The Relationship Between Psychological Distress, Negative Cognitions, and Expectancies on Problem Drinking: Exploring a Growing Problem Among University Students

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Abstract

Few studies have sought to understand the concurrent relationship between cognitive and affective processes on alcohol use and negative alcohol-related consequences, despite both being identified as predictive risk factors in the college population. More research is needed to understand the relationships between identified factors of problem drinking among this at-risk population. The purpose of this study was to test if the relationship between psychological distress and problem drinking among university students ($N = 284$; $M_{age} = 19.77$) was mediated by negative affect regulation strategies and positive alcohol-related expectancies. Two latent mediation models of problem drinking were tested using structural equation modeling (SEM). The parsimonious three-path mediated latent model was supported by the data, as evidenced by several model fit indices. Furthermore, the alternate saturated model provided similar fit to the data, but contained several direct relationships that were not statistically significant. The relationship between psychological distress and problem drinking was mediated by an extended contributory chain, including negative affect regulation and positive alcohol-related expectancies. Implications for prevention and treatment, as well as future directions, are discussed.

Keywords

alcohol; affect regulation; depression; anxiety; alcohol-related expectancies; problem drinking

Introduction

Despite a recent decrease in the prevalence of heavy drinking and alcohol dependence, alcohol abuse has risen (Grant et al., 2004). University students in particular are more likely to binge drink (i.e., consume 4 or 5 alcoholic beverages within a 2-hr period for women and men, respectively) compared with their non-college peers (Substance Abuse and Mental Health Services Administration [SAMHSA], 2013), which results in a host of immediate

negative behavioral consequences (e.g., injury, sexual abuse, legal difficulties, decreased academic performance, and even death; White & Hingson, 2014). Heavy drinking has been associated with many negative mental and physical health outcomes as well, including liver disease and several types of cancers (National Cancer Institute, 2012; Yoon & Yi, 2012). It has been estimated that 20% of university students meet criteria for an alcohol use disorder (Blanco et al., 2008). Furthermore, many of these students are below the legal drinking age. In 2013, 59.4% of college students aged 18 to 20 years reported having consumed alcohol in the past month, and 39% reported binge drinking (SAMHSA, 2013). This is of great concern based on the associations of underage drinking with problem behaviors and prospective heavy drinking (White & Hingson, 2014).

A large body of research has identified risk factors that predict problematic drinking, including cognitive (e.g., alcohol-related outcome expectations and motives) and affective (i.e., emotional distress and regulation strategies) variables; yet, little research has investigated these variables concurrently. As a result, one question largely remains: To what extent does the interaction of these two variables influence drinking behavior? The purpose of the present study was to further clarify our understanding of the pathways between identified predictors of problem drinking by assessing cognitive factors at the same time as affective factors among college undergraduate students.

Affective and Cognitive Conceptualizations of Problem Drinking

Historically, addiction researchers have emphasized the pharmacological effects of alcohol in understanding alcohol use behaviors (e.g., Ludwig & Wikler, 1974; Wikler, 1980). MacAndrew and Edgerton (1969) argued that pharmacological explanation of the effects of alcohol consumption on human behavior was limited in scope and should incorporate psychosocial variables such as cultural beliefs, attitudes, norms, and context. Consequently, a growing body of literature has investigated the effects of emotion and alcohol-related cognition on alcohol use behaviors (e.g., Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Cox & Klinger, 1988; Hufford, 2001; Martens et al., 2008; Read & Curtin, 2007; Scheier, Lapham, & C'de Baca, 2008; Wood, Sher, & Strathman, 1996).

Motivational models of alcohol use, for instance, rest upon the belief that people drink to achieve desired effects or outcomes (Cooper, Frone, Russell, & Mudar, 1995; Cox & Klinger, 1988). Notably, coping motives focused on affect regulation attempt to match one's desired affective experiences with their current affective state through drinking. Affect regulation can encompass a wide range of biopsychosocial processes (e.g., autonomic reactivity) and behavioral coping strategies (e.g., avoidance of stimuli; Augustine & Larsen, 2015). Indeed, maladaptive drinking behavior has been characterized by the use of alcohol to manage affect variability and attenuate negative emotions (Comasco, Berglund, Oreland, & Nilsson, 2010; Gottfredson & Hussong, 2013).

Findings support a modest relationship between alcohol consumption and the presence of negative affect (e.g., anxiety, depression; Hussong, Galloway, & Feagans, 2005; Hussong, Hicks, Levy, & Curran, 2001). However, the ability to cope with an event has been found to moderate the relationship between affect and alcohol use, specifically in the context of unpleasant affect (Cooper et al., 1995; Dermody, Cheong, & Manuck, 2013; Schuckit,

Smith, & Chacko, 2006; Shoal, Gudonis, Giancola, & Tarter, 2008). That is, the less skilled an individual is at regulating negative emotions, the more likely the individual will use alcohol as means to temporarily relieve the negative experience. Moreover, Hussong (2007) poignantly stated that drinking to regulate affect may reflect an "uncontrollable style of drinking," and research indicates that alcohol dependence symptoms may increase with repeated use of alcohol as a way to regulate negative affect (Carrigan et al., 2008; Gottfredson & Hussong, 2013). These drinkers may not only have skill deficits (i.e., a lack of coping alternatives) but may also hold strong positive alcohol-related outcome expectancies, which can enhance drinking motives in and of themselves (Hasking, Lyvers, & Carlopio, 2011).

