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Alcohol Use, Drinking Motivations, and Depression Among College Students: The Roles of Sociotropy and Autonomy

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Alcohol Use, Drinking Motivations, and Depression Among College Students: The Roles of
Sociotropy and Autonomy

A Thesis Presented in Partial Fulfillment of the Requirements
for the Masters in Forensic Psychology

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Abstract

Sociotropy and autonomy are two cognitive personality dimensions, or personality styles, that have been implicated in the way individuals may uniquely develop, experience, and respond to treatment for depression. The goal of the current study was to investigate whether these cognitive personality dimensions are differentially related to drinking motivations and alcohol-related behaviors among college students. Participants included 311 college students ($M_{\text{age}} = 23.1$, 63% male) recruited via Amazon Mechanical Turk. Results partially supported hypothesized relationships showing that generally, those higher in sociotropy were more likely to endorse external motivations for drinking (i.e. social and conformity motives), while those higher in autonomy were more likely to endorse internal motivations for drinking (i.e., coping motives). Moreover, results showed that sociotropy moderated the relationship between social drinking motives and binge drinking, and that gender did not impact this result. In comparison, autonomy moderated the relationship between coping drinking motives and alcohol-related negative consequences, and this relationship varied as a function of gender. Findings provide initial evidence that sociotropy and autonomy are differentially related to student drinking motivations and alcohol-related behaviors. Research that is sensitive to the heterogeneous nature of the development, maintenance, and treatment for depression may yield important treatment implications when considering alcohol misuse among college students.

Alcohol misuse and depression remain two of the most pervasive and debilitating human health concerns worldwide. In fact, globally, the World Health Organization ranks alcohol misuse as the fifth highest risk factor for disability and premature death; among those ages 15 to 49, alcohol misuse is ranked first (WHO, 2015). Moreover, among those ages 20 to 39, approximately 25% of total global deaths are attributable or partially attributable to alcohol (WHO, 2015). Depression, by contrast, is ranked as the single largest contributor to global disability, with a recent epidemiological survey finding that 4.4% of the global population (322 million) suffers from depression (WHO, 2017). Global rates of depression are also on the rise, with the total estimated number of people living with depression having increased by 18.4% between 2005 and 2015. Given the consistently reported high comorbidity rates between these two conditions (see Lai, Cleary, Sitharthan, & Hunt, 2015 for a meta-analytic review), research has sought to explicate the relationship between depression and problematic alcohol use.

Previous literature has long suggested that alcohol use is a complex behavior that occurs in response to a diverse range of contextual and psychological antecedents, or drinking motivations (Cooper, 1994), which can either be internally generated (i.e., drinking to regulate one's internal emotional experience) or externally generated (i.e., drinking to modulate one's external environment). Recent research attempting to elucidate the relationship between depression and alcohol misuse has therefore examined how depressive symptoms relate to differential drinking motivations and alcohol use. However, theorists have suggested that depression does not occur in a vacuum, but rather develops in the context of human personality and cognition. One such example of this are cognitive personality dimensions (Beck, 1983) – namely, sociotropy and autonomy – which are two trait personality styles that are differentially

implicated in the etiology, expression, and treatment of depression among those confronted with stressful life experiences (e.g., the transition to college).

The current study therefore sought to eliminate a gap in the literature by investigating how sociotropy and autonomy are uniquely related to drinking motivations and problematic alcohol use among college students – a population that has frequently demonstrated an enhanced proclivity for the development of both mood and alcohol-related problems (ACHA, 2015). If depression is treated as a homogeneous phenomenon, then researchers may be limited in extrapolating inferences made regarding the relationship between depression and alcohol use. Instead, research that accounts for the differential lines along which depression is developed and expressed may result in a more comprehensive conceptual understanding of the relationship between depression and alcohol use. Additionally, elucidating these relationships may yield important treatment implications given that individuals presenting with sociotropic and autonomous experiences of depression have been shown to respond differently to both type and duration of treatment (Blatt, Shahar, & Zuroff, 2001; Rector, Bagby, Segal, Joffe, & Levitt, 2000).

Prevalence and Sequelae of Alcohol Use and Depression Among College Students

Research has shown that the college years are marked by an increase in both rates of alcohol use and depression (Geisner, Mallet, & Kilmer, 2012; Eisenberg, Gollust, Golberstein, & Hefner, 2007; Mackenzie et al., 2011). The American College Health Association's (ACHA) most recent data from their National College Health Assessment (NCHA-II) indicate that over 60% of students reported using alcohol within the past thirty days and that 30% of students reported binge drinking behaviors within the past two weeks. Consistent with these statistics, researchers have suggested that college represents a period of peak lifetime alcohol consumption,

particularly among college males (Substance Abuse & Mental Health Services Administration (SAMHSA), 2015), and thus leaves many students prone to developing an alcohol use disorder or alcohol-related dependency (Grant et al., 2004; Kelly & McGuinness, 2012). Moreover, the adverse consequences of problematic alcohol use among college students have been well documented, with research indicating that those who engage in heavy drinking behaviors are at risk of suffering from a host of negative consequences, including poor academic performance, risky sexual activity, alcohol-related driving deaths, unintentional self-injury, and post-college consequences such as interpersonal relationship deficits and under- or unemployment (Hingson et al., 2002; Sullivan & Risler, 2002).

When considering depression among college students, the ACHA (2015) indicated that about 13% of students reported being treated for or diagnosed with depression in the past year, and that depression is generally more common among females. However, the prevalence of unreported and untreated depression and associated symptoms is likely much higher, with some studies reporting rates to be as high as 22% (Geisner, Neighbors, & Larimer, 2006). The associated negative repercussions of depression have also been well established in the literature. Depression has shown to be predictive of lower GPA and increased rates of dropout (Eisenberg, Golberstein, & Hunt, 2009). Data from NCHA-II support these findings, with depression consistently being reported as one of the most important factors that negatively impacts academic performance (ACHA, 2015). Moreover, studies have shown that depression is related to deleterious outcomes such as self-injury and suicidal ideation (Farabaugh et al., 2012; Gollust, Eisenberg, & Golberstein, 2008; Mackenzie et al., 2011).

The heightened prevalence rates of alcohol use and depression in this population can be partially attributed to the very nature of the college transition itself. For many first year college

students – especially those away from home – alcohol may be seen as a means to facilitate proper adjustment, with some students drinking in order to curtail social anxiety and promote social opportunity (Ham, 2009; LaBrie, Grant, & Hummer, 2011). For others, the first year of college may involve periods of maladjustment and ineffective coping strategies (Paul & Brier, 2001; Sevinc & Gizir, 2014). First-year college students must make adjustments across several domains, including the academic, the social, the personal-emotional, and the institutional. Maladjustment within these domains – for example, negative relationships with faculty, poor friendship relations, homesickness and “friendsickness”, and a poor sense of belonging to the institution – may contribute to adverse behaviors and consequences, particularly among those who endorse the use of ineffective coping strategies (Sevinc & Gizir, 2014). Thus, the very nature of the college transition itself, for many students, appears to represent a period of heightened vulnerability for increased rates of alcohol use and depression.

Alcohol Use and Depression

Given the heightened prevalence rate of both alcohol consumption and depression in college student populations, it is relatively unsurprising that a high comorbidity rate has been observed between the two (Dawson, Grant, Stinson, & Chou, 2005). As noted above, researchers have found that the consequences of depression and problematic alcohol use among college students are consistent. However, despite knowing that problematic alcohol use and depression are often concurrent, the nature of this relationship remains inconclusive. For example, some studies have reported no relationship between depressive symptoms and alcohol use (Flynn, 2000; Geisner, Larimer, & Neighbors, 2004; Martens et al., 2008). Instead, these studies have indicated that while individuals with more severe depressive symptomatology do not report consuming more alcohol than their mildly depressed or non-depressed peers, they do experience

more severe negative consequences as a result of their use. Other studies, however, have reported that individuals who suffer from more severe depressive symptomatology, and psychological distress in general, typically tend to consume higher rates of alcohol (Geisner, Mallett, & Kilmer, 2012; Linden & Lau-Barraco, 2013; Miller et al., 2002). Moreover, this relationship appears to become increasingly complex when considering the role of gender. For example, some studies have suggested that a stronger relationship exists between depressive symptom severity and levels of alcohol-related behaviors in men (Foster et al., 2014; Geisner, Larimer, & Neighbors, 2004; Pedrelli et al., 2011), while others suggest that this relationship is stronger in women (Kenney, Jones, & Barnett, 2015; Pedrelli, Borsari, Lipson, Heinze, & Eisenberg, 2016).

Drinking Motivations

While these aforementioned inconsistencies regarding the relationship between alcohol use and depression among college students have not yielded conclusive findings in the literature, recent research has sought to examine factors such as drinking motivations that may yield for a more comprehensive understanding of this relationship. Cooper's (1994) four-factor motivational model of alcohol use holds that drinking motives are the contextual and psychological antecedents to alcohol-related behaviors and outcomes (Cox & Klinger, 1988). This four-factor model suggests that drinking motivations are not homogeneous, but rather represent a range of distinct psychological processes that are corollary to the functions that motivate their use. Cox and Klinger (1988) proposed that drinking motivations could be categorized across two underlying dimensions reflecting the source (internal or external) and valence (positive or negative) of the expected outcome that individuals believe they will obtain through drinking. Thus, drinking represents specific, motivated behaviors that are aimed at either promoting positive outcomes (positively reinforcing) or avoiding negative outcomes (negatively

reinforcing). Furthermore, drinking results from anticipated internal reward, such as altering one's internal state (internally generated), or anticipated external reward, such as facilitating social approval (externally generated). Crossing these two dimensions yields four motives for alcohol use: coping motives (internally generated, negatively reinforcing), enhancement motives (internally generated, positively reinforcing), social motives (externally generated, positively reinforcing), and conformity motives (externally generated, negatively reinforcing) (Cooper, 1994; Cox & Klinger, 1988).

