HHS Public Access

Author manuscript

Sex Roles. Author manuscript; available in PMC 2016 July 01.

Published in final edited form as:

Sex Roles. 2015 July ; 73(1): 43–57. doi:10.1007/s11199-015-0483-z.

Current intimate relationship status, depression, and alcohol use among bisexual women: The mediating roles of bisexual-specific minority stressors

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Abstract

Current intimate relationship characteristics, including gender and number of partner(s), may affect one's visibility as a bisexual individual and the minority stressors they experience, which may in turn influence their health. The current study tested four hypotheses: 1) minority stressors vary by current intimate relationship status; 2) higher minority stressors are associated with higher depressive symptoms and alcohol-related outcomes; 3) depressive symptoms and alcohol-related outcomes vary by current intimate relationship status; and 4) minority stressors will mediate differences in these outcomes. Participants included 470 self-identified bisexual women (65% Caucasian, mean age: 21) from a sample of sexual minority women recruited from different geographic regions in the United States through advertisements on social networking sites and Craigslist. Participants completed a 45 minute survey. Respondents with single partners were first grouped by partner gender (male partner: n=282; female partner: n=56). Second, women were grouped by partner gender/number (single female/male partner: n = 338; women with multiple female and male partners: n=132). Women with single male partners and women with multiple male and female partners exhibited elevated experienced bi-negativity and differences in outness (H1). Experienced and internalized bi-negativity were associated with health outcomes, but not outness (H2). Differences in outcomes emerged by partner number and partner number/gender (H3); these differences were mediated by experienced bi-negativity (H4). These results suggest

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Compliance with Ethical Standards

The authors have no conflicts of interest to disclose. This research involves human participants and has been approved by the Institutional Review Board at the University of Washington. All participants read and completed informed consent prior to participation in this study.

that experiences of discrimination may underlie differences in health related to bisexual women's relationship structure and highlight the importance of evaluating women's relational context as well as sexual identification in understanding health risk behaviors.

Keywords

bisexual women; current intimate relationship status; minority stress; alcohol outcomes; depression

Introduction

The current study focuses on the mediating roles of bisexual-specific minority stressors on differences in depression and alcohol use across intimate relationship status among bisexual women residing in the United States (U.S.). Given the location of our study, the review of published work focuses on U.S. samples, unless otherwise noted. We anticipate that these relationships may also exist within other countries that have similar sociocultural emphases on opposite-gender relationships and monogamy (e.g., Canada, UK, European countries) and may not within other countries, wherein bisexuality is more accepted (Fox, 2000). Lesbian, gay, bisexual and transgender (LGBT) populations experience multiple forms of discrimination at internalized, interpersonal, and systemic levels in U.S. (Herek, 2010; Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010; Wight, LeBlanc & Badgett, 2013). These experiences of discrimination can be understood as distal or external minority stressors, which include societal prejudice and stigmatizing experiences (experienced stigma) and proximal or internal minority stressors such as the degree to which one's minority status is known (outness) and internalization of negative societal attitudes (internalized stigma) (Goffman, 1963; Herek, Gillis, & Cogan, 2009; Hatzenbuehler, 2009; Meyer, 2003). Traditional gender beliefs and values in the U.S. include framing opposite-gender relationships and compulsive monogamy as normative and have been linked to discrimination against LGBT individuals, in part due to the number and gender of intimate partners (Goodman & Moradi, 2008; Herek, 2002; Israel & Mohr, 2004; Parrott & Gallagher, 2008; Whitley, 2001; Whitley & Ægisdóttir, 2000). Bisexual populations further represent a distinctive threat to traditional gender norms, values, and practices, due to their range of intimate partners, and deviation from U.S. and other societies' normative binaries (Li, Dobinson, Scheim, & Ross, 2013, Canada; Rust, 2000, 2002; Samji, 2008). Their fluidity in sexual attraction, identity, and behavior, including engagement in heterosexual activity, also represent a challenge among U.S.-based lesbian/gay communities. Stigma associated with bisexuality (bi-negativity) can thus be understood as a multilevel consequence of dual exclusion from lesbian/gay and heterosexual communities (Cabaj, 1997; Herek, 2010; Ochs, 1996; Steffens & Wagner, 2010, Germany; Ross, Dobinson, & Eady, 2010, Canada; Yost & Thomas, 2012). These experiences and societal messages both from heterosexual and lesbian/gay communities may further underlie the greater proximal, internal stressors among bisexual populations compared to lesbian/gay individuals, including lower outness (D'Augelli, Grossman, & Starks, 2005; Herek, Gillis, & Cogan, 2009, Kuyper & Fokkema, 2011, Netherlands; Mulick and Wright, 2002; Ochs, 1996, 2007) and greater internalized minority stress (Weber, 2008; Lewis, Derlega, Brown, Rose, &

Henson, 2009; Moore & Norris, 2005; Balsam & Mohr, 2007). Bisexual populations thus represent a unique group to understand if and how U.S. societal and community norms concerning sexuality and the gender(s) of an individual and their intimate partners may influence health through exposure to minority stressors.

Notably, one's exposure to minority stressors as a bisexual individual may be related to one's visibility as a bisexual individual and, specifically, their current intimate relationship status, including partner number and gender(s). For example, bisexual women in relationships with multiple female and male partners may have greater visibility as a bisexual individual than bisexual women with a single male or female partner, which in turn may influence their experiences with stigma, outness as a sexual minority, and internalized stigma. Proximal and distal minority stressors have been associated with elevated levels of mental health problems and substance use among LGBT populations (Brewster, Moradi, DeBlaere, & Velez, 2013; Herek & Garnets, 2007; Hughes & Eliason, 2002; Mays & Cochran, 2001; Waldo, 1999; Weber, 2008). Given this, mental health problems and substance use may vary across current intimate relationship status among bisexual women, and minority stressors may mediate these differences. The current web-based U.S. survey research draws from the minority stress framework to test four hypotheses among a sample of bisexual women: 1) minority stressors vary across current intimate relationship status; 2) minority stressors are associated with depressive symptoms and alcohol-related outcomes; 3) depressive symptoms and alcohol-related outcomes vary across current intimate relationship status; and 4) minority stressors mediate differences in depressive symptoms and alcohol-related outcomes by current intimate relationship status. This research may be used to inform future studies that directly examine the impact of gender norms, values, and practices on individuals' health because of their current intimate relationship status, including the number and gender(s) of their partners.

