Evaluating Age Differences in Coping Motives as a Mediator of the Link Between Social Anxiety Symptoms and Alcohol Problems

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The goal of this study is to evaluate whether coping motives mediate the relationship between self-reported symptoms of social anxiety and alcohol problems across different age groups, building on previous research conducted among emerging adults. This study focuses on adult drinkers, including emerging adults (aged 18–25 years; \(n = 148\)), young adults (aged 26–39 years; \(n = 68\)), and middle-aged adults (aged 40–65 years; \(n = 51\)). All participants completed measures of social anxiety symptoms, alcohol problems, and coping motives, administered via the Web. Invariance tests using structural equation modeling suggested that among emerging adults (and to some degree middle-aged adults), coping motives mediated the positive relationship between symptoms of social anxiety and alcohol problems. Interestingly, coping motives appeared to suppress a negative relationship between social anxiety and alcohol problems in young adults. Results suggest that it is critical to consider age differences when attempting to understand the relationships between symptoms of social anxiety, alcohol problems, and coping motives.

Keywords: age, alcohol problems, coping motives, emerging adults, middle-aged adults, social anxiety

Past research indicates that among emerging adults, greater coping motives (i.e., drinking to reduce negative affect) may mediate the relationship between symptoms of social anxiety and problems associated with drinking (e.g., Ham, Zamboanga, Bacon, & Garcia, 2009). Importantly, a recent meta-analysis suggests that although college students with social anxiety symptoms are less likely to consume alcohol in general (e.g., typical quantity and frequency), social anxiety is associated with more alcohol-related problems (Schry & White, 2013). It may be that emerging adults with social anxiety tend to be high in coping motives, and thus feel especially motivated to drink when they are in social situations with high negative affect. Drinking in such situations may be more likely to result in problems than drinking in other, less risky situations. Critically, published research evaluating coping motives as a mediator of social anxiety symptoms and alcohol-related problems has only been conducted with emerging adults. Given normative developmental shifts that lead to reductions in problematic alcohol use (e.g., Littlefield, Sher, & Wood, 2010) and symptoms of social anxiety (e.g., Fehm, Beesdo, Jacobi, & Fiedler, 2008) with age, it is important to test whether coping motives will mediate the social anxiety–alcohol problem relationship in older individuals. Thus, the current study investigates coping motives as a mediator of the social anxiety–alcohol problems relationship across a broad age range of adult drinkers, and evaluates potential age-related differences in this mediation pattern.

The current project builds on previous research to provide a developmentally informed perspective on the relationship between
social anxiety, alcohol problems, and coping motives. We focus specifically on emerging adults (aged 18–25 years), young adults (aged 26–39 years), and middle-aged adults (aged 40–65 years). Our hypotheses are as follows:

1. For emerging adults, we expect that greater social anxiety symptoms will be associated with greater alcohol-related problems, as well as greater coping motives. Consistent with previous findings (e.g., Schry & White, 2013), we expect that coping motives will mediate the relationship between social anxiety symptoms and alcohol-related problems. We expect that this relationship will not be better accounted for by other drinking motives or alcohol consumption.

2. We consider two competing hypotheses for the young and middle-aged adult groups. First, it is possible that adults age 26+ will show a similar pattern of relationships as the emerging adult age group, given coping motives have been found to be positively related to alcohol-related problems, heavy drinking, and social anxiety symptoms in young and middle-aged adults (see Littlefield et al., 2010; Thomas, Randall, & Carrigan, 2003). Alternatively, to the extent that aging is associated with less impact from social threats and enhanced emotion regulation skills (see Teachman & Gordon, 2009), then the perceived need to drink to manage these threats may diminish with age. This suggests a second, competing hypothesis that coping motives may play less of a mediating role among middle-aged adults relative to emerging adults (with young adults’ results presumably falling in between their younger and older counterparts).

Method

This IRB-approved study was administered through the Project Implicit Website (www.implicit.harvard.edu). With approximately 10,000 completed study sessions per week, the pool of Project Implicit participants is large and diverse. Individuals registered on the site were randomly assigned to the current study from a pool of ongoing social cognition studies.

Participants

Participants were 267 adult drinkers aged 18 to 65 years who reported that they (a) drank at least once during the past month, and (b) drank at least 1 drink on a typical week during the past month. To be included, participants needed to provide data for each primary variable of interest. See Table 1 for sample characteristics (additional detail is available from the first author).