Coping and enhancement motives are internally generated yet occur as a result of two distinct motivational valences. Individuals who endorse coping motives use alcohol as a mechanism through which they can regulate, attenuate, or avoid negative emotions and affect. In comparison, alcohol consumed in response to enhancement motives provides an avenue through which individuals can achieve, increase, or attain positive affect or emotions. Whereas coping motives are used to minimize or prevent negative affective experiences, enhancement motives are aimed at achieving or increasing positive affective experiences. Social and conformity motives are externally generated yet they also occur as a result of two distinct motivational valences. Social motives include drinking in order to obtain positive social rewards whereas conformity motives include drinking in order to avoid social rejection (Cooper, 1994; Cox & Klinger, 1988).

Based on these models, Cooper (1994) also found that those who endorsed greater social, enhancement, and coping motives displayed a higher frequency and quantity of alcohol consumption. In comparison, greater endorsement of conformity motives was associated with lower levels of alcohol consumption. Additionally, these conceptual models yielded different patterns of social and contextual factors that were associated with each group. For example,

individuals who endorsed coping motives were more likely to drink at home and drink alone, while those who endorsed social motives were more likely to drink at parties and drink with other people. Furthermore, recent research has supported the suggestion that drinking motives are more aptly defined as state-like tendencies that vary by individual drinking episodes, as opposed to trait-like characteristics that are stable across time (Armeli, O'Hara, Ehrenberg, Sullivan, & Tennen, 2014; O'Hara et al., 2014). Thus, the social and contextual factors that are typical of distinct student drinking episodes appear to be congruent with the motives and the state for which they are drinking. As such, the relationship between depression and alcohol use may change as a function of the drinking motive endorsed.

Research has suggested that the relationship between alcohol use and depression may vary as a function of internally and externally generated drinking motives. The notion of using substances in effort to relieve negative affect or internal dysphoria (e.g., drinking to cope) has been consistently suggested and theorized, for example in the self-medication hypothesis (Khantzian, 1997). Hence, college students who experience greater levels of depression may turn to alcohol in order to cope with the internal distress associated with their depressive symptoms. In comparison, students who drink because of externally generated motives (e.g., social motives) are not drinking in response to painful affect, but rather drink to regulate to their environment and therefore seem to develop alcohol-related problems and mood problems as a result of repeated excessive alcohol use in the company of others (Corbin, Iwamoto, & Fromme, 2011; LaBrie, Hummer, & Pederson, 2007). This pattern is largely consistent with positive alcohol expectancy theory, which states that individuals consume greater amounts of alcohol in order to meet their expectation that alcohol will facilitate social camaraderie, interaction, and bonding (LaBrie, Grant, & Hummer, 2011; McBride, Barrett, Moore, & Schonfeld, 2014).

Alcohol Use, Drinking Motivations, and Depression

Given the variable nature of drinking motivations and subsequent alcohol use, and how such patterns may be differentially related to depression, a recent line of work has sought to explicitly examine relationships between depression and drinking motivations when considering alcohol-related outcomes. In one cross-sectional study that examined depressive symptoms as a moderator of the relationship between coping drinking motives and alcohol use, coping motives were positively associated with drinking frequency and related problems for males higher in depressive symptoms. In comparison, this relationship was true for women who endorsed lower levels of depressive symptoms (Foster et al., 2014). Similarly, Pedrelli, Collado, Shapero, Brill, and MacPherson (2016) showed that drinking to cope mediated the relationship between depressive symptoms and alcohol-related problems; however, this relationship was true among both males and females. Finally, a longitudinal study conducted by Kenney, Jones, & Barnett (2015) examined drinking motives as a mediator between depressive symptoms and alcohol-related behaviors, including both consumption and negative consequences. The authors found that, for females, depressive symptoms were predictive of alcohol-related consequences among those who endorsed coping drinking motives, and for males, social drinking motives were more strongly associated with alcohol-related consequences, irrespective of the presence of depressive symptoms. Taken together, the vast majority of this research has focused on internally generated motives – particularly drinking to cope – when considering the relationship between problematic alcohol use and depression. Additionally, this research has been complicated by inconclusive results when considering the role of gender.

Cognitive Personality Dimensions

Several theorists from a variety of orientations have proposed that depression does not occur in a vacuum, but rather in the context of personality (Arieti & Bemporad, 1980; Beck, 1983; Blatt, 1974). While depressive symptoms serve as a reflection of the severity of depression experienced by an individual, they offer no indication of the unique lines along which depression may develop. Comparatively, Beck (1983) proposed two cognitive-personality dimensions that are strongly implicated in the etiology, expression, and treatment of depression: sociotropy and autonomy. Sociotropy is characterized by themes of interpersonal dependency and a strong need for support from others. Sociotropic individuals are concerned with disapproval from others; their self-worth emanates from receiving acceptance and love from others, and also from affiliative interpersonal relationships. Autonomy, in comparison, is characterized by themes of goal achievement, self-worth, and independence. Autonomous individuals are concerned with the possibility of failure and their self-worth derives from excessive productivity and high achievement expectations. Despite differences in orientation and perspective among theorists, the interpersonal and achievement lines along which depression develops appear to resonate throughout (Arieti & Bemporad, 1980; Beck, 1983; Blatt, 1974).

Beck (1983) proposed that it is not simply the presence of the sociotropic or autonomous personality style that would result in depression, but rather the interaction between either of these two traits with stressful, negative life events that would manifest in depression. As such, individuals higher in sociotropy who are exposed to stressful events, such as the college transition, appear to develop depression as a result of interpersonal chaos or loss. Individuals higher in autonomy who are exposed to such events tend to develop depression when confronted with achievement failure or restrictions in independence. Given these two distinct experiences of depression, one might also expect that each dimension could result in a distinct pattern of

depressive symptoms. These theoretical symptom patterns have been supported by research indicating that depression experienced via the sociotropic domain is empirically related to what has been described as anxious depression, which is characterized by symptoms of inferiority, social self-consciousness, rejection sensitivity, guilt and self-blame, and anxiety. In contrast, depression as a result of the autonomous domain is related to endogenous depression, which consists of symptoms such as anhedonia, feelings of failure, hopelessness, and suicidal ideation (Beck, Taylor, & Robbins, 2003; Robins, Bagby, Rector, Lynch, & Kennedy, 1997). Finally, past studies from both the cognitive-behavioral and the psychodynamic perspective have shown that depressed patients who endorse sociotropy (i.e. anaclitic type for psychodynamic) respond differently to the type and length of treatment administered than do patients who display autonomous traits (i.e. introjective type) (Blatt, Shahar, & Zuroff, 2001; Rector, Bagby, Segal, Joffe, & Levitt, 2000).

Study Overview

Given the recent surge of literature focusing on depression and alcohol-related behaviors in college students, research may benefit from understanding how the personality styles that are uniquely implicated in the development and experience of depression are differentially related to drinking motivations and alcohol-related behaviors. If research treats the development and experience of depression as a homogeneous phenomenon, we may be limited in our ability to extrapolate inferences made about the relationship between alcohol use and depression. Research that instead considers the differential lines along which depression develops and is expressed may allow for a more comprehensive conceptual understanding of the relationship between depression and alcohol use. Additionally, given the disparate treatment responses to the sociotropic and autonomous experiences of depression (Rector, Bagby, Segal, Joffe, & Levitt,

2000), determining relationships between differential experiences of depression, drinking motivations, and alcohol use may yield important implications for treatment.

Specifically, it is plausible that students who endorse externally generated motives (i.e. social or conformity) might also endorse the sociotropic dimension, which is marked by externally oriented themes of dependency, affiliation, and acceptance in interpersonal relationships. For these individuals who place a great deal of importance on the interpersonal domain, alcohol may serve as an important means to facilitate social opportunity, which is largely in line with positive alcohol expectancy theory (LaBrie, Grant, & Hummer, 2011; McBride, Barrett, Moore, & Schonfeld, 2014). In contrast, those students who endorse internally generated motives (i.e. coping or enhancement motives) might also endorse the autonomous dimension, which is characterized by internally oriented themes of self-worth, failure, and personal achievement expectations. For these individuals who place greater emphasis on the personal achievement domain, alcohol may serve as an important means to attenuate associated negative internal affect, which is consistent with the self-medication theory (e.g., Khantzian, 1997). Furthermore, given the aforementioned complexities introduced by gender on the relationships between depression, alcohol-related behaviors, and drinking motivations, examining how these associations fluctuate based on gender may assist in bolstering our current understanding of the psychopathology of problematic alcohol use among college students, particularly among those who also struggle with depression.

