

Hazardous Drinking, Depression, and Anxiety Among Sexual-Minority Women: Self-Medication or Impaired Functioning?

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ABSTRACT. Objective: Sexual-minority women are at heightened risk for a number of mental health problems, including hazardous alcohol consumption, depression, and anxiety. We examined self-medication and impaired-functioning models of the associations among these variables and interpreted results within a life course framework that considered the unique social stressors experienced by sexual-minority women. **Method:** Data were from a sample of 384 women interviewed during the first two waves of the Chicago Health and Life Experiences of Women (CHLEW) study. **Results:** Covariance structure modeling revealed that

(a) consistent with a self-medication process, anxiety was prospectively associated with hazardous drinking and (b) consistent with an impaired-functioning process, hazardous drinking was prospectively associated with depression. **Conclusions:** Our findings support a life course perspective that interprets the mental health of adult sexual-minority women as influenced by adverse childhood experiences, age at drinking onset, first heterosexual intercourse, and first sexual identity disclosure, as well as by processes associated with self-medication and impaired functioning during adulthood. (*J. Stud. Alcohol Drugs*, 74, 565–575, 2013)

IN RECENT YEARS, there has been increased concern with the health of sexual-minority (lesbian, gay, bisexual) populations in the United States. In a follow-up to the 1999 report on lesbian health (Solarz, 1999), the Institute of Medicine recently released a more comprehensive report, *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding* (Institute of Medicine, 2011). This historic report emphasizes the unique health needs of sexual minorities and the limited understanding of these needs. Indeed, research over the past decade has produced compelling evidence of mental health disparities among sexual-minority women, including a heightened risk of hazardous drinking (Drabble et al., 2005; McCabe et al., 2009), depression, and anxiety (Bostwick et al., 2010; Cochran and Mays, 2009; King et al., 2008). However, little attention has been paid to the social and psychological processes underlying these disparities. Studies that address

these processes (Hughes et al., 2007; McCabe et al., 2010; Meyer, 2003) indicate that stress related to sexual-minority status plays an important role. In addition, recent research suggests that adverse childhood experiences, including childhood sexual and physical abuse, may help explain sexual-minority women's heightened risk of hazardous drinking and psychological distress (Balsam et al., 2010; Hughes et al., 2010a, 2010b).

Less understood are developmental characteristics that may influence the mental health of sexual minorities. Although most sexual minorities manage the process of identity development without serious consequences, the developmental stage at which this process occurs may function as a risk or protective factor for later negative mental health outcomes. In particular, coming out at a younger age may confer greater vulnerability to risky behaviors, such as earlier drinking onset (McCabe et al., 2013; Parks and Hughes, 2007). Indeed, studies have found that, compared with their heterosexual counterparts, sexual minorities report earlier ages at drinking onset (Corliss et al., 2008; S. C. Wilsnack et al., 2008) and first heterosexual intercourse (Blake et al., 2001; Saewyc et al., 1999).

Given the general reliance on cross-sectional research, the temporal nature and directional relationships of mental health processes among sexual-minority women have been largely unexplored. Evidence from general population

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samples, however, provides valuable insight. Available theories suggest that hazardous drinking may be a cause and a consequence of psychological distress. The forms of distress most commonly investigated are depression and anxiety—the most prevalent mental health conditions experienced by women (Satcher, 2000).

Alcohol use and depression

The association between alcohol use and depression is well documented and has been demonstrated to be stronger among women than men (Fleming et al., 2008; Grant and Harford, 1995). Historically, the most common explanation has been the self-medication hypothesis, which suggests that individuals use alcohol to self-medicate in an effort to alleviate depressive symptoms—placing them at increased risk for hazardous drinking (Graham et al., 2007; Peirce et al., 2000). Consistent with the social learning theory perspective, alcohol use in this context is interpreted as a coping mechanism that is invoked when other strategies have failed or are unavailable (Cooper et al., 1992; Holahan et al., 2001). Several longitudinal studies have found evidence consistent with the self-medication model (Moscato et al., 1997; Peirce et al., 2000; Repetto et al., 2004).

Hazardous drinking can also increase depressive symptoms (Jané-Llopis and Matytsina, 2006; Rao et al., 2000). The impaired-functioning model suggests that heavy drinking inhibits effective social functioning, which can harm personal relationships, threaten employment, and increase risk of accidents and vulnerability to victimization—all of which may serve as pathways to depression (Abraham and Fava, 1999; Newcomb et al., 1999). Physiological mechanisms also may contribute to this relationship, as depression may be a consequence of the toxic effects of alcohol on neurological functioning (Kuo et al., 2006; Merikangas et al., 1996; Stice et al., 2004) or the activation, via heavy alcohol use, of genetic markers associated with depression (Fergusson et al., 2008). Several investigators have reported prospective evidence supporting the impaired-functioning hypothesis of depression and alcohol use over the self-medication hypothesis (Fergusson et al., 2009; Rao et al., 2000; Rohde et al., 2001; Schutte et al., 1997; Stice et al., 2004).