Indeed, investigation into alcohol-related cognitive processes has gained attention, as affect regulation and motivational processes are thought to have a strong cognitive basis (Hasking et al., 2011; Kuntsche, Knibbe, Engels, & Gmel, 2007), and affect alone has not been sufficient in capturing the nature of problem drinking. Broadly, social learning theory posits that a range of stimuli (e.g., anxiety, peer pressure) in the environment and the reinforcing consequences of consumption (e.g., alleviation of negative affect) are causes of continued alcohol consumption (Bandura, 1969). Both direct (i.e., drinking events) and indirect (i.e., modeling, vicarious learning) experiences are thought to contribute to the development of alcohol-related beliefs (Maisto, Carey, & Bradizza, 1999). These experiences and associated beliefs are theorized to predict the likelihood of alcohol consumption at any given time, dependent upon the individual's perception of alcohol as being effective in obtaining the desired outcome (Goldman, Brown, & Christiansen, 1987; Goldman, Del Boca, & Darkes, 1999; Scaturo, 1987).

A review of literature on the link between alcohol expectancies and alcohol consumption has been offered by Jones, Corbin, and Fromme (2001). While results of the expectancy–alcohol use relationship have been mixed across domains (e.g., prevention and treatment of abuse and dependence, prediction of future consumption), it can be stated with confidence that positive alcohol-related expectancies better predict alcohol consumption and tend to result in poorer treatment outcomes (Jones et al., 2001). Research has supported this line of thought, demonstrating that positive alcohol-related expectancies are associated with problematic drinking (Armeli, Todd, & Mohr, 2005; Lienemann & Lamb, 2013; Monk & Heim, 2013; Nicolai et al., 2012). Moreover, both alcohol-related expectancies and affect regulation strategies (e.g., drinking to cope with negative affect) can serve as predictive measures in distinguishing problem or heavy drinkers from social or light drinkers (Houben & Wiers, 2008; Marlatt & Gordon, 1985; Martens et al., 2008).

Beyond the direct expectancy–alcohol use relationship, recent research has evidenced the mediating role of alcohol expectancies in the relationship between several risk factors for alcohol use and its consumption (de Castro, Husky, & Swendsen, 2011; Goldsmith, Tran, Smith, & Howe, 2009). Affective context has also been found to play an important role in activating alcohol-related expectancies and guiding alcohol use behaviors (Armeli et al., 2005; Grant & Stewart, 2007; Ham, Zamboanga, Bridges, Casner, & Bacon, 2013; Stewart & Zeitlin, 1995). In a study conducted by Kassel, Jackson, and Unrod (2000), beliefs of

alcohol's capability of alleviating negative affect was found to be proximally related to alcohol consumption, whereas coping styles were more distal influences.

In conclusion, the literature supports the notion that alcohol-related expectancies play an integral part in the alcohol use decision-making process. Research has also shown that alcohol-related expectancies can be influenced by affective context, and that cognitive and affective processes are not mutually exclusive influences on drinking behavior. Yet, more research is needed to elucidate the nature of these relationships with regard to alcohol consumption and negative alcohol-related consequences. To reiterate, there remains a dearth in the amount of alcohol research studies that have investigated the conjoint influences of cognition, affect, and affect regulation strategies with respect to alcohol use.

Present Study

The present study proposed two latent mediation models of problem drinking that are based on the extant literature. The overarching aim of this study was to test the proposed models' fit within the college population to determine which would best explain the nature of relationships between psychological distress (IV), negative affect regulation (M1), positive alcohol-related expectancies (M2), and problem drinking (DV). The primary model (Model 1) proposed that negative affect regulation and positive alcohol-related expectancies would mediate the relationship between psychological distress and problem drinking (IV → M1 → M2 → DV; see Figure 1). Alternatively, Model 2 suggests that adding the relationship between psychological distress and positive alcohol-related expectancies (IV → M2), in addition to the relationship between negative affect regulation and problem drinking (M1 → DV), to the three-path mediation model would provide a better fit to the data (see Figure 2). Overall, it was predicted that Model 1 would provide the best fit to the data - based on the empirical support in the extant literature - while also representing a more parsimonious conceptual model in comparison to Model 2. Structural equation modeling (SEM) was used to test these hypothesized models as they extend beyond the traditional recommendations for testing mediation models (Baron & Kenny, 1986; Iacobucci, 2008).

Method

Participants

Participants ($N = 337$) consisted of undergraduate students enrolled at a Midwestern university.[1] Given the focus of this study, participants who abstained from consuming alcoholic beverages (AUDIT = 0; 10.1%, $n = 34$) were removed from further analyses. An additional 19 participants were removed due to the presence of missing data (5.6%, $n = 19$). Therefore, this study focused on 284 participants. Of them, 52.1% ($n = 148$) were female, 47.5% ($n = 135$) were male, and 0.4% ($n = 1$) failed to report their sex. The age of the participants ranged from 18 to 52 years ($M = 19.77$, $SD = 3.40$). Sixty-eight percent ($n = 193$) self-identified as European American, 18.7% ($n = 53$) as African American, 3.2% ($n = $

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[1]An a priori power analysis was conducted to identify the minimum sample size needed to achieve a given level of power using root mean square error of approximation (RMSEA) as a measurement of model fit. Results from this RMSEA power analysis ($H_O = .05$; $H_1 = .08$; $\alpha = .05$; $df = 73$) indicated that a minimum of 206 participants would be needed to detect a good to moderate fit with power of .90 (Preacher & Coffman, 2006).

9) as Biracial, 1.8% (n = 5) as Asian/Asian American, and the remaining 7.0% (n = 20) self-identified as other; 1.4% (n = 4) failed to report their race/ethnicity. The vast majority of the participants were single and never married (93.3%). Each participant was asked, "Have you ever used professional services that were provided by a psychologist?" Seventy-four percent (n = 210) reported no, 24.6% (n = 70) reported yes, and 1.4% (n = 4) failed to report.