Hypotheses

Given the heightened prevalence rates of problematic alcohol use and depression among college students, the need for primary prevention and intervention services to ameliorate adverse resulting sequelae is imperative. However, despite past research examining associations between

depression and problematic alcohol use, the nature of this relationship continues to remain poorly understood. The current study therefore sought to eliminate a gap in the literature by investigating novel relationships between drinking motivations, alcohol-related behaviors, and cognitive personality dimensions in effort to better assess and understand the relationship between problematic alcohol use and depression in college students. Based on previous review of the literature, the current study tested the following hypotheses:

Hypothesis 1: Greater levels of coping drinking motives and enhancement drinking motives (i.e. internally generated) will be associated with higher autonomous scores while greater levels of social drinking motives and conformity drinking motives (i.e. externally generated) will be associated with higher sociotropic scores.

Hypothesis 2: Sociotropy will moderate the relationship between social drinking motives and alcohol-related behaviors, such that social motives will be positively associated with alcohol-related behaviors, and that this relationship will be stronger among those scoring higher in sociotropy.

Hypothesis 3: Autonomy will moderate the relationship between coping drinking motives and alcohol-related behaviors, such that coping motives will be positively associated with alcohol-related behaviors, and that this relationship will be stronger among those scoring higher in autonomy.

Hypotheses 4 and 5: Given aforementioned research showing that relationships between alcohol-related behaviors, drinking motivations, and depression may differ by gender (e.g., Foster et al., 2014; Geisner, Larimer, & Neighbors, 2004; Kenney, Jones, & Barnett, 2015, Pedrelli et al., 2011), the current study hypothesized that the moderating effect of sociotropy on the relationship between social motives and alcohol-related behaviors (H2) would change as a

function of gender. Similarly, this study estimated that the moderating effect of autonomy on the relationship between coping motives and alcohol-related behaviors (H3) would also change as a function of gender. However, as noted above, given the inconsistencies reported in past research, no directional estimations were made for the potential impact of gender on these relationships.

Methods

Research Design

The current study employed a cross-sectional correlational design utilizing self-report measures to investigate relationships between alcohol use, drinking motivations, and cognitive personality dimensions in college students.

Participants

Participants were 311 individuals who self-identified as undergraduate college students from across the United States (US). Participants were self-identified college students because the study was conducted online and there was no way to verify their college enrollment. Participants came from the following regions of the US: the South (34%), the West (28%), the Midwest (23%), and the Northeast (15%). The mean age of the current sample ($n = 311$; 63% male) was 23.1 years ($SD = 2.59$) and the majority of participants were Caucasian (70.1%), with 12.9% Asian, 8.4% Hispanic or Latino, 7.7% African American, and less than 1% American Indian. The majority of participants were juniors and seniors (30.9% and 30.2%, respectively), with 19% reporting as sophomores, 14.1% as fifth-year or beyond, and 5.8% as first-years. 63.3% of students reported living in off campus residencies, 19.3% commuted to campus, and 16.7% reported living in on campus residencies. Of the 311 students in the current sample, 32 reported Greek affiliation (7.1% Fraternity; 3.2% Sorority). The mean GPA of the overall sample was 3.4 ($SD = 0.35$), with a median of 3.4 and a range of 2.5 to 4.0.

Procedure

Any individual who self-identified as being over 18 years of age, was fluent in reading English, and was currently enrolled at an undergraduate institution in the United States was eligible to participate. Participants recruited were required to have, or be willing to create, an Amazon.com account prior to taking part in the study. Participants were recruited from the Amazon Mechanical Turk (MTurk) website. MTurk serves as a crowdsourcing website platform that provides access to a continuously available, large group of people who are willing to complete tasks or serve as participants in research studies in return for monetary compensation (Mason & Siddharth, 2012). MTurk operates through requesters (e.g., researchers) posting Human Intelligence Tasks (HITs) (e.g., surveys) for workers (e.g., participants) to complete. HITs are listed together on MTurk in a standardized format that allows workers to easily navigate, identify, and choose the job that they would like to complete based on the title of the HIT, the wage, the anticipated allotted time to complete the HIT, and when the HIT expires. For a more detailed description of MTurk, readers are directed to Mason and Siddharth (2012). The current study was advertised on MTurk to undergraduate students as one concerning personality, behavior, and health. Participants received \$3 after completing surveys. The study was advertised on MTurk only to workers with US IP addresses, but IP addresses were deleted to ensure participant anonymity. Those participants recruited via MTurk found the survey in a posting under a combination of keywords including “psychology”, “college students”, “health”, “behavior”, and “personality”. The survey found on MTurk was administered via the PsychData survey platform (Locke, 2001; <https://www.psychdata.com>) - a commonly used research platform to collect data online.

Participants read and completed an informed consent form prior to starting the study. Consent was provided via “click-through” agreement, which means that consent to participate is indicated by starting the study. The consent form asked potential participants to acknowledge that they were at least 18 years of age and were currently enrolled in a US college or university, had read the information page, and that by clicking through to start the study they were giving consent to participate in the study. Participants were informed during the consent process that they could skip specific questions that they felt were personally uncomfortable or would rather not disclose. Participants then answered questions regarding demographic information (including their affiliated institution), their alcohol-related behaviors, their motivations for drinking, cognitive-personality dimensions, and any depressive symptoms. The study took individuals approximately twenty minutes to complete. Upon completing the task, participants were given a unique respondent ID number that could be redeemed on the MTurk website to access their incentive of \$3. Data collection took place during the spring and fall of 2016. At the completion of the study, all participants also received a debriefing statement, which included the contact information for suicide lifelines, substance abuse services, and mental health services that could be accessed free of cost at all hours of the day. Additionally, participants were provided a website that could be used to locate affordable mental health treatment services, especially for those without insurance, in their communities.

Measures

Demographics

Participants provided information regarding their age, gender, and ethnicity. Data were also collected for class-year, place of residency, Greek affiliation, and self-reported GPA on a 4.0 scale.

Alcohol Consumption

Alcohol use was measured using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) and the Quantity/Frequency Questionnaire (QF; Marlatt et al., 1998). A standard drink was defined as 10-12 ounces beer/wine cooler, 4 ounces wine, or 1.25 ounces of liquor. The DDQ asks participants to report the number of drinks consumed on each day of the week for a typical week of drinking over the past month. The drinks consumed each day on a typical week were then summed to create a total weekly drinking variable. The QF was used to evaluate how often an individual used alcohol over the past thirty days. Participants were also asked to report their typical weekend drinking quantity. Finally, as a measure of binge drinking, students were asked to report how many drinks they consumed on the single occasion they consumed the most alcohol over the past thirty days. The DDQ has been widely used in university student samples and has demonstrated good convergent validity with measures such as the Alcohol Timeline Followback (TLFB) (Loranzo & Stephens, 2010). The QF has demonstrated good test-retest reliability and good convergent validity with measures such as the Graduated Frequency questionnaire, daily diary data, and biological markers of alcohol consumption (Poikolainen, Podkletnova, & Alho, 2002). Both the DDQ and the QF have demonstrated good internal consistency ($\alpha = .75$ and $.79$, respectively) in previous research examining alcohol consumption in college student populations (Geisner et al., 2012). In the current study, the DDQ and QF yielded acceptable internal consistency scores of $\alpha = .88$ and $\alpha = .73$, respectively.

Alcohol-Related Problems

The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) was used to evaluate alcohol-related negative consequences over the past three months. The RAPI is a 23-

item self-reported questionnaire where participants are asked to rate each item on a 4-point Likert scale from 0 to 3 (*None to More than 5 times*), with total scores ranging from 0 to 69. Items include questions such as, “How many times has alcohol caused you to neglect your responsibilities?” Higher scores on the index are indicative of greater negative consequences of alcohol on both health and social functioning (e.g. missing work or school, getting into fights with other people). The RAPI has been well validated in college student populations and has consistently demonstrated excellent internal reliability ($\alpha = .90-.92$) (Geisner et al., 2004; White & Labouvie, 1989; White, Labouvie, & Papadaratsakis, 2005). The RAPI demonstrated high internal consistency in the current study ($\alpha = .94$).

Drinking Motives

The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) was used to assess the motivational tendencies that participants tend to endorse for alcohol use. The DMQ-R is comprised of 20 statements for why individuals may consume alcohol. For each statement, the participant is asked to use a 5-point Likert scale ranging from 1 (*Never/Almost Never*) to 5 (*Almost Always/Always*) to rate how frequently that individual is motivated to drink because of those behaviors. The measure is made up of four subscales that provide distinct motivations for alcohol use: coping motives (e.g. to forget your worries), enhancement motives (e.g. because you like the feeling), social motives (e.g. to be sociable), and conformity motives (e.g. to fit in with a group you like). The DMQ-R has been well validated and is commonly used to measure drinking motives in college populations (Cooper, 1994; MacLean & Lecci, 2000). The coping ($\alpha = .91$), social ($\alpha = .92$), enhancement ($\alpha = .88$), and conformity motives ($\alpha = .90$) subscales’ all demonstrated high internal consistency in the current study. As previously noted, hypotheses for this study were formulated based on a combination of past research and theoretical

conceptualizations, and as such, only coping and social drinking motives were included in the regression analyses. Enhancement drinking motives were excluded from the regression analyses given the paucity of research investigating drinking to enhance – when compared with drinking to cope – and depression. Additionally, conformity drinking motives were also excluded from the regression analyses given previous research showing that conformity motives are negatively related to both quantity and frequency of alcohol use (Cooper, 1994).

