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Social anxiety, disengagement coping, and alcohol use behaviors among adolescents

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Abstract

Background and Objectives—Although research indicates that social anxiety (SA) is associated with problematic drinking, few studies have examined these relations among adolescents, and all alcohol-related assessments have been retrospective. Socially anxious youth may be at risk to drink in an effort to manage negative affectivity, and a proclivity towards disengagement coping (e.g., avoidance of aversive stimuli) may enhance the desire to drink and learning of coping-related use.

Design—Adding to research addressing adolescent SA and alcohol use, the current study examined (1) proportional drinking motives (subscale scores divided by the sum of all subscales), (2) current desire to drink in a socially-relevant environment (introduction to research laboratory), and (3) the indirect effect of retrospectively-reported disengagement in social stress contexts on proportional coping motives and desire to drink.

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Method—Participants were 70 community-recruited adolescents who reported recent alcohol use. Level of SA, disengagement coping, drinking motives, and desire to drink following laboratory introduction were assessed.

Results—Proclivity toward disengagement in prior socially-stressful contexts accounted for significant variance in the positive relations between SA and both proportional coping motives and current desire to drink.

Conclusions—These data complement existing work. Continued efforts in building developmentally-sensitive models of alcohol use are needed.

Keywords

alcohol use; coping; social anxiety; adolescence

Adolescent alcohol use is linked to an array of negative consequences, including neurological and somatic damage, sexual risk-taking, violence, and increased mortality rates (Hingson & Kenkel, 2004; Tapert et al., 2004). Moreover, risk-related use of alcohol during adolescence (e.g., early initiation; heavy consumption; coping-motivated drinking) is positively correlated with drinking behaviors in adulthood (Rohde et al., 2001; Wittchen et al., 2008), and adolescents transition from initial use to problematic drinking (i.e., experiencing negative consequences from drinking, including alcohol use disorders) more rapidly than adults (Deas et al., 2000). Of note, adolescence is characterized by an increase in certain risk-taking behaviors, including the use of alcohol (Arnett, 1999; Masten et al., 2009). Disentangling “normative” experimentation and “problem-prone” drinking, including work identifying subgroups of youth and malleable factors linked with problematic trajectories (e.g., heavy drinking, coping-related consumption; Jackson, 2008, Kuntsche, Stewart, & Cooper, 2008) is key to the development of effective intervention strategies (Labouvie & White, 2002; Masten et al., 2009; Weber et al., 1989).

Consistent with a large body of work conducted with adults (e.g., see Morris et al., 2005 for a review), a burgeoning literature indicates a positive association between adolescent social anxiety and problematic alcohol use (see Blumenthal, Leen-Feldner, Badour, & Babson, 2011). Indeed, despite documented “protection” from early initiation or regular use (Tomlinson & Brown, 2012), extant work consistently demonstrates elevated risk for an alcohol use disorder (AUD) among adolescents with social anxiety disorder (e.g., Clark et al., 1995) or elevated social fears (Essau et al., 1999). Further, social anxiety is identified as the antecedent disorder in the majority of cases across both large-scale retrospective (Nelson et al., 2000) and prospective (Zimmerman & Schmeelk-Cone, 2003; Zimmerman et al., 2003) designs. For example, in a sample of over 2,000 youth (14–24 years), Zimmerman and colleagues (2003) found that social anxiety disorder was associated with a two-fold increase in risk for concurrent alcohol dependence, as well as the onset of regular use, hazardous use (i.e., greater than 40g/day for men, 20g/day for women), and the persistence of alcohol dependence across a four-year follow-up period. Similarly, Buckner and colleagues (2008) found that adolescents diagnosed with social anxiety disorder were significantly more likely to develop alcohol dependence by age 30 years as compared to those without the diagnosis, even after controlling for gender and other relevant diagnoses (e.g., other anxiety, substance

use, and mood disorders). Although compelling, the majority of work conducted with adolescents has solely addressed the frequency of social anxiety-AUD co-occurrence, and little work has examined theoretically-derived mechanisms (e.g., social stress responding; drinking motives) potentially undergirding this relation.

