



HHS Public Access

Author manuscript

J Youth Adolesc. Author manuscript; available in PMC 2021 April 01.

Published in final edited form as:

J Youth Adolesc. 2020 April ; 49(4): 907–920. doi:10.1007/s10964-019-01144-6.

Relations of Stress and Drinking Motives to Young Adult Alcohol Misuse: Variations by Gender

Chelsie D. Temmen^a, Lisa J. Crockett^b

^a*Eunice Kennedy Shriver National Institute of Child Health and Human Development, Social and Behavioral Sciences Branch, 6710B Rockledge Drive, Bethesda, MD, 20817*

^b*University of Nebraska-Lincoln, Department of Psychology, 315 Burnett Hall Lincoln, NE, 68588*

Abstract

Theory and empirical findings have linked stress exposure to young adult alcohol misuse, but the processes underlying this association have not been fully investigated. This study examined gender differences in the indirect pathways linking stress in developmentally relevant domains to alcohol misuse in young adults, focusing on drinking motives as a possible mediator of the association. The longitudinal associations between adolescent heavy drinking and young adult stress were also explored. Participants were rural young adults who had been surveyed previously in adolescence ($N=442$; 55.7% female; 96% White; $M_{age}=23.29$, $SD=1.07$). Chronic stress and drinking motives were concurrently associated with young adult alcohol misuse. For men, occupational stress was indirectly related to alcohol misuse through both social and coping motives for drinking, whereas for women relationship stress was indirectly related to alcohol misuse through social motives only. When investigating the longitudinal effects of adolescent drunkenness, more frequent drunkenness in adolescence was related to more adult occupational stress for men but to neither kind of stress for women. These findings indicate that stress in specific life domains is related to young adult alcohol misuse through drinking motives, that the link between stress and alcohol misuse may be bidirectional for men, and that different stressors and drinking motives are salient for young adult men and women.

Keywords

early adulthood; alcohol use; stress; drinking motives

Introduction

Young adults engage in high levels of alcohol misuse: nearly one-third of U.S. youth from 18–30 years of age reported binge drinking in the past month and 13% reported engaging in heavy alcohol use during that period (Park, Scott, Adams, Brindis, & Irwin, 2014). These behaviors affect young adults' current health and safety (e.g., through greater risk of motor vehicle accidents) and increase their risk of future alcohol dependence and related health problems (Centers for Disease Control and Prevention, 2018). Understanding the processes

All correspondence should be sent to: Chelsie D. Temmen, Social and Behavioral Sciences Branch, NICHD, 6710B Rockledge Dr, Room 3155B, Bethesda, Maryland 20817, chelsie.temmen@nih.gov.

that contribute to young adult alcohol misuse is crucial for reducing these negative health outcomes. Stress associated with the transition to adulthood may help explain the high levels of alcohol misuse observed among young adults. Theory and prior empirical research have linked some forms of stress to alcohol use, but there has been less attention paid to the effects of chronic stress, particularly stress associated with normative developmental challenges such as starting a career and finding a partner. Thus, it is not known if these forms of stress are related to alcohol misuse, and, if so, which processes mediate these associations. To address these gaps in the literature, this study examined the associations between normative chronic stressors and alcohol misuse among young adults, focusing on drinking motives as a possible mediator. Gender differences in these linkages were examined and possible bidirectional relationships between stress and alcohol misuse were explored.

Early Adulthood

Early adulthood, corresponding to the third decade of life, is a time when most young people in the United States make important transitions in key life domains, such as leaving their childhood home, finishing their education, starting a career, getting married, and becoming a parent (Hogan & Astone, 1986). There is also an expectation that young adults take responsibility for themselves, make independent decisions, and become financially independent (Arnett, 2000). These normative challenges and transitions place demands on youth that may be stressful, particularly if progress towards these goals is slow or individuals experience failure. Completing these transitions and gaining a subjective sense of having reached adulthood are relevant for young adult adjustment, and youth who struggle during these transitions may experience mental health problems. Indeed, early adulthood is associated with increased risk for a variety of psychological and behavioral problems, including alcohol misuse (Arnett et al., 2014; Viner & Tanner, 2009).

Two activities—building committed relationships and launching work careers—have been identified as key developmental tasks of early adulthood, making them developmentally relevant and personally salient (Erikson, 1968; Havighurst, 1972; Roisman, Masten, Coates, & Tellegen, 2004). Consistent with this notion, one study found the number of personal goals related to work and family increased until the late twenties among European university students (Samelo-Aro, Aunola, & Nurmi, 2007). In the U.S., most young adults develop serious romantic relationships (Collins, Welsh, & Furman, 2009; Rauer, Pettit, Lansford, Bates, & Dodge, 2013) and most participate in the labor force, seeking financial independence (Federal Interagency Forum on Child and Family Statistics, 2014). Presumably, competence in these domains is a desirable outcome for young adults, whereas difficulties and lack of progress are stressful.

Success in relationships and work may be important to both men and women, but different domains may be particularly salient for each gender owing to gender role expectations and socialization. The social role theory of gender differences (Eagly, 1987) proposes that expectations for men's and women's behavior are grounded in the roles men and women play in society. Traditional gender roles include the role of caregiver and homemaker for women and the role of economic provider for men; these roles are also associated with stereotypes about the personal characteristics of each gender, leading to expectations that

women have communal or expressive characteristics and men have instrumental or agentic characteristics. In turn, men and women are more likely to display the characteristics associated with their gender role (Wood & Eagly, 2002). Research also indicates that parents and other socialization agents tend to foster gender-typed interests and activities in children. For example, parents encourage greater emotional expressivity and a greater focus on affiliation in girls than boys and assign gender-typed chores to children (Eagly et al., 2000; Leaper, 2002). Furthermore, peers and the media often support traditional gender role norms. Through these processes, boys are socialized to be more assertive and competitive, whereas girls are socialized to be more expressive and affiliative (Leaper & Friedman, 2007), and this early gender role socialization is reinforced in subsequent social interactions throughout life. Consistent with this perspective, women are more likely than men to report that good family relationships are important to them, whereas men are more likely to report that their work is a source of stress (American Psychological Association, 2010). Given these gender-based expectations and values, occupational stress might be especially salient for young men and relationship stress for young women.

Stress and Alcohol Misuse

Stress associated with the challenges of early adulthood may help explain high levels of alcohol misuse during this period. Stress is the body's reaction to a challenge or demand and is accompanied by emotional or physical tension, and several models of alcohol use posit that unpleasant tension and/or negative emotions drive alcohol consumption (Cappell & Greeley, 1987; Sher & Grekin, 2007). Thus, individuals who experience stress may drink in order to reduce their tension and negative affect. Consistent with this notion, research has implicated life stress (particularly the number of stressful life events) as a predictor of binge drinking and alcohol abuse among adults (Keyes et al. 2012). Research focused on the stress–alcohol relationship in young adults is more limited, but some studies have supported associations between perceived levels of general stress and alcohol use or negative consequences of drinking (e.g., Corbin, Farmer, & Nolen-Hoekesma, 2013; Rice & Van Arsdale, 2010). However, an association is not always found (e.g., Thomas, Merrill, von Hofe, & Magid, 2014).

To date, most studies of stress and alcohol use have focused on broad categories of stressors such as negative life events or daily hassles, with little attention to chronic stressors that may be especially relevant during specific developmental periods. Stressful life events such as divorce, death of a loved one, or job loss can be defined as “discrete, observable events that are thought to be threatening because they represent change” (Wheaton, 1990, p. 210). In contrast, daily hassles are minor events that arise in the course of daily life, such as misplacing one's cell phone or house key. Instead of focusing on specific stressful events (major or minor), some researchers have used general measures of perceived stress (e.g., Cohen, Karmarck, & Mermelstein, 1983) which assess subjective distress or feelings of being unable to control one's circumstances and manage difficulties. Chronic stress, the focus of this study, can be distinguished from these other stress constructs: it involves exposure to persistent conditions such as living with a chronically ill relative or experiencing sustained financial strain and can be defined as “continuous and persistent conditions in the social environment resulting in a problematic level of demand on the individual's capacity to

perform adequately in social roles” (Wheaton, 1990, p. 210). Due to societal expectations regarding career, financial independence, and finding a partner, chronic difficulties in the domains of work and relationships (e.g., financial instability or unsatisfying romantic relationships) would be expected to generate stress in young adults, particularly if compounded by a sense of inadequate progress towards adulthood. Although these conditions may be stressful at other times as well, their importance is likely to be intensified in early adulthood when expectations and responsibilities in both domains increase. To our knowledge, no prior study has focused on the implications of these two chronic stressors for young adult alcohol misuse.

