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Sexual orientation differences in the relationship between victimization and hazardous drinking among women in the National Alcohol Survey

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Abstract

This study examined relationships between past experiences of victimization (sexual abuse and physical abuse in childhood, sexual abuse and physical abuse in adulthood, and lifetime victimization) and hazardous drinking among sexual minority women compared to exclusively heterosexual women. Data were from 11,169 women responding to sexual identity and sexual behavior questions from three National Alcohol Survey waves: 2000 (n=3,880), 2005 (n=3,464) and 2010 (n=3,825). A hazardous drinking index was constructed from five dichotomous variables (5+ drinking in the past year, drinking two or more drinks daily, drinking to intoxication in the past year, two or more lifetime dependence symptoms and two or more lifetime drinking-related negative consequences). Exclusively heterosexual women were compared to three groups of sexual minority women: lesbian, bisexual, and women who identified as heterosexual but reported same-sex partners. Each of the sexual minority groups reported significantly higher rates of lifetime victimization (59.1% lesbians, 76% bisexuals, and 64.4% heterosexual women reporting same-sex partners) than exclusively heterosexual women (42.3 %). Odds for hazardous drinking among sexual minority women were attenuated when measures of victimization were included in the regression models. Sexual minority groups had significantly higher odds of hazardous drinking, even after controlling for demographic and victimization variables: lesbian ($OR_{adj}=2.0$, $CI=1.1-3.9$, $p<.01$; bisexual ($OR_{adj}=1.8$, $CI=1.0-3.3$, $p<.05$; heterosexual with same-sex partners ($OR_{adj}=2.7$; $CI=1.7-4.3$, $p<.001$). Higher rates of victimization likely contribute to, but do not fully explain, higher rates of hazardous drinking among sexual minority women.

Keywords

Sexual minority women; hazardous drinking; alcohol consumption; childhood sexual abuse; childhood physical abuse; adult victimization

Introduction

The need for greater research attention to alcohol use and alcohol-related problems among sexual minority women was identified more than 10 years ago in an Institute of Medicine report on lesbian health (Solarz, 1999). Since then, a growing body of research has documented disparities in risks for hazardous drinking among sexual minority women. Compared to heterosexual women, sexual minority women are generally less likely to abstain from drinking alcohol and are more likely to report heavy episodic drinking, negative consequences associated with drinking, symptoms of alcohol dependence, and help-seeking for alcohol related problems (Cochran, Keenan, Schober, & Mays, 2000; Cochran & Mays, 2000; Drabble, Trocki, & Midanik, 2005; McCabe, Hughes, Bostwick, West, & Boyd, 2009; Wilsnack et al., 2008). Although many studies combine sexual minority subgroups in analyses of hazardous drinking or other substance use because of small sample sizes, risks appear to vary significantly across subgroups. For example, several studies have found particularly higher risk of alcohol-related problems among bisexual women (McCabe, Hughes, & Boyd, 2004; McCabe, Hughes, & Bostwick, 2005; Wilsnack et al., 2008) and women who self-identify as 'mostly heterosexual' (Austin, Roberts, Corliss, & Molnar, 2008; Hughes, Szalacha, & McNair, 2010; Wilsnack et al., 2008; Ziyadeh et al., 2007).

Multiple factors, both individual and contextual, are posited to contribute to sexual-orientation related disparities in hazardous drinking. Primary among these is minority stress, characterized by external stressors (such as experiences of discrimination, rejection, or violence); increased vigilance in anticipation of negative events and stigmatization; and internalization of negative societal attitudes (Meyer, 2003). There is growing evidence to support the hypothesis that minority stress is associated with elevated risk of alcohol and drug problems among sexual minorities (Austin & Irwin, 2010; Keyes, Hatzenbuehler, & Hasin, 2011; Lehavot & Simoni, 2011; McCabe, Bostwick, Hughes, West, & Boyd, 2010; Parks, 1999). In addition, sexual minority women differ from heterosexual women in relation to some factors that are typically protective for alcohol-related problems (such as the lower likelihood of being married and having children), and may be disproportionately impacted by some risk factors such as underemployment, job discrimination, and stressors related to family conflict (Hughes, Haas, Razzano, Cassidy, & Matthews, 2000; Hughes & Wilsnack, 1997; Nawyn, Richman, Rospenda, & Hughes, 1999; Wilsnack et al., 2008). The reliance on bars as a focal point for developing social networks and entrée into LGBT communities has also been explored as a contributing factor to heavier drinking and alcohol-related problems (Gruskin, Byrne, Kools, & Altschuler, 2006; Heffernan, 1998; Parks, 1999; Trocki, Drabble, & Midanik, 2005).