Depressive Symptoms

Depressive symptoms were measured using the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-reported questionnaire that is commonly used to gauge depressive symptom severity in both clinical and non-clinical populations. The BDI is measured on a 4-point Likert scale from 0 to 3, with higher scores suggesting greater depressive symptom severity and total scores ranging from 0 to 63. Some items include asking participants to rate how they feel in domains such as sadness, indecisiveness, and concentration difficulty. Consistent with the BDI scoring manual and with past research, the BDI was scored via a grouping system broken down into the following components: 0-9 (minimally depressed), 10-19 (mildly depressed), 20-28 (moderately depressed), and 29 or above (severely depressed). The BDI-II has demonstrated strong internal consistency and construct validity in non-clinical populations of college students (Beck, Steer, & Brown, 1996). In the current study, Cronbach's alpha for the BDI-II was .95.

Cognitive Personality Dimensions

The Revised Personal Style Inventory (PSI-II; Robins et al., 1994) – a more recent and theoretically universal version of the Sociotropy-Autonomy Scale (SAS; Beck, Epstein, Harrison, & Emery, 1983) – was used to assess the dimensions of sociotropy and autonomy. The

PSI is a 48-item self-reported inventory that uses six subscales that comprise the dimensions of sociotropy and autonomy. Sociotropy is made up of the three following subscales: dependency, concern about what others think, and pleasing others (e.g. I try to please other people too much); and autonomy is made up of the three following subscales: need for control, defensive separation, and self-critical perfectionism (e.g. It bothers me when I feel that I am only average and ordinary). Based on results from confirmatory factor analysis, Bagby et al. (1998) recommended that the PSI-II be modified version to exclude the 4 items from the autonomy self-critical perfectionism subscale. The four excluded items from the self-critical perfectionism subscale were judged to be equally associated with both sociotropy and autonomy, particularly in non-clinical samples, thus detracting from the five remaining subscales' ability to effectively and independently assess and distinguish the domains of sociotropy and autonomy. Bagby et al. (2001) later showed that the modified PSI has good internal consistency and test-retest reliability, a low inter-correlation between the two subscales, and demonstrates strong stability scores in the context of fluctuations in depressed mood severity. In the current study, the modified PSI demonstrated high internal consistency for sociotropy ($\alpha = .92$) and autonomy ($\alpha = .90$).

Results

The current study sought to build upon existing literature examining the relationship between problematic alcohol use and depression in college students. Specifically, this research investigated relationships between student drinking motivations, cognitive personality dimensions, and alcohol-related behaviors. Descriptive statistics and independent samples t-tests examining gender differences are presented below followed by bivariate correlational analyses

examining relationships between variables. Hypotheses are then presented by subsection along with their corresponding statistical tests and results.

Alcohol Use and Related Negative Consequences. Consistent with national research investigating alcohol consumption among college students (ACHA, 2015), 61% of those in the current sample reported drinking at least once within the past month, with students on average consuming 7.85 drinks per week (Table 1). Participants' self-reported levels of alcohol consumption were variable, with reports of total weekly drinking ranging from 0 to 37 drinks per week. When asked about weekend drinking patterns, 28.4% of the sample reported *typically* consuming at least 5 drinks in one evening. Furthermore, when asked about one's single largest binge drinking occasion, 43.2% of the sample reported consuming at least 5 drinks in one sitting at least once over the past month. Consistent with the range of self-reported alcohol consumption, participants' RAPI scores were variable and ranged from 0 to 37, with a mean score of 6.54, which is comparable to large college student samples reported in past studies (White et al., 2005). When considering gender, men reported consuming alcohol in greater weekly quantities ($M_{\text{men}} = 8.73$, $SD = 8.35$; $M_{\text{women}} = 6.32$, $SD = 7.35$, $t(307) = -2.54$, $p = .01$, $d = 0.31$, 95% CI [0.07, 0.53]), greater weekend quantities ($M_{\text{men}} = 3.35$, $SD = 2.92$; $M_{\text{women}} = 2.71$, $SD = 2.55$, $t(307) = -1.95$, $p = .05$, $d = 0.23$, 95% CI [-0.002, 0.46]), more frequently ($M_{\text{men}} = 1.05$, $SD = 0.99$; $M_{\text{women}} = 0.79$, $SD = 0.91$, $t(306) = -2.28$, $p = .02$, $d = 0.27$, 95% CI [0.04, 0.50]) in comparison to women.

Drinking Motivations. Participants in the current sample most strongly endorsed social drinking motives, followed by enhancement, coping, and conformity motives, respectively. Gender differences emerged only when considering conformity drinking motives, with men ($M = 1.67$,

$SD = 0.87$) endorsing conformity motives to a greater extent than women ($M = 1.48$, $SD = 0.71$), $t(309) = -2.1$, $p = .04$, $d = 0.24$, 95% CI [0.01, 0.47]).

Depression. Participants reported experiencing a limited range of depressive symptom severity with 77.2% scoring in the minimally depressed range, 6.4% scoring in the mildly depressed range, 9.3% in the moderately depressed range, and 7.1% in the severely depressed range. Gender differences did not emerge when comparing depressive symptom severity in men and women.

Cognitive Personality Dimensions. After adjusting for item count due the removal of the autonomous self-critical perfectionism subscale, the current sample endorsed similar mean levels of sociotropy and autonomy. However, when considering gender differences for both the sociotropic and autonomous dimensions, findings emerged such that autonomy scores did not differ between men and women, but overall, women scored higher on the sociotropic domain ($M = 88.0$, $SD = 20.3$) in comparison to men ($M = 80.6$, $SD = 18.2$), $t(309) = 3.34$, $p < .001$, $d = 0.39$, 95% CI [0.16, 0.63]).

Bivariate Associations. All drinking variables (total weekly drinking, drinking frequency, weekend drinking frequency, and binge drinking) were strongly and positively related. As expected, alcohol-related negative consequences were also positively associated with all drinking variables. Similarly, all drinking motives, including conformity motives, were positively associated with each alcohol-related variable. All drinking variables were largely unrelated to depressive symptoms, with the exception of alcohol-related negative consequences, which were positively associated with depressive symptoms ($r = .38$, $p < .001$, 95% CI [0.28, 0.47]). Neither sociotropy nor autonomy was associated with any measure of alcohol use; however, like depressive symptoms, autonomy was positively related to alcohol-related negative consequences

($r = .21$, 95% CI [0.10, 0.31]). Finally, as expected, both sociotropy ($r = .22$, 95% CI [0.11, 0.32]) and autonomy ($r = .27$, 95% CI [0.16, 0.37]) were positively associated with depressive symptoms (both p 's $< .001$).

Hypothesis 1: Relationships Between Cognitive Personality Dimensions and Drinking Motivations

One of the primary goals of the current study was to examine how cognitive personality dimensions – two stable, trait personality styles implicated in the differential development and experience of depression among those confronted with stressful life events – might relate to student drinking motivations. Hypothesis 1 predicted that individuals scoring higher in sociotropy would endorse externally generated drinking motives (i.e. drinking for social reward or drinking to mitigate potential social rejection). In contrast, the current study hypothesized that those scoring higher in autonomy would be more likely to endorse internally generated drinking motives (i.e. drinking to alleviate negative internal affect or drinking to promote positive internal affect). As seen in Table 1, results partially supported hypothesized relationships. Those who scored higher on the sociotropic domain were more likely to endorse both social ($r = .19$, $p = .001$, 95% CI [0.08, 0.30]) and conformity ($r = .21$, $p < .001$, 95% CI [0.10, 0.31]) (i.e. external) motives while those who scored higher on the autonomous domain were more likely to endorse coping ($r = .21$, $p < .001$, 95% CI [0.10, 0.31]), but not enhancement (i.e. internal) motives. However, sociotropy was also positively related to coping motives ($r = .20$, $p < .001$, 95% CI [0.09, 0.31]) and autonomy was also positively related to conformity motives ($r = .15$, $p = .001$, 95% CI [0.04, 0.26]), both of which were unexpected results.

Hypothesis 2: The Moderating Effect of Sociotropy

In order to assess the impact of cognitive personality dimensions on the relationships between drinking motivations and alcohol-related behaviors, multiple hierarchical regressions were used to evaluate cognitive-personality dimensions as a moderator of coping and social drinking motives on all alcohol-related outcomes. Specifically, Hypothesis 2 anticipated that stronger relationships would exist between social drinking motives and alcohol-related behaviors among individuals who scored higher in sociotropy. Results were expected such that those excessively concerned with dependency, acceptance, and affiliative interpersonal relationships might consume higher rates of alcohol with the expectation that alcohol would facilitate social reward or opportunity in order to compensate for these interpersonal concerns. Hypothesized models were constructed such that social drinking motives and sociotropy were entered as predictor variables, and alcohol related behaviors (drinking frequency, weekend drinking frequency, total weekly drinking, binge drinking, and alcohol-related negative consequences) were entered as criterion variables. All variables were mean centered prior to being entered into the regression equation and prior to computing the interaction term in order to decrease multicollinearity between the interaction term and main effects. Main effects were analyzed at Step 1 and interaction effects were analyzed at Step 2. There were consistent main effects such that social drinking motives predicted all criterion variables. There were also main effects for sociotropy predicting total weekly drinking. As shown in Figure 1, social drinking motives and sociotropy interacted to predict binge drinking, but not total weekly drinking, drinking frequency, weekend drinking frequency, or negative consequences (Table 2). This interaction suggests that social drinking motives were positively associated with binge drinking; however, this relationship was stronger among those endorsing *lower* levels of sociotropy – not those who were higher in sociotropy as was expected.