Measures and Materials

Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). The consumption variable reflected the average number of drinks reported per day over the course of a typical week during the previous month. Responses ranged from 0 to 6 with the following response options: 0, 1–2, 3–4, 5–7, 8–11, 12–23, 24 or more drinks. (α = .81). See Table 1 for additional drinking quantity and frequency measures (assessed with the DDQ), which were used for inclusion criteria and/or to characterize the sample.

Drinking Motives Questionnaire—Revised (DMQR; Cooper, 1994). This 20-item questionnaire assesses four motivations for drinking, including coping (i.e., to alleviate negative affect; α = .82), social (i.e., to maximize social rewards; α = .90), enhancement (i.e., to heighten positive affect; α = .88), and conformity (i.e., to avoid being rejected socially; α = .76) motives.

Short Inventory of Problems (SIP-2R; Miller, Tonigan, & Longabaugh, 1995). This 15-item questionnaire assesses the adverse consequences of alcohol use over the previous three months, across the following five domains: physical, social responsibility, intrapersonal, impulse, and interpersonal (α = .91). It was used as a proxy for alcohol-related problems.

Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983). This 12-item measure assesses fear tied to negative social evaluation, and was used as a proxy for social anxiety symptoms given evidence that this measure distinguishes between individuals with and without social anxiety disorder (Rapee & Heimberg, 1997; Weeks et al., 2005; α = .90).

Procedure

After informed consent, volunteers completed the following questionnaires, which were administered in random order: DDQ, DMQ, SIP-2R, and BFNE.

Data Analytic Plan

To examine the relationships among social anxiety, coping motives, and alcohol problems across age groups, structural equation modeling (SEM) in AMOS 21 was used. This approach modeled the set of regression analyses examining our mediation hypotheses, and tested whether relationships with coping motives were invariant across the three age groups or better accounted for by other drinking motives or alcohol consumption. Because the measures of coping motives and alcohol problems were significantly positively skewed, bias-corrected bootstrapping was used in all structural equation models. This method is robust against violations of multivariate normality and provides bias-corrected estimates of confidence intervals in mediation (MacKinnon, Lockwood, & Williams, 2004). Following Shrout and Bolger (2002), we examined all mediation pathways of interest, regardless of the initial X → Y association. This decision also follows past research on social anxiety and alcohol that has sometimes found suppression effects by proposed mediators, such that a negative relationship between social anxiety and alcohol variables is evident once the mediator is entered (Eggleston, Woolaway-Bickel, & Schmidt, 2004).

1 Only measures relevant to the current hypotheses are included here. Participants also completed a Brief Implicit Association Test (Sriram & Greenwald, 2009). For additional detail regarding the Website, this task, and other measures that participants completed, please contact the first author.

2 Note that the Project Implicit infrastructure used to recruit participants only allows adults, aged 18+ years to participate. Although Project Implicit samples are not representative of the general population, they allow for examination of individual differences because of the relative heterogeneity. A number of articles detail the correspondence of Project Implicit samples to the U.S. population (see Nosek, 2005; Nosek et al., 2007).
Table 1
Sample Characteristics

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<th>Characteristic</th>
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<th>Young</th>
<th>Middle-aged</th>
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Note. Age differences are noted by unique letter superscripts (i.e., “a” versus “b”) and are all significant at p < .05. BFNE is the Brief Fear of Negative Evaluation; DMQ Coping, Enhancement, Social, and Conformity subscales refer to the subscales of the Drinking Motives Questionnaire; SIP is the Short Inventory of Problems. Means reflect the total score for each questionnaire (i.e., BFNE, DMQ-Coping, SIP). Percentages for race and ethnicity may not add up to 100% as a result of rounding. For demographic data, five participants did not report race (two emerging adults, two young adults, and one middle-aged adult), 18 participants did not report ethnicity (12 emerging adults, three young adults, and three middle-aged adults), and one participant did not report gender; these missing data are not reflected in the table. The Drinking Frequency variable (assessed with the DDQ) reflects frequency of alcohol consumption during the previous month. Responses were grouped into the following categories: 0 (never), 1 (less than once a month), 2 (once a month), 3 (two times a month), 4 (three times a month), 5 (once a week), 6 (two times a week), 7 (three times a week), 8 (four times a week), 9 (five times a week), 10 (six times a week), 11 (every day). The Drinking Quantity variable (assessed with the DDQ) reflects how many drinks on average participants consumed when they consumed alcohol during the past month. Responses indicate number of drinks (e.g., 0 = 0 drinks; 1 = 1 drink; etc., up to 25, which was equivalent to 25+ drinks). Because of skew, Kruskal–Wallis tests with follow-up Mann–Whitney U tests were used in place of one-way ANOVAs with follow-up Least Significant Difference tests for Coping motives, Enhancement motives, Conformity motives, the Short Inventory of Problems, and the Drinking Frequency and Quantity variables.

