

Protective Behavioral Strategies as a Mediator of the Generalized Anxiety and Alcohol Use Relationship Among Lesbian and Bisexual Women

DANA M. LITT, PH.D.,^{a,*} MELISSA A. LEWIS, PH.D.,^a JESSICA A. BLAYNEY, B.A.,^a AND DEBRA L. KAYSEN, PH.D.^a

^a*Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, Washington*

ABSTRACT. Objective: Alcohol use disorders and anxiety disorders often co-occur; moreover, lesbian and bisexual women appear at higher risk for both alcohol and anxiety disorders. Although research among college student samples has found direct effects of increased use of protective behavioral strategies on decreasing alcohol use and alcohol-related negative consequences, this has yet to be demonstrated among lesbian and bisexual women. Furthermore, it is unclear whether generalized anxiety influences the use of such strategies, which in turn predict alcohol consumption and related negative consequences. The primary objective of the present study was to examine the mediating role of protective behavioral strategies on the relationships between generalized anxiety and alcohol consumption and related negative consequences among a young adult sample of lesbian and bisexual women. **Method:** A national sample of 1,083 lesbian and bisexual women between the

ages of 18 and 25 years completed an online survey that assessed the constructs of interest. **Results:** Results showed support for mediation such that lesbian and bisexual women who reported having higher levels of generalized anxiety were less likely to use drinking protective behavioral strategies, which in turn led to higher levels of alcohol consumption as well as negative alcohol-related consequences. **Conclusions:** These findings highlight the importance of examining who is at risk for alcohol use disorders as well as why they are at risk. Results indicate that interventions for high-risk drinking among younger lesbian and bisexual women may need to specifically address factors such as affect management or coping with anxiety, at least for the proportion of women who are endorsing significant symptoms of anxiety. (*J. Stud. Alcohol Drugs*, 74, 168–174, 2013)

GENERALIZED ANXIETY DISORDER (GAD) is a chronic, disabling disorder marked by a pattern of frequent, constant worry and anxiety over many different activities and events and is associated with substantial personal, societal, and economic costs (Ballenger et al., 2001; Wittchen, 2002). One recent estimate from a nationally representative adult sample found that past-year and lifetime estimates of GAD (based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* [American Psychiatric Association, 1994]) were 2.1% and 4.1% (Grant et al., 2005). Other studies have found that past-year prevalence in a national sample of young adults was 3.1%, with roughly 76% of reported cases being moderate to severe (Kessler et al., 2006). Additionally, several studies have found that GAD is strongly associated with alcohol use (Alonso et al., 2004; Grant et al., 2005). One causal explanation for the etiology of comorbidity is that anxiety disorders (or anxiety symptoms per se) serve to promote direct use of alcohol and/or other

drugs. The primary hypothesis fitting within this general view, often referred to as the “self-medication hypothesis” (e.g., Quitkin et al., 1972), suggests that the pharmacological and/or psychological effects that alcohol serves decreases anxiety symptoms (e.g., Brady and Lydiard, 1993; Cowley, 1992; Cox et al., 1990; Kushner et al., 1990).

Depression, anxiety, and alcohol misuse are at least 1.5 times more common in lesbian, gay, and bisexual (LGB) individuals according to a meta-analysis conducted by King et al. (2008). Lesbian and bisexual women have been identified as a group that is at particular risk for alcohol misuse based on large epidemiological studies (King et al., 2008; McCabe et al., 2009; Mercer et al., 2007). Lesbian and bisexual women start using alcohol earlier and have greater increases in alcohol use over time compared with heterosexual adolescents and young adults (Corliss et al., 2008; Hatzenbuehler et al., 2008; Marshal et al., 2008, 2009). For example, a recent meta-analysis suggests that the odds of substance use were, on average, 340% higher for bisexual youth and 400% higher for women compared with heterosexual youth (Marshal et al., 2008).