Traumatic experiences such as childhood sexual abuse (CSA), childhood physical abuse (CPA), and adult victimization (sexual or physical abuse) are strongly associated with increased risk of hazardous drinking and alcohol-use disorders (Dube et al., 2006; Lown, Nayak, Korcha, & Greenfield, 2011; Wilsnack, Vogeltanz, & Harris, 1997). Sexual minority women and men appear to be at greater risk of victimization across the lifespan (Friedman et al., 2011; Hughes, McCabe, Wilsnack, West, & Boyd, 2010; Morris & Balsam, 2003; Roberts, Austin, Corliss, Vander Morris, & Koenen, 2010; Rothman, Exner, & Baughman, 2011). For example, a growing body of literature suggests that sexual minority women may be more likely than heterosexual women to report both CSA and CPA (Austin, Jun et al., 2008; Balsam, Rothblum, & Beauchaine, 2005; Corliss, Cochran, & Mays, 2002; D'Augelli & Grossman, 2001; Hughes, Johnson, & Wilsnack, 2001; Hughes, Johnson, Wilsnack, & Szalacha, 2007; Hughes, McCabe et al., 2010; Saewyc et al., 2006; Stoddard, Dibble, & Fineman, 2009; Tomeo, Templer, Anderson, & Kotler, 2001). Findings from studies comparing rates of adult sexual assault (ASA) in heterosexual and sexual minority women

are less consistent. For example, two studies comparing sexual minorities with heterosexual siblings found greater risk of ASA among lesbian and bisexual women compared to heterosexual women (Balsam et al., 2005; Stoddard et al., 2009), but no differences were found in a study using a national population-based sample (Hughes, McCabe et al., 2010) or in a study using a community-based sample of demographically matched lesbian and heterosexual women (Hughes et al., 2001).

Revictimization (sexual assault in both childhood and adulthood) increases the risk of hazardous drinking among both heterosexual and sexual minority women (Descamps, Rothblum, Bradford, & Ryan, 2000; Dube et al., 2006). Balsam and colleagues (2010) compared mental health correlates of revictimization among adult lesbians, gay men, and heterosexual women, finding higher levels of alcohol use, psychological distress, suicidality and self-harm behaviors among revictimized adults compared to non-victims or study participants who reported either CSA or ASA. These findings are similar to those from an earlier study in which lesbians and gay men who were revictimized scored significantly higher on measures of psychological distress compared to nonvictims or victims of one type of abuse—CSA or ASA (Heidt, Marx, & Gold, 2005).

In a study exploring relationships between child and adult sexual assault and hazardous drinking among sexual minorities, Hughes and colleagues (Hughes, Szalacha, Johnson et al., 2010) examined variations in rates of sexual assault and revictimization among heterosexual and four subgroups of sexual minority women (exclusively lesbian, mostly lesbian, bisexual, mostly heterosexual). These researchers pooled data from 405 participants in the 2001 Chicago Health and Life Experiences of Women (CHLEW) study and 548 urban/suburban dwelling participants in the 2001 National Study of Health and Life Experiences of Women (NSHLEW). Women in each of the four sexual minority groups reported higher rates of hazardous drinking and higher rates of CSA and sexual revictimization than did exclusively heterosexual women. Revictimization was a strong predictor of hazardous drinking (assessed using an index comprised of heavy episodic drinking, subjective intoxication, adverse drinking consequences and symptoms of potential alcohol dependence), particularly among women who identified as mostly heterosexual and mostly lesbian. Mean levels of hazardous drinking were also high among bisexual women with histories of CSA only. This study did not assess childhood physical abuse and, as the authors note, the use of non-probability sampling limits generalizability of the findings.

The current study addresses many of the gaps in previous literature. First, our analyses include sexual minority and heterosexual women from a national population-based study, providing greater generalizability. Second, detailed measures were used to assess alcohol consumption, alcohol risk factors, and experiences of sexual and physical abuse in both childhood and adulthood. Finally, data include both identity and behavioral measures of sexual orientation, allowing for examination of differences across sexual minority subgroups. Our goals were to (a) examine and compare the prevalence of hazardous drinking and experiences of victimization (childhood, adult, and lifetime) in sexual minority and exclusively heterosexual women; and (b) to examine the contribution of victimization to the risk of hazardous drinking among sexual minority women compared to exclusively heterosexual women.

Methods

The National Alcohol Survey (NAS) is a population-based study that examines alcohol consumption and a wide range of alcohol-related problems. Surveys are conducted approximately every five years. Since 2000, data have been collected using computer-assisted telephone interviews (CATI) of the adult population (age 18 or older) in all 50 U.S.

states and Washington, DC. Data for the current study are from 2000, 2005 and 2010. All respondents were contacted using random digit dialing (RDD) with oversampling of African-Americans, Latinos and low-population states. Although all three survey years accessed respondents using RDD, in 2000 and 2005 respondents were contacted exclusively through landlines whereas in 2010 they were contacted via landlines and cell phones. Cooperation rates were 58% in 2000, 56% in 2005, and 52% in 2010—levels typical of U.S. telephone surveys since the widespread use of caller identification (Keeter, Kennedy, Dimock, Best, & Craighill, 2006). Data are weighted to be representative of the U.S. population and to adjust for study design.