There is also evidence that the association between stress and alcohol use depends on the measure of alcohol use and the type of stressor examined. For example, McCreary and Sadava (1998) showed that certain stressors predicted alcohol use and misuse differentially: negative life events predicted both alcohol consumption and negative consequences of drinking, whereas daily hassles and general perceived stress predicted negative consequences only. Individual characteristics also affect the relationship between stress and alcohol misuse. In one study, stress predicted alcohol use and drinking problems but only for men who employed avoidant coping strategies (Cooper, Russell, Skinner, Frone, & Mudar, 1992). In another study, coping motives more strongly predicted alcohol consumption following a laboratory stressor among adults with low levels of adaptive coping skills (Merrill & Thomas, 2013). These nuanced findings suggest that a differentiated approach is needed in order to determine which kinds of stressors predict different kinds of alcohol misuse for particular groups of individuals.

Drinking Motives as Mediators of the Stress – Alcohol Use Association

Drinking motives, which are conceptualized as the proximal reasons people drink alcohol (Kuntsche, Knibbe, Engels, & Gmel, 2007), are a potential mediator of the relationship between stress and alcohol misuse. Cooper (1994) defined several drinking motives including social motives and coping motives, among others. Coping motives are internally directed: individuals use alcohol to reduce unpleasant tension or negative emotional states. Because stress is associated with such states, high levels of stress could increase coping motives for drinking. In contrast, social motives are viewed as externally directed—individuals drink alcohol to enhance social interactions, perhaps based on expectations that alcohol increases social disinhibition and acts as a social lubricant (Cooper, 1994; Kuntsche, Weirs, Janssen, & Gmel, 2010). For example, individuals might drink to facilitate interactions with friends or at parties. However, drinking to socialize may have other benefits as well. Drinking together is a common form of socializing in early adulthood, and drinking with friends may be a context for seeking social support during times of stress. Socializing is also a form of distraction—a way to stop thinking about one’s problems for the time being. For these reasons, it is plausible that individuals who feel stressed would be motivated to drink to socialize (social motives) as well as to alter their internal states (coping motives).

The present study focused on coping and social motives because they represent internally driven and externally driven motives, respectively, as well as negative reinforcement and positive reinforcement motives (Cooper, 1994); they are also thought to be the most and

least maladaptive drinking motives (Cooper, Kuntsche, Levitt, Barber, & Wolff, 2016). Coping motives have been consistently linked to higher levels of drinking problems, whereas social motives are often associated with drinking frequency but not with negative consequences of alcohol use (for a review see Cooper et al., 2016). Nonetheless, social motives have been shown to predict increases in episodic heavy drinking and negative consequences of drinking in some samples (e.g., Labhart, Kuntsche, Wicki, & Gmel, 2017). Furthermore, because different coping motives have distinct correlates and consequences, coping and social motives may show differential associations with stress. For instance, coping motives are more strongly associated with negative mood, which is a potential outcome of stress (Cooper et al., 2016). The two motives may also operate in tandem: for example, coping and social motives were found to interact in predicting frequency of drinking among college students (Armeli, Tamlin, Cullen, & Tennen, 2010). Examining coping and social motives together may provide novel insights into the connections between stress and young adult alcohol use.

Despite the potential for drinking motives to mediate the stress–alcohol misuse association, tests of this mediational model in normal young adult samples are limited. In a sample of undergraduates, Corbin and colleagues (2013) reported positive associations between a general measure of perceived stress and coping motives for drinking as well as between coping motives and negative consequences of drinking (but not weekly alcohol consumption); moreover, the effect of stress on negative consequences of drinking was reduced when level of coping motives was included in the model (Corbin et al., 2013). In a college sample, Rice and Van Arsdale (2010) documented a significant indirect path from general perceived stress to negative consequences of drinking through coping motives. Thus, there is emerging evidence that stress predicts young adult alcohol misuse through coping motives, but to our knowledge, the mediating role of social motives has not been investigated.

Adolescent Alcohol Misuse and Young Adult Stress

Although the stress-exposure model of alcohol misuse posits that the experience of stress leads to alcohol misuse, it is also possible that alcohol misuse increases subsequent stress exposure. Developmental theory and evidence suggest that maladaptive patterns of behavior in earlier phases of development influence functioning and life chances in subsequent phases (Caspi, Bem, & Elder, 1989; Rutter, 2013). Accordingly, alcohol misuse in adolescence could lead to negative consequences, such as poor grades or aggressive behavior, which limit future opportunities for satisfying employment and romantic relationships, increasing the risk of subsequent stress in these domains. Bidirectional relationships between life stress and alcohol abuse are hard to demonstrate (Keyes, Hatzenbuehler, Grant, & Hasin, 2012), and research on particular stressors (e.g., sexual assault) has provided mixed support for a bidirectional relationship between stress exposure and alcohol use (e.g., Corbin, Bernat, Calhoun, McNair, & Seals, 2001; Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). Given the sparse and mixed findings, it is important to determine if intoxication in adolescence predicts subsequent levels of occupational and relationship stress in early adulthood. Thus, in addition to examining the association between stress and alcohol misuse

in early adulthood, the present study also tested the longitudinal association between alcohol misuse in adolescence and young adult occupational and relationship stress.

Gender Differences in the Associations Among Stress, Drinking Motives, & Alcohol Misuse

Associations among stress, drinking motives, and alcohol misuse may differ by gender. Studies of adults have shown that men and women cope differently with stress (Wang et al., 2009) and that women may be more sensitive to a range of stressors than men (Hammen, 2005; Meadows, Brown, & Elder, 2006). Regarding the role of stress in alcohol misuse, the connection between major life stressors (e.g., childhood maltreatment, recent life events) and subsequent alcohol use disorders is stronger for women than men as are the associations between negative affective states and alcohol consumption, binge drinking, and alcohol dependence (for a review, see Peltier et al., 2019). For example, young women are more likely than young men to report drinking to avoid problems (Patrick et al., 2011) and there is some evidence that the link between perceived stress and coping motives is stronger for undergraduate women than men (Rice & Van Arsdale, 2010). Furthermore, among adults seeking treatment for alcohol problems, women reported drinking more in response to negative emotions and interpersonal conflict than men did (Lau-Barraco, Skewes, & Stasiewicz, 2009), suggesting a greater vulnerability among women to emotional and interpersonal stress. Taken together, these findings suggest a greater sensitivity of women to interpersonal stress and stronger associations among stress, drinking to cope, and alcohol misuse for women than men. However, some earlier studies report stronger associations between coping motives and alcohol-related problems for men than women (e.g., Peirce, Frone, Russell, & Cooper, 1994; Rutledge & Sher, 2001; Nolen-Hoeksema & Harrell, 2002), so further exploration of gender differences in the associations among stress, drinking motives, and alcohol misuse is warranted.

