Psychology Theses & Dissertations

Psychology

Fall 2017

Affective Factors Explaining the Association Between Depressive Functioning and Alcohol Outcomes

Peter D. Preonas
Old Dominion University, ppreo001@odu.edu

www.manaraa.com

AFFECTIVE FACTORS EXPLAINING THE ASSOCIATION BETWEEN DEPRESSIVE

FUNCTIONING AND ALCOHOL OUTCOMES

by

Peter D. Preonas
B.A. April 2011, University of Michigan

A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

PSYCHOLOGY

OLD DOMINION UNIVERSITY
December 2017

Approved by:

Cathy Lau-Barraco (Director)

Barbara Winstead (Member)

Valerian Derlega (Member)

ABSTRACT

AFFECTIVE FACTORS EXPLAINING THE ASSOCIATION BETWEEN DEPRESSIVE
FUNCTIONING AND ALCOHOL OUTCOMES

Peter D. Preonas
Old Dominion University, 2017
Director: Dr. Cathy Lau-Barraco

Depressive symptoms and alcohol use frequently coexist. In college students, the rates of depression and alcohol use are higher than in the general population, making this population at particular risk for co-occurrence of depressive symptoms and drinking. Though research has shown that depressive symptoms precede alcohol use and problems in non-clinical populations, it is unclear what mechanisms contribute to this relationship. Further exploration into how this relationship occurs could inform and improve intervention of depression and alcohol abuse on college campuses. This study sought to (1) assess three potential mediators (i.e., need for affect, distress tolerance, emotion regulation) to the relationship between depressive symptoms and alcohol use (i.e., quantity and problems), and (2) explore which of the proposed mechanisms best accounts for the relationship within each gender. Participants were 480 (65.4% female) college drinkers. Using path analysis, findings indicated that emotion regulation mediated the relationship between depressive symptoms and alcohol-related problems: however, it did not mediate the depressive symptoms-alcohol use link. Need for affect and distress tolerance were not supported as mediators between depressive symptoms and either alcohol use outcome. Invariance testing revealed that need for affect plays a larger role in this conceptual model for women than men, though model relationships through distress tolerance and emotion regulation did not vary based on gender. Overall, emotion regulation was found to explain the greatest amount of variance in the depressive symptoms-alcohol use link in both women and men. Future research may benefit from investigating this conceptual model in a higher risk population.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Alcohol use is a prevalent problem on college campuses (Wechsler, Lee, Kuo, & Lee, 2000). It has been estimated that 65% of college students report having consumed alcohol in the last 30 days (Johnston, O'Malley, Bachman, & Schulendberg, 2012), while approximately 44.4% of college students report binge drinking (e.g., five or more drinks on one occasion) within the same time frame (Wechsler et al., 2002). College students are also prone to high rates of depression (Furr, Westefel, McConnell, & Jenkins, 2001; Garlow et al., 2008). In particular, it is estimated that nearly 90% of college students experience at least brief periods of depressive symptoms while in college (Oswalt & Finkelberg, 1995). When considering drinking and depressive functioning together, both often co-occur in college students (Camatta & Nagoshi, 1995; Weitzman, 2004), with an estimated 40.6% reporting binge drinking and experiencing at least some depressive symptoms concurrently (Weitzman, 2004). Despite their frequent co-occurrence, the reasons underlying the depression-alcohol link in college students are not clearly understood. Further, the focus on college-age young adults is particularly crucial as rates of major depressive disorder-alcohol use disorder comorbidity are highest in early adulthood compared to other age ranges (Briére, Rohde, Seeley, Klein, & Lewinsohn, 2014). Consequently, the present study proposes to examine three affective-relevant constructs as mediators of this association in a sample of college students. Need for affect (Maio & Esses, 2001), distress tolerance (Simons & Gaher, 2005), and emotion regulation (Gross, 1998) have all been shown to contribute to the way people process and react to negative emotions. Thus, these affective variables could serve to explain the relationship between depressive functioning and alcohol use. Further, because rates of depression (Piccinelli & Wilkinson, 2000) and alcohol

abuse (Holmila & Raitasalo, 2005) have both been shown to differ based on gender, the present study also seeks to explore the unique contribution of each mediator in the mood and drinking pathway for each gender.

Alcohol and Depression

  Comorbidity. The relationship between depressive symptoms and alcohol abuse is well established (Deykin, Levy, & Wells, 1987; Kessler et al., 1996). Studies in clinical populations have shown that major depressive disorder (MDD) and alcohol use disorder (AUD) are highly comorbid. It is estimated that 18.4% to 42.2% of individuals with MDD also have an AUD diagnosis (Deykin et al., 1987; Gilman & Abraham, 2001; Schuckit, Tipp, Bucholz et al., 1997). Approximately one-third of individuals with AUD have had at least one major depressive episode (MDE), with up to 80% reporting at least some depressive symptoms (Schuckit, Tipp, Bergman et al., 1997). Individuals with a diagnosis of either MDD or alcohol dependence have been found to more likely meet criteria for the other diagnosis after one year, as compared to individuals without either diagnosis at the initial time point (Gilman & Abraham, 2001). Further, those diagnosed with MDD are more likely to use alcohol and other substances in higher quantities (Deykin et al., 1987). Women and men have been shown to have similar rates of comorbid MDD and AUD diagnoses, although women are more likely to have primary MDD diagnoses while men are more likely to have primary AUD diagnoses (Hanna & Grant, 1997).

  Beyond clinical populations, similar results have been found among non-clinical populations. A longitudinal study of a community sample found that women who reported more depressive symptoms were more likely to meet criteria for alcohol abuse or dependence disorder in the future (McCarty et al., 2009). In a longitudinal study using a community sample of twin participants, Kuo, Gardner, Kendler, and Prescott (2006) found that twins who had experienced

an MDE, when compared to those who had not, were more likely to develop subsequent alcohol

dependence after controlling for genetic similarities.

Among college student populations specifically, research has shown that students who

reported poorer overall mental health also reported greater alcohol consumption and drinking

related problems (Geisner, Larimer, & Neighbors, 2004; Weitzman, 2004). Students who binge

drink have been found to report more depressive symptoms and negative drinking-related

consequences as compared to non-binge-drinking students (Martens et al., 2008). Further,

heavier drinkers tended to have higher motivation to drink to cope with negative emotions,

suggesting that negative emotions may contribute to alcohol abuse (Cadigan, Martens, &

Herman, 2015). Overall, this literature on the co-occurrence of depressive symptoms and

drinking behavior supports that the two are interrelated, but does not illuminate what underlies

the relationship. In order to clarify how the relationship occurs, several studies have collected

lifespan data and longitudinal designs, suggesting that depressive symptoms precede and

contribute to alcohol use.

Depression Influences Drinking Behavior. Both cross-sectional and longitudinal

studies provide evidence for the influence of depressive symptoms on alcohol use. In a cross-

sectional study of treatment seekers, it was found that MDEs preceded alcohol dependence by an

average of 4.7 years (Abraham & Fava, 1999). This is in line with findings showing that onset

of psychiatric diagnoses is more likely to precede age of first drink and age of onset for alcohol

abuse (Deykin et al., 1987). Using longitudinal data, Kuo and colleagues (2006) found that prior

episodes of MDD greatly increased the likelihood of future alcohol abuse. However, alcohol

abuse did not predict future depressive symptoms, suggesting that depressive symptoms more

frequently precede alcohol abuse over time. These findings are supplemented by studies

showing that women who reported an MDE at earlier time points were more likely to report substance abuse at subsequent time points (McCarty et al., 2009; Wang & Patten, 2001).

The influence of affective functioning on later drinking is further supported by research on the childhood development of such disorders. Findings have shown that childhood depressive symptoms can predict later alcohol use and abuse, and that a developmental course for alcohol abuse can begin as early as infancy (Hussong, Jones, Stein, Baucom, & Boeding, 2011). A study which followed children from ages 9 to 16 found that both boys and girls who exhibited early signs of depression were more likely to report alcohol abuse as a teenager (Costello, Erkanli, Federman, & Angold, 1999). Pardini, White, and Stouthamer-Loeber (2007) also found that greater childhood depressive symptoms were predictive of adolescent and early adult alcohol use. Other studies have shown that childhood internalizing problems (e.g., depression and anxiety symptoms) can predict later alcohol problems, even when controlling for conduct and externalizing problems (Sung, Erkanli, Angold, & Costello; 2004; Wolitzky-Taylor, Bobova, Zinbarg, Mineka, & Craske, 2012). This body of evidence supports depressive functioning as an important aspect of alcohol use and abuse and suggests that depressive symptoms precede and possibly contribute to later drinking and drinking-related problems.

While evidence supports that depressive functioning could lead to alcohol use, it is important to acknowledge evidence supporting the influence of alcohol use on subsequent depressive functioning (Fergusson, Boden, & Horwood, 2009; Hasin & Grant, 2002) as well as their bi-directional relationship (Gilman & Abraham, 2001; Worley et al., 2012). With regard to evidence supporting alcohol use leading to depression, Fergusson and colleagues (2009) found that meeting criteria for Alcohol Abuse or Dependence was more likely to lead to a later diagnosis of MDD than the inverse direction. Using participants who had former diagnoses of

Alcohol Dependence, Hasin and Grant (2002) found that they more frequently met criteria for MDD than did individuals without a diagnosis of dependence. Wang and Patten (2002) also found longitudinal data supporting that women who reported at least one episode of binge drinking per month were more likely to meet criteria for MDD than women reporting less than one binge drinking episode per month; however, no difference was observed within men. Evidence also exists suggesting that depressive symptoms and alcohol use can each potentially lead to the other. In a longitudinal study, Gilman and Abraham (2001) found that higher baseline levels of both depressive symptoms and alcohol abuse symptoms increased the risk for greater symptomology of the other problem one year later. Specifically, individuals with MDD are more likely than those without MDD to develop Alcohol Dependence one year later. Similarly, individuals who meet criteria for Alcohol Dependence are more likely than those who do not to develop MDD one year later. Worley and colleagues (2012) found similar results when looking at treatment for depression and alcohol abuse. In a veteran sample, they found that treatment focused on improving depressive symptoms also improved alcohol abuse symptoms, and treatment focused on drinking lowered depressive symptoms over time.

Overall, the body of literature on affective functioning and alcohol use has found that greater depressive symptoms can increase the likelihood of alcohol use and abuse (Kuo et al., 2006). Strong evidence suggests that depression leads to alcohol use, such that individuals may drink more in response to their negative emotions (Bolton, Robinson, & Sareen, 2009; Holahan, Moos, Holahan, Cronkite, & Randall, 2004); although some evidence also suggests that alcohol use can lead to depression (Fergusson et al., 2009). It is also possible that both depressive symptoms and alcohol use can temporally precede the other (Gilman & Abraham, 2001), and that those two directions are explained by different mechanisms. Given the longitudinal studies

from childhood through early adulthood (Costello et al., 1999; Sung et al., 2004; Wolitzky-Taylor et al., 2012) it is clear that depressive symptoms and negative emotions can contribute to subsequent alcohol abuse and alcohol-related harms. Further research to explain the link of these important constructs are needed as such efforts could elucidate the mechanisms which explain how depression leads to drinking.

Theoretical Models of Affective Functioning and Drinking

There are several theoretical models that could help account for the association between depressive functioning and alcohol use. The negative reinforcement theory (NRT) posits that individuals seek out substances in order to alleviate negative sensations, either to reduce physiological or psychological withdrawal symptoms or to mask negative emotions (Wikler, 1948). The theory is based on evidence that the body becomes accustomed to intoxicated states due to alcohol and drug use, such that when the body is free from the substance there is a withdrawal. Due to these withdrawal symptoms, individuals use substances in an effort to alleviate these physiological sensations. Baker, Piper, McCarthy, Majeskie and Fiore (2004) later built upon Wikler's work by proposing a model that places greater emphasis on negative psychological states in addition to physiological withdrawal that was central to Wikler's model. This newer model suggests that heightened affective states can increase the risk of negative reinforcement. Specifically, by experiencing negative affect, individuals become more sensitive to future negative affect. Once an individual has consumed alcohol in an attempt to reduce negative affect, continued negative affect is more likely to be addressed using similar means. In other words, this cycle can cause emotional withdrawal such that an individual will continue to drink in an attempt to avoid negative affect because it has helped in the past. Baker and colleagues (2004) suggest this affective negative reinforcement adds to the risks of the

physiological withdrawals in alcohol and substance abuse. For many years, research has supported the notion that negative reinforcement has contributed to drinking (Cooper, 1994; Farber, Khavari, & Douglass, 1980) and more recent research has utilized ecological momentary assessment (EMA) to find that negative emotional states may be predictive of alcohol consumption (Swendsen et al., 2000).

An alternative model to explain how negative affect impacts alcohol use is the tension reduction hypothesis (TRH; Cappell & Herman, 1972; Greeley & Oei, 1999). The TRH posits that drinking behaviors are a consequence of an individual's desire to lower internal distress (Cappell & Herman, 1972; Greeley & Oei, 1999). Though similar to NRT, TRH is based on general distress, which could include depression and anxiety, while NRT focuses specifically on sad or depressive emotions. Individuals who experience high levels of stress or tension may choose to drink alcohol to mitigate these feelings rather than addressing them in other ways. According to this model, any level of symptoms can cause internal distress such that individuals may consume alcohol as a way to alleviate these emotions. Evidence supporting this model with college students comes from studies showing that students with higher distress (e.g., depression or anxiety symptoms) were more likely to drink (Kalodner, Delucia, & Ursprung, 1989), as were students who held higher tension-reduction expectancies regarding alcohol (Rutledge & Sher, 2001). One way college students have been shown to cope is by drinking alcohol in order to reduce this tension (Park & Levenson, 2002). While research supports that some individuals do consume alcohol for pleasure (Webb, Ashton, & Kamali, 1996), other studies have found that many individuals report that they are more likely to drink to reduce distress or tension (Sher, Bylund, Walitzer, Hartmann, & Ray-Prenger, 1994). Greeley and Oei (1999) argue that rather

than existing as a comprehensive theory explaining all alcohol use, the TRH serves to explain the portion of alcohol use which occurs to reduce stress.

A third model providing a basis for the association between affective functioning and drinking is the self-medication hypothesis (Deykin et al., 1987; Gilman & Abraham, 2001). Self-medication occurs when individuals abuse alcohol or drugs as a means of dealing with affective distress (Khantzian, 1997). Individuals who self-medicate lack other effective means of self-regulation and though alcohol only temporarily reduces affective distress, it remains the most effective regulatory behavior (Khantzian, 1997). It has been shown that nearly one-quarter of individuals with mood disorders self-medicate with alcohol or drugs (Bolton et al., 2009). Research has suggested that timely treatment of mental health disorders can decrease the risk of developing subsequent substance use disorders (Harris & Edlund, 2005). Drinking to self-medicate is relevant to college students in particular as students have been shown to experience varying degrees of depression (Oswalt & Finkelberg, 1995; Weitzman, 2004) and they report drinking as a way to cope with those negative emotions (O'Connor & Colder, 2005). While similar to the NRT and TRH, self-medication considers how a broader scope of subjective discomfort could lead to substance use, including problems with self-esteem and relationships.

Across the three models described above, affective functioning is a critical common element. Each model describes substance use as an individual's way of coping with and managing negative affective states and stimuli. Though the pattern and practice of drinking to cope with negative affect plays out in slightly different ways, the models complement one another in that negative emotions are a critical antecedent to drinking. While no one theory can fully explain alcohol use, Lang, Patrick, and Stritzke (1999) note that nearly all proposed theories include an emotional component. Despite the understanding that affective functioning

plays a role in alcohol use, it is still unclear how this functioning contributes to drinking. Considering these models together may promote a more comprehensive framework to better understand the underlying mechanisms contributing to affect-related drinking. It is possible that these models could each explain part of this relationship such that collectively they work to explain a greater portion of the negative affect-drinking link. Within the context of these models, further research can help explain the ways in which affective functioning plays a role in substance abuse.

Variables Explaining the Depressive Functioning-Alcohol Use Link

As stated above, nearly all theories of drinking include affective or emotional functioning (Lang et al., 1999). While the specific mechanisms and motives underlying alcohol use differ from theory to theory, Lang and colleagues (1999) note that alcohol use has been commonly thought to be in response to negative affect. Negative affect and, more generally, affective functioning are comprised of several more specific components. Identifying and measuring those specific constructs could help shed light on what aspects of affective functioning contribute to drinking to cope with negative emotions.

Affective functioning has been defined using three general constructs: desire to seek out emotional experiences (e.g., need for affect), emotional ability (e.g., distress tolerance), and emotional style (e.g., emotion regulation; Maio & Esses, 2001). Researchers argue that these constructs collectively represent affective functioning, and that individual differences in affective functioning can be measured along these lines (Maio & Esses, 2001). Further, Maio and Esses (2001) argue that these facets are key to developing a comprehensive understanding of affective functioning, which in turn could help explain the relationship between depressive symptoms and alcohol use.

Need for Affect. The desire to seek out emotional experience could be understood as need for affect, which is defined as the inherent motivation to either approach or avoid emotional stimuli or situations (Maio & Esses, 2001). It encompasses an individual's desire to approach and experience known emotional scenarios. For example, choosing to see a sad war movie is a way to seek out an emotional experience, whereas viewing a light-hearted comedy would be a way to avoid such an emotional situation.

Need for affect is supported by the cognitive-experiential self-theory (CEST; Epstein, 1998). This theory posits that information processing occurs through two distinct systems, rational and experiential. The rational system analytically processes information utilizing cognitive and logical thinking. This system is active when methodically considering all available information prior to addressing a problem. Alternatively, the experiential system is more holistic, emotional, and driven by positive and negative affect. The experiential system would be active if intense anger guided a decision to lash out at a friend. CEST assumes that these two systems work separately but simultaneously to process information and drive behavior, and that individual differences in behavior can be traced back to how one prioritizes these two systems (Epstein, 1998).

Need for affect measures the inherent tendency to utilize the experiential, emotional system for processing information. It considers emotional approach and avoidance individually given their distinct motivational processes (Higgins, 1997; Roth & Cohen, 1986). Conceptually, individuals have approach motivations when they consider emotions important and find value in experiencing extreme emotions. Conversely, avoidance motivations are represented by one's perceiving emotions as useless or distracting, as well as preferring to avoid intense emotions altogether. While approach and avoidance motivations are inversely related, they measure

specific concepts and thus contribute uniquely to overall need for affect. Overall need for affect

is one's desire to approach emotions, minus motivation to avoid emotions. Therefore,

individuals with high need for affect are more likely to seek out emotional interactions and

approach their own emotions, regardless of whether the emotions are positive or negative (Maio

& Esses, 2001). They are also more likely to experience extreme emotions as compared to

someone with lower need for affect (Maio & Esses, 2001).