A general proclivity towards disengagement coping strategies (e.g., efforts to avoid or separate one's self from an aversive stimulus; Connor-Smith et al., 2000) among socially anxious adolescents may set the stage for coping-related alcohol consumption (a pattern of use associated with the development of problematic drinking; Carpenter & Hasin, 1999; Kuntsche et al., 2005), particularly in the context of social stress. Drawing on contemporary self-medication (see Carrigan & Randall, 2003; Kushner, Abrams, & Borchardt, 2000) and the recently proposed biopsychosocial (Buckner et al., 2013) models of alcohol use, socially anxious youth may be at particular risk to use alcohol in an effort to manage or avoid negative affectivity. Implicit in models of avoidance-related drinking is that the anxiolytic effects of alcohol negatively reinforce consumption (Sayette, 1999; Torres & Ortega, 2004), thereby eliciting and maintaining its use as an avoidance or escape technique. The more distal tendency to employ voluntary disengagement strategies when faced with social stress (a characteristic consistent with the nature of social anxiety) may facilitate the learning, and maintenance of, avoidance-related drinking in socially stressful contexts (i.e., "telescoping"). Socially anxious adolescents may be at particular risk for the employment and eventual reliance upon disengagement coping strategies for at least two reasons. First, avoidance-related coping and dependence on identified 'safety behaviors' are common features of social anxiety (Ollendick, & Hirshfeld-Becker, 2002; Ottenbreit et al., 2014; Plasencia, Alden, & Taylor, 2011). Extant work further indicates that disengagement coping is positively correlated with anxiety (broadly defined) among both adolescents (Connor-Smith et al., 2000) and young adults (Connor-Smith & Compas, 2002). Second, as adolescents mature their coping repertoire also advances in complexity, and the ability to identify and employ voluntary responses is refined (e.g., Compas et al., 2001). As such, adolescence may be a key period during which socially anxious individuals learn to rely on disengagement coping strategies broadly and, subsequently, avoidance-related drinking behaviors specifically.

Cooper's (1994) four-factor model suggests four proximal motivational categories for alcohol use: a) coping (reducing or avoiding negative affect/anxiety), b) conformity (avoiding peer rejection), c) enhancement (increasing positive affect), and d) social (enhancing social situations). Enhancement and social motives are the most widely endorsed among adolescents; however, elevated coping motives are most consistently and uniquely linked with the development of alcohol-related problems (e.g., Kuntsche et al., 2005; Kuntsche, Stewart, & Cooper, 2008). Although findings are mixed (cf. Buckner et al., 2006; Ham, Bonin, & Hope, 2007; O'Grady et al., 2011), much of the extant work conducted with adults supports the contention that social anxiety is linked with avoidance-motivated alcohol consumption (i.e., coping, conformity; Buckner & Heimberg, 2010; Ham, Zamboanga, Bacon, & Garcia, 2009; Thomas et al., 2008). Further, across both large-scale cross-sectional (Ham et al., 2009) and prospective (Windle & Windle, 2012) designs, social anxiety evidences a positive, and unique, relation with coping motives in young adult samples (cf. Buckner et al., 2006). In the one study to date directly investigating the

association between social anxiety and motives for alcohol consumption among adolescents (50 community-recruited adolescents; age 12–17 years), Blumenthal and colleagues (2010) reported that level of social anxiety was positively related to coping motives for alcohol consumption, but not conformity, enhancement, or social motives. At present, the extant literature suggests that socially anxious adolescents may be at risk for avoidance-related alcohol consumption, and coping-related motivations in particular; however, it is important to replicate these findings across independent samples, as well as ascertain the role of responding to social stress specifically, as opposed to negative affect generally (Hussong & Chassin, 1994).

Recent work conducted with adults highlights the role of managing and/or avoiding social stress *specifically* in the relation between social anxiety and problematic drinking (e.g., Cludius et al., 2013). For example, Thomas and colleagues (2003) found that community-recruited adults high in social anxiety reported (a) drinking in an effort to reduce anticipatory and concurrent anxiety associated with social situations, (b) relief of (social) anxiety as a function of alcohol use, as well as (c) avoidance of social situations if alcohol is not available, all to a greater degree than a non-socially anxious comparison group. Similarly, in a sample of over 350 college students, Buckner and Heimberg (2010) found that drinking to cope in social situations (specifically), as well as intentional avoidance of social situations if alcohol was not available, accounted for a significant proportion of the relation between social anxiety and alcohol-related problems. This growing body of work more directly speaks to the supposition that socially anxious individuals, when faced with social stress, are at risk for using alcohol as a means of disengagement coping (please see O’Grady et al., 2011 for additional important considerations). Accordingly, the proclivity towards disengagement coping may represent a promising target for intervention, particularly in efforts aimed at disrupting the development of problematic substance use behaviors via avoidance-related patterns of use (e.g., also see Buckner, Heimberg, & Schmidt, 2011).

