

Social Anxiety and Heavy Situational Drinking: Coping and Conformity Motives as Multiple  
Mediators

Meredith A. Terlecki<sup>a\*</sup>

Julia D. Buckner<sup>b</sup>

<sup>a</sup> School of Psychology, University of East London, Stratford, London E15 4LZ, United Kingdom

<sup>b</sup> Department of Psychology, Louisiana State University, Baton Rouge, LA, 70803, United States

\* Corresponding author. Tel. +44(0)8223 4463. Email: [m.terlecki@uel.ac.uk](mailto:m.terlecki@uel.ac.uk).

### Abstract

Individuals with clinically elevated social anxiety are at greater risk for alcohol use disorder, and the relation between social anxiety and drinking problems is at least partially accounted for by drinking more in negative emotional (e.g., feeling sad or angry) and personal/intimate (e.g., before sexual intercourse) situations. Identification of cognitive/motivational factors related to drinking in these high-risk situations could inform the development of treatment and prevention interventions for these high-risk drinkers. The current study examined the mediating effect of drinking motives on the relationship between social anxiety and drinking these high-risk situations amongst undergraduates ( $N = 232$ ). Clinically elevated social anxiety was associated with greater coping and conformity motives. Both coping and conformity motives mediated the relation between social anxiety and heavier alcohol consumption in negative emotional and personal/intimate contexts. Multiple mediation analyses indicated that these motives work additively to mediate the social anxiety-drinking situations relationship, such that that heavy situational drinking amongst undergraduates with clinically elevated social anxiety can be jointly attributed to desire to cope with negative affect and to avoid social scrutiny.

*Keywords:* drinking problems, drinking context, drinking motives, college drinking, social anxiety

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### 1. Introduction

Heavy alcohol use among undergraduates remains a serious public health concern. Epidemiological studies indicate 20-30% of undergraduates meet diagnostic criteria for alcohol use disorder (AUD; Clements, 1999; Dawson, Grant, Stinson, & Chou, 2004; Knight et al., 2002). Socially anxious undergraduates are at particular risk for AUD. Clinically elevated social anxiety is associated with a four times greater increase in developing AUD (Buckner, Schmidt, et al., 2008) and precedes AUD onset among the vast majority of those with co-occurring AUD and social anxiety disorder (SAD; Buckner, Timpano, Zvolensky, Sachs-Ericsson, & Schmidt, 2008; Schneier et al., 2010). These findings are concerning because college students regularly face novel social anxiety-provoking situations (e.g., living with roommates, oral presentations, meeting new people) and frequent promotion of extreme alcohol use (Ham & Hope, 2003) on campus. Although brief treatments appear efficacious for reducing college drinking (for review, see Larimer & Crouse, 2007), students with clinically elevated social anxiety have poorer outcomes and continue to drink heavily after receiving treatment (Terlecki, Buckner, Larimer, & Copeland, 2011).

The majority of data suggest that social anxiety and SAD are positively related to drinking problems (for a recent review, see Buckner, Heimberg, Ecker, & Vinci, 2013). Yet, the literature is mixed regarding whether SAD is related to greater quantity or frequency of drinking (see Buckner et al., 2013). Recent data suggests disparate findings may be due to lack of attention to drinking context. We recently found that although social anxiety was not associated with heavy drinking in general, it was related to greater context-specific drinking such that compared to less anxious students, those with clinically elevated social anxiety drank more in negative emotional (e.g., when feeling sad, angry, or lonely) and personal/intimate contexts (e.g., on a date, after school) but not in social/convivial situations (Terlecki, Ecker, & Buckner, 2014). Importantly, drinking more in negative emotional and

personal/intimate situations mediated social anxiety's relation to more alcohol-related problems.

A next step in this line of work is to identify cognitive-motivational factors implicated in heavier drinking in these specific contexts among socially anxious persons, as such information could inform personalized intervention efforts to reduce alcohol use among these vulnerable individuals. Drinking motives, or an individual's reasons for drinking alcohol, are cognitive-motivational variables that seem to be involved in heavy drinking and drinking-related problems (Cooper, 1994). Consistent with the notion that socially anxious persons drink to manage their chronically elevated fear of negative evaluation, social anxiety tends to be associated with drinking to manage negative affect (coping motives) and to avoid social scrutiny (conformity motives; Lewis et al., 2008; Stewart, Morris, Mellings, & Komar, 2006). Yet, data are mixed as to whether these motives are related to greater drinking amongst socially anxious persons. Coping motives endorsement was positively associated with greater past-month drinking quantity amongst those with moderate to high social anxiety but not amongst those with normative levels of social anxiety (Ham, Bonin, & Hope, 2007). Yet neither coping nor conformity motives mediated the relation between social anxiety and past-month drinking quantity or frequency (Ham, Zamboanga, Bacon, & Garcia, 2009). However, it follows that these motives may account for heavy drinking in situations in which socially anxious persons are especially vulnerable to heavy drinking—specifically, negative emotional and personal/intimate situations (Terlecki et al., 2014).

### 1.1 *The current study*

The current study evaluated the impact of drinking motives on the relation of social anxiety and drinking in situations using an existing dataset in which socially anxious persons were found to engage in heavy drinking: negative emotional and personal/intimate situations. Specifically, Terlecki et al. (2014) showed a direct effect between social and heavy situational drinking and the mediation model employed situational drinking as the mediator variable in the relationship between social anxiety and drinking problems. The current study extends research on the observed direct effect

between social anxiety and situational drinking (Terlecki et al., 2014) by focusing on drinking motives as the indirect path in the relation between social anxiety and situational drinking. The present data builds upon Terlecki et al. (2014)'s finding by demonstrating the relevance of drinking motives as mediators of situational drinking among highly socially anxious drinkers. First, we sought to replicate the finding (Lewis et al., 2008; Stewart et al., 2006) that social anxiety is related to coping and conformity motives. Second, we tested whether coping and/or conformity motives mediated the relation between social anxiety and drinking in negative emotional and personal/intimate situations. Specifically, we tested whether coping and conformity motives independently mediated the relations of social anxiety to context-specific drinking. We also conducted multiple mediator analyses to test whether the additive effects of coping and conformity motives significantly mediated these relations.