Current Study

To provide a more nuanced view of the linkages among stress, drinking motives, and alcohol misuse in early adulthood, this study examined the associations of occupational and relationship stress to social and coping motives for drinking as well as alcohol misuse (i.e., binge drinking and negative consequences of drinking) in a community sample of young adults. Based on theory and prior evidence of associations among stress, drinking motives, and alcohol use (Cooper et al., 2016; Keyes et al., 2012), it was hypothesized that occupational and relationship stress, endorsement of coping and social drinking motives, and alcohol misuse would be positively interrelated (Hypothesis 1). Because drinking motives are considered to be the proximal reasons people drink (Kunsche et al., 2007), it was expected that the relationship between stress and alcohol misuse would be mediated by drinking motives (Hypothesis 2). Because coping motives are more consistently associated with alcohol use, whereas social motives are primarily linked to alcohol consumption (Cooper et al., 2016), it was expected that indirect relationships through social motives would be weaker than those through coping motives. Owing to gender role socialization, which prioritizes work for men and relationships for women, it was expected that the effect of occupational stress on alcohol misuse might be stronger for men than women (Hypothesis

3) whereas the effect of relationship stress on alcohol misuse would be stronger for women than men (Hypothesis 4). Furthermore, the longitudinal associations between adolescent heavy drinking and young adult occupational and relationship stress were explored based on the notion that heavy drinking in adolescence limits opportunities for satisfying employment and relationships in adulthood.

Methods

Participants

Data came from a cohort-sequential study of 657 young adults recruited in adolescence from a rural school district in the eastern United States. Adolescents in the first three years of secondary school at the onset of the study (ages 12–15 years) were surveyed annually in secondary school until graduation and followed up in early adulthood (seven time points in total). Most participants were white (96%) and from middle- to low-income families, reflecting the local population. More information about the sample demographics and recruitment methods have been detailed in previous studies (Beal & Crockett, 2010). The present study focused on the grade 12 and young adult time points ($N = 442$; 55.7% female; $M_{age} = 23.29$, $SD = 1.07$).

Attrition analyses compared participants who did and did not continue participation into early adulthood. T-tests indicated no significant differences between the two groups in frequency of drunkenness in adolescence, however, the attrition rate was significantly higher for males than females ($\chi^2 = 16.23$, $p < .01$). 159 youth participated in grade 12 but did not participate in early adulthood (73.5% retention rate), and 15.4% of participants provided partial data on one or more measures in early adulthood.

Procedure

Data were collected annually through written questionnaires administered at school each fall in adolescence. Project staff administered the survey without school staff being present, and girls and boys were surveyed separately. Students' names were removed from survey forms when the surveys were administered, and numeric codes were used to link students' questionnaires between survey years. For the young adult follow-up survey, data were collected via mailed survey and participants received a monetary incentive. Parents consented to their adolescents' participation (passive consent); young adults provided informed consent for their own participation.

Measures

Table 1 presents the univariate and bivariate statistics for the study variables. Except as noted, all variables were measured at a single time point in early adulthood.

Frequency of drunkenness in adolescence—Participants responded to a single item in grade 12 from the Primary Prevention Awareness Attitudes & Usage Scale (Swisher, Shute, & Bibeau, 1984). Participants indicated how often they had ever been drunk, using a six-point scale with response options ranging from 1 (*never happened*) to 6 (*happens almost every day or more*).

Chronic occupational stress—Participants completed 13 items adapted from Turner, Wheaton, and Lloyd (1995) concerning stressors experienced during the past six months. Specifically, items viewed as most relevant to young adults were selected from the original scale with minor changes in wording and subjected to a confirmatory factor analysis (see Appendix): four of the items load on a factor corresponding to an occupational stress scale (e.g., “you want to change jobs or career but don’t feel you can”; $\alpha = .73$). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The four occupational stress items were averaged to create a total occupational stress score, with higher scores indicating more occupational stress.

Chronic relationship stress—Four items from the Turner et al. (1995) stress measure formed a second factor (see Appendix) reflecting romantic relationship stress during the past six months. A sample item is “you have a lot of conflict with your spouse/partner”; $\alpha = .79$). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The four items were averaged to create a total score, with a higher score indicating more stress in romantic relationships.

Drinking motives—Participants responded to 11 questions adapted from the Harvard School of Public Health College Alcohol Study (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994) asking how important specific reasons for drinking alcohol were for them. Response options ranged from 1 (*not at all important*) to 4 (*very important*). An exploratory factor analysis was conducted, and the items factored into two scales labeled “coping motives” and “social motives,” respectively. Three items that did not fit Cooper’s (1994) definition of coping and social motives were dropped, and a confirmatory factor analysis was conducted (see Appendix). The final scales included four items for coping motives (e.g., “to get away from my problems or troubles”; $\alpha = .69$) and four items for social motives (e.g., “to celebrate”; $\alpha = .71$). The four items for each motive were averaged to create scores for coping motives and social motives, respectively. A higher score reflected greater endorsement of that drinking motive.

Negative consequences of drinking—Participants completed 14 items (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994) regarding negative consequences associated with their alcohol use in the last 12 months (e.g., “has your drinking ever caused you to miss school or work?”). Responses were coded 0 (*No*) and 1 (*Yes*). The 14 items were summed to create an overall total score corresponding to the number of drinking-related problems reported.

Binge drinking—Participants responded to the question, “Over the last 30 days, how many times have you had five or more drinks in a row?” Response options ranged from 1 (*never*) to 6 (*10 or more times*).

Demographic variables—Participants reported their age and gender (female = 1; male = 2) in early adulthood.

Analysis Plan

Data were analyzed using Mplus 6 (Muthén & Muthén, 2007). A multiple group analysis was conducted to examine if the relations between occupational and relationship stress, drinking to cope and drinking to socialize, and binge drinking and negative consequences from alcohol use differed significantly between men and women. Two separate models were estimated: one that constrained all paths in the model to be equal across men and women, and one that allowed those paths to vary freely. The fit indices of the two models were then compared using a chi-square difference test (Kline, 2005; Lehmann, Burkert, Daig, Glaesmer, & Brähler, 2011). A significant difference indicated meaningful differences between men and women in the associations among variables in the model. Then, each path was tested to determine if it differed significantly between men and women. The models controlled for young adult age and adolescent drunkenness. Finally, a longitudinal model was estimated, using a multiple group analysis, to investigate the effect of frequency of drunkenness in adolescence on young adult stress, drinking motives, and binge drinking and negative consequences of alcohol use. This model controlled on age in early adulthood. A bootstrap approach (Shrout & Bolger, 2002) was used to investigate the indirect effects of each type of stressor on alcohol misuse through coping motives and social motives. This method maximizes power and provides an approximation of the distribution of indirect effects within the sample. All models were estimated using Full Information Maximum Likelihood (FIML), which is considered the most appropriate estimation method for handling missing data (Enders, 2010). Model fit was examined using the cutoff criteria (values close to or greater than .95 for CFI and less than .08 for SRMR) established by Hu and Bentler (1999).

The analyses included all available data on the study variables from grade 12 and early adulthood by using maximum likelihood estimation. Any data manipulations and all measures examined are reported.

Results

Preliminary Analyses

Bivariate associations among the study variables are reported separately for men and women in Table 1. For both genders, more frequent drunkenness in adolescence and stronger endorsement of social motives and coping motives were significantly associated with more frequent binge drinking and more negative consequences of drinking in early adulthood. For men, relationship stress and occupational stress were positively associated with endorsement of coping motives and social motives, and occupational stress was associated with both types of alcohol misuse. For women, relationship stress was positively associated with coping motives and social motives and with negative consequences of drinking.

Cross-Sectional Model Predicting Young Adult Alcohol Misuse

A multiple group analysis was conducted to examine possible gender differences in the model. The model showed adequate model fit ($CFI = .938$; $SRMR = .078$). A chi-square difference test showed that the model in which corresponding paths for men and women could differ fit better than a model in which paths for men and women were constrained to

be equal ($\chi^2_{diff}(12) = 35.41, p < .001$). Therefore, we examined the model separately for men and women.

For men, greater occupational stress was significantly related to stronger endorsement of coping and social motives, partially supporting Hypothesis 1 (see Figure 1). Furthermore, endorsement of each drinking motive was positively related to binge drinking, and endorsement of social motives (but not coping motives) was related to negative consequences of drinking. There were significant indirect effects from occupational stress to binge drinking and negative consequences through stronger endorsement of both social and coping motives, partially supporting Hypothesis 2 (see Table 2). There were no significant effects of relationship stress. The model accounted for 33% of the variance in negative consequences of drinking and 40% of the variance in binge drinking for men.