Minority stressors among bisexual women by current intimate relationship status

Bisexual women's exposure to minority stressors in the U.S. can be understood in relation to societal binary perceptions of sexual orientation (i.e., heterosexual or gay/lesbian) and relationship structure (i.e., compulsory monogamy), which may result in individuals making assumptions about individuals' identities and influence the amount of exposure to experienced stigma bisexual individuals face (Baumgardner, 2007; Clark, 2013; Firestein, 1996; Mint, 2004; Ochs, 1996; Klesse, 2005, 2006, UK; Ross et al., 2010, Canada; Rust, 1996). Given this, minority stressors may rely not only on bisexual women's own gender and sexual identity, but also the gender and number of their partner(s) (Baumgardner, 2007; Clark, 2013; Firestein, 1996; Hequembourg & Brallier, 2009; Ochs, 1996; Rust, 1996).

Bisexual women with a single intimate partner may be more likely to be perceived to be a heterosexual woman or a lesbian than to be perceived as a bisexual woman. For example, bisexual women in a relationship with a single male partner may be perceived as heterosexual. Bisexual individuals in these relationships may have fewer opportunities to disclose bisexuality (Balsam & Mohr, 2007) as well as may be able to "pass" as heterosexual (Ochs, 1996), eliminating some pressure to be out. These women may want to avoid male partners' and others' assumptions of bisexual individuals as promiscuous (Li et

al., 2013, Canada; Samji, 2008) and other negative societal attitudes about LGBT individuals and bisexuality specifically (Bradford, 2004; Mint, 2004; Robinson, 2013, Canada). Simultaneously, they may have to make more of an effort to be "out", due to heterosexual assumptions. Recent research has found that bisexual women in a relationship with a single male partner were less open about their sexual orientation (Dyar, Feinstein, & London, 2014; Li et al., 2013, Canada). Although not being visible as a bisexual individual may decrease experienced bi-negativity from heterosexual communities (Mays & Cochran, 2001; Li et al., 2013, Canada), being less out can also lead to greater internalized bi-negativity (Brewster et al., 2013). Bisexual women in a relationship with a single female partner conversely may be more "out" as a sexual minority, in part due to a more consistent visibility of their same-gender attractions. This may result in greater discrimination from heterosexual individuals, but potentially less discrimination from LGBT communities. Indeed, being in a relationship with a single female partner may have protective benefits in being "out", including lower internalized bi-negativity and a greater sense of belonging and involvement with LGBT communities (Herek & Garnets, 2007; Meyer, 2003).

The number and gender(s) of partners are further likely to have complex interactive effects on bisexual women's exposure to minority stressors. Polyamory as a relationship structure is as common among bisexual individuals as it is among lesbian, gay, and heterosexual individuals (Weber, 2002) and bisexual women with multiple male or multiple female partners are likely to experience the stigmas associated with polygamy (Mint, 2004; Klesse, 2005, 2006, UK; Ross et al., 2010, Canada). Nonetheless, bisexuality may be most visible among women who have multiple partners and whose partners are female and male. Bisexual individuals known to have multiple female and male partners may thus experience greater bi-negativity from both lesbian/gay and heterosexual individuals, including unique dual exclusion and discrimination, and be more 'out' as a bisexual individual relative to bisexual individuals with only female or only male partners. This greater exposure to experienced binegativity may further lead to greater internalized bi-negativity (Herek et al., 2009).

Minority stressors, depressive symptoms and alcohol-related outcomes

Several minority stress theories have elucidated the potential adverse impacts of minority stressors on health outcomes (Hatzenbuehler, 2009; Meyer, 2003). Further, empirical evidence has demonstrated minority stressors are associated with poorer outcomes, including greater depressive symptoms and alcohol-related outcomes in the U.S. (e.g. Brewster et al., 2013; Herek & Garnets, 2007; Hughes & Eliason, 2002; Mays & Cochran, 2001; Waldo, 1999; Weber, 2008) and internationally (e.g. King et al.,2008, UK; Kuyper & Fokkema, 2011, Netherlands). Among bisexual populations, experiences with stigmatizing events has been associated with psychological distress in quantitative and qualitative studies (Brewster et al., 2013; Dodge et al., 2012a,b; Ross et al., 2010, Canada), though studies are often limited to instruments that address discrimination and prejudice by heterosexual communities. Outness and internalized bi-negativity have also been associated with worse mental health outcomes (Brewster et al., 2013; Dodge et al., 2012a,b; Ross et al., 2010, Canada; Ross, Siegel, Dobinson, Epstein, & Steele, 2012; Szymanski & Carr, 2008; Schrimshaw, Siegel, Downing, & Parsons, 2013; Shilo & Savaya, 2012, Israel). Notably,

outness may be harmful or protective, as being more out may lead to both greater exposure to stigmatizing experiences but also to more support from LGBT communities (Brewster, Moradi, DeBlaere, & Velez, 2013; Herek & Garnets, 2007; Meyer, 2003; Morris, Waldo, Esther, & Rothblum, 2001). This may lead to complicated relationships to health outcomes (Feldman & Wright, 2013), including linear and non-linear associations.

Current intimate relationship status, health, and minority stressors

Limited literature exists concerning health outcomes across current intimate relationship status. The two available studies suggest bisexual women who have been involved intimately with a male partner are more likely to experience worse mental health and illicit substance use than bisexual women with female partners (Dyar et al., 2014; Ross, Siegel, Dobinson, Epstein, & Steele, 2012). Notably, this research has often dichotomized relationship status, by examining women with a single male or female partner (Dyar et al., 2014) or dichotomizing women according to their recent activity with a male partner (Ross et al., 2012). More research is warranted to assess differences in health across bisexual women's current intimate relationship status, especially across both partner gender and number, given theory and literature described above with regard to differences in exposure to minority stressors and associations of minority stressors to health outcomes.