There have also been studies demonstrating elevations in risk of anxiety disorders among lesbian and bisexual women (Cochran et al., 2003; Gilman et al., 2001). Relatively few studies, however, have examined the prevalence of anxiety disorders in this population compared with the degree of research on alcohol use (Boehmer, 2002). There are reasons to presuppose that there is an elevated risk of

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*Correspondence may be sent to Dana M. Litt, Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354944, Seattle, WA 98195, or via email at: dlitt@uw.edu.

anxiety disorders within sexual minority women, including a higher risk of childhood and adulthood victimization in comparison with heterosexual women (Balsam et al., 2005; Friedman et al., 2011; Martin et al., 2011). Moreover, lesbian and bisexual women may have elevated perceptions of risk of violence or victimization, which could contribute to vulnerability for developing anxiety disorders (Otis, 2007). Studies have demonstrated higher rates of GAD among lesbian and bisexual women relative to heterosexual women (Cochran and Mays, 2009; Cochran et al., 2003; Gilman et al., 2001). For example, 15% of lesbian and bisexual women in a large national study were diagnosed with GAD over the past year compared with approximately 4% of heterosexual women (Cochran et al., 2003). Given that research has demonstrated connections between GAD and alcohol use, there is a clear need for studies to examine the relationship between GAD and alcohol misuse among lesbian and bisexual women (Alegría et al., 2010; Smith and Book, 2010; Vesga-López et al., 2008).

Drinking protective behavioral strategies

Previous research has found that individuals use various cognitive-behavioral strategies, called drinking protective behavioral strategies (PBS), to limit alcohol consumption and/or minimize alcohol-related negative consequences (e.g., Benton et al., 2004; Borden et al., 2011; Delva et al., 2004; Glassman et al., 2007; Martens et al., 2004, 2005, 2007, 2008; Sugarman and Carey, 2007). Some examples of PBS include alternating alcoholic and nonalcoholic drinks, limiting the number of drinks or the time spent drinking, and using a designated driver. Overall, research in this area indicates that greater use of PBS is associated with lower consumption and experiencing fewer alcohol-related negative consequences. A limitation of this research is that the majority of research examining PBS has been conducted among college student samples. The present study will expand this literature by examining the associations between PBS and drinking behavior among a young adult sample of lesbian and bisexual women.

Although prior research has documented that PBS are negatively associated with alcohol use and negative consequences, recent research is beginning to examine drinking PBS as a mediator (Martens et al., 2007). Martens et al. (2007) found that drinking for enhancement and social reasons was partially mediated by drinking PBS in predicting alcohol use and related problems. Thus, among college students, the use of PBS was based, in some part, on their motives to use alcohol. A similar relationship may be seen for lesbian and bisexual women who are higher in GAD, such that those higher in GAD would be less likely to use PBS and thus consume greater amounts of alcohol and experience more negative consequences.

Present study

The present study examined the mediating role of PBS on the relationships between GAD with alcohol consumption and related negative consequences among lesbian and bisexual women. It was hypothesized that PBS would mediate the relationship between GAD and alcohol use and related negative consequences such that having high levels of GAD would lead to less use of PBS, which, in turn, would predict greater reported levels of drinking and negative consequences (alternatively, being low in GAD would lead to greater use of PBS and lower levels of reported drinking and negative consequences).

Method

Participants

Online advertisements were used to recruit a national sample of 1,083 self-identified lesbian and bisexual women ages 18–25 years for a larger study on women's health behaviors. For the current study, the sample included 40.6% lesbians and 59.6% bisexuals. The ethnic composition was 76% White, 13% African American, 4% Asian, 4% multi-racial, and 3% other or did not respond. Of all participants, 12% identified themselves as Hispanic/Latina. The mean age for participants was 20.88 years old ($SD = 2.11$). The demographics of the present study were comparable with other recent national samples (Chandra et al., 2011).