Self-medication and impaired-functioning models are not mutually exclusive; alcohol consumption and depression can reinforce one another. Findings from several longitudinal studies suggest a transactional association between heavy alcohol use and depression in which each condition prospectively exacerbates the other (Gilman and Abraham, 2001; Locke and Newcomb, 2001; Marmorstein, 2009; Windle and Miller, 1990). Although a handful of researchers have found no evidence of a prospective association between the two (Fleming et al., 2008), with few exceptions (Kaplow et al., 2001) this research has not considered other forms of psychological distress, particularly anxiety, which is also

known to be associated with hazardous drinking (Kushner et al., 1999; Regier et al., 1998).

Alcohol use and anxiety

Similar to associations between alcohol use and depression, co-occurring anxiety and hazardous drinking are more common among women (Grant et al., 2009; Merikangas et al., 1996) and are also often interpreted within a self-medication perspective (Buckner et al., 2008; Crum and Pratt, 2001; Zimmermann et al., 2003). Most longitudinal evidence regarding the association between anxiety and hazardous drinking supports this perspective (Buckner et al., 2008; Cheng et al., 2004; Crum and Pratt, 2001; Goodwin et al., 2004; Kaplow et al., 2001; Schmidt et al., 2007; Zimmermann et al., 2003).

Consistent with the impaired-functioning model, symptoms of anxiety also may be a consequence of the many social and health-related problems associated with hazardous drinking. At least one prospective study has found a reciprocal relationship between anxiety and alcohol use disorders (Kushner et al., 1999), but there is less evidence of a prospective effect of alcohol use on anxiety (Jané-Llopis and Matytsina, 2006).

A life course perspective

Although a substantial body of research is now available, it rarely addresses the developmental processes and associated mental health outcomes of sexual-minority women. This is due in part to the lack of longitudinal studies of sexual-minority women's health. This general absence of empirical evidence has been paralleled by insufficient development of theoretical models of these processes (Meyer, 2003). Here, we offer a life course conceptualization of the development of depression, anxiety, and hazardous drinking among adult sexual-minority women.

Adverse childhood experiences, such as childhood sexual abuse or having a parent with alcohol-related problems, are known to place individuals at risk for early onset of alcohol use and heterosexual intercourse (Dube et al., 2006; Hillis et al., 2001; Hughes et al., 2007). These early experiences increase risk of hazardous drinking (Hingson et al., 2006; Pitkänen et al., 2005) and negative mental health consequences, such as depression and anxiety.

For sexual-minority women, an additional risk factor is the process of sexual identity formation. The formation and disclosure of a nonheterosexual sexual identity are often powerfully stressful experiences associated with social stigma, parental and peer rejection, social and workplace discrimination, victimization, and psychological distress (Ryan et al., 2010; Weiss and Hope, 2011). Consistent with general population findings that have linked anxiety and later onset of first heterosexual intercourse (Capaldi et al., 1996;

Zimmer-Gembeck and Helfand, 2008), anxiety and fear of rejection may prevent or delay disclosure of minority sexual identity (D'Augelli et al., 2010). Delayed or limited disclosure of sexual identity may consequently result in increased anxiety (Jordan and Deluty, 1998). In addition, experiences of discrimination and rejection associated with disclosure may lead to the development of depression, anxiety, and self-medication with alcohol. The impaired functioning associated with hazardous drinking may then contribute to increases in both anxiety and depression.

This life course perspective suggests developmental pathways that represent both general psychosocial processes and experiences that are unique to sexual minorities. In the research reported here, we used longitudinal data to investigate aspects of these developmental processes in a diverse sample of adult sexual-minority women. Available research led us to hypothesize that, among sexual-minority women: (1) adverse childhood experiences (childhood sexual abuse and parental drinking problems) are associated with earlier drinking onset and earlier first heterosexual intercourse (first sex); (2) earlier age at sexual orientation disclosure, earlier drinking onset, and earlier first sex are associated with higher levels of depression and hazardous drinking; (3) later age at sexual orientation disclosure, later drinking onset, and later first sex are associated with higher levels of anxiety; (4) higher levels of anxiety and depression are associated with higher levels of subsequent hazardous drinking, consistent with the self-medication model; and (5) higher levels of hazardous drinking are associated with higher levels of subsequent anxiety and depression, consistent with the impaired-functioning model. In exploring these hypotheses, we began to address the gaps in knowledge related to lesbian, gay, bisexual, and transgender health identified by the Institute of Medicine (2011; Solarz, 1999) and by the U.S. government (U.S. Department of Health and Human Services, 2010).

