stressors most predictive of adverse outcomes, and mechanisms through which these stressors impact health.

Health Disparities and SMW

Over the past decade, epidemiologic studies of mental health began to include questions from which sexual orientation could be inferred. This allowed researchers interested in lesbian, gay, bisexual, and transgender (LGBT) issues to examine mental health variables in a more comprehensive manner (Cochran & Mays, 2000; Gilman et al., 2001; Sandfort, de Graaf, Bijl, & Schnabel, 2001). These studies have found that women engaging in same-sex sexual behavior and/or identifying as LGB are at higher risk for mental health disorders compared with heterosexual women, including depression and anxiety disorders (see Cochran, 2001, and Meyer, 2003, for reviews). For example, data from the National Comorbidity Survey indicated that women reporting a same-sex partner were at two-fold greater risk for any mood and anxiety disorder compared with heterosexual women (Gilman et al., 2001).

Data from population-based health studies indicate that sexual minority status among women is also associated with alcohol and drug use and smoking. Compared with heterosexual women, SMW have been found to be less likely to abstain from alcohol (Burgard, Cochran, & Mays, 2005; Diamant, Wold, Spritzer, & Gelberg, 2000) and to drink more frequently and consume greater amounts at a time (Diamant et al., 2000; Hughes & Eliason, 2002). Previous research has also demonstrated an association between sexual minority status and higher risk of illicit drug use (Cochran, 2001; Gilman et al., 2001; Hughes & Eliason, 2002). Finally, several studies have demonstrated higher rates of smoking among SMW compared with heterosexual women, with rates among adults ranging from 11%–50%, compared with 28% in general adult samples (Hughes & Jacobson, 2003; Ryan, Wortley, Easton, Pederson, & Greenwood, 2001).

Minority Stress and SMW

Although research has documented important sexual orientation differences in health, it is not clear why SMW are at greater risk for these adverse health outcomes. One possible explanation is the impact of heterosexism on LGBT people or *minority stress*, defined as the stress to which individuals from stigmatized social categories are exposed to as a result of inferior social status (Brooks, 1981). Meyer (2003) conceptualized several LGBT-specific stressors, including experiences of discrimination, internalized homophobia, and concealment, as processes that may mediate the relationship between sexual minority status and health concerns.

LGB Victimization

A number of studies have demonstrated that compared with heterosexual women, SMW are at increased risk for interpersonal victimization over their life span, including verbal, physical, and sexual abuse (Balsam, Rothblum, & Beauchaine, 2005; Moracco, Runyan, Bowling, & Earp, 2007). Several studies have found that sexual orientation victimization experiences are more predictive of mental health variables than victimization experiences that are unrelated to sexual orientation (Descamps, Rothblum, Bradford, & Ryan, 2000; Herek, Gillis, & Cogan, 1999). Moreover, a robust body of literature links trauma and victimization with alcohol use and smoking (Schnurr & Green, 2005).

Internalized Homophobia

The internalization of socially sanctioned homophobia leads to self-devaluation and poor self-regard among sexual minorities (Meyer & Dean, 1998). Some have argued that a subset of sexual minorities never fully accept their sexual orientation because of deep-seated antigay socialization (Meyer, 2003). Among SMW, internalized homophobia has been empirically linked to psychological distress (Meyer, 1995; Nicholson, & Long, 1990), loneliness (Szymanski & Chung, 2001), lower self-esteem (Szymanski, Chung, & Balsam, 2001), and greater alcohol use (Amadio, 2006).

Concealment

Concealment of one's sexuality is a source of stress for many SMW, who may conceal their sexual orientation in an effort to protect themselves from real harm (e.g., being attacked, getting fired from a job) or out of shame and guilt (D'Augelli & Grossman, 2001). Although concealment may be used to avoid discrimination, the cost of hiding has been described as a cognitive burden consisting of constant preoccupation (Smart & Wegner, 2000). Studies of LGB adults have found that concealing sexual orientation is associated with adverse psychological, health, and job-related outcomes (Waldo, 1999).

Minority Stress and Health

Although numerous studies have established links between minority stress and health outcomes among ethnic and racial minorities (see Krieger, 1999, for a review), relatively fewer studies have examined these links among LGBT populations. Additionally, the majority of these studies have focused on mental health outcomes, and they have tended to examine only one outcome and one stressor rather than multiple indicators or constructs of the minority stress model. Most common are reports of studies that use multiple regression analysis to compare some but not all of the variables of interest (e.g., Amadio, 2006; Szymanski, 2005, 2006; Waldo, 1999).

With regard to substance use, its link with stress has been well documented in the general population (Kaplan, 1996). For example, stress has been linked to alcohol use disorders among women (McCreary & Savada, 1998). Women in general are more likely to report that they smoke to regulate mood and reduce stress, and women's smoking behavior has been linked to the occurrence of stressful life events (McKee, Maciejewski, Falba, & Mazure, 2003). However, with the exception of a few studies on alcohol use among LGBT adults

(e.g., Heffernan, 1998; Nawyn, Richman, Rospenda, & Hughes, 2000), the links between minority stress and substance use have not been examined among SMW.