The current study includes data from 11,169 women who responded to the sexual identity and sexual behavior questions from the three survey waves: NAS 2000 (n=3,880), NAS 2005 (n=3,464) and NAS 2010 (n=3,825). Women who responded “don’t know” or who refused to answer the sexual identity question (5.5%; n=649) were excluded from the analyses. Non-responders were older, more likely to be in a committed relationship, less educated, and drank significantly less alcohol in the past year than those who responded to the sexual identity question. Because inclusion of survey year did not impact the relationship between sexual orientation and hazardous drinking, nor did it impact relationships between the victimization and hazardous drinking measures this variable was excluded in the final models.

Measures

Sexual Orientation—The sexual orientation measure used in the study was derived primarily from responses to a question about self-identity, with the addition of responses to a question about sexual behavior used to classify women who identified as heterosexual but reported same-sex partners (Drabble, Midanik, & Trocki, 2005). Respondents were asked which of the following correctly identified their sexual orientation: heterosexual, prefer sex with the opposite gender; bisexual- prefer sex with people of either gender; or homosexual-prefer sex with your own gender. They were also asked a question about sexual partners in the past five years with the response options including only men, mostly men, the same number of men and women, mostly women, only women, and no sexual relationships in past five years. Using responses to these two questions we constructed a four-category sexual orientation variable: (1) exclusively heterosexual (no same-sex partners; n=10,723), (2) heterosexual identity with reports of same-sex partners (n=184), (3) bisexual identity (n=140), and (4) lesbian identity (n=122). This operationalization optimizes the use of a sexual identity measure shown to be particularly salient in studies of hazardous drinking (Midanik, Drabble, Trocki & Sell, 2006) while also capturing heterosexually identified women who report same-sex behavior—a group shown to be a elevated risk of hazardous drinking (Drabble, Trocki, & Midanik, 2006; Hughes, Szalacha & McNair, 2010).

Alcohol-related variables—*Alcohol consumption (past 12 months)*. Number of drinks in the past 12 months, consumption of five or more drinks in a sitting, and drinking two or more drinks per day were assessed using a graduated frequency (GF) methodology (Greenfield, 2000). The GF assesses maximum number of drinks consumed followed by questions about frequency of drinking at descending levels of quantity (Greenfield, Kerr, Bond, Ye, & Stockwell, 2009). *Drinking to intoxication (past 12 months)*: Drinking to intoxication was based on a single item, “How often in the last 12 months did you drink enough to feel drunk?” (once or more in the past year vs. never). *Alcohol-related dependence symptoms (lifetime)*: This measure assessed five alcohol dependence symptoms such as unsuccessful attempts to quit or cut down drinking, withdrawal symptoms, and drinking in amounts larger than intended. Respondents were classified as having lifetime alcohol-related dependence symptoms if two or more of these symptoms were reported.

Alcohol-related consequences (lifetime): This variable was derived from nine questions about negative consequences associated with alcohol use in five problem areas including fights/arguments, accidents/legal problems, health issues, work problems, and negative reactions from others (Midanik & Greenfield, 2000). Respondents reporting two or more consequences were compared to those who reported fewer than two consequences.

Hazardous drinking index: This index was constructed using five dichotomous variables including consuming five or more drinks on one or more occasion in the past year (heavy episodic drinking), drinking an average of two or more drinks daily in the past year, drinking to intoxication in the past year, two or more lifetime dependence symptoms and two or more lifetime negative consequences (range = 0 to 5). A dichotomous measure of hazardous drinking was created to include respondents reporting two or more of the five indicators. The hazardous drinking index was designed to parallel the hazardous drinking measure used in a study conducted by Hughes and colleagues (Hughes et. al, 2010c), with two modifications. First, we used lifetime rather than past year measures for alcohol dependence and alcohol-related consequences to better account for the potential impact of childhood victimization on hazardous drinking problems over the lifespan. Second, we used more stringent criteria for creating the hazardous drinking scale (e.g. 2+ consequences and dependence symptoms rather than one). Logistic regression models approximating Hughes et al. yielded similar outcomes (results not shown).

Abuse and victimization measures—*Childhood physical and sexual abuse.* Childhood physical abuse was derived from questions included in the Conflict Tactics Scale (Straus, 1990). The question asked, “During your childhood or adolescence, that is before age 18, did anyone ever hit you with something, beat you up, intentionally burn or scald you, or use a knife or gun to threaten you?” Childhood sexual abuse (Sorenson, Stein, Siegel, Golding, & Burnam, 1987) also prefaced the timeframe of childhood or adolescence and asked, “Did anyone ever force you to have sex against your will? By sex, I mean their touching your sexual parts, your touching their sexual parts, or sexual intercourse.” *Adult victimization (physical abuse and sexual abuse).* Physical abuse was ascertained using two questions that included ever being pushed, grabbed, shoved, slapped, bit, hit with a fist, beaten up, having a gun or knife used on you or, being threatened with a gun or knife since turning age 18 (Straus, 1990). The adult sexual abuse question was identical to the childhood sexual abuse question but with the preface “since turning age 18”. Questions assessing adult victimization were asked in NAS 2005 and NAS 2010 surveys only. *Lifetime victimization.* Using the adult and child abuse questions, we constructed a mutually exclusive measure of lifetime victimization that included four categories: no abuse, childhood abuse only, adult victimization only, and both childhood abuse and adult victimization. NAS 2000 assessed child abuse, but not adult victimization.