Method

Sample recruitment and retention

Data are from the Chicago Health and Life Experiences of Women (CHLEW) study, a longitudinal project focusing on risk and protective factors for hazardous drinking among sexual-minority women. Sampling methods in the CHLEW study were designed to minimize limitations and maximize the strengths of volunteer samples. To minimize systematic bias and increase sample diversity, we used a variety of recruitment methods. Multiple recruitment sources included clusters of social (e.g., formal community-based organizations and informal social groups) and individual social networks, including those of women who participated in the study. The study was advertised in local newspapers and on flyers posted in churches and bookstores and distributed to individuals and organizations via formal and informal social

events and networks. We especially targeted women who had been underrepresented in studies of lesbian health, including women of color, older lesbians, and lesbians of lower socioeconomic status. Eligible participants self-identified as lesbian, were 18 or older, spoke English, and resided in Chicago or surrounding suburbs. All participants provided written consent. The study protocol was approved by the University of Illinois Institution Review Board.

Both Wave 1 (2000–2001) and Wave 2 (2004–2005) data were collected in face-to-face interviews conducted by trained interviewers. Interviews lasted 1–2 hours. In Wave 1, 447 women were recruited and interviewed. Wave 2 interviews were conducted with 384 women—a response rate of 85.9% (87.9% of respondents who were still living and able to participate). Lost to follow-up were 33 (7.4%) women who could not be located, 10 (2.2%) who were deceased, 10 (2.2%) who refused, and 9 (2.0%) who were located but were unable to participate. One participant transitioned from female to male gender. Nonresponse rates were examined relative to all major drinking variables and seven demographic variables (age, race/ethnicity, education, income, employment status, relationship status, and having children living at home). We fit a logistic regression model to examine possible predictors of attrition. The only significant predictor of attrition was less than a high school education (odds ratio = 3.39, 95% CI [1.12, 10.2], $p = .03$).

In Wave 1, respondents were screened for eligibility with the question, “Understanding that sexual identity is only one part of your identity, do you consider yourself to be lesbian, bisexual, heterosexual, transgender, or something else?” Although the screening interview selected only women who self-identified as lesbians, in the main interview 11 women identified as bisexual, one as “queer,” and another refused to be labeled. In Wave 2, nearly twice as many women identified as bisexual ($n = 21$); 83 identified as mostly lesbian, 266 as lesbian, 7 as mostly heterosexual, 2 as heterosexual, and 5 as queer or something else (another label or “preferred not to be labeled”).

Survey questionnaires

The Wave 1 questionnaire was adapted from the National Study of Health and Life Experiences of Women (NSHLEW), a national study of women in the general population (R. W. Wilsnack et al., 2006; S. C. Wilsnack et al., 1991), to which we added additional questions about sexual orientation and sexual identity development milestones. The Wave 2 survey used measures of drinking behavior and drinking consequences identical to those in Wave 1.

Measures

Hazardous drinking. We constructed a latent measure of hazardous drinking that combined indicators of heavier

drinking and adverse consequences of drinking. We chose to use this combination of indicators because our longitudinal model included three outcome variables at each wave; separate variables for alcohol consumption and adverse consequences would have increased the number of model parameters to be estimated. In addition, because the community-based sample in the study had a relatively low prevalence of diagnosable alcohol use disorders, we preferred to use a composite measure of risky or hazardous drinking (heavier consumption and some adverse consequences) rather than diagnostic measures of alcohol abuse and dependence.

Two dichotomous indicators of hazardous drinking were heavy episodic drinking (one or more occasions of drinking six or more drinks in a day) and subjective intoxication (one or more occasions of having consumed “enough to feel drunk—that is, where drinking noticeably affected your thinking, talking, and behavior”)—based on past-12-month reports at each interview. The two other indicators were adverse drinking consequences (e.g., driving while drunk or high from alcohol, complaints about respondent’s drinking by her partner; range: 0–8) and symptoms of potential alcohol dependence (e.g., memory lapses [blackouts], inability to stop or reduce alcohol consumption over time; range: 0–5). Both measures were drawn from national drinking surveys (Calahan, 1970; Polich and Orvis, 1979) and were selected based on their prevalence in pretests of the NSHLEW.

Respondents were first asked whether they had ever experienced each of these problems. Those who answered affirmatively were then asked whether these experiences had occurred in the previous 12 months (for respondents who reported any drinking during these time frames). For both Waves 1 and 2, these measures were dichotomized (any vs. no adverse drinking consequences and any vs. no potential alcohol-dependence symptoms in the past 12 months). The KR-20 reliability coefficients for these indicators were 0.77 and 0.80 at Waves 1 and 2, respectively.