Although the handful of studies that have been conducted on sexual minorities have suggested that minority stress negatively impacts health, there is less research on the mechanisms by which stressors affect health. One possibility is that minority stress may attenuate social and psychological resources that are essential to health outcomes. Specifically, resources such as social support and spirituality have been shown to relate to health among LGBT persons. Whereas social support may be conceptualized as an interpersonal phenomenon (i.e., reaching out to others), spirituality pertains to intrapersonal coping (i.e., the sense of meaning, purpose, and morality that individuals espouse regarding their lives). Among LGBT persons, studies of social support have found both direct and stress-buffering effects on mental health (Szymanski et al., 2001; Wayment & Peplau, 1995), and spirituality has been found to be directly associated with adjustment and well-being (Lease, Horne, & Noffsinger-Frazier, 2005; Tan, 2005). Such social–psychological resources may thus mediate the relationship between stressors and health (e.g., Pearlin, Menaghan, Lieberman, & Mullan, 1981).

It is also important to elaborate on the minority stress model by incorporating individual social characteristics as antecedents that may impact the entire stress process. Among SMW, a potential antecedent is gender expression. The term *gender* describes the changing set of qualities that are culturally assigned to social categories such as masculine or feminine. Some gender theorists refer to specific lesbian gender identities, with *butch* as the vernacular term for women who are more comfortable with masculine gender styles or identities than with feminine or *femme* ones (Rubin, 1992). A recent investigation of butch/femme gender expression among SMW identified three defining characteristics, including a woman's appearance, gender roles, and emotional expression (Lehavot, King, & Simoni, 2010).

These characteristics may impact the stress process in that LGB people who defy traditional gender-defined characteristics may be more susceptible to harassment and discrimination (Herek, 1995). For example, in a large online study butch lesbians reported facing more frequent discrimination and prejudice than femme lesbians (Levitt & Horne, 2005). While butch SMW may thus experience more victimization, some research suggests that femme SMW may have significantly higher levels of internalized homophobia than butch SMW (Hiestand, Levitt, & Horne, 2005). Finally, preliminary evidence also suggests that gender-nonconforming SMW face deleterious health risks, including both alcohol and drug use and smoking (Rosario, Schrimshaw, & Hunter, 2008). Assessing diverse gender expression is especially important given that it may identify SMW most at risk for particular stressors and adverse health outcomes.

In the present study, our objective was to use structural equation modeling (SEM) with a large sample of SMW to test a minority stress model that explores the impact of antecedents, minority stressors, and social–psychological resources on health outcomes (see Figure 1). Our work is based on previously theorized models of the associations between stressors and health (e.g., Meyer, 2003). In particular, we theorize that gender expression will influence the experience of minority stress; in turn, minority stress will diminish use of social–

psychological resources, leaving one more vulnerable to adverse health outcomes (e.g., Pearlin et al., 1981; Wilcox, 1981). We improve on the existing literature by focusing specifically on SMW—a large, understudied, and socially vulnerable population—and by including multiple types of minority stressors, culturally relevant antecedents, multiple measures of mental health problems and substance use, and advanced statistical methods to test overall model fit as well as specific indirect effects.

Method

Procedure

An Internet-based survey was used to collect the data. Participants were recruited using snowball and targeted sampling methods. Announcements about the study were sent electronically to LGB listservs, website groups, and organizations in all 50 states. Participants were asked to forward information about the study to other individuals and groups that might be eligible to participate. In addition, given that bisexual women and LGB people of color are more difficult to recruit, targeted advertising was sent to venues focused on these groups, including Yahoo groups, e-mail lists specifically for bisexual women or people of color, and Craigslist.

Participants who followed our link were taken to a web-based information statement, which explained that the study was being conducted to “to better understand the specific experiences of lesbian, gay, and bisexual women.” The information statement also explained the criteria for participation (age 18 or older; biologically born female; identify as lesbian, gay, bisexual, queer, or two-spirit; live in the United States), the purpose of the study, its risks and benefits, and a confidentiality agreement. Participants who agreed to participate then completed the questionnaire online using Survey Monkey data collection software. The questionnaire was followed by a listing of LGB and mental health resources. Questionnaire completers could voluntarily choose to enter a drawing to win one of five \$50 prizes.

Participants

A total of 1,535 individuals participated in the survey. We excluded participants who completed only the demographic questions of the survey and none of the main study variables ($n = 154$). Compared with the remaining 1,381 participants, this group was younger ($M = 30.95$ vs. 33.54), $t(1496) = -2.42$, $p < .05$; less educated, $t(1514) = -4.90$, $p < .01$; and more likely to identify as bisexual (34% vs. 29%), $\chi^2(5) = 10.76$, $p < .01$. There were no significant differences in race/ethnicity, income, years identified as LGB, or geographical residence.

Measures

The survey included questions covering demographics, gender expression, LGB victimization, internalized homophobia, concealment, social–psychological resources, mental health, and substance use. Measures selected were psychometrically sound and widely used in the field.

Demographics—Using standard formats, we assessed participants' age, sex, sexual orientation (i.e., *lesbian, gay, bisexual, queer, two-spirit, or other*), gender identity (i.e., *butch, femme, androgynous, or none of the above*), race/ethnicity, education, income, relationship status, years identified as LGB, and area of residence.