Indeed, minority stressors may serve as mediating variables in relationships of current intimate relationship status and health outcomes (Goffman, 1963; Herek, Gillis, & Cogan, 2009; Hatzenbuehler, 2009; Meyer, 2003). This hypothesis is supported by minority stress frameworks that have tied worse health outcomes experienced by LGBT individuals to their experiences with distal, experienced and proximal, internalized stressors (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Burton, Marshal, Chisolm, Sucato, & Friedman, 2013; Williams, Connolly, Pepler, & Craig, 2005). In support of this, a recent study found bisexual women with a single male partner reported higher amounts of depressive symptoms, in part due to greater discrimination from LGBT communities (Dyar et al., 2014).

Current study

The current study tested several hypotheses concerning current intimate relationship status, minority stressors, and health outcomes among a sample of bisexual women. Before testing hypotheses, we conduct bivariate analyses to identify potential socio-demographic covariates (age, education, race/ethnicity), as these have been previously related to outcomes of interest (depressive symptoms: Galambos, Barker, & Krahn, 2006; Lorant, Deliege, Eaton, Robert, Philippot, & Ansseau, 2003; Turner & Gil, 2002; alcohol-related outcomes: Arnett, 2005; Chen & Jacobson, 2012; Galea, Nandi, & Vlahov, 2004; Turner & Gil, 2002).

H1: Minority stressors will vary across current intimate relationship status. H1a: We first test examine partner gender among women with a single partner. We predict that women with a single male partner may exhibit lower experienced bi-negativity and outness as well as greater internalized bi-negativity relative to women with a single female partner. H2a: Second, we test the effect of partner gender/number, by examining differences across women with a single female/male partner and women with multiple female/male partners. We predict that women with a single female/male partner may experience exhibit lower

experienced bi-negativity, outness, and internalized bi-negativity relative to women with multiple female/male partners. We test these hypotheses by conducting two multivariate analyses of co-variance (MANCOVA) with minority stressors as outcomes (experienced bi-negativity, outness, internalized binegativity) and current intimate relationship status as independent variables (single female versus male partner; single female/male partner versus multiple female/male partners). H2: Minority stressors will be associated with depressive symptoms and alcohol-related outcomes. Given literature described above, we predict greater experienced bi-negativity and internalized bi-negativity will be associated with greater depressive symptoms and alcohol-related outcomes. Further, we test if outness may have linear and non-linear effects with depressive symptoms and alcohol-related outcomes. We conduct multivariable linear regressions with depressive symptoms and alcohol-related consequences as outcomes and a logistic regression with binge drinking as the outcome. For all regression models, minority stressors are included as independent variables (experienced bi-negativity, outness, internalized bi-negativity).

H3: Depressive symptoms and alcohol-related outcomes will vary across current intimate relationship status. H3a: We first predict bisexual women with single male partners will exhibit greater depressive symptoms and negative alcohol-related outcomes relative to women with a single female partner. H3b: We hypothesize that women with multiple female/male partners will exhibit greater depressive symptoms and negative alcohol-related outcomes than women with single female/male partners. We test these hypotheses by conducting multivariate analyses of co-variance (MANCOVA) with depressive symptoms and alcohol-related consequences and logistic regression with binge drinking as the outcome. Current intimate relationship status is first included to compare single female and male partner status among women with a single partner and second to compare women with a single female/male partner and women with multiple female/male partners.

H4: We hypothesize that minority stressors will mediate differences in depressive symptoms and alcohol-related outcomes by current intimate relationship status. Specifically, we hypothesize that differences described in H3a and b will be mediated by differences in experienced bi-negativity, outness, and internalized bi-negativity described in H1 and H2. To test this hypothesis, we will conduct mediation models, using the Preachers and Hayes method (Hayes, 2009; Preacher & Hayes, 2008).

Method

Procedures

As part of a larger study, participants were recruited using 10 different advertisements on the social networking site Facebook. The advertisements were divided into LGB-specific and non-LGB specific content and were displayed in the sidebar of Facebook for sponsored advertisements only to women who met eligibility criteria, based on their Facebook profile (between the ages of 18-25, endorsed interest in relationships with women in their Facebook profile, female). Interested participants could respond to the ads by phone, email or clicking on the advertisement (this would take them to the screening assessment). The study was advertised on Craigslist in Atlanta, Austin, Boston, Chicago, Houston, Los Angeles, New

York, Philadelphia, San Francisco, Seattle, South Florida, and Washington D.C. Cities were selected based on geographic range to sample various regions of the United States.

A brief information statement was shown to participants who agreed to participate in the 5-minute screening assessment. A total of 4,119 women completed the screening survey; 1,877 women were deemed eligible to participate in the study. Eligibility criteria included women who (a) lived in the United States, (b) had a valid email address, (c) were between the ages of 18 and 25, and (d) self-identified as lesbian or bisexual woman at the time of the assessment. Eligible participants were sent two emails, one with the URL for the baseline survey followed by a separate email with a personal identification number. Duplicate respondents were checked for using first and last name, birth date, mailing address, and phone number. If duplicate data were found, the participant was informed that we could only accept one set of data from each individual. Custom survey programming eliminated the possibility of a participant using the same email address more than once, wherein individuals attempting to enter the same e-mail were given an automatized error message. Participants who attempted to use different e-mail addresses but had similar name and mailing address/contact information were identified by study staff and removed from the dataset. Neither the number of attempts to enter the same or multiple e-mail addresses from the same participant was tracked.

Participants viewed a full consent form for the study after logging in to take the 45-minute baseline survey. Upon agreement, they were administered the survey. Those who did not complete the baseline survey were reminded through an additional email and phone call. A total of 1,083 women completed the survey and were compensated $25 for their time. Only baseline survey data are used in the current study. For the current study, we only included women who 1) identified as a bisexual woman; and 2) indicated they were in an intimate relationship at the time of assessment. Table 1 depicts socio-demographic characteristics for the analytic sample.

Measures

Current intimate relationship status—Operationalization of current intimate relationship status took several steps. First, women were asked what their current intimate relationship status was (Single, Dating one person, Dating more than one person, In a committed relationship with one partner, In a committed relationship with more than one partner, Other). Women who indicated they were single were excluded from the analyses, given that the purpose of this study was to examine the gender and number of current intimate partner(s). Groups were then collapsed by partner gender among women with a single partner, such that women in relationships were categorized to have a single male partner (n =282) and a single female partner (n = 56). We finally categorized women according to whether they were in a relationship with a single female/male partner (n = 338) or multiple female and male partners (n = 132). Notably, no women reported dating multiple male-only partners or multiple female-only partners (all respondents endorsing multiple partners identified male and female partners). Given this, we could not disentangle the effect of partner gender and number of partners.