Demographics and Sample Characteristics—Demographic measures include relationship status (partnered status included respondents who were married and living with a spouse, living with someone as a couple, or married and not living with spouse; not Partnered included those who were separated, divorced, widowed, or never married), age, race (White, Black, Hispanic, Other), and highest year of education. Mean age of women in the exclusively heterosexual group was significantly older (45.8 years) than each of the three sexual minority groups (heterosexual women reporting same-sex partners, 40.6; bisexual women; 33.6, lesbians, 40.3. $p < .001$). The groups also differed significantly in terms of relationship status: 59.1% of exclusively heterosexual women were married or lived with a partner compared with 31.9% of bisexual women, 51% of heterosexual women with same-sex partners, and 50.5 % of lesbians ($p < .001$). Bisexual women were less likely than exclusively heterosexual women to have completed a bachelor’s degree (22.0 vs. 28.7

respectively, $p=.05$). Differences in relationship status and education are likely due, at least in part, to age differences.

Data Analysis

We used Chi square analyses in comparisons of categorical variables and analysis of variance (ANOVA) in comparisons using continuous measures. Follow-up tests for significant differences in bivariate analyses were conducted using logistic regression for categorical variables and Bonferroni post hoc tests for ANOVA analyses. We used logistic regression analyses to test models predicting hazardous drinking. All analyses were conducted using Stata (V10) statistical software.

Results

Drinking characteristics

Table 1 summarizes drinking status, volume of drinking and hazardous drinking indicators. We include non-current drinkers in comparisons of drinking volume and hazardous drinking indicators to approximate rates in the general population. Consistent with previous research, exclusively heterosexual women were less likely than each of the three sexual minority groups to report current drinking, heavy episodic drinking, and intoxication in the past 12 months. They were about one-third as likely (14.3%) as the other three groups (range 36.3% to 40.4%) to report two or more indicators of hazardous drinking.

Exclusively heterosexual women were significantly lower than sexual minority women in comparisons using continuous measures of mean number of drinks in the past year, number of days of heavy episodic drinking and number of hazardous drinking indicators, with one exception. The difference in the mean number of days of heavy episodic drinking in the past year between exclusively heterosexual women (4.0) and lesbians (13.8) approached but did not reach significance ($p=.09$); the average number of days of heavy episodic drinking among lesbians was closer to that of bisexual women (14.3) and heterosexual women reporting same-sex partners (18.6).

Experiences of Victimization

In Table 2 we summarize reports of lifetime victimization including childhood sexual abuse (CSA), childhood physical abuse (CPA), adult sexual abuse (ASA), and adult physical abuse (APA). Rates of any childhood abuse (CSA, CPA or both) and CPA only were significantly higher among bisexuals and lesbians than among exclusively heterosexual women. Exclusively heterosexual women were less likely to report CSA (10.6%) than each of the sexual minority groups (range 18.0 to 25.5%).

Comparisons of adult victimization are based on data from two of the three NAS surveys (NAS 2000 did not include these questions). The pattern of results is generally consistent with that of childhood victimization. Exclusively heterosexual women reported significantly lower rates of any adult victimization and APA only than each of the three sexual minority groups. Bisexual women were more than twice as likely as exclusively heterosexual women (63.1% versus 31.3%) to report any adult victimization. This is particularly notable given that bisexual women were younger than exclusively heterosexual women and thus had a shorter timeframe in which to experience adult victimization. The rate of ASA among heterosexuals with same-sex partners and bisexual women was significantly higher than rates among exclusively heterosexual women.

The bottom of the Table 2 shows rates of lifetime victimization. Rates of re-victimization (experiencing both childhood and adult abuse), was lower in the exclusively heterosexual group (9.9%) than in each of the three other groups (range 13.0% to 26.2%).

Multivariate analyses—To determine the relative contribution of victimization to the risk of hazardous drinking we conducted a series of logistic regression models with exclusively heterosexual women as the reference group (Table 3). In Model 1, sexual orientation alone was entered to estimate the odds of reporting two or more hazardous drinking indicators. Relative to exclusively heterosexual women, each of the sexual minority groups had significantly higher odds of hazardous drinking. In Model 2, in which we added the demographic variables, younger age was highly predictive of hazardous drinking. Compared to women over 50 years old, those who were 18–29 had more than nine times the odds of hazardous drinking. Adding the demographic variables attenuated the odds ratios for sexual orientation in predicting hazardous drinking. Odds for the bisexual group were reduced from 4.0 to 2.5, suggesting that age is a particularly strong confounder in the relationship between bisexual identity and hazardous drinking.