Hypothesis 3: The Moderating Effect of Autonomy

Conversely, Hypothesis 3 estimated that stronger relationships would exist between drinking to cope and alcohol-related behaviors among those higher in autonomy. The current study expected that those endorsing greater concerns regarding goal achievement, independence, and perceived personal failure might drink in order to alleviate the negative affect associated with these internal concerns. Hypothesized models were constructed such that coping motives were entered as predictor variables and alcohol-related behaviors were entered as criterion variables. All variables were again mean centered prior to computing the interaction term. Main effects were evaluated at Step 1 and interaction effects were evaluated at Step 2. There were consistent main effects such that coping motives consistently predicted all alcohol-related outcomes. There were also main effects for autonomy predicting alcohol-related negative consequences. However, results for the moderating effect of autonomy on the relationship between coping drinking motives and alcohol-related outcomes were not supported (Table 3).

Hypothesis 4: Do Relationships Between Sociotropy, Social Drinking Motives, and Alcohol-Related Behaviors Change as a Function of Gender?

The same regression models examined in Hypotheses 2 and 3 were then tested using an additional, dummy coded predictor variable for gender (0 = female, 1 = male) to evaluate whether the hypothesized moderating effects of sociotropy and autonomy might change as a function of gender. Given that women reported higher sociotropic scores and men endorsed greater quantity, frequency, and consequences related to alcohol consumption in the current sample, this research sought to explore whether gender might play a role when considering sociotropy as a moderator of the relationship between social drinking motives and alcohol-related behaviors. All predictors were mean centered prior to being entered into the regression

equation. Main effects were assessed at Step 1, two-way interactions were assessed at Step 2, and three-way interactions were assessed at Step 3. All significant two- and three-way interactions were graphed consistent with Cohen, Cohen, West, and Aiken (2003), using parameter estimates from the regression equation where high and low values were one standard deviation above and below their respective means. As shown in Table 4, there were positive main effects for social drinking motives on all alcohol-related outcomes, even when controlling for gender. There were main effects for sociotropy on weekend drinking frequency, total weekly drinking, and binge drinking. There were also positive main effects for gender on drinking frequency, weekend drinking frequency, total weekly drinking, and alcohol-related negative consequences. No significant two-way interactions were observed at Step 2 when controlling for gender, and no significant three-way interactions emerged between social drinking motives, sociotropy, and gender for any alcohol-related outcome.

Hypothesis 5: Do Relationships Between Autonomy, Coping Drinking Motives, and Alcohol-Related Behaviors Change as a Function of Gender?

Given the gender differences observed for alcohol use and associated negative outcomes, as well as past research indicating that gender differentially impacts the moderating/mediating effect of depressive symptoms on the relationship between drinking to cope and alcohol-related behaviors (e.g., Foster et al., 2014; Kenney et al., 2015), this study also sought to explore whether gender might play a role when considering autonomy as a moderator of the relationship between drinking to cope and alcohol-related behaviors. As above, all predictors were mean centered prior to being entered into the regression equation. Main effects were again evaluated at Step 1, two-way interactions were evaluated at Step 2, and three-way interactions were evaluated at Step 3. Consistent and positive main effects were observed for coping motives for all alcohol-

related outcomes, even when controlling for gender. No main effects were observed for autonomy. There were also positive main effects for gender on drinking frequency, weekend drinking frequency, total weekly drinking, and alcohol-related negative consequences. Significant two-way interactions were found between coping motives and gender in predicting drinking frequency and alcohol-related negative consequences. Finally, a significant three-way interaction emerged between coping motives, autonomy, and gender when predicting alcohol-related negative consequences (Figure 2). The positive association between drinking to cope and alcohol-related consequences was especially true for males higher in autonomy. In comparison, coping motives were more strongly linked to negative consequences among females endorsing lower levels of autonomy.

Discussion

The present study sought to advance a body of research that aims to elucidate the relationship between problematic alcohol use and depression among college students. Specifically, this study investigated relationships between drinking motivations, cognitive personality dimensions, and alcohol-related behaviors in a sample of college students. The goal of the current study was to determine whether two stable trait personality styles that have been differentially implicated in the way individuals confronted with stressful life events, such as the transition to college, develop, experience, and are treated for depression are related to drinking motivations and alcohol-related behaviors. Indeed, if patterns of motivations for drinking and subsequent alcohol consumption differ between personality styles that provide unique proclivities for the development and experience of depression, then exploring such relationships may be helpful in elucidating the role of depression among those who suffer from problematic alcohol use.

Linking Cognitive Personality Dimensions to Drinking Motivations

The first goal of the current study was to determine whether cognitive personality dimensions are in fact differentially related to drinking motivations that precede alcohol use. Findings showed that sociotropy was positively related to externally generated motivations for drinking; that is, social motives and conformity motives. Contextually, individuals scoring high on the sociotropic domain, who tend to place a great deal of emphasis on peer approval, receiving love and acceptance, and affiliative interpersonal relationships, also appear to endorse motivations for drinking that are characterized by attempts to regulate their external social environment. Specifically, these individuals appear to be drinking in order to either promote a social atmosphere or to mitigate the possibility of social rejection. Indeed, it is possible that those who develop depression along the sociotropic line (i.e. as a result of perceived interpersonal loss) endorse social motives as a compensatory mechanism to facilitate interpersonal opportunity or conformity motives as a means of avoiding further interpersonal loss. One possible explanation for this relationship comes from the social norms literature, namely positive alcohol expectancy theory, which postulates that individuals consume high rates of alcohol in order to meet their expectations that alcohol will facilitate social interactions and social bonding (LaBrie, Grant, & Hummer, 2011; McBride, Barrett, Moore, & Schonfeld, 2014).

In contrast, results showed that autonomy was positively related to drinking to cope, but not drinking to enhance. That is, those who tend to place concern on goal achievement, self-worth, and independence also appear to endorse drinking motivations that are aimed at regulating one's internal emotional state. Specifically, it appears that these individuals endorse drinking to relieve negative internal affect. This result is consistent with theories positing that individuals use substances as a means to cope with negative internal dysphoria (e.g., Khantzian, 1997), and

suggests that autonomous individuals endorse drinking to cope with negative affect associated with pressure emanating from personal goal achievement and independence. These results may be particularly true among those who develop depression along the autonomous line, who not only feel pressure to achieve and become independent, but also perceive personal failure in this regard.

The fact that sociotropy was also positively correlated with coping motives and that autonomy was positively correlated with conformity motives adds a layer of complexity when interpreting the meaning of these associations. Indeed, it is reasonable that those who score high in sociotropy might drink to cope with negative affect related to perceived interpersonal deficits. Given that drinking to cope has been associated with more solitary patterns of drinking (Cooper, 1994; Gonzalez et al., 2009), it is possible that drinking to cope among sociotropic individuals may actually exacerbate their proclivity for depression by precluding social experiences. Similarly, those high in autonomy may very well drink to conform in order to avoid social rejection. This research raises the possibility that drinking to conform among autonomous individuals may exacerbate negative affect and thus one's susceptibility to depression, as those who place greater value on independence may feel that drinking to conform directly conflicts with their personal values. Future research is encouraged to explore these possibilities. However, these results may be better explained by the inclination that cognitive personality dimensions exist along a continuum, with any given individual possessing a certain degree of each trait rather than one's personality being exclusively sociotropic or autonomous. Moreover, the fact that both dimensions correlated similarly with respect to each other and to depressive symptoms indicate that – to some degree – these constructs overlap (i.e. both target the underlying construct

of depression, albeit via differential lines of personality). Thus, it is not surprising that sociotropy and autonomy do not align perfectly with conscious drinking motivations.

The Moderating Effect of Sociotropy

The second goal of the current study was to determine whether hypothesized relationships between drinking motivations and cognitive personality dimensions persist when accounting for alcohol-related behaviors. Specifically, this research tested the moderating effect of cognitive personality dimensions on the relationship between drinking motivations and alcohol-related behaviors. Findings showed that sociotropy moderated the relationship between social motives and binge drinking; however, this relationship was strongest among those who were lower in sociotropy. This result raises interesting questions regarding the role of sociotropy when considering social motivations for drinking. As previously noted, these traits do not confer a vulnerability to depression in the absence of significant life stressors (Bagby et al., 2001; Beck 1983). In this regard, results showed that the majority of the current sample did not endorse depressive symptomatology (i.e. 83.6% of the sample scored in the minimally to mildly depressed range) – a result bolstered by evidence of a highly academic achieving sample with a mean GPA of 3.4. These results would therefore seem to indicate that while sociotropic individuals in the current sample were characterized by a need for interpersonal relationships, dependency, and peer approval, there were likely few individuals in the sample who were struggling with depression as a result of perceived interpersonal deficits. Thus, in the absence of depression, sociotropy may actually serve as a protective factor when considering heavy drinking behaviors that are often seen in the context of social drinking motivations (Kuntsche, 2005). Perhaps these individuals whose personalities are more inclined toward interpersonal relationships and support from others are deterred from dangerous binge drinking behaviors

motivated by social reward because their social support systems and interpersonal relationships are already in place. This may be especially true among juniors and seniors in college, who have already had a few years to cultivate their social support systems and who also made up the majority of the current sample. Future research should explore this possibility by examining the role of perceived social support in a sample that is more generalizable to underclassmen.