Bisexual minority stress scale (BMSS)—To measure experienced bi-negativity, we used a 10-item instrument that was developed as part of a larger mixed-method research project that developed several instruments unique to LGBT community ("Rainbow Project"; Balsam, Beadnell, & Molina, 2013) and specific sub-populations, including racial/ethnic minorities who identify as LGBT, bisexual individuals, and transgender individuals (Balsam, Beadnell, Simoni, & Cope, 2008). To develop these measures, focus groups and in-depth interviews were conducted with ethnically diverse LGBT adults in urban (e.g., Seattle) and rural (e.g., Yakima) parts of Washington State (Balsam et al., 2013), including one focus group focused on bisexual experiences specifically for BMSS item development. Individuals were assigned to focus groups according to identity and geographic location. Subsequently, items were tested, refined, and validated through two national web-based surveys. BMSS items were not refined across surveys, as they exhibited adequate psychometric properties with both of the Rainbow Project national web-based samples. All data from our own sample were examined through scree plots, eigenvalues, parallel analysis, and Cronbach's alphas, which suggested a 1-factor solution best fit the data. For our sample, all items of the BMSS had factor loadings of 0.40 or greater. Cronbach's α for the current sample was 0.76. Sample questions for this questionnaire concerned "Being asked 'when are you going to come out all the way?'"; and "People assuming you will sleep with anyone." Participants could respond from 0 = *Never* to 5 = *Almost Every Day.*

Outness inventory (OI)—The 11-item OI was used to measure outness (Mohr & Fassinger, 2000). This questionnaire was developed to assess the degree to which LGB populations are open about their sexual orientation and has been validated throughout a number of studies (Beaber, 2008; Swearingen, 2007). Individuals report "How open you are about your sexual orientation to the people listed below" and then are given a list of family/ friends, the world, and religious communities using a 7-point Likert scale (1 = Person definitely does not know about your sexual orientation to 7 = Person definitely knows about your sexual orientation status, and it is openly talked about). The original instrument has three subscales, with the specific items in parentheses: family (Mother, Father, Siblings, Extended family/relatives; Cronbach's α = 0.75), everyday life (My new heterosexual friends, my work peers, my work supervisors, strangers or new acquaintances, my old heterosexual friends, my school peers; Cronbach's α = 0.95), and religion (members of my religious community, leaders of my religious community; Cronbach's α = 0.74). For our data, parallel analyses and exploratory factor analyses revealed comparable factor structure as previous studies, with items loading on their relevant factors with a value of 0.50 or greater. Cronbach's α for the overall summary score was 0.81. In line with standard scoring for this instrument, the overall summary score was calculated as the average of the three subscales, such that the greater the score, the greater the degree of outness.

Internalized bi-negativity scale—The 3-item *Internalized Bi-negativity* sub-scale of the Lesbian, Gay, and Bisexual Identity Scale (LGBIS; Mohr & Fassinger, 2000) to measure internalized bi-negativity. This instrument is widely used and has adequate psychometric properties for LGBT communities (Moleiro, Pinto, & Freire, 2013; Schurr, 2013). Parallel analyses and exploratory factor analyses on our data revealed comparable 1-factor structure as previous studies, with factor loadings greater than 0.40. Cronbach's α for the current

sample was 0.77. A sample item for this questionnaire is "*I wish I were heterosexual.*" Participants were given a 7-point Likert scale that ranged from 1 = *Disagree strongly* to 7 = *Agree strongly*. Items were averaged to create summary scores, such that greater values indicated more internalized bi-negativity.

Depressive symptoms—Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) measured depressive symptoms. This 20-item instrument has exhibited adequate psychometric properties for LGBT populations (Hightow-Weidman et al., 2011; Cooperman, Simoni, & Lockhart, 2003). The original instrument has nine different 'symptom' subscales, including sadness, loss of appetite, sleep, thinking/concentration, guilt, fatigue, movement, and suicidal ideation. With regard to our data, examination of scree plots, eigenvalues, parallel analysis, and Cronbach's alphas suggested an overall summary score of items to be the preferred solution for adequate reliability (Cronbach's α = 0.78). Sample items for this scale include "I felt lonely" and "I felt depressed." For the current study, participants were given a 4-point Likert scale for these items (1 = *Rarely or none of the time* to 4 = *Most or all of the time*). Overall summary scores were calculated as the sum of all items, wherein a greater score indicates more depressive symptoms.

Binge drinking—Participants were provided with definitions of a standard alcoholic drink and asked how many they consumed on throughout the week using a modified version of the Daily Drinking Questionnaire (Sample item: "Consider a typical week during the last 12 months. How much alcohol, on average (measured in the number of drinks), do YOU drink on each day of a typical week?"; DDQ; Collins, Parks, & Marlatt, 1985). Responses were summed for the mean weekly drinking quantity. Preliminary analysis revealed our data for this measure exhibited statistically irregular, but extremely typical, high prevalence of 0 responses (Buu, Johnson, Li, Tan, 2011; Garcia, Blasco, Roca, & Poll, 2010). Responses were dichotomized based on the presence/absence of at least one binge drinking episode (defined as 4 or more standard drinks on one occasion).

Alcohol-related consequences—Participants completed the 48-item Young Adult Alcohol Consequences Questionnaire (YAACQ; Read, Kahler, Strong, & Colder, 2006), with responses to commonly experienced consequences within the past 30 days either confirmed or denied by participants. With regard to our data, parallel analyses and exploratory factor analyses revealed comparable factor structure with regard to the overall and eight subscales as previous studies, with items loading on their relevant factors with a value of 0.46 or greater. Sample items included "I have become very rude, obnoxious or insulting after drinking";"I have neglected my obligations to family, work, or school because of my drinking"; "I have felt badly about myself because of my drinking"; "Because of my drinking, I have not eaten properly"; "I have taken foolish risks when I have been drinking"; "The quality of my work or school work has suffered because of my drinking"; "I have had 'the shakes' after stopping or cutting down on drinking"; and "I've not been able to remember large stretches of time while drinking." Cronbach's α for the overall score was 0.95 for this sample. The overall scale was the sum of these dichotomous items. Preliminary analysis revealed this measure was not normally distributed and was square-root transformed for further analyses.