Need for affect and depression. Prior research has looked specifically at the relationship

between need for affect and negative emotions. In a study from their seminal article, Maio and

Esses (2001) showed that individuals who score high on the need for affect approach subscale

(i.e., "I think that it is important to explore my feelings") tend to report more intense emotions,

defined as the strength of the emotional response (Larsen & Diener, 1987), in response to

emotional stimuli. Findings also suggest that individuals with higher need for affect avoidance

scores (i.e., "I find emotions overwhelming and therefore try to avoid them") are more likely to

express negative emotions as well as ambivalence toward emotional expressiveness. Therefore,

individuals high on affect approach will show greater emotional intensity than those low on

approach, whereas those high on avoidance are more likely to experience negative emotions than

those low on avoidance. Results also showed that women tended to score higher on overall need

for affect, suggesting they are more likely to approach affective stimuli when compared with

men (Maio & Esses, 2001).

Emotional avoidance has been linked to levels of depressive functioning. For example,

Brockmeyer, Kulessa, Hautzinger, Bents, and Backenstrass (2015) found that participants with

an MDD diagnosis had significantly higher need for affect avoidance as compared to a non-

depressed control group. Another study found that need for affect avoidance was a significant

predictor of depressive symptoms (Brockmeyer, Holtforth, Pfeiffer, Backenstrass, Friederich, & Bents, 2012). Specifically, it showed that formerly-depressed individuals had significantly higher need for affect avoidance, even when controlling for current depressive symptoms. These results suggest that the desire to avoid affective stimuli is associated not only with current depressive symptoms, but perhaps with any history of depressive symptoms as well. Overall, these findings on need for affect and depressive symptoms support exploration of need for affect as a potential mechanism in the relationship between depressive symptoms and drinking behaviors. Given the link between need for affect and depressive functioning, it may be that experiencing negative emotions could be related to a desire to avoid emotional stimuli (i.e., higher need for affect avoidance), and this in turn, could be linked to greater alcohol consumption as a means to avoid those negative emotions.

Need for affect and alcohol use. Relatively little research exists exploring the direct relationship between need for affect and substance use. However, need for affect has been shown to be positively associated with positive health behaviors (e.g., brushing teeth, exercise; Lawton, Conner, & McEachan, 2009) and negatively associated with high-risk health behaviors (e.g., smoking cigarettes, lack of sun care; Janssen, van Osch, Lechner, Candel, & de Vries, 2012). While most prior investigations of need for affect have not specifically examined alcohol use, one study looked at alcohol use along with a number of other high-risk health behaviors (Trafimow et al., 2004). The study found that individuals more likely to approach affective situations were more likely avoid high-risk health behaviors (e.g., alcohol, cigarettes, fast food) compared to those more likely to avoid affective situations. This relationship remained significant while controlling for participants' affective impressions (e.g., pleasant or unpleasant) about each activity, suggesting that even though individuals may differ on whether or not

smoking cigarettes is subjectively pleasant, those with higher need for affect would be more successful in abstaining from smoking. Further research on tobacco use behavior has also shown that individuals who are more likely to approach emotional stimuli are less likely to smoke cigarettes following an affective intervention (Janssen et al., 2012). These initial findings suggest that the tendency to approach emotions may be associated with lower substance and alcohol use.

In addition to how need for affect may be associated with substance use, a more recent study looked at how emotional eating behaviors may be linked with the tendency to approach emotional situations. This study found that individuals who are more likely to approach affective situations are less likely to report emotional eating behaviors (Yüncü & Hepkul, 2016). Though causality could not be inferred, the authors suggest that individuals who are more likely to avoid emotional situations may look to high-risk health behaviors (e.g., emotional eating) as a means of coping with their emotions. Conversely, individuals who more readily approach emotional situations may cope with emotions through less destructive means. Yüncü and Hepkul's (2016) proposed explanation of the link between need for affect and emotional eating could also apply to alcohol, such that individuals who avoid emotions may be more likely to drink to cope. In general, these results suggest that the motivation to approach emotional stimuli may be associated with lower frequency of high-risk health behaviors. Based on these findings, individuals who are more likely to avoid affective situations might be at higher risk for risky behavior, such as alcohol or cigarette use, presumably because the substance use serves as a way to cope with negative emotions. The present study looks to explore the relationship between need for affect and alcohol use in order to consider need for affect as a potential mechanism contributing to the relationship between depressive symptoms and drinking.

Summary. Overall, the body of research on need for affect, defined as one's inherent motivation to either approach or avoid emotional situations, suggests that it plays an integral role in affective functioning. Need for affect has been shown to relate positively to negative affectivity and negatively with certain high-risk health behaviors (e.g., smoking cigarettes). Consequently, it may be that the avoidance of emotional stimuli results in individuals lacking healthy means to regulate their emotions, which then explains why they may look to high-risk health behaviors as a means to cope with negative affect.

Distress Tolerance. One way to define emotional ability is how well an individual is able to manage or cope with negative emotions. Generally, distress tolerance can represent the emotional ability to withstand discomfort or distress (Simons & Gaher, 2005). Distress tolerance has been conceptualized as it relates to psychological (i.e., negative emotions) or physiological stressors (i.e., uncomfortable bodily sensations), with a focus on tolerance being either emotional or somatic, respectively. Due to this discrepancy there have been calls to better define and support the concept theoretically (Leyro, Zvolensky, & Bernstein, 2010; Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Zvolensky and colleagues (2010) set to review various definitions of the construct and consolidate them into one comprehensive concept. They incorporated five lower-order constructs that combine to represent global experiential distress intolerance (i.e., tolerance of uncertainty, ambiguity, frustration, negative emotion, and physical discomfort). According to the model proposed by Zvolensky and colleagues (2010), measuring distress tolerance can lead to a better understanding of how individuals will respond to their own impulses, particularly in stressful situations. Therefore, an individual with high tolerance for distress can more successfully ignore or endure stressful stimuli (either psychological or physiological) and continue without much distraction or delay. Distressing events may instead

completely distract or impede tasks of an individual with low tolerance for distress, causing them to look to reduce or escape the uncomfortable feeling (TRH; Cappell & Herman, 1972). Therefore, the inability to tolerate distress may be related to greater negative emotions, as individuals are less successful at reducing negative affect when it arises. This may, in turn, lead to alcohol use as individuals attempt to reduce or avoid their depressive symptoms.

Distress tolerance and depression. Distress tolerance has been shown to be negatively related to depression (e.g., Anestis, Selby, Fink, & Joiner, 2007; Dennhardt & Murphy, 2011; Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010; Williams, Thompson, & Andrews, 2013). Specifically, Williams and colleagues (2013) found in a sample with MDD that those with low distress tolerance exhibited more depressive symptoms. The study also found distress tolerance to be a malleable construct in that distress tolerance increased in patients when targeted with CBT treatment. Further, the researchers found a gender effect in which men reported higher distress tolerance than women, suggesting that distress tolerance may serve different roles in men and women's affective functioning.

Similar results were found from a sample of adults seeking outpatient treatment. Allan, Macatee, Norr, and Schmidt (2014) found distress tolerance to be inversely related to clinical diagnoses for MDD and general anxiety disorder (GAD). Keough and colleagues (2010) found distress tolerance to be negatively related with subthreshold symptoms of depression and anxiety in a non-treatment seeking sample. Subthreshold depressive symptoms have also been shown to have a negative relationship with distress tolerance among college students (Dennardt & Murphy, 2011). In further support, Tull and Gratz (2013) found an interaction between MDD and distress tolerance, such that a diagnosis of MDD in addition to low distress tolerance predicted risky sexual behaviors in a treatment seeking sample, though neither MDD nor distress

tolerance were significant predictors alone. Overall, these studies demonstrated a negative relationship between depressive functioning and distress tolerance, and suggest that even non-clinical levels of depressive symptoms may be associated with lower distress tolerance.

   Distress tolerance and alcohol use. Distress tolerance has been shown to be related to alcohol use. Among undergraduate students, low distress tolerance has been associated with higher alcohol and marijuana use (Buckner, Keough, & Schmidt, 2007). Further, distress tolerance has been found to be related to one's drinking motives. Specifically, young adults with low distress tolerance were more likely to report drinking alcohol to cope than were individuals with high distress tolerance (Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010).

   With regard to clinical populations, distress tolerance has been shown to relate to substance abuse treatment dropout rates (Daughters et al., 2005). Individuals who dropped out of treatment for substance abuse had significantly lower distress tolerance than did individuals who completed treatment. Interestingly, it was found that psychological rather than physical distress was related to treatment dropout. Further, males receiving treatment for SUDs were less likely to complete treatment if they held a PTSD diagnosis and had low distress tolerance (Tull, Gratz, Coffey, Weiss, & McDermot, 2013). Ali, Seitz-Brown, and Daughters (2015) found that among women with depressive symptoms, distress tolerance and alcohol-related problems were negatively related. These findings suggest that lower distress tolerance is related with higher alcohol use, and that distress tolerance may even explain the relationship between depressive symptoms and drinking. The studies also suggest that distress tolerance may serve different roles in affective function among men and women

   Summary. Distress tolerance, or one's ability to withstand psychological or emotional distress, has been shown to be inversely related to depressive functioning and likelihood of

drinking to alleviate internal distress. There is also evidence that distress tolerance serves to mediate the relationship between depression and alcohol use among women. Given this evidence, it is possible that distress tolerance plays an important role in risky alcohol use among students and could serve as one mechanism in the depression-alcohol use link; however, this hypothesis remains to be empirically tested.

Emotion Regulation. Emotional style can be conceptualized as emotion regulation, or the way in which an individual processes and responds to emotional stimuli (Gross, 1998). Emotion regulation is viewed as the internal operations that occur in response to an external event which help an individual decide how to respond to that event. Gross (1998) argues that all people experience emotional cues and later enact emotional responses to those cues. He defined emotion regulation as the process in which emotional cues are transformed into responses. This regulatory process can occur automatically, as in situations with extreme emotional cues. In other instances, this regulation process is controlled deliberately.

While Gross (1998) focused more on the ways in which emotion regulation is beneficial, more recently, research has built upon deficiencies of the emotion regulation process. Linehan (1993) suggested that deficits in emotion regulation could play an integral role in dysfunctional behaviors, suggesting poor emotion regulation as a risk factor for a wide variety of behavioral and psychological problems. For example, individuals with poor emotion regulation skills may be at a greater risk of depressive symptoms and risky behaviors (e.g., drinking) in response to these negative emotions. Given this conceptualization, it may be that those experiencing depressive emotions may have a lower ability to regulate emotions and thereby may consume alcohol as an attempt to reduce or avoid negative emotions.

Emotion regulation and depression. In line with Linehan's conceptualization that emotion regulation may be related to psychological problems, research has shown an association between negative affect and emotion regulation. Specifically, Brockmeyer and colleagues (2012) showed that formerly depressed individuals have more difficulties with emotion regulation than do individuals who have never been depressed. Other studies have shown similar patterns within student samples (Aldao & Dixon-Gordon, 2014; Ehring, Fischer, Schnülle, Bösterling, & Tuschen-Caffier, 2008). Ehring and colleagues (2008) showed that greater past depressive symptoms were associated with self-perceived difficulties in regulating emotions above and beyond current depressive symptoms. In a non-clinical student sample, Aldao and Dixon-Gordon (2014) found higher rates of self-criticism, expressive suppression, and worry or rumination in participants with more difficulties in emotion regulation. These findings suggest individuals with depression and non-clinical depressive symptoms are less skilled at regulating their emotions.

Support exists that suggests women and men regulate emotions differently. Women are more likely to utilize internal strategies, whereas men are more likely to use external strategies or avoidance (Nolen-Hoeksma, 2012). Further, women are more likely to value emotions as information rather than dismiss or suppress them, and in turn use more abstract thinking while regulating emotions (Bardeen & Stevens, 2015). However, women are more likely to ruminate, which can potentially lengthen periods of depressed mood (Butler & Nolen-Hoeksema, 1994). In regard to external styles of emotion regulation, Nolen-Hoekesma (2012) found that men are more likely than to woman to respond to emotions with external behaviors, such as drinking to cope, rather than approaching them consciously. While in general individuals with higher levels

of negative emotions are at risk for increased alcohol use (Geisner et al., 2004; Weitzman, 2004), lower emotion regulation may help to explain the link between drinking and depression.

Emotion regulation and alcohol use. In addition to affective problems, lower emotion regulation has been shown to be related to higher alcohol use (Aldao & Dixon-Gordon, 2014; Berking et al., 2011). Aldao and Dixon-Gordon (2014) found college students with lower emotion regulation drank more alcohol. Further research has looked at emotion regulation as a potential predictor of subsequent drinking behaviors. A longitudinal investigation found that emotion regulation played a role in alcohol abuse and could improve with treatment (Berking et al., 2011). In particular, following CBT treatment focused on improving emotion regulation, participants' deficits in emotion regulation post-treatment predicted alcohol use during the follow-up, supporting emotion regulation as an essential mechanism in alcohol use. Other literature shows that emotion regulation deficiencies are related to alcohol-related problems, but are unrelated to alcohol use itself (Dvorak et al., 2014). Dragan (2015) also found that emotion regulation predicted alcohol use, but only when metacognitions about alcohol were considered in the model as a mediator. Research also suggests emotion regulation and depression may interact differently based on gender, leading to different alcohol outcomes (Nolen-Hoeksema, 2012). Collectively this research supports emotion regulation as a potential mechanism of alcohol use. One reason that those who experience depressive symptoms also consume higher levels of alcohol may be related to a lower ability to regulate emotions.

Summary. Emotion regulation is defined as the style with which individuals regulate their emotions and respond to emotional stimuli. Emotion regulation has been shown to have a negative relationship with depressive symptoms in clinical (Brockmeyer et al., 2012) and non-clinical populations (Aldao & Dixon-Gordon, 2014). Deficits in emotion regulation have also

been linked with greater alcohol use and poor treatment outcomes (Berking et al., 2011).

Considering these relationships, it is possible that emotion regulation could help to explain the

association between negative emotion and alcohol use. Further research is needed to investigate

whether and how emotion regulation may explain the relationship between depressive

functioning and drinking.

Current Study

While much research supports a relationship between depressive symptoms and alcohol

outcomes, there is a need for further research exploring the mechanisms that underlie this

relationship. Guided by Maio and Esses' (2001) model of affective functioning, the current

study proposed a conceptual model to examine several facets of affective functioning as

mediators of the depressive functioning-alcohol use link among college students. Specifically,

need for affect, distress tolerance, and emotion regulation were tested as underlying mechanisms

explaining associations between depressive functioning and drinking-related behaviors (i.e.,

alcohol use quantity and alcohol-related problems; see Figure 1).

The present investigation also focused on examining the relative influence of each

hypothesized affective mechanisms within each gender. Given research suggesting that

depression (Nolen-Hoeksema & Girgus, 1994), alcohol consumption (McCarty et al., 2009;

Wang & Patten, 2001), emotional functioning (Piccinelli & Wilkinson, 2000), distress tolerance

(Ali et al., 2015), and emotion regulation (Nolen-Hoeksema, 2012) differ based on gender, it was

considered that men and women may show differences in the role these mechanisms serve in the

depression-alcohol link. The goal was to illuminate which mechanisms are responsible for the

greatest variance in the relationship between depressive symptoms and alcohol use in women

and men.

The present investigation aimed to contribute to the larger body of research on depressive functioning and drinking among young adults in several ways. First, by considering three mediating constructs, findings of the current investigation sought to extend knowledge regarding contributions of specific affective mechanisms to drinking outcomes. This information could then aide in the identification of those most vulnerable to problematic drinking and the development of intervention efforts that target affective facets. Second, this study looked to understand which specific mechanisms have greater salience in explaining the relationship between depression and alcohol within women and men. By looking at women and men separately, findings aimed to highlight different affective mechanisms as most influential within each gender, thereby guiding the potential tailoring of intervention to maximize benefit for women and men. Finally, this study looked to build upon the existing theoretical understanding of the relationship between depressive functioning and alcohol use. While affective mechanisms have been explored as potential mediators between depression and alcohol use, prior studies have only considered one of these specific constructs within a given study or model. The current study is the first known study to examine these three specific mechanisms together, comprising a more comprehensive model of affective functioning that ultimately sought to lead to a more inclusive and accurate model for the relationship between negative affect and drinking.

Specific aims and hypotheses are as follows:

Aim 1: To test a conceptual model whereby the indirect relationship between depressive symptoms and drinking outcomes (i.e., alcohol use and alcohol problems) is mediated by need for affect, distress tolerance, and emotion regulation (see Figure 1).

Aim 1a: To examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *need for affect.*

Hypothesis 1a: As Maio and Esses (2001) have shown, individuals with a higher need for affect are more willing to approach emotionally based stimuli. In accordance with the cognitive-affective system theory of personality, individual differences in the desire to approach one's own emotions can contribute to differences among behaviors (Mischel & Shoda, 1995). Therefore, it was predicted that greater depressive symptoms would be associated with lower need for affect, which in turn would be associated with an increase in alcohol use and drinking-related problems.

Aim1b: To examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *distress tolerance*.

Hypothesis 1b: Individuals with depression have lower distress tolerance (Williams et al., 2013). Alcohol use is also higher when distress tolerance is low (Daughters et al., 2005). Therefore, it was predicted that greater depressive symptoms would be associated with lower distress tolerance, which in turn would be associated with an increase in alcohol use and drinking-related problems.

Aim 1c: To examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *emotion regulation*.