The Moderating Effect of Autonomy

Findings showed that autonomy did not moderate the relationship between drinking to cope and alcohol-related behaviors. However, results would again suggest that this study was limited in its ability to comprehensively explicate this relationship due to an overwhelming majority of the sample that endorsed minimal or mild depressive symptomatology. Thus, while the current sample likely captured autonomous individuals who were dealing with stress emanating from a personality style that places concern on goal achievement and independence – as was shown by the relationship between autonomy and drinking to cope – there appears to have been a paucity of individuals who were drinking to cope with depression resulting from feelings of perceived personal failure. Taken together, future research should explicitly seek to examine whether hypothesized relationships exist in depressed college students in order to more effectively understand the psychopathology of problematic alcohol use in this population.

The Impact of Gender

The role of gender has raised considerable attention in recent literature investigating the relationship between alcohol use and depression in college students (Foster et al., 2014; Geisner, Larimer, & Neighbors, 2004; Kenney et al., 2015; Pedrelli et al., 2011; Pedrelli et al., 2016). Given this past research as well as the current gender differences observed across sociotropy and alcohol-related behaviors, the third goal of the current study was to determine whether the

hypothesized moderating effects of both sociotropy and autonomy on their respective relationships would fluctuate as a function of gender. Findings showed that gender did not impact the moderating effect of sociotropy on the relationship between social drinking motives and alcohol-related behaviors. However, for the moderating effect of autonomy on the relationship between drinking to cope and alcohol-related behaviors, results emerged such that coping motives were more strongly associated with alcohol-related negative consequences for men who were higher in autonomy. The opposite relationship emerged in women, such that coping motives were more strongly associated with negative consequence for women who were lower in autonomy.

The present findings indicate that college males who score higher on the autonomous domain are particularly likely to drink to cope and subsequently experience more severe negative consequences as a result of their drinking. These findings extend the work of Foster et al. (2014), who found identical gender differences for the moderating effect of depressive symptoms on the relationship between drinking to cope and alcohol-related negative consequences. Taken together, these findings appear to indicate that college males who experience more severe symptoms of depression – particularly related to the autonomous domain – may be especially likely to experience negative consequences of alcohol use as a result of their motivation to drink to cope with internal negative affect. These findings also extend a body of literature indicating that while more severely depressed individuals do not tend to consume higher rates of alcohol than those who are more mildly or non-depressed, they do tend to experience more negative consequences as a result of their use (e.g., Martens et al., 2008). Moreover, this observed pattern of depression and alcohol use may be especially true among individuals who develop depression as a result of perceived achievement failure or restrictions in independence.

The opposite relationship was observed in females, by contrast, with results indicating that a stronger relationship exists between coping motives and alcohol-related negative consequences for females lower in autonomy. This result could suggest that females who drink to cope are doing so in order to ameliorate affect unrelated to personal achievement and independence restrictions. One possibility is that females, who endorsed higher sociotropic scores in the current sample when compared to males, might instead be more likely to drink in order to compensate for concerns related to perceived interpersonal and relational deficits. Future research should therefore explicitly seek to examine whether gender impacts the moderating effect of sociotropy on the relationship between drinking to cope and alcohol-related behaviors in order to assess this possibility. In support of this possibility, the current study observed a positive correlation between sociotropy and drinking to cope. Alternatively, it may be the case that among autonomously oriented individuals, women – in comparison to men – simply tend to endorse fewer coping drinking motivations as they possess alternative strategies for alleviating their tension, such as confiding in friends or seeking professional help, as suggested by Berger and Adesso (1991). This suggestion is largely consistent with stereotypical gender roles, which are difficult to ignore given present findings. One recent study by Berke, Reidy, Miller, and Zeichner (2017) found that men tend to engage in stereotypically masculine behaviors not only to reassert masculine status but also to regain control over situations associated with negative affective arousal and vulnerability. As such, college men who experience negative affect may feel compelled to use alcohol to cope because such means are a socially acceptable, stereotypically masculine behavior. In contrast, women who experience similar negative affect might possess alternative, healthy, and relationally oriented means of alleviating negative affect

that are more socially acceptable in a college environment, thus leading to lower levels of drinking to cope.

Limitations, Future Directions, and Implications

The present study sought to advance a body of literature investigating the relationship between problematic alcohol use and depression. Specifically, this research determined relationships between drinking motivations, cognitive personality dimensions, and alcohol-related behaviors in college students – a population marked by high rates of both alcohol use and depression (ACHA, 2015). Although the current study hopes to provide important insights into the convoluted relationship between alcohol use and depression among college students, this study is not without limitations.

Firstly, the majority of students in the current sample reported minimal or mild depressive symptomatology. Given that cognitive personality dimensions are personality styles implicated in the way one develops and experiences depression, the current study was limited in its ability to assess how sociotropic and autonomous experiences of depression are differentially related to drinking motivations and alcohol-related behaviors. Future research should therefore seek to examine these relationships in a depressed sample of college students in order to engender more effective comparisons. Secondly, although the present study targeted college students – given research indicating that college students are especially prone to the negative consequences of heavy alcohol use and depression (Eisenberg, Golberstein, & Hunt, 2009; Grant et al., 2004; Hingson et al., 2002; Sullivan & Risler, 2002) – the current sample was still largely one of convenience. As such, this sample was primarily made up of upper classmen, which limits generalizability to first-year students who may be particularly vulnerable to depression and heavy alcohol use in response to the college transition. Future research should explicitly aim to

target first- and second-year college students. Thirdly, although attempts were made to make the survey as brief as possible, it is still possible that extraneous factors such as fatigue and distraction – especially in a residential college environment – contributed to conditions that may not necessarily be reflective of an ideal testing environment. Therefore, future research in this area should work towards administering surveys in person, under the supervision of the researchers. Finally, researchers might also benefit from collecting more objective measures of alcohol use (e.g., blood alcohol content) in order to mitigate problems of response bias consistent with retrospective self-reported measures.

Despite the limitations observed in the current sample, results suggest that when considering problematic alcohol use in college students, there is still a great need for effective and well-implemented alcohol-related interventions in order to mitigate these behaviors and associated negative consequences. Research has indicated that brief alcohol interventions that incorporate personalized feedback are particularly effective; however, this feedback typically includes information on drinking patterns, alcohol-related risks, and strategies for moderation (Scott-Sheldon, Carey, Elliot, Garey, & Carey, 2014). Recent research has therefore suggested that personalized feedback interventions be modified to include information on student drinking motivations, such as how often and how strongly an individual endorses a particular motive, risks associated with each motive, and customized interventions based on the motive endorsed such as healthy alternative emotion regulation strategies or social skills training (Aurora & Klanecky, 2016). Given the pronounced rates of depression observed in college populations as well as the frequent comorbidity seen between depression and alcohol misuse (ACHA, 2015; Dawson et al., 2005), research explicating relationships between depression, drinking

motivations, and alcohol-related behaviors may be particularly important when informing these interventions.

Despite these suggestions, if research assumes that the experience of depression is a homogeneous phenomenon, then interventions targeting these problems may be limited in their utility to comprehensively assess and formulate treatment plans for individuals. For example, the treatment literature has shown that – across theoretical orientations – patients who develop depression along the personal achievement (i.e. autonomous or introjective) line respond differentially to treatment type and treatment duration than those who develop depression along the interpersonal (i.e. sociotropy or anaclitic) line (Blatt, Shahar, & Zuroff, 2001; Rector et al., 2000). Research sensitive to the indication that depression and alcohol-related behaviors are heterogeneous phenomena may therefore be well equipped to inform interventions that are both flexible and effective across a range of presenting patterns of depression and alcohol use. In this regard, the current study provides preliminary evidence for the existence of unique relationships between drinking motivations, alcohol-related behaviors, and differential experiences of depression among college students.

Conclusion

The current study sought to extend a body of literature investigating the relationship between alcohol use and depression among college students. Specifically, this research evaluated whether two cognitive personality styles, namely sociotropy and autonomy, which are uniquely implicated in the development, experience, and treatment of depression, were differentially related to student drinking motivations and alcohol-related behaviors. Results partially supported hypothesized relationships, with evidence indicating that, generally, sociotropic individuals endorsed external motivations for drinking (i.e. social and conformity motives) while

autonomous individuals endorsed internal motivations for drinking (i.e. coping motives). Moreover, when considering alcohol-related behaviors, results showed that social motives were most strongly related to alcohol use for individuals *lower* in sociotropy, regardless of gender. Comparatively, coping motives were most strongly linked to alcohol-related negative consequences, but not alcohol use, for females *lower* in autonomy and for males *higher* in autonomy. Although the current study was limited in its ability to comprehensively assess these relationships due to a high achieving sample endorsing minimal depressive symptomatology, these results provide initial evidence for the importance of examining depression as a heterogeneous phenomenon in the context of alcohol use. Doing so may yield for an augmented conceptual understanding of the relationship between alcohol use and depression among college students, and may also provide treatment implications that are sensitive to a broad range of clinical presentations.

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Appendix

Recruitment Letter

We used the following template to recruit participants via *Psychological Research on the Net* and *Mechanical Turk*.