## **2. Method**

### *2.1 Participants*

An undergraduate sample ( $N = 664$ ) was recruited through the Department of Psychology research participant pool at a large public university in the southern U.S. from April to May 2011 for a study of social anxiety and high-risk drinking situations (Terlecki et al., 2014). The study received approval from the university's Institutional Review Board. Students provided informed consent prior to commencing the survey. Twenty participants had incomplete survey responses and were excluded. Item responses greater than 3.29 standard deviations above respective means on drinking or social anxiety measures ( $n = 33$ ; 5%) were considered outliers (Tabachnick & Fidell, 2007). The majority of outliers ( $n = 28$ ; 85%) included extreme responding across more than one measure and therefore those responses were deemed inaccurate. We excluded outliers rather than recoded outliers to improve the accuracy of parameter and statistical estimates (Tabachnick & Fidell, 2007).

Given that the relationship of social anxiety to situational drinking tends to be greater among those with clinically elevated social anxiety (Terlecki et al., 2014) and to increase

generalizability to individuals with social anxiety disorder, empirically informed cut-off score on the *Social Phobia Scale (SPS)* or *Social Interaction Anxiety Scale (SIAS)*; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992) was used to identify participants with clinically elevated social anxiety. Participants scoring at least one standard deviation above the Heimberg et al. (1992) mean on either the SIAS ( $M=19.9$ ,  $SD=14.2$ ) or the SPS ( $M=12.5$ ,  $SD=11.5$ ) were included in the high social anxiety (HSA;  $n = 116$ ) group. Thus, participants scoring either above 34 on the SIAS or above 25 on the SPS comprised the HSA group. Previous research suggests use of either cut-off score is conservative measures of social anxiety among undergraduates (Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006) and improves identification of those with elevated social anxiety across the diagnostic domains of social interaction fears (SIAS) and social scrutiny fears (SPS; Heimberg et al., 1992). Among those in the HSA group, 76.7% ( $n = 89$ ) scored above the SIAS cut-off, 70.7% ( $n = 82$ ) scored above the SPS cut-off, and 47.4% ( $n = 55$ ) scored above both cut-offs. Due to the large sample size discrepancy among HSA and low social anxiety (LSA) groups, a random sample of 116 undergraduates scoring at or below the SIAS and SPS means (Heimberg et al., 1992) comprised the low social anxiety (LSA) group. This strategy facilitated the comparison of those with clinically elevated social anxiety to students with 'normative' sub-clinical levels of social anxiety while minimizing the risk of introducing errors in statistical analyses due to unequal sample size (Tabachnick & Fidell, 2007). There were no significant differences on key variables (e.g., alcohol use, social anxiety, drinking motives) between low SA undergraduates who were selected for the LSA group versus those who were unselected (all  $p$ 's > .05).

The final sample ( $N = 232$ ; 69.4% female) reported a mean age of 19.32 ( $SD = 1.34$ ) years. The majority (97.4%) was non-Hispanic/Latino and the racial composition was 7.3% African American/Black, 3.4% Asian/Asian American, 87.1% Caucasian/White, 0.4% Native American, and 1.7% "mixed". Half were employed part-time, 3.0% were employed full-time, and 44.4% were unemployed. The majority (77.6%) were not Greek system members. Most participants endorsed lifetime (89.1%) and current (past month; 81.0%) alcohol use.

## 2.2 Measures

### 2.21 Drinking motives

*Drinking Motives Questionnaire Revised* (DMQR; Cooper, 1994). The DMQR is a 15-item self-report measure designed to measure reasons for drinking alcohol across four empirically derived subscales: coping motives (i.e., drinking to manage negative emotions or undesirable experiences), social motives (i.e., celebratory and social drinking), and enhancement motives (i.e., drinking to augment enjoyable experiences or emotions), and conformity motives (i.e., drinking due to peer pressure or external social pressure). Subscale scores are derived by summing all items loading into each subscale. All subscale scores are positively correlated with drinking frequency; social and enhancement motives are positively correlated with drinking quantity and have high internal consistency among adult (Cooper, Russell, Skinner, & Windle, 1992) and undergraduate samples (Stewart, Zeitlin, & Samoluk, 1996). Internal consistency of the DMQR subscales was adequate in our sample: social ( $\alpha = .93$ ), coping ( $\alpha = .87$ ), enhancement ( $\alpha = .90$ ), conformity ( $\alpha = .88$ ).

### 2.22 Drinking context

*Drinking Context Scale-Revised* (DCS-R). A revised version of the *Drinking Context Scale* (DCS; O'Hare, 1997) assessed participant typical drinking quantity across eleven social situations (e.g., at a party, after school/work), nine interpersonal circumstances (e.g., on a date, with a close friend), and six negative emotional situations (e.g., when angry at others, after a fight). To assess situational drinking quantity, DCS items were measured using the DDQ scale (i.e., 0 to 30 or more drinks). Subscale scores were derived by summing item responses that loaded into each subscale. The measure consists of three factor-analytically derived subscales: social/convivial drinking (e.g., drinking at a club, bar, party); personal/intimate drinking (e.g., drinking after work/school, on a date); and negative emotional drinking (e.g., drinking when sad, angry, lonely). Internal consistency for each drinking situation was adequate: social/convivial ( $\alpha = .93$ ); personal/intimate ( $\alpha = .79$ ); and negative emotion ( $\alpha = .85$ ).