Procedures

Participants were solicited from an undergraduate research pool and received course credit for participating in this study. Prior to data collection, participants were informed of the general nature of the study. Confidentiality and anonymity were assured by assigning identification numbers rather than names to each questionnaire packet. Administration took place in group settings ranging from 3 to 12 participants per group. Involvement in this study was voluntary, and the battery of instruments took approximately 45 min to complete. After completing the battery, all participants were debriefed, which included the purpose and goals of the study, contact information of the primary investigator, and mental health resources in the event this study elicited psychological distress. This study was approved by the Institutional Review Board.

Instruments

Problem drinking—Problem drinking was measured by the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT is a well-established 10-item questionnaire designed to measure frequency of alcohol consumption and dependence. A total score of 8 or greater is considered hazardous or harmful alcohol consumption (Saunders et al., 1993). The AUDIT produced scores with adequate reliability in this sample (Cronbach's α = .85).

Alcohol-related expectancies—The Alcohol Expectancy Questionnaire (AEQ-3; George et al., 1995) is a standard measurement of alcohol outcome expectancies. Six expectancy factors were included for the purpose of this study: global positive, social and physical pleasure, social expressiveness, sexual enhancement, power and aggression, and tension reduction/relaxation. In this study, the AEQ-3 produced scores with adequate reliability (Cronbach's α = .89).

Psychological distress—The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used to measure dimensions of psychological distress, with specific attention given to depression and anxiety, given their relationship with problem drinking. In prior research, scores on the BSI illustrated acceptable internal consistency and 2-week test–retest reliability (Derogatis & Melisaratos, 1983). In the present study, the BSI produced scores with adequate reliability (Cronbach's α = .96).

Affect regulation strategies—The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij, & Spinhoven, 2001) is a 36-item instrument used to assess individual affective regulation strategies that are employed during or after a negative life experience. The following negative affect regulation subscales were included, given their demonstrated relationship with problem drinking: Self-Blame, Blaming Others, Rumination,

and Catastrophizing. Subscales of this measure have demonstrated moderate to high internal consistency (Garnefski et al., 2001). The CERQ produced scores with adequate reliability (Cronbach's α = .89) in this study.

Statistical Plan

Two mediation models were tested using SEM. The use of SEM provides some methodological advantages for testing complex mediation models (MacKinnon, 2008), in comparison with the traditional regression techniques put forward by Baron and Kenny (1986). For example, SEM allows for the use of contributory chains that extend beyond one indicator (e.g., negative affect regulation and positive alcohol-related expectancies in Model 1) to be tested as one model. Standard errors are reduced due to the simultaneous estimation of all the model parameters. In addition, each latent variable is informed by several indicators, and therefore enhances the reliability of the measured constructs (Iacobucci, 2008). Ultimately, traditional regression techniques cannot be applied to latent variable modeling.

In both models, psychological distress was an exogenous variable, whereas negative affect regulation, positive alcohol-related expectancies, and problem drinking were endogenous variables. Several model fit indices were explored to test how well the models fit in the sample population and to ascertain the direct and indirect effects tested in the hypothesized models.[2]

Results

Descriptive Statistics

The mean AUDIT score for this sample was 10.63 ($SD = 7.30$). More specifically, 62.7% of the sample engaged in hazardous or harmful alcohol consumption. While the participants ranged from 18 to 52 years of age ($M = 19.77$, $SD = 3.40$), 81.0% ($n = 230$) were considered to be underage drinkers. Problem drinking was found to be positively correlated with measures of depression, anxiety, negative emotion regulation, and alcohol-related expectancies (see Table 1). Means, standard deviations, and the possible range of the measured variables are also presented in Table 1.

Observed Indicators

Latent variables assessing negative affect regulation, psychological distress, and alcohol-related expectancies were each indicated by previously established subscales from their respective instruments. More specifically, four subscales from the CERQ (Garnefski et al., 2001) were used to estimate negative affect regulation strategies (i.e., Self-Blame, Rumination, Catastrophizing, and Other-Blame), two subscales from the BSI (Derogatis & Melisaratos, 1983) were used to estimate psychological distress (i.e., Depression and Anxiety), and six subscales from the AEQ-3 (George et al., 1995) were used to estimate alcohol-related expectancies (i.e., Global Positive, Social and Physical Pleasure, Social

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[2]Skewness and kurtosis are both indicators of multivariate normality and were tested on the measured variables included in this study. There was no evidence of insufficient symmetry or extreme peakedness of the sample distributions that would call into question the validity of the statistics utilized in the structural equation modeling (SEM) analyses.

Expressiveness, Sexual Enhancement, Power and Aggression, and Tension Reduction/ Relaxation). The AUDIT was split into two parcels to measure problem drinking as it measures frequency of alcohol consumption and drinking behaviors associated with alcohol dependence (Saunders et al., 1993).

Structural Model for Testing Mediated Effects

We tested the hypothesized mediation models with the maximum-likelihood method in LISREL 8.8. Model 1 produced several fit indices that suggested a close to moderate fit to the data ($df = 73$, $\chi^2 = 161.55$; root mean square error of approximation [$RMSEA$] = .070, non-normed fit index [$NNFI$] = .94, comparative fit index [CFI] = .95, standardized root mean square residual [$SRMR$] = .061; expected cross-validation index [$ECVI$] = .84). In addition, all three paths in the mediation effects chain were statistically significant (see Figure 1). According to the joint significance test, the data support the hypothesized mediation model (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Taylor, MacKinnon, & Tein, 2008). The total effect ($TE = 0.22$ [$SE = 0.07$], $p < .001$) and indirect effect ($IE = 0.09$ [$SE = 0.03$], $p = .003$) of psychological distress (IV) on problem drinking (DV) was found to be significant. More specifically, the product-of-coefficients test ($\beta_1\beta_2\beta_3$; MacKinnon et al., 2002; Taylor et al., 2008) supported the hypothesis that the relationship between psychological distress and problem drinking was mediated by negative affect regulation (M1) and positive alcohol-related expectancies (M2).