It is important to note that no work has yet examined how social anxiety, disengagement coping, and alcohol use indices may relate to one another among adolescents. The dearth of literature in this area is unfortunate, given adolescence is a period in which (a) a more sophisticated understanding and application of coping responses, including forms and functions of disengagement emerges (Compas et al., 2001), (b) normative increases in social anxiety and experimentation with alcohol are seen (Essau et al., 1999; Wittchen et al., 2008), (c) the onset of dysfunctional social anxiety and problematic alcohol use behaviors typically occur (Labouvie & White, 2002; Velting & Albano, 2001), and (d) beliefs about the effects of alcohol continue to form (Christiansen, Goldman, & Inn, 1982; Schell et al., 2005). This suite of characteristics highlights adolescence as an important developmental epoch during which to study the onset of, and linkages among, problematic social anxiety and alcohol use. The current study was designed to address several key limitations of the extant literature.

First, no work has specifically examined the role of disengagement responding to social stress in the association between adolescent social anxiety and (coping-related) alcohol use behaviors. Given that this construct reflects the putative mechanism underlying the link between social anxiety and problematic alcohol use, the current study tested the indirect

effect of retrospectively-reported disengagement coping in the relation between social anxiety and two relevant drinking indices: (1) coping motives broadly, and (2) current desire to drink in the unfamiliar laboratory environment. Second, only one study to date has directly examined social anxiety and coping-related drinking motives among adolescents (Blumenthal et al., 2010), and thus replication in an independent sample is needed to support the stability of this finding. Finally, retrospective data may be subject to several reporting biases, (e.g., misattribution, memory distortion; Nisbett & Ross, 1980), which can be reduced by assessing the desire to consume alcohol during a potentially anxiety producing activity (e.g., in anticipation of or during a social interaction; Thomas & Bacon, 2013). For that reason, in addition to self-reported coping motives for drinking, the present study examined participants' *current* desire to drink shortly after their introduction to the laboratory (e.g., Gunnar et al., 2009; Walker et al., 2001), a novel social situation with unfamiliar individuals and unclear expectations for behavior. Further, participants were aware that completion of questionnaires would be followed by an interview with the researcher, thus enhancing the social relevance of the environment.

Consistent with prior work conducted with adults (e.g., Ham et al., 2009) and preliminary data among adolescents (Blumenthal et al., 2010), it was hypothesized that social anxiety would positively relate to self-reported coping-related drinking motives as well as the current desire to drink in a novel, socially-relevant context (i.e., research laboratory; Gunnar et al., 2009) beyond variance attributable to typical alcohol use frequency (cf. Blumenthal et al., 2010; Christiansen et al., 1982; Windle & Windle, 2012). It was further expected that the indirect effect of disengagement coping in response to prior social stress would account for a significant proportion of these relations. This series of analyses was then tested in regard to current desire to drink (i.e., replacing coping motives).

Method

Participants

Participants were 70 community-recruited adolescents ages 12 to 17 years ($M = 15.78$, $SD = 1.26$; 42.9% girls) who reported a positive history of recent alcohol use (i.e., within the past 6 months; Cooper et al., 1995; Huselid & Cooper, 1992) and took part in a larger investigation focused on adolescent emotional vulnerability and health-related behaviors ($N = 96$). As a part of the larger protocol, which included possible assignment to a voluntary hyperventilation procedure, exclusionary criteria were as follows: (a) chronic respiratory (e.g., bronchitis) or cardiovascular (e.g., hypertension) problems related to physiological arousal, (b) current pregnancy, (c) lifetime history of DSM-IV-defined panic disorder or AUD, (d) current suicidality, (e) limited mental capacity or inability to provide informed, written assent to participate, or (f) absence of a parent or legal guardian to provide written informed consent. Approximately 600 parents and youth contacted the laboratory about the larger study. Seventeen interested participants did not fall within the required age range (12–17 years); 372 reported never having consumed a full, standard alcoholic beverage, and 63 had done so but not in the past six months. Additional exclusionary criteria reported at screening included: relevant respiratory problems (primarily asthma; $n = 68$), cardiovascular problems ($n = 6$), potential lifetime panic disorder ($n = 5$) and/or AUD ($n = 14$). Finally, 49

individuals were not interested in participation following study description and/or were unable to provide assent/consent for participation.¹ Ninety-six adolescents met all screening criteria and participated in the larger study; participants included in the current analyses were those with complete predictor (e.g., social anxiety) and criterion (e.g., desire to drink) data (72.9% total study sample). It is important to note that participants selected for analysis did not differ significantly from those in the larger study across any of the primary predictor, criterion, or demographic variables.

