Social Anxiety and Alcohol-Related Negative Consequences Among College Drinkers: Do Protective Behavioral Strategies Mediate the Association?

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The link between social anxiety and alcohol-related negative consequences among college students has been well documented. Protective behavioral strategies are cognitive–behavioral strategies that college students use in an effort to reduce harm while they are drinking. In the current study we examined the mediating role of the 2 categories of protective behavioral strategies (i.e., controlled consumption and serious harm reduction) in the relationship that social anxiety symptoms have with alcohol-related negative consequences. Participants were 572 undergraduates who completed measures of social anxiety, alcohol use, negative consequences of alcohol use, and protective behavioral strategy use. Only serious harm reduction strategies emerged as a mediator of the association that social anxiety symptoms had with alcohol-related negative consequences. Clinical and research implications are discussed.

Keywords: social anxiety, college alcohol use, protective strategies, negative consequences

College alcohol use is concerning because it not only has consequences for the individual student but also impacts campuses and surrounding communities (Wechsler et al., 2002). With approximately 50% of students engaging in heavy episodic drinking (HED) at least once within the past 2 weeks (U.S. Department of Health and Human Services, National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2012), the range of negative consequences that accompany college student drinking provides cause for concern, and some students are at increased risk of experiencing alcohol-related negative consequences. For instance, students with elevated social anxiety symptoms tend to report more physical, personal, and role functioning consequences from drinking than do less socially anxious students (Norberg, Olivier, Alperstien, Zvolensky, & Norton, 2011). For these reasons, a better understanding of the relationship between social anxiety and alcohol-related negative consequences is essential for developing more effective prevention and intervention efforts.

Social anxiety symptoms are prominent among college students (Purdon, Antony, Monteiro, & Swinson, 2001), and increase their risk for experiencing alcohol-related negative consequences (Kashdan & Steger, 2006). For example, Blanco and colleagues (2008) found that over 3% of their college student sample met criteria for social anxiety disorder, and Buckner, Timpano, Zvolensky, Sachs-Ericsson, and Schmidt (2008) found that 80% of their participants reported that their social anxiety predated their alcohol use disorder. These studies support the existence of a link between social anxiety and harmful drinking that may be exacerbated by the college environment. Given that college students consume more alcohol than their noncollege peers (Johnston, O'Malley, Bachman, & Schulenberg, 2012), combined with the psychological vulnerabilities experienced by students with social anxiety symptoms (Buckner, Heimberg, Ecker, & Vinci, 2013), it is important to examine predictors of negative consequences when drinking and to reduce their occurrence.

Recently, Schry and White (2013) conducted a meta-analysis of 219 studies and found a link between social anxiety symptoms and higher levels of alcohol-related negative consequences even though they were not associated with alcohol consumption (i.e., quantity and frequency). Although counterintuitive, this finding may be explained by the fact that students with social anxiety symptoms often avoid social situations (Morris, Stewart, & Ham, 2005) that may reduce their overall frequency of alcohol consumption and tolerance. However, when these students are in social situations where alcohol is available, they may consume relatively large quantities of alcohol in an attempt to “self-medicate” but are less able to tolerate these amounts (e.g., Strahan, Panayiotou,
Clements, & Scott, 2011). These episodes of heavy drinking among socially anxious students may explain why Villarosa, Madson, Zeigler-Hill, Noble, and Mohn (2014) found that students with elevated social anxiety symptoms reported less alcohol consumption but higher levels of hazardous drinking and more alcohol-related negative consequences than students with fewer social anxiety symptoms. However, relatively little is known about the role that protective behavioral strategies (PBS) may play in reducing alcohol-related negative consequences among students with social anxiety symptoms.