Gender expression—Gender expression was assessed with the 15-item Gender Expression Measure for Sexual Minority Women (GEM-SMW; Lehavot et al., 2010). The scale consists of three subscales: Appearance (e.g., "I often wear skirts and dresses"), Gender Roles (e.g., "I enjoy activities that involve tools, such as car work or household repairs"), and Emotional Expression (e.g., "I talk to my friends about how I feel"). Responses are scored on a scale from 1 (*strongly agree*) to 6 (*strongly disagree*), with higher scores indicating greater masculinity/butch gender expression and lower scores indicating greater femininity/feminine gender expression. The scale has demonstrated face and construct validity and internal consistency. In the current study, Cronbach's alpha for the overall scale was .80.

LGB victimization

Heterosexist Harassment, Rejection, and Discrimination Scale: The Heterosexist Harassment, Rejection, and Discrimination Scale (HHRD; Szymanski, 2006) consists of 14 items reflecting the frequency with which LGBs report having experienced discrimination because they are LGB in the past year. The scale consists of three subscales, including Harassment and Rejection (e.g., "How many times have you been treated unfairly by family members because you are LGB?"), Workplace and School Discrimination (e.g., "How many times have you been treated unfairly by your employer, boss, or supervisors because you are LGB?"), and Other Discrimination (e.g., "How many times have you been treated unfairly by strangers because you are LGB?"). Each item is rated on a 6-point Likert scale, from 1 (*the event has never happened to you*) to 6 (*the event happened almost all the time*). The scale has good reported validity and internal consistency (Szymanski, 2006). In the current study, Cronbach's alpha was .90.

Prejudice events: An additional measure of prejudice events was assessed by adapting a six-question measure from D'Augelli (2005). On a scale ranging from 0 (*never*) to 3 (*three or more times*), items assess the lifetime frequency of various verbal and physical victimization experiences (e.g., "verbal harassment," "objects thrown at you," "punched or hit," "raped or sexually assaulted") due to being LGB; an additional item was added assessing the frequency of "being chased, followed, or stalked." In the current study, Cronbach's alpha was .78.

Internalized homophobia—Internalized homophobia was measured with the Internalized Homophobia Scale (IHP; Meyer, 1995), an empirically validated, nine-item self-administered scale querying how troubled sexual minorities are about identifying as such over the last year (e.g., "How often have you wished you weren't LGB?"). Participants rated the frequency with which they experienced such thoughts and feelings on a 4-point scale ranging from 1 (*never*) to 4 (*often*). In the current study, Cronbach's alpha was .82.

Concealment—Concealment was assessed with five items indicating the degree of disclosure of sexual orientation to family, heterosexual friends, LGB friends, coworkers, and health care providers (Meyer, Rossano, Ellis, & Bradford, 2002). Participants rated the extent to which they were “out of the closet” to each of these groups on a scale of 1 (*out to all*) to 4 (*out to none*). The measure has good face validity, construct validity, and internal consistency (Frost & Meyer, 2009). In the current study, Cronbach’s alpha was .84.

Social–psychological resources

Social support: Social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS consists of 12 items assessing subjective social support from family, friends, and significant others. Responses are scored on a 7-point scale from 1 (*completely disagree*) to 7 (*completely agree*). The scale has demonstrated good internal and test–retest reliability and construct validity (Zimet et al., 1988). In the current study, Cronbach’s alpha was .92.

Spirituality: Spirituality was assessed using the Existential Well-Being (EBW) subscale of the Spiritual Well-Being Scale (Ellison, 1983). Items are scored on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*), with higher scores indicating more spirituality. The EBW subscale consists of 10 items assessing perceptions of spiritual meaning and a sense of life purpose (e.g., “I believe there is some real purpose for my life”); this subscale was used to assess spirituality, as opposed to the Religious Well-Being subscale, which assesses prayer and one’s relationship with God, because the former was thought to better capture the broad range of spiritual experience among SMW, many of whom have not found acceptance in traditional religious contexts. The scale has good face validity and test–retest reliability (Ellison, 1983) and has been used with LGB populations (e.g., Coleman, 2003; Tan, 2005). In the current study, Cronbach’s alpha was .88.

Mental health problems

Depression: Depression was assessed using the 10-item Center for Epidemiologic Studies Depression Scale—Short Form (CES–D; Andresen, Malmgren, Carter, & Patrick, 1994). The shorter measure has been shown to be a reliable and valid measure of assessing dysphoric mood and symptoms associated with depression during the previous week (Grzywacz, Hovey, Seligman, Arcury, & Quandt, 2006). Each item is measured on a 4-point Likert scale ranging from 0 (*rarely or none of the time*) to 3 (*all of the time*). A person scoring 10 or higher is considered possibly depressed. In the current study, Cronbach’s alpha was .86.

Anxiety: Anxiety was assessed using the Generalized Anxiety Disorder Seven-Item Scale (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006), a valid and efficient tool for assessing anxiety symptoms over the past 2 weeks. Items are scored on a scale from 0 (*not at all*) to 3 (*nearly every day*). A score of 10 or higher is interpreted as indicative of significant anxiety, and scores over 15 indicate severe anxiety. In the current study, Cronbach’s alpha was .92.