For women, more relationship stress was associated with stronger endorsement of coping and social drinking motives (see Figure 1), partially supporting Hypothesis 1. In turn, stronger endorsement of social motives was significantly related to more binge drinking (but not to negative consequences). The indirect effect of relationship stress on binge drinking through social motives was significant, whereas the indirect effect of relationship stress through coping motives was not, partially supporting Hypothesis 2 (see Table 2). There were no significant effects of occupational stress. The model accounted for 28% of the variance in negative consequences of drinking and 14% of the variance in binge drinking for women.

Longitudinal Effects of Adolescent Drunkenness

Next, an exploratory model that included the effects of adolescent frequency of drunkenness on young adult stress and drinking motives was examined. The multiple group model showed adequate model fit ($CFI = .969$; $SRMR = .053$; Hu & Bentler, 1999), and a chi-square difference test indicated that it was appropriate to examine the model separately for men and women ($\chi^2_{diff}(16) = 36.75, p < .01$).

For both men and women, all significant direct and indirect effects that were present in the cross-sectional model continued to be significant in the longitudinal model (see Table 3 and Figure 2). Additionally, for women, two effects (one direct and one indirect) were now significant that were not significant in the cross-sectional model. Greater endorsement of coping motives was directly related to more negative consequences, and more relationship stress was indirectly related to more negative consequences from alcohol use through greater endorsement of coping motives.

Regarding the effects of adolescent drunkenness, more frequent drunkenness during adolescence was related to greater endorsement of coping and social motives for both men and women. Additionally, more frequent adolescent drunkenness was related to more occupational stress for men only. There was no significant relationship between adolescent frequency of drunkenness and relationship stress for either men or women. Significant indirect effects of adolescent drunkenness on binge drinking and negative consequences were present for men only. More frequent drunkenness in adolescence was significantly related to more young adult negative consequences and binge drinking through more occupational stress, which was then related to greater endorsement of social motives (see

Table 3). Furthermore, more frequent adolescent drunkenness was indirectly related to more young adult binge drinking through more occupational stress, which was then related to greater endorsement of coping motives. The model accounted for 34% and 29% of the variance in negative consequences of drinking and 40% and 15% of the variance in binge drinking for men and women, respectively.

Gender Differences in the Longitudinal Model

A series of models were estimated to determine if each path in the model was significantly different between men and women. In each analysis, one path in the model could vary between men and women. This model was then compared to the fully constrained model using a chi-square difference test. Results from these analyses indicated that only the relations between coping motives and binge drinking ($\chi^2_{diff}(1) = 13.052, p < .001$) and social motives and binge drinking ($\chi^2_{diff}(1) = 13.068, p < .001$) were significantly different between men and women, which did not support Hypotheses 3 and 4. These results indicated that the positive relations between coping and social motives and binge drinking were significantly stronger in men than women.

Discussion

Stress has been linked to various forms of alcohol misuse, but several questions remain regarding these associations. Most research investigating the importance of stress for alcohol misuse has focused on extreme stressors or major life events, with less attention to chronic stressors, particularly those related to normative developmental challenges. Moreover, relatively little work has focused on the mechanisms involved in these relations. Attention to gender differences in the stress–alcohol relation has also been limited. Considering normative developmental stress and understanding the underlying processes linking normative stress with alcohol use for young men and women can inform tailored interventions aimed at preventing the negative impacts of stress on alcohol misuse in early adulthood. The current study focused on one underlying process, the mediating role of drinking motives, in the relations between two different normative stressors (occupational stress and relationship stress) and alcohol misuse, with close attention paid to the role of gender. Additionally, the possibility of bidirectional relations between normative stress and alcohol misuse was explored.

Findings indicated that relationship stress and occupational stress were related to alcohol misuse differentially for young men and women, with occupational stress being indirectly related to alcohol misuse for men through both social and coping motives and relationship stress being indirectly related to alcohol misuse for women through social motives. Evidence of a bidirectional association between stress and alcohol misuse was found for men but not for women.

This study extended the conceptualization of stressors by considering developmentally relevant domains of chronic stress that have not been the focus of previous studies of the stress–alcohol misuse association. The life domains of work and relationships reflect normative developmental tasks of early adulthood (Havighurst, 1972) that are personally relevant to youth in the third decade of life (Samelo-Aro et al., 2007). Challenges in

completing developmental tasks may result in tension and unpleasant emotions that young adults seek to alleviate by using alcohol. The results indicate that difficulties in relationships and problems in finding satisfying employment and financial security are linked both to drinking motives and alcohol use, albeit differently for men and women. The findings confirm the importance of these sources of stress for young adults, supporting the value of pursuing a developmentally based, domain-specific notion of life stress in future studies of alcohol misuse in early adulthood. Applying this perspective to other life phases may also yield new insights; for example, the transition to parenthood and associated concerns about infertility among couples who are trying to conceive may become increasingly relevant in the fourth and fifth decades of life as the chances of pregnancy wane.

The significant indirect relationships from stress to alcohol misuse via coping and social motives support the role of drinking motives as an underlying mechanism linking stress to negative consequences of drinking. Such a mechanism is consistent with theory (Cooper, 1994) and prior research on adolescents and adults (Cooper et al., 2016), but most studies have focused on coping motives as the putative mediator of stress–alcohol relations. The present findings confirm this pathway but also support the role of social drinking motives as a mediator of the stress–alcohol misuse association for both genders. The findings indicate that young adults who are under stress are likely to endorse using alcohol to enhance social interaction as well as to alleviate negative internal states. This could mean that normatively stressed young adults socialize in part to deal with their stress and use alcohol to facilitate these social interactions. Social interaction is a context for venting frustrations and seeking social support, which are both strategies for reducing stress; alternatively, social interaction can serve as a distraction from pressures or problems. Put differently, by enhancing interactions with peers and especially friends, drinking to socialize may serve as a means of coping with stress by providing a distraction or creating opportunities to gain social support. If replicated in other studies, the link between normative stress and social motives may require a reconceptualization of social motives.

In contrast to most previous research on drinking motives (Cooper et al., 2016), the present findings indicated more consistent associations between drinking motives and binge drinking than negative consequences of drinking. This could reflect the fact that the statistical analyses included both forms of alcohol misuse in the same model, whereas other studies have often treated these outcomes separately. It could also reflect the focus on young adults and normative stress or the characteristics of the sample, which came from a largely white, rural community. In any case, the results suggest that social motives may be an especially relevant mediator of the links between normative stress and alcohol misuse in early adulthood.

The results also showed that distinct pathways from stress to alcohol misuse were significant for men and women, with occupational stress playing a prominent role for men and relationship stress for women. These differences echo traditional gender roles which emphasize the provider (occupational) role for men and caregiver (relationships) role for women (Eagly, 1987; Wood & Eagly, 2002), as well as prior research suggesting that occupational stress is salient for men while women place a greater emphasis on positive family relationships (American Psychological Association, 2010). The results also build on

prior research showing that traditional gender roles can influence the association between stress and alcohol use (Perrotte, Baumann, & Knight, 2018). Taken together, the findings indicate that because of their distinct priorities, young men may be more likely to misuse alcohol in the context of work-related stressors whereas young women may be more likely to do so in response to problems in romantic relationships. Although gender differences in the associations between stress and drinking motives have been reported previously in some studies (e.g., King, Bernardy, & Hauner, 2003; Rice & Van Arsdale, 2010), those studies focused on general measures of perceived stress rather than domain-specific, normative stress.

It is also noteworthy that both drinking motives were supported as mediators of stress effects for young men, but only social motives were supported for young women. This finding was unexpected as other studies have shown stronger associations among stress, coping motives, and alcohol use for women than for men (Peltier et al., 2019). A possible explanation is that women socialize in part to access social support when they are stressed. Women are more likely than men to solicit social support in general and are more likely to feel satisfied with the support they receive (Barbee & Cunningham, 1993); they are also more likely to be social facilitators. Thus, social drinking motives among women may partly reflect the desire for social support. However, socializing at parties is also a context for drinking in early adulthood, which may lead some young women to engage in heavy alcohol use, including binge drinking. Further research, especially qualitative studies that probe the meanings behind drinking to socialize and studies that illuminate the processes that encourage binge drinking at social gatherings, would help to elucidate the reasons for these gender-specific pathways.