The ethnic and racial composition of the sample was as follows: 11.8% Hispanic/Latino, 82.6% Caucasian, 7.2% African American, 1.4% Asian, 1.4% Native American, 4.3% multiracial, and 2.8% “other.” Parents who accompanied youth to the laboratory (62.2% biological mothers) reported a median household income of \$70,000. Parental education was as follows: 2.2% did not graduate high school, 15.6% received a high school diploma or equivalent degree, 26.7% completed some college, 35.6% held an Associate’s or Bachelor’s degree, 8.9% reported some graduate or professional schooling, and 11.1% completed graduate or professional school. Finally, 64.4% of parents reported being married or living with someone, 22.2% were divorced, 4.4% separated, and 8.9% never married.

Measures

Screening materials—Relevant items from the well-established Youth Risk Behavior Survey (e.g., “[Other than for religious purposes], have you ever had an alcoholic drink;” CDC, 2006) in conjunction with a timeline follow-back procedure (Chung, Maisto, Cornelius, & Martin, 2004; Sobell & Sobell, 1996; Winters, 2003) were used to screen for recent alcohol use. Only youth endorsing a positive history of alcohol consumption (i.e., at least one standard drink; National Institute on Alcohol and Alcoholism, 2000) in the past six months were eligible to participate in the current study (e.g., Cooper et al., 1995). Relevant medical conditions were assessed via a structured medical health interview (e.g., Leen-Feldner, Reardon, & Zvolensky, 2007). The interview consisted of a series of two-part open-ended questions, asking (1) whether a doctor has ever diagnosed the participant with a specific condition (e.g., asthma), and (2) whether the participant has any reason to believe that they might have the condition. The full interview was administered separately to the parent (regarding child medical history) and adolescent. Finally, the well-established ADIS-C for DSM-IV (Silverman & Albano, 1996; Silverman et al., 2001) was administered by trained interviewers to establish the presence/absence of psychological exclusionary criteria (i.e., panic disorder, AUD, current suicidality).

Social anxiety—The Revised Child Anxiety and Depression Scale – Social phobia subscale (RCADS-SP; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) was used to index level of social anxiety. Participants rated nine items (e.g., “I am afraid of looking foolish in front of other people;” “I worry about what others think of me”) on a four-point scale (0 = *Never* to 3 = *Always*), indicating how often each statement reflects how they typically feel. Item ratings were summed to yield a total score. Designed to reflect the dimensions of several DSM-IV-defined anxiety disorders among adolescents, the RCADS

¹Inclusionary and exclusionary category data are not mutually exclusive.

evidences good reliability, validity, and internal consistency (e.g., SP subscale $\alpha = .85$ in the present sample; Chorpita et al., 2000).

Disengagement coping—The Voluntary Disengagement subscale of the Responses to Stress Questionnaire – Social stress version (RSQ-VD; Connor-Smith et al., 2000) was used to assess volitional disengagement responses to social stressors. Participants first are presented with a description and list of specific social stress examples (e.g., being teased, feeling pressured, being left out or rejected), and are instructed to respond to the following questions regarding how they feel, or things they do, when they have experienced these specific types of problems. The RSQ-VD subscale includes nine items addressing avoidance (e.g., “I try not to feel anything”), denial (e.g., “I try to believe it never happened”), and wishful thinking (e.g., “I wish that I were stronger, smarter, or more popular so that things would be different”), to which participants respond on a four-point scale (1 = *Not at all* to 4 = *A lot*) the frequency they use each strategy in the context of social stress (e.g., being teased). Responses were summed to yield a total score. The RSQ-VD was designed for work with adolescents, and evidences adequate reliability, validity, and internal consistency (e.g., current study $\alpha = .76$; Connor-Smith et al., 2000).

Coping motives for alcohol use—The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) was used to index motives for alcohol consumption. This measure includes four, five-item subscales indexing coping (e.g., “because it helps you when you feel depressed or nervous”), conformity (e.g., “to fit in with a group you like”), enhancement (e.g., “because it gives you a pleasant feeling”), and social (e.g., “to celebrate a special occasion with friends”) motives for drinking. Participants indicated on a five-point scale (1 = *Almost never/never* to 5 = *Almost always/always*) the frequency with which they drink for the purpose listed in each item; ratings across each of the five items were averaged to yield a subscale score. This measure has been successfully used in prior work with adolescents (Blumenthal et al., 2010; Kuntsche et al., 2008), and evidences good internal consistency (e.g., $\alpha = .85, .79, .92, .88$ for coping, conformity, enhancement, and social, respectively in the present sample), and validity (Cooper, 1994). Finally, in an effort to account for shared variance and capture relations unique to coping motives, a proportional score was derived from the subscale and total scores (Vitaliano, Maiuro, Russo, & Becker, 1987). Specifically, the coping motives subscale score was divided by the sum of all of the subscales (including coping), to create a proportional value reflecting the *relative* degree to which one endorsed coping motives for drinking. This proportion score was used in the primary analyses; however, raw scores also are presented in Table 1 for descriptive purposes.