Substance use

Alcohol abuse: Alcohol abuse was assessed using the Brief Michigan Alcohol Screening Test (Brief MAST; Pokorny, Miller, & Kaplan, 1972), a 10-question measure with yes–no items designed to assess lifetime problematic alcohol use. The scale refers to participants' self-appraisal of their drinking habits and the social, physical, and psychological consequences associated with problematic alcohol use. Items are weighted on the basis of severity rankings (*yes* coded as 1 to 5; *no* coded as 0) and summed to produce an overall diagnostic score. A score of 6 or more on the Brief MAST distinguishes problematic alcohol users from non-problem users (Pokorny et al., 1972; Zung, 1979). The Brief MAST correlates strongly with the full version (Pokorny et al., 1972) and is an effective screening tool for alcohol problems among current drinkers (Allen, Maisto, & Connors, 1995). In the current study, Cronbach's alpha was .72.

Drug abuse: Drug abuse was assessed using the Brief Drug Abuse Screening Test (Brief DAST; Skinner, 1982), a 10-item measure with yes–no items designed to assess problems related to drugs in the past year, excluding alcohol and tobacco. The total score reflects a problem level related to general drug use during the past 12 months, with higher scores reflecting greater drug use-related consequences. Generally, 3 to 5 is used as a cutoff for “moderate” problems, 6 to 8 for “substantial” problems, and 9 to 10 for “severe” problems. The Brief DAST is a widely used drug screen and has shown good internal consistency and discriminant and concurrent validity (Skinner, 1982). In the current study, Cronbach's alpha was .65.

Smoking: Current smoking was assessed using a standard item from the Washington State Behavioral Risk Factor Surveillance System (Section 11; Washington State Department of Health, 2005). Participants indicate whether they smoke cigarettes not at all, some days, or every day, scored on a scale from 1–3, respectively.

Analytic Plan

To examine hypothesized associations between variables (see Figure 1), we performed path analysis using SEM with Mplus statistical modeling software (Version 5.2; Muthén & Muthén, 2007). SEM allows us to test the relations of all variables and underlying constructs simultaneously. The major advantages of this approach are the ability to identify direct and indirect effects and the corresponding standard errors, examine the associations among multiple independent and dependent variables in the model simultaneously, and obtain indices of overall model fit. Missing data on the main study variables ranged from 1%–18%. In order to retain as much data as possible, analyses used full-information maximum-likelihood estimation (Schafer & Graham, 2002).

Model fit to the sample data was assessed through the recommended two-step procedure (Anderson & Gerbing, 1988). First, a measurement model was tested with all relevant paths left free to vary. Then, the hypothesized structural path model was tested wherein all hypothesized paths shown in Figure 1 were estimated freely. Modification indices were inspected for significant areas of model misfit, and the model was adjusted accordingly and run again. Model fit was assessed by the comparative fit index (CFI), the Tucker–Lewis

Index (TLI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). Indicators of acceptable model fit are considered to be a *CFI* and *TLI* > .90, *RMSEA* < .06, and *SRMR* < .08 (e.g., Hu & Bentler, 1999; Kline, 2005).

Results

Sample Description

The 1,381 participants ranged in age from 18–86 years ($M = 33.54$, $SD = 12.14$). Forty-six percent identified as lesbian, 4% as gay, 29% as bisexual, 16% as queer, 2% as two-spirit, and 3% as other. The average number of years women identified as LGB was 13.77 ($SD = 11.05$). With regard to gender identity, 15% identified as butch, 40% as femme, 13% as androgynous, and 32% as none of these terms. Seventy-four percent identified as White, 7% as African American, 5% as Latina, 3% as Asian, 1% as American Indian, 9% as multiracial, and 1% as other. Twenty-eight percent of the women were single, and most had some college education (24%) or a bachelor's degree or more advanced education (63%). The median individual annual income was \$20,000–\$29,000, and the median household annual income was \$40,000–\$59,000. All women lived in the United States, with 44% residing in a large city, 25% in a medium-sized city, 18% in a small city, 4% in a rural area, and 9% in a suburban area.

Preliminary Analyses

Descriptive statistics for the main study variables are presented in Table 1. On the basis of cutoff scores, 38% of the sample reported symptoms indicating depression, 12% indicated a significant level of anxiety, and 7% indicated a severe level of anxiety. With regard to substance use, 10% of the sample indicated problematic alcohol use, and 6% indicated moderate to severe problematic drug use. Ten percent indicated that they smoked on some days, and 13% indicated smoking every day.

Bivariate correlations among all measured variables are presented in Table 2. Moderate strength correlations were found among measures of minority stress (e.g., discrimination measures, internalized homophobia, concealment). Measures of health-related outcomes were highly intercorrelated in the expected direction, especially depression and anxiety. Indicators of minority stress were associated with perceived social support and spirituality in the expected negative direction. Examination of demographic variables with the main study variables demonstrated that older age, higher household income, and greater education were each associated with less harassment and rejection, less concealment, greater existential well-being, and less depression, anxiety, drug use, and smoking.

Measurement Model

Latent variables were formed for gender expression, comprising the Appearance, Gender Roles, and Emotional Expression sub-scales of the GEM–SMW; for LGB victimization, comprising harassment and rejection, workplace and school discrimination, other discrimination, and prejudice events; for social–psychological resources, comprising social support and spirituality; for mental health, comprising depression and anxiety; and for substance use, comprising alcohol abuse, drug abuse, and smoking. The latent factors were

allowed to freely correlate in a preliminary model. The model demonstrated close to acceptable fit, $\chi^2(67) = 410.27, p < .05, CFI = .92, TLI = .89, SRMR = .05, RMSEA = .06$ (90% CI on *RMSEA* [.06, .07]).