Consistent with the recommendations of Martens and colleagues (2004), we examined an additional comparative model. In Model 2, two direct paths (IV → M2, M1 → DV) were added to Model 1 to test if these constraints to the original three-path mediated effect (Model 1) were supported by the data. As Model 1 was nested in Model 2, a difference test was conducted to examine if both models fit equally to the data. These two direct paths failed to significantly add to the model's fit to the data ($\chi^2_{diff} = 4.03$, $df_{diff} = 2$, $p = .133$). Furthermore, both paths were found to be statistically non-significant (β_5 IV → M2 = .15, $p = .133$; β_6 M1 → DV = .14, $p = .141$) and supported the retention of the more parsimonious Model 1.

Discussion

Despite well-established associations of alcohol-related expectancies, affect regulation, and psychological distress to problem drinking, the investigation between cognitive and affective processes simultaneously has remained largely overlooked. The present study proposed two mediation models aimed at determining the extent to which these factors conjointly influence problem drinking in a college sample.

As expected, Model 1 was found to provide adequate fit to the data. More specifically, the relationship between psychological distress and problem drinking was mediated by an extended contributory chain that consisted of increased levels of negative affect regulation strategies and the presence of increased positive alcohol-related expectancies. Participants who endorsed higher levels of psychological distress (i.e., Depression and Anxiety) were more likely to engage in problem drinking. This relationship was stronger when participants endorsed regulating affect by self-blaming, blaming others, catastrophizing, and/or

ruminating, in addition to experiencing positive expectancies associated with consuming alcoholic beverages (i.e., Global Positive, Social and Physical Pleasure, Power and Aggression, Tension Reduction/Relaxation, Social Expressiveness, and Sexual Enhancement).

Although alcohol researchers acknowledge the contribution of cognitive and affective processes on problem alcohol use and long-term negative consequences (see Quirk, 2001, for a review), there has been a relative disconnect in the concurrent assessment of psychological distress, alcohol-related cognition, and affect regulation strategies in the literature. The primary model introduced in the present study—Model 1—provides a means of conceptualizing the relationship between psychological distress and problem drinking via two mediators in the contributory chain: negative affect regulation and positive alcohol-related expectancies.

These results are consistent with findings in the literature that link problem drinking with poor affect regulation (e.g., Birch et al., 2004; Birch et al., 2008; Dvorak et al., 2014), low self-control (Dvorak, Simons, & Wray, 2011; Leeman & Wapner, 2001), poor affective decision making (Patrick, Blair, & Maggs, 2008), and positive beliefs about the effects of heavy alcohol consumption (Read & O'Connor, 2006). Recent research assessing affect regulation and alcohol-related cognitions also substantiates these findings. That is, associations between positive alcohol-related expectancies have been linked to heavy drinking mediated by negative coping strategies (i.e., drinking to alleviate anxiety; Greenfield, Harford, & Tam, 2009). This suggests that use of alcohol as a negative affect regulation strategy may lead to the development of problem drinking.

It is important to note that Model 2 failed to identify negative affect regulation or positive alcohol-related expectancies as independent mediators of the relationship between psychological distress and problem drinking. This forwards the idea that contributory chains associated with problem drinking as a means for coping with negative affect are often complex and influenced by experiences of affect regulation and positive alcohol-related expectancies.

Clinical Implications

Research on campus-based alcohol use prevention and intervention strategies has shown several programs to be successful in reducing heavy alcohol consumption and decreasing negative alcohol-related consequences (e.g., Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Carey, Carey, Maisto, & Henson, 2006; Cousins, Connor, & Kypri, 2014; LaBrie, Pedersen, Lamb, & Quinlan, 2007). A reliable model that clearly articulates which risk factors are crucial to target is much needed. The results from this study suggest that such efforts should consider the conjoint influences of psychological distress, affect regulation, and alcohol expectancies with regard to problem drinking in this population. Furthermore, an investigation into sociocultural protective factors that buffer the effects of psychological distress on problem drinking may provide the foundation for more strength-based approaches. Such information would be exceptionally important to college counseling centers offering services to a population where alcohol abuse and dependence problems are of growing concern and effective prevention and intervention strategies are in constant need.

Historically, identification of at-risk drinkers on college campuses has been done by campus-wide screenings or by post-admission into a treatment facility. The primary model supported by the data in this study may allow for earlier identification of problem drinkers by assessing cognitive, affective, and behavioral patterns shown to predict problematic alcohol use behaviors in college student drinkers. In line with recent recommendations by researchers in the field (Martens et al., 2008), clinicians could use this model to identify prevention targets aimed at providing relevant psychoeducation to at-risk populations and micro-skills trainings that can develop positive affect regulation strategies. In addition, these risk factors can be used to identify various targets of intervention, such as symptomology associated with anxiety and depression (Sugarman & Carey, 2007), negative alcohol-related consequences (Martens et al., 2008), or problematic drinking (e.g., binge drinking; Martens et al., 2004), that can be addressed during the course of treatment.