Current desire to drink—In an effort to capture the desire to consume alcohol in a novel, socially-relevant context, participants completed the Desires for Alcohol Questionnaire (DAQ; Love, James, & Willner, 1998) shortly after introduction to the laboratory (e.g., Gunnar et al., 2009; Walker et al., 2001). Importantly, participants also were aware that completion of the questionnaires would be followed by an interview with the researcher, thus enhancing the social relevance of the environment. The well-established DAQ includes 28 items to which participants indicated their agreement with how much each statement reflects how they currently feel on a scale of 1 (*Strongly disagree*) to 7 (*Strongly agree*).

Items reflect moderate (e.g., “I might like a drink now”), as well as strong (e.g., “I need a drink now”) desires for alcohol; responses were summed to compute an overall desire for alcohol score. The DAQ evidences excellent psychometric properties (e.g., $\alpha = .96$ in the current sample; Love et al., 1998), and has been successfully employed in studies examining social drinkers (Duka, Jackson, Smith, & Stephens, 1999; Schulze & Jones, 2000), as well as adolescent populations (Tapert et al., 2003).

Alcohol use frequency—The Adolescent Alcohol and Drug Involvement Scale (AADIS; Moberg, 2000), was used to assess frequency of alcohol use. This face-valid measure asks participants to select a single answer on a scale of 0 (*never used*) to 7 (*several times a day*) that best reflects how often they typically drink alcohol (i.e., “... the response that best matches your experience.”). Each response point is accompanied by a written descriptor and higher numbers reflect increased alcohol consumption (e.g., 2 = *several times a year*, 3 = *several times a month*). This scale has been successfully used in prior work examining similar community-based samples of adolescents (e.g., Blumenthal et al., 2010).

Procedure

Study procedures were approved by the University Institutional Review Board prior to participant contact. Adolescents and guardians responding to recruitment efforts (e.g., flyers, radio advertisements) were given a detailed description of study procedures. Importantly, all participant data was kept confidential (including drinking status); parents and adolescents were made aware of this prior to screening and again at the laboratory. Following verbal parental consent, interested youth completed a preliminary (confidential) telephone screening. Adolescents eligible at this stage were invited to the laboratory (accompanied by a parent or legal guardian), at which time written parental consent and adolescent assent were obtained, and screening criteria (e.g., prior alcohol consumption) were again privately assessed and recorded. Interested parents completed a small battery of questionnaires (e.g., demographics), and adolescent participants completed a larger series of questionnaires, including the DAQ (placed near the top of the packet to ensure proximity to laboratory introduction), RCADS, RSQ, DMQ-R, and AADIS (randomly ordered). Participants then completed the ADIS-C and a series of tasks not related to the current project (e.g., breath holding). Finally, both parties were thanked, debriefed, and compensated for participation (adolescents: \$40; participating parents: \$5).

Results

Please see Table 1 for descriptive data concerning all continuous measures. Importantly, voluntary disengagement responding (RSQ-VD) evidenced statistically significant, but modest correlations with social anxiety (RCADS-SP; $r = .47$), raw ($r = .48$) and proportional coping motives scores (DMQ-R; $r = .47$), as well as the desire to drink (DAQ; $r = .34$), suggesting this measure taps a distinct construct and supporting theoretical distinctions among these variables.

Primary analyses were conducted using the PROCESS custom dialog for SPSS 19 (Hayes, 2008). Specifically, the first model tested the hypotheses that (1) social anxiety would positively relate to proportional coping motives (pathway c), (2) social anxiety positively

related to voluntary disengagement responding (pathway a), (3) disengagement responding positively related to proportional coping motives (pathway b), and (4) a significant proportion of the total effect of social anxiety on the coping motives would be accounted for by the indirect effect via voluntary disengagement responding (pathway ab). The second model tested the same series of hypotheses in regard to desire to drink rather than coping motives. A bias-corrected 95% confidence interval (CI) was used to examine the indirect effect in each model. As recommended, this approach included 5000 bootstrapping samples, and the interpretation of the indirect effect was based upon a CI that does not include zero (Preacher & Hayes, 2008).