Inspection of the modification indices indicated that the Emotional Expression subscale of the GEM–SMW could be used as an indicator of the latent construct social–psychological resources. Theoretically, there is indeed overlap between emotional expression (e.g., “I talk to my friends about how I feel”) and the use of inter- and intrapersonal resources. Thus, we decided to exclude the Emotional Expression subscale from the model in order to have cleaner and more distinctive constructs of both gender expression and social–psychological resources. Excluding this subscale resulted in acceptable fit of the measurement model, $\chi^2(55) = 294.75, p < .05, CFI = .94, TLI = .92, SRMR = .05, RMSEA = .06$ (90% CI for *RMSEA* [.05, .06]). Factor loadings for the indicators of each latent variable were $> .30$.

Minority Stress Model

SEM was used to test the hypothesized model (see Figure 1), examining the effects of different minority stressors on mental health and substance use outcomes, with gender expression as an antecedent and social–psychological resources as a mediator between stressors and health outcomes.

The hypothesized structural path shown in Figure 1 fit the data well, $\chi^2(80) = 441.42, p < .05, CFI = .92, TLI = .90, SRMR = .06, RMSEA = .06$. Inspection of the modification indices revealed potential areas of misfit and suggested the estimation of an additional path from LGB victimization to substance use. The addition of this path is theoretically acceptable, as direct effects of minority stress on substance use have been previously reported (Amadio, 2006; Rosario et al., 2008) and may not be fully accounted for by social–psychological resources. The model was rerun after this path was left free to vary. The resulting model (shown in Figure 2) demonstrated acceptable fit, $\chi^2(79) = 414.00, p < .05, CFI = .93, TLI = .91, SRMR = .05, RMSEA = .06$. Inspection of the modification indices revealed no further areas of misfit.

In addition, we examined age, household income, and education as important contextual factors that may account for the observed relationships. Including these indicators as correlates of gender expression, minority stressors, social–psychological resources, and health outcomes did not change the pattern of results. Because the previous model was more parsimonious, it was considered the final model.

The final model demonstrated that more masculine/butch gender expression was associated with greater LGB victimization but with less internalized homophobia and concealment. In turn, all the minority stressors were negatively associated with social–psychological resources, which was negatively associated with both mental health problems and substance use. In addition, LGB victimization was also directly associated with substance use.

This model accounted for 56% of the variance in mental health problems and 14% of the variance in substance use. The model also accounted for 24% of the variance in social–psychological resources. Per Bryan, Schmiede, and Broaddus (2007), indirect effects of the

minority stressors on the health-related outcomes were tested. Results of indirect effects are presented in Table 3. The indirect effects of all three minority stressors on both mental health problems and on substance use through social–psychological resources reached significance.

To test whether there were direct effects in addition to the indirect effects, we tested an alternative model wherein the paths from all the minority stressors to the health-related outcomes were left free to vary. The model demonstrated acceptable fit, $\chi^2(74) = 403.65$, $p < .05$, $CFI = .93$, $TLI = .90$, $SRMR = .05$, $RMSEA = .06$; however, only the individual paths from LGB victimization to substance use ($\beta = .25$, $z = 4.94$, $p < .001$) and from internalized homophobia to substance use ($\beta = .10$, $z = 2.25$, $p = .02$) were significant. This suggests that changes in the outcomes are a result of indirect effects through social–psychological resources for mental health problems but that some minority stressors also exert direct effects on substance use.

Discussion

Lesbian and bisexual women experience large and serious health disparities (e.g., Cochran, 2001; Gilman et al., 2001; Mercer et al., 2007). Indeed, our sample consisted of a diverse group of SMW (age = 18–86 years, 26% non-White, 29% bisexual) with significant levels of depression (38%), anxiety (19%), and current smoking (20%). But although several large, national studies have documented SMW's adverse health, there is much less research examining predictors and mechanisms that may account for it.

To our knowledge, this is the first study to examine multiple minority stressors and various health-related outcomes among a large, national sample of lesbian and bisexual women. The study not only looked at the distinctive roles of LGB victimization, internalized homophobia, and concealment but also incorporated a culturally relevant antecedent (i.e., gender expression) and mediator (i.e., social–psychological resources) to the stress–health model. In addition, the role of minority stress has mostly been discussed, both theoretically and empirically, in terms of its impact on mental health. We also included substance use as an outcome, given health disparities that SMW experience in this domain (e.g., Hughes & Eliason, 2002).

We found our hypothesized minority stress model to be largely supported. In the final model, the antecedent gender expression indicated that a more masculine/butch score was associated with more frequent LGB victimization but with less internalized homophobia and concealment. Experiencing each of these minority stressors was related to less activation of social–psychological resources, that is, less perceived social support and positive beliefs about spirituality. This, in turn, was associated with more mental health problems and substance use. Two direct links emerged during the model testing—that of LGB victimization to substance use, and internalized homophobia to substance use—over and above the mediated effect of social–psychological resources.