When exploring the potential bidirectional effects of alcohol misuse longitudinally from adolescence to early adulthood, differences again emerged between men and women. For men, frequent drunkenness predicted occupational (but not relationship) stress in early adulthood, but, for women, there were no significant relations between adolescent drunkenness and either stressor. This indicates that a bidirectional relationship between alcohol misuse and occupational stress may be present, at least for men. The relation between adolescent alcohol misuse and occupational stress is consistent with the idea that problematic patterns early in life interfere with subsequent functioning (Caspi, Bem, & Elder, 1989; Rutter, 2013). That is, frequent drunkenness in adolescence may limit youths' educational and career opportunities (e.g., through poorer school performance, missing work), leading to occupational stress in early adulthood when youth are not able to reach desired career and financial goals. The finding that this association appeared only for men may relate to pressures they feel as a result of the traditional gender roles emphasizing men as breadwinners. Relationship stress may not be affected by early drinking in the same way as occupational stress because the effects of early drinking on relationships (e.g., partying too much, more conflict when intoxicated) may be more immediate, without lasting cumulative effects. Further research is needed to fully examine if these differences in the bidirectional relationships are consistent for other types of stress and for different alcohol use behaviors.

The findings can inform policy and intervention efforts in several ways. Evidence supporting the importance of normative occupational and relationship stress suggests that, in addition to negative life events, interventions to reduce alcohol misuse in early adulthood might attend to salient stressors frequently experienced during this developmental period. Relatedly, knowing that different types of stressors are particularly salient for men and women can inform the development of interventions tailored for each gender. The finding that both social and coping motives are implicated in alcohol misuse indicates that it may be useful to steer young adults away from using alcohol for either reason. Finally, concern over young adult mental health has grown in recent years (Schulenberg & Zarett, 2006), and policy has started to focus on preventing mental health and substance use problems in young adult populations (U.S. Department of Health and Human Services, Office of the Surgeon General, 2016). A better understanding of which types of stressors impact young adult well-being can better inform these efforts by highlighting that even normative stress experienced by most individuals can have adverse effects on young adults.

Several study limitations should be noted. First, the community sample was composed of mostly white, Non-Hispanic young adults in a rural environment, so replication with more diverse samples is needed to determine if the findings generalize to other populations. Also, the data were based exclusively on participants' self-reports. Self-reports are appropriate for measuring personal motives, and the validity of self-reports of substance use has been supported (Freedberg, & Johnston, 1980); nonetheless, alternative measures of stress and drinking behavior would be desirable. In addition, most of the study variables were measured at a single time-point so the causal direction of the stress–alcohol misuse association cannot be determined. Longitudinal research across early adulthood is needed to test systematically for bidirectional effects and to determine the predictive value of life stress and drinking motives for subsequent alcohol misuse. Finally, this study only measured coping and social motives, and other drinking motives need to be examined in future research to more fully understand the relationships among normative stress, coping motives, and alcohol misuse.

Conclusions

Although stress has been linked to alcohol misuse both theoretically and empirically, the underlying processes supporting this association have not been fully examined. Understanding these processes is especially important during early adulthood, a period characterized by normative life challenges and high levels of alcohol use and abuse. This study examined the role of drinking motives, including drinking to cope and drinking to socialize, as potential mediators of the association between normative life stressors and alcohol misuse. The findings suggest that, with prior alcohol use taken into account, young adult alcohol misuse is sensitive to normative developmental stressors of early adulthood, which operate in part by influencing drinking motives in ways that differ for young men and women. More broadly, the results suggest a need for a nuanced approach to investigating the linkages among stress, drinking motives, and alcohol misuse, one that considers gender and developmental stage in conceptualizing these associations.

Appendix. Confirmatory factor analysis information for the coping and social drinking motives subscales and the occupational and relationship stress subscales

Drinking Motives Subscales	
Coping Motives	β
$\chi^2(2) = 11.14, p < .01, CFI = .95, SRMR = .03$	
1. To get away from my problems and troubles	.67
2. To relax or relieve tension	.60
3. Because of boredom	.55
4. To help me get my work done	.44
Social Motives	
$\chi^2(2) = 12.46, p < .01, CFI = .96, SRMR = .04$	
1. To have a good time with my friends	.81
2. To celebrate	.74
3. As a reward for working hard	.54
4. To feel more comfortable with the opposite sex	.35
Stress Subscales	
Occupational Stress	
$\chi^2(1) = .04, p = .85, CFI = 1.00, SRMR < .01$	
1. You don't have enough money to buy the things you need	.40
2. You don't have enough money to do the things you want to do or buy the things you want.	.34
3. You want change jobs or career but don't feel you can.	.72
4. You are looking for a job and can't find the one you want.	.84
Relationship Stress	
$\chi^2(1) = 2.73, p = .10, CFI = 1.00, SRMR = .01$	
1. You have a lot of conflict with your spouse/partner	.51
2. Your sexual needs are not being fulfilled	.77
3. You don't have a relationship that meets your emotional needs.	.77
4. Your partner seems dissatisfied with your relationship.	.56

Note: Standardized estimates are reported.

References

- Armeli S, Conner TS, Cullum J, & Tennen H (2010). A longitudinal analysis of drinking motives moderating the negative affect-drinking association among college students. *Psychology of Addictive Behaviors*, 24(1), 38. doi:10.1037/a0017530 [PubMed: 20307111]
- American Psychological Association (2010). Gender and stress. Retrieved from <https://www.apa.org/news/press/releases/stress/2010/gender-stress.aspx>

- Arnett JJ (2000). Emerging adulthood: A theory of development from the late teens to the twenties. *American Psychologist*, 55, 469–480. doi:10.1037/0003-066x.55.5.469 [PubMed: 10842426]
- Arnett JJ, Žukauskien R, & Sugimura K (2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *The Lancet Psychiatry*, 1(7), 569–576. doi:10.1016/s2215-0366(14)00080-7 [PubMed: 26361316]
- Barbee AP, & Cunningham MR (1993). Effects of gender role expectations on the social support process. *Journal of Social Issues*, 49, 175–190. doi:10.1111/j.1540-4560.1993.tb01175.x
- Beal SJ, & Crockett LJ (2010). Adolescents' occupational and educational aspirations and expectations: Links to high school activities and adult educational attainment. *Developmental Psychology*, 46(1), 258. doi:10.1037/a0017416 [PubMed: 20053022]
- Cappell H, & Greeley J (1987). *Psychological theories of drinking and alcoholism*. New York: Guilford.
- Caspi A, Bem DJ, & Elder GH Jr. (1989). Continuities and consequences of interactional styles across the life course. *Journal of Personality*, 57, 375–406. doi:10.1111/j.1467-6494.1989.tb00487.x [PubMed: 2769561]
- Centers for Disease Control and Prevention (2018). Fact sheets – Binge drinking. Retrieved from <https://www.cdc.gov/alcohol/fact-sheets/binge-drinking.htm>
- Cohen S, Karmarck T, & Mermelstein R (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385–396. doi:10.2307/2136404 [PubMed: 6668417]
- Collins WA, Welsh DP, & Furman F (2009). Adolescent romantic relationships. *Annual Review of Psychology*, 60, 631–652.
- Cooper ML (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, 6, 117–128. doi:10.1037/1040-3590.6.2.117
- Cooper ML, Kuntsche E, Levitt A, Barber LL, & Wolf S (2016). Motivational models of substance use: A review of theory and research on motives for using alcohol, marijuana, and tobacco In Sher K (Ed.), *The Oxford Handbook of Substance Use and Substance Use Disorders* (pp. 1–117). New York, NY: Oxford University Press.
- Cooper ML, Russell M, Skinner JB, Frone MR, & Mudar P (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology*, 101, 139–152. doi:10.1037/0021-843x.101.1.139 [PubMed: 1537960]
- Corbin W, Bernat JA, Calhoun KS, McNair LD, & Seals KL (2001). Role of alcohol expectancies and alcohol consumption among sexually victimized and non-victimized college women. *Journal of Interpersonal Violence*, 16, 297–311. doi:10.1177/088626001016004002
- Corbin WR, Farmer NA, & Nolen-Hoekesma S (2013). Relations among stress, coping strategies, coping motives, alcohol consumption and related problems: A mediated moderation model. *Addictive Behaviors*, 38, 1912–1919. doi:10.1016/j.addbeh.2012.12.005 [PubMed: 23380486]
- Eagly AH (1987). *Sex differences in social behavior: A social-role interpretation*. Hillsdale, NJ: Lawrence Erlbaum.
- Eagly AH, Wood W, & Diekman AB (2000). Social role theory of sex differences and similarities: A current appraisal. *The developmental social psychology of gender*, 12, 174.
- Enders CK (2010). *Applied missing data analysis*. New York: Guilford Press.
- Erikson EE (1963). *Childhood and society*. New York, NY: Norton
- Federal Interagency Forum on Child and Family Statistics, (2014). *America's young adults: Special issue, 2014*. Washington, DC: U.S. Government Printing Office Retrieved August 9, 2019 from http://childstats.gov/pdf/sc2014/YA_14.pdf
- Freedberg EJ, & Johnston WE (1980). Validity and reliability of alcoholics' self-reports of use of alcohol submitted before and after treatment. *Psychological Reports*, 46 (3, Pt 1). 10.2466/pr0.1980.46.3.999
- Hammen C, (2005). Stress and depression. *Annual Review of Clinical Psychology*, 1, 293–319.
- Havighurst R (1953/1972). *Human development and education*. New York, NY: McKay.
- Hogan DP, & Astone NM (1986). The transition to adulthood. *Annual Review of Sociology*, 12, 109–130.