Depression. Depressive symptoms were measured using questions from the National Institute of Mental Health Diagnostic Interview Schedule (Robins et al., 1981). Respondents were asked about experiences of nine specific symptoms (e.g., decreased appetite, problems with sleeping, tired all the time, felt worthless) during their lifetime (at Wave 1) and since the last interview (at Wave 2). KR-20 reliability coefficients were 0.83 (at Wave 1) and 0.87 (at Wave 2).

Anxiety. Six indicators were used to represent anxiety. Each was assessed using a 5-point Likert-type response format. The six items (e.g., worries a lot, can be tense, gets nervous easily) were adapted from the neuroticism scale of the Eysenck Personality Questionnaire (Eysenck and Eysenck, 1991). At each wave, respondents were asked about their current experience. Cronbach’s α for these indicators were .80 and .78, respectively, at Waves 1 and 2.

Parental drinking problems. A respondent’s perceptions of whether her father and/or mother had experienced drinking

problems during the time she was growing up were assessed by asking, “Did your [father/mother] ever have any problems due to [his/her] drinking, such as marriage or family problems, problems with the law, problems with work or health—any kind of problems related to [his/her] drinking?” Responses were coded as *no parent* (0), *one parent* (1), or *both parents* (2) with drinking problems.

Childhood sexual abuse. We used a measure of self-perceived childhood sexual abuse. Respondents were asked, “Do you feel that you were sexually abused when you were growing up?” after a series of in-depth questions about childhood sexual experiences (S. C. Wilsnack et al., 1997, 2004). These questions inquired about a range of sexual experiences before age 18 that were used to classify women’s experiences based on Wyatt’s (1985) definitions of intrafamilial and extrafamilial childhood sexual abuse. We used a single self-perception question in the current analyses because 14% ($n = 53$) of the cases had insufficient information to classify them according to Wyatt’s criteria and because Wyatt’s definition likely captures some experiences considered consensual by the respondent. All of the women classified based on Wyatt’s criteria also reported self-perceived childhood sexual abuse.

Age at drinking onset. Age at drinking onset was assessed using the question, “How old were you when you began to drink alcoholic beverages (more than just a sip), even if you were under age?” Responses were categorized as 10 years or younger, 11–12, 13–14, 15–16, 17–18, 19–20, and 21 years or older.

Age at first consensual heterosexual sexual intercourse. Age at first heterosexual intercourse (age at first sex) was categorized as 11–12, 13–14, 15–16, 17–18, 19–20, and 21 years or older.

Age at first disclosure of sexual orientation. To assess this sexual identity development milestone, respondents were asked, “How old were you when you first told someone you were lesbian/gay?” For these analyses, responses were categorized as 6–12, 13–16, 17–20, 21–24, 25–28, 29–32, and 33 years or older.

Race/ethnicity. Respondents were classified as White (1) versus non-White (0).

Age. Respondent age at baseline interview was measured in years. Frequency distributions or means for all study variables are presented in Table 1.

Analysis

We tested our hypotheses with covariance structure models using the mean and variance adjusted weighted least-squares method of estimation (Hayduk, 1987). A key advantage of covariance structure modeling is that it can be used to construct latent variable measures and to conduct path analyses simultaneously. The path analytic or structural component is appropriate for analyzing and describing time-

TABLE 1. Means and frequencies of study variables ($N = 384$)