College students who employ more PBS while drinking typically experience fewer alcohol-related negative consequences (Kenney & LaBrie, 2013). The focus on PBS has increased recently, with at least three randomized control trials demonstrating that PBS mediates the effects of brief alcohol interventions (Barnett, Murphy, Colby, & Monti, 2007; Larimer et al., 2007; Murphy et al., 2012), and numerous other studies highlighting differential effects of PBS depending on the type of PBS employed (Pearson, 2013; Pearson, D’Lima, & Kelley, 2013; Prince, Carey, & Maisto, 2013). In particular, controlled consumption strategies (CC)/direct PBS (e.g., alternating alcoholic and nonalcoholic drinks) are related to less alcohol consumption; whereas, serious harm reduction strategies (SHR)/indirect PBS (e.g., make sure you go home with a friend) are more strongly related to fewer alcohol-related negative consequences (DeMartini et al., 2013; Madson, Arnao, & Lambert, 2013). Thus, dismantling PBS into specific categories may better inform the associations among risk factors, alcohol consumption, PBS use, and alcohol-related negative consequences.

There is increasing support for PBS as a mediator between mental health characteristics and alcohol-related negative consequences among college students (Kenney & LaBrie, 2013). Martens et al. (2008) found that PBS partially mediated the link between depressive symptoms and alcohol-related negative consequences. Linden, Lau-Barraco, and Mallet (2013) found a similar mediated relationship between anxiety symptoms and alcohol-related negative consequences. Although little is known about the social anxiety–PBS relationship, theorists have identified cognitive (e.g., perceived social deficits) and social (e.g., social avoidance) deficits that may impact these students’ decisions to use PBS (Buckner et al., 2013). Socially anxious students are often motivated to consume alcohol to alleviate distress when in social situations (Norberg, Norton, Olivier, & Zvolensky, 2010), so it is plausible that they would be less adept at employing PBS that are directly related to controlling their consumption (e.g., alternating alcoholic and nonalcoholic beverages). However, the value of PBS in reducing alcohol-related negative consequences among socially anxious students warrants investigation. Thus, the purpose of the present study was to evaluate the mediating effects of specific types of PBS on the relationship between social anxiety symptoms and alcohol-related negative consequences. Our first goal was to replicate previous findings regarding the relationship between social anxiety symptoms and alcohol-related negative consequences (see Clerkin & Barnett, 2012). We predicted that students with elevated social anxiety symptoms would report more alcohol-related negative consequences. Second, we wanted to explore to what extent the two categories of PBS (i.e., CC and SHR) would explain the relationship between social anxiety and alcohol-related negative consequences, while controlling for alcohol consumption.

We predicted the SHR category of PBS would significantly mediate the relationship between social anxiety symptoms and alcohol-related negative consequences; however, we did not expect the CC category of PBS to mediate this association. The rationale for this prediction is twofold: (1) individuals who report high levels of social anxiety symptoms tend to experience more alcohol-related negative consequences but do not consume as much alcohol as their counterparts (Schry & White, 2013), and (2) SHR strategies are more strongly associated with alcohol-related negative consequences than are CC strategies (DeMartini et al., 2013; Madson et al., 2013).

Method

Participants and Procedure

Participants were 572 (155 men, 417 women) traditional-aged undergraduates enrolled in psychology courses at a university in the southern region of the United States. All students participated in return for partial fulfillment of a research participation requirement. Participants completed measures of social anxiety symptoms, alcohol consumption, alcohol-related negative consequences, and PBS use via a secure web site. To be eligible for the study, participants had to be between the ages of 18 and 25 (M = 19.72 years, SD = 1.66) and must have consumed alcohol at least once within the past 30 days. The racial/ethnic composition of our sample was 58% White non-Hispanic, 38% African American, and 4% other.

Measures

Amount of alcohol consumed. The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) was used to assess typical drinks per week. Participants indicated the number of standard alcoholic beverages they drank each day of a typical week during the past 30 days.