Results

The analytic sample included 470 women who 1) identified as bisexual; and 2) reported they were in a relationship. Given the relatively low amounts of missing data (<2%), we used pairwise case deletions, wherein all non-missing data are used on an analysis by analysis basis. An overall MANCOVA of continuous variables indicated significant differences among women with a single female partner, single male partner, and multiple female/male partners, *Wilks' lamda* = 0.85, F (14, 890) = 5.36, p <.0001. Tables 1 and 2 provide, respectively, descriptive information as well as univariate analyses concerning socio-demographic characteristics and study variables across current intimate relationship status. We first sought to identify potential socio-demographic covariates through examining the relationship of age, education, and race/ethnicity to current intimate relationship status, minority stressors, depressive symptoms, and alcohol-related variables through analyses of variance (ANOVAs), chi-square tests, and Pearson's correlations. Education was significantly correlated with experienced bi-negativity, outness, internalized bi-negativity, and depressive symptoms (all p<.05). Age was significantly correlated with alcohol-related variables (both p <.05). Racial/ethnic differences emerged with regard to internalized bi-negativity. Subsequent post-hoc comparisons found African American participants to exhibit more internalized bi-negativity relative to White participants. No other racial/ethnic comparisons were significant, including intimate relationship status (χ^2=5.06, df = 6, p = .56). Given these findings, age, education, and race/ethnicity (dummy-coded as African American or not) were included in covariates across subsequent analyses.

H1: Minority stressors will vary across current intimate relationship status

The adjusted means and standard deviations for minority stressors across current intimate relationship status are presented in Table 3. With regard to H1a ("Women with a single male partner may exhibit lower experienced bi-negativity and outness as well as greater internalized bi-negativity relative to women with a single female partner"), we first conducted a MANCOVA to examine differences in minority stressors (experienced bi-negativity, internalized bi-negativity, outness) across women with a single female partner and women with a single male partner, after adjusting for covariates (age, education, race/ethnicity). We use partial omega squared tests (ω^2) as measures of effect size. Women with a single male partner reported greater experienced bi-negativity, partial ω^2 = 0.02, F(1,302) = 7.74, p = .006; and lower outness relative to women with a single female partner, ω^2 = 0.14, F(1,302) = 29.35, p <.0001. There were no significant differences in internalized bi-negativity, ω^2 = -0.003, F(1,302)=0.85, p=.36. For H2a ("Women with a single female/male partner may experience exhibit lower experienced bi-negativity, outness, and internalized bi-negativity relative to women with multiple female/male partners"), we conducted another MANCOVA to examine differences in minority stressors across women with a single female/male partner and women with multiple female/male partners. Women with multiple female/male partners exhibited greater experienced bi-negativity, ω^2 = 0.03, F(1,424) = 17.17, p<.0001; and outness, ω^2 = 0.03, F(1,424) = 7.85, p=.005; but did not differ with regard to internalized bi-negativity, ω^2 = 0.0007, F(1,424) = 1.28, p=.26.

H2: Minority stressors will be associated with depressive symptoms and alcohol-related outcomes

Our second set of hypotheses concerned associations of minority stressors, depressive symptoms, and alcohol-related outcomes. We conducted three multivariable linear regression models, including covariates (age, education, race/ethnicity), outcomes (depressive symptoms, binge drinking, alcohol-related consequences) and independent variables (experienced binegativity, internalized bi-negativity, outness). Formal tests for multicollinearity revealed VIF values ranging between 1.01 and 1.03. Standardized coefficients and odds ratios are used as measures of effect size. Experienced bi-negativity was positively related to all three outcomes: depressive symptoms, $B = 0.21$, $t(418) = 4.35$, $p < .0001$; alcohol-related consequences, $B = 0.21$, $t(414) = 4.36$, $p < .0001$, and binge drinking, a$OR = 1.38$, 95%CI [1.11, 1.73], $df = 1$, $p = .004$. Internalized bi-negativity was positively related to depressive symptoms, $B = 0.12$, $t(418) = 2.44$, $p = .02$, and alcohol-related consequences, $B = 0.22$, $t(414) = 4.47$, $p < .0001$, but not binge drinking, $aOR = 1.05$, 95%CI [0.86, 1.28], $df = 1$, $p = .67$. We also examined linear and non-linear relationships between outness, depressive symptoms, binge drinking, and alcohol-related consequences. There were no significant linear or non-linear relationships between outness, depressive symptoms, and alcohol-related variables (*p*s= .19-.90).

H3: Depressive symptoms and alcohol-related outcomes will vary across current intimate relationship status

Depressive symptoms and alcohol-related outcomes across current intimate relationship status are presented in Table 3. For H3a (“Bisexual women with single male partners will exhibit greater depressive symptoms and negative alcohol-related outcomes relative to women with a single female partner”), we first conducted a MANCOVA to examine differences in depressive symptoms and alcohol-related consequences between women with a single female partner and women with a single male partner. We use partial omega squared tests (ω^2) as measures of effect size. Women with a single male partner reported slightly greater depressive symptoms relative to women with a single female partner, partial $\omega^2 = 0.47$, $F(1,297) = 2.84$, $p = .09$, and exhibited significantly greater alcohol-related consequences, partial $\omega^2 = 0.006$, $F(1, 297) = 6.04$, $p = .02$. Next, we examined a multivariable logistic regression model with odds ratios as an measure of effect size, which revealed women with a single female partner to report lower binge drinking relative to women with a single male partner, $aOR = 0.47$, 95%CI [0.23, 0.94], $df = 1$, $p = .03$. For H3b (“Women with multiple female/male partners will exhibit greater depressive symptoms and negative alcohol-related outcomes than women with single female/male partners”), MANCOVA omnibus testing revealed significant differences in depressive symptoms and alcohol-related consequences between women with a single female/male partner and women with multiple female/male partners. Women with multiple female/male partners reported greater depressive symptoms, partial $\omega^2 = 0.60$, $F(1,417) = 5.08$, $p = .03$; and alcohol-related consequences relative to women with a single female/male partner, partial $\omega^2 = 0.05$, $F(1,417) = 7.79$, $p = .005$. A multivariable logistic regression model revealed comparable binge drinking, $aOR = 1.47$, 95%CI [0.96, 2.26], $df = 1$, $p = .08$.