### 2.23 Social anxiety

The *Social Phobia Scale* (SPS) and the *Social Interaction Anxiety Scale* (SIAS; Mattick & Clarke, 1998) was used to assess social anxiety. Each measure contains 20 items scored from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). These measures have demonstrated good internal consistency in both community and undergraduate samples and have been shown to be specific for social anxiety relative to other forms of anxiety (i.e., trait anxiety) (Brown et al., 1997). Internal consistency of the SIAS-SPS was adequate in the current sample ( $\alpha = .95$ ).

### 3. Results

#### 3.1 Participant Demographics

LSA participants were more likely to be unemployed (53.4%) relative to HSA participants (35.3%),  $\chi^2(2) = 6.93, p < .01$ . HSA and LSA groups did not significantly differ on other demographic variables: Race (LSA, 84.5% Caucasian; HSA, 89.7% Caucasian;  $\chi^2(5) = 1.38, p = .24$ ); Gender (LSA, 71.6% female; HSA, 67.2% female;  $\chi^2(1) = 0.51, p = .48$ ), and Greek system membership (LSA, 25% members; HSA, 19.8% members;  $\chi^2(1) = 0.89, p = .35$ ).

#### 3.2 Social anxiety and drinking motives

Intercorrelations, means, and standard deviations of social anxiety, drinking motives, and drinking situations variables are presented in Table 1. A multivariate analysis of covariance (MANCOVA) was conducted to evaluate whether social anxiety group (HSA vs. LSA) was related to drinking motives endorsement (social, enhancement, coping, conformity). Covariates were gender and employment status. The overall model was significant,  $F(4,225) = 11.45, p < .001, d = .90$  (Table 2). The HSA group reported significantly greater coping and conformity motives relative to the LSA group. No significant between-groups difference emerged for social or enhancement drinking motives.

#### 3.3 Mediation Analyses

We tested whether coping and/or conformity motives mediated the relations of social anxiety group to drinking in negative emotion and personal/intimate situations using maximum likelihood bootstrapping (10,000 samples were drawn) within the structural



equation modeling program AMOS 20 (Arbuckle, 2011). Estimated standard errors and confidence intervals (95%) were calculated for all indirect, direct, and total effects. Six fully mediated models were tested. Three models were tested for drinking in negative emotion situations: the mediational effects of coping motives (Model A), the mediational effects of conformity motives (Model B), and the two proposed mediators simultaneously (Model C). These three models were also tested for drinking in personal/intimate situations: coping motives (Model D), conformity motives (Model E), and the two proposed mediators simultaneously (Model F). In Models C and F, the motives' error terms were co-varied. These conceptual path models are presented in Figure 1. For each model, three measures of model fit were calculated;  $\chi^2$ , Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR). A non-significant  $\chi^2$  indicates good model fit; however,  $\chi^2$  is sensitive to sample size. A CFI value of .95 or higher and an SRMR value of .08 or lower are indicative of good model fit (Hu & Bentler, 1999). Regression results for paths *a* and *b* for each model are presented in Table 3. The estimates of the specific and conditional indirect effects are presented in Table 4. To examine whether the two proposed mediators additively mediated the relations between social anxiety group and drinking context, the sum of the indirect effects was tested. To examine whether one indirect effect was greater than the other, a difference between the indirect effects was tested.

Model A demonstrated acceptable fit,  $\chi^2(1) = 0.23, p > .05, CFI = 1.00, SRMR = .01$ . Social anxiety group was significantly indirectly (via coping motives) related to drinking more in negative emotion situations. Model B demonstrated acceptable fit,  $\chi^2(1) = 0.01, p > .05, CFI = 1.00, SRMR = .00$ . Social anxiety group was significantly indirectly (via conformity motives) related to drinking more in negative emotion situations. Model C demonstrated acceptable fit,  $\chi^2(1) = 0.12, p > .05, CFI = 1.00, SRMR = .00$ . Social anxiety group was significantly indirectly (via coping and conformity motives) related to drinking more in negative emotion situations. The sum of these indirect effects was significant. Although the

estimated effect of coping motives was slightly larger than that of conformity motives, this difference was not significant.

Model D demonstrated acceptable fit,  $\chi^2(1) = 2.81, p > .05$ , CFI = 0.98, SRMR = .03. Social anxiety group was significantly indirectly (via coping motives) related to drinking more in personal/intimate situations. Model E demonstrated acceptable fit,  $\chi^2(1) = 3.35, p > .05$ , CFI = 0.98, SRMR = .03. Social anxiety group was significantly indirectly (via conformity motives) related to drinking more in personal/intimate situations. Model F demonstrated somewhat poorer fit,  $\chi^2(1) = 5.09, p = .02$ , CFI = 0.99, SRMR = .03. Social anxiety group was significantly indirectly (via coping and conformity motives) related to drinking more in personal/intimate situations. However, this indirect effect should be interpreted with caution given the  $\chi^2$  value. The sum of these indirect effects was significant. Although the estimated effect of coping motives was slightly larger than that of conformity motives, this difference was not significant.

#### **4. Discussion**

The present findings contribute to the literature in several ways by providing a detailed analysis of potential unique situation-specific mechanisms of heavy drinking among socially anxious drinkers. First, consistent with prior work (e.g., Lewis et al., 2008; Stewart et al., 2006), participants with clinically elevated social anxiety endorsed greater negative drinking motives (coping, conformity) relative to those with normative social anxiety. Social anxiety was not significantly associated with greater positive drinking motives (social, enhancement). However, there was a trend that approached significance for highly socially anxious drinkers to report greater social motives, which was associated with small-to-medium effect sizes. These data suggest that socially anxious drinkers endorse greater drinking in response to negative emotions and to avoid scrutiny rather than to enhance positive mood or increase sociability. Second, coping and conformity motives independently and additively mediated the relation between social anxiety and past-month situation-specific drinking. These results are in contrast to prior work finding that coping and conformity

motives did not impact the relation of social anxiety to past-month drinking broadly (Ham et al., 2009). Rather our results highlight the importance of considering drinking context. Specifically, socially anxious undergrads appear vulnerable to heavy drinking in particular contexts (i.e., situations involving negative emotions and personal/intimate situations) and they seem to drink more in these specific situations to cope with negative affect and avoid ridicule from alcohol-using peers.