Results

Age Differences in Social Anxiety, Drinking Motives, and Alcohol Problems

Please see Table 1 for demographic information, and means and standard deviations for the measures of social anxiety (BFNE), drinking motives (DMQ), alcohol problems (SIP), and drinking quantity and frequency, including tests of mean differences across age groups.

The sample included a broad range of clinical symptom severity, with 11% scoring above the pretreatment BFNE mean for a sample diagnosed with social anxiety disorder (Weeks et al., 2005), and 13% scoring above the pretreatment SIP mean for a sample of “problem drinkers” interested in reducing or stopping drinking (Feinn, Tennen, & Kranzler, 2003). Pointing to our sample’s representativeness, this is comparable with lifetime prevalence rates of social phobia (12.1%) and alcohol abuse (13.2%) in nationally representative surveys (Kessler et al., 2005).

Coping Motives as a Mediator of the Link Between Social Anxiety and Alcohol Problems

We tested whether coping motives (as assessed by the coping subscale of the DMQR) would mediate the relationship between social anxiety and alcohol problems in the full sample. We used SEM to test Baron and Kenny’s (1986) guidelines for mediation, as well as MacKinnon, Lockwood, Hoffman, West, and Sheets’ (2002) method for determining the size of the indirect effect of social anxiety on alcohol problems via coping motives. First, we tested whether social anxiety would significantly predict alcohol problems. Next, we tested whether social anxiety would predict coping motives, and whether coping motives would predict alcohol problems. To test for full mediation, we used two criteria: (a) the significant relationship between social anxiety and alcohol problems should become nonsignificant once coping motives are included in the model; and (b) the estimated indirect effect of social anxiety on alcohol problems through coping motives (i.e., social anxiety predicts coping motives, which in turn predict alcohol problems) should be different from zero. Lastly, we tested whether other drinking motives or alcohol consumption also acted as mediators.
As expected, results showed that social anxiety predicted greater alcohol problems ($\beta = .12, p = .006, 95\% CI = .03 to .22$; see Figure 1). Social anxiety also predicted higher coping motives ($\beta = .37, p = .001, 95\% CI = .27 to .48$), and higher coping motives, in turn, predicted greater alcohol problems ($\beta = .57, p = .002, 95\% CI = .46 to .65$). Full mediation was supported: (a) the relationship between social anxiety and alcohol problems was reduced from $\beta = .12, p = .006$ to $\beta = -.09, p = .06$ (95\% CI = -.18 to .00) once coping motives was entered, and (b) the estimate of the relationship between social anxiety and alcohol problems that occurred via coping motives (i.e., the indirect effect) was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$). Finally, the other drinking motives and alcohol consumption variables were entered as additional mediators in a multiple mediator model (see Figure 2). Only enhancement motives also met criteria for a mediator. When entered individually as a mediator, the size of the indirect effect for enhancement motives (.09, 95\% CI = .06 to .12, $p = .01$, 95\% CI = .006 to .03) once coping motives was included, and (b) the estimate of the relationship between social anxiety and alcohol problems was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$). The other drinking motives and alcohol consumption variables were entered as additional mediators in a multiple mediator model (see Figure 2). Only enhancement motives also met criteria for a mediator. When entered individually as a mediator, the size of the indirect effect for enhancement motives (.09, 95\% CI = .06 to .12, $p = .01$, 95\% CI = .006 to .03) once coping motives was included, and (b) the estimate of the relationship between social anxiety and alcohol problems was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$). Finally, the other drinking motives and alcohol consumption variables were entered as additional mediators in a multiple mediator model (see Figure 2). Only enhancement motives also met criteria for a mediator. When entered individually as a mediator, the size of the indirect effect for enhancement motives (.09, 95\% CI = .06 to .12, $p = .01$, 95\% CI = .006 to .03) once coping motives was included, and (b) the estimate of the relationship between social anxiety and alcohol problems was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$). Finally, the other drinking motives and alcohol consumption variables were entered as additional mediators in a multiple mediator model (see Figure 2). Only enhancement motives also met criteria for a mediator. When entered individually as a mediator, the size of the indirect effect for enhancement motives (.09, 95\% CI = .06 to .12, $p = .01$, 95\% CI = .006 to .03) once coping motives was included, and (b) the estimate of the relationship between social anxiety and alcohol problems was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$). Finally, the other drinking motives and alcohol consumption variables were entered as additional mediators in a multiple mediator model (see Figure 2). Only enhancement motives also met criteria for a mediator. When entered individually as a mediator, the size of the indirect effect for enhancement motives (.09, 95\% CI = .06 to .12, $p = .01$, 95\% CI = .006 to .03) once coping motives was included, and (b) the estimate of the relationship between social anxiety and alcohol problems was significantly different than zero (.21, 95\% CI = .14 to .29, $p = .001$).