Limitations

While the present findings make a contribution to the literature by deriving a parsimonious model of problem drinking among university students, it is not without limitations. Because of the correlational research design, causality of significant relationships could not be inferred. Along similar lines, it is plausible that alternative models not explored in this study could have fit the data equally well, or that moderating variables left unexplored may account for additional variance. It may also be of concern that the mediation models were tested with cross-sectional data rather than longitudinal data. Although a substantial amount of psychological research uses such data to fit mediation models with a reliance on the extant literature to support the inferences, the best practice regarding the use of model fit indices is longitudinal data (Tomarken & Waller, 2003). Also, it is possible that social desirability may have influenced the accuracy of self-report measures. Despite these limitations, the sufficient sample size and the adequate fit of indices provide confidence in the primary model of problem drinking proposed in this study.

Future Directions

The current findings indicate that the relationship between psychological distress and problem drinking was statistically mediated by a contributory chain that included affect regulation and positive alcohol-related expectancies. To explore the proposed relationships of the primary model, future research should investigate these constructs in a longitudinal design to allow causality to be directly inferred from the data. Furthermore, other variables with potential influence on problem drinking may be included in the model, such as drinking motives or the assessment of implicit alcohol-related cognitions (which would address the limitation of social desirability biases that accompanies self-report measures). Drinking context and demographic factors, such as age and gender, have also been highlighted as important factors in influencing outcome expectancies and hazardous drinking (Monk & Heim, 2013; Thompson et al., 2009). Finally, these results must be replicated within the college population to establish the reliability of the model, in addition to non-college and clinical samples to determine the model's generalizability to other populations.

References

Armeli S, Todd M, Mohr C. A daily process approach to individual differences in stress-related alcohol use. Journal of Personality. 2005; 73:1657–1686. [PubMed: 16274449]

Augustine, AA.; Larsen, RJ. Personality, affect, and affect regulation. In: Mikulincer, M.; Saver, PR.; Cooper, ML.; Larsen, RJ., editors. APA handbook of personality and social psychology, Volume 4: Personality processes and individual differences. Washington, DC: American Psychological Association; 2015. p. 147-165.

Baer JS, Kivlahan DR, Blume AW, McKnight P, Marlatt A. Brief intervention for heavy-drinking college students: 4-year follow up and natural history. American Journal of Public Health. 2001; 91:1310–1316. [PubMed: 11499124]

Baker TB, Piper ME, McCarthy DE, Majeskie MR, Fiore MC. Addiction motivation reformulated: An affective processing model of negative reinforcement. Psychological Review. 2004; 111:33–51. [PubMed: 14756584]

Bandura, A. Principles of behavior modification. New York, NY: Hold, Rinehart & Winston; 1969.

Baron R, Kenny D. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology. 1986; 51:1173–1182. [PubMed: 3806354]

Birch CD, Stewart SH, Wall AM, McKee SA, Eisnor SJ, Theakston JA. Mood-induced increases in alcohol expectancy strength in internally motivated drinkers. Psychology of Addictive Behaviors. 2004; 18:231–238. [PubMed: 15482078]

Birch CD, Stewart SH, Wiers RW, Klein RM, MacLean AD, Berish MJ. The mood-induced activation of implicit alcohol cognition in enhancement and coping motivated drinkers. Addictive Behaviors. 2008; 33:565–581. [PubMed: 18155854]

Blanco C, Okuda M, Wright C, Hasin DS, Grant BF, Liu SM, Olfson M. Mental health of college students and their non-college-attending peers: Results from the National Epidemiologic Study on Alcohol and Related Conditions. Archives of General Psychiatry. 2008; 65:1429–1437. [PubMed: 19047530]

Carey KB, Carey MP, Maisto SA, Henson JM. Brief motivational interventions for heavy college drinkers: A randomized controlled trial. Journal of Consulting and Clinical Psychology. 2006; 74:943–954. [PubMed: 17032098]

Carrigan MH, Ham LS, Thomas SE, Randall CL. Alcohol outcome expectancies and drinking to cope with social situations. Addictive behaviors. 2008; 33(9):1162–1166. [PubMed: 18550293]

Comasco E, Berglund K, Oreland L, Nilsson KW. Why do adolescents drink? Motivational patterns related to alcohol consumption and alcohol-related problems. Substance Use & Misuse. 2010; 45:1589–1604. [PubMed: 20590377]

Cooper ML, Frone MR, Russell M, Mudar P. Drinking to regulate positive and negative emotions: A motivational model of alcohol use. Journal of Personal and Social Psychology. 1995; 69:990–1005.

Cousins K, Connor JL, Kypri K. Effects of the campus watch intervention on alcohol consumption and related harm in a university population. Drug and Alcohol Dependence. 2014; 143:120–126. [PubMed: 25108584]

Cox WM, Klinger E. A motivational model of alcohol use. Journal of Abnormal Psychology. 1988; 97:168–180. [PubMed: 3290306]

de Castro KC, Husky MM, Swendsen J. The role of alcohol expectancies: From theory to practice. Revue Francophone De Clinique Comportementale Et Cognitive. 2011; 16:47–55.

Dermody SS, Cheong J, Manuck S. An evaluation of the stress-negative affect model in explaining alcohol use: The role of components of negative affect and coping style. Substance Use & Misuse. 2013; 48:297–308. [PubMed: 23368670]

Derogatis LR, Melisaratos N. The Brief Symptom Inventory: An introductory report. Psychological Medicine. 1983; 13:595–605. [PubMed: 6622612]

Dvorak RD, Sargent EM, Kilwein TM, Stevenson BL, Kuvaas NJ, Williams TJ. Alcohol use and alcohol-related consequences: Associations with emotion regulation difficulties. The American Journal of Drug and Alcohol Abuse. 2014; 40:125–130. [PubMed: 24588419]

Dvorak RD, Simons JS, Wray TB. Alcohol use and problem severity: Associations with dual systems of self-control. Journal of Studies on Alcohol and Drugs. 2011; 72:678. [PubMed: 21683050]

Garnefski N, Kraaij V, Spinhoven P. Negative life events, cognitive emotion regulation and emotional problems. Personality and Individual Differences. 2001; 30:1311–1327.