Hello,

IF: You are at least 18 years old
 You are currently enrolled in college/university
Have (or could create) an Amazon.com email account
 You reside in a dormitory

I would appreciate it if you could take a few moments to complete this online survey.

The College Experience Project:

1. Is *voluntary*
2. Can be completed *online*
3. Is SHORT (takes 20-25 minutes)
4. Receive \$3 towards Amazon.com for completing the survey!

Thank you for your time and support!

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Demographic Questionnaire

Demographic Questionnaire

Directions: Please complete the following questions listed below.

1. What is your current institutional affiliation? (School, City, State)

2. What is your age (in years)? _____

3. What year are you in college (check one)? *First Year* *Sophomore*

Junior *Senior*

Fifth year or beyond

4. What is your gender?

Male *Female*

5. Please identify your race or ethnicity:

American Indian or Alaskan Native

Black or African American (not of Hispanic origin)

Asian

Hispanic or Latino

Native Hawaiian or Other Pacific Islander

White or Caucasian (not of Hispanic origin)

Middle Eastern

6. Where do you currently live as a part of your college affiliation?

On Campus *Off Campus* *Commute* *Other:* _____

7. Please indicate any Greek affiliation:

Fraternity *Sorority* *No Greek Affiliation*

8. Please indicate your GPA on a scale of 0 to 4 (e.g. 3.27): _____

Table 1. Descriptive statistics and correlations among key study variables (n = 311).

Primary Variables	Aggregate Descriptives			Independent Samples <i>t</i> -tests	Correlations among student drinking motives, alcohol-related variables, depression-related variables, and demographic controls.														
	Range	M	SD		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Social Motives	1-5	2.75	1.17	$t(309) = 0.52$	-														
2. Coping Motives	1-5	1.94	1.00	$t(309) = 0.73$.54	-													
3. Enhancement Motives	1-5	2.41	1.08	$t(309) = 0.68$.74	.63	-												
4. Conformity Motives	1-4	1.60	0.82	$t(309) = -2.1^*$.47	.60	.46	-											
5. Sociotropy	27-134	83.3	19.3	$t(309) = 3.3^{***}$.19	.20	.06	.21	-										
6. Autonomy	24-111	67.7	16.4	$t(309) = -1.7$.04	.21	.11	.15	.33	-									
7. Depressive Symptoms	0-42	8.27	10.8	$t(309) = 0.28$.07	.35	.12	.25	.22	.27	-								
8. Drinking Frequency	0-5	0.95	0.97	$t(306) = -2.3^*$.42	.35	.46	.30	.00	.09	.03	-							
9. Weekend Drinking Freq.	0-13	3.12	2.80	$t(308) = -2.0^*$.54	.30	.54	.27	-.08	-.01	-.05	.61	-						
10. Total Weekly Drinking	0-37	7.85	8.07	$t(307) = -2.5^*$.51	.34	.55	.33	-.03	.05	.02	.66	.84	-					
11. Binge Drinking	0-17	4.44	4.20	$t(308) = -1.0$.54	.29	.45	.22	-.05	.01	-.00	.55	.73	.65	-				
12. Negative Consequences	0-37	6.54	9.81	$t(309) = -1.9$.25	.53	.39	.50	.10	.21	.38	.39	.28	.36	.24	-			
Pertinent Demographics	Range	M	SD																
13. Age	18 - 29	23.1	2.59		-.00	-.00	.01	.02	.03	-.02	.09	.06	-.03	.06	.01	.07	-		
14. Gender (% Male)	63.0				-.03	-.04	-.04	.11	-.19	.10	-.01	.13	.11	.14	.05	.10	-.01	-	
15. Race (% Caucasian)	70.1				.19	.18	.19	.12	-.04	-.03	.03	.11	.07	.10	.08	.09	.01	.12	-

NOTE: The variables presented are aggregates across the entire sample. Independent samples *t*-tests compared variables as a function of gender. Correlations are presented below the diagonal and statistically significant correlations ($p < .05$) have been bolded for ease of interpretation.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2. Hierarchical regression analyses for social drinking motives and sociotropy predicting alcohol-related outcomes (n = 311).

Criterion		Predictor	B	SE B	β	95% CI	R ²	ΔR^2
Drinking Frequency	Step 1	Social Drinking Motives (SDM)	0.36	0.04	0.44***	[0.28, 0.45]	0.18	
		Sociotropy	-0.004	0.003	-0.08	[-0.01, 0.001]		
	Step 2	SDM * Sociotropy	-0.003	0.002	-0.07	[-0.01, 0.001]	0.19	0.01
Weekend Drinking Freq.	Step 1	SDM	1.37	0.11	0.58***	[1.15, 1.60]	0.33	
		Sociotropy	-0.03	0.01	-0.19***	[-0.04, -0.01]		
	Step 2	SDM * Sociotropy	-0.01	0.01	-0.08	[-0.02, 0.001]	0.33	0.00
Total Weekly Drinking	Step 1	SDM	3.68	0.34	0.53***	[3.01, 4.35]	0.28	
		Sociotropy	-0.06	0.02	-0.14**	[-0.10, -0.02]		
	Step 2	SDM * Sociotropy	-0.02	0.02	-0.07	[-0.05, 0.01]	0.28	0.00
Binge Drinking	Step 1	SDM	2.04	0.17	0.57***	[1.70, 2.38]	0.31	0.31
		Sociotropy	-0.03	0.01	-0.15**	[-0.05, -0.01]		
	Step 2	SDM * Sociotropy	-0.02	0.01	-0.10*	[-0.03, -0.001]	0.32	0.01
Negative Consequences	Step 1	SDM	2.05	0.48	0.24***	[1.09, 3.00]	0.06	
		Sociotropy	0.03	0.03	0.06	[-0.03, 0.09]		
	Step 2	SDM * Sociotropy	-0.02	0.02	-0.05	[-0.06, 0.03]	0.06	0.00

NOTE: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3. Hierarchical regression analyses for coping drinking motives and autonomy predicting alcohol-related outcomes (n = 311).

Criterion		Predictor	B	SE B	β	95% CI	R ²	ΔR^2
Drinking Frequency	Step 1	Coping Drinking Motives (CDM)	0.34	0.05	0.35***	[.23, .44]	0.13	0.00
		Autonomy	0.001	0.003	0.02	[-0.01, 0.01]		
	Step 2	CDM * Autonomy	-0.01	0.003	-0.10	[-0.01, 0.001]	0.13	
Weekend Drinking Freq.	Step 1	CDM	0.88	0.16	0.32***	[.577, 1.19]	0.09	0.00
		Autonomy	-0.01	0.01	-0.08	[-0.03, 0.01]		
	Step 2	CDM * Autonomy	-0.01	0.01	-0.08	[-0.02, 0.01]	0.09	
Total Weekly Drinking	Step 1	CDM	2.78	0.44	0.35***	[1.91, 3.65]	0.11	0.00
		Autonomy	-0.01	0.03	-0.03	[-0.07, 0.04]		
	Step 2	CDM * Autonomy	-0.03	0.03	-0.05	[-0.08, 0.03]	0.11	
Binge Drinking	Step 1	CDM	1.25	0.23	0.30***	[.792, 1.71]	0.08	0.00
		Autonomy	-0.01	0.01	-0.05	[-0.04, 0.02]		
	Step 2	CDM * Autonomy	-0.02	0.02	-0.09	[-0.05, 0.01]	0.08	
Negative Consequences	Step 1	CDM	5.14	0.49	0.51***	[4.17, 6.11]	0.29	0.00
		Autonomy	0.06	0.03	0.10*	[0.000, 0.119]		
	Step 2	CDM * Autonomy	0.02	0.03	0.02	[-0.05, 0.078]	0.29	

NOTE: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4. Hierarchical regression analyses for social motives, sociotropy, and gender predicting alcohol-related outcomes.