Hypothesis 1c: Emotion dysregulation has been shown to relate with both depression (Brockmeyer et al., 2012) and alcohol abuse (Berking et al., 2011). Effective emotion regulation strategies have been linked with healthier, low risk outcomes (Gross, 2002). Therefore, it was predicted that greater depressive symptoms would be associated with lower emotion regulation, which in turn would be associated with an increase in alcohol use and problems.
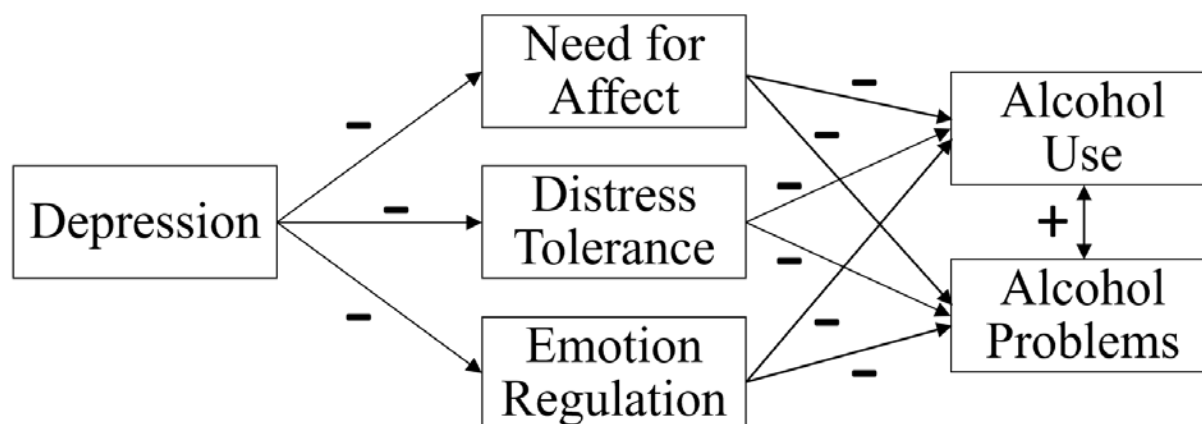
Figure 1. A conceptual model in which the indirect relationship between depression and drinking outcomes (alcohol use and problems) is mediated by affective mediators (need for affect, distress tolerance, and emotion regulation).

Aim 2: To examine potential gender differences in the strength and fit of the mediation model through gender invariance testing.

Hypothesis 2: Research has suggested that depression, alcohol outcomes, need for affect, distress tolerance and emotion regulation have different prevalence rates and frequencies based on gender. Specifically, women are more likely to experience depression than men (Piccinelli & Wilkinson, 2000), with rates of depressive symptoms potentially twice as high among women (Nolen-Hoeksema & Girgus, 1994). Men have been found to consume more alcohol and drink more frequently than women (Wilsnack, Vogeltanz, Wilsnack & Harris, 2000), while women are more likely to abstain from drinking altogether (Holmila & Raitasalo, 2005). Women with low distress tolerance and high depressive symptoms have been shown to drink more alcohol, while that relationship was not observed among men (Ali et al., 2015). Women

have a greater tendency to approach affective stimuli (Maio & Esses, 2001), as well as greater emotion regulation abilities (Nolen-Hoeksema, 2012). Emotion regulation has also shown to be more automatic within men (Barrett, Lane, Sechrest, & Schwartz, 2000), which could suggest it plays less of a role for men when regulating negative emotions. Therefore, it was predicted that the fit of the overall model would differ based on gender as demonstrated through invariance testing. Specifically, it was hypothesized that among the proposed mediators, distress tolerance would account for the greatest amount of unique variance in the relationship between depressive symptoms and alcohol outcomes for *women*, while need for affect would account for the greatest amount of unique variance among *men*.

CHAPTER II

METHOD

Participants and Recruitment

Participants for the present study were undergraduate students at Old Dominion University (ODU) enrolled in psychology courses. To be eligible, they must have been between the ages of 18-25. Further, in order to obtain a sample that consumed alcohol but still reflected a range of use levels, participants needed to report having consumed alcohol at least once within the past 12 months (Lau-Barraco, Milletich, & Linden, 2014). According to Kline (2011), power analysis to determine sample size for a path analysis model can follow a 20:1 ratio, such that 20 participants are needed for each parameter. The current study utilized six parameters of interest (i.e., depressive symptoms, need for affect, distress tolerance, emotion regulation, alcohol use, alcohol problems). This resulted in a target sample of 120 participants. However, in order to examine the hypothesized model by gender, as proposed in Aim 2, a total final target sample of 240 participants was needed. In total, 550 ODU students began to complete the study survey. Of those initial participants who responded to the survey, 65 entries were removed due to incomplete responses on more than two variables. An additional 5 participants were removed from analysis due to completing the entire survey in under five minutes, thus raising concerns about response validity (Meade & Craig, 2012). The final sample consisted of 480 participants, the majority of whom were female ($N = 314$, 65.4%). The average age was 20.40 ($SD = 2.20$) years, and was comprised of 33.3% freshmen, 19.4% sophomores, 18.8% juniors, and 27.9% seniors. Sample ethnicity was 40.4% White/Caucasian, 39.8% Black/African American, 4.4% Asian, 3.8% Hispanic, 0.2% American Indian, 0.2% Pacific Islander, and 11.3% Biracial. Further demographic statistics with gender differences are reported in Table 1.

Table 1

Descriptive Statistics and Gender Differences among Demographic Variables

Variable	Men *n* = 164 *n* = (%)	Women *n* = 314 *n* = (%)	Total *n* = 480 *n* = (%)
Race			
White/Caucasian	70 (42.7%)	123 (39.2%)	194 (40.4%)
Black/African American	55 (33.5%)	136 (43.3%)	191 (39.8%)
Asian	10 (6.1%)	11 (3.5%)	21 (4.4%)
Hispanic/Latino	9 (5.5%)	9 (2.9%)	18 (3.8%)
American Indian	0 (0.0%)	1 (0.3%)	1 (0.2%)
Pacific Islander	1 (0.6%)	0 (0.0%)	1 (0.2%)
Biracial	19 (11.6%)	34 (10.8%)	54 (11.3%)
Class			
Freshman	80 (48.8%)	79 (25.2%)	160 (33.3%)
Sophomore	31 (18.9%)	62 (19.7%)	93 (19.4%)
Junior	20 (12.2%)	69 (22.0%)	90 (18.8%)
Senior	33 (20.1%)	101 (32.2%)	134 (27.9%)
N/A	0 (0.0%	3 (1.0%)	3 (0.6%)

Procedure

Data collection was administered online through the SONA systems. The online survey was accessible on any computer with internet access. The survey consisted entirely of self-report measures, and participants received 0.5 SONA credits for participating. The survey took approximately 20-30 minutes to complete. Participants were given informed consent (Appendix A). Following the survey, participants were debriefed and provided contact information for available community resources (Appendices I & J). The study was reviewed and approved by the College of Science Human Subjects Review Committee and followed APA Standards (APA, 2010).

Measures

Demographics. Participants reported their general background information including age, gender, ethnicity, and class standing (Appendix B).

Depressive symptoms. The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R; Eaton, Muntaner, Smith, Tien, & Ybarra, 2004; See Appendix C) is a brief self-report measure of depression. The CESD-R is a 20-item questionnaire in which individuals indicated on a 5-point Likert scale from 0 (not at all or less than 1 day) to 4 (nearly every day for 2 weeks) how frequently each feeling or behavior (e.g., "I could not shake off the blues," "my sleep was restless") occurred over the past week. Van Dam and Earleywine (2011) found items to be highly inter-correlated (α = .92). The computerized test has been shown to have high test-retest reliability at one week (r = .85; Kurt, Bogner, Straton, Tien, & Gallo, 2004). CESD-R also has strong convergent validity with the Positive and Negative Affect Scale – Negative Affect (r = .58; Van Dam & Earleywine, 2011). Coefficient alpha for the present study was .95.

Alcohol use. Alcohol use (e.g., quantity) was assessed using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985; see Appendix D). Participants were asked to report the number of standard drinks they consume on a typical day of the week averaged over the past three months. From this measure, quantity (total number of standard drinks in a typical week) was calculated as an index of typical alcohol use. Collins, Parks, and Marlatt (1985) found the DDQ to have high internal consistency ($\alpha = .88$) as well as adequate test-retest reliability ($r = .72$). Marlatt and colleagues (1998) also found the self-report drinking quantity measure to have adequate convergent validity with collateral reports of participants' alcohol use over a one-year study ($r = .72$). The self-report measure has been shown to accurately predict alcohol consumption among college students (Larimer et al., 2001).

Alcohol problems. The 48-item Young Adult Alcohol Consequences Questionnaire (YAACQ, Read, Kahler, Strong, & Colder, 2006; see Appendix E) was used to measure negative consequences of drinking (e.g., "I have passed out from drinking"). Participants responded either *yes* or *no*. A total score was calculated by summing all items. Read and colleagues (2006) found the YAACQ to have strong internal consistency with alpha coefficients ranging from .79 to .86 and high test-retest reliability ($r = .86$). The present sample demonstrated an even higher alpha coefficient ($\alpha = .95$). It has also been shown to have strong predictive validity for actual alcohol-related consequences (Read, Merrill, Kahler, & Strong, 2007). The YAACQ has high convergent validity ($r = .79$) with the Rutgers Alcohol Problems Inventory (RAPI; White & Labouvie, 1989).

Need for affect. Need for affect was measured using the Need for Affect Questionnaire (NAQ; Maio & Esses, 2001; see Appendix F). The scale has 26 items that load onto two subscales, Approach and Avoidance. Higher scores indicate greater desire to approach

emotional situations. Approach items ask participants to rate their general desire to approach affective stimuli (e.g., "I think it is important to explore my feelings"), while Avoidance items measures the desire to avoid affective stimuli (e.g., "I find strong emotions overwhelming and therefore try to avoid them") along a 7-point Likert scale from -3 (*strongly disagree*) to 3 (*strongly agree*). The net NAQ score was calculated by subtracting the avoidance items from the approach items, representing the degree to which individuals approach rather than avoid emotional stimuli. All 26 items have been shown to have high internal consistency ($\alpha = .87$), as did each subscale (Approach, $\alpha = .83$; Avoidance, $\alpha = .84$; Maio & Esses, 2001). The subscales are negatively correlated ($r = -.39$), however the moderate effect size suggests that the subscales are not measuring the same construct inversely, rather they each add unique contributions to the overall NAQ score. Overall NAQ score, which was used in the present model, includes all items in the measure. It is NAQ Approach Total minus NAQ Avoidance Total (Maio & Esses, 2001), and measures the comprehensive definition of need for affect: an individual's desire to approach affective stimuli minus the tendency to avoid affective stimuli. Although there are no comparable scales which measure need for affect, the NAQ has adequate construct validity with related concepts such as positive affectivity ($r = .36$) and extroversion ($r = .36$) (Maio & Esses, 2001). Maio and Esses (2001) also found the NAQ to have adequate predictive validity as related to number of emotions ($r = .42$) and number of behaviors ($r = .39$) participants reported after viewing an emotional video. Coefficient alpha for the present study was .91.

Distress tolerance. Distress tolerance was measured using the Distress Tolerance Scale (DTS; Simons & Gaher, 2005; see Appendix G). The measure consists of 14 items measured along a 5-point Likert scale from 1 (*strongly agree*) to 5 (*strongly disagree*). The overall DTS score was calculated by summing the items, and higher scores corresponded with greater ability

to withstand psychological distress. Simons and Gaher (2005) found the DTS to have good internal consistency ($\alpha = .89$), with alpha coefficients ranging from .70 to .82 for the subscales. The DTS also has strong convergent validity in relation to negative affectivity ($r = -.59$), as well as strong convergent validity with negative mood regulation ($r = .54$) and adequate convergent validity with positive affectivity ($r = .26$). Coefficient alpha for the present study was .93.

   Emotion regulation. Emotion regulation was measured using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004; see Appendix H). The DERS is a 36-item scale in which participants respond to statements along a 5-point Likert scale from 1 (*almost never*) to 5 (*almost always*). The overall DERS score was derived by summing the individual items. The overall score was calculated such that higher scores indicated greater abilities in emotion regulation. Gratz and Roemer (2004) also found the DERS to be very stable, with a high test-retest reliability over a period of four to eight weeks ($r = .88$). The DERS also has strong convergent validity ($r = -.69$) with the Negative Mood Regulation Scale (NMR, Catanzaro & Mearns, 1990) despite negative correlation, as the NMR intends to measure regulation abilities as opposed to deficiencies. The DERS was also found to be a significant predictor for self-harming behaviors in men ($r = .26$) and women ($r = .20$). Coefficient alpha for the present study was .94.

CHAPTER III

RESULTS

Missing data and outliers. Prior to conducting analyses, missing data and outliers were addressed. Of the final sample consisting of 480 participants, 16 entries (3.3%) had missing data on one variable, with full data on all remaining variables. Path analysis, which utilizes maximum likelihood estimation, accounted for and addressed the remaining missingness in the final sample (Kline, 2016). Extreme outliers beyond three interquartile ranges were identified using box plots and Winsorized to equal the next closest data point (Barnett & Lewis, 1994). For the CESD-R, four positive outliers (values: 80, 78, 74, 74) were Winsorized to a value of 64, where they fell within three interquartile ranges of the median. For the NAQ, one negative outlier (value: -78) was Winsorized to a value of -66, where it fell within three interquartile ranges of the median. For the DDQ, nine positive outliers (values: 340, 87, 83, 73, 51, 49, 47, 46, 44) were Winsorized to values of 38, but remained outliers beyond three interquartile ranges. The data were again Winsorized to a value of 37, where they fell within three interquartile ranges of the median. For the YAACQ, five positive outliers (values: 47, 45, 44, 44, 43) were Winsorized to a value of 42, but remained outliers beyond three interquartile ranges. The data were again Winsorized to a value of 41, where they fell within three interquartile ranges of the median. No outliers beyond three interquartile ranges were present for the DTS or DERS variables.

Statistical assumptions. Assumptions for linear regression were addressed. Scatterplots of the unstandardized residuals were utilized to test the first regression assumption. Results indicated that the IV (CESD-R) and DVs (DDQ and YAACQ) were positively, linearly correlated. The second assumption, which holds that all relevant variables are included in the

model, was addressed by considering prior research and theory. The third assumption, that all measures are error free, is addressed by inclusion of measures which have been shown to have high validity, and which showed strong internal consistency within this sample (see Table 2). The fourth and fifth assumptions state that residuals are constant and independent. These assumptions were assessed using scatterplots of residuals, which found that variance within a variable did not depend on the value of that variable, nor were any clusters found to suggest that variance across variables was related. To test the sixth assumption, histograms and Q-Q plots were used to assess normality, skewness, and kurtosis. Three variables (depression, alcohol quantity, alcohol consequences) were found to be leptokurtic and have a positive skew. To correct for kurtosis and skew in the predictor variable (i.e., depression) and outcome variables (i.e., alcohol quantity and alcohol consequences), robust maximum likelihood estimations were utilized for all analyses (Kline, 2016).

Table 2

Internal Consistency of Study Variables

Variable	Cronbach's Alpha
CESD-R	.95
NAQ	.91
DTS	.93
DERS	.94
YAACQ	.95

Note. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; YAACQ = Young Adult Alcohol Consequences Questionnaire.

Descriptive statistics. Overall, the sample reported consuming an average of 6.95 ($SD =$ 8.03) standard drinks in a typical week, with an average of 7.82 (SD = 9.09) alcohol related-problems in the past 30 days. Depressive symptoms were mild (Van Dam & Earleywine, 2011; $M = 13.90$, $SD = 14.04$), though with a broad range of reported symptoms (0-64). Scores under 16 indicate no clinical significance for depression (Eaton et al., 2004). Alcohol quantity and related problems were moderately correlated, $r = .50$, $p < .01$. Depressive symptoms were found to be positively correlated with alcohol consequences ($r = .18$, $p < .01$) and negatively associated with the three mediators: need for affect ($r = - .27$, $p < .01$), distress tolerance ($r = -.37$, $p < .01$), and emotion regulation ($r = -.57$, $p < .01$). However, depressive symptoms and alcohol quantity were unrelated. Intercorrelations between all study variables are reported in Table 3. Further descriptive statistics of study variables can be found in Table 4.

Table 3

Intercorrelations among Study Variables

Variable	1	2	3	4	5	6
1. CESD-R	-					
2. NAQ	-.27**	-				
3. DTS	-.37**	.22**	-			
4. DERS	-.57**	.42**	.59**	-		
5. DDQ	.02	-.08	-.05	-.09*	-	
6. YAACQ	.18**	-.14**	-.17**	-.25**	.50**	-

Note. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

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

Table 4

Descriptive Statistics and Gender Differences among Study Variables

Variable	Men M (SD)	Women M (SD)	Total M (SD)
CESD-R	11.13 (12.77)	15.35 (14.51)	13.89 (14.04)
NAQ	7.05 (17.76)	12.57 (20.60)	10.68 (19.80)
DTS	49.03 (14.23)	47.29 (12.66)	47.82 (13.25)
DERS	81.26 (21.24)	82.93 (24.75)	82.37 (23.56)
DDQ	8.15 (9.89)	6.35 (6.87)	6.95 (8.03)
YAACQ	7.89 (9.35)	7.68 (8.80)	7.82 (9.09)

Note. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

Statistical analysis testing Aim 1. Study Aim 1 was to test a conceptual model whereby the indirect relationship between depressive symptoms and drinking outcomes (i.e., alcohol use and alcohol problems) is mediated by need for affect, distress tolerance, and emotion regulation (see Figure 2 for model; Tables 5 and 6 for indirect effects).
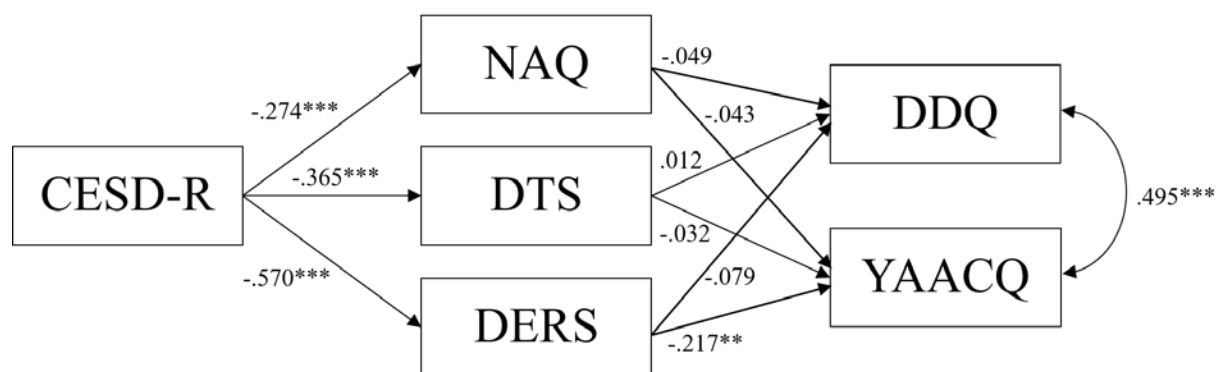
Figure 2. Results of the path analyses for Aim 1. Standardized effect sizes are shown, where **p<.01, *** p<.001. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

Table 5

Specific Indirect Effects from Depression to Alcohol Outcomes

	β	95% CI	SE	*p*
CESD-R → NAQ → DDQ	0.01	(-.03, .05)	0.02	0.37
CESD-R → DTS → DDQ	0.00	(-.07, .06)	0.02	0.86
CESD-R → DERS → DDQ	0.05	(-.05, .14)	0.04	0.20
CESD-R → NAQ → YAACQ	0.01	(-.02, .05)	0.01	0.38
CESD-R → DTS → YAACQ	0.01	(-.04, .07)	0.02	0.57
CESD-R → DERS → YAACQ	0.12	(.03, .22)	0.04	0.00

Note. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

Table 6

*Summed Indirect Effects from Depression to Alcohol Outcomes.*

	β	95% CI	SE	*p*
CESD-R → DDQ	0.05	(-0.02, .13)	0.03	0.05
CESD-R → YAACQ	0.15	(.07, .22)	0.026	0.00

Note. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; DDQ = Daily

Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences

Questionnaire.