George WH, Frone MR, Cooper ML, Russell M, Skinner JB, Windle M. A revised Alcohol Expectancy Questionnaire: Factor structure confirmation and invariance in a general population sample. Journal on the Studies of Alcoholism. 1995; 56:177–185.

Goldman, MS.; Brown, SA.; Christiansen, BA. Expectancy theory: Thinking about drinking. In: Blane, HT.; Leonard, KE., editors. Psychological theories of drinking and alcoholism. New York, NY: Guilford Press; 1987. p. 181-226.

Goldman, MS.; Del Boca, F.; Darkes, J. Alcohol expectancy theory: The application of cognitive neuroscience. In: Leonard, KE.; Blane, HT., editors. Psychological theories of drinking and alcoholism. 2. New York, NY: Guilford Press; 1999. p. 203-246.

Goldsmith AA, Tran GQ, Smith JP, Howe SR. Alcohol expectancies and drinking motives in college drinkers: Mediating effects on the relationship between generalized anxiety and heavy drinking in negative-affect situations. Addictive Behaviors. 2009; 34:505–513. [PubMed: 19249161]

Gottfredson NC, Hussong AM. Drinking to dampen affect variability: Findings from a college student sample. Journal of Studies on Alcohol and Drugs. 2013; 74:576–583. [PubMed: 23739021]

Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, Kaplan K. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the national epide-miologic survey on alcohol and related conditions. Archives of general psychiatry. 2004; 61(8):807–816. [PubMed: 15289279]

Grant VV, Stewart SH. Impact of experimentally induced positive and anxious mood on alcohol expectancy strength in internally motivated drinkers. Cognitive Behaviour Therapy. 2007; 36:102–111. [PubMed: 17530496]

Greenfield TK, Harford TC, Tam TW. Modeling cognitive influences on drinking and alcohol problems. Journal of Studies on Alcohol and Drugs. 2009; 70:78–86. [PubMed: 19118395]

Ham LS, Zamboanga BL, Bridges AJ, Casner HG, Bacon AK. Alcohol expectancies and alcohol use frequency: Does drinking context matter? Cognitive Therapy and Research. 2013; 37:620–632.

Hasking P, Lyvers M, Carlopio C. The relationship between coping strategies, alcohol expectancies, drinking motives and drinking behavior. Addictive Behaviors. 2011; 36:479–487. [PubMed: 21300441]

Houben K, Wiers RW. Implicitly positive about alcohol? Implicit positive associations predict drinking behavior. Addictive Behaviors. 2008; 33:979–986. [PubMed: 18434034]

Hufford MR. An examination of mood effects on positive alcohol expectancies among undergraduate drinkers. Cognition and Emotion. 2001; 15:593–613.

Hussong AM. Predictors of drinking immediacy following daily sadness: An application of survival analysis to experience sampling data. Addictive Behaviors. 2007; 32:1054–1065. [PubMed: 16934413]

Hussong AM, Galloway CA, Feagans LA. Coping motives as a moderator of daily mood-drinking covariation. Journal of Studies on Alcohol. 2005; 66:344–353. [PubMed: 16047523]

Hussong AM, Hicks RE, Levy SA, Curran PJ. Specifying the relations between affect and heavy alcohol use among young adults. Journal of Abnormal Psychology. 2001; 110:449–461. [PubMed: 11502088]

Iacobucci, D. Mediation analysis (No 156). New York, NY: Sage; 2008.

Jones BT, Corbin W, Fromme K. Conceptualizing addiction: A review of expectancy theory and alcohol consumption. Addiction. 2001; 96:57–72. [PubMed: 11177520]

Kassel JD, Jackson SI, Unrod M. Generalized expectancies for negative mood regulation and problem drinking among college students. Journal of Studies on Alcohol. 2000; 61:332–340. [PubMed: 10757145]

Kuntsche E, Knibbe R, Engels R, Gmel G. Drinking motives as mediators of the link between alcohol expectancies and alcohol use among adolescents. Journal of Studies on Alcohol and Drugs. 2007; 68:76–85. [PubMed: 17149520]

LaBrie JW, Pedersen ER, Lamb TF, Quinlan T. A campus-based motivational enhancement group intervention reduces problematic drinking in freshmen male college students. Addictive Behaviors. 2007; 32:889–901. [PubMed: 16876963]

Leeman RF, Wapner S. Some factors involved in alcohol consumption of first-year undergraduates. Journal of Drug Education. 2001; 31:249–262. [PubMed: 11696962]

Lienemann BA, Lamb CS. Heavy episodic drinking in college females: An exploration of expectancies, consequences, and self-efficacy. Substance Use & Misuse. 2013; 48:73–81. [PubMed: 23050593]

Ludwig AM, Wikler A. "Craving" and relapse to drink. Quarterly Journal of Studies on Alcohol. 1974; 35:108–130.

MacAndrew, C.; Edgerton, RB. Drunken comportment: A social explanation. Chicago, IL: Aldine; 1969.

MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. Psychological Methods. 2002; 7:83–104. [PubMed: 11928892]

Maisto, SA.; Carey, KB.; Bradizza, CM. Social learning theory. In: Leonard, KE.; Blane, HT., editors. Psychological theories of drinking and alcoholism. 2. New York, NY: Guilford Press; 1999. p. 106-163.