H4: Minority stressors will mediate differences in depressive symptoms and alcohol-related outcomes by current intimate relationship status

We tested our final set of predictions, that minority stressors would mediate differences in depressive symptoms, binge drinking, and alcohol-related consequences by current intimate relationship status, using the Preachers and Hayes method (Hayes, 2009; Preacher & Hayes, 2008). We only examined the mediating effects of experienced bi-negativity, given it was the only minority stressor that varied across current intimate relationship status and was associated with outcomes. This bootstrap method is a nonparametric resampling procedure that involves sampling from the data set multiple times (5,000 for this study) and generating a sampling distribution. We calculated 95% confidence intervals of the effect of current intimate relationship status on depressive symptoms and alcohol-related variables through minority stressors. For effect size, we calculated k^2 values as the indirect effect divided by the maximum possible indirect effect" (Preacher & Kelley 2011); effect sizes are comparable to coefficients of determination. We found experienced bi-negativity was a significant mediator in differences in binge drinking and alcohol-related consequences between women with a single male and single female partner and differences in depressive symptoms and alcohol-related consequences between women with a single female/male and women with multiple female/male partners (Table 4). Effect size values were comparable and small to medium (0.30-0.40).

Discussion

Public relationships may influence the types of exposures a woman has with external minority stressors as well as her options and perceptions concerning her identity, which may in turn influence health outcomes. Several studies have provided qualitative information on the unique experiences of bisexual individuals in varying types of relationships (Ochs, 1996, 2007; Ross et al., 2012, Canada; McLean, 2008, Australia). To date, however, little research has used quantitative methodologies to explore how differences in types of relationships may influence experiences of minority stressors among bisexual women (Clark, 2013). This exploratory study offers several important, novel findings regarding current intimate relationship characteristics, minority stress, and health among bisexual women. First, we found significant, albeit mostly within the small-moderate range of magnitude, differences in minority stressors (experienced binegativity, outness, internalized bi-negativity) across current intimate relationship status. Interestingly, our findings suggest that women with a single male partner and women with multiple female and male partners may be more exposed to greater experienced bi-negativity. Women with a single male partner further appear to be less out than women with a single female partner. Second, we provide information concerning the role of minority stressors in relation to an understudied segment of the LGBT community: our study indicates that bisexual-specific minority stress (i.e., experienced bi-negativity) is, in particular, associated with health outcomes (small and large effect sizes). Our third and fourth hypotheses focus on the specific contribution of current intimate relationship status on health and extend the current literature by assessing the mediating effects of experienced bi-negativity. Our findings suggest that women with a single male partner and women with multiple female and male partners may be particularly vulnerable to depressive symptoms and alcohol-related outcomes due to greater exposure to

experienced bi-negativity. These mediating effects were within the small/moderate range for our sample.

Minority stressors among bisexual women by current intimate relationship status

Our first set of hypotheses concerned potential differences in minority stressors across current intimate relationship status. With regard to Hypothesis 1a, similar to previous literature (Dyar et al., 2014; Ochs, 1996), women in our sample who had a single male partner appeared to be much less out relative to other bisexual women. Opportunities for disclosure of sexual minority status may not be as available within heteronormative relationships (Balsam & Mohr, 2007) and may lead to increased experienced bi-negativity from the heterosexual community (Li et al., 2013, Canada). Women with single male partners also reported significantly greater experienced bi-negativity relative to women with single female partners, although the magnitude of this difference was smaller than differences in outness. These results may reflect the greater sensitivity of our experienced bi-negativity measures to assess stigma perpetuated by lesbian/gay communities, similar to other recent work (Dyar et al., 2014) and in contrast to other studies that have focused on individuals' experiences with heterosexual-based discrimination (e.g., Mays & Cochran, 2001).

In line with our hypothesis concerning the visibility of women in multiple relationships with male and female partners (H1b), partner number and gender further appeared to influence exposure to minority stressors. Women with multiple female and male partners appear to experience greater stigma relative to women with single female/male partners and have greater outness; the magnitude of these differences also ranged within the small-moderate range. As described earlier, although polyamory, or non-monogamy, is not more common among bisexual populations (Li et al., 2013, Canada; McLean, 2008, Australia), this stigma may augment discrimination against bisexual individuals. Indeed, a woman's number of partners and their genders can potentially expose a bisexual woman's sexuality to others in a unique way not experienced by individuals with single partners or with multiple partners of the same gender, which may increase her options in being out about her identity as well as the likelihood of experienced bi-negativity (Weitzman, 2006). Future research comparing different levels of partner number and gender are needed to disentangle their potential effects as well as characterize their interactive effects on types of minority stressors women experience.

Our findings suggest few differences in internalized bi-negativity across current intimate relationship status. Previous studies have found less internalized homonegativity is reported by individuals in a committed same-gender relationship (Bauermeister et al., 2010; Riggle et al., 2010). The lack of a similar finding within our study warrants further study, given our findings concerning differences in outness across current intimate relationship status and previous research linking experienced stigma and outness to internalized stigma (Brewster et al., 2013; Herek et al., 2009).