Aim 1a. Study Aim 1a was to examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *need for affect.* It was predicted that greater depressive symptoms would be associated with lower need for affect, which in turn would be associated with an increase in alcohol use and drinking-related problems. Path analysis was conducted to investigate the relationship between depressive symptoms and drinking outcomes (i.e., alcohol use and problems) as mediated by need for affect. Need for affect was not found to mediate the relationship between depressive symptoms and alcohol use, $\beta = .013$ with 95% BC CI [-.026, .053], nor between depressive symptoms and alcohol problems, $\beta = .012$, 95% BC CI [-.024, .048].

Aim 1b. Study Aim 1b was to examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *distress tolerance*. It was predicted that greater depressive symptoms would be associated with lower distress tolerance, which in turn would be associated with an increase in alcohol use and drinking-related problems. Path analysis was conducted to investigate the relationship. Distress tolerance was not found to mediate the relationship between depressive symptoms and alcohol use, $\beta = -.004$ with 95% BC CI [-.068, .059], nor between depressive symptoms and alcohol problems, $\beta = .012$, 95% BC CI [-.045, .068].

Aim 1c. Study Aim 1c was to examine the indirect relationship between depressive symptoms and alcohol outcomes (alcohol use and alcohol problems) through its association with *emotion regulation*. It was predicted that greater depressive symptoms would be associated with lower emotion regulation, which in turn would be associated with an increase in alcohol use and problems. Path analysis was conducted to investigate the relationship. Emotion regulation was not found to mediate the relationship between depressive symptoms and alcohol use, $\beta = .045$

with 95% BC CI [-.048, .138]. However, emotion regulation significantly mediated the

relationship depressive symptoms and alcohol problems, β = .124, 95% BC CI [.027, .220].

Statistical analysis testing Aim 2. Study Aim 2 was to examine potential gender

differences in the strength and fit of the mediation model through gender invariance testing. It

was hypothesized that the fit of the overall model would differ based on gender.

To test invariance, first, a configural invariance test was conducted to examine the free

model, which allowed all model parameters to vary based on gender (Byrne, 2008). Results

found the free model to be a poor fit, χ^2[10] = 163.92, p < .05, CFI = .74, RMSEA = .25, SRMR

= .10. In the next step, a constrained model was conducted to examine the model with all

parameters fixed for gender. Results also found this model to fit poorly, χ^2[20] = 192.56, p <

.05, CFI = .71, RMSEA = .19, SRMR = .11. To compare the free and constrained models, a chi-

square difference test found the two models to be significantly different, $\Delta\chi^2$ = 28.64, Δdf = 10, p

< .01. The free model fits the data significantly better, suggesting the conceptual model more

accurately fits the data when gender is allowed to vary freely. Although poor model fit signifies

that neither model completely accounts for the variance in the outcome variables (alcohol use

and consequences), significant results from the chi-square difference test illustrate that the model

differs based on gender (Bontempo & Hofer, 2007). Figure 3 depicts path coefficients for the

free model for each gender.

a

b
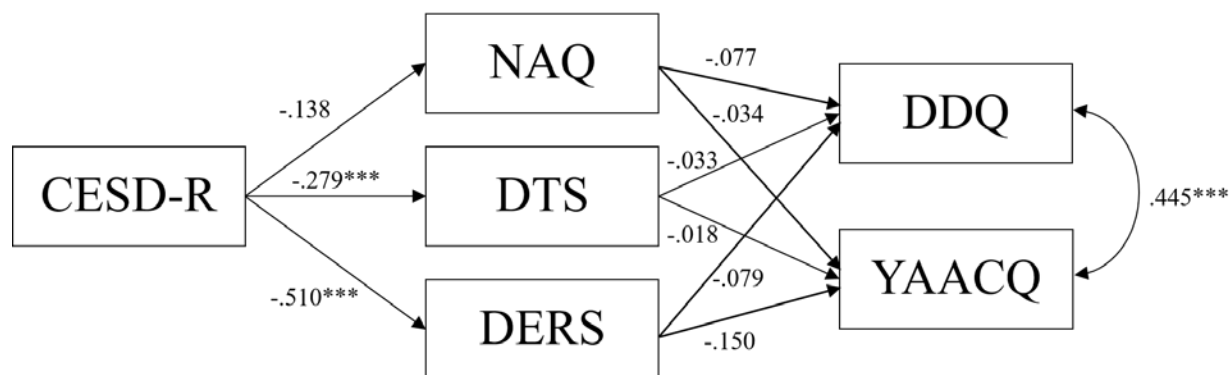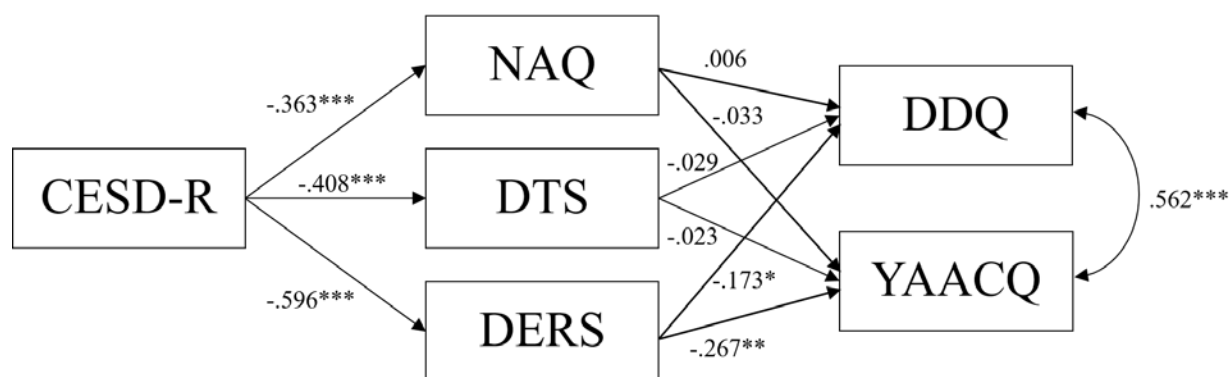
Figure 3. Results of the path analyses for Aim 2 with gender allowed to vary freely among all paths. Figure 3a depicts standardized path coefficients for women. Figure 3b depicts standardized path coefficients for men. Standardized effect sizes are shown, where *p<.05, *** *p<.001. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

Further analyses were conducted to isolate which specific paths contribute to the above difference between the free and constrained models. Each mediator was analyzed at a time, in order to examine potential gender differences among model paths for each mediator. First, a model was tested where all parameters were constrained for gender. Then, another model was tested which allowed the specific paths to and from need for affect (i.e., depressive symptoms to need for affect, need for affect to alcohol quantity, and need for affect to drinking consequences) to vary freely, and constrained all other model parameters. Model fit was poor for both the overall constrained model, $\chi^2[20] = 192.56$, $p < .05$, CFI = .71, RMSEA = .19, SRMR = .11, and the model where need for affect parameters varied freely, $\chi^2[17] = 181.39$, $p < .05$, CFI = .72, RMSEA = .20, SRMR = .10. However, the model in which need for affect parameters were allowed to vary based on gender fit the data significantly better than the overall constrained model ($\Delta\chi^2 = 17.47$, $\Delta df = 7$, $p = .01$), suggesting that the pathways involving need for affect differ based on gender. Specifically, the pathway from depressive symptoms to need for affect was found to be significant among women, but was not found to be significant among men. Figure 4 depicts path coefficients for the free model for each gender.
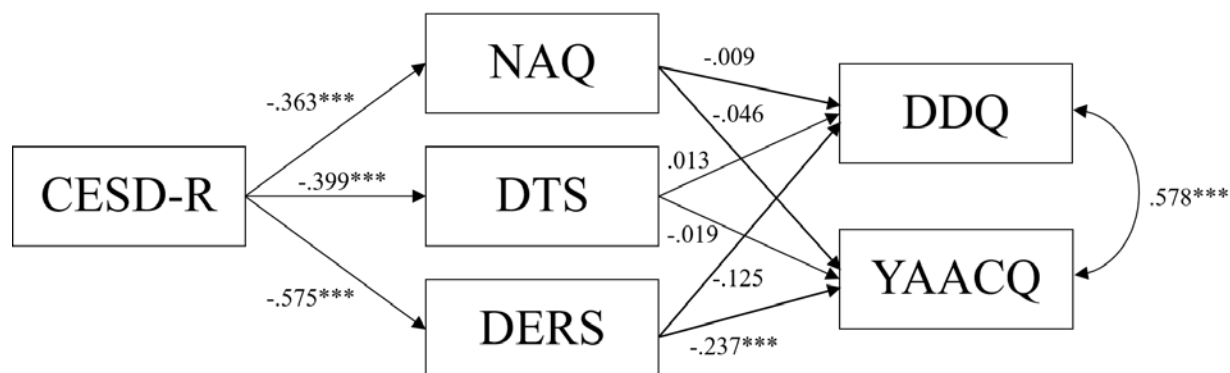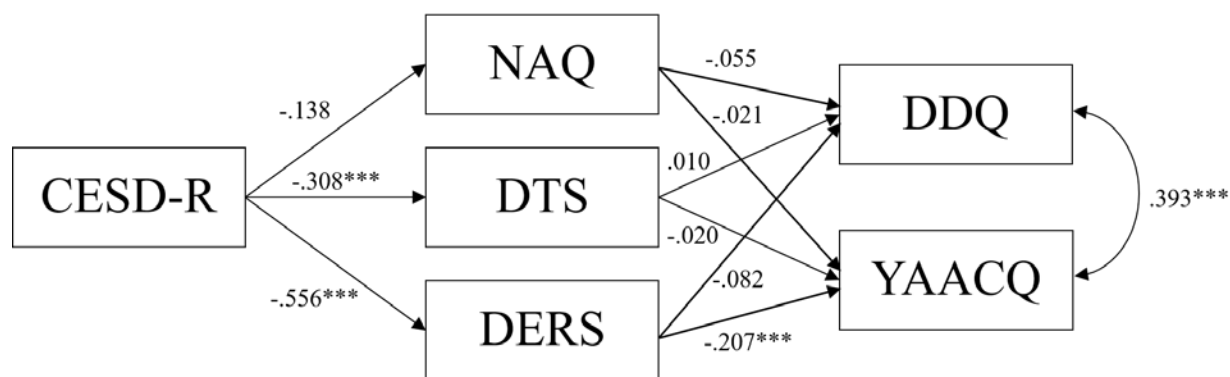
a

b

Figure 4. Results of the path analyses for Aim 2 with gender allowed to vary freely among NAQ

paths. Figure 4a depicts standardized path coefficients for women. Figure 4b depicts

standardized path coefficients for men. Standardized effect sizes are shown, where *** *p<*.001.

CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for

Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion

Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult

Alcohol Consequences Questionnaire.

The same process was utilized to examine distress tolerance. First, a model was conducted which constrained gender for all parameters. Then, another model was tested which allowed the specific paths to and from distress tolerance (i.e., depressive symptoms to distress tolerance, distress tolerance to alcohol quantity, and distress tolerance to alcohol consequences) to vary freely based on gender, and constrained all other model parameters. Model fit was poor for both the overall constrained model, $\chi^2[20] = 192.56$, $p < .05$, CFI $= .71$, RMSEA $= .19$, SRMR $= .11$, and the model where distress tolerance parameters varied freely based on gender, $\chi^2[17] = 187.75$, $p < .05$, CFI $= .71$, RMSEA $= .20$, SRMR $= .10$. The overall constrained model fit the data significantly better than the model which allowed distress tolerance parameters to vary based on gender ($\Delta\chi^2 = 23.84$, $\Delta df = 7$, $p < .01$) indicating that distress tolerance pathways did not differ based on gender. Figure 5 depicts path coefficients for the free model for each gender.

a

b

Figure 5. Results of the path analyses for Aim 2 with gender allowed to vary freely among DTS paths. Figure 5a depicts standardized path coefficients for women. Figure 5b depicts standardized path coefficients for men. Standardized effect sizes are shown, where *** $p<.001$. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult Alcohol Consequences Questionnaire.

The same process was utilized to test pathways involving emotion regulation. A model was conducted which constrained all parameters based on gender. Then, another model was tested which allowed the specific paths to and from emotion regulations (i.e., depressive symptoms to emotion regulation, emotion regulation to alcohol quantity, emotion regulation to alcohol consequences) to vary freely based on gender, and all other model parameters were constrained. Model fit was poor for both the overall constrained model, $\chi^2[20] = 192.56$, $p < .05$, CFI = .71, RMSEA = .19, SRMR = .11, and the model which allowed emotion regulation paths to vary based on gender, $\chi^2[17] = 183.93$, $p < .05$, CFI = .72, RMSEA = .20, SRMR = .10. The overall constrained model fit the data significantly better than the model which freed the emotion regulation paths based on gender ($\Delta\chi^2 = 20.01$, $\Delta df = 7$, $p < .01$) suggesting that those paths including emotion regulation do not differ based on gender. Figure 6 depicts path coefficients for the free model for each gender.
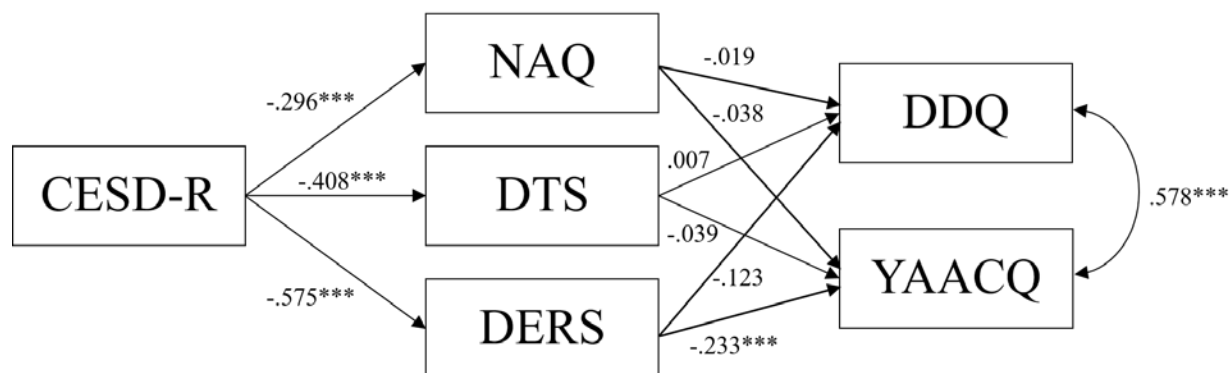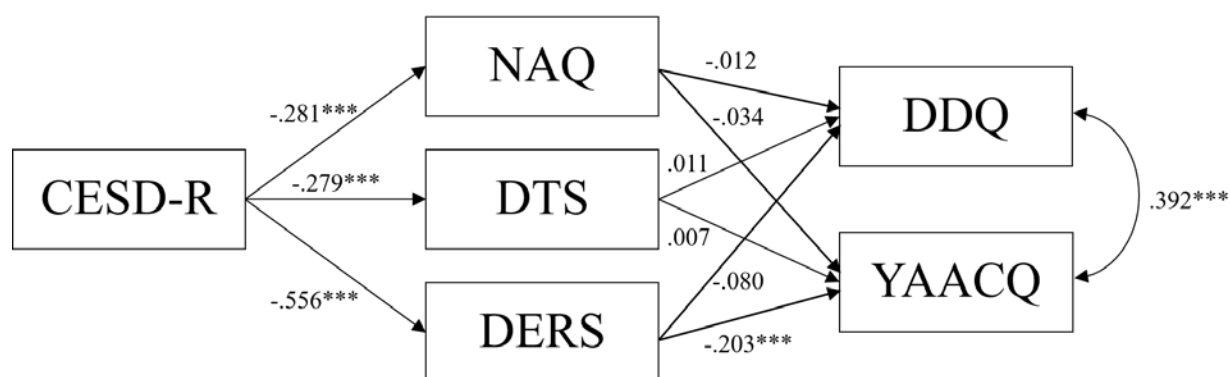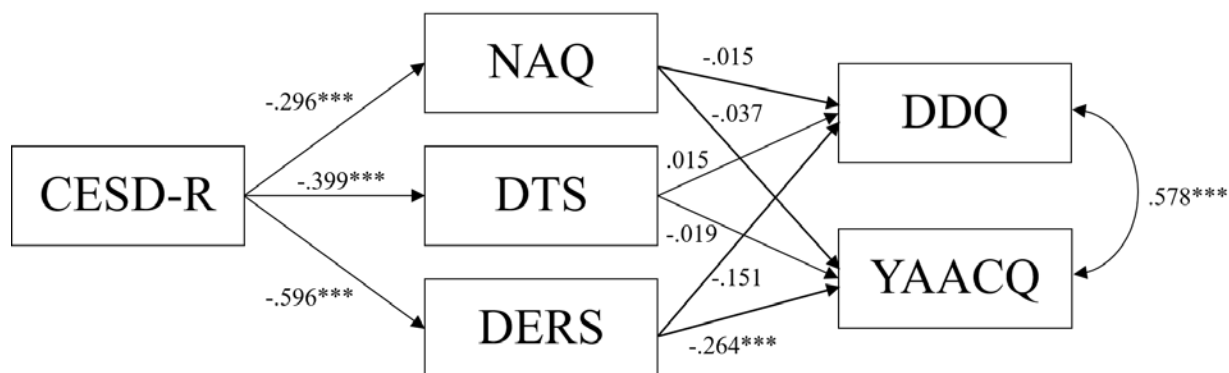
a
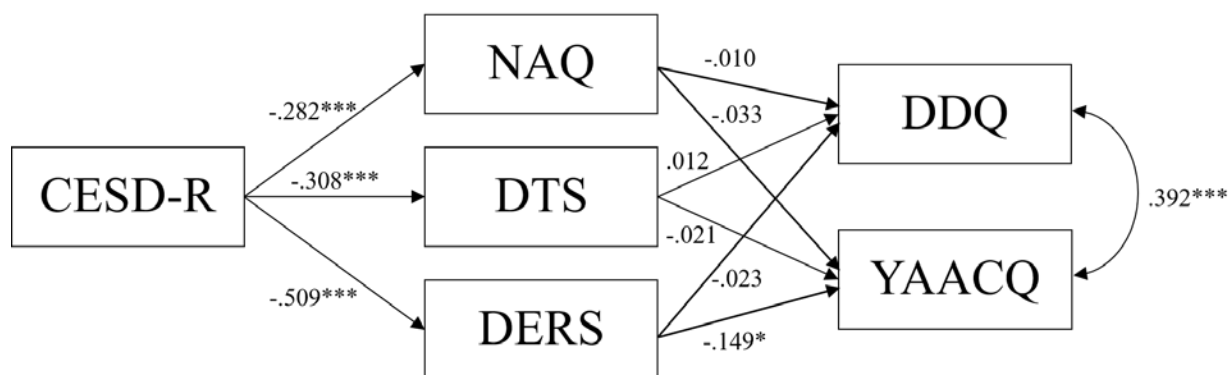
b

Figure 6. Results of the path analyses for Aim 2 with gender allowed to vary freely among

DERS paths. Figure 6a depicts standardized path coefficients for women. Figure 6b depicts

standardized path coefficients for men. Standardized effect sizes are shown, where * *p<.05, ***

*p<.001. CESD-R = Center for Epidemiologic Studies Depression Scale – Revised; NAQ = Need

for Affect Questionnaire; DTS = Distress Tolerance Scale; DERS = Difficulties in Emotion

Regulation Scale; DDQ = Daily Drinking Questionnaire, Quantity; YAACQ = Young Adult

Alcohol Consequences Questionnaire.