Coping Motives

As expected, the first model accounted for a significant amount of the variance in proportional coping motives for alcohol use ($F[3, 66] = 6.51, p < .001$, adjusted $R^2 = .22$). Specifically, social anxiety significantly related to proportional coping motives (path c; $p = .046$) as well as voluntary disengagement (path a; $p < .001$), and voluntary disengagement significantly related to proportional coping motives (path b; $p < .001$). Analyses also indicated an indirect effect of social anxiety on proportional coping motives through voluntary disengagement (path ab: corrected $\beta = .003, SE = .001, 95\% \text{ CI } [.001, .006]$). Finally, the direct effect of social anxiety on proportional coping motives no longer met traditional levels of significance with the indirect effect via voluntary disengagement included in the model (path c'; $p = .983$).² Please see Figure 1 for further detail.

Desire to Drink

The second model accounted for a significant amount of the variance in current desire to drink ($F[3, 66] = 12.27, p < .001$, adjusted $R^2 = .35$). Similar to the pattern found for coping motives as the outcome variable, social anxiety significantly related to current desire to drink (path c; $p = .046$), as well as voluntary disengagement (path a; $p < .001$), and voluntary disengagement significantly related to current desire to drink (path b; $p = .029$). Analyses also indicated an indirect effect of social anxiety on current desire to drink through the linkage with voluntary disengagement (path ab: corrected $\beta = .93, SE = .61, 95\% \text{ CI } [.073, 2.46]$). Finally, the direct effect of social anxiety on current desire to drink no longer met traditional levels of significance with the indirect effect via voluntary disengagement included in the model (path c'; $p = .500$). Please see Figure 2 for further detail.

Discussion

Adolescent alcohol use represents a considerable public health and safety concern (U.S. Department of Health & Human Services, 2011), and a growing body of work indicates that socially anxious individuals are at risk for problematic use behaviors (Morris et al., 2005). The present study was designed to address several key limitations of the literature examining this linkage among adolescents. First, analyses indicated that a proclivity toward disengagement coping in the context of prior social stressors accounted for a significant

²Analyses including proportional conformity, enhancement, and social motives also were conducted. Findings replicated prior work suggesting specificity in the relation between social anxiety and coping motives among adolescents (total effect on conformity: $\beta = .001, SE = .001, p = .328$; enhancement: $\beta = -.002, SE = .001, p = .190$; social: $\beta = -.002, SE = .001, p = .074$).

proportion of the relation between social anxiety and the precursors to drinking behavior assessed here. The current study replicated prior work, indicating a positive relation between level of social anxiety and coping motives for alcohol use after accounting for variance attributed to frequency of use. Finally, social anxiety also was similarly related to adolescents' current desire to drink upon introduction to the novel, socially-relevant laboratory environment.

The current study uniquely adds to the extant literature via retrospective assessment of disengagement coping in the context of social stress. These data are consistent with contemporary theoretical accounts (e.g., Buckner et al., 2013), as well as a growing body of work conducted with adults (e.g., Buckner & Heimberg, 2010; Cludius et al., 2013). Specifically, disengagement-related affective and behavioral responding to prior social stressors, above and beyond social anxiety per se, accounted for a significant proportion of the variance in the relation between social anxiety and the drinking indices assessed here. Continued efforts in specifying the nature and boundaries of this relation are needed. Of primary importance is the current cross-sectional, correlational design; although such work is a necessary first step in establishing linkages among related processes, prospective and experimental designs will be required to ascertain the temporal patterning and causal mechanisms that are at the heart of this work (e.g., Kraemer, Yesavage, Taylor, & Kupfer, 2000). It is also important to note that only the voluntary disengagement subscale of the RSQ was available for analysis in the current study. Future work would benefit from use of the full measure, allowing for examination of the relative role of proclivity towards disengagement and/or engagement coping (e.g., "I think about the things that I am learning from the situation...", "I try to think of different ways to change the problem or fix the situation."), as well as involuntary stress responding (e.g., rumination, inaction; Connor-Smith et al., 2000) in the strength and direction of these relations. Further, a next step will be adaptation of current assessments (i.e., validated with adults) designed to directly tap in to drinking in an effort to reduce social anxiety and negative affectivity experienced in social situations (e.g., Drinking to Cope with Social Anxiety questionnaire; Buckner & Heimberg, 2010).