Minority stressors, depressive symptoms, and alcohol-related outcomes

Our second set of hypotheses aligns with conceptualizations of minority stress as multifaceted and calls for research to quantify different forms of minority stress to compare the relative effects and identify target priorities for future interventions (Goffman, 1963; Herek, Gillis, & Cogan, 2009; Hatzenbuehler, 2009; Meyer, 2003). Similar to extant literature (Brewster et al., 2013; Dodge et al., 2012a,b; Ross et al., 2010, Canada;Szymanski & Carr, 2008), our results indicated a positive association between poor mental health and both experienced and internalized stigma. These relationships ranged from small to large, indicating particularly large effects concerning experienced bi-negativity to depression and alcohol-related consequences, moderate relationships between internalized bi-negativity to alcohol-related consequences, and relatively small effects in relation to binge drinking. We also have addressed a gap in existing research concerning the relationship between minority stressors and alcohol use within the bisexual population. Our work suggests the potential of integrating stigma reduction interventions that target experienced and internalized bi-negativity with existing mental health and substance use interventions to increase efficacy and relevance for this high risk subgroup. Outness was not related to these outcomes, contrary to theory and findings concerning other segments of the bisexual community (e.g., men, different age cohorts; Brewster et al., 2013; Friedman et al., 2014; Schrimshaw et al., 2013), suggesting a more nuanced relationship. There is a need for further research to replicate and confirm findings, especially given that both bisexual women with single male partners and multiple female and male partners experience worse health outcomes, but differ in their levels of outness.

Current intimate relationship status, health, and minority stressors

In line with our third hypothesis, we add to the literature through examining differences in depressive symptoms and alcohol-related outcomes among bisexual women and the mediating effects of minority stressors. Our work parallels two other studies in finding bisexual women with male partners to be vulnerable (Dyar et al., 2014; Ross et al., 2012, Canada) and, in our study, specifically with regard to alcohol-related outcomes. Further, our work additionally indicates the importance of both partner gender and number in health conditions, wherein women with multiple female/male partners also demonstrated greater depressive symptoms and alcohol-related consequences relative to women with a single partner. Notably, although differences in depressive symptoms were not statistically significant across partner gender, they were significantly different across partner number and effect size values were large for both comparisons. Conversely, binge drinking was significantly different across partner gender but not number; nonetheless effect sizes ranged between small and medium. Differences across partner gender and number for alcohol-related consequences were both significant and ranged between small-moderate. Altogether, these findings suggest the importance of examining intimate relationship status across different health conditions for this vulnerable population.

To date, Meyer (1995, 2003) and others have suggested that minority stress may serve as a mediator, wherein individuals experiencing greater minority stress may subsequently be at risk for poorer health outcomes (Almeida et al., 2009; Burton et al., 2013; Williams et al., 2005). Notably, our work is among the first of studies to examine simultaneously the

associations between current intimate relationship status and minority stressors as well as associations between minority stressors, depressive symptoms, and alcohol-related outcomes. This current study thus provides a major contribution to existing literature by examining the mediating effects of minority stressors. One study to date has examined the mediating effects of minority stress on associations of current intimate relationship status and health (Dyar et al., 2014). Our data provide additional support to suggest that bisexual women with a single male partner are more likely to experience worse outcomes (binge drinking, alcohol-related consequences) than women with a single female partner, and that this may be due in part because of greater experiences with bi-negativity. Further, experienced bi-negativity may underlie the greater depressive symptoms and alcohol-related consequences women with multiple female/male partners report relative to women with a single female/male partner. These indirect effects appear to be small-moderate, but meaningful. Our preliminary research is valuable to future, directed work with bisexual populations: specifically, longitudinal research is warranted to confirm the causal pathways suggested by our and Dyar and colleagues' (2014) findings. These results suggest that social context is important, but it is important in the extent to which one's relationships are perceived and consequent influences on internal beliefs and external experiences of discrimination.

Strengths and limitations

Our study has several strengths. First, innovative social media recruitment techniques yielded a large and geographically diverse sample of bisexual women. Although social media have been used to recruit individuals through listservs or Facebook pages who are already out, this is one of the first studies to systematically present targeted advertisements to individuals based on their demographics and Facebook profile. This may help to account for our large proportion of bisexual individuals. Second, our analytic approaches allowed us to test mediation in our distinct sample groups to not only document the increased risk but also demonstrate the putative mechanisms for poorer health outcomes (Fritz & MacKinnon, 2007; Hayes & Preacher, 2010). Third, we utilized a minority stress instrument developed to quantify the specific experiences of bisexual populations rather than attempting to generalize measures created for and tested within other populations. Future longitudinal, quantitative research should implement such population-specific measures to replicate our preliminary, cross-sectional evidence. Additionally, there is a need for follow-up qualitative research concerning *how* and *from whom* bisexual women in different relationship statuses experience stigma to understand our findings.

Simultaneously, a number of limitations warrant attention. First, most significantly, no participants in our sample endorsed multiple partners of the same gender (multiple male-only or multiple female-only); thus we are unable to disentangle the influence of partner gender and number. Second, our sample contained relatively few women with female partners (56 out of 470). This may be due to several different factors. Previously self-identified bisexual women in relationships with a single female partner may have identified as a lesbian at the point of data collection and therefore may not have been included in our sample (Diamond, 2000, 2002). Previous research has found a negative sentiment among self-identified lesbian women and gay men towards bisexual individuals (Israel & Mohr,

2004; Rust, 1993; Sarno & Wright, 2013), which may lead to a decrease in their willingness to date openly bisexual individuals and thus limit the number of bisexual women with only female partners. Third, our sample primarily identified as White non-Hispanic (65%) and all lived in the U.S., so generalizability is uncertain for bisexual women of color or non-U.S. populations. Further work is warranted, especially research that quantifies these relationships in socio-cultural contexts that vary in gender norms, values, and practices concerning the acceptability of bisexuality. Indeed, future research examining other countries with similar values and norms as the U.S. as well as countries that have greater acceptance of same-gender and polyamorous relationships. Fourth, we did not collect information on perceptions of intimate relationships or information on relationship length and stability. These variables may play important roles in the well-being of bisexual women who have been in long-term, committed relationships. Finally, our study was cross-sectional which precludes causal inferences.