In Model 3 we added the childhood victimization variables (demographic variables were included in this model and the two subsequent models but odds are not shown in order to highlight the abuse and sexual orientation predictors). Childhood abuse was strongly predictive of hazardous drinking: women who reported CPA were 50% more likely, and women who reported CSA were 80% more likely, than those with no childhood victimization to report hazardous drinking. The strength of the relationship between sexual orientation and hazardous drinking was also attenuated by the addition of the childhood victimization variables. Adult victimization, added in Model 4, was strongly predictive of hazardous drinking. The addition of adult victimization again attenuated the relationship between sexual orientation and hazardous drinking; only the relationship between sexual orientation and hazardous drinking for heterosexuals with same-sex partners remained significant.

We also tested an additional model of the relationship between revictimization (both childhood and adult victimization) that included all respondents for whom data were available ($n=10,486$); adult abuse was missing for respondents in NAS 2000. Results suggested that the combination of childhood and adult victimization further attenuates, but does not eliminate, the relationship of sexual orientation to hazardous drinking. All three sexual minority groups were significantly more likely to report two or more indicators of hazardous drinking (heterosexuals with same-sex partners: $OR=2.7$ [CI, 1.7, 4.3], $p<.001$; bisexuals: $OR=1.8$ [CI=1.0, 3.3], $p<.05$; lesbians: $OR=2.7$ [CI=1.1, 3.9], $p<.01$) even after demographic characteristics, childhood victimization and adult victimization were included in the model. When we ran this model excluding all respondents from NAS 2000, as in model 4 the odds ratios remain the same but differences did not reach significance for bisexuals and lesbians (data not shown). We also tested supplemental logistic regression models selecting for women with any abuse (adult or child) and selecting for women with no abuse (adult or child). Specifically, we confirmed that the odds of hazardous drinking remained significantly greater among both lesbians ($OR=4.9$, CI=2.4, 9.90) and bisexuals ($OR=3.9$, CI=1.7, 9.1) who reported no childhood or adult abuse experiences compared to exclusively heterosexual women with no abuse (data not shown).

Discussion

As expected, we found strong relationships between hazardous drinking and reports of childhood, adult, and lifetime victimization. Women who identified as lesbian or bisexual, and those who identified as heterosexual but reported same-sex partners, generally had

higher odds of hazardous drinking—even when demographic characteristics, childhood victimization and adult victimization were included in the multivariate model. Thus, we conclude that higher rates of victimization contribute to higher odds of hazardous drinking among sexual minority women but that there are likely additional factors, unmeasured in the current study, that mediate the relationship between sexual orientation and hazardous drinking.

The high rates of both hazardous drinking and lifetime victimization among sexual minority women compared to exclusively heterosexual women echo findings of two previous studies (Hughes, Szalacha et al., 2010; Hughes, McCabe et al., 2010). Hughes, Szalacha and colleagues found significantly higher rates of hazardous drinking, CSA, and revictimization in adulthood among sexual minority groups (mostly heterosexual, bisexual, mostly lesbian, and exclusively lesbian) compared to exclusively heterosexual women. It is possible that many of the women that we classified as heterosexual with same-sex partners in the current study would have identified as mostly heterosexual if that option had been available to them. Rates of victimization and hazardous drinking among mostly heterosexual women in the Hughes et al. (2010) study and among women in the current study were similar (and significantly higher) than among exclusively heterosexual women. For example, despite differences in methodologies used in our study (population-based telephone survey) and in Hughes, Szalacha et al.'s study (diverse community-based sample with face-to-face interviews), the percentages of women reporting no lifetime sexual abuse in the Hughes et al. study (62% exclusively heterosexual; 47% mostly heterosexual; 22% bisexual; 35% mostly lesbian and 34% exclusively lesbian) and in our study (58% exclusively heterosexual; 36% heterosexual identified reporting same-sex partners; 24% bisexual; 33% lesbian) were remarkably similar. Findings from the current study are also consistent with those from another U.S. national probability sample (Hughes, McCabe et al., 2010) that found elevated rates of lifetime victimization and substance use disorders among women who identify as lesbian or bisexual.

Adult victimization was strongly associated with hazardous drinking among women in the sample as a whole, which is consistent with other studies (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Lown, 2011; Smith, Homish, Leonard, & Cornelius, 2012). However, we also found that adult victimization attenuated the relationship between sexual orientation and hazardous drinking. Specifically, lesbian and bisexual women's risk for hazardous drinking remained elevated but were no longer significant in the model that included adult victimization. By contrast, Hughes, McCabe et al. (2010) found that lesbian identity was associated with past year alcohol abuse even in multivariate models that included adult victimization. Our findings should be interpreted with caution given that Model 4 included data from only two survey years. The lack of statistical significance in the relationships between victimization and hazardous drinking in some sexual orientation subgroups may be explained, in part, by small sample sizes.