Procedures

Advertisements were placed on the social networking site Facebook so that only women who met eligibility criteria, based on their Facebook profile, would be shown the advertisement. At the time of recruitment, advertisements were projected to be shown to 1,028,700 lesbian and bisexual female Facebook users at any given time. Upon logging into Facebook, potential participants would be shown the study advertisement in the sidebar as they navigated through the site. During the recruitment phase, 10 advertisements were placed on Facebook. Typically, in any given month, two to three advertisements would be displayed at the same time. Advertisements were divided into LGB-specific content (e.g., "LGB women needed for an online study on partying") and non-LGB-specific content (e.g., "We need you for an online study on health behaviors"). Advertisements were varied to include either an LGB-specific study logo or a non-LGB study logo. Interested participants were instructed to either call, email, or click the advertisement for more information. By clicking the advertisement, participants were directed to the screening assessment.

In addition, online advertisements were placed on Craigslist in the following 12 cities/regions: Atlanta, Austin,

Boston, Chicago, Houston, Los Angeles, New York, Philadelphia, San Francisco, Seattle, South Florida, and Washington, DC. Craigslist advertisements provided participants with a brief summary of the project and a URL to the screening survey.

Upon logging into the screening assessment, potential participants were shown a bulleted information statement. Those who agreed to participate were then routed to the 5-minute screening assessment. A total of 4,119 completed the screening survey. 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 years, and (d) self-identified as lesbian or bisexual at the time of the assessment. Eligible participants ($n = 1,877$) were sent two automatic emails: one containing the URL for the baseline assessment and the second containing their personal identification number. Participants who did not complete the baseline assessment received additional email and telephone reminders. Upon logging into the baseline survey, participants were shown a full consent form for the larger study. If they agreed, they were routed to the 45-minute baseline survey, which 1,083 completed. Participants who completed the survey were compensated \$25 for their time.

Measures

Generalized anxiety. The Generalized Anxiety Disorder 7 (GAD-7; Spitzer et al., 2006; Swinson, 2006) was used to assess GAD. Participants were asked how often they were bothered by each item in the past month. Seven questions were presented, including “feeling nervous, anxious, or on edge” and “worrying too much about different things.” Response options included 0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, and 3 = *nearly every day*. Items were averaged to create an overall GAD score ($\alpha = .891$).

Typical drinks per week. The typical number of drinks consumed per week was assessed with a modified version of the Daily Drinking Questionnaire (Collins et al., 1985). Participants were asked, “Consider a typical week during the last 12 months. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?” A response table was presented with each day of the week for participants to report typical drinks for each day. A sum score was then calculated by adding the reported number of drinks.

Alcohol-related negative consequences. The Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2006) was used to assess alcohol-related negative consequences experienced. Participants were presented 48 items and were asked which, if any, they had experienced in the past 30 days. The Young Adult Alcohol Consequences Questionnaire is made up of eight subscales: academic/occupational (e.g., “The quality of my work or school work has suffered because of drinking”), blackout drinking (e.g.,

“I have awakened the day after drinking and found I could not remember a part of the evening before”), diminished self-perception (e.g., “I have felt badly about myself because of drinking”), impaired control (e.g., “I often have ended up drinking on nights when I had planned not to drink”), physiological dependence (e.g., “I have felt like I needed a drink after I’d gotten up”), poor self-care (e.g., “Because of my drinking, I have not eaten properly”), risky behavior (e.g., “I have driven a car when I knew I had too much to drink to drive”), and social/interpersonal (e.g., “While drinking, I have said or done embarrassing things”). Response options were 1 = *yes* and 0 = *no*. A sum score was calculated to determine the total number of alcohol-related negative consequences experienced in the last 30 days.

Protective behavioral strategies. The Protective Behavioral Strategies Scale (Martens et al., 2005) was used to assess the strategies utilized to prevent alcohol-related negative consequences. Participants were presented 15 items and were asked how often they engaged in each behavior while partying. The PBS Scale comprises three subscales: limiting or stopping drinking (e.g., “stop drinking at a predetermined time”; $\alpha = .807$), manner of drinking (e.g., “avoid trying to ‘keep up’ or ‘out-drink’ others”; $\alpha = .767$); and serious negative consequences (e.g., “use a designated driver”; $\alpha = .881$). Response options were based on a Likert scale of 0 = *never* (0%) to 4 = *always* (100%).