In addition to testing overall and localized differences based on gender, hypothesized mechanisms were examined to see which accounted for the greatest variance in each gender. In both women and men, emotion regulation accounted for the greatest amount of indirect variance in explaining associations between alcohol outcomes (i.e., use and problems) and depressive symptoms (see Figure 3).

CHAPTER IV

DISCUSSION

The current study sought to examine the association between depressive symptoms and alcohol outcomes through affective functioning (e.g., need for affect, distress tolerance, and emotion regulation). Overall, it was predicted that depressive symptoms and alcohol outcomes would be positively related, and their relationship would be mediated by need for affect, distress tolerance, and emotion regulation. Further, it was predicted that the relationships in the proposed theoretical model would differ for men and women, such that affective functioning mechanisms would serve to mediate the depressive symptoms-alcohol outcomes link differently for each gender. It was predicted that need for affect would play a stronger role relative to the other affective measures for men, whereas distress tolerance would be more prominent than the other mediators among women.

Aim 1: Depressive Symptoms, Affective Functioning, and Alcohol Outcomes

Need for affect. The first study aim assessed whether need for affect served as a mediator explaining the relationship between depressive symptoms and alcohol outcomes. Prior literature found that individuals high in depressive symptoms reported lower need for affect (Brockmeyer et al., 2012) and that low levels of need for affect were associated with higher compensatory behaviors (e.g., emotional eating; Yüncü & Hepkul, 2016). Therefore, it was predicted that the depressive symptoms-alcohol link would be mediated by need for affect, such that high depressive symptoms would be associated with low need for affect, and low need for affect would in turn be correlated with higher alcohol use and problems. In line with prior research (Maio & Esses, 2001; Brockmeyer et al., 2012), the present results indicated that depressive symptoms and need for affect were negatively correlated, however need for affect did

not serve as a significant mediator. Findings do not support need for affect as a mechanism through which the depressive symptoms-alcohol link exists, however endorsement of high depressive symptoms is associated with low need for affect.

This null finding may call into question the role of need for affect as it relates specifically to drinking. While existing literature demonstrates how need for affect relates to risky health behaviors (e.g., smoking cigarettes, Janssen et al., 2012; emotional eating, Yüncü & Hepkul, 2016), little research has looked at whether need for affect is directly associated with alcohol use and problems. Individuals who engage in any risky behaviors may be more likely to engage in other high-risk activities (Childs, 2008), contributing to the hypothesis that need for affect would be related with drinking behaviors. As expected, the current study found need for affect and alcohol-related problems to be negatively correlated. However, drinking quantity was found to be unrelated to need for affect. It could be that need for affect is an important construct as it relates to high-risk drinking, thus explaining the correlation with drinking consequences, but is less related to drinking quantity alone. Further, despite being related with both depressive symptoms and aspects of drinking behavior (e.g., problems), need for affect did not explain a significant portion the relationship between depressive symptoms and alcohol outcomes. This finding calls into question need for affect's relevance in the context of the conceptual model. Perhaps one's desire to approach emotional situations is not as uniquely relevant for the depressive symptoms-alcohol relationship as it is for other risky behaviors and negative consequences.

Distress tolerance. Distress tolerance was tested as a potential mediator in the depressive symptoms-alcohol outcomes link. Literature has shown that low levels of distress tolerance are associated with greater depressive symptoms (Williams et al., 2013) and greater

alcohol use (Buckner et al., 2007). As such, it was hypothesized that distress tolerance would mediate this relationship, such that high depressive symptoms would be related to low distress tolerance, and low distress tolerance would be associated with higher alcohol use and problems. Distress tolerance was not supported as a mediator for the relationship between depressive symptoms and alcohol outcomes. Considering bivariate correlations, distress tolerance was found to be inversely related to depressive symptoms and alcohol problems, though it was unrelated to alcohol quantity alone. These results suggest that while distress tolerance is associated with depressive symptoms some alcohol outcomes, it does not explain a portion of the relationship between depressive symptoms and alcohol outcomes.

Altogether these findings support distress tolerance as a relevant affective functioning measure associated with depressive symptoms and alcohol problems. As expected the current study found distress tolerance to correlate with depressive symptoms and alcohol-related consequences. However, distress tolerance was unrelated to alcohol quantity and there was no evidence to support distress tolerance as a mediator in the relationship between depressive symptoms and alcohol outcomes. Although some research suggests distress tolerance may be less relevant to drinking outcomes in certain demographic populations (e.g., Caucasian students compared with African American students; Dennhardt & Murphy, 2011), these findings contradict the general body of existing literature (e.g., Daughters et al, 2009; Howell et al., 2010), which shows that distress tolerance is negatively related to alcohol use. Despite its relationship to depressive symptoms and alcohol problems, distress tolerance did not explain the link between the two, but rather may just be correlated with each.

The lack of support for distress tolerance as a mediator may also be related to the absence of a clear, uniform definition for the construct. A recent review on distress tolerance highlighted

the limitations of the construct based on its broad definitions (Leyro et al., 2010), with some

researchers understanding the construct to be more physiological in nature (e.g., the ability to

withstand physical discomfort; Schmidt, Richey, & Fitzpatrick, 2006) while others understand

the term to be more psychologically based (e.g., the ability to withstand mental duress; Simons &

Gaher, 2005). This discrepancy alone compromises the ability to group all distress tolerance

research into the same category. And even within the scope of psychological distress tolerance,

some argue that it is more closely related to anxiety symptoms than depressive symptoms (e.g.,

Schmidt et al., 2006; Howell et al., 2010), further obscuring the understanding of the construct.

However, the Distress Tolerance Scale (Simons & Gaher, 2005) utilized in the current study

aims to capture distress tolerance related specifically to negative emotion. Further, scale items

have been found to accurately measure intolerance of negative emotions, as compared with

intolerance of physical discomfort, uncertainty, ambiguity, or frustration (Bebane, Flowe, &

Maltby, 2015), suggesting the scale is an appropriate tool to measure the distress tolerance in the

current study. Still, despite the substantial amount of research dedicated to distress tolerance, the

Distress Tolerance Scale alone may represent only a portion of the construct, potentially

contributing to the null findings in the current study. Future research may benefit from

measuring distress tolerance in various ways and considering how it relates to negative affect in

general, rather than depressive symptoms specifically.

Emotion regulation. Emotion regulation was tested as a potential mediator in the

relationship between depressive symptoms and alcohol outcomes. Research has demonstrated

that low emotion regulation is associated with greater depressive symptoms (Brockmeyer et al.,

2015) and greater levels of alcohol consumption (Aldao & Dixon-Gordon, 2014). Therefore, it

was predicted that the relationship between depressive symptoms and alcohol outcomes would

be mediated by emotion regulation, such that high depressive symptoms would be associated with low emotion regulation, and low emotion regulation would be associated with higher alcohol use and problems. Findings indicated that depressive symptoms were indirectly related to alcohol problems through emotion regulation, although emotion regulation did not serve to mediate the relationship between depressive symptoms and alcohol quantity.

It is interesting to note that emotion regulation emerged as a statistical mediator between depressive symptoms and alcohol-related problems but not with drinking quantity. There are several possible explanations for this finding. Although increased alcohol consumption is related to greater number and severity of alcohol related consequences (Wechsler, Lee, Gledhill-Hoyt, & Nelson, 2001), drinking quantity and problems are not perfectly correlated (Borsari, Neal, Collins, & Carey, 2001). This discrepancy may be particularly relevant for the current sample, as some research has shown that college students consume greater amounts of alcohol without necessarily experiencing greater risks (e.g., Perkins, 2002). Emotion regulation was hypothesized to mediate the relationships between depressive symptoms and each alcohol outcome variable, however it is not a surprise that of the two outcome variables, alcohol-related problems was found to be significant. Strongly endorsing measure items (e.g., "When I'm upset, I become out of control;" "When I'm upset, I lose control over my behaviors") may be more indicative of high-risk drinking behaviors than drinking quantity itself. Our findings could suggest that individuals experiencing higher depressive symptoms and low emotion regulation may not necessarily drink more than other individuals, but they make riskier decisions while drinking.

Aim 2: Gender Differences in the Relationships between Depressive Symptoms, Affective Functioning, and Alcohol Outcomes

The second general aim of the present study was to examine whether the proposed conceptual model differed for men and women. Prior research supports the notion that men and women endorse different rates of depressive symptoms (Piccinelli & Wilkinson, 2000) and alcohol outcomes (Wilsnack et al., 2000). Additionally, men tend to have higher rates of distress tolerance (Williams et al., 2013), and the relationship between distress tolerance and alcohol use is stronger among women than men (Ali et al., 2015). Further, women have been found to endorse greater need for affect (Maio & Esses, 2001). Therefore, it was predicted that the overall model fit would differ based on gender.

As predicted, the overall model improved when gender varied freely, suggesting that the proposed affective mechanisms may mediate the depressive symptom-alcohol link differently for men and women. Follow-up analyses indicated that indirect pathways through need for affect differed based on gender, contributing to the gender difference found in the overall model. Specifically, the path from depressive symptoms to need for affect was significant among only women. These results support need for affect as a mechanism which serves a different purpose among men and women in the context of the present model. However, indirect pathways through distress tolerance and emotion regulation did not differ based on gender, suggesting these mechanisms play similar roles in the depressive symptom-alcohol link among both men and women.

While these findings suggest that the relationships between some of these variables may be different among men and women, invariance testing revealed that the present model did not wholly explain the variance in alcohol outcomes, regardless of whether gender was accounted for in the analysis. Given the poor model fit, we cannot conclude that all relationships in the conceptual model differ based on gender (Byrne, 2008). Overall model invariance testing relies

on good model fit, which the present study did not attain through preliminary analyses. As such, despite results which indicate the model differs significantly when gender is allowed to vary freely, we cannot conclude from the present analyses that the overall model differs based on gender (Byrne, 2008). Rather, it can be derived that relationship between depressive symptoms and need for affect are different for each gender, a conclusion which does not depend on good overall model fit (Bontempo & Hofer, 2007). Thus, need for affect was shown to serve a different role for men and women in the depressive symptom-alcohol link, whereas no such gender differences were found among pathways including distress tolerance or emotion regulation.

The model also examined which mediators accounted for the greatest amount of variance among each gender. Against our prediction, findings showed that emotion regulation accounted for the greatest amount of variance of the three mediators in both genders. This null finding may be related to the overall strength of the model. As noted above, need for affect has a paucity of literature devoted to its direct relationship with alcohol-related measures. Though general risky behaviors are inversely related with need for affect (e.g., Janssen et al., 2012; Yüncü & Hepkul, 2016), the specific mechanism through which these relationships exist may be absent for alcohol outcomes. As such, not only was need for affect found to account for a non-significant amount of variance in Aim 1a, but it also accounted for the least amount of variance of the mediators among men.

Similarly, distress tolerance was not found to be a mediator in the general model nor did it account for the most variance among women. Despite empirical support for distress tolerance as it relates to both depressive symptoms (Williams et al., 2013) and alcohol use (Buckner et al., 2007), some research indicates that distress tolerance is most relevant with anxiety symptoms

rather than depressive symptoms (Howell et al., 2010). Additionally, prior literature suggest that distress tolerance is not associated directly with substance use, rather indirectly through motives (Zvolensky et al., 2009). The present model did not capture drinking motives, and as such may have limited the extent to which distress tolerance could account for variance in the depressive symptoms-alcohol outcomes relationship.

General Discussion

Overall, some of the present study's hypotheses were supported. Results showed that emotion regulation serves as a mediator explaining the relationship between depressive symptoms and alcohol problems among men and women. This finding is supported by prior research (Aldao & Dixon-Gordon, 2014; Brockmeyer et al., 2012) and theoretical models (Lang et al., 1999). Specifically, consistent with the tension reduction hypothesis (TRH; Cappell & Herman, 1972), participants with greater depressive symptoms reported greater alcohol-related consequences, which can be conceptualized as individuals looking to reduce tension caused by feeling depressed. When depressive symptoms increase, individuals reported a greater number of alcohol-related problems, perhaps due to lack of safer strategies to reduce higher depressive tension as a result of low emotion regulation ability. TRH explains that individuals with greater emotion regulation skills may use healthier ways to reduce the depressive stress as compared with drinking, which would in turn explain why those individuals experienced fewer drinking problems.

Given these findings, there are several practical implications which can be drawn. Knowing that emotion regulation plays an important role mediating the relationship between depressive symptoms and alcohol consequences, future treatment-related efforts could include a focus on emotion regulation skills for individuals endorsing depressive symptoms. By

increasing the ability to regulate emotions in a more adaptive manner, individuals with depression may be more likely to reduce their high-risk drinking. Findings also suggest that emotion regulation is important to both men and women in the way it mediates the depressive symptoms-alcohol consequences link. As such, increasing emotion regulation skills could serve as a protective factor for men and women.

Despite some results following prediction, several of the study's hypotheses were not supported. Need for affect and distress tolerance were not found to be significant mediators between depressive symptoms and alcohol outcomes, implying that these two variables may not be as crucial to the depressive symptoms-alcohol link as emotion regulation. There are several reasons which may clarify these results in the context of the present study. The specific population (i.e., college students who are not abstinent from alcohol) and drinking measures (i.e., use and problems, rather than a measure of risky alcohol use) may have weakened the model's ability to detect mediation. Low frequency drinking behavior and minimal depressive symptoms may not be as strongly related through these affective mechanisms. Prior literature highlights known associations of depressive symptoms with need for affect (e.g., Maio & Esses, 2001) and with distress tolerance (e.g., Williams et al., 2013), which were replicated in the present study. However, empirical research which illustrates the relationship between need for affect and high-risk behaviors (Yüncü & Hepkul, 2016), and distress tolerance as it relates to drinking (Daughters et al., 2005), has been conducted using high-risk populations rather than an inclusive, college student sample. It may be that the conceptual model could better fit a higher risk population (e.g., heavy drinkers or individuals with clinical depression), and that the proposed relationships may not be as salient in a general college student sample.

Additionally, none of the proposed mediators were shown to explain the relationship between depressive symptoms and alcohol use, and in fact depressive symptoms and alcohol use were not themselves found to be correlated. These results conflicted with prior literature, which suggests a positive relationship between depression and alcohol use among college students (Carey et al., 2017; Weitzman, 2004). Despite a lack of evidence for a bivariate correlation, mediation analyses can examine indirect relationships between unrelated variables (Hayes, 2009; MacKinnon, Fairchild, & Fritz, 2007; MacKinnon, Krull, & Lockwood, 2000). As such, the conceptual model utilized to examine the proposed hypotheses could have detected significant indirect effects from depressive symptoms to alcohol quantity, even in the absence of significant bivariate findings. However, none of the three affective mechanisms was supported as a mediator between depressive symptoms and alcohol use, which suggests that they do not fully mediate the depressive symptoms-alcohol use link.

Drinking context may also help explain why alcohol use played a nonsignificant role in the present study, even when alcohol problems were related with other study measures. Alcohol literature has demonstrated that there are distinct and measurable motivations which lead individuals to drink, ranging from enhancing mood to coping with negative affect (Cooper, 1994). Further research has demonstrated that the specific type of motivation to drink can impact the level of risk associated with alcohol use (Carey & Correia, 1997). Specifically, individuals who report drinking to cope with negative affect have been found to experience a greater number of problems as a result of their drinking (Ham, Bonin, & Hope, 2007). It could be that many from this college student sample were drinking for enhancement purposes, rather than drinking to cope with depressive symptoms, thus reducing the overall risk associated with their reported alcohol use (Read, Wood, Kahler, Maddock, & Palfai, 2003). If the present

sample reported consuming alcohol for enhancement purposes, the proposed mediators would not be expected to play a particularly relevant role for those individuals drinking while experiencing positive affect (Wray, Simons, Dvorak, & Gaher, 2012). Furthermore, literature indicates enhancement motives are not directly related to drinking problems (Cooper, Agocha, & Sheldon, 2000), suggesting that a consideration of one's drinking motivations may be important in future theoretical models.

Regarding gender findings, need for affect was found to serve a different role in the model based on gender. Specifically, depressive symptoms and need for affect were negatively related among women but unrelated among men, implying that need for affect may be more relevant in this conceptual model for women than for men. Existing literature suggests that women are more likely than men to approach emotional situations (e.g., Maio & Esses, 20001), and our current findings reflect this literature. Due to differences in the prevalence and presentation of depressive symptoms between men and women (Butler & Nolen-Hoeksema, 1994), it could be that need for affect is more strongly related with depressive symptoms among women, therefore making it a more important mechanism in the conceptual model than for men.