- Hu LT, & Bentler PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. doi:10.1080/10705519909540118
- Keyes KM, Hatzenbuehler ML, Grant BF, & Hasin DS (2012). Stress and alcohol: Epidemiologic evidence. *Alcohol Research*, 34(4): 391–400. [PubMed: 23584105]
- Kilpatrick DG, Acierno R, & Resnick HS, Saunders BE, & Best CL (1997). A 2-year longitudinal analysis of the relationship between violent assault and substance use in women. *Journal of Consulting and Clinical Psychology*, 65, 834–847. doi:10.1037/0022-006x.65.5.834 [PubMed: 9337502]
- King AC, Bernardy NC, & Hauner K (2003). Stressful events, personality, and mood disturbance: Gender differences in alcoholics and problem drinkers. *Addictive Behaviors*, 28(1), 171–187. doi:10.1016/s0306-4603(01)00264-7 [PubMed: 12507535]
- Kline RB (2015). *Principles and practice of structural equation modeling*. Guilford Publications.
- Kuntsche E, Knibbe R, Engels R, & Gmel G (2007). Drinking motives as mediators of the link between alcohol expectancies and alcohol use among adolescents. *Journal of Studies of Alcohol and Drugs*, 68, 76–85. doi:10.15288/jsad.2007.68.76
- Kuntsche E, Weirs R, Janssen S & Gmel G (2010). Same wording, distinct concepts? Testing differences of expectancies and motives in a mediation model of alcohol outcomes. *Experimental and Clinical Psychopharmacology*, 18, 436–444. doi:10.1037/a0019724 [PubMed: 20939647]
- Labhart F, Kuntsche E, Wicki M, & Gmel G (2017). Reciprocal influences of drinking motives on alcohol use and related consequences: A full cross-lagged panel study among young men. *Behavioral Medicine*, 43, 277–284. doi:10.1080/08964289.2016.1157057 [PubMed: 26959722]
- Lau-Barraco C, Skewes MC, Stasiewicz PR (2009). Gender differences in high-risk symptoms for drinking: Are they mediated by depressive symptoms? *Addictive Behaviors*, 34, 68–74. doi:10.1016/j.addbeh.2008.09.002 [PubMed: 18940274]
- Leaper C (2002). Parenting boys and girls In Bornstein MH (Ed.). *Handbook of parenting: Vol. 1. Children and parenting* (2nd ed., pp. 189–225). Mahwah, NJ: Erlbaum.
- Leaper C, & Friedman CK (2007). The socialization of gender. *Handbook of socialization: Theory and research*, 561–587.
- Lehmann A, Burkert S, Daig I, Glaesmer H, & Brähler E (2011). Subjective underchallenge at work and its impact on mental health. *International Archives of Occupational and Environmental Health*, 84(6), 655–664. doi:10.1007/s00420-011-0628-5 [PubMed: 21424247]
- McCreary DR, & Sadava SW (1998). Stress, drinking, and the adverse consequences of drinking in two samples of young adults. *Psychology of Addictive Behaviors*, 12, 247–261. doi:10.1037/0893-164x.12.4.247
- Meadows SO, Brown JS, & Elder GH (2006). Depressive symptoms, stress, and support: Gendered trajectories from adolescence to young adulthood. *Journal of Youth and Adolescence*, 35, 93–103. doi:10.1007/s10964-005-9021-6
- Merrill JE, & Thomas SE (2013). Interactions between adaptive coping and drinking to cope in predicting naturalistic drinking and drinking following a lab-based psychosocial stressor. *Addictive Behaviors*, 38, 1672–1678. doi:10.1016/j.addbeh.2012.10.003 [PubMed: 23254217]
- Muthén LK., & Muthén BO (2007). *Mplus User's Guide* (Sixth Edition). Los Angeles, CA: Muthén & Muthén.
- Nolen-Hoeksema S, & Harrell ZAT (2002). Rumination, depression, and alcohol use: Tests of gender differences. *Journal of Cognitive Psychotherapy: An International Quarterly*, 16, 391–404. doi:10.1891/088983902780935687
- Park MJ, Scott JT, Adams SH, Brindis CD, & Irwin CE (2014). Adolescent and young adult health in the United States in the past decade: Little improvement and young adults remain worse off than adolescents. *Journal of Adolescent Health*, 55, 3–16. doi:10.1016/j.jadohealth.2014.04.003 [PubMed: 24815958]
- Patrick ME, Schulenberg JE, O'Malley PM, Maggs JL, Kloska DD, Johnston LD, & Bachman JG (2011). Age-related changes in reasons for using alcohol and marijuana from ages 18 to 30 in a national sample. *Psychology of Addictive Behaviors*, 25, 330–339. doi:10.1037/a0022445 [PubMed: 21417516]