Results

Descriptives and correlations

Table 1 presents means and standard deviations for each of the primary study variables. On average, individuals in this sample drank 8.40 drinks per week ($SD = 11.66$) and experienced 8.01 ($SD = 9.34$) negative consequences in the past 30 days. As seen in Table 1, GAD was negatively associated with PBS (limiting/stopping drinking and serious harm reduction) and positively associated with drinks per week and alcohol-related negative consequences. Additionally, only the serious harm reduction and limiting/stopping subscales of the PBS Scale were significantly negatively associated with drinks per week, whereas the manner of drinking subscale was not correlated with drinks per week. However, all three PBS subscales were significantly and negatively associated with alcohol-related negative consequences.

Mediation analyses

Before conducting the mediation analyses described below, we first examined whether sexual orientation moderated the relationship between GAD and our outcome variables. Based on nonsignificant moderation effects, lesbians and bisexuals have been presented together in the subsequent analyses. All analyses controlled for age and sexual orien-

TABLE 1. Means, standard deviations, and correlations ($N = 1,083$)

Variable	1.	2.	3.	4.	5.	6.	7.	<i>M</i>	<i>SD</i>
1. Generalized anxiety	—							1.92	1.10
2. PBS—limiting/stopping	-.089**	—						2.70	1.02
3. PBS—serious harm reduction	-.107**	.737**	—					2.28	1.28
4. PBS—manner of drinking	-.049	.777**	.694**	—				2.21	0.89
5. Typical drinks per week	.090**	-.065*	-.200**	-.031	—			8.40	11.66
6. Alcohol-related consequences	.264**	-.106**	-.243**	-.065*	.596**	—		8.01	9.34
7. Age	-.012	.041	.011**	.089**	.109**	.112**	—	20.88	2.10

Notes: PBS = protective behavioral strategies.

* $p < .05$; ** $p < .01$.

tation (lesbian vs. bisexual). In addition, the analyses followed the guidelines set forth by Baron and Kenny (1986) such that, in the first step, the dependent variable (alcohol consumption and negative consequences) was regressed on GAD symptoms. In the second step, the mediator variable (PBS—all three subscales) was regressed on GAD. Next, the dependent variables were regressed on the mediator variable. Finally, to establish that full mediation occurred, the effect of GAD on alcohol consumption and related problems was tested, controlling for PBS. Baron and Kenny (1986) was selected as the appropriate test for two primary reasons. First, retrospective analyses (Gelfand et al., 2009) have indicated that additional tests of mediation above the classic Baron and Kenny paradigm are not necessary. Second, because of the nature of our variables, both regular linear regression (normal distribution of the dependent variable) and negative binomial regression (nonnormal distributions for both drinking outcomes and variance that was substantially greater than the mean; alcohol consumption and negative consequences;

Atkins and Gallop, 2007) were used to estimate different paths, and it is unclear how a joint significance test would account for this.

Alcohol consumption. As expected, the results of a negative binomial regression indicated that GAD symptoms were positively and significantly related to typical weekly alcohol consumption. In the second step, PBS were regressed on GAD using linear regression. The results indicated that GAD was negatively associated with the limiting/stopping and serious harm reduction subscales (but not the manner of drinking subscale) of the PBS. In the final step of the analysis, there was a significant relationship between PBS (all three subscales) and alcohol consumption, such that greater use of PBS predicted less alcohol consumption, whereas the relationship between GAD and alcohol consumption became nonsignificant (Table 2).