Variable	Wave 1		Wave 2	
	<i>n</i>	% or <i>M (SD)</i>	<i>n</i>	% or <i>M (SD)</i>
Hazardous drinking indicators ^a				
(all indicators range: 0–1)				
Any drinking problem consequences	82	21.4%	96	25.0%
Any alcohol dependence symptoms	87	22.7%	95	24.7%
Any heavy episodic drinking	98	25.5%	96	25.0%
Intoxication	210	54.7%	186	48.4%
Depression indicators ^b				
(all indicators range: 0–1)				
Felt sad/blue	276	71.9%	220	57.3%
Lost appetite	190	49.5%	126	32.8%
Trouble sleeping	262	68.2%	233	60.7%
Tired out all the time	268	69.8%	231	60.2%
Moving all the time	116	30.2%	72	18.8%
Talked/moved slowly	142	37.0%	133	34.6%
Lost interest in sex	252	65.6%	217	56.5%
Felt worthless	213	55.5%	124	32.3%
Thinking was harder	216	56.3%	175	45.6%
Anxiety indicators ^c				
(all indicators range: 1–5)				
Relaxed, handles stress well (reversed)	384	2.8 (1.3)	384	2.5 (1.2)
Remains calm in tense situations (reversed)	384	2.2 (1.1)	384	2.1 (1.1)
Emotionally stable (reversed)	383	2.3 (1.2)	384	2.1 (1.1)
Nervous easily	384	2.9 (1.3)	384	2.7 (1.3)
Tense	384	3.5 (1.2)	384	3.3 (1.2)
Worries a lot	384	3.6 (1.3)	384	3.3 (1.3)
Self-perceived childhood sexual abuse	124	32.3		
Parental drinking problems	134	34.9		
Age at drinking onset (range: 0–6)				
≤10 years	13	3.4%		
11–12 years	28	7.3%		
13–14 years	52	13.5%		
15–16 years	96	25.0%		
17–18 years	85	22.1%		
19–20 years	42	10.9%		
≥21 years	68	17.7%		
Age at first sexual intercourse (range: 0–6)				
11–12 years	7	1.8%		
13–14 years	25	6.5%		
15–16 years	45	11.7%		
17–18 years	86	22.4%		
19–20 years	70	18.2%		
≥21 years	149	38.8%		
Age first disclosed sexual orientation (range: 0–6)				
6–12 years	8	2.1%		
13–16 years	43	11.2%		
17–20 years	117	30.5%		
21–24 years	74	19.3%		
25–28 years	49	12.8%		
29–32 years	38	9.9%		
33–40 years	32	8.3%		
Race (White = 1)	192	50.0%		
Age in years (range: 18–83)	384	37.9 (11.8)		

^aHazardous drinking questions asked about past year experiences at Wave 1 and at Wave 2 interviews;

^bdepression questions asked about lifetime experiences at Wave 1 interview and about experiences “since last interview” at Wave 2 interview; ^canxiety questions asked about current experiences at Wave 1 and at Wave 2 interviews.

ordered relationships among multiple variables in a single model. It also permits estimation of direct and indirect effects of the independent variables.

We estimated a path model that examined the effects of adverse childhood experiences on age-at-onset measures (first alcohol use, sexual intercourse, and sexual orientation

disclosure) and subsequent effects of these experiences on hazardous drinking, anxiety, and depression. We also examined the longitudinal effects of hazardous drinking, anxiety, and depression on one another. All models were estimated using unweighted data with Mplus 6.0 (Muthén and Muthén, 1998).

Results

Description of sample

At baseline, the 447 women in the study ranged in age from 18 to 83 years ($M = 37.5$, $SD = 11.7$). Fewer than half (47%) identified as non-Hispanic White, 28% were Black non-Hispanic, 20% were Hispanic/Latina, and 5% were Asian/Pacific Islander, Native American, or multiracial. Comparisons of respondents' race/ethnicity with 2000 census data indicated that the sample closely reflected the distribution of the population in Cook County, Illinois, where the large majority of CHLEW respondents lived. In contrast to the general Cook County population, but similar to other lesbian samples, the respondents were well educated; 56% had a bachelor's degree or higher. The majority of respondents worked full time at one (54%) or multiple jobs (14%). Eleven percent worked part time, and 20% were not employed. One fourth had annual household incomes of less than \$20,000, whereas 21% had incomes of \$75,000 or more. Most (67%) respondents were in a committed relationship with a female partner. Nearly one third had one or more children, and 19% had at least one child younger than age 18 living with them.

Measurement model

The measurement model used to construct latent measures of hazardous drinking, depression, and anxiety for each wave is presented in Table 2. Each of the four observed indicators of any past-year alcohol-problem consequences, alcohol-dependence symptoms, intoxication, and heavy episodic drinking loaded significantly on the hazardous drinking latent construct at each wave.

Latent measures of depression and anxiety also were successfully developed. All factor loadings and correlated error terms for Waves 1 and 2 assessments of each indicator were constrained to be equal. All indicators loaded significantly on their respective latent measures at Waves 1 and 2. The overall measurement model was evaluated simultaneously with the structural model.

Structural model

A structural model was estimated to simultaneously assess each hypothesis. This model examined relationships among childhood experiences, adolescent experiences, and the hazardous drinking, depression, and anxiety latent measures assessed at two points in time. Nonsignificant paths were trimmed, resulting in the final model presented in Figure 1. Overall fit measures suggested a close fit between the specified model and the data, $\chi^2(188) = 336.7$, $p < .0001$; $\chi^2/df = 1.79$; root mean square error of approximation = .05; comparative fit index = .94; Tucker-Lewis index = .96. Although not depicted, autocorrelated errors between Wave 1

TABLE 2. Factor loadings of indicators of latent constructs: Standardized coefficients