#### 4.1 *Mediation Results*

Consistent with tension-reduction based models of substance use (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Conger, 1956; Khantzian, 1997), coping motives mediated the relation between social anxiety and drinking in negative emotion situations (e.g., after a fight, when angry or sad). It follows that coping motives may not impact the relation between social anxiety and drinking behaviors broadly (Ham et al., 2009)—rather, socially anxious persons seem to drink to cope with negative affect specifically in situations in which they experience greater negative affect. One such situation appears to be personal/intimate situations. It may be that socially anxious persons drink more while on a date, with a lover, or prior to engaging in sexual intercourse, for example, to help (either subjectively or objectively) relieve anxiety. Socially anxious drinkers use alcohol to cope with their social anxiety (Buckner & Heimberg, 2010; Thomas, Randall, & Carrigan, 2003) and to reduce state social anxiety (Battista & Kocovski, 2010). It could be that socially anxious persons fear that the physiological symptoms of social anxiety (e.g., sweating, blushing, shaking) may be especially noticeable in personal/intimate situations (e.g., prior to sexual intercourse) relative to larger social gatherings. Socially anxious drinkers may be motivated to drink to cope with these physiological symptoms for fear that they may result in negative evaluation or rejection. Heavy drinking in these situations might also occur to cope with fears of intimacy and/or sexual performance anxiety, given that socially anxious persons report greater fear of intimacy (Montesi et al., 2013), greater sexual performance anxiety (Bodinger et al., 2002), and greater sexual dysfunction (Figueira, Possidente, Marques, & Hayes, 2001).

Our results suggest that conformity motives also mediated the relationship between social anxiety and drinking in negative emotion and personal/intimate situations. These findings may reflect that in some drinking contexts, socially anxious persons experience elevated fear of negative evaluation by alcohol-using peers and use alcohol as a way to “fit in,” thereby avoiding negative evaluation and decreasing negative affect associated with evaluation fears. Yet, socially anxious do not drink more in social/convivial (e.g., parties, bars) situations (Terlecki et al., 2014)--situations in which others are presumably also drinking and could thereby prompt fear of scrutiny. This suggests there may be other high-risk situations in which socially anxious persons especially fear negative evaluation for not drinking, such personal/intimate situations drinking. Social events in college often involve alcohol and students tend to overestimate peer drinking, leading to increased consumption (Neighbors, Larimer, & Lewis, 2004). Socially anxious students are particularly vulnerable to heavy drinking in response to perceived drinking norms (LaBrie, Hummer, & Neighbors, 2008; Neighbors et al., 2007) such that high social anxiety students with larger misperceptions of peer drinking endorse greater drinking (Neighbors et al., 2007). Socially anxious students may therefore use alcohol in personal/intimate situations (e.g., after work/school, on a date) to conform to beliefs that heavy drinking is socially expected and doing so will help them avoid negative evaluation in smaller, more intimate social contexts in which they will presumably be more likely to be the focus of another’s attention. Alternatively, socially anxious drinkers may find drink refusal more difficult in personal/intimate situations due to higher perceived risk of social ridicule or difficulties resisting perceived social pressure to drink (Buckner, Meade Eggleston, & Schmidt, 2006).

#### *4.2 Treatment implications*

The present findings may be useful for alcohol prevention and treatment efforts for socially anxious undergraduate drinkers given that they continue to engage in heavy drinking after a brief motivational intervention (BMI; Terlecki et al., 2011). Heavy post-BMI drinking may be partially attributable to elevated descriptive norms (perceived peer drinking behavior) and/or injunctive norms (perceived peer approval of drinking behavior) following the BMI. For

example, cognitive restructuring components in BMI (e.g., corrective peer norms interventions) aim to improve awareness of actual rather than perceived descriptive norms for peer alcohol use given that students tend to believe their peers drink more heavily than they do (Borsari & Carey, 2001). Students who successfully engage in cognitive restructuring for peer drinking after BMI also report lower post-BMI drinking (Neighbors et al., 2004). Further, socially anxious drinkers who did not lower perceived drinking norms following a BMI remained vulnerable to post-BMI heavy typical drinking (Terlecki, Buckner, Larimer, & Copeland, 2012). Thus further emphasis on helping highly socially anxious drinkers engage in cognitive restructuring (i.e., decrease normative beliefs about peer drinking) in a BMI may help decrease conformity motivated drinking. It could also be that more intensive psychosocial treatment such as cognitive behavior therapy might be useful for highly socially anxious students who are less able to change inaccurate beliefs regarding peer alcohol use via brief treatment. To illustrate, cognitive restructuring and behavioral experiments may prove helpful for socially anxious drinkers who are prone to believing that alcohol is a means to gain social approval, avoid social disapproval, or cope with negative affect so that more accurate beliefs about the effects of alcohol are developed.

In addition, development of injunctive drinking norms components may be useful to reduce heavy drinking as a means of gaining social approval or acceptance among socially anxious drinkers. Social norms feedback (Lewis & Neighbors, 2006) may help correct erroneous perceptions that alcohol is needed to gain social approval or to 'fit in', which might be more salient for socially anxious drinkers than the descriptive norms feedback we utilized in our BMI (Terlecki et al., 2012). Among undergraduates unselected for SA, injunctive norms endorsement predicted heavy drinking, alcohol problems and alcohol dependence one year later (Larimer, Turner, Mallett, & Geisner, 2004). Injunctive norm endorsement also predicted drinking consequences when controlling for drinking levels (LaBrie, Hummer, Neighbors, & Larimer, 2010). Socially anxious students with greater injunctive norms also report more alcohol problems (Buckner, Ecker, & Proctor, 2011), which may account for the association between social anxiety and greater alcohol problems (Buckner et al., 2013).