Social anxiety symptoms. A combination of the Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS) was used to assess social anxiety symptoms (Mattick & Clarke, 1998). The SIAS assesses anxiety related to interacting with others through 20 items such as “I have difficulty making eye-contact with others” and the SPS assesses performance-related anxiety through 20 items such as “I get nervous that people are staring at me as I walk down the street.” Respondents indicated the degree to which each item was characteristic of themselves using scales that ranged from 0 (not at all) to 4 (extremely) with higher scores on each instrument indicating greater social anxiety symptoms. Similar to Ham and Hope (2006), we calculated a total social anxiety score by centering and combining the SIAS and SPS. Internal consistency for the combined social anxiety measure was α = .86.

PBS. The use of PBS was assessed by using the 18-item Protective Behavioral Strategies Scale—Revised (PBSS–R; Madson et al., 2013). The PBSS–R asks participants to “Indicate the degree to which you engage in the following behaviors to keep yourself safe when using alcohol or partying:” Participants responded to each item using scales that ranged from 1 (never) to 6 (always) such that scores ranged from 18 to 108, with higher scores indicating greater use of PBS. Madson and colleagues (2013) recently identified that PBS are more accurately divided
into two categories: CC, which includes “having a set number of drinks” and “alternating between alcoholic and nonalcoholic drinks,” and SHR, which includes “using a designated driver” and “going home with a friend.” The reliability and validity of the PBSS-R has been demonstrated among college student drinkers (Madson et al., 2013). For the present sample, the internal consistency ranged from good to excellent for the PBSS-R total (α = .92), CC (α = .91), and SHR (α = .83).

**Alcohol-related negative consequences.** The negative consequences of alcohol consumption were measured using the brief version of the Rutgers Alcohol Problem Index (RAPI; Earleywine, LaBrie, & Pedersen, 2008). The RAPI is a 23-item measure that instructs participants to rate how often they have experienced a specific negative consequence such as “neglected your responsibilities” or “missed a day, or part of a day, of school or work” within the past year using scales ranging from 0 (never) to 4 (more than 10 times). The total score ranges from 0 to 92 with higher scores indicating more negative consequences experienced. The RAPI has been shown to provide reliable and valid data with college students (Neal, Corbin, & Fromme, 2006). The internal consistency for this sample was α = .94.

**Data Analytic Approach**

A multiple mediation analysis—using a macro by Preacher and Hayes (2004)—was performed to determine which types of PBS (i.e., CC and SHR) mediated the relationship between social anxiety symptoms and alcohol-related negative consequences. The advantages of this approach include the ability to test multiple mediators simultaneously, utility with skewed data, and reduced likelihood of Type I error (Hayes, 2013). We used a bootstrapping technique (i.e., a nonparametric approach to effect-size estimation that makes no assumptions about the sample distribution) that involved the extraction of 5,000 resamples with the mediational effect being calculated for each resample (Preacher & Hayes, 2004). Thus, we conducted a multiple mediation analysis with social anxiety as the predictor, alcohol-related negative consequences as the criterion, and the two categories of PBS entered as potential mediators.1

**Results**

Means, standard deviations, and intercorrelations for the measures are presented in Table 1. Based on the DDQ, 67% of participants were classified as light or moderate drinkers and the median and mode number of drinks per week was seven and two, respectively (Collins et al., 1985). In contrast, 66% of women and 51% of men reported at least one heavy drinking episode in the past month indicating participants consume larger quantities of alcohol when they do drink although their frequency of typical drinking during the week is rather low. The most frequently endorsed alcohol-related negative consequences were “tried to control your drinking by trying to drink only at certain times of the day or certain places” (M = .88, SD = 1.25); “not able to do your homework or study for a test” (M = .75, SD = .95); and “neglected your responsibilities” (M = .73, SD = .92). Alcohol consumption was positively related to alcohol-related negative consequences (r = .32, p < .01) and inversely related to PBS (r = –.33, p < .01), SHR (r = –.26, p < .01), and CC (r = –.31, p < .01). There was no direct association between social anxiety and alcohol consumption (r = .07, ns). Social anxiety symptoms were positively related to alcohol-related negative consequences (r = .32, p < .01) and inversely related to PBS (r = –.13, p < .05) and SHR (r = –.25, p < .01), but not related to CC (r = –.06, p = .14). Alcohol-related negative consequences were negatively related to PBS (r = –.32, p < .01), SHR (r = –.45, p < .01), and CC (r = –.21, p < .01). Alcohol consumption was included as a control variable in the model because it was correlated with the other alcohol-related variables and PBS did not mediate the social anxiety-alcohol consumption relationship.