**Testing the Invariance of the Mediation Model Across Age Groups**

Next, we tested the central question: whether the mediation by coping motives would be invariant across the three age groups. For these multigroup comparisons, we tested whether constraining particular regression paths to be equivalent across age groups would lead to significant misfit compared with estimating them freely in one or several age groups. We then entered coping motives as a mediator to estimate the size of the indirect effect associated with coping motives for each age group. Finally, we tested the invariance of the multiple mediator model using drinking motives and alcohol consumption as additional mediators.

For the initial regression with social anxiety predicting alcohol problems, there were meaningful age differences. Social anxiety was related to alcohol problems for emerging ($\beta = .20, p = .01$, 95\% CI = .05 to .34), but not young ($\beta = -.08, p = .34$, 95\% CI = -.25 to .08) adults. Although there was no relationship between social anxiety and alcohol problems in the middle-aged group ($\beta = .16, p = .34$, 95\% CI = -.27 to .39), the effect size was similar to emerging adults.

Next, we tested the age invariance of the coping motives mediation model (see Figure 1), finding significant misfit ($\Delta \chi^2 = 34.21$ on $\Delta df = 6, p < .001$, $\Delta NFI = .215$) across age groups when regression paths were constrained to be equal. In follow-up models, we freed one regression path at a time, testing each possible comparison of two age groups. The misfit was attributable to two specific paths: (a) the relationship between coping motives and alcohol problems for emerging adults, and (b) the relationship between social anxiety and alcohol problems for young adults once coping motives was entered as a mediator. Once these two paths were freed, the amount of misfit was no longer substantial ($\Delta \chi^2 = 5.41$ on $\Delta df = 4, p = .25$, $\Delta NFI = .034$).

To follow up, we examined the misfit stemming from the path between coping motives and alcohol problems. Examining the unconstrained regression coefficients for each age group, the relationship between coping motives and alcohol problems was less strong in emerging adults ($\beta = .47, p = .001, 95\% CI = .32 to .62$) versus young ($\beta = .74, p = .002, 95\% CI = .48 to .90$) and middle-aged adults ($\beta = .74, p = .01, 95\% CI = .

**Figure 1.** Testing coping motives as a mediator of the relationship between social anxiety and alcohol problems, for the overall sample, emerging adults, young adults, and middle-aged adults. $* p < .05$. In each path diagram, the path from social anxiety to alcohol problems displays the standardized regression coefficients before and after coping motives were entered as a mediator. We initially considered gender and race (coded as Caucasian vs. other) as possible covariates, but dropped these variables from our models because they did not affect the pattern of results.
When examining the misfit stemming from the path between social anxiety and alcohol problem after coping motives was entered as a mediator, the relationship between social anxiety and alcohol problems was similar for emerging (β = .02, p = .80, 95% CI = -.14 to .17) and middle-aged (β = -.09, p = .34, 95% CI = -.34 to .07) adults. For young adults, the original nonsignificant coefficient between social anxiety and alcohol problems (β = -.08, p = .34) was also decreased when coping motives were included as a mediator, such that there was now a significant negative relationship in the mediated model (β = -.35, p = .001, 95% CI = -.50 to -.18). Thus, greater social anxiety symptoms predicted fewer alcohol problems for young adults once coping motives was included as a mediator. In other words, coping motives served as a suppressor variable insofar as it enhanced the predictive validity of a different variable (in this case, the prediction by social anxiety of alcohol problems) by its inclusion in the regression equation.