Our findings were consistent with studies indicating that risk for hazardous drinking is particularly pronounced among bisexual women (Bostwick et al., 2007; McCabe et al., 2004; McCabe et al., 2005; Wilsnack et al., 2008). Although reasons for bisexual women's heightened risk remain unclear, researchers hypothesize vulnerability may be related to experiences of marginalization and lack of acceptance from both the heterosexual and lesbian/gay communities. In support of this hypothesis, one study found that bisexual identity was associated with disadvantages in social well-being, but that disadvantages in social well-being were mediated by community connectedness and positive identity valence (Kertzner, Meyer, Frost, & Stirratt, 2009). Similarly, Corliss, Austin, Roberts, and Molnar (2009) found that compared to women who identify as exclusively heterosexual those who identify as mostly heterosexual have less social support from both family and friends.

Strengths and limitations

Although combining data from three surveys substantially boosted the overall numbers of sexual minority women available for analysis and provided large enough subsample sizes to permit reliable statistical within group comparisons, the number of respondents reporting sexual minority identity or behavior in national population-based surveys such as the NAS is inevitably small. The percentage of respondents classified as sexual minorities in the current study is comparable to similar national population-based studies (Cochran, et. al, 2007; Hughes, McCabe et. al, 2010). Nevertheless, the sample size did not allow for a nuanced analysis of some questions of interest, such as the perpetrator of physical abuse (e.g., family members vs. peers, or adult non-relatives). Preliminary exploration of our data found that sexual minority women were more likely than heterosexual women to report victimization by multiple persons—a finding that is consistent with other research suggesting that sexual minority youth are at greater risk of both parental abuse and peer victimization (Friedman et al, 2011). However, additional research is needed to better understand the relationship between abuse characteristics and sexual orientation.

Unfortunately, questions about adult sexual or physical abuse were not included in the 2000 survey. Consequently, the sexual minority subgroup sample sizes in models that included adult victimization was somewhat smaller than in the models that included childhood victimization experiences (see Table 2, including footnotes). Our final model for lifetime victimization (data not shown) used censored data. That is, respondents who experienced childhood sexual abuse from all years were included but data were missing for respondents from the 2000 survey who may have experienced victimization only in adulthood. Given emerging evidence about the importance of multiple experiences of victimization and risk of hazardous drinking among sexual minorities (Descamps et al. 2000; Hughes, McCabe et al., 2010) as well as the paucity of population-based data examining these variables, we elected to report lifetime victimization findings. Even with missing data for adult victimization for the year 2000 survey respondents, the model for lifetime victimization found that both lifetime victimization and sexual minority status were significantly associated with hazardous drinking.

Other limitations of the study include the use of single questions for assessment of childhood sexual abuse, adult sexual abuse, and childhood sexual abuse. Two questions were used to assess adult physical abuse. The physical violence items for before and after age 18 were adapted from the Conflicts Tactic Scale (Straus, 1980), which typically uses multiple items. The sexual abuse measure that we used is a standard in the field and has been used in the epidemiological catchment area study (Sorenson et al, 1987). The National Alcohol Survey did not include multiple, behaviorally specific items to assess childhood or adult victimization, which may have led to under-reporting. Because the current study focused on associations between experiences of victimization and hazardous drinking, biases related to underreporting would be likely to support the null hypothesis. However, estimates of childhood and adult victimization in our study were generally comparable to a similar national population-based study (Hughes, McCabe et. al, 2010).

The 2010 cell phone sample used five dependence symptoms and nine consequence items (rather than nine dependence symptoms and eleven consequence items as used in non-cell phone sample). The current study used the shorter measures to include cell phone respondents, which resulted in somewhat lower estimates of dependence and problems. Despite the smaller numbers and use of more conservative measures, we were able to detect a number of significant differences between exclusively heterosexual and sexual minority groups.

It is also important to note that the identity and behavior questions used to construct the 4-category sexual orientation variable were based on different timeframes. Whereas the question about identity asked respondents how they *currently* identified (heterosexual, bisexual or lesbian), the sexual behavior question asked about gender of sexual partners in the *past five years*. Responses to the behavior question were used to classify women as 'heterosexual, with same-sex partners.' The number of women included in this category may have varied with a different timeframe (e.g., past year or lifetime). It is also not possible with the cross-sectional design to determine if, or how, identity changed over time. We also do not know whether respondents who identified as heterosexual but reported same-sex partners would have classified themselves as "mostly heterosexual" if given the option to do so. Given findings indicating higher risk of hazardous drinking among mostly heterosexual women in other studies (Hughes, Szalacha, & McNair, 2010; Wilsnack et al., 2008; Ziyadeh et al., 2007) it is important that researchers consider including mostly heterosexual as a response option in assessments of sexual identity.