Criterion		Predictor	B	SE B	β	95% CI	R ²	ΔR^2		
Drinking Frequency	Step 1	Social Drinking Motives (SDM)	0.37	0.04	0.45***	[.29, .46]	0.21	0.00		
		Sociotropy	-0.003	0.003	-0.07	[-0.01, 0.002]				
		Gender	0.26	0.11	0.13*	[0.05, 0.47]				
	Step 2	SDM * Sociotropy	-0.001	0.002	-0.03	[-0.01, 0.003]	0.21			
		SDM * Gender	0.06	0.10	0.05	[-0.13, 0.24]				
		Sociotropy * Gender	-0.002	0.01	-0.03	[-0.01, 0.01]				
	Step 3	SDM * Sociotropy * Gender	-0.001	0.004	-0.03	[-0.01, 0.01]	0.21		0.00	
	Weekend Drinking Freq.	Step 1	SDM	1.38	0.11	0.58***	[1.16, 1.61]		0.34	0.01
			Sociotropy	-0.03	0.01	-0.18***	[-0.04, -0.01]			
Gender			0.54	0.28	0.10*	[-0.01, 1.08]				
Step 2		SDM * Sociotropy	-0.01	0.01	-0.05	[-0.02, 0.01]	0.35			
		SDM * Gender	0.47	0.25	0.16	[-0.02, .96]				
		Sociotropy * Gender	-0.01	0.02	-0.07	[-0.04, 0.02]				
Step 3		SDM * Sociotropy * Gender	-0.01	0.01	-0.06	[-0.03, 0.01]	0.35	0.00		
Total Weekly Drinking		Step 1	SDM	3.69	0.34	0.53***	[3.02, 4.36]	0.29	0.02	
			Sociotropy	-0.05	0.02	-0.11*	[-0.09, -0.01]			
	Gender		2.30	0.83	0.14**	[-.67, 3.93]				
	Step 2	SDM * Sociotropy	-0.01	0.02	-0.04	[-0.05, 0.02]	0.31			
		SDM * Gender	1.35	0.74	0.15	[-0.10, 2.80]				
		Sociotropy * Gender	-0.08	0.04	-0.15	[-0.17, 0.001]				
	Step 3	SDM * Sociotropy * Gender	-0.04	0.03	-0.09	[-0.11, 0.03]	0.31	0.00		
	Binge Drinking	Step 1	SDM	2.06	0.17	0.57***	[1.71, 2.40]	0.32		0.01
			Sociotropy	-0.03	0.01	-0.15**	[-0.05, -0.01]			
Gender			0.36	0.42	0.04	[-0.47, 1.19]				
Step 2		SDM * Sociotropy	-0.01	0.01	-0.08	[-0.03, 0.003]	0.33			
		SDM * Gender	0.48	0.38	0.11	[-0.25, 1.22]				
		Sociotropy * Gender	-0.03	0.02	-0.10	[-0.07, 0.02]				
Step 3		SDM * Sociotropy * Gender	-0.002	0.02	-0.01	[-0.04, 0.03]	0.33	0.00		
Negative Consequences		Step 1	SDM	2.04	0.49	0.24***	[1.08, 2.99]	0.08		
			Sociotropy	0.05	0.03	0.09	[-0.01, 0.11]			

	Gender	2.6	1.17	0.13*	[0.32, 4.94]		
Step 2	SDM * Sociotropy	-0.01	0.02	-0.03	[-0.06, 0.04]	0.08	0.00
	SDM * Gender	0.05	1.06	0.004	[-2.03, 2.12]		
	Sociotropy * Gender	0.03	0.06	0.04	[-0.09, 0.15]		
Step 3	SDM * Sociotropy * Gender	0.04	0.05	0.07	[-0.06, 0.13]	0.08	0.00

NOTE: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5. Hierarchical regression analyses for coping motives, autonomy, and gender predicting alcohol-related outcomes.

Criterion		Predictor	B	SE B	β	95% CI	R ²	ΔR^2
Drinking Frequency	Step 1	Coping Drinking Motives (CDM)	0.35	0.05	0.37***	[0.25, 0.46]	0.15	0.02
		Autonomy	-0.001	0.003	-0.01	[-0.01, 0.01]		
		Gender	0.29	0.11	0.15**	[0.08, 0.50]		
	Step 2	CDM * Autonomy	-0.01	0.003	-0.10	[-0.01, 0.001]	0.17	
		CDM * Gender	0.23	0.11	0.19*	[0.02, 0.45]		
		Autonomy * Gender	-0.01	0.01	-0.12	[-0.02, 0.01]		
Step 3	CDM * Autonomy * Gender	-0.01	0.01	-0.12	[-0.02, 0.004]	0.18	0.01	
Weekend Drinking Freq.	Step 1	Coping Drinking Motives (CDM)	0.90	0.16	0.32***	[0.60, 1.21]	0.11	0.01
		Autonomy	-0.02	0.01	-0.09	[-0.04, 0.003]		
		Gender	0.76	0.32	0.13*	[0.14, 1.39]		
	Step 2	CDM * Autonomy	-0.01	0.01	-0.07	[-0.03, 0.01]	0.12	
		CDM * Gender	0.42	0.32	0.12	[-0.21, 1.05]		
		Autonomy * Gender	0.001	0.02	0.004	[-0.04, 0.04]		
Step 3	CDM * Autonomy * Gender	0.01	0.02	0.05	[-0.03, 0.05]	0.12	0.00	
Total Weekly Drinking	Step 1	Coping Drinking Motives (CDM)	2.85	0.44	0.35***	[1.99, 3.72]	0.14	0.01
		Autonomy	-0.02	0.03	-0.04	[-0.08, 0.03]		
		Gender	2.72	0.90	0.16**	[0.95, 4.49]		
	Step 2	CDM * Autonomy	-0.03	0.03	-0.05	[-0.08, 0.03]	0.15	
		CDM * Gender	1.35	0.92	0.13	[-0.45, 3.15]		
		Autonomy * Gender	-0.05	0.06	-0.08	[-0.17, 0.06]		
Step 3	CDM * Autonomy * Gender	-0.02	0.06	-0.03	[-0.13, 0.10]	0.15	0.00	
Binge Drinking	Step 1	Coping Drinking Motives (CDM)	1.27	0.24	0.30***	[0.80, 1.73]	0.09	0.01
		Autonomy	-0.02	0.01	-0.06	[-0.04, 0.01]		
		Gender	0.63	0.48	0.07	[-0.32, 1.57]		
	Step 2	CDM * Autonomy	-0.02	0.02	-0.09	[-0.05, 0.01]	0.10	
		CDM * Gender	0.37	0.49	0.07	[-0.59, 1.34]		
		Autonomy * Gender	-0.02	0.03	-0.05	[-0.08, 0.05]		
Step 3	CDM * Autonomy * Gender	0.02	0.03	0.04	[-0.05, 0.08]	0.10	0.00	
Negative Consequences	Step 1	Coping Drinking Motives (CDM)	5.22	0.49	0.52***	[4.25, 6.19]	0.31	
		Autonomy	0.05	0.03	0.09	[-0.01, 0.11]		
		Gender	2.40	1.01	0.12*	[0.42, 4.39]		

Step 2	CDM * Autonomy	0.01	0.03	0.02	[-0.05, 0.08]	0.36	0.05
	CDM * Gender	4.12	0.99	0.32***	[2.15, 6.06]		
	Autonomy * Gender	0.08	0.06	0.10	[-0.05, 0.20]		
Step 3	CDM * Autonomy * Gender	0.18	0.06	0.22**	[0.06, 0.30]	0.37	0.02

NOTE: * $p < .05$, ** $p < .01$, *** $p < .000$.

Figure 1. This two-way interaction demonstrates that sociotropy moderates the relationship between social drinking motives and binge drinking such that social motives are positively related to binge drinking, especially among students low in sociotropy.

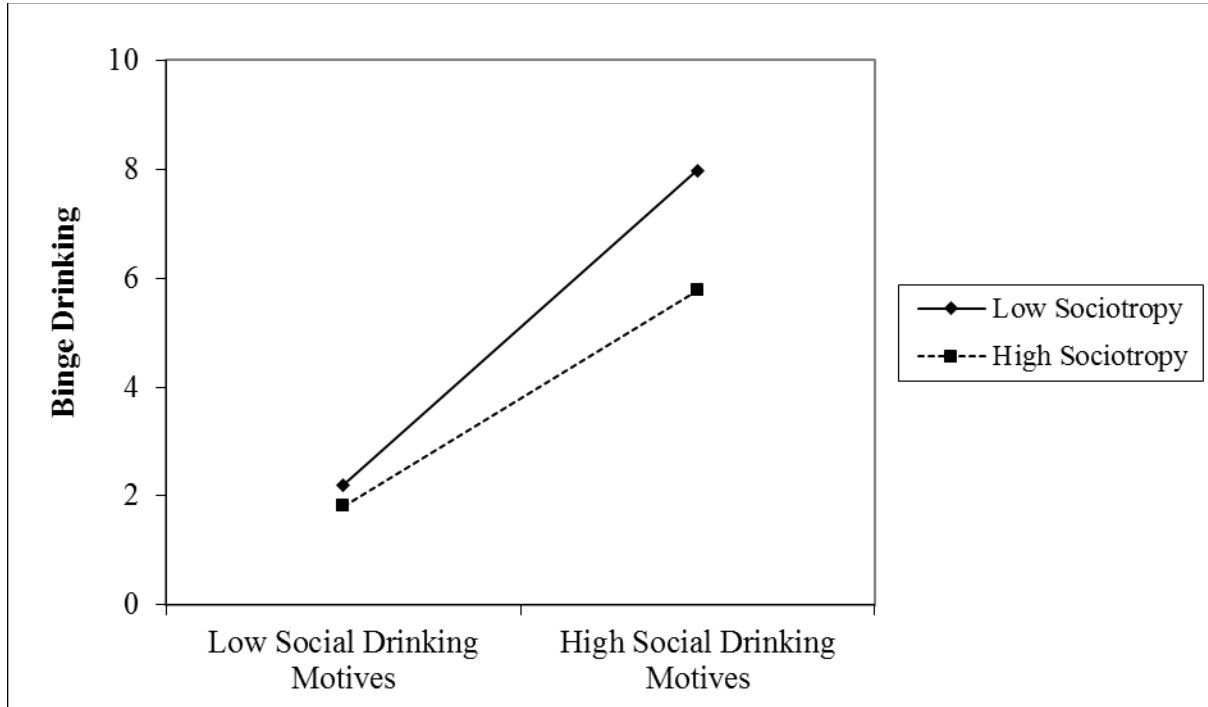


Figure 2. This three-way interaction suggests that there is a positive relationship between coping drinking motives and alcohol-related negative consequences, and that this relationship was especially true among males higher in autonomy. The opposite results emerged for females as a stronger positive relationship between coping motives and negative consequences was found among females lower in autonomy.