Variable	Wave 1	Wave 2
Hazardous drinking		
Any heavy episodic drinking	.841	.840
Any intoxication	.923	.922
Any drinking problem consequences	.873	.872
Any alcohol-dependence symptoms	.854	.853
Depression		
Felt sad/blue	.899	.909
Lost appetite	.681	.702
Trouble sleeping	.743	.762
Tired out all the time	.810	.825
Moving all the time	.587	.610
Talked/moved slow	.763	.781
Lost interest in sex	.518	.540
Felt worthless	.808	.824
Thinking was harder	.795	.811
Anxiety		
Nervousness or anxiety interfered with your everyday life or activities	.656	.643
Relaxed, handles stress well (reversed)	.716	.705
Remains calm in tense situations (reversed)	.611	.599
Emotionally stable (reversed)	.658	.645
Nervous easily	.649	.637
Tense	.584	.571
Worries a lot	.646	.634

Notes: This measurement part of the model was simultaneously fitted with the structural part of the model. Autocorrelated errors (not shown) between Wave 1 and Wave 2 measures were specified to account for within-subject clustering.

and 2 measures of each construct were specified to account for within-subject clustering.

Consistent with Hypothesis 1, women who reported parental drinking problems were more likely to report earlier drinking onset. Contrary to Hypothesis 1, childhood sexual abuse was not associated with any of the age-at-onset measures. Race was associated with age at first heterosexual sexual intercourse (White women were older when they first had sexual intercourse). Earlier age at drinking onset was also associated with earlier age at first sex. Older women in the sample first disclosed their minority sexual orientation at a later age.

Two age-at-onset measures were independently associated with hazardous drinking at Wave 1. Consistent with Hypothesis 2, levels of hazardous drinking were higher among women who reported earlier drinking onset and those who reported earlier age at first heterosexual sex. In addition, younger women reported higher levels of hazardous drinking at Wave 1.

In contrast, none of the age-at-onset measures were significantly associated with depression at Wave 1. Only childhood sexual abuse was independently associated with Wave 1 depression, suggesting that childhood sexual abuse directly influences adult depression, independent of any mediating processes. Thus, Hypothesis 2 was not supported for depression.

Consistent with Hypothesis 3, several age-at-onset measures were associated with Wave 1 anxiety. Later age at first sexual intercourse and later age at first sexual orientation