Conclusions

A growing body of research proposes that the bisexual population suffers from particularly poor mental health (Fredriksen-Goldsen, Kim, Barkan, Balsam, & Mincer, 2010; Jorm et al., 2002, Australia; Leonard et al., 2012, Australia) and elevated substance use (Midanik, Drabble, Trocki, & Sell, 2007; Conron, Mimiaga, & Landers, 2010; Robin et al., 2002). These disparities may be due to unique minority stressors bisexual populations face. The gender and number of one's partner(s) may contribute to one's visibility as a bisexual individual, and consequently the type and amount of discrimination within heterosexual and lesbian/gay communities. Nonetheless, little work to date had assessed experiences and outcomes by intimate relationship status. The current study adds to the literature by addressing a gap within previous research in regards to the associations between bisexual women's current intimate relationship status on minority stressors and health. The results of our study suggest that the gender and number of a bisexual woman's partner(s) are associated with women's experienced bi-negativity (small-medium effects) and outness (small-large effects) as well as depressive symptoms and alcohol-related outcomes. Greater experienced and internalized bi-negativity further appeared to be associated with greater depressive symptoms and alcohol-related outcomes (small-large effects). Experienced bi-negativity appears to have small-moderate mediating effects in relationships between characteristics of current intimate relationship status (gender, number/gender) on mental health and alcohol use. Bisexual women's current intimate relationship status and their experiences with minority stressors should thus potentially be taken into consideration when their health is being examined. Future interventions may consider these unique experiences when developing programs to address the disparities within the bisexual population.

Acknowledgments

This work was supported by the National Institute on Alcohol Abuse and Alcoholism (R01AA018292; PI: Kaysen, DL; trainee DEL - NIAAA T32 AA007459 PI: Monti) and the National Cancer Institute (trainee YM - R25 CA92408; PI: Patrick D). We would like to thank Keren Lehavot and Deva Wells for their thoughts during early stages of this project.

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Table 1

Socio-demographic variables by current intimate relationship status.

	Single Female Partner	Single Male Partner	Multiple Female and Male partners	
	n (%)	n (%)	n (%)	p-value (df)
Race/ethnicity				.54 (6)
White	32 (63%)	192 (74%)	306 (71%)	
African American	7 (14%)	22 (9%)	12 (10%)	
Latina	5 (10%)	24 (9%)	16 (13%)	
Other	7 (14%)	21 (8%)	12 (10%)	

	Range	M (SD)	M (SD)	M (SD)	
Age	18-26	20.95 (2.16)	21.54 (2.12)	21.73 (1.98)	.60 (2, 467)
Education[1]	1-7	3.80 (1.53)	3.45 (1.46)	3.62 (1.41)	.20 (2, 467)

Analyses compare the following groups: single female partner, single male partner, and multiple female and male partners.

[1]Education was coded as such: 1 = Less than a high school diploma, 2 = High school diploma, 3 = Vocational degree, 4= Some college, 5 = Associate's degree, 6 = Bachelor's degree, 7 = Graduate or professional degree.

Table 2

Minority stressors, depressive symptoms, and alcohol-related outcomes.

	Single Female Partner	Single Male Partner	Multiple Female and Male partners	
	n (%)	n (%)	n (%)	p-value (df)
Binge drinking	14 (25%)	119 (42%)	62 (47%)	.02 (2)

	Range	M (SD)	M (SD)	M (SD)	
Experienced bi-negativity	0-4.67	2.08 (0.79)	2.33 (0.90)	2.68 (0.96)	<.0001 (2, 467)
Internalized bi-negativity	1-5.60	1.96 (1.00)	2.09 (1.03)	1.93 (1.03)	.32 (2, 467)
Outness	1-7	4.43 (1.34)	3.41 (1.39)	3.96 (1.39)	<.0001 (2, 464)
Depressive symptoms	0-59	24.04 (12.00)	21.42 (11.84)	25.96 (12.97)	.06 (2, 462)
Alcohol-related outcomes	0-6.71	2.32 (1.72)	1.77 (1.54)	2.75 (1.83)	.002 (2, 460)

Analyses compare the following groups: single female partner, single male partner, and multiple female and male partners.

Table 3

Minority stressors, depressive symptoms, and alcohol-related outcomes by current intimate relationship status.

		Single Female Partner	Single Male Partner		Single Female/Male Partner	Multiple Female/Male Partners	
	Range	M(SE)[2]	M(SE)[2]	p-value(df)[2]	M(SE)[2]	M(SE)[2]	p-value(df)[2]
Experienced bi-negativity	0-4.67	2.00(0.12)	2.37(0.06)	.006(1,302)	2.31(0.05)	2.71(0.08)	<.0001(1,424)
Internalized bi-negativity	1-5.60	1.91(0.14)	2.07(0.06)	.37(1,302)	2.05(0.06)	1.92(0.09)	.27(1,424)
Outness	1-7	4.55(0.20)	3.38(0.09)	<.0001(1,302)	3.57(0.08)	4.00(0.13)	.02(1,424)
Depressive symptoms	0-59	20.60(1.76)	23.86(0.77)	.09(1,302)	23.34(0.71)	26.35(1.13)	.02(1, 417)
Alcohol-related consequences[1]	0-6.71	1.69(0.24)	2.34(0.11)	.02(1,302)	2.24(0.10)	2.76(0.16)	.005(1,417)

	N(%)	N(%)	N(%)	p-value(df)[2]	N(%)	N(%)	p-value(df)[2]
Binge drinking	195(42)	14(25)	119(42)	.03(1)	133(39)	62(47)	.08(1)

[1] Variable was square-root transformed, due to non-normal distribution.

[2] Adjusted for age, education, and African American identity.

Table 4

Models testing the mediating effects of experienced bi-negativity, using Preacher & Hayes methods.

		95% Confidence Interval (CI)[1]		
	κ^2[2]	Mediation Effect	Lower	Upper	%Mediated[3]
Single Female versus Single Male Partner[4]					
Alcohol-related consequences	**0.04**	**0.18**	**0.06**	**0.38**	**29%**
Binge drinking	**0.03**	**0.15**	**0.03**	**0.35**	**19%**
Single Female/Male Partner versus Multiple Female/Male Partners[5]					
Depressive symptoms	**0.04**	**1.13**	**0.50**	**2.05**	**39%**
Alcohol-related consequences	**0.04**	**0.16**	**0.07**	**0.29**	**30%**

Note. CI = confidence interval. Boldface type highlights a significant effect as determined by the 95% bias corrected and accelerated confidence interval (95% CI).

[1] 5,000 resamples.

[2] Kappa-squared is a standardized "proportion of the maximum possible indirect effect"(Preacher & Kelley 2011).

[3] %Mediated was calculated as ab/(ab+c').

[4] N=305-310.

[5] N=424-429.