- Peirce RS, Frone MR, Russell M, & Cooper ML (1994). Relationship of financial strain and psychosocial resources to alcohol use and abuse: The mediating role of negative affect and drinking motives. *Journal of Health and Social Behavior*, 35, 291–303. doi:10.2307/2137211 [PubMed: 7844327]
- Peltier M, Verplaetse TL, Mineur YS... McKee SA (2019). Sex differences in stress-related alcohol use. *Neurobiology of Stress*, 10, 100149. doi:10.1016/j.ynstr.2019.100149 [PubMed: 30949562]
- Perrotte JK, Baumann MR, & Knight CF (2018). Traditional gender roles and the stress–alcohol relationship among Latina/o college students. *Substance Use & Misuse*, 53(10), 1700–1705. doi:10.1080/10826084.2018.1429472 [PubMed: 29424577]
- Rauer AJ, Pettit GS, Lansford JE, Bates JE, & Dodge K, A. (2013). Romantic relationship patterns in young adulthood and their developmental antecedents. *Developmental Psychology*, 49, (11). doi:10.1037/a0031845
- Rice KG, & Van Arsdale AC (2010). Perfectionism, perceived stress, drinking to cope, and alcohol-related problems among college students. *Journal of Counseling Psychology*, 57, 439–450. doi:10.1037/a0020221
- Roisman GI, Masten AS, Coates JD, & Tellegen A (2004) Salient and emerging developmental tasks in the transition to adulthood. *Child Development*, 75, 123–133. doi:10.1111/j.1467-8624.2004.00658.x [PubMed: 15015679]
- Rutledge PC, & Sher KJ (2001). Heavy drinking from the freshman year into early young adulthood: The roles of stress, tension-reduction drinking motives, gender and personality. *Journal of Studies on Alcohol*, 62, 457–566. doi:10.15288/jsa.2001.62.457 [PubMed: 11523533]
- Rutter M (2013). Developmental psychopathology: A paradigm shift or just a relabeling? *Developmental Psychopathology*, 25, 1201–13. doi:10.1017/s0954579413000564
- Samelo-Aro K, Aunola K, & Nurmi J-E (2007). Personal goals during emerging adulthood: A 10-year follow up. *Journal of Adolescent Research*, 22, 690–715. doi:10.1177/0743558407303978
- Schulenberg JE, & Zaratt N (2006). Mental health during emerging adulthood: Continuity and discontinuity in courses, causes, and functions In Arnett JJ & Tanner JL (Eds.) *Emerging adults in America: Coming of age in the 21st century* (pp. 135–171). American Psychological Association.
- Sher K, & Grekin ER (2007). Alcohol and affect regulation In Gross JJ (Ed.), *Handbook of emotion regulation* (pp. 560–580). New York, NY: Guilford
- Shrout PE, & Bolger N (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422–445. doi:10.1037/1082-989x.7.4.422 [PubMed: 12530702]
- Swisher JD, Shute RE, & Bibeau D (1984). Assessing drug and alcohol abuse: An instrument for planning and evaluation. *Measurement and Evaluation in Counseling and Development*, 17, 91–97. doi:10.1080/07481756.1984.12022752
- Thomas SE, Merrill JE, von Hofe J, & Magid V (2014). Coping motives for drinking affect stress reactivity but not alcohol consumptions in a clinical laboratory setting. *Journal of Studies of Alcohol and Drugs*, 115–123. doi:10.15288/jsad.2014.75.115
- Turner RJ, Wheaton B, & Lloyd DA (1995). The epidemiology of social stress. *American Sociological Review*, 104–125.
- U.S. Department of Health and Human Services, Office of the Surgeon General (2016). *Facing Addiction in America: The Surgeon General’s Report on Alcohol, Drugs, and Health, 2016*. Retrieved from <https://www.surgeongeneral.gov/library/2016alcoholdrughealth/index.html>
- Viner J & Tanner JL (2009). Psychiatric disorders in emerging adulthood. *Yellowbrick Journal* 1, 6–7. Downloaded August 19, 2019 from <https://www.yellowbrickprogram.com/Papers-By-Yellowbrick/psychiatric-disordersemerging-adult.html>
- Wang J, Keown L, Patten S, Williams J, Currie S, Beck C, ... El-Guebaly N (2009). A population-based study on ways of dealing with daily stress: Comparisons among individuals with mental disorders, with long-term general medical conditions and healthy people. *Social Psychiatry and Psychiatric Epidemiology*, 44, 666–674. doi:10.1007/s00127-008-0482-2 [PubMed: 19039509]
- Wechsler H, Davenport A, Dowdall G, Moeykens B, & Castillo S (1994). Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *Jama*, 272(21), 1672–1677. doi:10.1001/jama.1994.03520210056032 [PubMed: 7966895]

- Wheaton B (1990). Life transitions, role histories, and mental health. *American Sociological Review*, 55, 209–223. doi:10.2307/2095627
- Wood W, & Eagly AH (2002). A cross-cultural analysis of the behavior of women and men: Implications for the origins of sex differences. *Psychological Bulletin*, 128, 699–727. doi:10.1037/0033-2909.128.5.699 [PubMed: 12206191]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

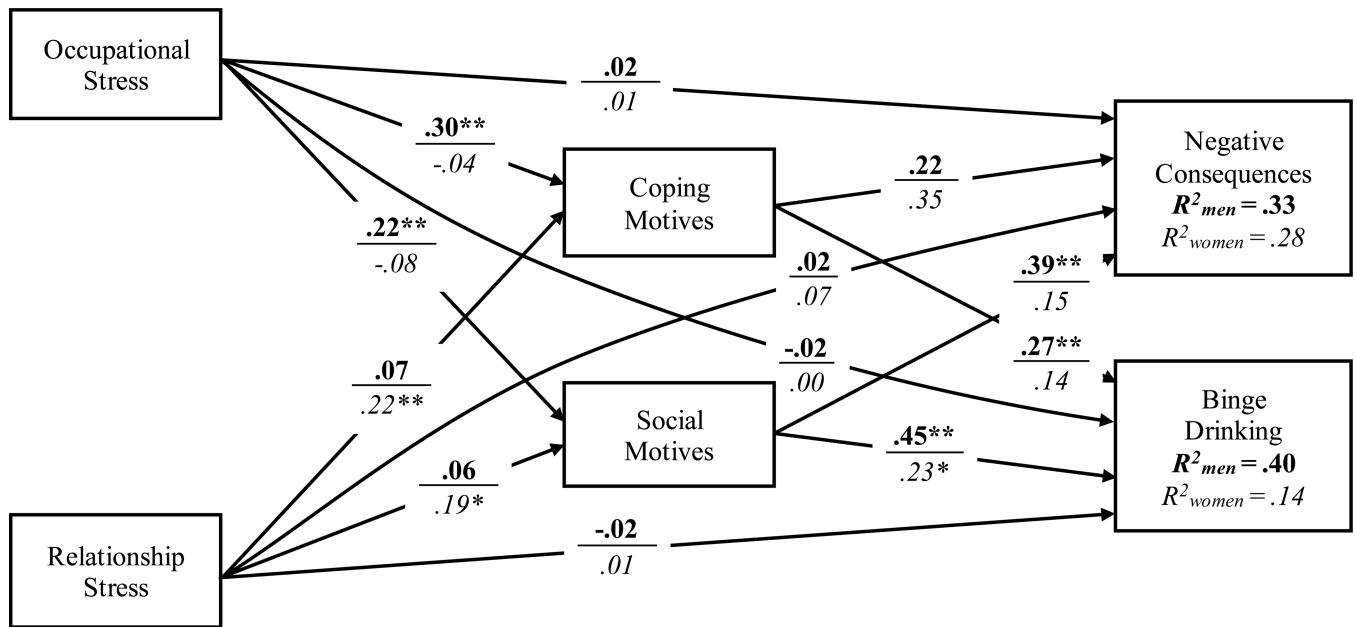


Figure 1. Cross-sectional model predicting young adult negative consequences of drinking and binge drinking.

Note: Standardized estimates are reported. Bolded values are for men; italicized values are for women. Age and adolescent frequency of drunkenness are included as controls. Outcome residuals and covariances were significantly correlated, but are not shown.

$\chi^2(16) = 45.50, p < .01, CFI = .94, SRMR = .08$

* $p < .05$; ** $p < .01$.