Marlatt, GA.; Gordon, JR., editors. Relapse prevention. New York, NY: Guilford Press; 1985.

Martens MP, Martin JL, Hatchett ES, Folwer RM, Fleming KM, Karakashian MA, Cimini MD. Protective behavioral strategies and the relationship between depressive symptoms and alcohol-related negative consequences among college students. Journal of Counseling Psychology. 2008; 55:535–541. [PubMed: 22017560]

Martens MP, Taylor KK, Damann KM, Page JC, Mowry ES, Cimini MD. Protective behavioral strategies when drinking alcohol and their relationship to negative alcohol-related consequences in college students. Psychology of Addictive Behaviors. 2004; 18:390–393. [PubMed: 15631613]

Monk RL, Heim D. A critical systematic review of alcohol-related outcome expectancies. Substance Use & Misuse. 2013; 48:539–557. [PubMed: 23647167]

National Cancer Institute. Cancer trends progress report, 2011–2012 update. 2012. Available from http://progressreport.cancer.gov

Nicolai J, Moshagen M, Demmel R. Patterns of alcohol expectancies and alcohol use across age and gender. Drug and Alcohol Dependence. 2012; 126:347–353. [PubMed: 22748519]

Patrick ME, Blair C, Maggs JL. Executive function, approach sensitivity, and emotional decision making as influences of risk behaviors in young adults. Journal of Clinical and Experimental Neuropsychology. 2008; 30:449–462. [PubMed: 18938681]

Preacher, KJ.; Coffman, DL. Computing power and minimum sample size for RMSEA. 2006. [Computer software]. Available from http://quantpsy.org

Quirk SW. Emotion concepts in models of substance abuse. Drug and Alcohol Review. 2001; 20:95–104.

Read JP, Curtin JJ. Contextual influence on alcohol expectancy processes. Journal of Studies on Alcohol and Drugs. 2007; 68:759–770. [PubMed: 17690810]

Read JP, O'Connor RM. High- and low-dose expectancies as mediators of personality dimensions and alcohol involvement. Journal of Studies on Alcohol. 2006; 67:204–214. [PubMed: 16562402]

Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption. Addiction. 1993; 88:791–804. [PubMed: 8329970]

Scaturo DJ. Toward and adult developmental conceptualization of alcohol abuse: A review of the literature. British Journal of Addiction. 1987; 82:857–870. [PubMed: 3314960]

Scheier LM, Lapham SC, C'de Baca J. Cognitive predictors of alcohol involvement and alcohol consumption-related consequences in a sample of drunk-driving offenders. Substance Use & Misuse. 2008; 43:2089–2115. [PubMed: 19085438]

Schuckit MA, Smith TL, Chacko Y. Evaluation of a depression-related model of alcohol problems in 430 probands from the San Diego prospective study. Drug and Alcohol Dependence. 2006; 82:194–203. [PubMed: 16257139]

Shoal GD, Gudonis LC, Giancola PR, Tarter RE. Negative affectivity and drinking in adolescents: An examination of moderators predicted by affect regulation theory. Journal of Psychopathology and Behavioral Assessment. 2008; 30:61–70.

Stewart SH, Zeitlin SB. Anxiety sensitivity and alcohol use motives. Journal of Anxiety Disorders. 1995; 9(3):229–240.

Substance Abuse and Mental Health Services Administration. Results from the 2013 National Survey on Drug Use and Health (NSDUH): Summary of National Findings. 2013. Retrieved from http://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHTML2013/Web/NSDUHresults2013.pdf

Sugarman DE, Carey KB. The relationship between drinking control strategies and college student alcohol use. Psychology of Addictive Behaviors. 2007; 21:338–345. [PubMed: 17874884]

Taylor AB, MacKinnon DP, Tein J. Tests of the three-path mediated effect. Organizational Research Methods. 2008; 11:241–269.

Thompson MP, Spitler H, Mccoy TP, Marra L, Sutfin EL, Rhodes SD, Brown C. The moderating role of gender in the prospective associations between expectancies and alcohol-related negative consequences among college students. Substance Use & Misuse. 2009; 44:934–942. [PubMed: 19938937]

Tomarken AJ, Waller NG. Potential problems with" well fitting" models. Journal of abnormal psychology. 2003; 112(4):578. [PubMed: 14674870]

White A, Hingson R. The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. Alcohol Research: Current Reviews. 2014; 35:201–218. [PubMed: 24881329]

Wikler, A. Conditioning processes in opioid dependence and in relapse. In: Wikler, A., editor. Opioid dependence: Mechanisms and treatment. New York, NY: Plenum; 1980. p. 167-218.

Wood MD, Sher KJ, Strathman A. Alcohol outcome expectancies and alcohol use and problems. Journal of Studies on Alcohol. 1996; 57:283–288. [PubMed: 8709587]

Yoon, YH.; Yi, HY. Liver cirrhosis mortality in the United States, 1970–2009. Bethesda, MD: NIAAA; 2012. Surveillance Report No. 93Retrieved from http://pubs.niaaa.nih.gov/publications/Surveillance93/Cirr09.htm