As expected, gender expression played an important role in the stress–health model, in that it was significantly associated with differential experiences of minority stress. In particular,

a more butch/masculine gender expression was associated with greater LGB victimization (e.g., workplace and school discrimination, prejudice events), whereas a more femme/feminine gender expression was associated with greater internalized homophobia and concealment. This finding in itself has significant clinical implications in terms of the need to assess gender expression as a vulnerability factor for minority stress. Knowing which women are at greatest risk for particular forms of minority stress can allow clinicians to target them more effectively.

Also as expected, all three minority stressors were independently related to less social-psychological resources. In other words, LGB victimization, internalized homophobia, and concealment were each associated with less activation of interpersonal and intrapersonal resources. In turn, fewer resources were associated with increased mental health problems (i.e., depression, anxiety) and substance use (i.e., alcohol abuse, drug abuse, smoking). An especially large amount of the variance in mental health problems (56%) was accounted for by the model.

Although the causal effect of the pathways investigated cannot be determined by cross-sectional data, the current theoretically informed model has important clinical implications for those working with SMW. Findings suggest the imperative to screen all SMW for minority stress and incorporate the mobilization of resources in interventions to prevent and treat mental health problems and substance use. Indeed, results indicate the relevance of psychosocial interventions that address minority stress and the environment, such as LGB-affirmative cognitive behavioral therapy, which provides opportunities for clients to learn coping strategies related to the stress of sexual minority status (Martell, Safren, & Prince, 2004). Meyer (2003) suggested that interventions for minority stress might aim to change how situations are appraised and to develop strategies to cope with stressful conditions such as discrimination. Clinicians may choose to focus on helping SMW reduce their negative self-perceptions and attitudes (i.e., internalized homophobia) and reevaluate their coping mechanisms for discrimination. Treatments that take the social environment into account, and highlight the connection between minority stress, resources, and health, may provide valuable insight for SMW.

Moreover, interventions that address social support and spirituality may be able to improve health outcomes. Social support has been widely addressed in the literature and articulated in the minority stress model (Meyer, 2003). Although we assessed provision of social support by significant others, family, and friends (without specification of sexual orientation), some research suggests that support from other LGBs may have an even greater impact on mental health than support from heterosexuals (Szymanski et al., 2001). As opposed to social support (an interpersonal phenomenon), spirituality (an intrapersonal phenomenon) has been relatively underinvestigated. Because most mainstream religions condemn any form of homosexuality, one may assume that LGBs would have little to do with traditional spirituality. However, LGBs may especially benefit from connecting with spiritual beliefs and finding or maintaining meaning in life specifically because of the oppression they face. Findings from a handful of studies have supported this notion, finding that spirituality was a significant predictor of adjustment and well-being (Coleman, 2003; Lease et al., 2005; Tan, 2005). As indicated by our findings, interventions that mobilize

clients to actively use interpersonal and intrapersonal resources may prove especially helpful.

Although social–psychological resources completely mediated the impact of minority stress on mental health problems, LGB victimization and internalized homophobia exerted direct effects on substance use. Other mechanisms, beyond the ones measured in the current study, may better account for this effect. For example, avoidant coping strategies may be linked to substance use among LGB men (Halkitis & Shrem, 2006), though this has not yet been examined among women. Future studies should continue to examine factors that explain substance use problems in this population. Meanwhile, it will be crucial for clinicians to assess for substance use among SMW clients and recognize minority stressors as important risk factors.

As with any study, there are limitations that restrict generalizability. The design is cross-sectional, thus precluding causal inferences. Experimental and longitudinal research designs are clearly needed to examine the potentially causal effects of gender expression, minority stress, and social–psychological resources on health outcomes. Moreover, the survey took place over the Internet. Using the Internet may have some benefits in collecting data from hard-to-reach populations (Epstein & Klikenberg, 2002), such as by increasing access to bisexual women and those who conceal their sexuality. On the other hand, we do not know how many people viewed our solicitation (and thus we cannot calculate a response rate), what motivated participants to respond, or how the participants differ in any systematic way from those who did not see our recruitment materials or chose not to participate (Meyer & Wilson, 2009). For example, although we targeted SMW of color in an attempt to obtain an ethnically diverse sample, the web-based format of our study may have resulted in lower participation by ethnic minorities, who may have less Internet access at home (Cheeseman, Janus, & Davis, 2005). Finally, the measures used were based on self-report and thus are subject to participant misunderstanding or biased responding.

This study incorporates novel elements that address several limitations of previous work. The study included a large sample of SMW, allowing us to test a more thorough model of minority stress using SEM. Indeed, previous studies have largely limited their minority stress variable and health outcome to one type among smaller samples. We used several measures with established psychometric properties of minority stress, mental health problems, and substance use, in addition to examining an antecedent and mediator of the minority stress model.

In conclusion, this study provides strong support for the impact of minority stress on mental health and substance use among SMW, mediated by social–psychological resources. Clinical implications include increased identification of minority stress and the activation of the individual’s interpersonal and intrapersonal resources. Health care professionals may wish to offer evidence-based treatments that target specific symptom clusters and focus on mobilizing resources and reframing minority stress. Investigators are encouraged to test and disseminate such interventions, especially those that combine traditional evidence-based approaches with culturally relevant factors.