Finally, methodological studies of the National Alcohol Survey, from which our study data were derived, found that interactive voice response, a computerized technique that allows respondents to interact directly with a computerized system, yielded higher rates of respondents identifying as homosexual and bisexual compared to Computer-Assisted Telephone Interviewing (CATI) mode (Midanik & Greenfield, 2010). However, differences in reporting sexual minority identity were significant only among respondents over the age of 40 years, suggesting that our data may underestimate the prevalence of sexual minority women in older age groups. Rates of alcohol-related problems, physical abuse, sexual abuse, or sexual behavior were not significantly different by mode of administration.

In spite of these limitations, this study is notable for its probability sampling design and the inclusion of relatively large numbers of sexual minority women in each of the sexual minority subgroups. Although a growing number of national probability studies have added questions about sexual orientation, many of these studies include very small numbers of sexual minority respondents. By combining data from three surveys, the numbers of lesbian and bisexual women exceed those of similarly identified respondents in most large national surveys.

Implications for Practice and Research

Findings from the current study underscore the importance of adopting approaches to treatment that are sensitive to the histories of victimization among sexual minority women. Recent research has documented the need for trauma-informed services and systems in treatment of substance use disorders and mental health issues among women (Fowler & Faulkner, 2011; Markoff, Reed, Fallot, Elliott, & Bjelajac, 2005) and the provision of services that are responsive to histories of trauma may be particularly salient for sexual minority women. Although psychological distress associated with victimization may be similar across sexual orientation groups, healthcare providers need to consider additional complexities that may be particularly relevant to sexual minorities such as ongoing traumatic stressors in the form of bias-related harassment, discrimination or rejection (Morris & Balsam, 2003; Szymanski & Balsam, 2012).

Although theories suggesting a causal link between CSA and sexual minority identity or behavior lack empirical evidence (Friedman et al., 2011; Wilson & Widom, 2010), sexual minority women recovering from history of violence may have to contend with the added stress of "cultural myths regarding the impact of abuse on sexual identity" (Morris & Balsam, 2003, p. 81). These myths may complicate the process of coming out or developing a stable positive sexual identity among sexual minority women who have experienced CSA (Baker, 2003; Robohm, Litzenberger, & Pearlman, 2003). Identity disturbance (e.g.,

unstable sense of self) appears to be related to alcohol problems among sexual minority women, and identity disturbance is impacted by childhood abuse (Talley, Tomko, Littlefield, Trull, & Sher, 2011).

Our findings also underscore the importance of developing prevention and intervention strategies tailored to better respond to risk for, and experiences of, victimization among sexual minority children. For example, there is growing evidence that gender non-conforming children may be at greater risk of victimization (Balsam et al., 2005; Corliss et al., 2002; Corliss, Cochran, Mays, Greenland, & Seeman, 2009; D'Augelli, Grossman, & Starks, 2006). Consequently, prevention efforts might target families and schools to reduce risk of violence among sexual minority and gender non-confirming children and youth. Future research may explore how experiences or perceived risk of discrimination and violence based on sexual orientation may impact recovery from childhood trauma or substance-use disorders and what sexual minority-related factors (such as gender role nonconformity, responses to coming out, social support) moderate or mediate the relationship between childhood abuse and different health outcomes.

Future research is needed to investigate the complexities of risk factors as well as factors that may mediate risk and build resiliency, such as development of positive identity, coping skills, social support, and community connection (Baker, 2003). Growing evidence for the importance of parental support in positive health outcomes, including alcohol and drug use among sexual minority youth (Bouris et al., 2010), point to the need for prevention and health services research that consider family support. Additional research exploring variations in risk and protective factors for hazardous drinking and drug use within the sexual minority population is also needed, including studies that examine differences by race/ethnicity and age cohort (Cochran, Mays, Ortega, Alegria, & Takeuchi, 2007; Hughes et al., 2006; McCabe et al., 2010). Future population-based studies might overcome limitations associated with small numbers of sexual minority respondents through over-sampling.

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Table 1

Drinking characteristics by NAS year and sexual orientation, inclusive of non-current drinkers.

	Exclusively heterosexual (n=10,723)	Heterosexual identity/ same sex partners (n=184)	Bisexual (n=140)	Lesbian (n=122)
<i>Categorical measures</i> ***	%	%	%	%
Drinking status				
Current drinker ^a	60.4	75.3	72.0	78.4
Ex-drinker	14.4	12.3	13.4	11.0
Never drinker	25.2	12.4	14.6	10.6
5+ Drinks on one occasion /past 12 mos ^a	12.9	35.3	35.4	33.5
2+ Drinks per day /past 12 months ^b	3.0	11.0	7.9	5.5
Intoxication /past 12 mos ^a	24.5	45.5	50.6	45.2
2+ Consequences /lifetime ^b	3.4	12.0	10.3	7.4
2+ Dependence symptoms /lifetime ^b	4.8	15.9	12.8	7.8
2+ Hazardous drinking Index ^a	14.3	39.4	40.4	36.3
<i>Continuous measures</i> ***	<i>x (se)</i>	<i>x (se)</i>	<i>x (se)</i>	<i>x (se)</i>
Past year volume ^a	99.9 (3.9)	259.0 (46.0)	252.8 (55.1)	245.2 (72.6)
# days 5+ drinking in past year ^b	4.0 (0.3)	14.3 (4.5)	18.6 (5.8)	13.8 (5.8)
Hazardous drinking index (range 0–5) ^a	0.5 (0.1)	1.2 (0.1)	1.2 (0.1)	0.9 (0.1)

*** all between group Chi square and ANOVA comparisons $p < 0.001$

^a $p < 0.05$ exclusively heterosexual group significantly lower than all other groups

^b $p < 0.05$ exclusively heterosexual group significantly lower than heterosexuals with same-sex partners and bisexuals

Table 2

Childhood abuse, adult victimization, and lifetime victimization by sexual orientation.