Next, we entered coping motives as the sole mediator to obtain estimates of the relationship between social anxiety and alcohol problems that was mediated via coping motives (i.e., the indirect effect). Indirect effects were similar in magnitude across age groups, and significantly different from zero for emerging (.16, 95% CI = 0.10 to .28, p = .001), young (.27, 95% CI = .10 to .45, p = .001), and middle-aged (.25, 95% CI = .02 to .47, p = .04) adults. Because confidence intervals did not include zero, this provided further evidence that coping motives either mediated (in emerging and to some extent middle-aged adults) or suppressed (in young adults) the relationship between social anxiety and alcohol problems similarly within each age group (albeit, the pattern of relationships was different across age groups). Finally, the pattern of relationships was not meaningfully altered when invariance tests were repeated using the multiple mediator model (see Figure 2). Relationships between all mediators (other than coping motives), social anxiety, and alcohol problems were invariant across age groups (see Figure 2).
Discussion

Collapsing across age groups, coping motives mediated the relationship between greater social anxiety symptoms and greater alcohol problems, replicating prior work among emerging adults (Schry & White, 2013). Neither other drinking motives nor alcohol consumption appeared to be as critical in accounting for this pattern. When examining age invariance, the pattern of mediation and magnitude of the effects were largely consistent across the emerging and middle-aged groups (although the initial anxiety/alcohol problems relationship did not reach significance in the middle-aged group). This pattern differed from the young adult group. Overall, findings for both the emerging and middle age-groups were consistent with research from the emerging adult literature (e.g., Schry & White, 2013) and point to the relative importance of coping motives as mediators (vs. other possible drinking motives) in the social anxiety—alcohol problems link. In contrast, coping motives served as a suppressor variable in the young adult group. When coping motives were included in the model, there was a significant, negative relationship between social anxiety and alcohol-related problems. This finding was unanticipated, but is in line with work by Eggleston et al. (2004; see also Bruch et al., 1992; Bruch, Rivet, Heimberg, & Levin, 1997) that found a suppressor effect when investigating positive alcohol expectancies as a mediator between social anxiety and alcohol use. Future research is needed to evaluate whether this suppressor finding replicates, and to determine what key developmental shifts occur in young adulthood that produce this unique pattern of relationships. Although speculative, it is possible that socially anxious young adults are not as likely to drink in the types of high-risk situations that put emerging adults at risk for alcohol-related problems (see Buckner, Schmidt, & Eggleston, 2006). It is also possible that socially anxious young adults who do drink have become more used to the effects of alcohol (as compared with emerging adults), so they are less likely to encounter alcohol-related problems while drinking (see Buckner et al., 2006), though this leaves unclear why the positive social anxiety–alcohol problems relationship reemerges in middle age.

Understanding how social anxiety and coping motives interact to predict either more or less alcohol-related problems depending on age is critical for theory and intervention efforts. Ultimately, interventions highlighting ways that individuals with social anxiety may inadvertently increase their risk for encountering alcohol-related problems (e.g., drinking in high risk situations, such as drinking to cope with negative affect) are likely to be valuable, particularly for socially anxious emerging and middle-aged adults.

Limitations

Our findings must be interpreted in light of several limitations. First, these data are cross-sectional, so cohort effects are possible. As well, the cross-sectional design is a limitation for mediation testing because it is not possible to determine the temporal relationships between social anxiety, change in coping motives, and alcohol problems. Second, given our use of a mostly female convenience sample and self-report measures, replication is needed using other samples and multiple measurement methods. Third, our emerging adult cohort was considerably larger than the other two groups. Although each age group was adequately powered to test mediation using bootstrapping (Fritz & MacKinnon, 2007), conducting invariance testing with larger samples, including adults over the age of 65 years, will be important. Fourth, it is possible that other substance use behaviors, not assessed here, may have influenced our findings. Finally, this study was administered via the Web, which provides a less well-controlled environment than a laboratory setting. Notwithstanding, Web-based data have shown strong validity and comparable findings to laboratory-based data (Buhrmester, Kwang, & Gosling, 2011; Houben & Wiers, 2008), and, on average, participants report they are more comfortable disclosing clinical information via the Web than in person (Shapiro, Chandler, & Mueller, 2013).

Conclusions

Together, these findings shed light on one of the fundamental questions in the comorbidity literature: under what conditions social anxiety and alcohol problems will be associated with one another, and what factors helps to account for their relationship.

References