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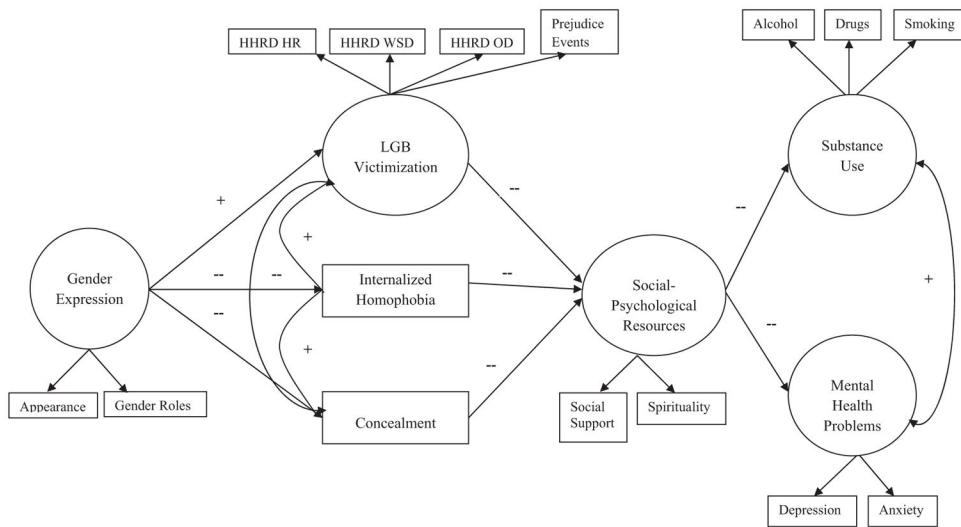


Figure 1. Hypothesized path model. Paths where a positive association was predicted are represented with a plus sign (+), and paths where a negative association was predicted are represented with a minus sign (-). HHRD HR = Harassment and Rejection subscale of the Heterosexist Harassment, Rejection, and Discrimination (HHRD) Scale; HHRD WSD = Workplace and School Discrimination subscale of the HHRD; HHRD OD = Other Discrimination subscale of the HHRD; LGB = lesbian, gay, or bisexual.

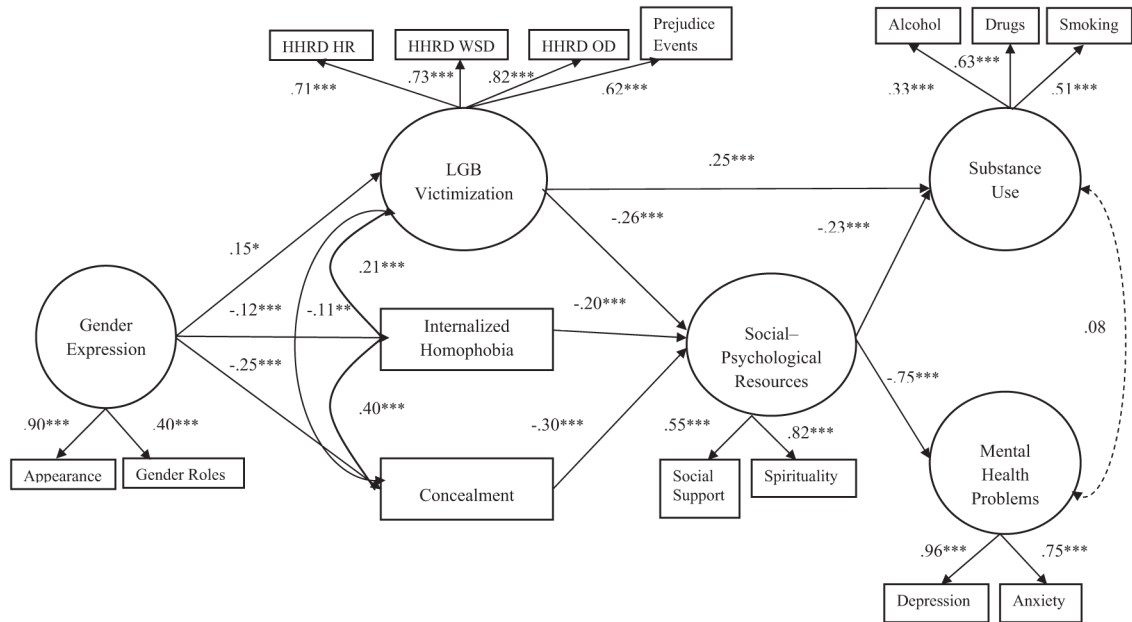


Figure 2. Path model and standardized path coefficients for prediction of health outcomes. HHRD HR = Harassment and Rejection subscale of the Heterosexist Harassment, Rejection, and Discrimination (HHRD) Scale; HHRD WSD = Workplace and School Discrimination subscale of the HHRD; HHRD OD = Other Discrimination subscale of the HHRD; LGB = lesbian, gay, or bisexual. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1