**Social Anxiety, SHR, CC, and Negative Consequences**

The results of the multiple mediation model that examined the mediating effects of SHR and CC was significant (R² = .24, p < .01) and are presented in Figure 1. Of the two categories of PBS, SHR was the only significant partial mediator of the relationship between social anxiety symptoms and negative consequences (β = .08, p < .05) and it accounted for 31% of the mediated effect; however, the absolute change value after including SHR in the model was .08, indicating a small effect size. More specifically, social anxiety symptoms predicted a decrease in SHR (β = –.23, p < .001). In turn, SHR predicted a decrease in negative consequences (β = –.36, p < .001) such that students using fewer SHR reported experiencing more negative consequences. The bootstrap results indicate significant mediation with the 95% confidence interval for the indirect effect of SHR on the social anxiety-negative consequences relationship failing to include zero (CI_lower = .05, CI_higher = .13). We ran a second analysis with alcohol consumption excluded from the model, and found no

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1 We conducted a mediation analysis with the composite PBS score as the potential mediator of the relationship between social anxiety and alcohol-related negative consequences. PBS total score emerged as a significant mediator (β = .04, p < .05) accounting for 12% of the variance in the relationship between social anxiety and alcohol-related negative consequences. We also conducted two moderated mediation analyses but sex (CC: β = –.09, p = .37; SHR: β = .12, p = .20) and race (CC: β = –.01, p = .86; SHR: β = –.10, p = .23) failed to emerge as a significant moderator so we do not report these analyses in the interest of parsimony.
significant changes in results. Thus, these results suggest that SHR significantly mediates the relationship between social anxiety symptoms and negative consequences regardless of the amount of alcohol consumed (i.e., students with more social anxiety symptoms are less likely to use SHR and subsequently more likely to experience alcohol-related negative consequences).

Discussion

The purpose of this study was to elaborate on the mediating effect of PBS in the relationship between social anxiety symptoms and alcohol-related negative consequences among college students. As predicted, students who reported elevated social anxiety symptoms reported more alcohol-related negative consequences than did students who reported fewer social anxiety symptoms. Our findings are consistent with previous studies showing that socially anxious college students experience more alcohol-related negative consequences when drinking (Kashdan & Steger, 2006). One potential explanation for this relationship is that when students who experience social anxiety symptoms are in situations where alcohol is available, they may be likely to drink to reduce their distress and worry, making them more vulnerable to alcohol-related negative consequences (Bacon & Ham, 2010; Schry & White, 2013). Thus, reducing their perceived need to use CC strategies. Also, previous results have shown that students use more SHR during relatively heavy drinking episodes in an effort to offset drinking more than usual (Pearson et al., 2013), and students with social anxiety symptoms may be consuming more alcohol when in social situations because of its tension-reducing effects (Schry & White, 2013). Thus, socially anxious students may be increasing their alcohol consumption while simultaneously disregarding PBS use as a way to alleviate their anxiety when in social situations, placing them at greater risk for alcohol-related negative consequences. However, the present findings indicate that the risk of socially anxious students experiencing these consequences may be reduced, in part, if they incorporate SHR strategies when they choose to drink.