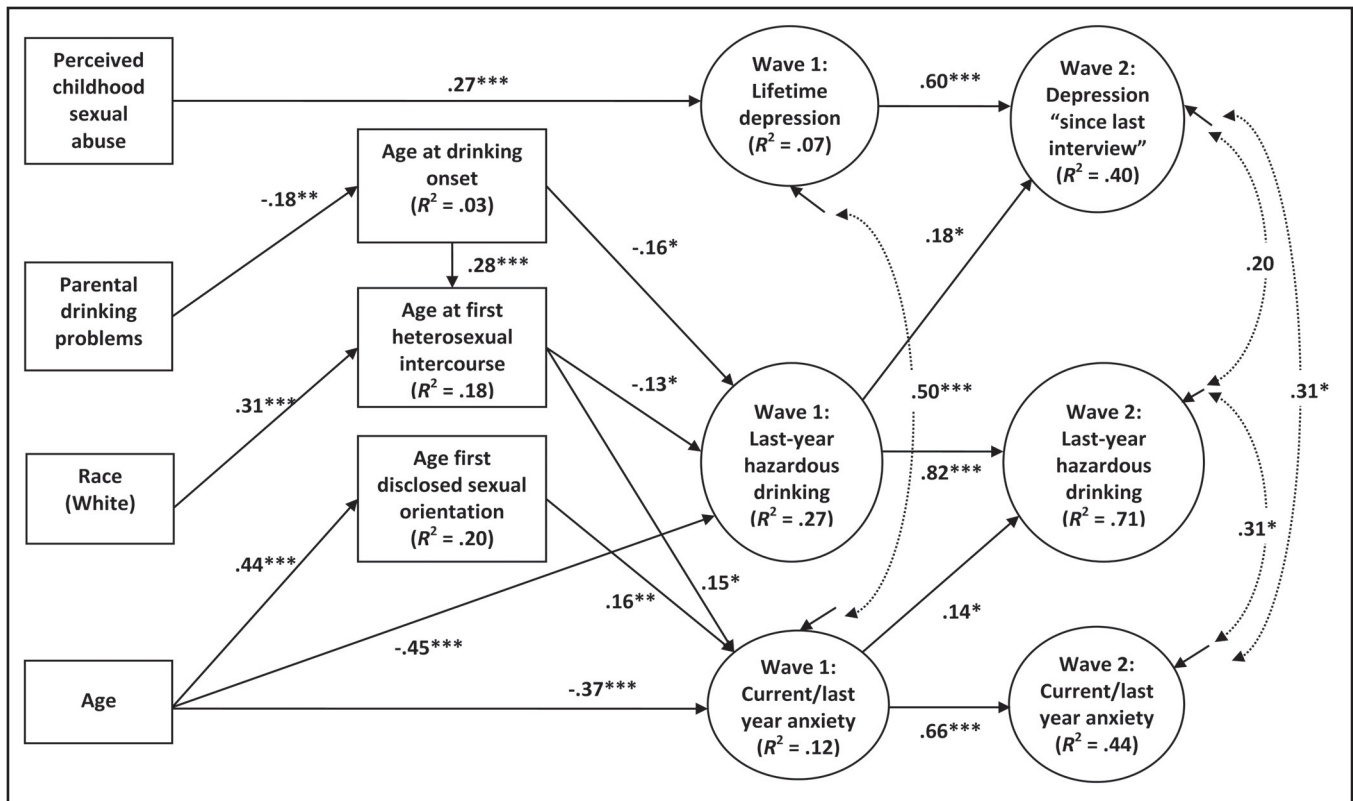


FIGURE 1. Longitudinal predictors of hazardous drinking, depression, and anxiety: Standardized coefficients. Model fit $\chi^2(188) = 336.7, p < .0001$; $\chi^2/df = 1.79$; root mean square error of approximation = .05; comparative fit index = .94; Tucker-Lewis index = .96.

* $p < .05$; ** $p < .01$; *** $p < .001$ (nondirectional).

disclosure were each independently associated with greater levels of anxiety. In addition, older sexual-minority women reported lower levels of anxiety.

Level of anxiety at Wave 1 was positively associated with hazardous drinking at Wave 2, controlling for Wave 1 hazardous drinking, a prospective association supportive of a self-medication process (Hypothesis 4). A similar process was not observed with depression, as Wave 1 depression levels were not associated with Wave 2 hazardous drinking.

The impaired-functioning model (Hypothesis 5) was partially supported. Wave 1 hazardous drinking levels were associated with Wave 2 levels of depression, after controlling for baseline depression. Wave 1 hazardous drinking was not associated with Wave 2 anxiety. Hence, among sexual-minority women in this sample, prospective analyses suggested that symptoms of anxiety may lead to self-medication via hazardous drinking, and hazardous drinking may be associated with impaired functioning and heightened risk of depression.

Discussion

Although research has demonstrated that sexual-minority women are at heightened risk for hazardous drinking and psychological distress, relatively little is known about the

social and behavioral processes associated with these risks. We examined a theoretical model of potential precursors of negative mental health in this population. Taken as a whole, findings support a life course perspective that interprets the mental health of adult sexual-minority women as being associated with adverse childhood experiences (Hypothesis 1), the timing of drinking onset, first heterosexual intercourse, and first sexual identity disclosure (Hypotheses 2 and 3), as well as processes associated with self-medication and impaired functioning during adulthood (Hypotheses 4 and 5, respectively).

In support of Hypothesis 1, having parents with drinking problems was independently associated with earlier age at drinking onset. This finding is consistent with findings from both general population (Dube et al., 2006) and sexual-minority (McCabe et al., 2013) literature. This may reflect social modeling of adult behavior (Latendresse et al., 2008) and/or familial/genetic vulnerability (Cotton, 1979). Age at drinking onset, in turn, appears to mediate the association between parental drinking problems and first heterosexual intercourse, providing additional evidence of how adverse childhood experiences may contribute to earlier initiation of behaviors that place adolescents at risk for negative social and health outcomes.

Adverse childhood experiences were neither directly nor indirectly associated with age at first sexual orientation disclosure. Only respondents' baseline age was associated with age at disclosure. Younger women in the sample tended to disclose earlier, which may reflect the growing visibility and social acceptance of sexual minorities.

Childhood sexual abuse was not associated with any age-at-onset measure. As in prior research with general population (Dube et al., 2005) and sexual-minority women (Hughes et al., 2007) samples, childhood sexual abuse did have a direct effect on depression. The processes believed to underlie this relationship include long-lasting trauma-induced increases in sensitivity to the depressogenic effects of stressful life events (Kendler et al., 2004), impairment of intimate relationships by adverse psychological effects of childhood sexual abuse (e.g., anger, distrust, low self-esteem, sexual problems) with resulting social isolation and depression (Covington and Surrey, 1997), and pervasive neurodevelopmental effects of chronic sexual abuse, resulting in multiple adverse mental health outcomes, including depression (van der Kolk et al., 1996).

Earlier ages at drinking onset and first sex were associated with hazardous drinking, a finding supporting Hypothesis 2 and consistent with existing research (Mason et al., 2010). Earlier age at drinking onset is believed to increase risk of developing problematic drinking by increasing the period of drinking during adolescence and young adulthood when individuals are most vulnerable (Dube et al., 2006). Our findings suggest that age at drinking onset has a direct effect on hazardous drinking, as well as an indirect effect via increasing the likelihood of early sex (Fergusson and Lynskey, 1996). These developmental milestones, however, were not found to be predictive of baseline depression.