Descriptive Statistics for Main Study Variables

Measure	Lesbian/Gay (n = 690)		Bisexual (n = 402)		Other (n = 284)	
	M	SD	M	SD	M	SD
Age	36.52	13.52	30.96	9.94	29.89	9.29
Income ^a	5.40	2.39	4.89	2.30	4.21	2.42
Education ^b	4.95	1.80	4.86	1.74	5.08	1.51
GEM-SMW Appearance	3.31	1.24	2.46	0.88	3.16	1.27
GEM-SMW Gender Roles	3.57	1.11	3.28	0.98	3.39	0.98
HHRD Harassment and Rejection	1.78	0.86	1.62	0.83	1.83	0.87
HHRD Workplace and School Discrimination	1.36	0.61	1.25	0.57	1.35	0.56
HHRD Other Discrimination	1.56	0.76	1.42	0.69	1.73	0.81
Prejudice events	0.44	0.51	0.31	0.48	0.47	0.48
Internalized homophobia	1.33	0.44	1.47	0.54	1.33	0.42
Concealment	1.59	0.64	2.30	0.76	1.81	0.70
Social support	5.25	1.33	5.32	1.22	5.33	1.20
Spirituality	4.53	0.88	4.39	0.90	4.39	0.91
Depression	8.88	6.00	10.47	6.26	9.92	6.25
Anxiety	5.53	5.05	6.67	5.41	6.43	5.01
Alcohol abuse	2.97	5.13	2.15	3.67	1.92	3.84
Drug abuse	1.02	1.36	1.08	1.52	1.31	1.43
Smoking	1.38	0.72	1.33	0.67	1.36	0.68

Note. Income = household annual income before taxes; GEM-SMW = Gender Expression Measure for Sexual Minority Women; HHRD = Heterosexist Harassment, Rejection, and Discrimination Scale.

^a 1 = under \$10,000; 2 = \$10,000–\$19,000; 3 = \$20,000–\$29,000; 4 = \$30,000–\$39,000; 5 = \$40,000–\$59,000; 6 = \$60,000–\$79,000; 7 = \$80,000–\$99,000; 8 = \$100,000–\$149,000; 9 = over \$150,000.

^b 1 = some or no high school; 2 = high school degree; 3 = some college; 4 = associate's degree; 5 = bachelor's degree; 6 = some graduate school; 7 = advanced degree.

Table 2

Correlations Among Measured Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. App	—																	
2. GR	.37***	—																
3. HR	.02	.15***	—															
4. WSD	.08**	.16***	.51***	—														
5. OD	.10***	.14***	.58***	.61***	—													
6. PE	.19***	.21***	.43***	.45***	.50***	—												
7. IH	-.11***	.04	.24***	.14***	.12***	.04	—											
8. Con	-.23***	-.04	-.01	-.09**	-.13***	-.19***	.41***	—										
9. SS	-.07**	-.01	-.27***	-.16***	-.14***	-.10***	-.27***	-.22***	—									
10. Spirit	-.03	-.03	-.16***	-.09**	-.12***	-.06*	-.28***	-.27***	.45***	—								
11. Dep	-.04	.06*	.23***	.12***	.16***	.11***	.26***	.22***	-.36***	-.60***	—							
12. Anx	-.06*	.07**	.27***	.13***	.20***	.15***	.24***	.18***	-.24***	-.46***	.73***	—						
13. AA	.09**	.09***	.09***	.09***	.10***	.17***	.09**	-.02	-.06*	-.06*	.07*	.04	—					
14. DA	-.08**	.05	.16***	.07**	.14***	.09***	.14***	.07**	-.10***	-.13***	.15***	.21***	.21***	—				
15. Smk	-.04	.12***	.13***	.12***	.09***	.14***	.08**	.02	-.11***	-.13***	.14***	.14***	.14***	.32***	—			
16. Age	.20***	-.02	-.19***	-.04	-.11***	.04	-.22***	-.32***	.02	.17***	-.19***	-.25***	.13***	-.20***	.08**	—		
17. Inc	-.01	-.00	-.07*	.01	-.02	-.03	-.04	-.11***	.10**	.18***	-.19***	-.17***	.01	-.13***	.10**	.31***	—	
18. Edu	.03	-.16***	-.12***	-.12***	-.08**	-.06	-.13***	-.22***	.16***	.20***	-.20***	-.19***	-.05	-.22***	.26***	.33***	.27***	—

Note. App = Appearance subscale of the Gender Expression Measure for Sexual Minority Women (GEM-SMW); GR = Gender Roles subscale of the GEM-SMW; HR = Harassment and Rejection subscale of the Heterosexist Harassment, Rejection, and Discrimination (HHRD) Scale; WSD = Workplace and School Discrimination subscale of the HHRD; OD = Other Discrimination subscale of the HHRD; PE = prejudice events; IH = internalized homophobia; Con = concealment; SS = social support; Spirit = spirituality; Dep = depression; Anx = anxiety; AA = alcohol abuse; DA = drug abuse; Smk = smoking; Inc = annual household income; Edu = education.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Indirect Effects of Minority Stressors on Health Outcomes

Indirect pathway	β	SE	Z
Mental health problems			
Effect of LGB victimization via social–psychological resources	.19	.03	7.07***
Effect of internalized homophobia via social–psychological resources	.15	.03	5.58***
Effect of concealment via social–psychological resources	.22	.03	8.49***
Substance use			
Effect of LGB victimization via social–psychological resources	.06	.02	3.94***
Effect of internalized homophobia via social–psychological resources	.04	.01	3.50***
Effect of concealment via social–psychological resources	.07	.02	4.08***

Note. LGB = lesbian, gay, or bisexual.

 $p < .001$.