Increased attention on the benefits of injunctive norms components, may help reduce conformity motivated drinking amongst social anxious drinkers yet this contention has not been tested to our knowledge. The majority of social norms interventions have utilized descriptive norms, yet emerging evidence suggests that injunctive norms interventions have resulted in positive behavior change (Reid & Aiken, 2013). Given these findings, the development of injunctive norms interventions that include a proximal referent's (e.g., peer, significant other, or family) approval of the individual's heavy drinking behavior may be especially salient for reducing alcohol use among socially anxious drinkers.

#### *4.3 Limitations and future directions*

The present study should be considered in light of limitations that can inform additional avenues for work in this area. First, the cross-sectional nature of the data limits our ability to draw conclusions regarding causal relations. Second, the data were collected via self-report which is subject to measurement error. Third, future work is necessary to determine whether our results generalize to treatment-seeking sample of socially anxious undergraduate drinkers or to non-undergraduate samples. Fourth, our sample was predominantly Caucasian. Fifth, we examined situation-specific drinking quantity and future work could benefit from assessing how frequently undergraduates drink in each specific situation.

#### *4.4 Conclusions*

The current study provides evidence of negative drinking motives as mechanisms of heavy situational drinking among undergraduate drinkers with clinically elevated social anxiety. These findings may contribute to the extant literature on alcohol intervention components (e.g., injunctive norms interventions) that could be personalized to improve outcomes among a group of individuals who risk poorer treatment outcomes with current therapeutic interventions (Terlecki et al., 2011).

## References

- Arbuckle, J. L. (2011). AMOS 20. Meadville, PA: SPSS.
- Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*, *111*(1), 33-51. doi: 10.1037/0033-295x.111.1.33
- Battista, S. R., & Kocovski, N. L. (2010). Exploring the effect of alcohol on post-event processing specific to a social event. *Cognitive Behaviour Therapy*, *39*(1), 1-10. doi: 10.1080/16506070902767613
- Bodinger, L., Hermesh, H., Aizenberg, D., Valevski, A., Marom, S., Shiloh, R., . . . Weizman, A. (2002). Sexual function and behavior in social phobia. *Journal of Clinical Psychiatry*, *63*(10), 874-879.
- Borsari, B., & Carey, K. B. (2001). Peer influences on college drinking: A review of the research. *Journal of Substance Abuse*, *13*, 391-424.
- Brown, E. J., Turovsky, J., Heimberg, R. G., Juster, H. R., Brown, T. A., & Barlow, D. H. (1997). Validation of the social interaction anxiety scale and the social phobia scale across the anxiety disorders. *Psychological Assessment*, *9*(1), 21-27. doi: 10.1037/1040-3590.9.1.21
- Buckner, J. D., Ecker, A. H., & Proctor, S. L. (2011). Social anxiety and alcohol problems: The roles of perceived descriptive and injunctive peer norms. *Journal of Anxiety Disorders*, *25*(5), 631-638.
- Buckner, J. D., & Heimberg, R. G. (2010). Drinking behaviors in social situations account for alcohol-related problems among socially anxious individuals. *Psychology of Addictive Behaviors*, *24*(4), 640-648. doi: 10.1037/a0020968
- Buckner, J. D., Heimberg, R. G., Ecker, A. H., & Vinci, C. (2013). A biopsychosocial model of social anxiety and substance use. *Depression and Anxiety*, *30*(3), 276-284. doi: 10.1002/da.22032

- Buckner, J. D., Meade Eggleston, A., & Schmidt, N. B. (2006). Social anxiety and problematic alcohol consumption: The mediating role of drinking motives and situations. *Behavior Therapy, 37*(4), 381-391. doi: 10.1016/j.beth.2006.02.007
- Buckner, J. D., Schmidt, N. B., Lang, A. R., Small, J. W., Schlauch, R. C., & Lewinsohn, P. M. (2008). Specificity of social anxiety disorder as a risk factor for alcohol and cannabis dependence. *Journal of Psychiatric Research, 42*(3), 230-239. doi: 10.1016/j.jpsychires.2007.01.002
- Buckner, J. D., Timpano, K. R., Zvolensky, M. J., Sachs-Ericsson, N., & Schmidt, N. B. (2008). Implications of comorbid alcohol dependence among individuals with social anxiety disorder. *Depression and Anxiety, 25*(12), 1028-1037. doi: 10.1002/da.20442
- Clements, R. (1999). Prevalence of alcohol-use disorders and alcohol-related problems in a college student sample. *Journal of American College Health, 48*(3), 111-118. doi: 10.1080/07448489909595682
- Conger, J. J. (1956). Alcoholism: Theory, problem and challenge. II. Reinforcement theory and the dynamics of alcoholism. *Quarterly Journal of Studies on Alcohol, 17*(2), 296-305.
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment, 6*(2), 117-128. doi: 10.1037/1040-3590.6.2.117
- Cooper, M. L., Russell, M., Skinner, J. B., & Windle, M. (1992). Development and validation of a three-dimensional measure of drinking motives. *Psychological Assessment, 4*(2), 123-132. doi: 10.1037/1040-3590.4.2.123
- Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2004). Another look at heavy episodic drinking and alcohol use disorders among college and noncollege youth. *Journal of Studies on Alcohol, 65*(4), 477-488.
- Figueira, I., Possidente, E., Marques, C., & Hayes, K. (2001). Sexual Dysfunction: A Neglected Complication of Panic Disorder and Social Phobia. *Archives of Sexual Behavior, 30*(4), 369-377. doi: 10.1023/a:1010257214859