Alcohol-related negative consequences. As predicted, results of a negative binomial regression indicated that GAD symptoms were positively and significantly related

TABLE 2. Summary of mediation analyses with alcohol consumption as the dependent variable ($N = 1,083$)

Regression criterion, Step 1 ^a	Predictor	<i>B</i>	<i>SE B</i>	<i>Z</i>	Ratio	[95% CI]
Alcohol consumption	Age	0.067	.020	3.36*	1.069	[1.028, 1.112]
	Sexual orientation	-0.171	.092	-1.85	0.843	[0.703, 1.013]
	Generalized anxiety	0.116	.040	2.93*	1.122	[1.039, 1.214]
Regression criterion, Step 2 ^b	Predictor	<i>B</i>	<i>SE B</i>	β	<i>t</i>	
PBS—limiting/stopping	Age	0.020	0.316	.040	1.332	
	Sexual orientation	0.023	0.069	.011	0.332	
	Generalized anxiety	-0.083	0.015	-.089	-2.940*	
PBS—serious harm reduct.	Age	-0.007	0.395	-.012	-0.394	
	Sexual orientation	-0.009	0.086	-.004	-0.249	
	Generalized anxiety	-0.125	0.035	-.107	-3.540*	
PBS—manner of drinking	Age	1.501	0.275	.088	2.914*	
	Sexual orientation	-0.005	0.060	-.002	-0.067	
	Generalized anxiety	-0.390	0.025	-.048	-1.583	
Regression criterion, Step 3 ^a	Predictor	<i>B</i>	<i>SE B</i>	<i>Z</i>	Ratio	[95% CI]
Alcohol consumption	Age	0.071	0.019	3.66*	1.073	[1.033, 1.114]
	Sexual orientation	-0.141	0.089	-1.58	0.869	[0.729, 1.034]
	Generalized anxiety	0.067	0.020	1.64	1.069	[0.986, 1.112]
	PBS—limiting/stopping	0.229	0.077	2.96*	1.257	[1.080, 1.464]
	PBS—serious harm reduct.	-0.481	0.054	-8.87*	0.618	[0.555, 0.687]
	PBS—manner of drinking	0.205	0.078	2.62*	1.227	[1.052, 1.429]

Notes: CI = confidence interval; PBS = protective behavioral strategies; reduct. = reduction. ^aNegative binomial regression; ^blinear regression.

* $p < .05$.

TABLE 3. Summary of mediation analyses with negative consequences as the dependent variable ($N = 1,083$)

Regression criterion, Step 1 ^a	Predictor	<i>B</i>	<i>SE B</i>	<i>Z</i>	Ratio	[95% CI]
Negative consequences,	Age	0.065	0.020	3.26*	1.069	[1.026, 1.170]
	Sexual orientation	0.128	0.081	1.58	1.130	[0.970, 1.331]
	Generalized anxiety	0.307	0.038	7.97*	1.359	[1.260, 1.465]
Regression criterion, Step 3 ^a	Predictor	<i>B</i>	<i>SE B</i>	<i>Z</i>	Ratio	[95% CI]
Negative consequences	Age	0.064	0.019	3.35*	1.066	[1.027, 1.107]
	Sexual orientation	0.105	0.079	1.34	1.111	[0.952, 1.297]
	Generalized anxiety	0.278	0.037	7.50*	1.320	[1.228, 1.420]
	PBS—limiting/stopping	0.156	0.075	2.07*	1.168	[1.008, 1.352]
	PBS—serious harm reduct.	-0.417	0.053	-7.93*	0.659	[0.595, 0.730]
	PBS—manner of drinking	0.100	0.075	2.07*	1.105	[0.953, 1.282]

Notes: CI = confidence interval; PBS = protective behavioral strategies; reduct. = reduction. ^aNegative binomial regression; ^blinear regression.

* $p < .05$.

to alcohol-related negative consequences. In the final step of the analysis, there was a significant relationship between PBS (limiting/stopping and serious harm reduction subscales only) and alcohol-related negative consequences, whereas the relationship between GAD and negative consequences was weakened, indicating partial mediation (9.4% reduction) (Table 3).