Finally, need for affect did not account for the most variance among men, nor did distress tolerance account for the most variance among women; rather, emotion regulation served as the strongest mediator in the model for both men and women. These findings could be a consequence of the overall poor model fit. In each of the analyses conducted in Aim 2, the conceptual model fit the data poorly, suggesting that the drinking quantity and problems outcome variables were not well accounted for by the other model variables (Byrne, 2008; Contempo & Hofer, 2007). Poor model fit can be linked to inadequately accounting for the important variables, such as including unimportant variables in the model or omitting ones of relevance

(Kline, 2016). Although the current model was built upon empirical and theoretical support, poor model fit suggests that it does not fully explain alcohol outcomes in this study sample. As such, the proposed mediators did not fully explain the positive correlation between depressive symptoms and alcohol outcomes. It could be the case that the empirical and theoretical support for the overall model would fit data in a severe drinking population, but lacks the ability to account for drinking in a lower risk population. Despite poor model fit, the significant correlations and mediations from the present study can be interpreted as such, though making broad conclusions about the overall model would require improved fit statistics (Contempo & Hofer, 2007). The proposed conceptual model may be a viable tool to continue examining the depressive symptoms-alcohol link in future research, perhaps examining a higher-risk population using more comprehensive drinking data to capture higher risk behaviors.

Limitations and Future Directions

In considering the current research, it is important to acknowledge the cross-sectional nature of the design. Given that data were collected at one time-point, results from the present study can only be viewed as correlational. Longitudinal research, which contributed to the present investigation's conceptual model (e.g., Abraham & Fava, 1999), could inform the causal relationships presupposed in this study, such that drinking outcomes could be analyzed as a result of depressive symptoms over time. Further, daily diary designs could analyze the daily relationship between negative affect and alcohol use and problems. Such a design would allow researchers to examine whether day-to-day fluctuations in depressive symptoms impact alcohol outcomes that night. Additionally, the present study utilized self-report questionnaires. While this may invite potential response bias, self-report measures of alcohol use and related consequences have been shown to correlate with transdermal alcohol assessment (Simons, Wills,

Emery, & Marks, 2015) and collateral reports on alcohol use (Borsari & Muellerleile, 2009).

Future research could benefit from utilizing additional modes of data collection to minimize

potential participant response bias. Such studies could investigate baseline levels of the three

affective mechanisms as potential mediators in the depressive symptoms-alcohol link, using

biologically collected or collateral assessments.

 Additionally, the study has several limitations that could impact the generalizability of

study findings. The present sample was predominantly female (65.4%), which lowers the ability

to generalize the current results to men. However, the balanced distribution across college class

and the overall racial and ethnic heterogeneity from the sample (see Table 1) suggest that results

are less likely to be influenced by those demographic factors. Although the population of interest

was college students who are not abstinent from alcohol (e.g., any college student who consumed

alcohol within the past month), 37.0% of the present sample reported drinking 2 or less drinks in

the past week and 21.4% reported they did not drink any alcohol in the past week. Given these

low levels of drinking, it could be that low-level drinkers may be unlikely to drink given any set

of circumstances or depressive symptoms, which in turn impacted results from the entire model.

While the study aimed to analyze these relationships among all college students, those with

heightened risk (e.g., greater alcohol use and problems) were of specific interest, due to potential

contributions to treatment efforts. As such, future research may benefit from limiting study

inclusion to individuals with riskier drinking habits. Much support demonstrating the link

between affective functioning variables and drinking outcomes focused on high-risk populations,

rather than general college populations (Berking et al., 2011; Daughters et al., 2005). Although

analyzing this study's conceptual model with high-risk college drinkers could result in stronger

model implications, testing these hypotheses in clinical populations where individuals have diagnoses of depression and/or alcohol use disorder may reveal stronger or significant effects.

Although the present study aimed to analyze affective functioning in a comprehensive manner, no model can include all relevant facets explaining the behaviors of interest. As a result, the current model omitted several mechanisms shown to be associated with alcohol use. For example, constructs such as alcohol expectancies (Cooper, Russell, Skinner, Frone, & Mudar, 1992), social norms (Neighbors, Lee, Lewis, Fossos, & Larimer, 2007), drinking motives (Read et al., 2003), and readiness to change (Caldwell, 2002) were absent from this study, despite their known impact on drinking behaviors. Combining some of these other factors with the affective measures from the present study could elucidate the ways in which these mechanisms interact with depressive symptoms and alcohol outcomes.

In particular, omitting drinking motives from the present study may have hindered the relationships of interest as college students have been shown to drink for enhancement purposes (Read et al., 2003), which generally leads to fewer alcohol-related negative consequences (Wray et al., 2012). The relationships predicted between study variables presumed that alcohol outcomes would be influenced by depressive symptoms, and thus do not translate to enhancement drinking. Depressive symptoms and affective functioning would be expected to have minimal influence on alcohol use and problems accrued while drinking for enhancement purposes. Future research could include drinking motives in the model to examine the same relationships among individuals who drink to cope, with motives as a moderating variable, or by controlling for motives among all individuals, with motives as a covariate. This would allow for a clearer examination of the variable relationships of interest. Finally, the present study utilized two variables (e.g., alcohol quantity and alcohol problems) as outcome variables representing

alcohol use. Other alcohol measures, such as the Alcohol Use Disorders Identification Test

(AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), may allow future research to

specifically examine high-risk drinking behavior as it relates to the present conceptual model.

CHAPTER V

CONCLUSIONS

The present study represented the first to explore a conceptual model examining the indirect relationship of depressive symptoms and alcohol outcomes (e.g., use and problems) through three affective mechanisms (need for affect, distress tolerance, and emotion regulation). Specifically, the study aimed to test need for affect, distress tolerance, and emotion regulation as potential mediators to the depressive symptoms-alcohol link, as well as examine potential gender differences in the relationships between these variables. Overall, findings suggest that emotion regulation accounts for the greatest amount of variance, as it mediated the depressive symptoms-alcohol consequences relationship. Additionally, need for affect differed based on gender, such that it was more relevant to the overall model for women than for men. Need for affect and distress tolerance were not supported as mediators in the relationship between depressive symptoms and alcohol outcomes, and no other relationships in the model differed between women and men. Future research on the depression-alcohol link may benefit from further examining the roles of these affective mechanisms within a population where higher levels depressive symptoms and alcohol use pose greater overall risk.

REFERENCES

Abraham, H. D., & Fava, M. (1999). Order of onset of substance abuse and depression in a

sample of depressed outpatients. *Comprehensive Psychiatry, 40*, 44-50. doi:

10.1016/S0010-440X(99)90076-7.

Aldao, A., & Dixon-Gordon, K. L. (2014). Broadening the scope of research on emotion

regulation strategies and psychopathology. *Cognitive Behaviour Therapy*, *43*, 22-33. doi:

10.1080/16506073.2013.816769.

Ali, B., Seitz-Brown, C. J., & Daughters, S. B. (2015). The interacting effect of depressive

symptoms, gender, and distress tolerance on substance use problems among residential

treatment-seeking substance users. *Drug and Alcohol Dependence*, *148*, 21-26. doi:

10.1016/j.drugalcdep.2014.11.024.

Allan, N. P., Macatee, R. J., Norr, A. M., & Schmidt, N. B. (2014). Direct and interactive effects

of distress tolerance and anxiety sensitivity on generalized anxiety and depression.

Cognitive Therapy and Research, *38*, 530-540. doi: 10.1007/s10608-014-9623-y.

American Psychological Association Ethics Committee. (2010). Amendments to the 2002

Ethical principles of psychologists and code of conduct. *American Psychologist*, *65*, 493.

doi: 10.1037/a0020168.

Anestis, M. D., Selby, E. A., Fink, E. L., & Joiner, T. E. (2007). The multifaceted role of distress

tolerance in dysregulated eating behaviors. *International Journal of Eating Disorders*, *40*,

718-726. doi:10.1002/eat.20471.

Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction

motivation reformulated: An affective processing model of negative reinforcement.

Psychological Review, 111, 33-51. doi: 10.1037/0033-295X.111.1.33.

Bardeen, J. R., & Stevens, E. N. (2015). Sex differences in the indirect effects of cognitive

    processes on anxiety through emotion regulation difficulties. *Personality and Individual*

    Differences, *81*, 180-187. doi: 10.1016/j.paid.2014.07.009.

Barnett, V., & Lewis, T. (1994). *Outliers in statistical data* (Vol.3). New York: Wiley.

Barrett, L. F., Lane, R. D., Sechrest, L., & Schwartz, G. E. (2000). Sex differences in emotional

    awareness. *Personality and Social Psychology Bulletin*, *26*, 1027-1035. doi:

    10.1177/01461672002611001.

Bebane, S., Flowe, H. D., & Maltby, J. (2015). Re-refining the measurement of distress

    intolerance. *Personality and Individual Differences*, *85*, 159-164. doi:

    10.1016/j.paid.2015.05.005.

Berking, M., Margraf, M., Ebert, D., Wupperman, P., Hofmann, S. G., & Junghanns, K. (2011).

    Deficits in emotion-regulation skills predict alcohol use during and after cognitive–

    behavioral therapy for alcohol dependence. *Journal of Consulting and Clinical*

    Psychology, *79*, 307-318. doi: 10.1037/a0023421.

Bolton, J. M., Robinson, J., & Sareen, J. (2009). Self-medication of mood disorders with alcohol

    and drugs in the National Epidemiologic Survey on Alcohol and Related Conditions.

    Journal of Affective Disorders, *115*, 367-375. doi: 10.1016/j.jad.2008.10.003.

Bontempo, D. E., & Hofer, S. M. (2007). Assessing factorial invariance in cross-sectional and

    longitudinal studies. In A. D. Ong & M. van Dulmen (Eds.), *Oxford handbook of methods*

    in positive psychology (153-175). New York, NY: Oxford University Press.

Borsari, B., & Muellerleile, P. (2009). Collateral reports in the college setting: A meta-analytic

    integration. *Alcoholism: Clinical and Experimental Research*, *33*, 826-838. doi:

    10.1111/j.1530-0277.2009.00902.x.

Borsari, B., Neal, D. J., Collins, S. E., & Carey, K. B. (2001). Differential utility of three indexes of risky drinking for predicting alcohol problems in college students. *Psychology of Addictive Behaviors*, *15*, 321-324. doi: 10.1037/0893-164X.15.4.321.

Brière, F. N., Rohde, P., Seeley, J. R., Klein, D., & Lewinsohn, P. M. (2014). Comorbidity between major depression and alcohol use disorder from adolescence to adulthood. *Comprehensive Psychiatry, 55*, 526-533. doi: 10.1016/j.comppsych.2013.10.007

Brockmeyer, T., Holtforth, M. G., Pfeiffer, N., Backenstrass, M., Friederich, H. C., & Bents, H. (2012). Mood regulation expectancies and emotion avoidance in depression vulnerability. *Personality and Individual Differences*, *53*, 351-354. doi: 10.1016/j.paid.2012.03.018.

Brockmeyer, T., Kulessa, D., Hautzinger, M., Bents, H., & Backenstrass, M. (2015). Differentiating early-onset chronic depression from episodic depression in terms of cognitive-behavioral and emotional avoidance. *Journal of Affective Disorders*, *175*, 418-423. doi: 10.1016/j.jad.2015.01.045.

Buckner, J. D., Keough, M. E., & Schmidt, N. B. (2007). Problematic alcohol and cannabis use among young adults: The roles of depression and discomfort and distress tolerance. *Addictive Behaviors*, *32*, 1957-1963. doi: 10.1016/j.addbeh.2006.12.019.

Butler, L. D., & Nolen-Hoeksema, S. (1994). Gender differences in responses to depressed mood in a college sample. *Sex Roles*, *30*, 331-346. doi:10.1007/BF01420597.

Byrne, B. M. (2008). Testing for multigroup equivalence of a measuring instrument: A walk through the process. *Psicothema*, *20*, 872-882.

Cadigan, J. M., Martens, M. P., & Herman, K. C. (2015). A latent profile analysis of drinking motives among heavy drinking college students. *Addictive Behaviors*, *51*, 100-105. doi: 10.1016/j.addbeh.2015.07.029.

Caldwell, P. E. (2002). Drinking levels, related problems and readiness to change in a college sample. *Alcoholism Treatment Quarterly*, *20*, 1-15. doi: 10.1300/J020v20n02_01.

Camatta, C. D., & Nagoshi, C. T. (1995). Stress, depression, irrational beliefs, and alcohol use and problems in a college student sample. *Alcoholism: Clinical and Experimental Research*, *19*, 142-146. doi:10.1111/j.1530-0277.1995.tb01482.x.

Cappell, H., & Herman, C. P. (1972). Alcohol and tension reduction: A review. *Quarterly Journal of Studies on Alcohol, 33,* 33-64.

Carey, K. B., & Correia, C. J. (1997). Drinking motives predict alcohol-related problems in college students. *Journal of Studies on Alcohol*, *58*, 100-105. doi: 10.15288/jsa.1997.58.100.

Carey, K. B., Merrill, J. E., Walsh, J. L., Lust, S. A., Kalichman, S. C., & Carey, M. P. (2017). Predictors of short-term change after a brief alcohol intervention for mandated college drinkers. *Addictive Behaviors, 77,* 152-159. doi: 10.1016/j.addbeh.2017.09.019.

Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment*, *54*, 546-563. doi: 10.1080/00223891.1990.9674019.

Childs, K. K. (2008). *A group-based approach to examining the association among risky sexual behavior, drug use, and criminal involvement in a sample of newly arrested juvenile offenders* (Unpublished doctoral dissertation). University of South Florida, Tampa, FL.

Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, *53*, 189-200. doi: 10.1037/0022-006X.53.2.189.

Cooper, M. L. (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, M. L., Agocha, V. B., & Sheldon, M. S. (2000). A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality*, *68*, 1059-1088. doi: 10.1111/1467-6494.00126.

Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & 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.

Costello, E. J., Erkanli, A., Federman, E., & Angold, A. (1999). Development of psychiatric comorbidity with substance abuse in adolescents: Effects of timing and sex. *Journal of Clinical Child Psychology, 28*, 298-311. doi: 10.1207/S15374424jccp280302.

Daughters, S. B., Lejuez, C. W., Bornovalova, M. A., Kahler, C. W., Strong, D. R., & Brown, R. A. (2005). Distress tolerance as a predictor of early treatment dropout in a residential substance abuse treatment facility. *Journal of Abnormal Psychology*, *114*, 729-734. doi: 10.1037/0021-843X.114.4.729.

Dennhardt, A. A., & Murphy, J. G. (2011). Associations between depression, distress tolerance, delay discounting, and alcohol-related problems in European American and African American college students. *Psychology of Addictive Behaviors*, *25*, 595-604. doi: 10.1037/a0025807.

Deykin, E. Y., Levy, J. C., & Wells, V. (1987). Adolescent depression, alcohol and drug abuse. *American Journal of Public Health, 77*, 178-182. doi: 10.2105/AJPH.77.2.178.

Dragan, M. (2015). Difficulties in emotion regulation and problem drinking in young women: The mediating effect of metacognitions about alcohol use. *Addictive behaviors*, *48*, 30-35. doi: 10.1016/j.addbeh.2015.04.008.

Dvorak, R. D., Sargent, E. M., Kilwein, T. M., Stevenson, B. L., Kuvaas, N. J., & Williams, T. J. (2014). Alcohol use and alcohol-related consequences: Associations with emotion regulation difficulties. *The American Journal of Drug and Alcohol Abuse*, *40*, 125-130. doi: 10.3109/00952990.2013.877920.

Eaton, W. W., Smith, C., Ybarra, M., Muntaner, C., & Tien, A. (2004). Center for Epidemiologic Studies Depression Scale: Review and Revision (CESD and CESD-R). The use of psychological testing for treatment planning and outcomes assessment: Instruments for adults, Volume 3, 3rd ed (pp. 363-377). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Ehring, T., Fischer, S., Schnülle, J., Bösterling, A., & Tuschen-Caffier, B. (2008). Characteristics of emotion regulation in recovered depressed versus never depressed individuals. *Personality and Individual Differences*, *44*, 1574-1584. doi: 10.1016/j.paid.2008.01.013.

Epstein, S. (1998). Cognitive-experiential self-theory. In D. F. Barone, M., Hersen, & V. B. Van Hasselt, V. B. (Eds.), *Advanced personality* (pp. 211-238). US: Springer Science & Business Media.

Farber, P. D., Khavari, K. A., & Douglass, F. M. (1980). A factor analytic study of reasons for drinking: Empirical validation of positive and negative reinforcement dimensions. *Journal of Consulting and Clinical Psychology*, *48*, 780-781. doi: 10.1037/0022-006X.48.6.780.

Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2009). Tests of causal links between alcohol abuse or dependence and major depression. *Archives of General Psychiatry, 66*, 260-266. doi: 10.1001/archgenpsychiatry.2008.543.

Furr, S. R., Westefeld, J. S., McConnell, G. N., & Jenkins, J. M. (2001). Suicide and depression among college students: A decade later. *Professional Psychology: Research and Practice*, *32*, 97-100. doi: 10.1037/0735-7028.32.1.97.

Garlow, S. J., Rosenberg, J., Moore, J. D., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students: Results from the American Foundation for Suicide Prevention College Screening Project at Emory University. *Depression and Anxiety*, *25*, 482-488. doi: 10.1002/da.20321.

Geisner, I. M., Larimer, M. E., & Neighbors, C. (2004). The relationship among alcohol use, related problems, and symptoms of psychological distress: Gender as a moderator in a college sample. *Addictive Behaviors*, *29*, 843-848. doi: 10.1016/j.addbeh.2004.02.024.

Gilman, S. E., & Abraham, H. D. (2001). A longitudinal study of the order of onset of alcohol dependence and major depression. *Drug and Alcohol Dependence, 63*, 277-286. doi: 10.1016/S0376-8716(00)00216-7.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, *26*, 41-54. doi: 10.1023/B:JOBA.0000007455.08539.94.

Greeley, J., & Oei, T. (1999). Alcohol and tension reduction. *Psychological Theories of Drinking and Alcoholism, 2*, 14-53.

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*, 271-299. doi: 10.1037/1089-2680.2.3.271.

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology, 39*, 281-291. doi: 10.1017/S0048577201393198.

Ham, L. S., Bonin, M., & Hope, D. A. (2007). The role of drinking motives in social anxiety and alcohol use. *Journal of Anxiety Disorders*, *21*, 991-1003. doi: 10.1016/j.janxdis.2006.10.014.

Hanna, E. Z., & Grant, B. F. (1997). Gender differences in DSM-IV alcohol use disorders and major depression as distributed in the general population: Clinical implications. *Comprehensive Psychiatry*, *38*, 202-212. doi: 10.1016/S0010-440X(97)90028-6.