Hypothesis 3 posited that age-at-onset developmental markers would be associated with anxiety, such that sexual-minority women who reported higher levels of anxiety would also report later ages for these developmental milestones. This hypothesis was partially supported, as sexual-minority women who reported greater anxiety levels were older at first consensual heterosexual intercourse and sexual identity disclosure.

It is not surprising that anxiety was associated with delays both in initiating heterosexual relationships and in disclosing minority sexual identity. Studies have found that family and other social pressures to enter into heterosexual relationships, to marry, and to have children are major stressors for many sexual-minority women (Greene, 1994; Morris et al., 2002). Attempting to balance adherence to heterosexual societal norms and a minority sexual identity by delaying or avoiding heterosexual sexual relationships and delaying sexual identity disclosure may be both a cause and a consequence of anxiety symptoms (Jordan and Deluty, 1998). Unfortunately, our data cannot resolve the temporal/causal ordering between anxiety and these developmental mile-

stones. Examining these relationships should be a goal of future inquiry.

Wave 1 anxiety level was positively associated with Wave 2 level of hazardous drinking, a finding supportive of the self-medication model (Hypothesis 4). However, Wave 1 depression was not associated with Wave 2 hazardous drinking. This finding is consistent with results from a national study of young (ages 18–25 years) sexual-minority women (Kaysen et al., 2012) but inconsistent with studies of the women in the general population, which have documented a prospective association between depression and subsequent drinking behavior (McCarty et al., 2009; Moscato et al., 1997; Schutte, et al., 1997; Wang and Patten, 2001). It is notable, however, that these studies did not control for the effects of anxiety.

We also found only partial support for the impaired-functioning model (Hypothesis 5) in that Wave 1 hazardous drinking was associated with Wave 2 depression but not Wave 2 anxiety levels. These findings are consistent with prior research suggesting that hazardous drinking is prospectively more strongly associated with depression than anxiety (Jané-Llopis and Matysina, 2006). Overall, our results suggest that self-medication via hazardous drinking may be a strategy for coping with anxiety among sexual-minority women and that depression is the more common consequence of this strategy.

Our findings also suggest that heightened risk of hazardous drinking can be explained, at least in part, by sexual-minority women's attempts to cope with anxiety resulting from social stress, stigma, rejection, and discrimination associated with minority sexual identity and the social pressures of navigating heterocentric social environments. The finding that hazardous drinking was not prospectively associated with anxiety suggests that efforts to self-medicate symptoms of anxiety may be, in part, successful. The prospective relationship between hazardous drinking and subsequent depression does, however, provide evidence that conforms to an impaired-functioning model. It seems reasonable that any of the health, social, and economic costs of hazardous drinking may increase risk of depression.

Limitations and strengths

It is important to note that more than one possible model can be estimated in covariance structure modeling. Thus, there is no guarantee that the model presented reflects the most appropriate representation of these data. However, the model is rooted in theory and provides a scientifically plausible depiction of the social behavioral processes in the development of hazardous drinking in this high-risk population.

The study sample was recruited using nonprobability methods. The sampling strategy, however, was carefully designed and executed to ensure recruitment of a diverse sam-

ple of this difficult-to-find population, an approach deemed necessary given the prohibitive costs of using probability sampling to recruit sexual-minority participants. In addition, although we have demonstrated theoretically derived, temporal associations among several variables, we cannot establish causality using these data. Indeed, the complexity of the processes examined and the range of other potential social, psychological, and health-related mediators or moderators preclude the possibility of definitively identifying causal mechanisms. The time frames used to measure hazardous drinking, anxiety, and depression were not fully consistent with one another in the two waves of data collection. There may have also been unmeasured events between Waves 1 and 2. Additional concerns related to measurement quality include reliance on retrospective self-reports, a strategy known to be associated with measurement error; reliance on subjective indicators of childhood sexual abuse; and use of depression and anxiety measures that do not reflect strict criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (American Psychiatric Association, 1994).

Although these limitations are important to consider, we also emphasize strengths of the study. Most notable is the study design. Our analyses used one of the few currently available longitudinal data sets related to sexual-minority women's health. The data were collected using rigorous survey procedures that included high-quality face-to-face interviews and careful follow-up procedures that successfully minimized attrition across waves. This study goes beyond the previous modest research literature that has focused on descriptive reporting of prevalence by investigating an integrated set of research hypotheses designed to elucidate the social and behavioral processes associated with the alcohol use and mental health of adult sexual-minority women.

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