- Ham, L. S., Bonin, M., & Hope, D. A. (2007). The role of drinking motives in social anxiety and alcohol use. *Journal of Anxiety Disorders, 21*(8), 991-1003. doi: 10.1016/j.janxdis.2006.10.014
- Ham, L. S., & Hope, D. A. (2003). College students and problematic drinking: A review of the literature. *Clinical Psychology Review, 23*(5), 719-759. doi: 10.1016/s0272-7358(03)00071-0
- Ham, L. S., Zamboanga, B. L., Bacon, A. K., & Garcia, T. A. (2009). Drinking Motives as Mediators of Social Anxiety and Hazardous Drinking Among College Students. *Cognitive Behaviour Therapy, 38*(3), 133-145. doi: 10.1080/16506070802610889
- Heimberg, R., Mueller, G., Holt, C., Hope, D., & Leibowitz, M. (1992). Assessment of anxiety in social interaction and being observed by others: The social interaction scale and the social phobia scale. *Behavior Therapy, 23*, 53-73. doi: 10.1016/S0005-7894(05)80308-9
- Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. doi: 10.1080/10705519909540118
- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry, 4*(5), 231-244. doi: 10.3109/10673229709030550
- Knight, J. R., Wechsler, H., Kuo, M., Seibring, M., Weitzman, E. R., & Schuckit, M. A. (2002). Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol, 63*, 263-270.
- LaBrie, J. W., Hummer, J. F., & Neighbors, C. (2008). Self-consciousness moderates the relationship between perceived norms and drinking in college students. *Addictive Behaviors, 33*(12), 1529-1539. doi: 10.1016/j.addbeh.2008.07.008
- LaBrie, J. W., Hummer, J. F., Neighbors, C., & Larimer, M. E. (2010). Whose opinion matters? The relationship between injunctive norms and alcohol consequences in

- college students. *Addictive Behaviors*, 35(4), 343-349. doi:  
<http://dx.doi.org/10.1016/j.addbeh.2009.12.003>
- Larimer, M. E., & Cronce, J. M. (2007). Identification, prevention, and treatment revisited: Individual-focused college drinking prevention strategies 1999–2006. *Addictive Behaviors*, 32(11), 2439-2468. doi: 10.1016/j.addbeh.2007.05.006
- Larimer, M. E., Turner, A. P., Mallett, K. A., & Geisner, I. M. (2004). Predicting Drinking Behavior and Alcohol-Related Problems Among Fraternity and Sorority Members: Examining the Role of Descriptive and Injunctive Norms. *Psychology of Addictive Behaviors*, 18(3), 203-212. doi: 10.1037/0893-164x.18.3.203
- Lewis, M. A., Hove, M. C., Whiteside, U., Lee, C. M., Kirkeby, B. S., Oster-Aaland, L., . . . Larimer, M. E. (2008). Fitting in and feeling fine: Conformity and coping motives as mediators of the relationship between social anxiety and problematic drinking. *Psychology of Addictive Behaviors*, 22(1), 58-67. doi: 10.1037/0893-164x.22.1.58
- Lewis, M. A., & Neighbors, C. (2006). Who is the typical college student? Implications for personalized normative feedback interventions. *Addictive Behaviors*, 31(11), 2120-2126. doi: 10.1016/j.addbeh.2006.01.011
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, 36(4), 455-470. doi: 10.1016/s0005-7967(97)10031-6
- Montesi, J. L., Conner, B. T., Gordon, E. A., Fauber, R. L., Kim, K. H., & Heimberg, R. G. (2013). On the relationship among social anxiety, intimacy, sexual communication, and sexual satisfaction in young couples. *Archives of Sexual Behavior*, 42(1), 81-91. doi: 10.1007/s10508-012-9929-3
- Neighbors, C., Fossos, N., Woods, B. A., Fabiano, P., Sledge, M., & Frost, D. (2007). Social anxiety as a moderator of the relationship between perceived norms and drinking. *Journal of Studies on Alcohol and Drugs*, 68(1), 91-96.
- Neighbors, C., Larimer, M. E., & Lewis, M. A. (2004). Targeting misperceptions of descriptive drinking norms: Efficacy of a computer-delivered personalized normative feedback

- intervention. *Journal of Consulting and Clinical Psychology*, 72(3), 434-447. doi: 10.1037/0022-006x.72.3.434
- O'Hare, T. M. (1997). Measuring excessive alcohol use in college drinking contexts: The drinking context scale. *Addictive Behaviors*, 22(4), 469-477. doi: 10.1016/s0306-4603(96)00050-0
- Reid, A. E., & Aiken, L. S. (2013). Correcting injunctive norm misperceptions motivates behavior change: A randomized controlled sun protection intervention. *Health Psychology*, 32(5), 551-560. doi: 10.1037/a0028140
- Rodebaugh, T. L., Woods, C. M., Heimberg, R. G., Liebowitz, M. R., & Schneier, F. R. (2006). The Factor Structure and Screening Utility of the Social Interaction Anxiety Scale. *Psychological Assessment*, 18(2), 231-237. doi: 10.1037/1040-3590.18.2.231
- Schneier, F. R., Foose, T. E., Hasin, D. S., Heimberg, R. G., Liu, S.-M., Grant, B. F., & Blanco, C. (2010). Social anxiety disorder and alcohol use disorder comorbidity in the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychological Medicine*, 40(6), 977-988. doi: 10.1017/S0033291709991231
- Stewart, S. H., Morris, E., Mellings, T., & Komar, J. (2006). Relations of social anxiety variables to drinking motives, drinking quantity and frequency, and alcohol-related problems in undergraduates. *Journal of Mental Health*, 15(6), 671-682. doi: 10.1080/09638230600998904
- Stewart, S. H., Zeitlin, S. B., & Samoluk, S. B. (1996). Examination of a three-dimensional Drinking Motives Questionnaire in a young adult university student sample. *Behaviour Research and Therapy*, 34(1), 61-71. doi: 10.1016/0005-7967(95)00036-w
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson Education Inc.
- Terlecki, M. A., Buckner, J. D., Larimer, M. E., & Copeland, A. L. (2011). The role of social anxiety in a brief alcohol intervention for heavy-drinking college students. *Journal of Cognitive Psychotherapy*, 25(1), 7-21. doi: 10.1891/0889-8391.24.4.5