We found support for our second hypothesis that SHR strategies would explain a significant portion of the association between social anxiety and alcohol-related negative consequences. That is, students who reported elevated social anxiety symptoms also reported using fewer SHR and, in turn, reported experiencing more alcohol-related negative consequences. Furthermore, CC strategies were not found to mediate the relationship between social anxiety symptoms and alcohol-related negative consequences. One explanation for this finding is that students with elevated social anxiety symptoms are not drinking as frequently as their less socially anxious counterparts (Ham & Hope, 2006; Schry & White, 2013), thus reducing their perceived need to use CC strategies. Also, previous results have shown that students use more SHR during relatively heavy drinking episodes in an effort to offset drinking more than usual (Pearson et al., 2013), and students with social anxiety symptoms may be consuming more alcohol when in social situations because of its tension-reducing effects (Schry & White, 2013). Thus, socially anxious students may be increasing their alcohol consumption while simultaneously disregarding PBS use as a way to alleviate their anxiety when in social situations, placing them at greater risk for alcohol-related negative consequences. However, the present findings indicate that the risk of socially anxious students experiencing these consequences may be reduced, in part, if they incorporate SHR strategies when they choose to drink.

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2 We conducted a multiple mediation analysis with alcohol consumption excluded. Consistent with our presented model, SHR significantly mediated the association between social anxiety and negative consequences ($\beta = .10, p < .05$), accounting for 31% of the mediated effect. The absolute value change was .10, indicating a small effect size.
Our findings have implications for prevention and intervention efforts with students who have elevated social anxiety symptoms, especially considering that these students are less likely to have positive outcomes following brief alcohol interventions (Terlecki, Buckner, Larimer, & Copeland, 2012). Programs such as the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999) may benefit from careful consideration of how social anxiety symptoms may impact drinking decisions such as use of PBS and discussions concerning how certain types of PBS can allow for symptom alleviation while also reducing the negative consequences experienced.

This study has highlighted several implications for future research with social anxiety and PBS. First, researchers should consider using diverse measures of alcohol use when examining the drinking behaviors of socially anxious students. Researchers have found that alcohol outcome expectancies help explain the relationship between social anxiety and weekly alcohol consumption (Booth & Hasking, 2009), but researchers also should consider the role of heavy episodic drinking in addition to alcohol expectancies among this subgroup to better understand the link between social anxiety-drinking behaviors. Second, researchers should consider how the drinking context may contribute to socially anxious students engaging in harmful drinking practices (i.e., use fewer PBS and experience more negative consequences). Finally, researchers should investigate synergistic effects of various empirically supported harm-reduction techniques. Ehret, Ghaidarov, and LaBrie (2013) found that students with lower confidence to resist alcohol when drinking to relieve emotional distress or under social pressure were more susceptible to the risk-reducing effects of PBS. Thus, simultaneously assessing the effects of drinking-refusal self-efficacy and PBS may have added value for socially anxious students.

The results of the present study should be interpreted in light of the study’s limitations. First, these results may not generalize to other populations because data were collected from a single institution in the southern region of the United States. Second, the demographic characteristics of the current sample—although representative of the university—are comprised of predominantly White, non-Hispanic women. Research is needed to determine if the current findings translate to more diverse samples of college students. Finally, the data collected were cross-sectional in nature, which prevents causal inferences from being made. Researchers should consider longitudinal designs that can examine the changes in PBS use and negative consequences in socially anxious students over the course of their college years.

Overall, our results shed light on an underlying mechanism involved in transmitting the effect of social anxiety symptoms on alcohol-related negative consequences. Serious harm reduction strategies not controlled consumption strategies accounted for a significant portion of the relationship between social anxiety and alcohol-related negative consequences. These results highlight the importance of incorporating social anxiety as a risk factor in harm reduction programs for college student drinkers and contribute to the literature by identifying the significant impact of serious harm reduction strategies on potentially reducing the prevalence of negative consequences among socially anxious college students.

References


Received October 29, 2013
Revision received June 26, 2014
Accepted July 3, 2014