The current findings complement existing work conducted with adults (e.g., Windle & Windle, 2012), replicating the finding that coping motives for alcohol use are elevated among socially anxious adolescent drinkers. Importantly, both large-scale cross-sectional and prospective work identifies coping-related drinking as an important predictor of the development and maintenance of problematic alcohol use (Carpenter & Hasin, 1998; Cooper et al., 1995; Windle, 1996). Work conducted with college-age samples also has identified coping-related drinking as a partial mediator of the relation between social anxiety and alcohol use problems (Ham et al., 2009; Lewis, Hove, & Whiteside, 2008). Learning to use alcohol in an effort to reduce socially-oriented anxiety may be especially problematic among adolescents given the social nature of typical drinking environments (e.g., at parties; group settings) and saliency of social evaluation (e.g., imaginary audience, Elkind, 1967; Schwartz, Maynard, & Uzelac, 2008) characteristic of this period. Taken together, this growing literature suggests that the use of alcohol in an effort to directly avoid or escape negative affect among socially anxious individuals may emerge in adolescence, laying the foundation

for observed associations between adolescent social anxiety and subsequent drinking-related problems.

It is important to note that participants in the current study were screened and excluded for certain psychological and physical health indices, including lifetime history of a DSM-IV-defined AUD. Although this approach limits certain conclusions (e.g., generalizability to clinical populations), it allows for the consideration of theorized etiologic processes while limiting the potentially confounding effects of concurrent clinical conditions (e.g., Zvolensky et al., 2001). Indeed, as beliefs about the effects of alcohol and motives for consumption continue to be shaped across adolescence (Cooper, 1994; Schell et al., 2005), targeted intervention programs focused on such precipitants of alcohol use behaviors may help prevent the development of problematic use and related difficulties later in life (Conrod et al., 2011; Gottfredson & Wilson, 2003).

Although the current study extended prior work via the assessment of recent drinkers (cf., lifetime exposure; Blumenthal et al., 2010), alcohol-related problems were not examined. Given the burgeoning literature underscoring the relation between social anxiety and alcohol-related problems (as opposed to use behaviors broadly; Buckner & Heimberg, 2010; Buckner et al., 2008; Tomlinson & Brown, 2012), an important next step will be cross-sectional and prospective work directly addressing the linkages among social anxiety, motives for drinking, and alcohol-related problems among adolescents. Further, extension of this work to clinical populations, particularly those with social anxiety disorder and/or an AUD, is needed. If the present findings hold across such samples, then socially anxious adolescents may benefit from interventions targeting specific maladaptive coping strategies. For example, evidence supports using cognitive-behavioral interventions that target maladaptive coping strategies matching the adolescent's "personality risk factors" in reducing alcohol-related and internalizing problems (Castellanos & Conrod, 2006; Conrod et al., 2011; Conrod et al., 2006). Such interventions could be applied to socially anxious adolescents who use disengagement strategies in the context of social stress to reduce the likelihood of coping-motivated drinking and subsequent alcohol-related problems.

Finally, the present study advanced prior work, which included only retrospective measures of drinking behaviors, via assessment of participants' current desire to drink upon introduction to the socially-relevant laboratory context. The fact that these findings mirrored those found in terms of standard coping motives is noteworthy, given it suggests that more nuanced environments that adolescents regularly experience (e.g., new classes) may elicit the desire to consume alcohol among those with elevated social anxiety. Of note, the current study did not directly assess indices of current anxiety or physiological arousal (e.g., via self-report, skin conductance, cortisol level), or desire to drink prior to laboratory introduction. The correlational design also warrants significant caution in inferences drawn from these preliminary data, particularly in light of the fact that the laboratory context is not one in which alcohol promotion would be expected, thus limiting the ecological validity of the assessment. Further, both drinking motives and current desire to drink were indexed via self-report. Although this is a common technique in work conducted with adolescents (e.g., Tapert et al., 2003), and participants completed assessments in a private space following assurance of confidentiality, laboratory tasks such as assessing psychophysiological

responding to alcohol-relevant cues (e.g., words, pictures; Lowman, Hunt, Litten, & Drummond, 2000; Sayette et al., 2000; Tapert et al., 2003) may provide more precise assessments as compared to self-report alone, particularly among socially anxious adolescents. In addition to efforts addressing the aforementioned limitations, this literature also would benefit from a task comparison study, in which the effects of a more subtle social context (such as in the current project) is compared with that elicited by more typical and universally stressful performance (e.g., the Trier Social Stress Test; Buske-Kirschbaum et al., 1997) and rejection-oriented (e.g., Yale Interpersonal Stressor; Stroud et al., 2000) social stress tasks (please see Battista, Stewart, & Ham, 2010 for a review of work conducted with adults). Incorporating these sophisticated assessment techniques into a larger study amenable to more advanced statistical approaches would allow for a comprehensive assessment of the pathways linking social anxiety, voluntary disengagement, coping-related drinking motives, and alcohol-relevant responding (e.g., selective attention to alcohol cues) in the context of acute social stress.