- Terlecki, M. A., Buckner, J. D., Larimer, M. E., & Copeland, A. L. (2012). Brief motivational intervention for college drinking: The synergistic impact of social anxiety and perceived drinking norms. *Psychology of Addictive Behaviors*. doi: 10.1037/a0027982
- Terlecki, M. A., Ecker, A. H., & Buckner, J. D. (2014). College drinking problems and social anxiety: The importance of drinking context. *Psychology of Addictive Behaviors*, 28(2), 545-552. doi: 10.1037/a0035770
- Thomas, S. E., Randall, C. L., & Carrigan, M. H. (2003). Drinking to cope in socially anxious individuals: A controlled study. *Alcoholism: Clinical and Experimental Research*, 27(12), 1937-1943. doi: 10.1097/01.ALC.0000100942.30743.8C

Table 1

*Intercorrelations, means, and standard deviations of social anxiety, drinking motives, and drinking situations variables*

	1	2	3	4	5	6	7	8
1. Social anxiety	-							
2. Enhancement motives	.07	-						
3. Coping motives	.34 <sup>***</sup>	.55 <sup>***</sup>	-					
4. Social motives	.11	.81 <sup>***</sup>	.63 <sup>***</sup>	-				
5. Conformity motives	.36 <sup>***</sup>	.31 <sup>***</sup>	.58 <sup>***</sup>	.37 <sup>***</sup>	-			
6. Social/convivial drinking	.01	.60 <sup>***</sup>	.45 <sup>***</sup>	.57 <sup>***</sup>	.29 <sup>***</sup>	-		
7. Personal/intimate drinking	.11	.39 <sup>***</sup>	.36 <sup>***</sup>	.35 <sup>***</sup>	.29 <sup>***</sup>	.68 <sup>***</sup>	-	
8. Negative coping drinking	.25 <sup>***</sup>	.22 <sup>**</sup>	.38 <sup>***</sup>	.17 <sup>**</sup>	.38 <sup>***</sup>	.47 <sup>***</sup>	.58 <sup>***</sup>	-
Means	43.97	11.97	8.81	13.24	7.58	4.66	1.71	1.50
(SD)	(25.94)	(5.38)	(4.03)	(5.79)	(3.40)	(3.29)	(1.49)	(1.62)

*Note.*  $N = 232$ . Social anxiety was measured with the *Social Phobia Scale* (SPS) and the *Social Interaction Anxiety Scale* (SIAS). Drinking motives were measured with the *Drinking Motives Questionnaire Revised* (DMQR). Alcohol use was measured via a drinking situation specific revision of the *Drinking Context Scale Revised* (DCSR).

<sup>\*\*\*</sup>  $p < .001$ ; <sup>\*\*</sup>  $p < .01$ .

Table 2

*Mean scores, standard deviations, and significance of drinking motives subscales by social anxiety group controlling for employment and gender*

Variable	Low Social Anxiety ( <i>n</i> = 116)		High Social Anxiety ( <i>n</i> = 116)		<i>F</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<i>DMQ-R</i>							
Social	12.53	5.42	13.96	6.08	2.64	.106	.25
Enhancement	11.46	5.36	12.47	5.38	1.60	.207	.19
Coping	7.52	3.07	10.11	4.45	25.27	<.001	.68
Conformity	6.28	2.17	8.88	3.89	37.06	<.001	.83

*Note.* *N* = 232. *DMQ-R* = *Drinking Motives Questionnaire-Revised*. *d* = Cohen's *d*.

Table 3

*Regression results for six mediation models.*

	Path	$\beta$	<i>b</i>	<i>SE</i>	<i>P</i>
<b>Model A</b>					
Social anxiety group → Coping motives	a1	.22	2.102	.379	<.001
Coping motives → Negative emotional drinking contexts	b1	.38	1.122	.112	<.001
<b>Model B</b>					
Social anxiety group → Conformity motives	a2	.28	2.167	.297	<.001
Conformity motives → Negative emotional drinking contexts	b2	.34	1.276	.142	<.001
<b>Model C</b>					
Social anxiety group → Coping motives	a1	.22	2.102	.379	<.001
Social anxiety group → Conformity motives	a2	.28	2.167	.297	<.001
Coping motives → Negative emotional drinking contexts	b1	.27	.804	.111	<.001
Conformity motives → Negative emotional drinking contexts	b2	.19	.700	.139	<.001
<b>Model D</b>					
Social anxiety group → Coping motives	a1	.22	2.102	.379	<.001
Coping motives → Personal/intimate drinking contexts	b1	.31	1.339	.165	<.001
<b>Model E</b>					
Social anxiety group → Conformity motives	a2	.28	2.167	.297	<.001
Conformity motives → Personal/intimate drinking contexts	b2	.26	1.405	.210	<.001
<b>Model F</b>					
Social anxiety group → Coping motives	a1	.22	2.102	.379	<.001
Social anxiety group → Conformity motives	a2	.28	2.167	.297	<.001
Coping motives → Personal/intimate drinking contexts	b1	.24	1.038	.200	<.001
Conformity motives → Personal/intimate drinking contexts	b2	.12	.661	.250	.008

*Note.*  $\beta$  = standardized regression weight, *b* = unstandardized regression weight.