Harris, K. M., & Edlund, M. J. (2005). Self-medication of mental health problems: New evidence from a national survey. *Health Services Research*, *40*, 117-134. doi: 10.1111/j.1475-6773.2005.00345.x.

Hasin, D. S., & Grant, B. F. (2002). Major depression in 6050 former drinkers: Association with past alcohol dependence. *Archives of General Psychiatry, 59*, 794-800. doi: 10.1001/archpsyc.59.9.794.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*, 408-420. doi: 10.1080/03637750903310360.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*, 1280-1300. doi: 10.1037/0003-066X.52.12.1280.

Holahan, C. J., Moos, R. H., Holahan, C. K., Cronkite, R. C., & Randall, P. K. (2004). Unipolar depression, life context vulnerabilities, and drinking to cope. *Journal of Consulting and Clinical Psychology, 72*, 269-275. doi: 10.1037/0022-006X.72.2.269.

Holmila, M., & Raitasalo, K. (2005). Gender differences in drinking: Why do they still exist? *Addiction*, *100*, 1763-1769. doi: 10.1111/j.1360-0443.2005.01249.x.

Howell, A. N., Leyro, T. M., Hogan, J., Buckner, J. D., & Zvolensky, M. J. (2010). Anxiety sensitivity, distress tolerance, and discomfort intolerance in relation to coping and conformity motives for alcohol use and alcohol use problems among young adult drinkers. *Addictive Behaviors*, *35*, 1144-1147. doi: 10.1016/j.addbeh.2010.07.003.

Hussong, A. M., Jones, D. J., Stein, G. L., Baucom, D. H., & Boeding, S. (2011). An internalizing pathway to alcohol and substance use disorders. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors, 25*, 390–404. doi:10.1037/a0024519.

Janssen, E., van Osch, L., Lechner, L., Candel, M., & de Vries, H. (2012). Thinking versus feeling: Differentiating between cognitive and affective components of perceived cancer risk. *Psychology & Health*, *27*, 767-783. doi: 10.1080/08870446.2011.580846.

Johnston L.D., O'Malley P.M., Bachman J.G., & Schulenberg J.E. Monitoring the Future national survey results on drug use, 1975–2011. Volume II: College students and adults ages 19–50. *Ann Arbor: Institute for Social Research, the University of Michigan*; 2012.

Kalodner, C. R., Delucia, J. L., & Ursprung, A. W. (1989). An examination of the tension reduction hypothesis: The relationship between anxiety and alcohol in college students. *Addictive Behaviors, 14*, 649-654. doi: 10.1016/0306-4603(89)90007-5.

Keough, M. E., Riccardi, C. J., Timpano, K. R., Mitchell, M. A., & Schmidt, N. B. (2010). Anxiety symptomatology: The association with distress tolerance and anxiety sensitivity. *Behavior Therapy, 41*, 567-574. doi: 10.1016/j.beth.2010.04.002

Kessler, R. C., Nelson, C. B., McGonagle, K. A., Edlund, M. J., Frank, R. G., & Leaf, P. J. (1996). The epidemiology of co-occurring addictive and mental disorders: Implications for prevention and service utilization. *American Journal of Orthopsychiatry, 66*, 17-31. doi: 10.1037/h0080151.

Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, *4*, 231-244. doi: 10.3109/10673229709030550.

Kline, R. B. (2016). *Principles and practice of structural equation modeling, 4ᵗʰ ed*. New York: Guilford Press.

Kuo, P.-H., Gardner, C. O., Kendler, K. S., & Prescott, C. A. (2006). The temporal relationship of the onsets of alcohol dependence and major depression: Using a genetically informative study design. *Psychological Medicine, 36*, 1153-1162. doi: 10.1017/S0033291706007860.

Kurt, R., Bogner, H. R., Straton, J. B., Tien, A. Y., & Gallo, J. J. (2004). Computer-assisted assessment of depression and function in older primary care patients. *Computer Methods and Programs in Biomedicine, 73*, 165-171.

Lang, A. R., Patrick, C. J., & Stritzke, W. G. (1999). Alcohol and emotional response: A multidimensional-multilevel analysis. *Psychological theories of drinking and alcoholism*, *2*, 328-371.

Larsen, R. J., & Diener, E. (1987). Affect intensity as an individual difference characteristic: A review. *Journal of Research in Personality*, *21*, 1-39. doi: 10.1016/0092-6566(87)90023-7.

Larimer, M. E., Turner, A. P., Anderson, B. K., Fader, J. S., Kilmer, J. R., Palmer, R. S., & Cronce, J. M. (2001). Evaluating a brief alcohol intervention with fraternities. *Journal of Studies on Alcohol*, *62*, 370-380. doi: 10.15288/jsa.2001.62.370.

Lau-Barraco, C., Milletich, R. J., & Linden, A. N. (2014). Caffeinated alcohol consumption profiles and associations with use severity and outcome expectancies. *Addictive Behaviors*, *39*, 308-315.doi: 10.1016/j.addbeh.2013.10.017.

Lawton, R., Conner, M., & McEachan, R. (2009). Desire or reason: Predicting health behaviors from affective and cognitive attitudes. *Health Psychology*, *28*, 56-65. doi: 10.1037/a0013424.

Leyro, T. M., Zvolensky, M. J., & Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: A review of the empirical literature among adults. *Psychological Bulletin*, *136*, 576-600. doi: 10.1037/a0019712.

Linehan, M. M. (1993). *Skills training manual for treating borderline personality disorder*. New York: Guilford Press.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593. doi: 10.1146/annurev.psych.58.110405.085542.

MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, *1*, 173-181.

Maio, G. R., & Esses, V. M. (2001). The need for affect: Individual differences in the motivation to approach or avoid emotions. *Journal of Personality*, *69*, 583-614. doi: 10.1111/1467-6494.694156.

Marlatt, G. A., Baer, J. S., Kivlahan, D. R., Dimeff, L. A., Larimer, M. E., Quigley, L. A., ... & Williams, E. (1998). Screening and brief intervention for high-risk college student drinkers: Results from a 2-year follow-up assessment. *Journal of Consulting and Clinical Psychology, 66*, 604-615. doi: 10.1037/0022-006X.66.4.604.

Martens, M. P., Martin, J. L., Hatchett, E. S., Fowler, R. M., Fleming, K. M., Karakashian, M. A., & Cimini, M. D. (2008). Protective behavioral strategies and the relationship between depressive symptoms and alcohol-related negative consequences among college students. *Journal of Counseling Psychology*, *55*, 535-541. doi: 10.1037/a0013588.

McCarty, C. A., Kosterman, R., Mason, W. A., McCauley, E., Hawkins, J. D., Herrenkohl, T. I., & Lengua, L. J. (2009). Longitudinal associations among depression, obesity and alcohol use disorders in young adulthood. *General Hospital Psychiatry*, *31*, 442-450. doi: 10.1016/j.genhosppsych.2009.05.013.

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, *17*, 437-455. doi: 10.1037/a0028085.

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*, 246-268. doi: 10.1037/0033-295X.102.2.246.

Muthén, B., & Asparouhov, T. (2002). Latent variable analysis with categorical outcomes: Multiple-group and growth modeling in Mplus. *Mplus web notes*, *4*, 1-22.

Muthén, L. K., & Muthén, B. (2008). *Mplus user's guide.* Los Angeles CA: Muthén & Muthén.

Neighbors, C., Lee, C. M., Lewis, M. A., Fossos, N., & Larimer, M. E. (2007). Are social norms the best predictor of outcomes among heavy-drinking college students?. *Journal of Studies on Alcohol and Drugs*, *68*, 556-565. doi: 10.15288/jsad.2007.68.556.

Nolen-Hoeksema, S. (2012). Emotion regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology*, *8*, 161-187. doi: 10.1146/annurev-clinpsy-032511-143109.

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, *115*, 424-443. doi: 10.1037/0033-2909.115.3.424.

O'Connor, R. M., & Colder, C. R. (2005). Predicting alcohol patterns in first-year college students through motivational systems and reasons for drinking. *Psychology of Addictive Behaviors, 19*, 10-20. doi: 10.1037/0893-164X.19.1.10.

Oswalt, R., & Finkelberg, S. (1995). College depression: Causes, duration, and coping. *Psychological Reports*, *77*, 858. doi: 10.2466/pr0.1995.77.3.858.

Pardini, D., White, H. R., & Stouthamer-Loeber, M. (2007). Early adolescent psychopathology as a predictor of alcohol use disorders by young adulthood. *Drug and Alcohol Dependence, 88*, S38-S49. doi: 10.1016/j.drugalcdep.2006.12.014.

Park, C. L., & Levenson, M. R. (2002). Drinking to cope among college students: prevalence, problems and coping processes. *Journal of Studies on Alcohol*, *63*, 486-497. doi: 10.15288/jsa.2002.63.486.

Perkins, H. W. (2002). Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol, supplement*, (14), 91-100. doi: 10.15288/jsas.2002.s14.91.

Piccinelli, M., & Wilkinson, G. (2000). Gender differences in depression critical review. *The British Journal of Psychiatry*, *177*, 486-492. doi: 10.1192/bjp.177.6.486.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717-731. doi: 10.3758/BF03206553.

Presley, C. A., Meilman, P. W., & Leichliter, J. S. (2002). College factors that influence drinking. *Journal of Studies on Alcohol, Supplement*, *14*, 82-90. doi: 10.15288/jsas.2002.s14.82.

Read, J. P., Kahler, C. W., Strong, D. R., & Colder, C. R. (2006). Development and preliminary validation of the young adult alcohol consequences questionnaire. *Journal of Studies on Alcohol*, *67*, 169-177. doi: 10.15288/jsa.2006.67.169.

Read, J. P., Merrill, J. E., Kahler, C. W., & Strong, D. R. (2007). Predicting functional outcomes among college drinkers: Reliability and predictive validity of the Young Adult Alcohol Consequences Questionnaire. *Addictive Behaviors*, *32*, 2597-2610. doi: 10.1016/j.addbeh.2007.06.021.

Read, J. P., Wood, M. D., Kahler, C. W., Maddock, J. E., & Palfai, T. P. (2003). Examining the role of drinking motives in college student alcohol use and problems. *Psychology of Addictive Behaviors*, *17*, 13-23. doi: 10.1037/0893-164X.17.1.13.

Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist*, *41*, 813-819. doi: 10.1037/0003-066X.41.7.813.

Rutledge, P. C., & Sher, K. J. (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*, 457-466. doi: 10.15288/jsa.2001.62.457.

Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993).

    Development of the alcohol use disorders identification test (AUDIT): WHO

    collaborative project on early detection of persons with harmful alcohol consumption-

    II. *Addiction*, *88*, 791-804. doi: 10.1111/j.1360-0443.1993.tb02093.x.

Schmidt, N. B., Richey, J. A., & Fitzpatrick, K. K. (2006). Discomfort intolerance: Development

    of a construct and measure relevant to panic disorder. *Journal of Anxiety disorders*, *20*,

    263-280. doi: 10.1016/j.janxdis.2005.02.002.

Schuckit, M. A., Tipp, J. E., Bergman, M., Reich, W., Hesselbrock, V. M., & Smith, T. L.

    (1997). Comparison of induced and independent major depressive disorders in 2,945

    alcoholics. *American Journal of Psychiatry*, *154*, 948-957. doi: 10.1176/ajp.154.7.948.

Schuckit, M. A., Tipp, J. E., Bucholz, K. K., Nurnberger, J. I., Hesselbrock, V. M., Crowe, R. R.,

    & Kramer, J. (1997). The life-time rates of three major mood disorders and four major

    anxiety disorders in alcoholics and controls. *Addiction*, *92*, 1289-1304. doi:

    10.1111/j.1360-0443.1997.tb02848.x.

Sher, K. J., Bylund, D. B., Walitzer, K. S., Hartmann, J., & Ray-Prenger, C. (1994). Platelet

    monoamine oxidase (MAO) activity: Personality, substance use, and the stress-response-

    dampening effect of alcohol. *Experimental and Clinical Psychopharmacology*, *2*, 53-81.

    doi: 10.1037/1064-1297.2.1.53.

Simons, J. S., & Gaher, R. M. (2005). The Distress Tolerance Scale: Development and validation

    of a self-report measure. *Motivation and Emotion*, *29*, 83-102. doi: 10.1007/s11031-005-

    7955-3.

Simons, J. S., Wills, T. A., Emery, N. N., & Marks, R. M. (2015). Quantifying alcohol consumption: self-report, transdermal assessment, and prediction of dependence symptoms. *Addictive Behaviors*, *50*, 205-212. doi: 10.1016/j.addbeh.2015.06.042.

Sung, M., Erkanli, A., Angold, A., & Costello, E. J. (2004). Effects of age at first substance use and psychiatric comorbidity on the development of substance use disorders. *Drug and Alcohol Dependence, 75,* 287-299. doi: 10.1016/j.drugalcdep.2004.03.013.

Swendsen, J. D., Tennen, H., Carney, M. A., Affleck, G., Willard, A., & Hromi, A. (2000). Mood and alcohol consumption: An experience sampling test of the self-medication hypothesis. *Journal of Abnormal Psychology, 109*, 198-204. doi: 10.1037/0021-843X.109.2.198.

Trafimow, D., Sheeran, P., Lombardo, B., Finlay, K. A., Brown, J., & Armitage, C. J. (2004). Affective and cognitive control of persons and behaviours. *British Journal of Social Psychology*, *43*, 207-224. doi: 10.1348/0144666041501642.

Tull, M. T., & Gratz, K. L. (2013). Major depression and risky sexual behavior among substance dependent patients: The moderating roles of distress tolerance and gender. *Cognitive Therapy and Research*, *37*, 483-497. doi: 10.1007/s10608-012-9490-3.

Tull, M. T., Gratz, K. L., Coffey, S. F., Weiss, N. H., & McDermott, M. J. (2013). Examining the interactive effect of posttraumatic stress disorder, distress tolerance, and gender on residential substance use disorder treatment retention. *Psychology of Addictive Behaviors, 27,* 763-773. doi: 10.1037/a0029911.

Van Dam, N. T., & Earleywine, M. (2011). Validation of the Center for Epidemiologic Studies Depression Scale—Revised (CESD-R): Pragmatic depression assessment in the general population. *Psychiatry Research*, *186*, 128-132. doi: 10.1016/j.psychres.2010.08.018.

Wang, J., & Patten, S. B. (2001). A prospective study of sex-specific effects of major depression on alcohol consumption. *Canadian Journal of Psychiatry*, *46*, 422-425. doi: 10.1177/070674370104600507.

Wang, J., & Patten, S. B. (2002). Prospective study of frequent heavy alcohol use and the risk of major depression in the Canadian general population. *Depression and Anxiety, 15*, 42-45. doi: 10.1002/da.1084.

Webb, E., Ashton, C. H., Kelly, P., & Kamali, F. (1996). Alcohol and drug use in UK university students. *The Lancet*, *348*, 922-925. doi: 10.1016/S0140-6736(96)03410-1.

Wechsler, H., Lee, J. E., Gledhill-Hoyt, J., & Nelson, T. F. (2001). Alcohol use and problems at colleges banning alcohol: Results of a national survey. *Journal of Studies on Alcohol*, *62*, 133-141. doi: 10.15288/jsa.2001.62.133.

Wechsler, H., Lee, J. E., Kuo, M., & Lee, H. (2000). College binge drinking in the 1990s: A continuing problem results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*, *48*, 199-210. doi: 10.1080/07448480009599305.

Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health College Alcohol Study surveys: 1993–2001. *Journal of American College Health*, *50*, 203-217. doi: 10.1080/07448480209595713.

Weitzman, E. R. (2004). Poor mental health, depression, and associations with alcohol consumption, harm, and abuse in a national sample of young adults in college. *The Journal of Nervous and Mental Disease*, *192*, 269-277. doi: 10.1097/01.nmd.0000120885.17362.94.

White, H. R., & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol*, *50*, 30-37. doi: 10.15288/jsa.1989.50.30.

Wikler, A. (1948). Recent progress in research on the neurophysiologic basis of morphine addiction. *American Journal of Psychiatry*, *105*, 329-338. doi: 10.1176/ajp.105.5.329.

Williams, A. D., Thompson, J., & Andrews, G. (2013). The impact of psychological distress tolerance in the treatment of depression. *Behaviour Research and Therapy*, *51*, 469-475. doi: 10.1016/j.brat.2013.05.005.

Wilsnack, R. W., Vogeltanz, N. D., Wilsnack, S. C., & Harris, T. R. (2000). Gender differences in alcohol consumption and adverse drinking consequences: Cross-cultural patterns. *Addiction*, *95*, 251-265. doi: 10.1046/j.1360-0443.2000.95225112.x.

Worley, M. J., Trim, R. S., Roesch, S. C., Mrnak-Meyer, J., Tate, S. R., & Brown, S. A. (2012). Comorbid depression and substance use disorder: Longitudinal associations between symptoms in a controlled trial. *Journal of Substance Abuse Treatment*, *43*, 291-302. doi: 10.1016/j.jsat.2011.12.010.

Wolitzky-Taylor, K., Bobova, L., Zinbarg, R. E., Mineka, S., & Craske, M. G. (2012). Longitudinal investigation of the impact of anxiety and mood disorders in adolescence on subsequent substance use disorder onset and vice versa. *Addictive Behaviors, 37*, 982-985. doi: 10.1016/j.addbeh.2012.03.026.

Wray, T. B., Simons, J. S., Dvorak, R. D., & Gaher, R. M. (2012). Trait-based affective processes in alcohol-involved "risk behaviors". *Addictive Behaviors*, *37*, 1230-1239. doi: 1 0.1016/j.addbeh.2012.06.004.

Yüncü, H., & Hepkul, A. (2016). Assessing relationship between need for affects and eating behavior. *International Journal of Humanities and Social Science Intervention, 5,* 29-34.

Zvolensky, M. J., Vujanovic, A. A., Bernstein, A., & Leyro, T. (2010). Distress tolerance theory, measurement, and relations to psychopathology. *Current Directions in Psychological Science*, *19*, 406-410. doi: 10.1177/0963721410388642.

APPENDIX A

NOTIFICATION STATEMENT

Old Dominion University

Project Title: Project DASH

Introduction: The purpose of this form is to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES.

Researchers: Responsible Project Investigator: Cathy Lau-Barraco, Ph.D., Associate Professor, College of Sciences, Department of Psychology. Co-Investigator: Peter Preonas, B.A., Graduate Student, College of Sciences, Department of Psychology.