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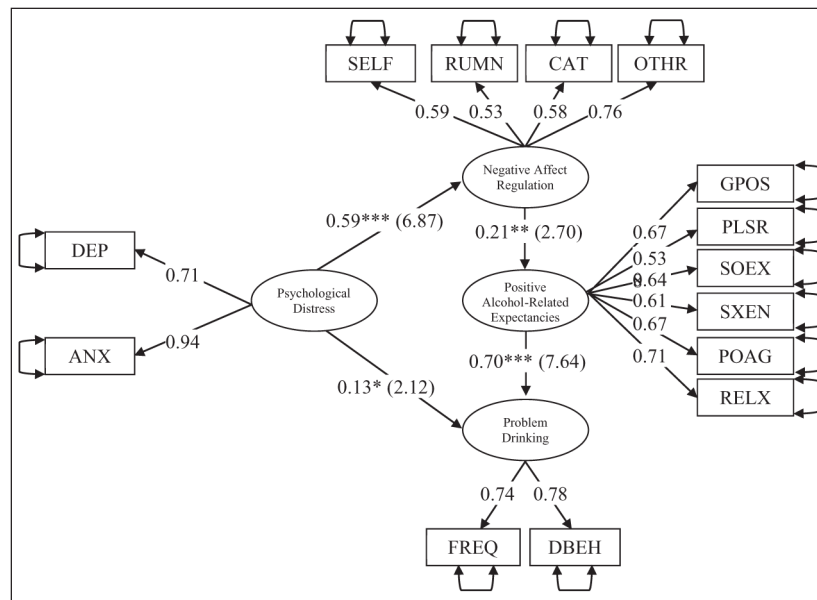
Figure 1.

Model 1: Standardized parameter estimates of the three-path mediated SEM ($N = 284$) testing if negative affect regulation strategies and alcohol-related expectancies mediate the relationship between psychological distress and problem drinking.

Note. The *t* values are presented in parentheses. SEM = structural equation modeling; ANX = Anxiety; CAT = Catastrophizing; DEP = Depression; DBEH = Drinking Behaviors; FREQ = Drinking Frequency; GPOS = Global Positive; OTHR = Blaming Others; PLSR = Social and Physical Pleasure; POAG = Power and Aggression; RUMN = Rumination; SELF = Blaming Self; RELX = Tension Reduction and Relaxation; SOEX = Social Expressiveness; SXEN = Sexual Enhancement.

*p < .05. **p < .01. ***p < .001.

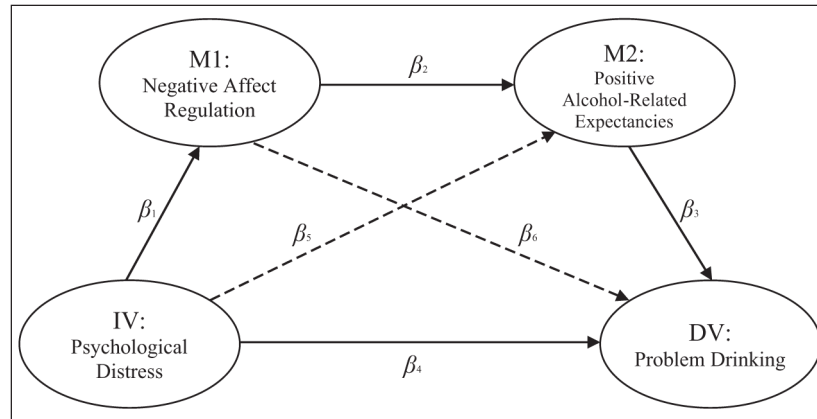**Figure 2.**
Model 2: Structural model of the saturated three-path mediated effect associated with Model 1.

Note. The dashed lines represent the two paths that were added to Model 1. Only β1 and β3 were statistically significant.

Table 1

Intercorrelations and Descriptive Statistics Among the Measured Variables (*N* = 284).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
AUDIT	—													
BSI-DEP	.183**	—												
BSI-ANX	.206**	.667**	—											
CERQ-SELF	.157**	.284**	.391**	—										
CERQ-RUMN	.088	.286**	.363**	.515**	—									
CERQ-CAT	.227**	.252**	.368**	.333**	.414**	—								
CERQ-OTHR	.178**	.170**	.209**	.258**	.284**	.482**	—							
AEQ-GPOS	.464**	.208**	.188**	.101	.137*	.248**	.101	—						
AEQ-PLSR	.250**	.073	-.015	-.050	.046	-.005	-.090	.293**	—					
AEQ-SOEX	.343**	.122*	.051	.019	.065	.037	-.012	.355**	.442**	—				
AEQ-SXEN	.397**	.075	.140*	.069	.072	.129*	.040	.489**	.224**	.404**	—			
AEQ-POAG	.435**	.176**	.166**	.080	.065	.174**	.070	.442**	.311**	.465**	.413**	—		
AEQ-RELX	.420**	.121*	.085	.021	.078	.074	-.002	.467**	.503**	.448**	.380**	.459**	—	
M	10.63	4.66	4.60	4.27	9.99	11.37	8.31	8.20	1.49	3.92	3.62	2.18	2.94	2.92
SD	7.30	4.60	4.21	4.21	2.93	3.20	3.08	2.53	1.29	1.33	1.56	1.69	1.74	1.54
Possible range	0–50	0–63	0–63	4–20	4–20	4–20	4–20	4–20	0–5	0–5	0–5	0–5	0–6	0–5

Note. AUDIT = Alcohol Use Disorders Identification Test; BSI = Brief Symptom Inventory, of which three scales were used: GSI = Global Severity Index, DEP = Depression, and ANX = Anxiety; CERQ = Cognitive Emotion Regulation Questionnaire and its subscales included: SELF = Self-Blame, RUMN = Rumination, CAT = Catastrophizing; OTHR = Other-Blame; AEQ = alcohol-related expectancies, of which six of its subscales were used: GPOS = Global Positive, PLSR = Social and Physical Pleasure, SOEX = Social Expressiveness, SXEN = Sexual Enhancement, POAG = Power and Aggression, RELX = Tension Reduction and Relaxation.

*
p < .05.

**
p < .01.