Discussion

The purpose of the present study was to further examine the relationship between GAD, alcohol use, and alcohol-related negative consequences to determine whether PBS mediated this relationship among young adult lesbian and bisexual women. As hypothesized, GAD was positively associated with typical alcohol consumption and negatively associated with two of the three PBS subscales (limiting/stopping and serious harm reduction but not manner of drinking). Further, PBS were associated with alcohol consumption, providing a full mediation between GAD and alcohol use. When examining the relationship between GAD and negative consequences, GAD was positively associated with alcohol-related negative consequences. The results indicated the presence of a significant relationship between two of the three PBS subscales (limiting/stopping and serious harm reduction) and negative consequences. Results indicated a partial mediation with PBS in the GAD and alcohol consequences relationship. In sum, PBS were found to be a mediator in the relationship between anxiety, alcohol use, and negative consequences among young adult lesbian and bisexual women.

Interestingly, research among college students has found that all three subscales of the PBS are negatively associated with drinks per week (e.g., Martens et al., 2008), whereas in the current study, manner of drinking was not significantly correlated with drinks per week. It is possible that this difference is attributable to lesbian and bisexual women not engaging in the strategies related to manner of drinking. This is supported when looking at the relative endorsement

of the three subscales in both this sample and general college samples. Whereas in college samples, the least frequently endorsed strategies are those related to serious harm reduction (Martens et al., 2008), the manner of drinking strategies were the least endorsed in the present study. Given the relatively high perceptions of potential victimization reported by lesbian and bisexual women (Otis, 2007), it would fit that women in this sample would strongly endorse strategies that protect them from being assaulted (i.e., go home with a friend and know where your drink is it all times).

Sexual minority women may struggle with multiple stressors because of gender, sexual orientation, and potentially their own race/culture as well. Bisexual women, in addition, can be marginalized from the rest of the lesbian and gay community, which may add additional burdens and further strain mental health. Many brief interventions for young adult drinking may focus more on social norms or normative misperceptions. However, it may be that these interventions are less effective for those who are higher in psychological distress. Interventions for high-risk drinking among young adult lesbian and bisexual women may need to specifically address factors such as affect management or coping with anxiety, at least for the proportion of women who are endorsing significant symptoms of anxiety. Cognitive behavioral strategies or distress tolerance skills may be useful as brief interventions for anxiety with lesbian and bisexual women who are endorsing more distress. Focusing on barriers to using PBS like limiting/stopping use or reducing the most serious types of harm may be a way of helping decrease both use and consequences for this population. It is also important to consider the role that alcohol use may play in this population. Traditionally, the bar culture has been a primary safe venue for LGB individuals to meet and socialize (McKirnan and Peterson, 1989; Trocki et al., 2005). For those individuals who are already struggling with significant symptoms of anxiety, this may create a more high-risk situation for riskier drinking. Thus, interventions for this population may want to focus on generating alternative strategies for social facilitation.

Limitations/future directions

As with most research, the present study is not without limitations. First, participants were required to self-identify as either lesbian or bisexual. Because sexuality and sexual self-identification can be fluid, especially among women (Diamond, 2000), we may have lost those women who have sex with women but do not identify as a sexual minority. Future research should also continue to examine possible differences between lesbian and bisexual women because these are distinct identities and as such may differ in their relationships with PBS, alcohol, and anxiety. Additionally, it is unknown whether the present findings are generalizable to sexual minority women of color. However, based on a comparison with a recent national estimate of women ages 15–44 years in the United States from the National Survey of Family Growth (Chandra et al., 2011), the demographics collected in the present research project are relatively comparable. In the National Survey of Family Growth data, 13% of the women in the sample who identified as lesbian or bisexual were Hispanic, 75% were White non-Hispanic, 15% were African American, and 10% were in other racial/ethnic groups. Findings may not generalize to sexual minority women of color. Lesbian and bisexual women of color must balance multiple identities and may also face discrimination based on racial bias within the LGB community and homophobia from within ethnic minority communities. Future research should examine the intersection between race and sexuality on mental health and alcohol-related outcomes. Second, because of the cross-sectional nature of this study, we are unable to determine causality. This study is derived from a larger longitudinal examination of lesbian and bisexual women's health behaviors, therefore, an investigation of GAD and drinking behaviors will and should be examined further. Future directions should include testing interventions for anxiety disorders in relation to drinking behavior to decrease alcohol use and alcohol-related negative consequences among sexual minorities.

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