Description of research study: A purpose of the present research is to explore factors (e.g., cognitive, social, psychological) that are associated with alcohol use among college students aged 18-25. The knowledge gained from this study will help us to ultimately develop more effective strategies to address alcohol use in college students in the future. If you decide to participate, you will be asked to complete an anonymous survey. The survey will ask you about various aspects of your cognitive, mental and social functioning, as well as your use of alcohol. You will also be asked questions regarding your perceptions and beliefs regarding alcohol use. Some of the questions may be of a sensitive nature (i.e., questions about your alcohol use). You can refuse to answer any question. Neither your name nor any identifying information will appear in this survey. If you say YES to this study, then your participation will last for approximately 30 minutes. Approximately 250 students will be participating in this study.

Exclusionary criteria: To be eligible for the present study, you must (1) be between 18 and 25 years old, and (2) have consumed at least one alcoholic beverage in the past 12 months.

Costs and payments: If you decide to participate in this study, you will receive 0.5 Psychology Department research credits, which may be applied to course requirements or extra credit in certain Psychology courses. Equivalent credits may be obtained in other ways. You do not have to participate in this study, or any Psychology Department study, in order to obtain this credit.

New information: If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

Confidentiality: All information obtained about you in this study is strictly anonymous unless disclosure is required by law. The results of this study may be used in reports, presentations and publications, but the researcher will not identify you.

Withdrawal privilege: It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study – at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to

which you might otherwise be entitled. The researchers reserve the right to withdraw your participation in this study, at any time, if they observe potential problems with your continued participation.

Compensation for illness and injury: If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Cathy Lau-Barraco at (757) 683-4445 who would be glad to review the matter with you.

Voluntary consent: By continuing with this survey, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand the form, the research study, and its risks and benefits. If you have any questions later on, then the researchers should be able to answer them:

Cathy Lau-Barraco, Ph.D.
Department of Psychology, MGB 333
Phone: (757) 683-4445

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you can call the Old Dominion University Office of Research, at (757) 683-3460.

And importantly, by clicking "next" below, you are telling the researcher YES, that you agree to participate in this study.

APPENDIX B

DEMOGRAPHIC INFORMATION

1. How old are you?
   (Text Box)

2. What is your sex?
   a. Male
   b. Female

3. What is your gender?
   a. Male
   b. Female
   c. Transgender
   d. Questioning

4. What is your current relationship status?
   a. Single
   b. In a committed relationship
   c. Living with someone
   d. Engaged
   e. Married
   f. Separated/Divorced
   g. Widowed

5. What is your class standing?
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. N/A (graduated or not in college)
   6. How would you describe your race?
      a. Asian
      b. Black/African American
      c. Hispanic/Latino
      d. White/Caucasian
      e. American Indian or Alaska Native
      f. Native Hawaiian or Other Pacific Islander
      g. Biracial
      h. Other (Given you selected "other" please explain):
         (Text Box)

7. Are you currently involved in a fraternity or sorority on campus?
      a. Yes
      b. No

8. Where is your current residence?
      a. A parent's or relative's home
      b. A dormitory, residence hall, or apartment on a college campus
      c. A house, apartment, or room (not affiliated with a college/university)
      d. A fraternity or sorority house
      e. Other (please specify): _____

9. Are you employed now?
      a. Yes, part-time only
      b. Yes, full and part-time
      c. Yes, full-time only
      d. No

APPENDIX C

CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION SCALE – REVISED

Below is a list of the ways you might have felt or behaved. Please indicate how often you have felt this way in the past week or so.

0. Not at all *or* Less than 1 day
1. 1 – 2 days
2. 3 – 4 days
3. 5 – 7 days
4. Nearly every day for 2 weeks

1) My appetite was poor.
2) I could not shake off the blues.
3) I had trouble keeping my mind on what I was doing.
4) I felt depressed.
5) My sleep was restless.
6) I felt sad.
7) I could not get going.
8) Nothing made me happy.
9) I felt like a bad person.
10) I lost interest in my usual activities.
11) I slept much more than usual.
12) I felt like I was moving too slowly.
13) I felt fidgety.
14) I wished I were dead.
15) I wanted to hurt myself.
16) I was tired all the time.
17) I did not like myself.
18) I lost a lot of weight without trying to.
19) I had a lot of trouble getting to sleep.
20) I could not focus on the important things.

APPENDIX D

DAILY DRINKING QUESTIONNAIRE

ALCOHOL USE

Please think about your typical drinking over the **PAST 3 MONTHS**. On a typical day, how many drinks would you have, and over how many hours would you have them? That is, how many drinks would you typically have on each day in the 3 months? How long (in hours) would a typical drinking occasion last on that day? Use any applicable number, starting with 0, and please note that each space must be filled in.

NOTE: 1 drink = 1 Beer (12 oz.) = 1 Wine Cooler (12 oz.) = 1 Glass of Wine (5 oz.) = 1 Shot of Liquor (1-1.5 oz.) = 1 Mixed Drink (1-1.5 oz. of liquor)

Over the **PAST 3 MONTHS**, on a….

	TYPICAL MONDAY	TYPICAL TUESDAY	TYPICAL WEDNESDAY	TYPICAL THURSDAY	TYPICAL FRIDAY	TYPICAL SATURDAY	TYPICAL SUNDAY
NUMBER OF DRINKS							
NUMBER OF HOURS							

1. Over the past 3 months, on average, how many standard alcoholic drinks did you typically have in a week?

    _____ Drinks/week

2. Over the PAST 30 days, on how many days did you consume any alcohol?

    _____ days in past month

3. Over the PAST 30 days, how many times have you had *four or more* drinks (if you are a **female**) or *five or more* drinks (if you are a **male**) in a single sitting?

    _____ times in past month

4. At what age did you FIRST DRINK alcohol? _____

5. At what age did you FIRST get DRUNK on alcohol? _____

6. At what age did you begin regularly drinking alcohol (at least one drink per month)? If you have never been a regular drinker, please place an X in the blank.

APPENDIX E

YOUNG ADULT CONSEQUENCE QUESTIONNAIRE

Below is a list of things that sometimes happen to people either during or after they have been drinking alcohol. Next to each item below, respond with either NO or YES to indicate whether that item describes something that has happened to you IN THE PAST 30 DAYS.

1. While drinking, I have said or done embarrassing things.
2. The quality of my work or school work has suffered because of my drinking.
3. I have felt badly about myself because of my drinking.
4. I have driven a car when I knew I had too much to drink to drive safely.
5. I have had a hangover (headache, sick stomach) the morning after I had been drinking.
6. I have passed out from drinking.
7. I have taken foolish risks when I have been drinking.
8. I have felt very sick to my stomach or thrown up after drinking.
9. I have gotten into trouble at work or school because of drinking.
10. I often drank more than I originally had planned.
11. My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.
12. I have been unhappy because of my drinking.
13. I have gotten into physical fights because of drinking.
14. I have spent too much time drinking.
15. I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.
16. I have felt I needed a drink after I'd gotten up (that is, before breakfast).
17. I have become very rude, obnoxious or insulting after drinking.
18. I have felt guilty about my drinking.
19. I have damaged property or done something disruptive such as setting off a false fire alarm, or other things like that after I had been drinking.
20. Because of my drinking, I have not eaten properly.
21. I have been less physically active because of drinking.
22. I have had "the shakes" after stopping or cutting down on drinking (eg., hands shake so that coffee cup rattles in the saucer or have trouble lighting a cigarette).
23. My boyfriend/girlfriend/spouse, or parents have complained to me about my drinking.
24. I have woken up in an unexpected place after heavy drinking.
25. I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.
26. As a result of drinking, I neglected to protect myself or my partner from a sexually transmitted disease (STD) or an unwanted pregnancy.
27. I have neglected my obligations to family, work, or school because of drinking.
28. I often have ended up drinking on nights when I had planned not to drink.
29. When drinking, I have done impulsive things that I regretted later.
30. I have often found it difficult to limit how much I drink.
31. My drinking has gotten me into sexual situations I later regretted.
32. I've not been able to remember large stretches of time while drinking heavily.

33. While drinking, I have said harsh or cruel things to someone.
34. Because of my drinking I have not slept properly.
35. My physical appearance has been harmed by my drinking.
36. I have said things while drinking that I later regretted.
37. I have awakened the day after drinking and found that I could not remember a part of the evening.
38. I have been overweight because of drinking.
39. I haven't been as sharp mentally because of my drinking.
40. I have received a lower grade on an exam or paper that I ordinarily could have because of my drinking.
41. I have tried to quit drinking because I thought I was drinking too much.
42. I have felt anxious, agitated, or restless after stopping or cutting down on drinking.
43. I have not had as much time to pursue activities or recreation because of drinking.
44. I have injured someone else while drinking or intoxicated.
45. I often have thought about needing to cut down or stop drinking.
46. I have had less energy or felt tired because of my drinking.
47. I have had a blackout after drinking heavily (i.e., could not remember hours at a time).
48. Drinking has made me feel depressed or sad.

APPENDIX F

NEED FOR AFFECT QUESTIONNAIRE

For each item below, please circle the scale number that most accurately reflects the extent to which the item is true or false for you.

1. If I reflect on my past, I see that I tend to be afraid of feeling emotions.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

2. I have trouble telling the people close to me that I love them.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

3. I feel that I need to experience strong emotions regularly.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

4. Emotions help people get along in life.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

5. I am a very emotional person.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

6. I think that it is important to explore my feelings.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

7. I approach situations in which I expect to experience strong emotions.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

8. I find strong emotions overwhelming and therefore try to avoid them.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

9. I would prefer not to experience either the lows or highs of emotion.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

10. I do not know how to handle my emotions, so I avoid them.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

11. Emotions are dangerous - they tend to get me into situations that I would rather avoid.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

12. Acting on one's emotions is always a mistake.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

13. We should indulge our emotions.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

14. Displays of emotions are embarrassing.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

15. Strong emotions are generally beneficial.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

16. People can function most effectively when they are not experiencing strong emotions.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

17. The experience of emotions promotes human survival.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

18. It is important for me to be in touch with my feelings.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

19. It is important for me to know how others are feeling.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

20. I like to dwell on my emotions.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

21. I wish I could feel less emotion.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

22. Avoiding emotional events helps me sleep better at night.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

23. I am sometimes afraid of how I might act if I become too emotional.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

24. I feel like I need a good cry every now and then.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

25. I would love to be like "Mr. Spock," who is totally logical and experiences little emotion.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

26. I like decorating my bedroom with a lot of pictures and posters of things emotionally significant to me.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
-3	-2	-1	0	1	2	3

APPENDIX G

DISTRESS TOLERANCE SCALE

DIRECTIONS: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1. Strongly agree
2. Mildly agree
3. Agree and disagree equally
4. Mildly disagree
5. Strongly disagree

1. Feeling distressed or upset is unbearable to me.
2. When I feel distressed or upset, all I can think about is how bad I feel.
3. I can't handle feeling distressed or upset.
4. My feelings of distress are so intense that they completely take over.
5. There's nothing worse than feeling distressed or upset.
6. I can tolerate being distressed or upset as well as most people. (r)
7. My feelings of distress or being upset are not acceptable.
8. I'll do anything to avoid feeling distressed or upset.
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
10. Being distressed or upset is always a major ordeal for me.
11. I am ashamed of myself when I feel distressed or upset.
12. My feelings of distress or being upset scare me.
13. I'll do anything to stop feeling distressed or upset.
14. When I feel distressed or upset, I must do something about it immediately.
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

Scoring: Item 6 is reverse scored.

APPENDIX H

DIFFICULTIES IN EMOTION REGULATION SCALE

Select the item from the menu that best describes your response to each of the statements below.

1. Almost Never
2. Sometimes
3. About Half the Time
4. Most of the Time
5. Almost Always

1. I am clear about my feelings. (r)
2. I pay attention to how I feel. (r)
3. I experience my emotions as overwhelming and out of control.
4. I have no idea how I am feeling.
5. I have difficulty making sense out of my feelings.
6. I am attentive to my feelings. (r)
7. I know exactly how I am feeling. (r)
8. I care about what I am feeling. (r)
9. I am confused about how I feel.
10. When I'm upset, I acknowledge my emotions. (r)
11. When I'm upset, I become angry with myself for feeling that way.
12. When I'm upset, I become embarrassed for feeling that way.
13. When I'm upset, I have difficulty getting work done.
14. When I'm upset, I become out of control.
15. When I'm upset, I believe that I will remain that way for a long time.
16. When I'm upset, I believe that I'll end up feeling very depressed.
17. When I'm upset, I believe that my feelings are valid and important. (r)
18. When I'm upset, I have difficulty focusing on other things.
19. When I'm upset, I feel out of control.
20. When I'm upset, I can still get things done. (r)
21. When I'm upset, I feel ashamed with myself for feeling that way.
22. When I'm upset, I know that I can find a way to eventually feel better. (r)
23. When I'm upset, I feel like I am weak.
24. When I'm upset, I feel like I can remain in control of my behaviors. (r)
25. When I'm upset, I feel guilty for feeling that way.
26. When I'm upset, I have difficulty concentrating.
27. When I'm upset, I have difficulty controlling my behaviors.
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.
29. When I'm upset, I become irritated with myself for feeling that way.
30. When I'm upset, I start to feel very bad about myself.
31. When I'm upset, I believe that wallowing in it is all I can do.
32. When I'm upset, I lose control over my behaviors.
33. When I'm upset, I have difficulty thinking about anything else.

34. When I'm upset, I take time to figure out what I'm really feeling. (r)
35. When I'm upset, it takes me a long time to feel better.
36. When I'm upset, my emotions feel overwhelming.

Scoring: Items marked with (r) are reverse scored.

APPENDIX I

DEBRIEFING PAGE

This study is concerned with alcohol use, depressive symptoms, and affective or emotional functioning among college students. In this study, you were asked to report current typical alcohol use and depressive symptoms, as well as respond to items regarding your emotional processes.

Hypotheses and main questions:
We expect to find that how individuals process emotions will contribute to the way in which depressive mood and alcohol use are related. When we examine these items, we expect individuals who show more interest in their emotions will drink less alcohol when experiencing high emotional distress.

Why is this important to study?
Findings from this study will advance our understanding of college student alcohol use and related behaviors. Specifically, if we understand how depressive symptoms could lead to alcohol use, we can help those understand why they may engage in risky drinking.

What if I want to know more?
If you are interested in learning more about different types of emotional functioning and risks related to alcohol use, you may want to consult:
    (1) Lang, A. R., Patrick, C. J., & Stritzke, W. G. (1999). Alcohol and emotional response: A multidimensional-multilevel analysis. *Psychological theories of drinking and alcoholism*, *2*, 328-371.
    (2) Ali, B., Seitz-Brown, C. J., & Daughters, S. B. (2015). The interacting effect of depressive symptoms, gender, and distress tolerance on substance use problems among residential treatment-seeking substance users. *Drug and Alcohol Dependence*, *148*, 21-26. doi: 10.1016/j.drugalcdep.2014.11.024

No personally identifiable information was collected in today's study. We are not interested in any one individual's responses; we want to look at the general patterns that emerge when the data are aggregated together.

We also ask that you do not discuss this study with other students. In order to collect the most accurate information, and to maintain research integrity, it is important that participants are not aware of what we are interested in examining.

If your participation in this study has caused you concerns, anxiety, or otherwise distressed you, you may want to contact the ODU Counseling Center at (757) 683-4401. Further services with contact information are provided below.

If you have questions about your participation in this study or would like to contact the researcher, please email Peter Preonas, B.A., at ppreonas@odu.edu.

Thank you again for your participation.

APPENDIX J

COMMUNITY RESOURCES

Community Resources

This is a list of mental health resources in the Hampton Roads community.

Addiction Helpline
(757) 461-7030
5600 Brickell Road, Norfolk, VA 23502

Alcoholics Anonymous
(757) 490-3980
4968 Euclid Rd # F Virginia Beach, VA 23462-5833

Community Mental Health
(757) 664-7699
3755 E Virginia Beach Blvd, Norfolk, VA 23502-3238
Provides psychiatric assessment, evaluation and stabilization services for clients with both chronic and acute mental health disorders.

Crisis Line
(757) 664-7690

Domestic Violence Hotline
(800) 942-6906

Norfolk Community Services Board
(757) 664-6670
7460 Tidewater Drive Norfolk, VA
Provides substance abuse treatment services.

Response Sexual Assault Support Services
(757) 622-4300
253 West Freemason Street, Norfolk, VA 23510
Provides crisis intervention, advocacy and counseling to sexual assault victims and their families; 24-hour hotline.

YWCA Women in Crisis Program
(757) 625-5570

VITA

Peter D. Preonas

Old Dominion University
Department of Psychology
Norfolk, VA 23529

Education and Training

Ph.D. **Virginia Consortium Program in Clinical Psychology**, *Norfolk, VA*
(APA Accredited)
Clinical Psychology, 2020 (Expected)
Advisor: Cathy Lau-Barraco, Ph.D.

M.S. **Old Dominion University**, *Norfolk, VA*
Experimental Psychology, 2017 (Expected)
Advisor: Cathy Lau-Barraco, Ph.D.

B.A. **University of Michigan**, *Ann Arbor, MI*
Psychology, 2011; Political Science, 2011
Advisor: Daphna Oyserman, Ph.D.

Background

Peter D. Preonas is a third year graduate student at the Virginia Consortium Program in Clinical Psychology, which is composed of Old Dominion University, Norfolk State University, and Eastern Virginia Medical School. He is pursuing a Master's degree in Experimental Psychology and a Ph.D. in Clinical Psychology. For the past two years, he has served as lab coordinator for Dr. Cathy Lau-Barraco. His research interests include alcohol use as it relates emotional functioning, general health psychology, and substance use interventions.

Select Publications and Poster Presentations

Stamates, A. L., Linden-Carmichael, A. N., Sheehan, B. E., **Preonas, P. D.**, & Lau-Barraco, C. (2017). An examination of the most recent episode of molly use among college students. *Journal of Drug Issues.* doi: 10.1177/0022042616687283

Preonas, P. D., Stamates, A.L., Mejia, P. & Lau-Barraco, C. (2017). Readiness to change drinking and psychosocial functioning in nonstudent emerging adult at-risk drinkers. Poster presented at the 2017 meeting of Society for Prevention Research, Washington DC.

Stamates, A. L., **Preonas, P. D.**, Martin, I., & Lau-Barraco, C. (2017). Concurrent polysubstance use among college and non-college emerging adults. Poster presented at the 2017 meeting for the American Psychological Association, Washington DC.