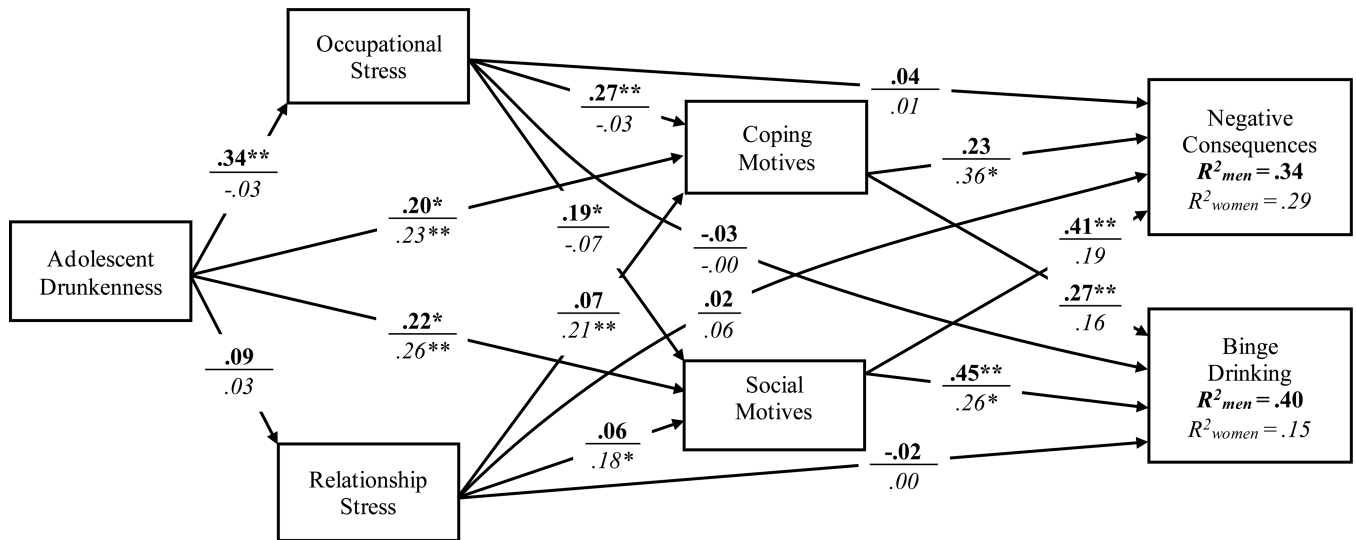


Figure 2. Longitudinal model predicting young adult negative consequences of drinking and binge drinking.
Note: Standardized estimates are reported. Bolded values are for men; italicized values are for women. Age is included as a control. Outcome residuals and covariances were significantly correlated, but are not shown.
 $\chi^2(12) = 27.64, p < .01, CFI = .97, SRMR = .05$
 * $p < .05$; ** $p < .01$.

Table 1.

Bivariate and descriptive statistics for men and women

									Women		Men	
	1	2	3	4	5	6	7	8	Mean (SD)	N	Mean (SD)	N
1. Age	-	.06	-.01	-.09	-.16*	-.22**	-.22**	-.10	23.20 (1.05)	246	23.40 (1.10)	196
2. Adolescent Drunkenness	.14	-	.03	.03	.24**	.26**	.28**	.23**	2.84 (1.43)	185	3.30 (1.35)	147
3. Occupational Stress	.03	.18*	-	.26**	.07	.01	-.03	.00	3.83 (1.56)	243	3.78 (1.54)	194
4. Relationship Stress	.04	.10	.38**	-	.25**	.20**	.16*	.13	2.75 (1.61)	225	2.85 (1.51)	183
5. Coping Motives	.06	.24**	.27**	.18*	-	.63**	.43**	.31**	1.39 (0.48)	239	1.49 (0.47)	195
6. Social Motives	-.07	.24**	.22**	.15*	.55**	-	.40**	.32**	1.80 (0.61)	240	2.02 (0.64)	193
7. Negative Consequences of Drinking	-.04	.27**	.18*	.14	.49**	.48**	-	.62**	2.47 (2.80)	239	4.13 (3.67)	187
8. Binge Drinking	-.05	.20*	.16*	.08	.46**	.51**	.57**	-	1.70 (1.15)	246	2.55 (1.54)	199

Note: Bolded values are for men; italicized values are for women.

* p<.05

** p<.01.

Cross-sectional indirect effects of stress on binge drinking and negative consequences of drinking through drinking motives.

Table 2.

		95% BC CI				
Men						
Occupational Stress	→	Coping Motives	→	Negative Consequences	.006	.436
Occupational Stress	→	Social Motives	→	Negative Consequences	.060	.440
Relationship Stress	→	Coping Motives	→	Negative Consequences	-.043	.273
Relationship Stress	→	Social Motives	→	Negative Consequences	-.115	.265
Occupational Stress	→	Coping Motives	→	Binge Drinking	.019	.176
Occupational Stress	→	Social Motives	→	Binge Drinking	.033	.218
Relationship Stress	→	Coping Motives	→	Binge Drinking	-.032	.095
Relationship Stress	→	Social Motives	→	Binge Drinking	-.060	.126
Women						
Occupational Stress	→	Coping Motives	→	Negative Consequences	-.161	.040
Occupational Stress	→	Social Motives	→	Negative Consequences	-.120	.021
Relationship Stress	→	Coping Motives	→	Negative Consequences	.000	.410
Relationship Stress	→	Social Motives	→	Negative Consequences	-.011	.200
Occupational Stress	→	Coping Motives	→	Binge Drinking	-.036	.005
Occupational Stress	→	Social Motives	→	Binge Drinking	-.056	.010
Relationship Stress	→	Coping Motives	→	Binge Drinking	-.017	.090
Relationship Stress	→	Social Motives	→	Binge Drinking	.002	.094

Note: Bold values indicate a significant indirect effect.

Longitudinal indirect effects of adolescent frequency of drunkenness on binge drinking and negative consequences of drinking through stress and drinking motives.

Table 3.

								95% BC CI
Men								
Adolescent Drunkenness	→	Occupational Stress	→	Coping Motives	→	Negative Consequences	.000	.046
Adolescent Drunkenness	→	Occupational Stress	→	Social Motives	→	Negative Consequences	.001	.045
Adolescent Drunkenness	→	Relationship Stress	→	Coping Motives	→	Negative Consequences	-.001	.019
Adolescent Drunkenness	→	Relationship Stress	→	Social Motives	→	Negative Consequences	-.004	.021
Adolescent Drunkenness	→	Occupational Stress	→	Coping Motives	→	Binge Drinking	.001	.044
Adolescent Drunkenness	→	Occupational Stress	→	Social Motives	→	Binge Drinking	.001	.051
Adolescent Drunkenness	→	Relationship Stress	→	Coping Motives	→	Binge Drinking	-.002	.018
Adolescent Drunkenness	→	Relationship Stress	→	Social Motives	→	Binge Drinking	-.004	.023
		Occupational Stress	→	Coping Motives	→	Negative Consequences	.003	.169
		Occupational Stress	→	Social Motives	→	Negative Consequences	.010	.184
		Relationship Stress	→	Coping Motives	→	Negative Consequences	-.016	.099
		Relationship Stress	→	Social Motives	→	Negative Consequences	-.059	.109
		Occupational Stress	→	Coping Motives	→	Binge Drinking	.016	.159
		Occupational Stress	→	Social Motives	→	Binge Drinking	.010	.194
		Relationship Stress	→	Coping Motives	→	Binge Drinking	-.029	.082
		Relationship Stress	→	Social Motives	→	Binge Drinking	-.062	.115
Women								
Adolescent Drunkenness	→	Occupational Stress	→	Coping Motives	→	Negative Consequences	-.001	.011
Adolescent Drunkenness	→	Occupational Stress	→	Social Motives	→	Negative Consequences	-.001	.012
Adolescent Drunkenness	→	Relationship Stress	→	Coping Motives	→	Negative Consequences	-.006	.028
Adolescent Drunkenness	→	Relationship Stress	→	Social Motives	→	Negative Consequences	-.003	.017
Adolescent Drunkenness	→	Occupational Stress	→	Coping Motives	→	Binge Drinking	.000	.007
Adolescent Drunkenness	→	Occupational Stress	→	Social Motives	→	Binge Drinking	-.001	.012
Adolescent Drunkenness	→	Relationship Stress	→	Coping Motives	→	Binge Drinking	-.002	.015
Adolescent Drunkenness	→	Relationship Stress	→	Social Motives	→	Binge Drinking	-.004	.017
		Occupational Stress	→	Coping Motives	→	Negative Consequences	-.083	.027

Occupational Stress	→	Social Motives	→	Negative Consequences	-.065	.013
Relationship Stress	→	Coping Motives	→	Negative Consequences	.002	.197
Relationship Stress	→	Social Motives	→	Negative Consequences	-.003	.122
Occupational Stress	→	Coping Motives	→	Binge Drinking	-.049	.011
Occupational Stress	→	Social Motives	→	Binge Drinking	-.076	.013
Relationship Stress	→	Coping Motives	→	Binge Drinking	-.023	.121
Relationship Stress	→	Social Motives	→	Binge Drinking	.002	.139

Note: Bold values indicate a significant indirect effect.