Additional limitations of the current study warrant consideration. First, the sample was relatively homogenous (e.g., largely Caucasian), and comprised of adolescents willing and able to come to the laboratory for a monetary reward. More diverse sampling and collection strategies (e.g., via schools) will be important in determining the generalizability of the current findings (e.g., across racial/ethnic groups; Cooper et al., 2008). Finally, the current sample was too small to adequately address the role of gender (i.e., via moderated mediation analyses or separately within each gender). For example, following Buckner and Turner's (2009) finding that social anxiety disorder was prospectively related to AUD status among women, but not men, future work designed and powered to examine these relations among male and female adolescents (as well as in terms of other relevant moderators, such as peer or family use behaviors) is needed.

Together, the current study provides a springboard for continued efforts in building developmentally-sensitive models of problematic alcohol use. These data complement extant theoretical and empirical work, suggesting that socially anxious adolescents are at risk for problematic use behaviors (e.g., coping related drinking), and specify the overarching influence of disengagement coping in this relation. Future research is needed, as understanding context-specific drinking, particularly among youth at risk for problematic use, will be key to the design of effective risk-reduction and prevention efforts (Neighbors et al., 2007).

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Figure 1.

Diagram of the final model predicting proportional coping-related drinking motives (adjusted for alcohol use frequency).

Figure 2.

Diagram of the final model predicting desire to drink upon laboratory introduction (adjusted for alcohol use frequency).

Table 1

Means (standard deviation) and Zero-order Relations among all Continuous Variables

Variable	M(SD)	2	3	4	5	6	7	8	9	10	11	12
1. Social anxiety ^a	9.85 (5.22)	.47**	.18	.28*	-.00	-.01	.19	.19	-.19	-.21	.09	-.21
2. Voluntary disengagement ^b	19.12 (5.10)	–	.48**	.24*	-.02	.09	.46**	.03	-.32**	-.20	.34**	.09
3. Coping motives – Raw ^c	2.28 (1.13)	–	–	.24*	.46**	.36**	.74**	-.36**	-.09	-.36**	.54**	.40**
4. Conformity motives – Raw ^c	1.42 (0.58)	–	–	–	-.01	.12	.05	.58**	-.44**	-.18	.07	.02
5. Enhancement motives – Raw ^c	3.19 (1.30)	–	–	–	–	.74**	-.11	-.73**	.70**	.11	.54**	.47**
6. Social motives – Raw ^c	3.10 (1.19)	–	–	–	–	–	-.25*	-.57**	.25*	.60**	.44**	.44**
7. Coping – Proportional ^d	0.22 (0.07)	–	–	–	–	–	–	-.03	-.38**	-.67**	.21	.10
8. Conformity – Proportional ^d	0.15 (0.06)	–	–	–	–	–	–	–	-.66**	-.27*	-.41**	-.40**
9. Enhancement – Proportional ^d	0.31 (0.07)	–	–	–	–	–	–	–	–	.04	.23*	.22
10. Social – Proportional ^d	0.30 (0.06)	–	–	–	–	–	–	–	–	–	-.07	.05
11. Current desire to drink ^e	70.41 (37.19)	–	–	–	–	–	–	–	–	–	–	.51**
12. Drinking frequency ^f	2.71 (1.09)	–	–	–	–	–	–	–	–	–	–	–

Note. $n = 70$.^aRevised Child Anxiety and Depression Scale – Social anxiety subscale (Chorpita et al., 2000).^bResponses to Stress Questionnaire, Social stress version – Voluntary Disengagement subscale (Connor-Smith et al., 2000).^cDrinking Motives Questionnaire-Revised raw subscale score (DMQ-R; Cooper, 1994).^dDMQ-R proportional subscale values (Cooper, 1994; Vitaliano et al., 1987).^eDesire for Alcohol Questionnaire (Love et al., 1998).^fAdolescent Alcohol and Drug Involvement Scale (Moberg, 2000).* $p < .05$ ** $p < .001$