Table 4

*Bootstrap estimates of the standard errors and 95% confidence intervals for the indirect effects.*

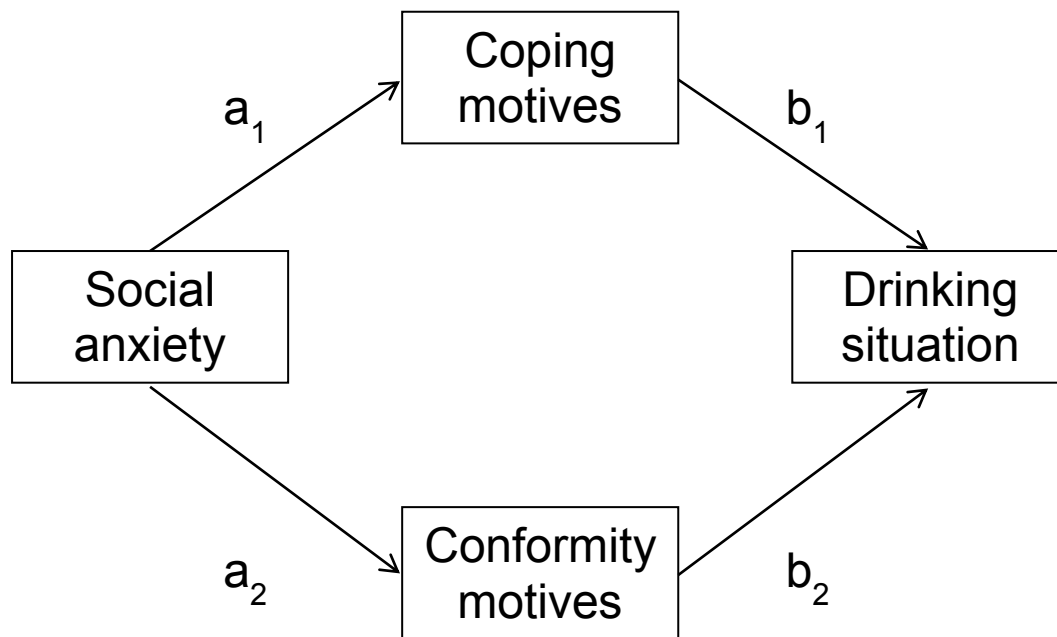
Indirect Effects	$\beta$	$b$	SE	CI (lower)	CI (upper)	$p$
<b>Model A</b>						
Social anxiety → Coping motives → Negative emotional contexts ( $a_1*b_1$ )	.08	2.359	.599	1.351	3.764	<.001
<b>Model B</b>						
Social anxiety → Conformity motives → Negative emotional contexts ( $a_2*b_2$ )	.10	2.764	.674	1.622	4.299	<.001
<b>Model C</b>						
Social anxiety → Coping motives → Negative emotional contexts ( $a_1*b_1$ )	.06	1.689	.478	.924	2.858	<.001
Social anxiety → Conformity motives → Negative emotional contexts ( $a_2*b_2$ )	.05	1.516	.562	.598	2.823	.001
( $a_1*b_1$ ) + ( $a_2*b_2$ )	.11	3.205	.729	1.952	4.841	<.001
( $a_1*b_1$ ) - ( $a_2*b_2$ )	.01	.173	.747	-1.271	1.677	.817
<b>Model D</b>						
Social anxiety → Coping motives → Personal/intimate contexts ( $a_1*b_1$ )	.07	2.81	.659	1.659	4.255	<.001
<b>Model E</b>						
Social anxiety → Conformity motives → Personal/intimate contexts ( $a_2*b_2$ )	.07	3.04	.707	1.834	4.646	<.001
<b>Model F</b>						
Social anxiety → Coping motives → Personal/intimate contexts ( $a_1*b_1$ )	.05	2.18	.578	1.206	3.519	.000
Social anxiety → Conformity motives → Personal/intimate contexts ( $a_2*b_2$ )	.03	1.43	.635	.344	2.852	.010
( $a_1*b_1$ ) + ( $a_2*b_2$ )	.08	3.61	.781	2.250	5.313	.000
( $a_1*b_1$ ) - ( $a_2*b_2$ )	.02	.75	.931	-.981	2.726	.391

*Note.* Social anxiety group is the independent variable, Motives (Coping or conformity;  $M_1$ ) are the mediators, and drinking contexts (Negative Emotional or Personal/Intimate) are the outcomes.  $a_1*b_1$  and  $a_2*b_2$  = Specific indirect effects of  $M_1$ . The 95% Confidence Intervals (CI) for indirect effects were obtained by bootstrapping with 10,000 resamples. CI (lower) = lower bound of a 95% confidence interval; CI (upper) = upper bound; → = affects.

$\beta$  = standardized indirect effect,  $b$  = unstandardized indirect effect.



Figure 1. Conceptual path model for the effect of social anxiety on situational drinking (negative emotion, personal/intimate situations) via coping and conformity motives.



### **Author Disclosures**

Social Anxiety, Coping and Conformity Motives, and Heavy Situational Drinking: Multiple Mediator Analyses

### **Role of Funding Sources**

This project was partially supported by the following grants: F31AA017565 awarded to Meredith Terlecki and 5R21DA029811-02 and 1R34DA031937-01A1 awarded to Julia Buckner. Neither NIAAA nor NIDA had a role in study design, data collection, data analysis, manuscript writing nor the decision to submit the paper for publication.

### **Contributors**

The study's authors Drs Terlecki and Buckner contributed to the literature review, study design, data analysis, and manuscript writing. All authors approve the final manuscript for submission. The authors agree with the indicated authorship order. The study's authors contributed significantly to the completion of this manuscript.

### **Conflict of Interest**

The study's authors do not have conflicts of interest in conducting the study or the reporting of its results.

## Highlights

- Elevated social anxiety (SA) is associated with greater coping & conformity motives
- Coping & conforming motives additively mediated heavy situational drinking
- Negative affect coping & scrutiny avoidance drive situational drinking in high SA