	Exclusively heterosexual (n=10,723)	Heterosexual identity/ same sex partners (n=184)	Bisexual (n=140)	Lesbian (n=122)
	%	%	%	%
Childhood abuse ***				
Any Childhood Abuse ^c	23.5	30.5	41.4	36.7
Childhood physical abuse ^c	18.3	24.5	35.5	31.1
Childhood sexual abuse ^a	10.6	18.0	25.5	23.0
4 category childhood abuse ***				
None	76.5	69.5	58.6	63.3
Physical only	12.9	12.5	16.0	13.8
Sexual only	5.2	6.1	6.0	5.6
Physical and sexual	5.4	11.9	19.5	17.4
Adult victimization *** &				
Any adult victimization ^a	31.3	54.1	63.1	55.8
Adult physical abuse ^a	27.7	46.8	57.9	51.9
Adult sexual abuse ^b	5.9	15.0	14.9	8.1
3 category Adult victimization *** &				
None	68.7	45.9	36.9	44.2
Physical only	25.4	39.1	48.2	47.7
Physical and sexual	5.9	15.0	14.9	8.1
Lifetime victimization ***				
None	66.3	54.6	38.7	46.6
Childhood only	13.5	16.0	15.3	13.9
Adulthood only	10.4	16.4	19.9	16.6
Childhood + adulthood	9.9	13.0	26.2	22.9

*** Chi square comparisons $p < 0.001$

& Adult victimization questions for NAS 2005 and NAS 2010 surveys only; n=6,705 heterosexual, n=101 heterosexual with same-sex partners, n=86 bisexual, n=81 lesbian

^a $p < 0.05$ exclusively heterosexual group significantly lower than all other groups

^b $p < 0.05$ exclusively heterosexual group significantly lower than heterosexuals with same-sex partners and bisexuals

^c $p < 0.05$ exclusively heterosexual group significantly lower than bisexual and lesbian groups

Table 3

Multivariate logistic regression models predicting a score of 2 or more on the hazardous drinking index, weighted.

	Model 1 (n=11,125)	Model 2 [^] (n=10,776)	Model 3 [^] (n=10,633)	Model 4 [^] & (n=6,879)
	OR _{crude}	OR _{adj}	OR _{adj}	OR _{adj}
	95% CI	95% CI	95% CI	95% CI
Demographics				
partnership status (ref=married/live with div/sep/wid)		1.6 **		
		1.3, 2.0		
never married		1.7 ***		
		1.4, 2.1		
Age (ref=50+)				
18–29		9.5 ***		
		7.3, 12.3		
30–49		5.0 ***		
		4.1, 6.2		
Race (ref=white)				
Black		0.3 ***		
		0.3, 0.5		
Hispanic		0.4 ***		
		0.3, 0.6		
Other		0.6 ***		
		0.4, 0.8		
Education (ref=LT college grad) college graduate+		1.5 ***		
		1.3, 1.8		
Childhood Abuse (ref=none)				
physical only			1.5 ***	1.2, 1.8
sexual only			1.8 ***	1.3, 2.5
physical+sexual			3.3 ***	2.5, 4.5
Adult victimization (ref=none)				
physical only				2.5 ***
physical+sexual				3.1 ***
Sexual orientation (ref=hetero)				

	Model 1 (n=11,125)		Model 2 [^] (n=10,776)		Model 3 [^] (n=10,633)		Model 4 [^] & (n=6,879)	
	<i>OR_{crude}</i>	95% CI	<i>OR_{adj}</i>	95% CI	<i>OR_{adj}</i>	95% CI	<i>OR_{adj}</i>	95% CI
Heterosexual/same-sex	3.8 ***	2.6, 5.6	3.2 ***	2.0, 4.9	2.9 ***	1.9, 4.6	3.3 ***	1.7, 6.1
Bisexual	4.0 ***	2.5, 6.4	2.5 ***	1.5, 4.1	2.0 ***	1.2, 3.4	2.0	0.9, 4.4
Lesbian	3.1 ***	1.8, 5.3	2.6 ***	1.5, 4.7	2.3 ***	1.2, 4.3	1.4	0.6, 2.7

[&] Model inclusive of NAS 2005 and NAS 2010 surveys only

[^] Model controls for partnership status, age, race, and education

* p<.05;

** p<0.01;

*** p<0.001